THE LUNAR OBSERVER

A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.
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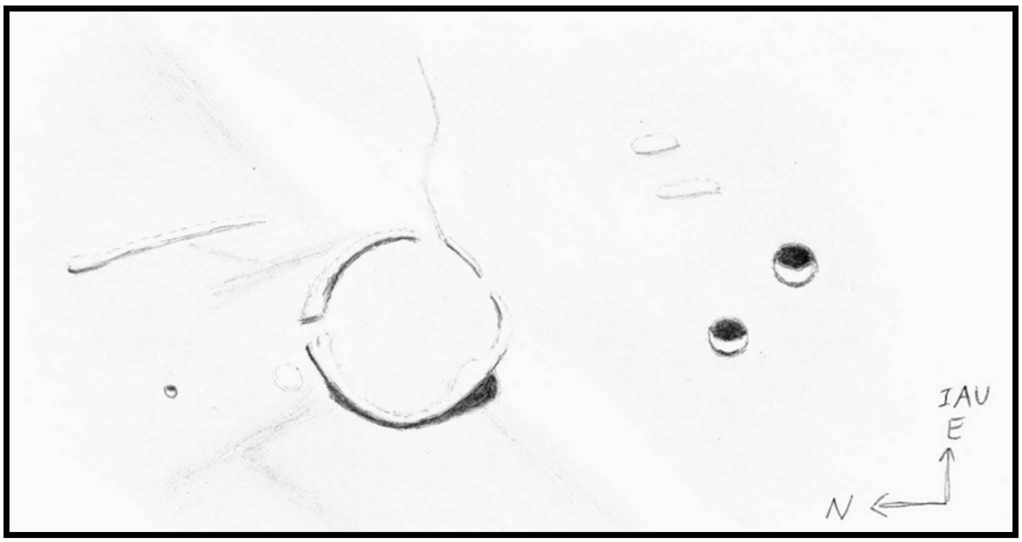
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – JULY 2010

WALLACE



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
March 24, 2010 02:35-02:45, 02:55-03:20 UT
15 cm refl, 170x, seeing 8

I sketched this crater and vicinity on the evening of March 23/24, 2010 while watching three occultations. This broken crater is in southeast Mare Imbrium, north of Eratosthenes. It has a squarish shape with breaks to the north, east and southeast. The highest point is on the southwest rim, which seemingly rears up from the mare like a large fin, judging from its shadow. There are also wide areas near the break on the north rim. The bit of rim between the east and southeast breaks is very low and narrow. The interior of Wallace appears smooth and featureless. A bright shadowless spot is just north of Wallace, and the tiny pit Wallace H is farther to the north. Three wrinkles extending to the NNW are in this area; the most easterly one has a sunward brightening and darker shadowing. A wide, diffuse wrinkle cuts across the area by the southeast rim of Wallace. This wrinkle, however, is not evident on Wallace's floor. A narrow line of shadow extends eastward from Wallace, appearing like a rille or fault. The conspicuous crater due south of Wallace is Eratosthenes B, and Eratosthenes A is to its southeast. Two short low ridges are to their east. The area between these ridges and Wallace appears very smooth.

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LUNAR CALENDAR

JULY-AUGUST 2010 (UT)

July 01	10:13	Moon at Apogee (405,035 km – 251,677 miles)
July 03	16:00	Moon 6.0 Degrees NNW of Uranus
July 03	20:00	Moon 6.5 Degrees NNW of Jupiter
July 04	14:36	Last Quarter
July 06	16:54	Extreme North Declination
July 11	19:40	New Moon (Start of Lunation 1083)
July 11	19:40	Total eclipse of the Sun
July 12	23:00	Moon 3.9 SSW of Mercury
July 13	11:22	Moon at Perigee (361,114 km - 224,386 miles)
July 14	22:00	Moon 5.5 Degrees SSW of Venus
July 16	00:00	Moon 5.6 Degrees SSW of Mars
July 16	14:00	Moon 7.4 Degrees SSW of Saturn
July 18	21:59	First Quarter
July 22	11:18	Extreme South Declination
July 26	01:36	Full Moon
July 28	02:00	Moon 4.3 Degrees NNW of Neptune
July 28	23:51	Moon at Apogee (405,954 km - 252,248 miles)
July 30	22:00	Moon 5.9 Degrees NNW of Uranus
July 31	02:00	Moon 6.6 Degrees NNW of Jupiter
Aug. 06	02:54	Extreme North Declination
Aug. 03	04:60	Last Quarter
Aug. 10	03:08	New Moon (Start of Lunation 1084)
Aug. 10	17:57	Moon at Perigee (357,857 km - 222,362 miles)
Aug. 12	00:00	Moon 2.2 SSW of Mercury
Aug. 13	02:00	Moon 7.3 Degrees SSW of Saturn
Aug. 13	08:00	Moon 4.2 Degrees SSW of Venus
Aug. 13	14:00	Moon 5.5 Degrees SSW of Mars
Aug. 16	18:14	First Quarter
Aug. 18	17:06	Extreme South Declination
Aug. 24	07:00	Moon 4.2 Degrees NNW of Neptune
Aug. 24	17:05	Full Moon
Aug. 25	05:52	Moon at Apogee (406,389 km - 252,518 miles)
Aug. 27	01:00	Moon 5.8 Degrees NNW of Uranus
Aug. 27	05:00	Moon 6.6 Degrees NNW of Jupiter

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 non-member 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 can be found on-line at: **http://www.alpo-astronomy.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.

Note: The published images now contain links to the original, full resolution images. Clicking on an image while connected to the internet, will download the original image, which in some cases is significantly higher resolution than the published version.

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 always be included:

Name and location of observer
Name of feature
Date and time (UT) of observation
Size and type of telescope used
Orientation of image: (North/South - East/West)
Seeing: 1 to 10 (1-Worst 10-Best)
Transparency: 1 to 6
Magnification (for sketches)
Medium employed (for photos and electronic images)

CALL FOR OBSERVATIONS: FOCUS ON: Mare Nectaris Basin

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 **September 2010** edition will be the Mare Nectaris Basin area. This includes scarps, craters, rilles, wrinkle ridges and albedo features in the surrounding area as well as on the mare itself Observations of all kinds (electronic or film based images, drawings, etc.) are welcomed and invited. Keep in mind that observations do not have to be recent ones, so search your files and/or add these unusual craters to your observing list and send your favorites to:

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

Deadline for inclusion in the Mare Nectaris Basin article is August 20, 2010

FUTURE FOCUS ON ARTICLES:

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

Milichius-T. Mayer Area	**TLO Issue: Nov. 2010**	**Deadline: Oct. 20, 2010**
Marius-Reiner gamma	**TLO Issue: Jan. 2011**	**Deadline: Dec. 20, 2010**

CALL FOR PAPERS
ALPO 2010

The 2010 annual conference of the Assn of Lunar & Planetary Observers will be held Thursday through Saturday, July 29 - 31, at Florida State College at Jacksonville. Participants are encouraged to submit research papers, presentations, and experience reports concerning Earth-based observational astronomy of our solar system for presentation at the event.

Topics

Suggested topics for papers and presentations include the following:

* New or ongoing observing programs and studies of solar system bodies, specifically, how those programs were designed, implemented and continue to function.
* Results of personal or ALPO group studies of solar system bodies possibly including (but not limited to) Venus cloud albedo events, dust storms and the polar caps of Mars, the various belts and Great Red Spot of Jupiter, the various belts and ring system of Saturn, variances in activity of periodic meteor showers and comets, etc.
* New or ongoing activities involving astronomical instrumentation, construction or improvement.
* Challenges faced by Earth-based observers including increased or lack of interest, deteriorating observing conditions brought about by possible global warming, etc.

Submission Format

Please observe and follow these guidelines:

* **Presentations** — The preferred format is Microsoft PowerPoint, though 35mm slides or overhead projector slides are also acceptable. The final presentation should not exceed 45 minutes in length, to be followed by no more than five (5) minutes of questions (if any) from the audience.
* **Research Papers** — Full and final research papers not being presented as described above should not exceed 5,000 words (approximately 8 pages), including figures and references. Important: The results described must not be under consideration for publication elsewhere.
* **Posters** — Posters should not exceed 1,000 words. Posters provide an opportunity to present late-breaking results and new ideas in an informal, visual and interactive format. Accepted poster submissions will receive a one-page description in the conference proceedings. The submission abstract must be no longer than one page.

Acceptance for presentation is contingent on registration for the conference. In the case of multiple authors, at least one must register.

Important Dates

* **June 15, 2010 –** Deadline for four- or five-sentence abstracts / proposals for papers, reports, workshops, and posters.
* **March 30, 2010 -** Registration opens.
* **July 1, 2010 -** Late registration fee begins (late registration via mail accepted up to July 15; then in person at conference afterwards).
* **July 29 - 31, 2010 -** ALPO Con 2010.

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FOCUS ON: DARK-HALOED CRATERS

By Wayne Bailey
Acting Coordinator: Lunar Topographical Studies

Dark-haloed craters (DHC), as the name implies, are craters surrounded by a low albedo region. Most DHCs are small, a few kilometers diameter or smaller, which may be a reason for the seeming lack of interest in observing them. Some widely recognized examples are the dark-rayed crater Dionysius (fig. 1), Copernicus H (DHC #1 in the following article by Howard Eskildsen) and several examples easily visible as dark spots in Alphonsus (fig. 2) and Atlas (fig. 3). A dark ring surrounds the familiar crater Tycho (fig. 4), but I don't know of any list of DHCs that includes it. Howard Eskildsen examines the DHCs around Copernicus in some detail in the following article. DHCs have also been seen on the planet Mercury (Lackdawalla, 2008).

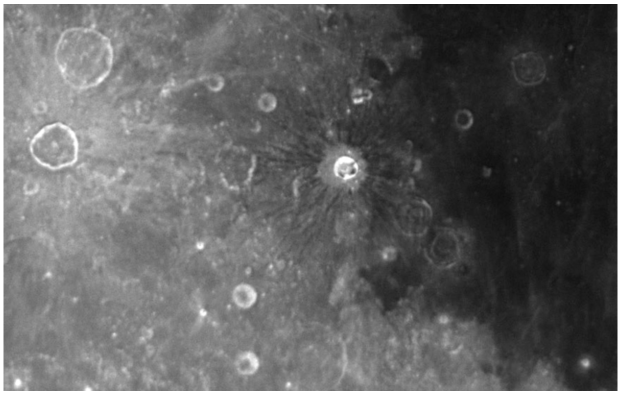


FIGURE 1. Dark rayed crater Dionysius - Wayne Bailey, Sewell, NJ, USA. December 5, 2006 04:28 UT. Seeing 5/10, Transparency 4/6, Colongitude 87.6º. C-11 SCT, f/10, Skynyx 2-1M, Schuler IR72.

Dark-haloed craters are not randomly distributed over the moon. They are found along linear features such as rilles, and around the margins of mare basins (fig. 5) where they often occur in groups. Appendices A & B of the Selected Areas Handbook (http://moon.scopesandscapes.com/sap-hdbk-5.pdf) contains a list of dark-haloed craters and groups. An extended list, along with additional information, can be found at http://fisherka.csolutionshosting.net/astronote/plan/dhccat/DarkHaloCraters.html.

The origin of the DHCs has been a subject of discussion for some time. One view holds that they are eruptive volcanic features, analogous to terrestrial cinder cones, while another interprets them as impact craters that excavated and dispersed underlying darker material. Both types of DHCs apparently exist.

FIGURE 2. Dark-haloed craters in Alphonsus – Ed Crandall – Lewisville, North Carolina, USA. March 25, 2010 00:38 UT. Colongitude 25º, Seeing AII-III. 110 mm f/6.5 APO, 3x barlow, ToUcam.

Shorty, a DHC crater near the Apollo 17 landing site, was found to be an impact crater that had penetrated and dispersed a buried pyroclastic layer of orange to black beads termed "orange soil". Other DHCs located in highlands areas near maria also appear to be impact features. On close examination, these are typical small

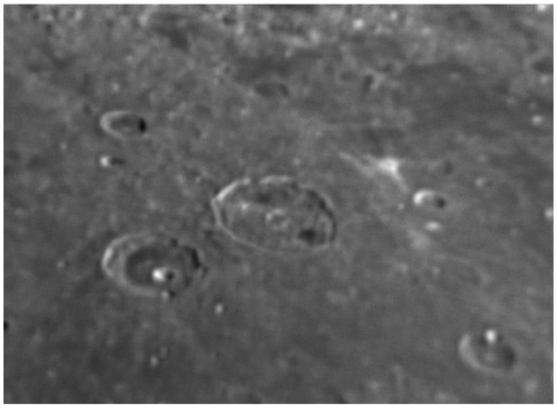


FIGURE 3. Dark-haloed craters in Atlas –Wayne Bailey, Sewell, NJ, USA. May 14, 2008 0308 UT. Seeing 3/10, Transparency 4/6, Colongitude 17º. C-11 SCT, f/10, Skynyx 2-1M, Schuler IR72 filter.

bowl craters with raised rims and concave upward outer slopes. In these cases DHCs apparently reveal the existence of buried mare lavas (Antonenko, 1999), which are termed cryptomare. The DHCs around Copernicus, discussed by Eskildsen, appear to penetrate the light colored ejecta from Copernicus to reveal the underlying dark mare basalt.

FIGURE 4. Tycho-Maurice Collins - Palmerston North, New Zealand. April 2, 2010 09:15-10:00 UT. Seeing A-IV. C8, SCT, LPI.

In other cases, DHCs appear to be related to structural features of the terrain, such as rilles or faults. These are typically tiny craters surrounded by a more or less circular dark halo. On close examination, these appear to have outer slopes that are convex upward, typical of cinder cone volcanoes. A good example is the DHCs in Alphonsus (fig. 6). The three DHCs on the north and east portion of the crater floor all occur on visible rilles. These seem very likely to be eruptive features related to the flooding of the crater floor.

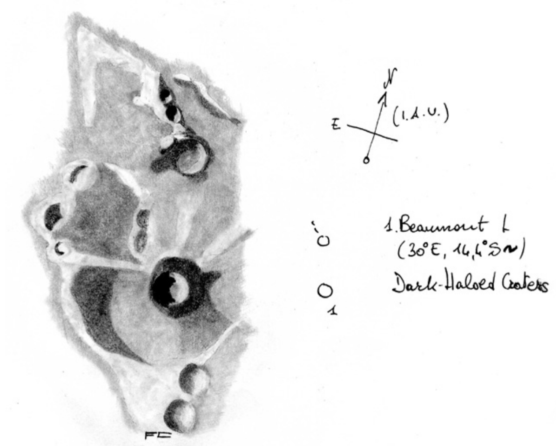
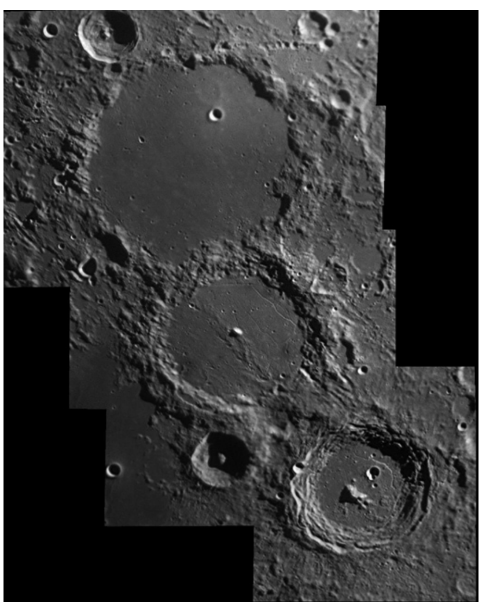


FIGURE 5. Beaumont L-Fred Corno-Settimo Torinese, Italy. March 23, 2010 21:30 UT. 5" Taka refractor, 208 & 260x, light haze.

Dionysius appears to be an example of a ray crater that excavated mainly dark underlying material. The main difference between it and other impact DHCs may be its size (17.6 km diameter), which is larger than most DHCs.



Tycho has a dark halo but bright rays. Surveyor 7, which landed near the northern edge of the dark halo, and orbiter images have shown that Tycho's dark halo results from extensive coverage of the area by dark, glassy impact melt splashed from the crater. Since Tycho is young, this dark melt hasn't been eroded and mixed with surrounding rocks yet. So Tycho isn't representative of either type of DHC. Either it shouldn't be considered a DHC (the apparent consensus), or it represents a third type.

FIGURE 6. Alphonsus – Richard Hill – Tucson, Arizona, USA. May 22, 2010 03:01 UT. Seeing 8/10. C14, 2x barlow, f/22, SCT. DMK21AU04, UV/IR block filter.

So, although most DHCs may be formed by impact, they all are related to lunar volcanism. The eruptive DHCs are direct results of volcanic activity, and the impact DHCs are the result of excavating buried volcanic formations. Even though dark-haloed craters seem to be an insignificant class of features, they have much to tell us about volcanic processes on the moon.

ADDITIONAL READING

Antonenko, Irene. 1999. PhD Thesis, Brown University, Dept. of Geological Sciences, Providence, RI. "Volumes of Cryptomafic Deposits on the Western Limb of the Moon: Implications for Lunar Volcanism". (http://clients.teksavvy.com/~iant/Thesis/)

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Halos and Rays

By Howard Eskildsen
Ocala, Florida, USA

The composite image used in figures 1 and 2 was made from two images derived from 1 minute AVI files time-centered on 2010/01/28 01:08 UT, using a Meade 6” f/8 refractor, 2X Barlow, DMK 41AU02.AS imager. Seeing was 8/10 and Transparency 5/6. The frames were stacked in Registax 6 and processed with Photoshop Elements 6.0. The Lunar Terminator Visualization Tool (LTVT) was used to calibrate the image, emplace circles and take the various measurements.

Short turquoise lines mark what appear to be dark halo craters in rays near, south, and east of Copernicus. Using the Lunar Terminator Visualization Tool (LTVT) I placed 200 km diameter circles around two areas of greatest dark halo crater concentrations and made measurements mentioned below. A total of 70 dark halo craters appear on this image (figure 1). The greatest concentrations are inside the circles in areas where the ray structures are the thinnest. Outside of the circles the dark halos are much fewer and have a greater diameter than inside, presumably since it takes a larger impact to penetrate the deeper ray layers closer to Copernicus.

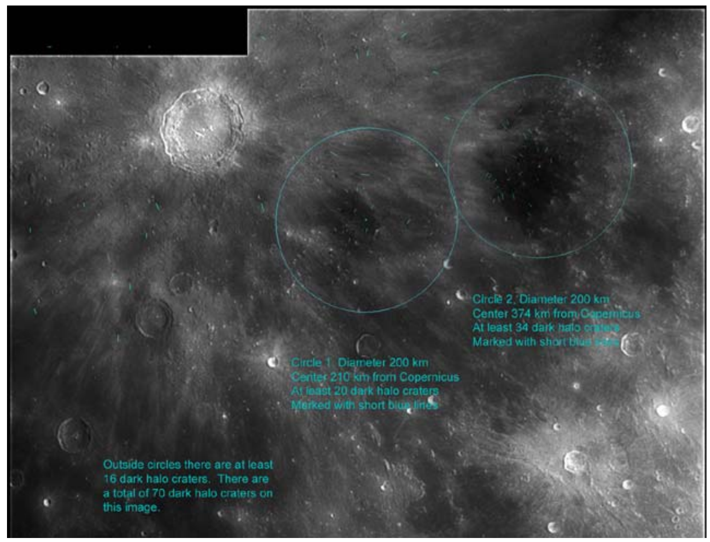
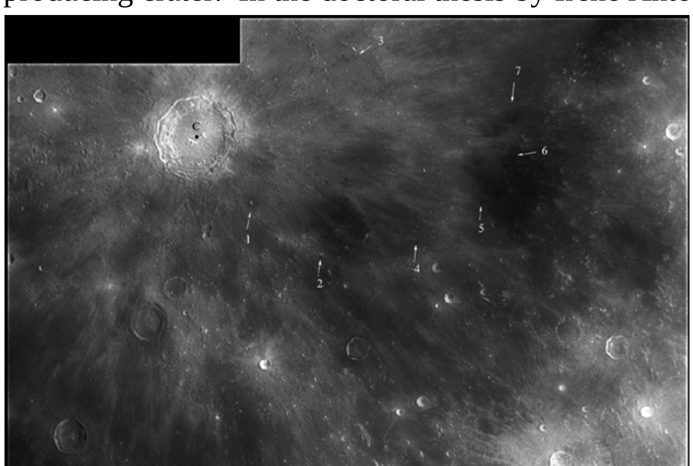


FIGURE 1: Dark-haloed crater concentrations near Copernicus

I spent some time trying to relate the thickness of the ray material to the diameter of the halo-producing crater. In the doctoral thesis by Irene Antonenko, experiments with hypervelocity projectiles suggested that the thickness of material overlying darker (mafic) maria can be expressed by the equation: $t(m) = 0.066*D(r)$ with an error of ± 15%, where $t(m)$ is the thickness of the bright overlying layer and $D(r)$ = the rim diameter of the smallest crater that could produce a dark halo. This equation is for simple craters under 19 km in diameter.



Copernicus Rays and Dark Halo Craters

Dark Halo Crater	Distance from Copernicus (km)	Halo Diameter (km)	Est. Crater Diameter (km)	Est Crater Depth (km)	Max Ray Depth (km)
1	98.7	14.2	5.68	1.14	0.37
2	198	1.6	0.64	0.13	0.04
3	199	6.6	2.64	0.53	0.17
4	278	2.4	0.96	0.19	0.06
5	331	2.4	0.96	0.19	0.06
6	359	1.7	0.68	0.14	0.04
7	356	1.3	0.52	0.10	0.03

FIGURE 2: Dark-haloed craters near Copernicus

Since most of the dark halo craters were too small to resolve with my current observing setup, I wondered if it were possible to relate the crater diameter, and hence the thickness of the ray material overlying the mafic mare layer to the diameter of the halo. For example Copernicus H (crater 1) has a dark halo that is approximately three times the diameter of the crater (the dark halo must be the continuous ejecta from the crater in this case). However crater "3" on the image has a dark halo that is only 2.1 times the crater diameter, and based on this limited sampling, a very rough estimate of average halo to crater rim diameter would be 2.5 ± 20%. Admittedly the limited sampling would lead to high error (likely higher than the estimated 20%). Also, I did an analysis of pixel resolution of the image and came up with approximately 0.5 km per pixel, so, assuming a one-pixel uncertainty, measurements of halo diameters less than 5 pixels (2.5 km) would have an error of greater than ± 20% which is compounded by the error in the halo/rim diameter ratio. But I did venture a crude estimate of the upper limit of the possible thickness of ray materials listed below. I suspect that the total error range is greater than 50%, however. See Figure 2 and table below.

Copernicus Rays and Dark-haloed Craters

Dark Halo Crater	Distance from Copernicus	Halo Diameter	Estimated Crater Diameter	Estimated Crater Depth	Max Ray Depth
	(km)	(km)	(km)	(km)	(km)
1	98.7	14.2	5.68	1.14	0.37
2	198	1.6	0.64	0.13	0.04
3	199	6.6	2.64	0.53	0.17
4	278	2.4	0.96	0.19	0.06
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In addition to errors in measurement noted above it is difficult to determine which craters just penetrate deeply enough to produce a halo and which excavate much deeper into the mafic layer below. Since it is likely that some of the craters penetrate considerably deeper, estimates of the ray thickness will be too deep in many cases, so the results listed should be considered a rough upper limit of the thickness and not the true thickness of the rays.

This was a fun exercise, but it was limited by accuracy of the measurements and assumptions of crater depths based on halo diameters. To obtain more precise results requires the direct measurement of the rim diameter of the dark-haloed craters, rather than estimation based on halo diameter. With my current setup it would be impossible to measure features less than 3.5 km with an accuracy of ± 15% and it would probably be difficult to measure less than 2km diameter craters with that accuracy even with larger ground-based telescopes and higher magnification. Lunar satellite images would be needed to really refine estimates of ray and ejecta thickness.

References:

Antonenko, I., Cintala, M.J. and Hšrz, F., 1999. Experimental Studies of Dark-Haloed Craters: Implications for the Thickness Measurements of Lunar Cryptomafic Deposits, Department of Geological Sciences, Brown University, Providence, RI, USA See: http://clients.teksavvy.com/~iant/Thesis/

Lunar Terminator Visualization Tool, http://ltvt.wikispaces.com/LTVT

Virtual Moon Atlas, 3.5c http://virtual-moon-atlas-expert.software.informer.com/

LUNAR TOPOGRAPHICAL STUDIES

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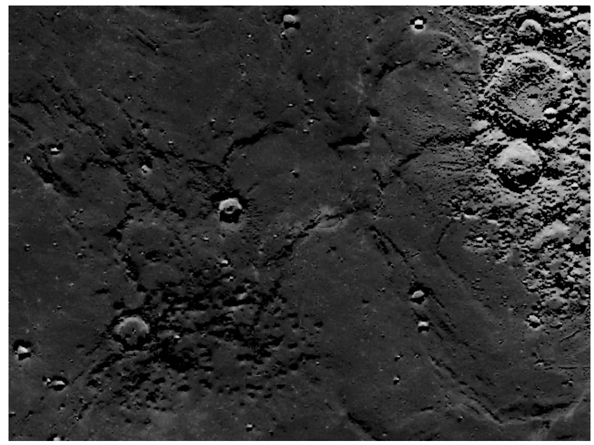
Assistant Coordinator – William Dembowski - dembowski@zone-vx.com

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

REINER GAMMA

Maurice Collins
Palmerston North, New Zealand

A few weeks back I made this LTVT digital elevation model image of Reiner Gamma with sun in the north at 0.5 degrees and overlayed a layer with the Clementine image with photoshop to make the higher albedo feature visible at the low sun angle for positional reference.



It appears that Reiner Gamma sits on a wrinkle ridge. I wonder, could it be an iron-rich dyke of lava that solidified when there was a magnetic field on the Moon and retains the magnetism enough to keep the solar wind at bay? Or is it just a coincidence it sits on the wrinkle ridge? Pure speculation of course, but I wonder. Thought it may be of interest to others as I was asked about it this morning.

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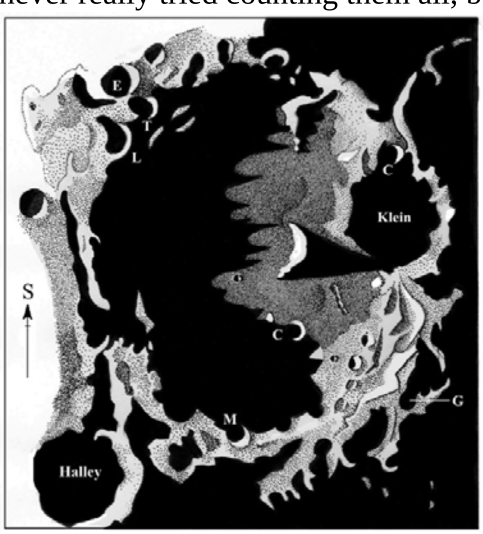
THE SPIRES OF ALBATEGNIUS

Phil Morgan

Did you know that at sunrise Albategnius has more spires of shadow cutting across its floor area than any other lunar crater on the nearside? In fact I don't really know if that statement is correct since I have never really tried counting them all, but I would think that Albategnius would be amongst one of the top contenders! On this occasion I counted 16 or more including the spire cast from the great central peak.



This mass of shadow spire is due to the plethora of lesser craters that encircle the ramparts of this vast crater. This includes L high on the east rampart, which is a small banded crater.

ALBATEGNIUS-Phillip Morgan –Lower Harthall-Tenbury Wells, Worcestershire, England. May 20, 2010 20:25-21:10 UT. Seeing 9/10, Transparency 3/5. Colongitude 358.4-358.8º. 305mm, f/5, Newtonian, 400x.

The central peak of Albategnius is in fact slightly off-centre, being situated to the west of floor arena, and is so large that it almost looks like the up tilted remnants of a once grand crater that has sunk, leaving just a section of its western rampart sticking out. Recent measurements by John Moore give the height of this peak as 1,735 meters above the floor. On the very summit sits a small craterlet about 1 mile in diameter. This is a fine test for the visual observer, requiring steady seeing and the correct lighting for you to be able to pick it out.

To the west of the central peak is the ringwall crater Klein with a diameter of 44km, with the prominent small crater Klein C on its southern cusp. While just to the northwest of the central peak I noted a short and somewhat denuded crater-chain on the floor region together with some low mounds. Due north of Klein and situated on the northern outer flanks of Albategnius is the small crater Albategnius G. This was named Alter by Wilkins and Moore, but the IAU didn't adopt the name and gave it to a far side crater instead.

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Stadius crater

Antonius Schalken

Stadius is a large 'ghost' crater (diam approx 67km) between Eratosthenes and Copernicus, near mare Insularum and sinus Aestuum (Rükl map 32).

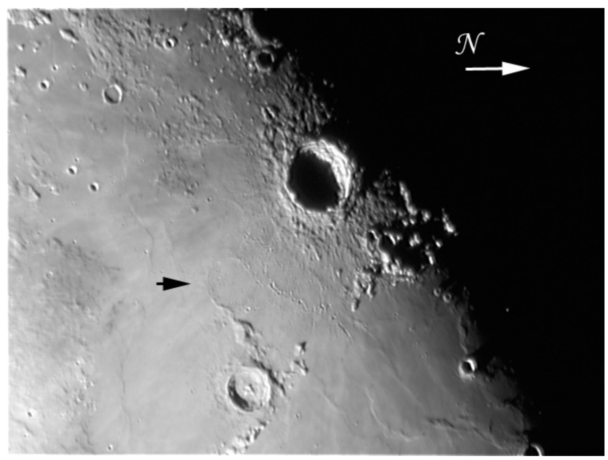

Figure1a: Stadius Crater (arrowed) with Copernicus (at the terminator) and Eratosthenes. Colongitude:22.8^{o}, Lunation: 8.9 days Sun approximately 9.1^{o} above horizon. Antonius J Schalken – 'Luar' Observatory, Melbourne, Victoria, Australia. December 10, 2005 12:08 UT. Rumak_Maksutov 6" f/10, ToUcam Pro II 740K.

The crater Stadius lies buried beneath lava maria and for the most part is inconspicuous. Remnants of this crater are best seen under conditions of low incident illumination. In most images all one can see are segments of the rim (figure 1) and some of the large number of craterlets. Though the remaining topography is not easy to see, the rim segments are relatively easy to distinguish from the surrounding terrain. This is no doubt assisted by the arc of craterlets that lie to the west of the flooded crater, giving the impression of continuity to the crater rim.

Figure1b: Stadius Crater resized 200% using Lanzcos algorithm (details as per fig.1a).

Commencing at the promontory-like formation, extending southwest-wards from Eratosthenes, and going clock-wise we have:

- In figures 1a and 1b the North-East rim of Stadius, which appears to be a continuation of the range of mountains South of Eratosthenes, rises above the mare flow and remains just visible for a short distance.
- The rim just about disappears as one progresses around the crater. The nice feature is that though Stadius has been filed nearly to oblivion, the contour of the filled crater remains as a very faint outline.
- Stadius B can be seen just North of the main crater.
- The surface of the mare-filled Stadius is pock-marked by a number of craterlets which are just visible at this level of illumination.

At very low incident sunlight, more features become evident. In parts the rim does extend somewhat above mare material and one can start to see some features on and around the rim and on the floor of the crater.

- In figure 2 one can see that the rim of Stadius extends above the flooded maria, enough to cast a shadow on the maria floor. There is also a depression/crater at the top of the rim.
- The extremely low angle of incident light in this picture shows us that the surface enclosed by the rim is not featureless. My 6inch instrument has not enabled me to resolve the nature of these features. Some are obviously the results of the cratering shown in figure 1b and some appear to be dome-like in character.
- A section of the South-Western rim of Stadius rises, very slightly, above the mare.

Fig.2: Stadius Crater (arrowed) and Eratosthenes. Col:15.5^o , Lunation: 8.4 days Sun approximately 2.5^o above horizon. April 14, 2008 12:39 UT (other details as per fig.1a).

References

A Rükl (1993), Atlas de la Lune, Librarie, Grund, Paris.

OBSERVATIONS RECEIVED

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 2, 3, 9, 19 day Moon, 1st Quarter Moon, Copernicus, Moretus-Eratosthenes & Theophilus. Digital terrain model images of Mare Imbrium, far-side & Reiner Gamma.

FRED CORNO-SETTIMO TORINESE, ITALY. Drawing of Beaumont L.

ED CRANDALL – LEWISVILLE, NORTH CAROLINA, USA. Digital images of Anaxagoras rays, Eratosthenes, Eudoxus-Burg, Fra Mauro-Guericke, Lansberg domes, Mons Vinogradov, Montes Riphaeus & Posidonius

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Albufeda-Descartes & Taurantius measured in LTVT.

PETER GREGO – ST. DENNIS, CORNWALL, UK. Drawings of Baily B, Hypatia & Flammarion (2).

ROBERT HAYS – WORTH, ILLINOIS, USA Drawings of Foucault & Wallace.

RICHARD HILL – TUCSON, ARIZONA, USA Digital images of Plato-Valllis Alpes, Hadley Rille-Apollo 15, Rupes Recta, Ptolemaeus-Arzachel.

PAOLO LAZZAROTTI – MASSA, ITALY. Digital images of Cauchy-Taruntius, Gutenberg-Messier, Hommel-Rosenburger & Jansson-Stiborius.

PHILLIP MORGAN –LOWER HARTHALL-TENBURY WELLS, WORCESTERSHIRE, ENGLAND. Drawing of Albatragnius

TONY SCHALKEN – MELBOURNE, AUSTRALIA Digital image of Stadius.

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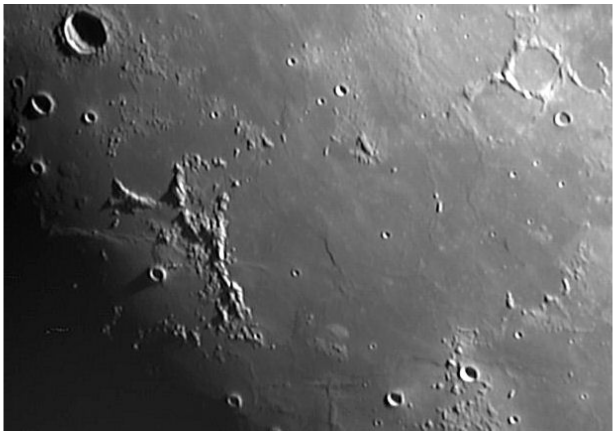
RECENT TOPOGRAPHICAL OBSERVATIONS

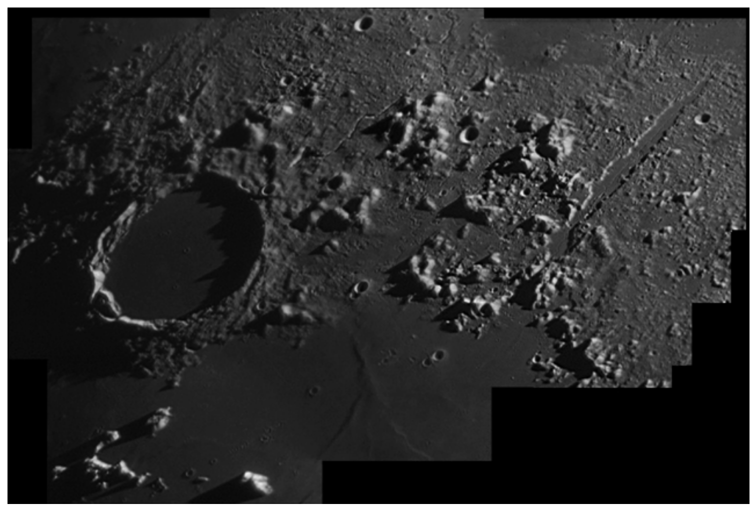
THEOPHILUS-Maurice Collins - Palmerston North, New Zealand. June 2, 2010 12:13 UT. Seeing A-III. C8, SCT, LPI.

RECENT TOPOGRAPHICAL OBSERVATIONS



LANSBERG Domes – Ed Crandall – Lewisville, North Carolina, USA. June 22, 2010 00:55 UT. Colongitude 31.5º, Seeing AII. 110 mm f/6.5 APO, 3x barlow, ToUcam.

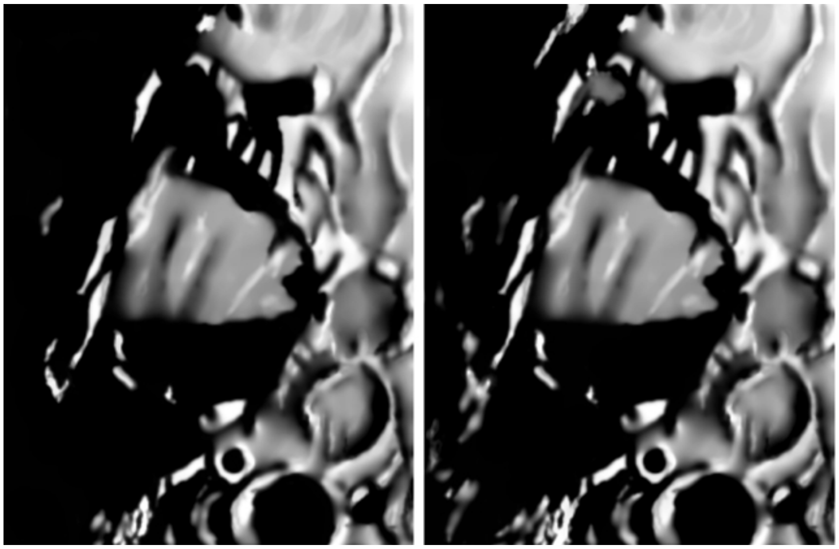
PLATO-VALLIS ALPES – Richard Hill – Tucson, Arizona, USA . May 22, 2010 02:29 UT. Seeing 8/10. C14, 2x barlow, f/22, SCT. DMK21AU04, UV/IR block filter.



TAURUNTIUS- Howard Eskildsen- Ocala, Florida, USA. May 31, 2010 09:59 UT. Seeing 6/10, Transparency 4/6. Orion 80mm refractor, 5x barlow, DMK 41AU02 AS, Luminance filter.

LTVT used to calibrate image and take measurements. Calibration craters selected: 1. Sinas, 2, Messier. After recording coordinates and measurements, measurements were repeated and differences from original readings were used to estimate error.

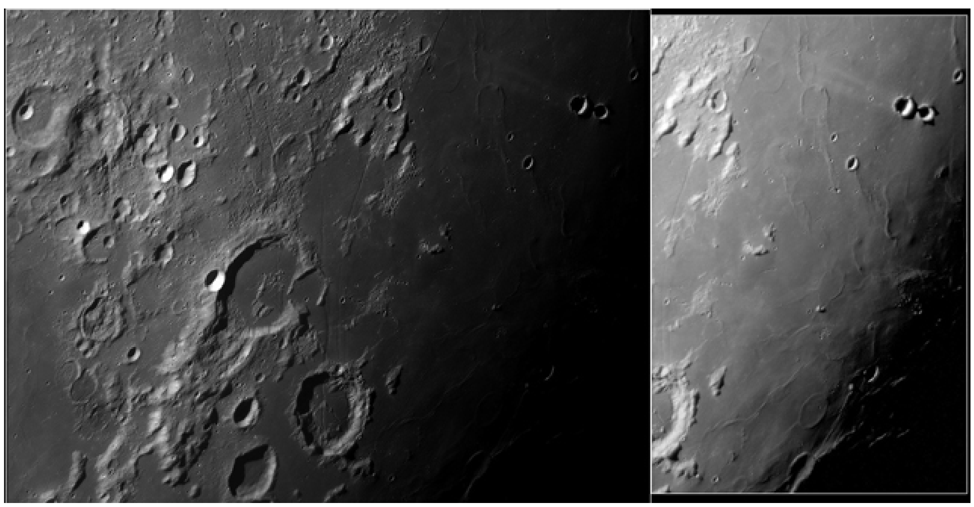
RECENT TOPOGRAPHICAL OBSERVATIONS



FLAMMARION-Peter Grego, St. Dennis, Cornwall UK. June 19, 2010. Seeing AII-III, Moon 25° high in southwest. 200mm f/10 SCT, 195x, integrated light. Left image: 21:10-21:45 UT Colongitude 4.7-5.0º. Right image: 21:45-21:55 UT Colongitude 5.0-5.1º

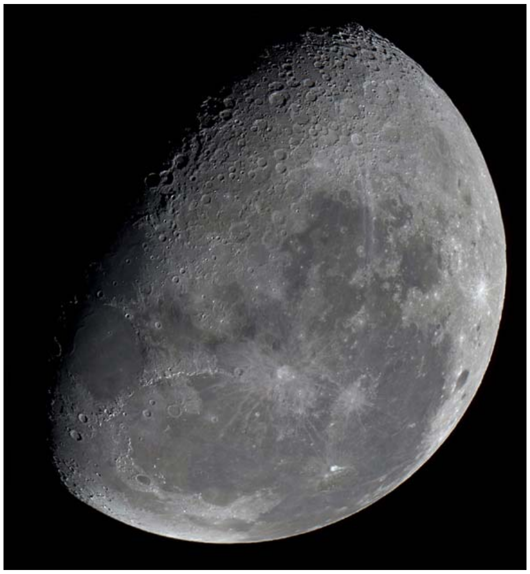
Flammarion on the sunrise terminator of the 7.4 day-old Moon made a good subject for an observational study, despite the somewhat low lunar altitude, seeing was tolerably good, permitting a fairly high magnification. Flammarion itself had emerged from the terminator only hours earlier, but its interior shadowing produced a rather startling contrast; while the southern part of the crater floor was completely covered with shadow, most of the northern half of Flammarion's floor was illuminated by sunlight, save for a small section cast by the crater's northeastern rim. During the observation I had hoped to capture the moment when parts of the southern floor began to be illuminated, but alas this was not observed. Several dark streaks were observed running north across the crater floor from the northern edge of the interior shadow, these appearing to be shadows cast by low ridges; a broad, flattish elevated area was observed just northwest of crater centre. Also observed were Flammarion T and Sporer, adjoining Flammarion's southeastern wall, and further south lay Herschel, of which crater most (except its southern part) is depicted in this sketch. Herschel was largely full of shadow, but its inner western wall was brilliant and displayed slight darkening in the south. In the second observational study of the same area (using the previous PDA sketch as a template), the Sun had risen sufficiently high to illuminate several high areas beyond the terminator to the west and southwest of Flammarion; in addition, during the second sketch it was noticed that the northern half of the floor of Flammarion M (adjoining the northern part of Flammarion) was illuminated by sunshine. Worth returning to in a future lunation in order to catch and record the moment when morning sunlight begins to illuminate the southern part of Flammarion's floor.

GUTENBERG-MESSIER-
Paolo Lazzarotti – Massa, Italy. October 7, 2009 01:06 UT. Seeing 6-7/10, Transparency 4/6. Gladius CF-315 Lazzarotti Opt. Scope, LVI-1392 PRO experimental camera, Edmund R filter, 0.18 arcsec/pixel.



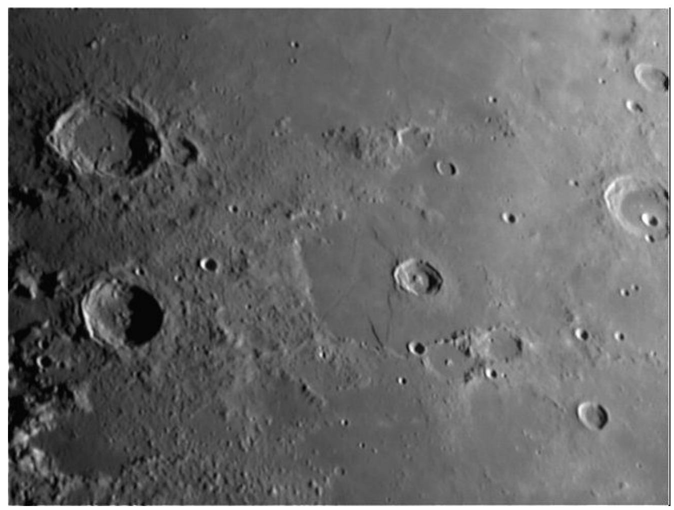
Find here another intriguing area by geological point of view that can be found in the southermost part of the mare Fecunditatis between Goclenius and Messier craters. On the left side of the image, you can see the fractured ground typical of seas' edges. On the right side, you can see a log stretched version of the shadowed sea bringing more in evidence all those smooth irregularities of the ground illuminated by an extremely low sun angle. http://www.lazzarotti-hires.com/2010/06/tra-gutenberg-goclenius-e-messier.html

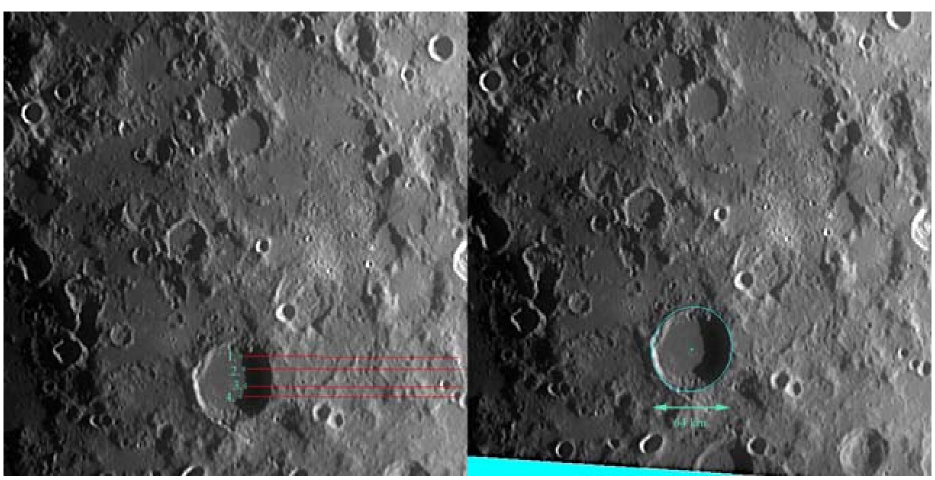
ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



19 DAY MOON-Maurice Collins - Palmerston North, New Zealand. June 2, 2010 11:40-12:20 UT. Seeing A-III-IV. C8, SCT, LPI.
…Looking at the image, the Kant Plateau was standing out nicely near Theophilus, which was experiencing sunset. The "serpentine ridge" in Mare Serenitatis was well lit also with Posidonius half lit at the terminator.

EUDOXUS-BURG – Ed Crandall – Lewisville, North Carolina, USA. June 19, 2010 00:59 UT. Colongitude 355º, Seeing AIII. 110 mm f/6.5 APO, 3x barlow, ToUcam.



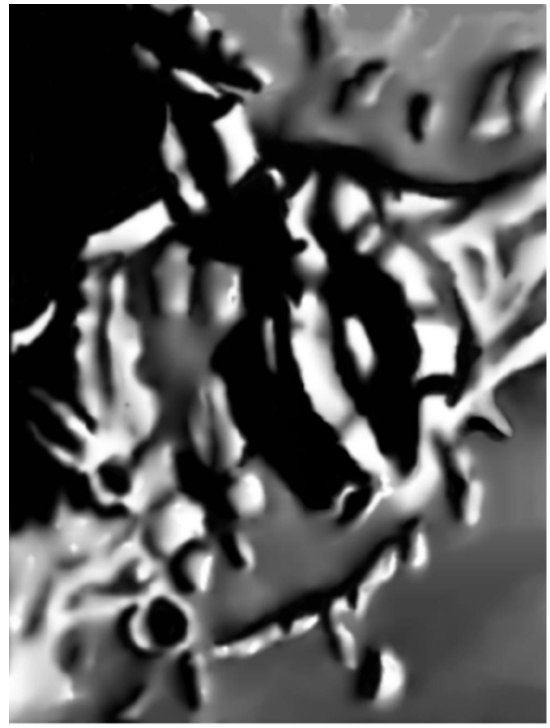


ALBULFEDA-Howard Eskildsen-Ocala, Florida, USA. Feb. 20, 2010 23:39 UT. Seeing 8/10, Transparency 6/6. Meade 6" f/8 refractor, 2x barlow, DMK 41AU02 AS, W-8 yellow filter.

LTVT measurements: Diameter: 64 km. Rim elevation points 1: 3080 m, 2: 3110 m, 3: 2950 m, 4: 3350 m (all ± 50 m).

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

HYPATIA-Peter Grego, St. Dennis, Cornwall UK. June 17, 2010. 21:10-21:50 UT. Colongitude 340.4-340.8º. Seeing AII, darkening twilight. 75mm Refractor (Watson), 150x, integrated light.



A crisp, clear view was had through the old Watson OG. On the border of Sinus Asperitatis and illuminated by a rising Sun, Hypatia, an elongated crater, was largely filled with shadow cast by its eastern wall but an illuminated hill was visible protruding from the floor shadow. To the west of Hypatia, and partly covered by the shadow cast by Hypatia's western rim, was a large rectangular enclosure whose floor displayed a number of broad, low hills. The highland terrain further west was jumbled and extremely complicated, difficult to sketch. From the southern tip of Hypatia, going west across the bordering marial plain, was a hilly ridge extending to Zollner K. East of Hypatia was a broad hilly plateau that tapered to the east; this too was complicated and difficult to portray with confidence. North of it was a smoother area containing several low rises (yet further north from here are the Rimae Hypatia, but these lay outside the area of the sketch). A most interesting area and one worth returning to.

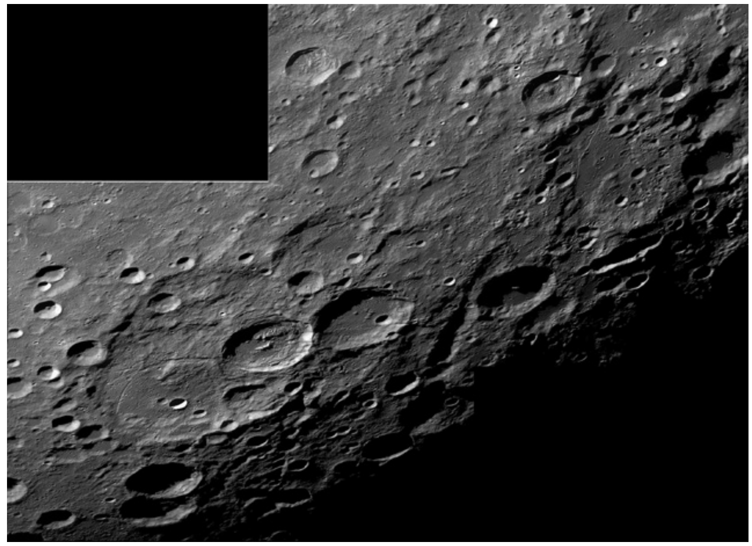
HADLEY RILLE – Richard Hill – Tucson, Arizona, USA. May 22, 2010 01:42 UT. Seeing 8/10. C14, 2x barlow, f/22, SCT. DMK21AU04.

Apollo 15 landing site indicated by arrow.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

JANSSEN-STIBORIUS-Paolo Lazzarotti – Massa, Italy. October 7, 2009 00:35 UT. Seeing 6-7/10, Transparency 4/6. Gladius CF-315 Lazzarotti Opt. Scope, LVI-1392 PRO experimental camera, Edmund R filter, 0.18 arcsec/pixel.

The south-eastern limb is surely dominated by magnificent Janssen crater and majestic Vallis Reitha, but you can also notice how many craters with huge differences in age are spreaded there in a very rough floor. I can literally see a whole generation! This image might be looking too contrasty, but this is exactly the same view I could admire at the eyepiece. http://www.lazzarotti-hires.com/2010/06/generazione-di-crateri.html



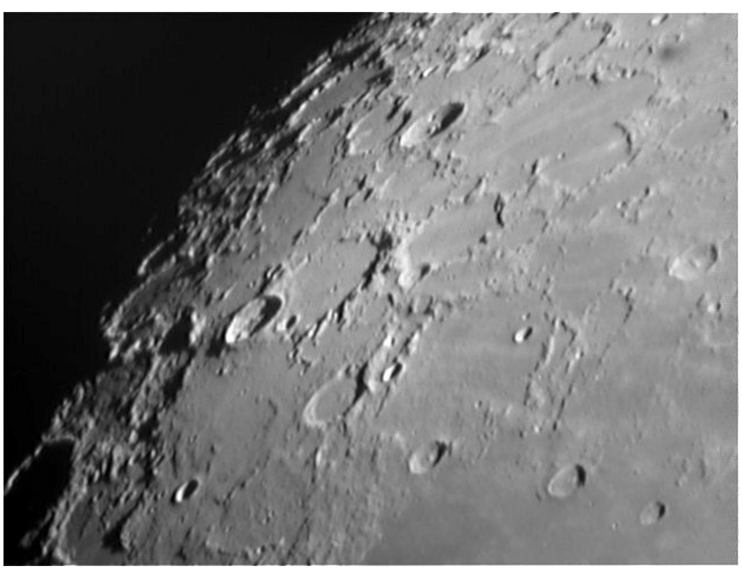
BRIGHT LUNAR RAYS PROJECT

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

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

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

RECENT RAY OBSERVATIONS



ANAXAGORAS RAYS – Ed Crandall – Lewisville, North Carolina, USA. June 22, 2010 00:51 UT. Colongitude 31.5º, Seeing AIII. 110 mm f/6.5 APO, 3x barlow, ToUcam.

LUNAR TRANSIENT PHENOMENA

Coordinator – Dr. Anthony Cook – atc@aber.ac.uk
Assistant Coordinator – David O. Darling - DOD121252@aol.com

LTP NEWSLETTER – JULY 2010

Dr. Anthony Cook - Coordinator

Observations for May 2010 were received from the following observers: Jay Albert (Lakeworth, FL, USA), Brendan Shaw (UK), Maurice Collins (New Zealand), myself (Aberystwyth University, UK), and Marie Cook (Mundesley, UK).

News: At this year's European Planetary Science Conference (EPSC), to be held in Rome September 19-25, one of the papers is entitled: "A Preliminary Comparison of the Frequency of Transient Lunar Phenomena with Routine Observations". As soon as the abstracts go on-line, I will provide you with a link, suffice to say we are starting to see a culmination in the analysis of the statistics of all the years of hard work on the LTP observing campaign. So do please keep on observing, looking for LTP and also checking out repeat illumination predictions for past LTP. Without your help we would not be able to do any meaningful statistical analysis or eliminate some unreliable LTP reports.

At the time of writing, NASA's LRO spacecraft is hugging the terminator of the Moon very closely. I do not know if this had something to do with the recent partial lunar eclipse, as a way of stealing extra sunlight for the solar panels, however minor orbital adjustments can make it flip easily from the morning terminator to the evening terminator and reverse its dayside trajectory from north to south or vice versa. You can see where LRO is at present on http://lroc.sese.asu.edu/whereislro/ and if you take images or make sketches of any feature that it is overflying at that time, then eventually when LRO high resolution and wide angle images are released, then you will be able to compare your observations with what the spacecraft was seeing. This approach has been used in the past during the Clementine and Lunar Prospector missions to coordinate LTP observing, however I would welcome a wider participation as a way of encouraging members to observe features that they would not otherwise study.

On the subject of future spacecraft (even if they are still on the drawing board), whilst Googling I came across a recent Lund University masters thesis by Bao Han entitled:"Design a nano-satellite for observation of transient lunar phenomena(TLP)". If you would like to take a look at this intriguing idea to use an Earth-orbiting satellite to monitor the Moon above our atmosphere, then it can be found at the following web site: http://epubl.ltu.se/1653-0187/2009/106/LTU-PB-EX-09106-SE.pdf

LTP Reports: No LTP reports were received for May.

Routine Reports: On 2010 May 21, whilst observing between 01:25 and 03:25, Jay Albert (Lakeworth, FL) checked out several of the repeat illumination predictions. One of these, on the tail end (03:16UT) of the prediction time was for:

2010-May-21 Theophilus observed by Haiduk on 1972-5-20 Theophilus 1972 May 20 UTC 19:10-19:59 Observed by Haiduk (13.25E, 52.5N, 75mm refractor) "Well visible brihtening on the SW wall" S=2, T=3 Ref: Hilbrecht & Kuveler Moon & Planets (1984) Vol 30, pp53-61.

Jay observed a thin, bright streak on the south wall and confirmed a brighter than average area on the SW wall (x311 magnification, no filters). Unfortunately this does not explain the "brightening" seen by Haiduk, although it does at least confirm that there was a bright area on the SW. This 1972 LTP already has a low ALPO/BAA weight of 1, due to a small telescope being used, and I plan to leave it at that for the moment.

An interesting repeat illumination observation was made by Brendan Shaw and is shown in Figure 1 (left). This corresponds to the same illumination (within +/- 0.5°) to an observation by an Uraguayan astronomer back in the year 1885. The details of the original observation, transcribed from Cameron's 1978 catalog are given in italics below.

Knopp of Paysandu, Uruguay on 1885 Feb 21 at 23:00-23:30? UT saw red patches in the crater. Reddish smoke or mist. The observer says several others had seen a star like point there that night. Cameron's 1978 catalog ID=348 and weight=4. **ALPO/BAA weight=4*.***

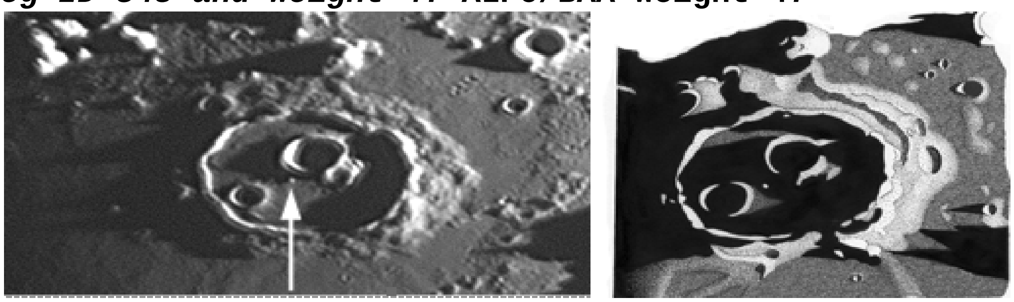


Figure 1. Cassini (Left) as imaged by Bernadan Shaw, using a DMK31 camera,(IR pass band filter) on 2010 May 20 at UT 20:06. North is at the top. The arrow points at a star-like point near Cassini A. (Right) as drawn by Phil Morgan on 2009 Jan 03 at UT 17:05-18:00. In both cases north is to the top.

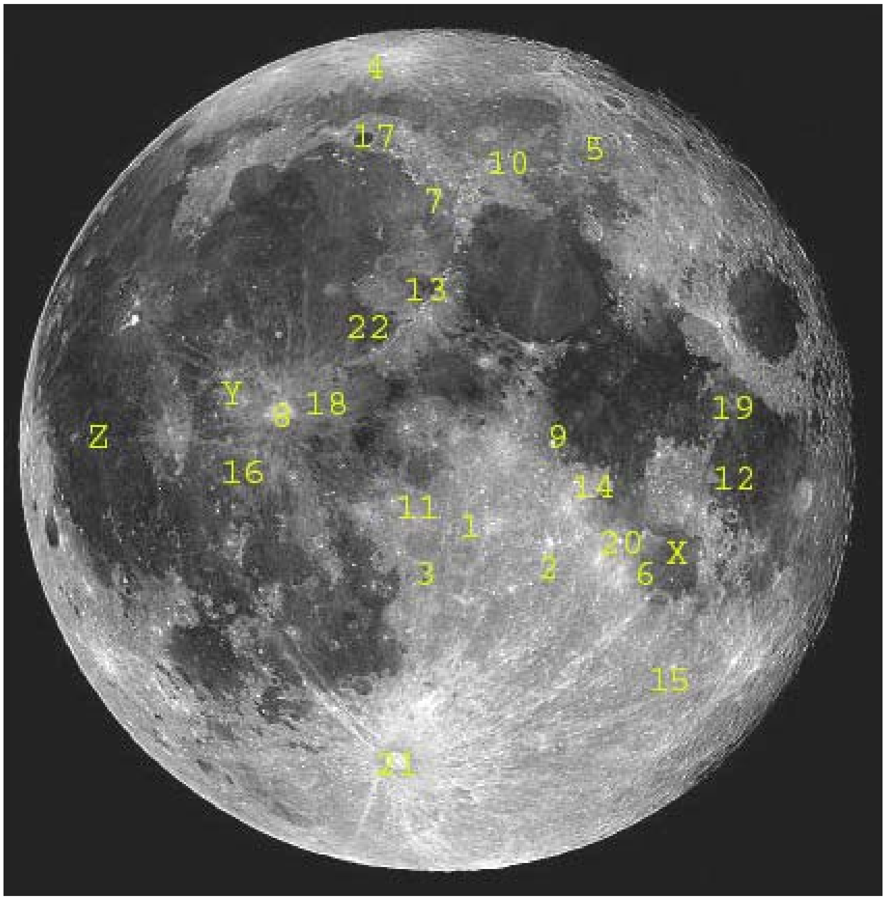
Brendan points out that there is in fact a star like point south west of Cassini and as the Sun rose it became clear that this was simply a small mountain emerging into sunlight. Phil Morgan has sent me a sketch that he made in January 2009, that shows the same point-like feature emerging from shadow. In view of these I am now demoting the ALPO/BAA weight of this Victorian era observation to 3, because although the star-like point is normal, the reddish patches are still unexplained, but we no longer have independent confirmation of LTP activity in this crater. If anybody can find a reference to the original LTP observation, or information about Knopp, then I would be really interested to see this.

Observing Schedule: For repeat illumination (only) LTP predictions for the coming month, these can be found on the following web site: http://users.aber.ac.uk/atc/tlp/tlp.htm . 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.

Dr Anthony Cook, Institute of Mathematical and Physical Sciences, University of Wales Aberystwyth, Penglais, Aberystwyth, Ceredigion, SY23 3BZ, WALES, UNITED KINGDOM. Email: atc @ aber.ac.uk

KEY TO IMAGES IN THIS ISSUE

1. **Albategnius**
2. **Albulfeda**
3. **Alphonsus**
4. **Anaxagoras**
5. **Atlas**
6. **Beaumont L**
7. **Cassini**
8. **Copernicus**
9. **Dionysius**
10. **Eudoxus-Burg**
11. **Flammarion**
12. **Gutenberg-Messier**
13. **Hadley Rille**
14. **Hypatia**
15. **Janssen-Stiborius**
16. **Lansberg**
17. **Plato-Vallis Alpes**
18. **Stadius**
19. **Tauruntius**
20. **Theophilus**
21. **Tycho**
22. **Wallace**



FOCUS ON targets

X = Mare Nectaris (September)
Y = Milichius-T. Mayer Area (November)
Z = Marius-Reiner gamma (January)