THE LUNAR OBSERVER

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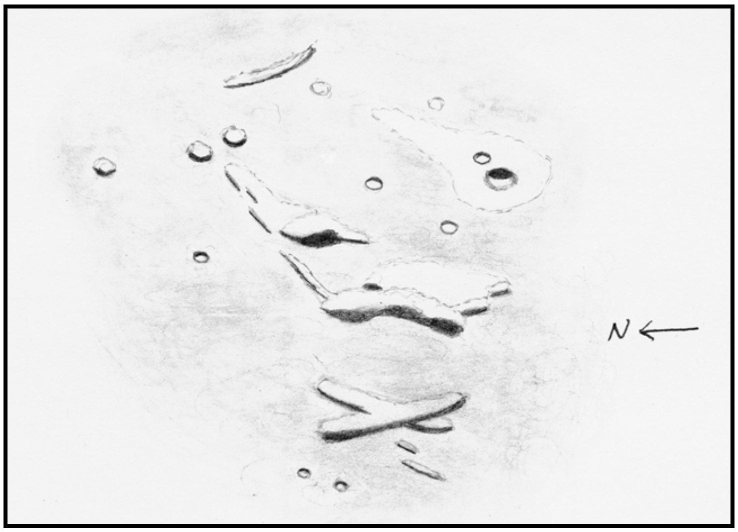
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – MAY 2010

FLAMSTEED T



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
December 29, 2009 05:22-05:50 UT
15 cm refl, 170x, seeing 8-9

I observed the details of Flamsteed T and the surrounding area on the night of Dec. 28/29, 2009 after the lunar Pleiades passage that evening. This is an area of isolated elevations in southwest Oceanus Procellarum. Flamsteed T is a broken ring framed by a bright X-shaped feature on the west side and a curved ridge with multiple humps on the east side. There are no north or south rims, nor is any noticeable detail on the floor. There are some small elevations and two tiny pits just west of the bright X-shaped feature. The ghost ring Flamsteed GC might be contained within this detail. There is a low plateau of sorts adjoining the aforementioned curved ridge. This area is brighter than the surrounding mare, but not as bright as the sunlit side of the ridge. A narrow extension off the north end of this ridge points toward the peak Flamsteed rho. This peak is not as large as the curved ridge, but is probably steeper, since its shadow is very dark (It is probably the darkest shadow in this sketch). A small plateau extends northeastward from the north end of Flamsteed rho. Three small peaks and a pit are farther to the north and northeast. Flamsteed GB is the small, crisp crater southeast of Flamsteed T. A small pit is just northeast of GB, and two more pits lie between Flamsteed GB and T. A bright, poorly defined patch surrounds Flamsteed GB and its companion pit. Two small, bright spots are near this patch, and a low, curved ridge is north of these spots and east of Flamsteed rho.

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LUNAR CALENDAR

MAY-JUNE 2010 (UT)

May 01	14:00	Extreme South Declination
May 02	21:00	Moon 1.7 Degrees SE of asteroid 1 Ceres
May 06	04:15	Last Quarter
May 06	21:54	Moon at Apogee (404,230 km - 251,177 miles)
May 07	05:00	Moon 4.1 Degrees NNW of Neptune
May 07	23:00	Moon 1.9 Degrees NNW of asteroid 6 Hebe
May 09	12:00	Moon 5.9 Degrees NNW of Jupiter
May 09	21:00	Moon 5.7 Degrees NNW of Uranus
May 12	12:00	Moon 7.4 Degrees NNW of Mercury
May 14	01:05	New Moon (Start of Lunation 1081)
May 15	23:12	Extreme North Declination
May 16	09:00	Moon 0.62 Degrees W of Venus
May 20	07:00	Moon 4.9 Degrees SSW of Mars
May 20	08:40	Moon at Perigee (369,728 km - 229,738 miles)
May 20	23:43	First Quarter
May 22	23:00	Moon 7.5 Degrees SSW of Saturn
May 27	23:07	Full Moon
May 28	22:12	Extreme South Declination
May 29	23:00	Moon 0.61 Degrees E of asteroid 1 Ceres
June 03	15:00	Moon 4.3 Degrees NNW of Neptune
June 03	16:52	Moon at Apogee (404,264 km - 251,298 miles)
June 04	22:13	Last Quarter
June 06	04:00	Moon 6.3 Degrees NNW of Jupiter
June 06	05:00	Moon 5.9 Degrees NNW of Uranus
June 11	01:00	Moon 5.2 Degrees N of Mercury
June 12	11:14	New Moon (Start of Lunation 1082)
June 12	07:06	Extreme North Declination
June 15	04:00	Moon 3.8 Degrees SSW of Venus
June 15	14:55	Moon at Perigee (365,936km - 227,382 miles)
June 17	15:00	Moon 5.4 Degrees SSW of Mars
June 19	04:30	First Quarter
June 19	04:00	Moon 7.5 Degrees SSW of Saturn
June 25	05:06	Extreme South Declination
June 25	20:00	Moon 1.4 Degrees NE of asteroid 1 Ceres
June 26	11:30	Full Moon
June 30	22:00	Moon 4.3 Degrees NNW of Neptune

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: Dark-Haloed Craters

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 **July 2010** edition will be Dark-Haloed Craters. A list of some dark haloed craters is in Appendix A of the Selected Areas Program Handbook, available at: http://moon.scopesandscapes.com/sap-hdbk-5.pdf. 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 Dark-Haloed Crater article is June 20, 2010

FUTURE FOCUS ON ARTICLES:

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

Mare Nectaris Basin	**TLO Issue: Sept. 2010**	**Deadline: Aug. 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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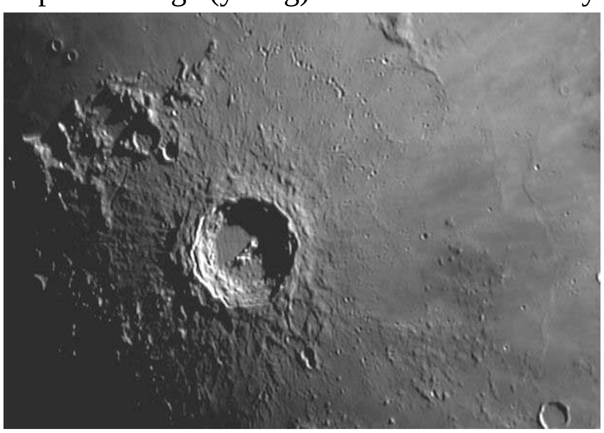
FOCUS ON: Ray Craters

By Wayne Bailey
Acting Coordinator: Lunar Topographical Studies

Ray systems are one of the most widely recognized features on the moon. The rays associated with Tycho, Copernicus and Kepler are even obvious to the naked eye around full moon (Fig. 1). Only the maria are more easily seen. But rays are also among the least substantial lunar features and are frequently ignored. This short article will describe the phenomenology of rays, their visible characteristics and how their appearance changes throughout the lunation, and will also introduce some of the physical and geological interpretations of the formation and evolution of ray systems.

Figure 1: 12 day old Moon. *Mike White, Levin, New Zealand. February 6, 2010 09:30-09:49 UT. Seeing 5-6/10. Orion XT10i, DMK41AF02.*

Ray systems are albedo features, extending beyond their source crater rim, that were created by the impact that formed the source crater. They have no significant topographic relief. They are transient features on the moon. Over time they degrade and eventually disappear. So they are associated with young craters. In fact, one criterion for classifying craters as Copernican age (young) is the existence of rays.



Ray visibility is commonly associated with high sun angle phases (near full phase), and they are most obvious at these times. But many ray systems are also visible fairly close to the terminator (fig. 2). A ray is visible because it has a higher albedo (reflectivity) than the surrounding material; some rays are among the brightest objects on the moon. Their albedo can be 20% higher than the typical highland area, and twice the albedo of mare material. Interestingly, bright rays tend to be bluish, but bright highland areas tend to be reddish.

Figure 2. Copernicus near the terminator. *Ed Crandall, Lewisville, NC, USA. March 25, 2010 00:34 UT. Seeing AIII, Colongitude 25º. 110 mm f/6.5 APO, 3x barlow, Toucam.*

Large, young craters such as Tycho or Copernicus (fig. 1), have very extensive ray systems. Tycho, in the lunar south, has long, straight, narrow rays that extend across much of the visible hemisphere. The crater itself is also one of the brightest objects on the full moon. But Tycho's ray system is not symmetrical; the most obvious rays extend into the moon's eastern hemisphere. Tycho itself is ringed by a dark halo. Then the area beyond this, out to about one crater

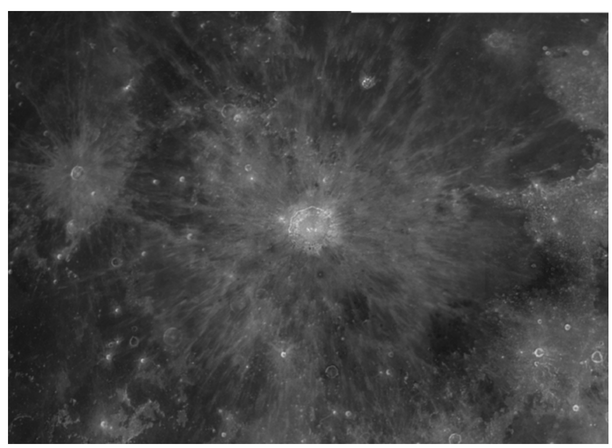


Figure 3. Copernicus & Kepler. *Wayne Bailey, Sewell, NJ, USA. September 26, 2007 02:29 UT. Seeing 5/10, Transparency 4/6, colongitude 83.8º. C-11 SCT, f//10, Skynyx 2-1M, Schuler IR72 filter.*

diameter or slightly more from the rim, is covered with high albedo material. Beyond this, radial rays dominate, although the large rays appear to be tangent to the rim rather than radial from the center of the crater.

Copernicus (fig. 3), although similar in size and appearance to Tycho, has a ray system that is noticably different. It is more compact and symmetrical than Tycho's. Also the individual rays are more feathery or plume-like than the long, straight rays associated with Tycho. Copernicus is located closer to the center of the visible hemisphere, and is also emplaced on mare material, which is darker than the highlands surrounding Tycho.

Kepler (fig. 4), west of Copernicus, displays a ray system that appears to be a smaller version of Copernicus' system. Where the two systems overlap, the web of rays becomes very confusing. Aristarchus, to the northwest, is of similar size to Kepler. The crater is extremely bright, but its ray system, although comparable in extent to Kepler's, is much less conspicuous (fig. 5). Byrgius A (fig. 6), however, near the southwest limb, is an inconspicuous crater, with a very conspicous ray system.

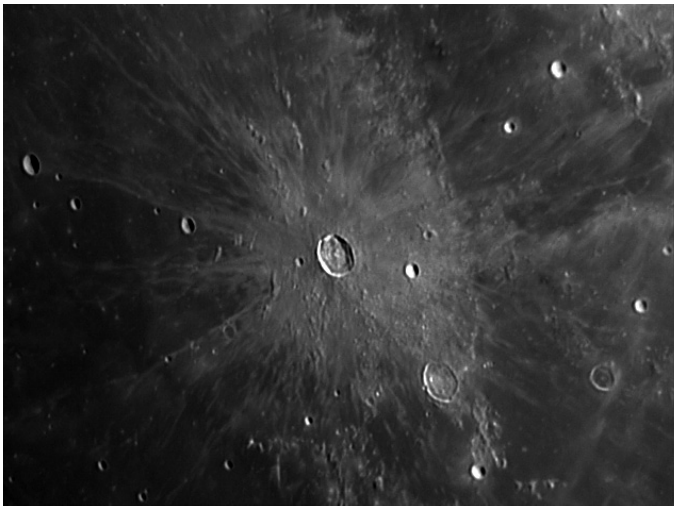


Figure 4: Kepler. *Hongsun Yoon, Seoul, Repuplic of Korea. March 28, 2010 10:18:36 -10:20:36 UT. Seeing 5/10, Transparency 3/6. 12 inch, Dall-Kirkham, f/11.9, Lumenera LU075, Astronomik R dichroic filter.*

Proclus (fig. 7), near the western boundary of Mare Crisium, is the classic example of a highly asymmetric ray system. The southwestern quadrant, crossing Palus Somni, contains no rays. This asymmetry is created by a low angle impact. In this case, the impactor arrived from the southwest and impacted from only a few degrees above horizontal.

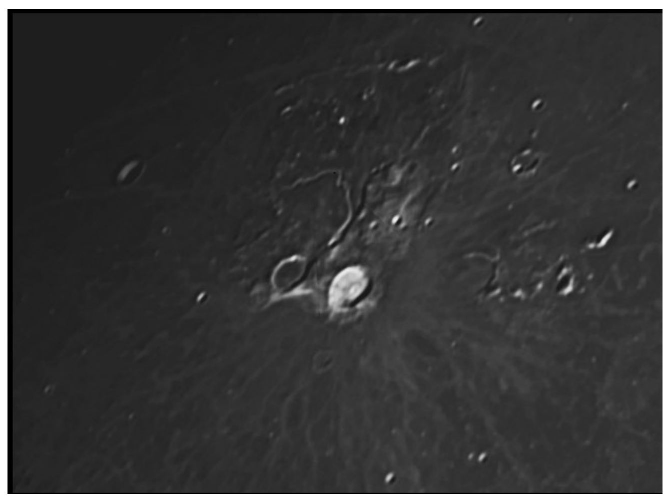


Figure 5. Aristarchus. *Richard Hill, Tucson, AZ, USA. July 16, 2008 05:19 UT. Seeing 5/10. Questar, 2x barlow, SPC900NC, UV/IR blocking filter.*

Although rays are usually thought of as bright features, Dionysius (fig. 8) is one of a few craters whose ray systems are dark. Presumably, this results from a darker layer of material below the surface that was excavated by the impact.

So there is quite a wide variety of morphological forms among ray systems. If we look at the smaller craters (1-15 km diameter) that are best seen on spacecraft images, we also find

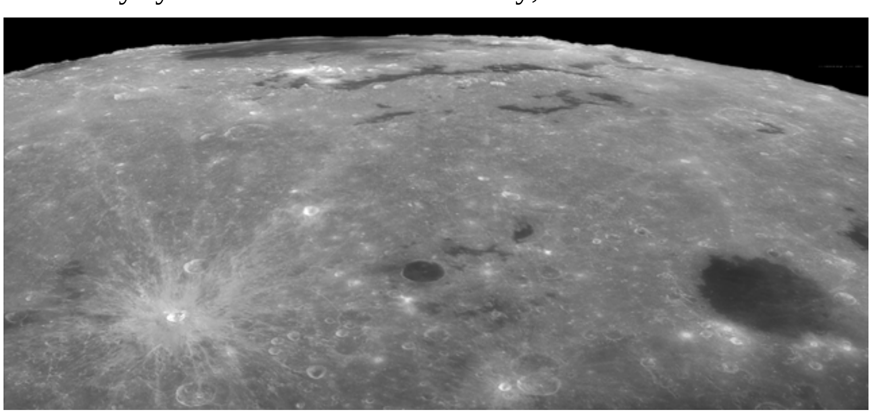


Figure 6. Byrgius A-Grimaldi-Mare Orientale. *Paolo Lazzarotti. Massa, Italy. August 12, 2009 02:12-02:21 UT. Seeing 5/10, Transparency 4/6. Gladius CF-315,, LVI-1392 PRO, Edmund R filter.*

"ray" systems consisting of only a bright halo around the crater, without the classic radial rays. There is no single cause for these differences; age, size, impact geometry, composition and physical state of the impact site all play a role. So now we'll discuss how ray systems are thought to form and degrade.

Ray systems are created by ejecta from the impact that formed the parent crater. That seems like an obvious statement, but the reason rays are visible is that their albedo is different than the surrounding surface and there are several mechanisms by which the ejecta can modify the albedo.

The simplest mechanism is ballastic distribution of pulverized material from the impact over the surrounding area. The resulting albedo may be different either because the excavated material is not the same as the surface material (different composition, color, or brightness from a different location or depth), or because finely pulverized material reflects light differently than massive material. Anyone who has taken an Introductory Geology or Earth Science class has seen examples of a mineral's streak (finely divided powder) that appears significantly different than the hand specimen. Some portion of the ejecta also may be melted, which will deposit as glass whose color and albedo will differ from the unmelted regolith.

Figure 7. Proclus on Gibbous Moon. *Howard Eskildsen, Ocala, FL, USA. March 24, 2010 00:11-00:24 UT. Seeing 6/10, Transparency 4/6. Orion 80mm ED, 2x barlow, DMK41AU02AS.*

Generally, lunar regolith darkens with exposure to space. Ultraviolet light from the sun, cosmic ray and solar wind exposure, and pitting by micrometeorites have all been suggested as causes of exposed surface darkening. This is one reason that rays fade with age, so that only young craters display ray systems. The situation may not be quite this simple, however, since even the early Surveyor footpads exposed darker material where they scraped away a thin, brighter, surface layer. Possibly, space weathering tends to shift the albedo towards a common value, not necessarily to a lower value. Regardless, freshly exposed material, either in-situ or distributed from the impact site, is likely to have a different albedo than undisturbed regolith.

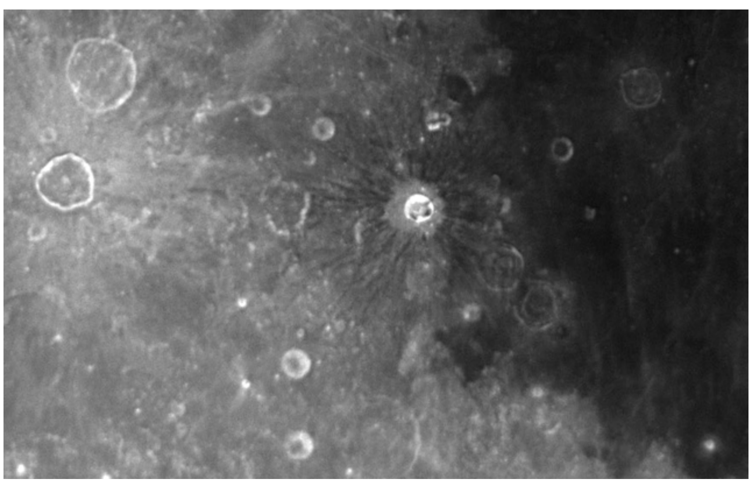


Figure 8. Dionysius. *Wayne Bailey, Sewell, NJ, USA. December 5, 2006 04:28 UT. Seeing 5/10, Transparency 4/6, Colongitude 87.6º. C-11 SCT, f/10, Skynyx 2-1M, Schuler IR72 filter.*

The albedo of a surface also depends on its porosity; a porous surface is darker than a similar smooth surface. This is why pitting by micrometeorite impacts tends to darken surfaces. Debris clouds flowing away from an impact can scour the surface, making it less porous and more reflective. Surface flows dissipate within a relatively short distance of impact, so should only be effective close to the crater, and may also be affected by the local topography. The result may also be modified the arrival of ballistically transported ejecta.

Finally, the larger fragments of ballistic ejecta will create secondary craterlets where they land, each with it's own small splash pattern, thus altering the surface properties. Closer examination of rays shows that they can frequently be resolved into multiple smaller impacts, each with a small bright halo or ray, that together form the larger ray pattern.

Given these various formation mechanisms, we shouldn't be surprised to find that their relative contribution differs for each ray crater. Scouring seems to be the dominant mechanism for small craters, possibly because there simply aren't enough ballistic ejecta to be significant. The ejecta from larger craters will alter the surface properties by impact, as in the outer rays. If a sufficient volume is deposited, it may also simply cover the surface, as is seen in the inner halo close to the crater. Tycho (fig. 1) has a distinctive dark collar, apparently glassy ejecta melt, surrounding the bright crater. Copernicus (figs. 2 & 3) by comparison, has a bright halo with blocky ejecta surrounding the crater wall. We also note that the relative brightness of the outer rays doesn't necessarily correlate with the brightness of the parent crater (figs. 5 & 6). This would naturally occur by mixing of field material with the ray during emplacement, but it could also be a result of a degradation rate that is dependant on the particle size.

We have already mentioned that exposed surfaces darken, in most cases, due to space weathering. Another reason that rays degrade in time, is mixing within the regolith (gardening) due to meteorite impacts and thermal disturbance. The ray material, which is deposited on the surface, is gradually mixed into the regolith. Since the average meteorite flux should be independent of position on the moon, any differences in rate of degradation from gardening must be due to regolith or ray material differences.

Observationally, ray systems are low contrast objects with ill-defined boundaries. In some cases, color filters may enhance ray contrast, but this is usually a small effect. Image processing can be used to increase contrast, thereby defining ray boundaries more clearly (fig. 9, compare to fig. 5). Additional information can be found in the article by Bill Dembowski (Dembowski 2009) in the Journal of the ALPO.

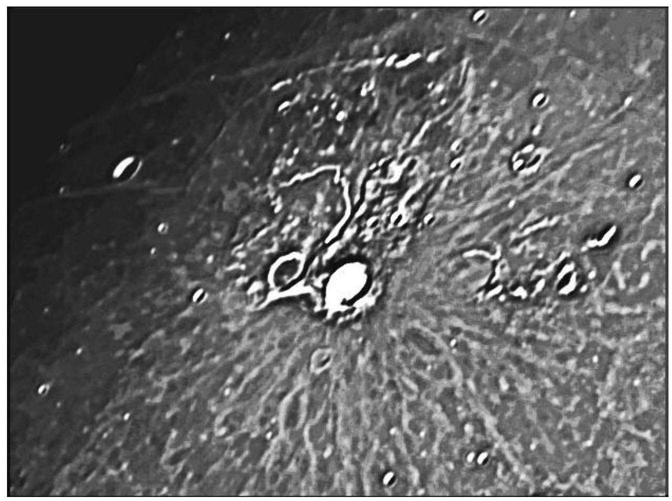


Figure 9. Aristarchus, processed for rays. *Richard Hill, Tucson, AZ, USA. July 16, 2008 05:19 UT. Seeing 5/10. Questar, 2x barlow, SPC900NC, UV/IR blocking filter. Compare to figure 5.*

Additional information on the ALPO Bright Lunar Rays Project, including a list of some ray craters and research suggestions can be found at http://moon.scopesandscapes.com/ALPO_Rays_Project.htm.

ADDITIONAL READING

Bussey, Ben & Paul Spudis. 2004. The Clementine Atlas of the Moon. Cambridge University Press, New York.
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Grego, Peter. 2005. The Moon and How to Observe It. Springer-Verlag, London.
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North, Gerald. 2000. Observing the Moon, Cambridge University Press, Cambridge.
Rukl, Antonin. 2004. Atlas of the Moon, revised updated edition, ed. Gary Seronik, Sky Publishing Corp., Cambridge.
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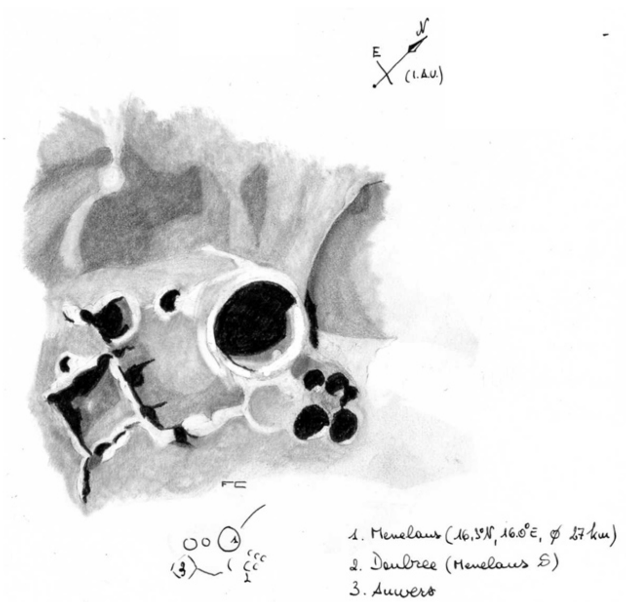
ADDITIONAL RAY CRATER OBSERVATIONS

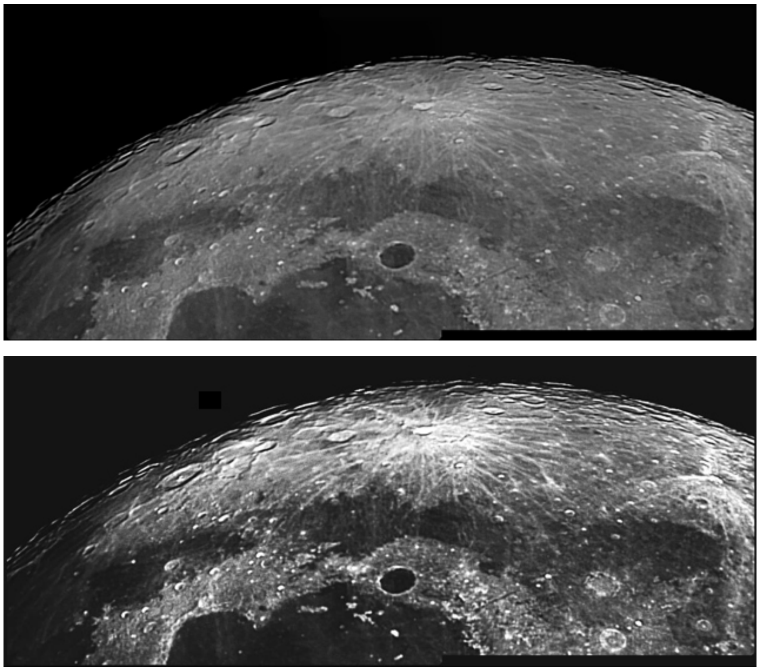
WANING GIBBOUS MOON-Mike Boschat-Halifax, Nova Scotia, Canada. March 25, 2010 23:30-24:00 UT. Seeing 7/10, Transparency 4/6. C8, f/10 SCT, 80x, afocal. Canon Rebel XT 350D 8.0 MP 18-55mm lens, 1/80 second, f/5, .6,400 ISO.



MENELAUS-Fred Corno-Settimo Torinese, Italy. February 20, 2010 start at 20:20 UT. Seeing-medium with light haze. 5" Apochromat, 149x.

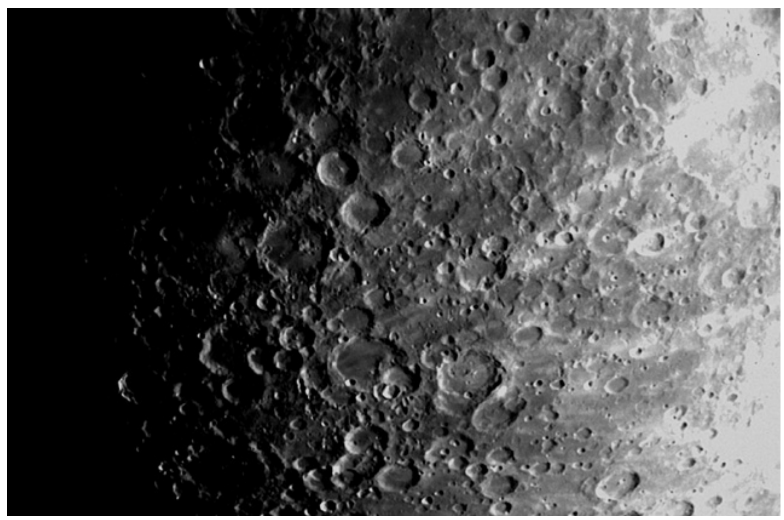
The ray pointing north from Menelaus was fairly visible, as was the squared formation just Southeast of it. When compared with photo pictures and maps, the reliefs sitting at the West of Menelaus were by me interpreted as crater like formations rather than ridges as they are. Such an effect is due to difficulties in correctly placing features when seeing is not perfect and the tendency of brain to interpret random forms as something already known.

SINUS AESTUUM-Howard Eskildsen-Ocala, Florida, USA. January 28, 2010 01:06 UT. Seeing 8/10, Transparency 5/6. Meade 6" f/8 refractor, 2x barlow, DMK 41AU02 AS, no filter.



NORTHERN LIMB-Richard Hill – Tucson, Arizona, USA July 18, 2008 08:10 UT. 3.5" Questar, 2x barlow, SP900NC. Top, normal processing. Bottom, processed for rays.

TYCHO RAYS-Jerry Hubbell. April 4, 2009 00:25 UT. Sky-Watcher Equinox 120 ED APO refractor, ATIK 314e.



ARISTARCHUS-Paolo Lazzarotti – Massa, Italy. August 15, 2009 03:58 UT. Seeing 6/10, Transparency 4/6. Gladius CF-315 Lazzarotti Opt. Scope, LVI-1392 PRO experimental camera, Edmund R filter, 0.18 arcsec/pixel.

KEPLER Sunrise-Richard Hill – Tucson, Arizona, USA March 26, 2010 04:08 UT. Seeing 8/10. C14, 2x barlow, f/22. DMK21AU04, UV/IR blocking filter.

KEPLER - Paolo Lazzarotti – Massa, Italy. September 30, 2009 20:50 UT. Seeing 6-8/10, Transparency 5/6. Gladius CF-315 Lazzarotti Opt. Scope, LVI-1392 PRO experimental camera, Edmund R filter, 0.18 arcsec/pixel.

Sculpturing the Moon

Fred Corno, Settimo Torinese, Italy

Highland districts in proximity to the middle of the visible side of the Moon play a fundamental role in understanding of lunar geological history. Gilbert, at the end of 1800, was the first observer attentive enough to recognize the linear sculptures crossing the area as radiating from a common point, centered in Mare Imbrium: he interpreted them as the "scars" of material projected by a giant impact, violent enough to generate the basin hosting the Sea of Rains. Unfortunately, Gilbert, a geologist, published his arguments in an obscure geological journal. The study went completely unnoticed. A correct understanding of the real nature of the sculptures was proposed again only in the mid 1900's, with the work of Baldwin. The concept of lunar craters as impact structures rather than volcanic was eventually laid out, and the ground for all the next age of lunar geological studies was then set.

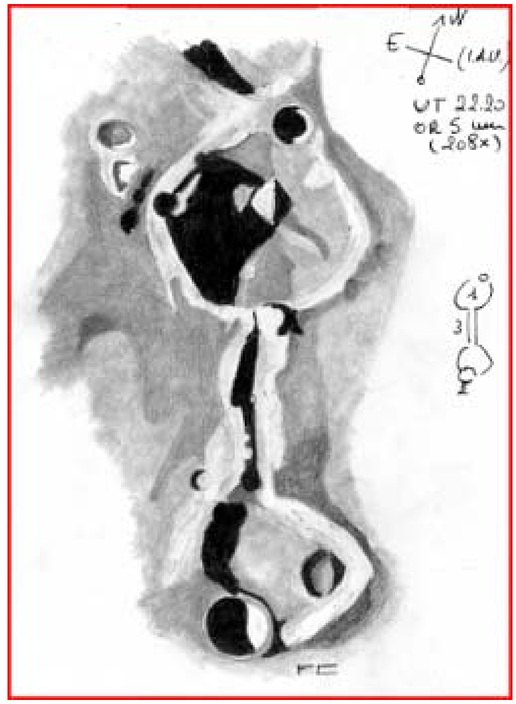


Figure 1: Drawing from the observation of the 23rd of March 2010, at 208x with a 5" apo, at 22.20 UT, from Settimo Torinese, Italy.

Probe sensing and manned missions finalized the lunar geological model, accounting for different structures laid out due to the driving force of a bombardment by meteoroids, modulated along the solar system lifespan: heavy bombardment with powerful strokes initially shaped a basin landscape, where mare lavas were collected from a then still hot Moon. Progressively smaller bodies went on poking our satellite, still changing the appearance of both the highlands and mare domains. Progressive cooling of the interior caused the lava surfacing to be less and less massive, until the Moon became a body essentially cold and inert from the geological standpoint. Active volcanic features are still the Holy Grail of all lunar scientists, observers and amateurs, who in most of the cases have to content themselves with observing domes and dark halo craters, both representative of the most recent lunar endogenous activity.

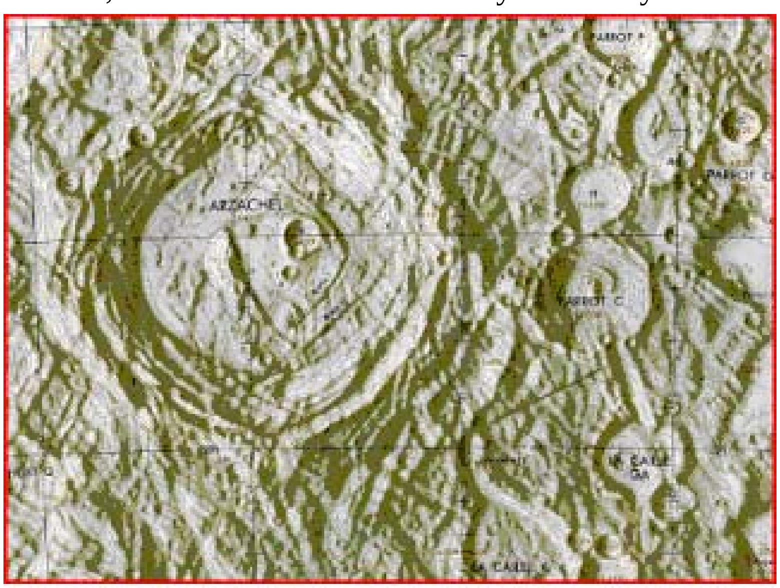


Figure 2: A crop from LAC 095, representing Arzachel and, on its eastern side, Parrot C and La Caille GA.

As one of those amateurs, the night of the 23rd of March 2010 (22.20 UT) I was actually scanning the Alphonsus area for dark halo craters, when I come upon the feature here described: craters Parrot C (marked as 1 in my drawing, fig. 1) and La Caille GA (marked as 2) lie immediately to the East of the prominent Arzachel (approximately 1°E, 18.5°S): the two of them are connected by an evident linear trough (3),, running in the NNW-SSE direction. I interpreted it as a member of the Imbrian Sculpture system, superimposed on previously formed craters. The whole region spans approximately 80 km from N to S.

The feature is depicted in the LAC 095 (fig. 2) and Moon Geological Chart I-822: according to the latter, the trough runs through a portion of pre-imbrian or lower-imbrian age terrain, where radial sculptures from Imbrian impact may have been laid out. Crater Parrot C shows also in the middle some sort of a peak that has been interpreted as a dome and is very prominent in the drawing I made during my observing session. I had therefore the opportunity to observe several different characteristics of the lunar geological history at once: ancient highlands, scarred by subdued craters and the projection of the Imbrian impact, as long with hints of volcanism.

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LUNAR TOPOGRAPHICAL STUDIES

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

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

OBSERVATIONS RECEIVED

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 6, 8, 14, 15, 17 day Moon, Theophilus, Constant solar illumination angle synthetic images (6).

FRED CORNO-SETTIMO TORINESE, ITALY. Drawing of Parrot C to La Caille GA.

ED CRANDALL – LEWISVILLE, NORTH CAROLINA, USA. Digital images of Alphonsus, Archimedes, Bode, Clavius, Copernicus, Davy to Fra Mauro, Deslandres, Plato, & Straight Wall.

PETER GREGO – ST. DENNIS, CORNWALL, UK. Drawings of Aristarchus, Briggs, Cauchy, Parry & Rima Ariadaeus.

RICHARD HILL – TUCSON, ARIZONA, USA Digital images of Kepler, Philolaus.

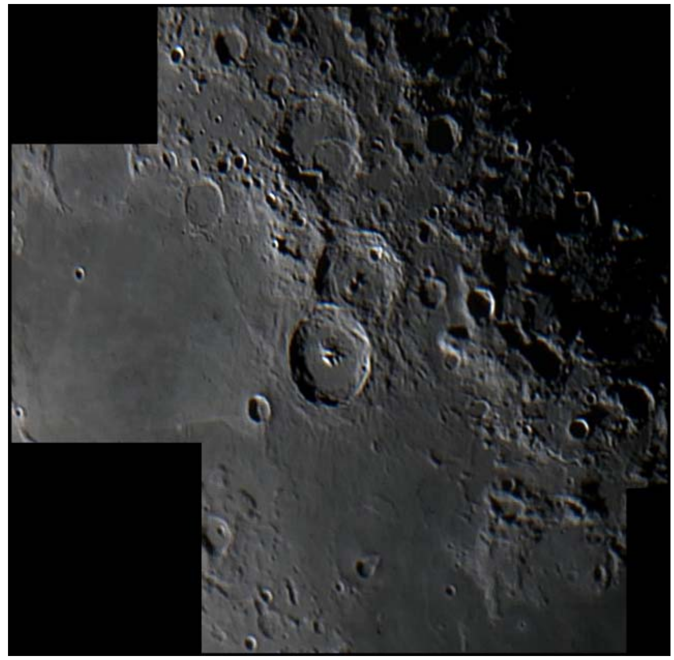
STEVE LANG- AUCKLAND, NEW ZEALAND. Digital images of Full Moon & Neper-Mare Marginis.

PAOLO LAZZAROTTI – MASSA, ITALY. Digital images of Gassendi-Mersenius-Billy & Kepler.

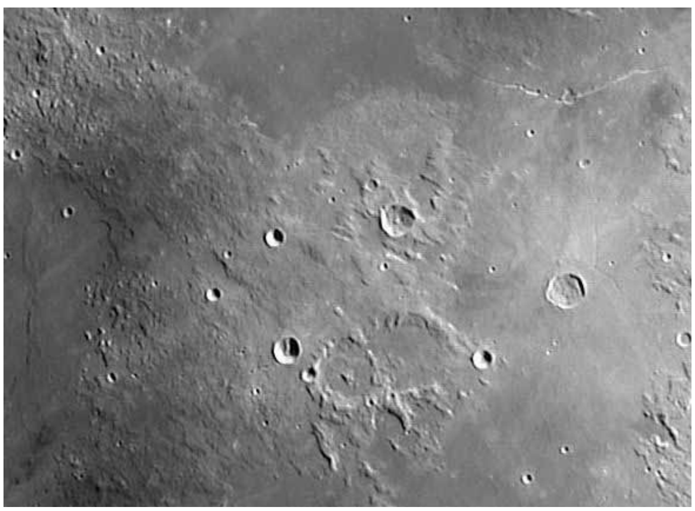
PHILLIP MORGAN –LOWER HARTHALL-TENBURY WELLS, WORCESTERSHIRE, ENGLAND. Drawing of Silberslag to Hyginus.

HONGSUN YOON –SEOUL, REPUBLIC OF KOREA. Digital image Kepler.

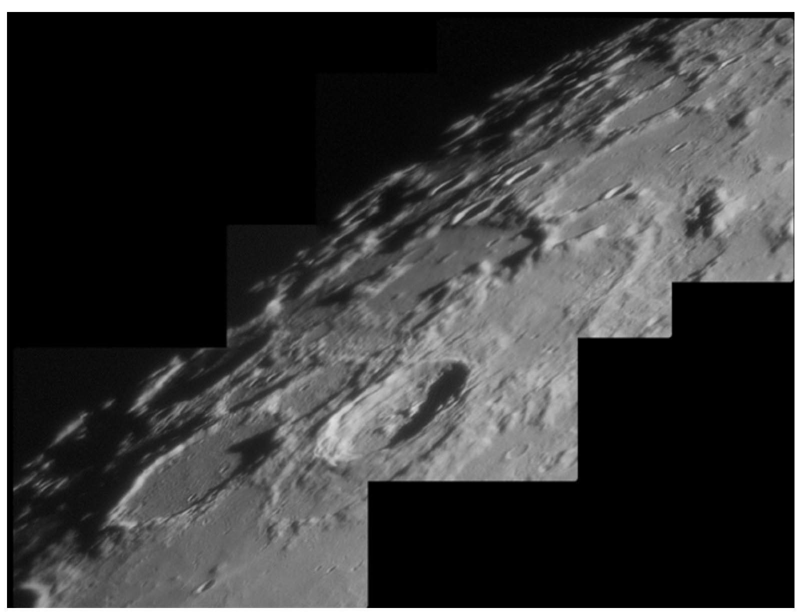
RECENT TOPOGRAPHICAL OBSERVATIONS



THEOPHILUS-Maurice Collins - Palmerston North, New Zealand. April 20, 2010 07:30 UT. C8, SCT, 3x barlow, LPI.

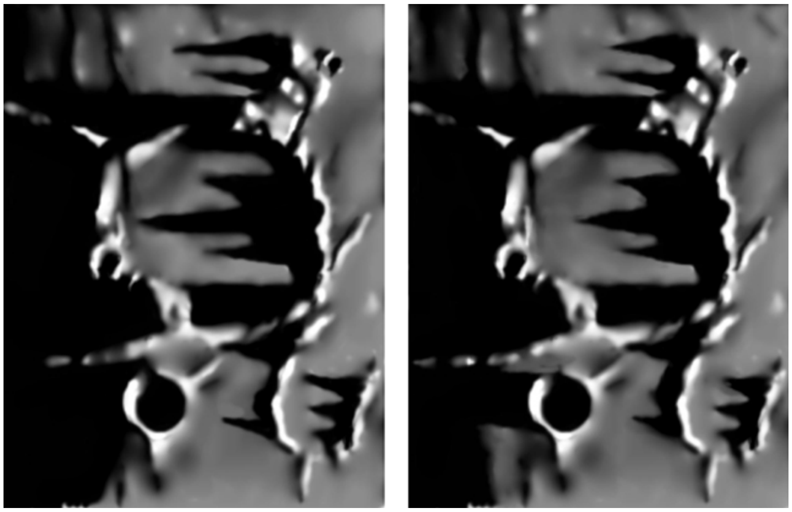


BODE – Ed Crandall – Lewisville, North Carolina, USA. March 25, 2010 00:55 UT. Colongitude 25º, Seeing AIII. 110 mm f/6.5 APO, 3x barlow, ToUcam.



PHILOLAUS – Richard Hill – Tucson, Arizona, USA . March 27, 2007 04:36 UT. Seeing 8/10. C14, 2x barlow, f/22, SCT. DMK21AU04, UV/IR block filter.

RECENT TOPOGRAPHICAL OBSERVATIONS

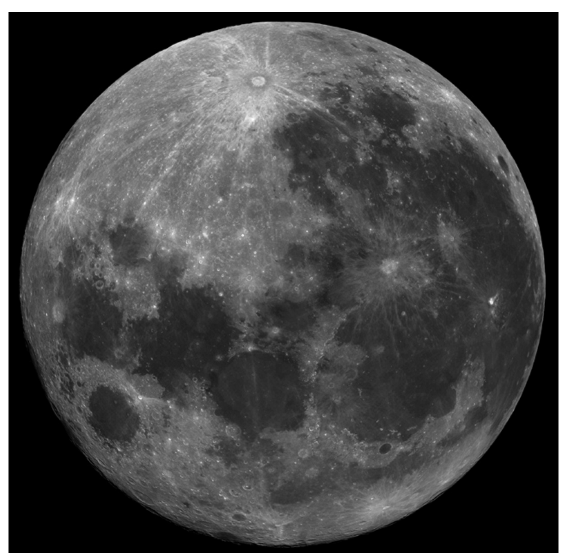


PARRY-Peter Grego, St. Dennis, Cornwall UK. April 22, 2010 Left 22:10-22:40, Right 22:55-23:05 UT. Seeing AIII. 200mm SCT, 250x.

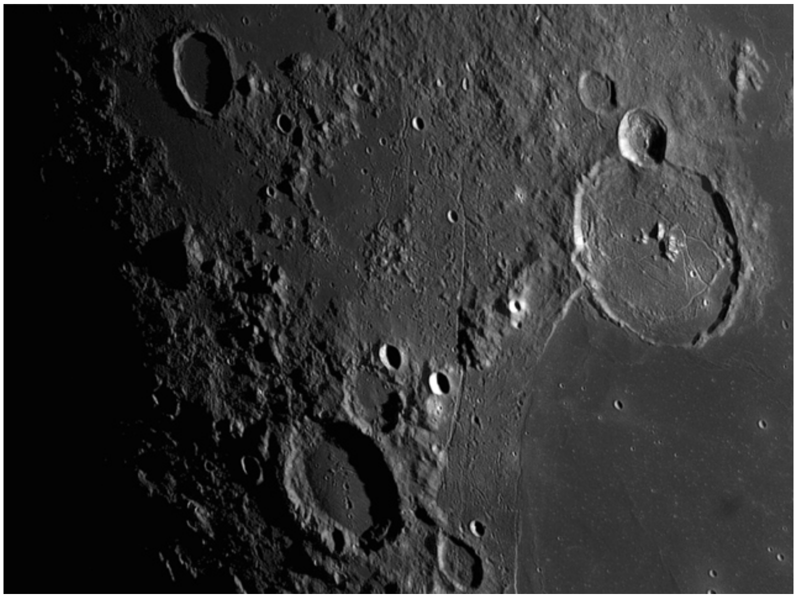
Parry was chosen for study as it lay on the morning terminator and displayed a number of long pointed shadows on its floor. Two observational sketches were made, the second using the first as a template upon which any changes caused by the increasing angle of illumination could be depicted. Parry was crossed by a number of shadows cast by its eastern rim; one elongated shadow ran across the floor to almost touch the inner western wall, and this was flanked in the north and south by two smaller elongated shadows. By the time the second observation was made these shadows had retreated somewhat, the longest middle shadow reaching around two-thirds of the way across Parry's floor. Shadow also covered a portion of the far northern floor and a good portion of Parry's southern floor. Little topographical detail was discerned on the parts of parry's floor that were illuminated, but there was some tonal variation,

particularly in the north where a darker section was observed. A linear rille was observed on Parry's far western floor, running from the mid-point of the inner wall's base across the wall itself, and this appeared to be continued into the crater Fra Mauro, the southern part of which occupies the top of the sketch. Another shadowed north-south linear feature lay further west on Fra Mauro's floor, probably another rille. Part of Fra Mauro's southern wall extended to the west, illuminated and distinct from the shadow. To the north of Parry there was a complex group of mountains which cast two elongated shadows part way across the floor of Fra Mauro. Bonpland, west of Parry, was entirely in shadow apart from a section of its northern wall (shared with Fra Mauro) and a section of its southern wall near Tolansky. Tolansky was on the terminator at the beginning of the observation and was largely internally shadowed; by the time the second observation was made, the shadow cast by Tolansky towards the terminator was clearly defined. The interior of the flooded crater Parry M was visible, and it was crossed by three distinct elongated shadows.

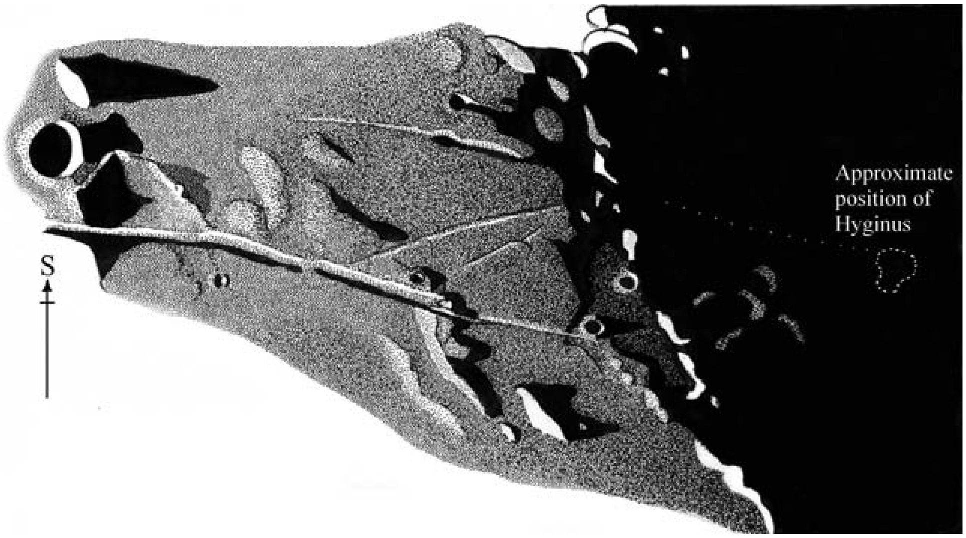
FULL MOON-Steve Lang, Auckland, New Zealand. March 30, 2010 08:05-08:10 UT. Seeing AIII. 254 mm, f/4.7 Newtonian. Vineon UCM1301, Baader UV/IR filter.



RECENT TOPOGRAPHICAL OBSERVATIONS



GASSENDI-MERSENIUS-BILLY - Paolo Lazzarotti – Massa, Italy. September 30, 2009 20:37 UT. Seeing 6-8/10, Transparency 5/6. Gladius CF-315 Lazzarotti Opt. Scope, LVI-1392 PRO experimental camera, Edmund R filter, 0.18 arcsec/pixel.

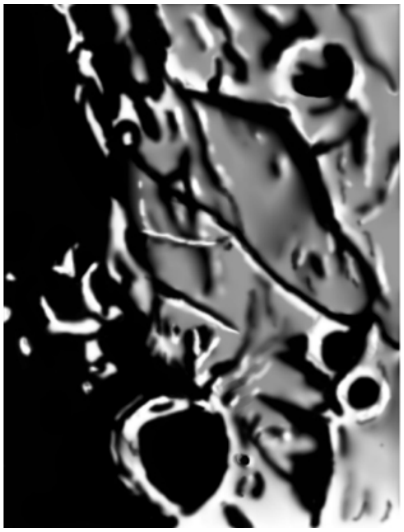


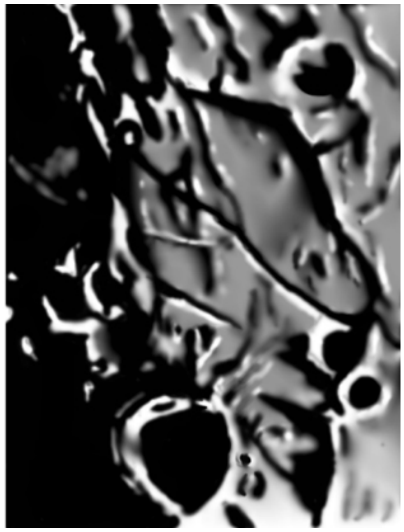
SILBERSCHLAG-HYGINUS-Phillip Morgan – Lower Harthall-Tenbury Wells, Worcestershire, England. April 20, 2010 20:00-20:30 UT. Seeing 7/10, Transparency 3/5. Colongitude 351.8-352.1º. 305mm, f/5, Newtonian, 400x.

(Note: Peter Grego's observations of Rima Ariadaeus are simultaneous with this.)

The Ariadaeus region is one of endless fascination with nearly always something of interest to study. On this occasion I was concentrating on the western terminus of the great rille where it starts to dwindle in depth and width after passing through a ridge some distance west of Silberschlag. This final western section of the rille is very faint and appears to completely disappear at the small craterlet Hyginus F. Just to the south-west of F is a similar craterlet Hyginus C. Cutting through the ridge to the west of Silberschlag there is a faint oblique branching rille that links the Ariadaeus Rille with the more southerly lying Hyginus Rille. This branch is not a difficult object at this colongitude, but as soon as the Sun has risen a little it soon becomes invisible to the observer. Just immediately to the north of this oblique rille a shorter and more difficult rille-like feature was noted. Subsequent studies of the Orbiter, Clementine and LAC charts reveal nothing of this feature. It was, however, held clearly for some time and definitely exists. In The Times Atlas there is a faint line of shade in exactly the correct position, indicating a faint ridge or similar. Further observations are needed to determine the precise nature of this object.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



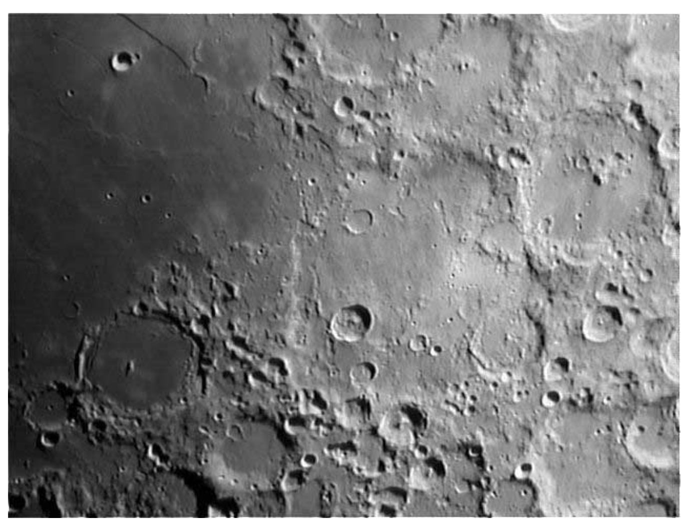


RIMA ARIADAEUS – Peter Grego – St. Dennis, Cornwall, UK. April 20, 2010 19:40-20:20 UT (left), 20:20-20:30 UT (right). Seeing AI-II, very good, no wind, clear. Colongitude 351.7-352.1º. 200 mm SCT, 250x.

(Note: Phillip Morgan's observations of Silberschlag to Hyginus are simultaneous with these.)

The observation was commenced in astronomical twilight. A sizeable area covering eastern Sinus Medii and the western section of Rima Ariadaeus from near Silberschlag to the terminator, from Agrippa in the south to Boscovich in the north, was portrayed. The vast amount of intricate topographical detail within this area renders this a general study only – there was too much fine detail on view to depict it all. Agrippa was largely full of shadow, but its inner western rim was illuminated brightly; a dark section of this wall lay in the north, presumably a section of terracing, while mid-inner wall a dusky band was observed. Curiously, beyond the main western rim of Agrippa there appeared dim sections of a narrow outer ridge, parallel to the rim. The area immediately north of Agrippa was full of radial ridges (impact sculpting). Much of the area under this illumination is taken with what superficially appears to be a very large and eroded unnamed crater, its eastern wall being clearly defined by a scarp running north of Silberschlag and around to the south of Boscovich; although this is not a single crater in reality, the area may conceal a number of partly buried and eroded craters predating the mare fill. In the north, Boscovich was largely filled with shadow, but some of its western floor was visible; however, the Rima Boscovich likely lay within shadow. The main feature in this observation, the western part of Rima Ariadaeus, was very prominent; also visible was a section of eastern Rima Hyginus, northwest of Agrippa, plus another rille that appeared to cross between Rima Hyginus and Rima Ariadaeus. The first study was made between 19:40 and 20:20 UT, and by the time the second observation was made up to 20:30 UT, several features beyond the terminator had dimly come into view, including what appears to be a small section of Rima Hyginus to the east of Hyginus itself.

DESLANDRES – Ed Crandall – Lewisville, North Carolina, USA. March 25, 2010 00:35 UT. Colongitude 25º, Seeing AIII. 110 mm f/6.5 APO, 3x barlow, ToUcam.



LUNAR TRANSIENT PHENOMENA

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

LTP NEWSLETTER – MAY 2010

Dr. Anthony Cook - Coordinator

Observations for March 2010 were received from the following observers: Jay Albert (Lakeworth, FL, USA), Maurice Collins (New Zealand), myself (Aberystwyth University, UK), Marie Cook (Mundesley, UK), Steve Lang (New Zealand), and Prof. Bill Leatherbarrow (Sheffield, UK).

LTP Reports: No LTP reports were received for March 2010, although at 02:00UT on March 26th, Peter Grego (St Dennis, UK) noted that the Moon looked green to his eyes through cloud, and at 00:25UT on April 23rd the Moon had a magenta colored corona. Whether these were related to the recent Icelandic dust cloud, that caused European air space authorities to ground all flights for several days, is a possibility that Peter considers. However from Wales (UK), I kept a close watch on sunsets for odd colors, and also for evidence of the extension of twilight hours, but found nothing unusual. However if the volcanic dust cloud distribution was clumpy in density, across the Europe then just maybe Peter was looking through a more dense region of sky?

On 2010 April 18th at UT 20:45-21:00 Peter Grego, using his new 17.5 inch reflector noted that Aristarchus was the brightest that he had ever seen it before, most notably the central peak (estimated 8th magnitude – but approximate due to the lack of nearby comparison stars). The effect lasted 15 minutes and although it faded, Peter states that other features in Earthshine remained clearly visible. The seeing was Antoniadi II-III. A limited alert was put out by Twitter, and via David Darling's email alert system. One response from Raffaello Braga (UAI, Italy), was that nothing unusual seen in Earthshine, although I don't have his observing times yet for that night.

Now there are plenty LTP reports in the past concerning Aristarchus appearing very bright and varying in brightness in Earthshine. However it is also important to remember the findings of Dr Sally Langford of University of Melbourne's School of Physics, where she found that in red light, reflectivity from the Earth's landmass, oceans and atmosphere could change by up to 23% over a period of 1 hour. Now one would presume that at shorter wavelengths, and with a blue Earth, that the variations could be even greater? This of course will affect brightness and contrast of the whole of the Earthlit hemisphere. However Aristarchus is known to have a hint of a bluish cast, therefore any increase in reflected light from the Earth, at blue wavelengths, could make it appear to brighten more relatively than other lunar features. Well this is only a theory!

Although the following is not a LTP, readers may be interested to know that on 2010 April 27th at UT 00:10-00:30 (col 66.6-66.8°) and UT 01:45-02:00 (col. 67.4-67.6°) Peter Grego (20 and 30cm reflectors) reported seeing: (1) a small craterlet, and (2) an adjacent near E-W trending lighter shade lineament (or wrinkle ridge?), both just east of Briggs crater. Neither reported features appear on the relevant Lunar Aeronautical Charts, Lunar Orbiter photographs, nor on very recent LROC images at the precise position indicated on Peter's drawing. Assuming the accuracy of his sketch, then the craterlet lies approximately midway between the NE rim of Briggs crater and Briggs C. So if any of you have images or sketches, of this area, at this colongitude range, then please let us know so that we can solve this observational puzzle.

Routine Reports: Here are a sample selection of routine reports received for March and comparisons with the original LTP reports (in italics) under the similar illumination conditions:

On 1987 Jun 04 at UT02:26-03:26 D. Darling (Sun Praire, WI, USA, S=G and T=4) observed that Mons Piton was the brightest object on the Moon that he had ever noted before. Variations seen gave *the mountain a "silvery" shine. The abnormal brightness was confirmed by another independent observer. The Cameron 2006 catalog ID=302 and the weight=5.*

Marie Cook observed on 2010 Mar 22 at 21:25UT and reported: “Piton quite bright on terminator”. Earlier, at 19:44UT Prof Bill Leatherbarrow imaged Mons Piton (See Figure 1) and had also checked the area visually and said: “Piton was indeed very bright, but I did not regard this as unusual in any way and it seemed entirely consonant with what one might expect as such a feature caught the low morning sun”. Clearly nothing abnormal seen on this occasion by either observer!

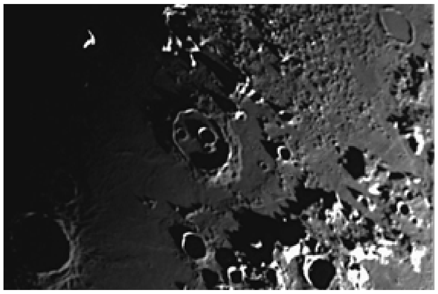

Figure 1. CCD image of Mons Piton (North at the top) taken by Prof Leatherbarrow 2010 Mar 22 at 1944UT in red light.

Eratosthenes 1961 Oct 18 UT 01:05-01:25 Observed by Bartlett (Baltimore, MD, USA, 5" reflector x180, S=P, T=G) "Fluorescent violet on inner E(IAU?) wall (reported as bright spot in MB). NASA catalog weight=4 (high). NASA catalog ID #751.

Eratosthenes 1970 Apr 15 UTC 01:25-01:42 Observed by daSilva (Brazil,10" reflector x200 & 20" refractor x224, Seeing=good, Transparency=Good). "Vis. blink? on lower c.p. Ilum. walls were yellowish-white C.p. diamond brightness with a pt. flashing. Turbulent atms. impeded confirm. Other features were normal (Apollo 13 watch)" NASA catalog weight=3. NASA catalog ID #1252.

On 2010 Mar 24, between UT01:35-03:20 Jay Albert checked out Eratosthenes under similar (+/- 0.5°) illumination conditions to the above two past LTP and reported that: “Eratosthenes [751]- the inner E wall, as well as the entire crater floor, was in deep shadow. The W wall was brightly lit with a small, especially bright spot in the middle. No "fluorescent violet" was seen on the E wall or anywhere else”. Then for the second LTP: “”Eratosthenes [1252]- I couldn't see the central peak at all when I first got the crater in the eyepiece. I may have spotted the top of the central peak at 03:05. It was tiny and very faint, but it also seemed offset to the W of the center of the crater floor. The apparent offset might have been an illusion due to the entire E wall below the rim being in shadow while the W wall was clearly seen almost to the crater's floor. I don't think it was an elevated part of the lowest slope of the W wall. In any case, it was too tiny and too faint to remain visible when I tried a red/blue blink. 03:15 UT”.

So this tells us that for the Bartlett LTP, the original LTP description should probably read “W(IAU) wall, and for the daSilva LTP I suspect that Jay observed just on the edge of the +/- 0.5° similar illumination tolerance. Still it is good to have a record of the appearance leading up to the LTP illumination conditions.

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 .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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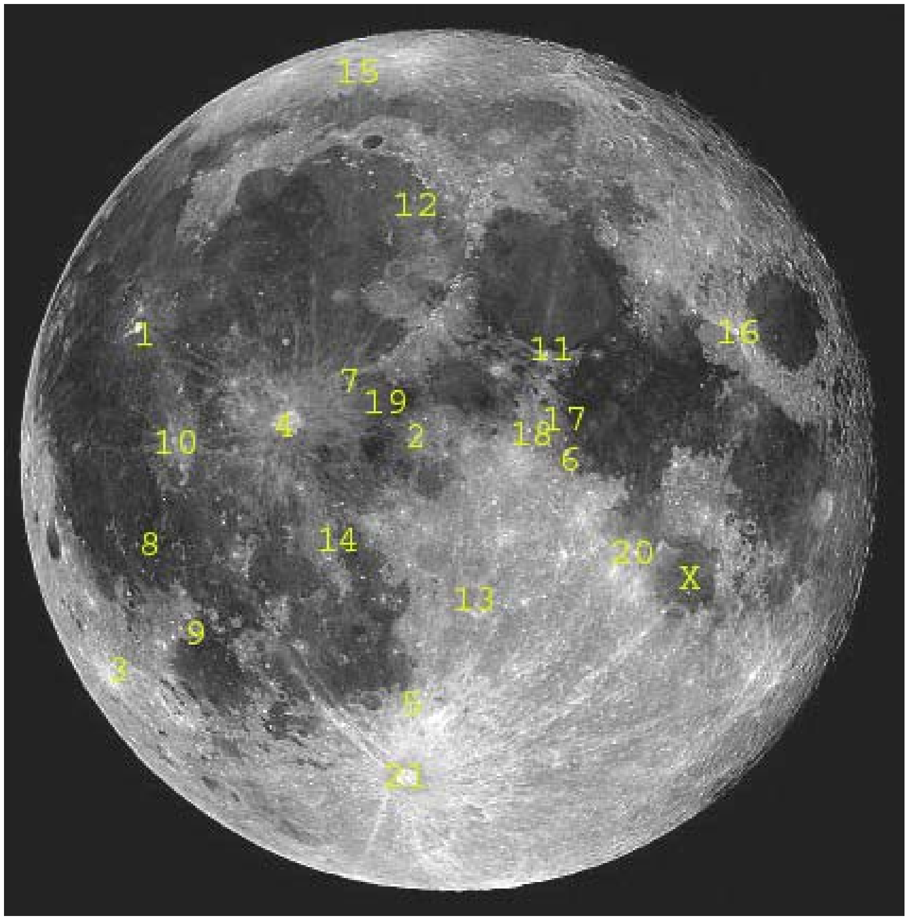
KEY TO IMAGES IN THIS ISSUE

1. **Aristarchus**
2. **Bode**
3. **Byrgius A**
4. **Copernicus**
5. **Delandres**
6. **Dionysius**
7. **Eratosthenes**
8. **Flamsteed T**
9. **Gassendi**
10. **Kepler**
11. **Menelaus**
12. **Mons Piton**
13. **Parrot C**
14. **Parry**
15. **Philolaus**
16. **Proclus**
17. **Rima Ariadaeus**
18. **Silberschlag**
19. **Sinus Aestuum**
20. **Theophilus**
21. **Tycho**



FOCUS ON targets

Dark-Haloed Craters (July)

X = Mare Nectaris (September)