THE LUNAR OBSERVER

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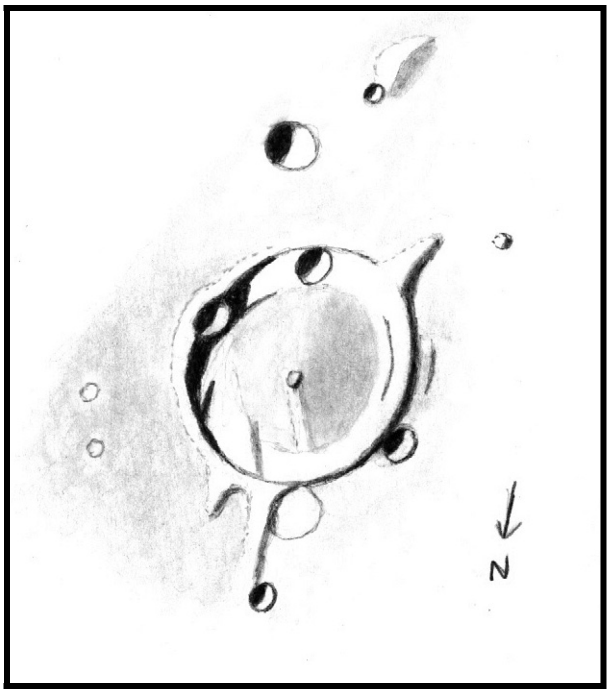
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – MAY 2013

SANTBECH



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
January 18, 2013 00:50-01:28 UT, 15 cm refl, 170x, seeing 7/10

I sketched this crater and vicinity on the evening of Jan. 17/18, 2013 while watching the moon hide four faint stars. This crater is near the southern tip of Mare Fecunditatis. Santbech has a small central peak (labeled beta on the Lunar Quadrant map), and what looks like a low ridge extending northwestward from it. The western half of its floor appears darker than its eastern half, and there is evidence of terracing. Several craters are in or near Santbech. The feature buried within interior eastern shadow is Santbech D, and an unlabeled crater is inside the south rim of Santbech. Santbech E is the larger crater to the south. This feature is elongated east-west and has a bright interior. The pit south of E is Santbech G; it is on the north side of a substantial mound. Santbech H abuts the west rim of Santbech. A ridge or prong extends southwestward from the rim of Santbech between the unlabeled crater and Santbech H, and an isolated hill is near the tip of this prong. Santbech J is on the north rim of Santbech. This crater is somewhat D-shaped, and appears shallower than any other crater on this sketch. Santbech K is the small, crisp crater north of J. Two other prongs extend northward from Santbech near J and K. These prongs are not as strongly shadowed as the prong to the southwest; they are obviously not as high. A fuzzy strip of shadow is inside the north rim of Santbech, and appears parallel to the low ridge near the central peak. Two tiny bright spots are in darker terrain east of Santbech. That side of Santbech is nearer to the main part of Mare Fecunditatis.

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LUNAR CALENDAR

MAY-JUNE 2013 (UT)

May 02	11:16	Last Quarter
May 04	03:00	Moon 5.7 Degrees NNW of Neptune
May 06	22:00	Moon 3.8 Degrees NNW of Uranus
May 09	15:00	Moon 0.75 Degrees NE of Mars
May 09	21:00	Moon 0.81 Degrees ENE of Mercury
May 10	00:31	New Moon (Start of Lunation 1118) (Annular Eclipse)
May 11	00:00	Moon 1.4 Degrees S of Venus
May 12	14:00	Moon 2.6 Degrees S of Jupiter
May 13	22:23	Moon at Apogee (405,826 km – 252,169 miles)
May 18	04:35	First Quarter
May 23	06:00	Moon 3.7 Degrees SSW of Saturn
May 25	04:26	Full Moon (Penumbral eclipse of Moon)
May 26	01:46	Moon at Perigee (358,374 km – 222,683 miles)
May 27	17:00	Moon 1.5 Degrees NE of Pluto
May 31	10:00	Moon 5.6 Degrees NNW of Neptune
May 31	18:59	Last Quarter
June 03	04:00	Moon 3.8 Degrees NNW of Uranus
June 07	14:00	Moon 1.8 Degrees SSE of Mars
June 08	15:58	New Moon (Start of Lunation 1119)
June 09	07:00	Moon 3.2 Degrees SSW of Jupiter
June 09	21:41	Moon at Apogee (406,486 km – 252,579 miles)
June 10	09:00	Moon 5.3 Degrees S of Venus
June 10	21:00	Moon 5.8 Degrees S of Mercury
June 16	17:24	First Quarter
June 19	17:00	Moon 3.6 Degrees S of Saturn
June 23	11:11	Moon at Perigee (356,989 km – 221,823 miles)
June 23	11:33	Full Moon
June 24	00:00	Moon 0.96 Degrees NNW of Pluto
June 27	19:00	Moon 5.6 Degrees N of Neptune
June 30	04:54	Last Quarter
June 30	13:00	Moon 3.5 Degrees NNW of Uranus

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** 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: Domes

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 2013** edition will be **Domes.** Current catalogs of lunar domes can be found at: http://digilander.libero.it/glrgroup/kapralcatalog.pdf and http://digilander.libero.it/glrgroup/consolidatedlunardomecatalogue.htm. Domes will only be visible on observations close to the terminator, although 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 add some of these objects to your observing list and send your favorites to:

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

Deadline for inclusion in the Domes article is June 20, 2013

FUTURE FOCUS ON ARTICLES:

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

Subject	TLO Issue	Deadline
Mons Rumker	**September, 2013**	**August 20, 2013**

ALCon 2013 In Atlanta

This year, the annual ALPO meeting will again be held in conjunction with the Astronomical League's ALCon, Wednesday July 24, 2013 through Saturday July 27, 2013 at Fernbank Science Center, near Atlanta, GA. Detailed information can be found in the JALPO vol. 55, #2, Spring 2013, which is freely available at http://www.alpo-astronomy.org/djalpo/55-2/JALPO55-2 - FREE with ALCon 2013 Registration.pdf or on the Astronomical League's website http://alcon2013.astroleague.org/.

A discounted room rate is available at the Emory Conference Center Hotel.

This year, all technical papers will be mainstreamed and presented at one location. Previously, the ALPO technical papers were presented separately from the others. Papers will be presented on Wednesday, July 24, and Thursday, July 25. If you would like to present a paper please submit by June 15, 2013, the following:

- Title of the paper being presented.
- A four- or five-sentence abstract of each paper.
- The format in which the presentation will be.
- A 100-word biography and a recent photograph of the presenter for posting on the ALCon 2013 website and inclusion in the printed program guide.

E-mail is the preferred method for contact: *ken.poshedly@alpo-astronomy.org*. If regular mail must be used, address all materials to:

ALCon 2013
c/o Ken Poshedly
1741 Bruckner Court
Snellville, Georgia 30078 USA

The preferred format is Microsoft PowerPoint, though 35mm slides are also acceptable. The final presentation should not exceed 20 minutes in length, to be followed by no more than five (5) minutes of questions from the audience. A hard-copy version of the paper should be made available for future web site publication.

Three side-trips are also available: Deerlick Astronomy Village; Agnes Scott College Bradley Observatory for the Star BBQ; and the Atlanta Astronomy Club's Walter F. Barber Observatory. In addition to these attractions, vendors will be available to discuss their exhibits, wares and services. The ALPO board meeting, which is open to all members, will be held Friday morning.

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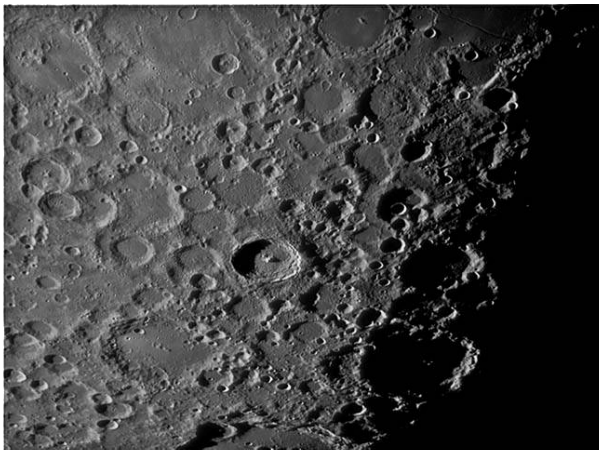
ONCE UPON A TIME

Howard Eskildsen

Once upon a time the Moon was bombarded mercilessly until its surface was saturated with craters, and each new impact erased other craters as it slammed the moon anew. Then things changed. Huge, basin-forming impacts erased many of the ancient craters and left deep depressions that later filled with lavas and provided a fresh smooth surface to record subsequent collisions with the lunar surface. Since that time only a few large impacts have left notable craters and no more huge impacts have occurred to resurface the Moon.



TYCHO REGION. *Howard Eskildsen-Ocala, Florida, USA. April 20, 2013 UT 02:01 UT. Seeing 7-8/10, Transparency 0-3/6 (holes & cirrus). 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.*

Evidence of this change can be found as simply as looking from south to north. The image "Tycho Region" shows the rugged, heavily-battered southern highlands where every crater infringes upon another and most look like tired old remnants of their former glory. Tycho, near the center of the image, is the shining exception and still looks fresh and youthful.

Next view the image "Archimedes-Lambert;" this part of Mare Imbrium is nearly as featureless as the Nebraska plains. Even the large crater on the right, Archimedes, formed before the basalt was emplaced, while Timocharis at the lower center of the image, and Lambert to the lower left, are the only sizeable craters on the whole image that are younger than the mare basalts . Obviously impacting objects have become much, much fewer and smaller on average than before the Imbrium basin formed. Since the Apollo missions showed the Imbrium basin to be around 3.85 billion years old, and its basaltic fill more than 3 billion years old, the period of heavy cratering of the Moon occurred once upon a time a very long time ago. Wow!

ARCHIMEDES-LAMBERT. *Howard Eskildsen-Ocala, Florida, USA. April 20, 2013 UT 01:48 UT. Seeing 7-8/10, Transparency 0-3/6 (holes & cirrus). 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.*

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FOCUS ON: Mare Insularum

By Wayne Bailey

Coordinator: Lunar Topographical Studies

Mare Insularum is rather poorly defined region, lying south and west of Copernicus. It was created, in the 1970's, to mark a proposed impact basin, whose existence has never been verified. It does, however, serve to partition some of the large area formerly occupied by Oceanus Procellarum and Mare Nubium. It's well situated for observation with sunrise occurring shortly after first quarter, when the moon is high in the early evening sky. It also offers a wide range of features for examination: craters, crater chains, domes, mare surface, mountains, rays and wrinkle ridges. Surveyors 2 & 3 and Apollo 12 landed in what is now Mare Insularum. Apollo 14 landed near the southeast border, north of Fra Mauro. The Apollo 12 astronauts retrieved pieces of the Surveyor 3 spacecraft to investigate the effects of exposure to the lunar environment.

Figure 1 is a high sun overview of northern Mare Insularum. The image is dominated by Copernicus and its ray system, but we're going to concentrate on the areas to the west (left) and south (down). On the northern edge, the Montes Carpatus mark the southern edge of Mare Imbrium. The shallow, flat floored craters T. Mayer and Gay-Lussac are near the west and east ends respectively of the mountains. The conspicuous craters Reinhold and Lansberg are southwest of Copernicus. Hortensius is a little south of midway along a line between T. Mayer and Lansberg. Milichius is the middle crater in the line of three craters between Hortensius and T. Mayer.

Figure 1. ***High Sun Overview*** *- Maurice Collins-Palmerston North, New Zealand. March 23, 2013 08:38 UT. WO FLT-110, Refr, f/21(3x barlow), LPI.*

Mare Insularum continues south to Fra Mauro as shown in the high sun view in figure 2. In this view, Eratosthenes is near the upper right, Reinhold is center left. Gambart is the shallow crater midway between Reinhold and Mosting in the lower right. Fra Mauro is just beyond the lower edge, left of center. High sun images emphasize albedo differences, so rays are prominent. Some textural differences are visible on the mare surface, however. Notice the overall roughness of the region extending north from Fra Mauro towards Copernicus. Even though this is a fairly high sun image, the dome field north of Hortensius is visible.

Figure 2 ***Southeast Mare Insularum High Sun*** *Jay Albert-Lake Worth, Florida, USA. March 22, 2013 03:06UT C-11 SCT, Nextimage 5.*

Figure 3 is another high sun view of most of Mare Insularum that emphasizes the rays and ejecta that overlie much of the region. Again, the dome field north of Hortensius and Milichius pi are faintly visible in this image, although the summit pits are not (see below for more discussion of the domes)

Figure 4 shows a low sun view of southern Mare Insularum which emphasizes the low relief features. Compare the surface structure between Gambart (in the middle of the image) and Fra Mauro (the large buried crater near the center of the bottom edge) to that east or west of Gambart. The surface east of Gambart is typical flat mare. West of Gambart, the surface is dotted with small blocks. Between Gambart and Fra Mauro the surface rises, and appears to be scarred by linear grooves radial to Mare Imbrium.

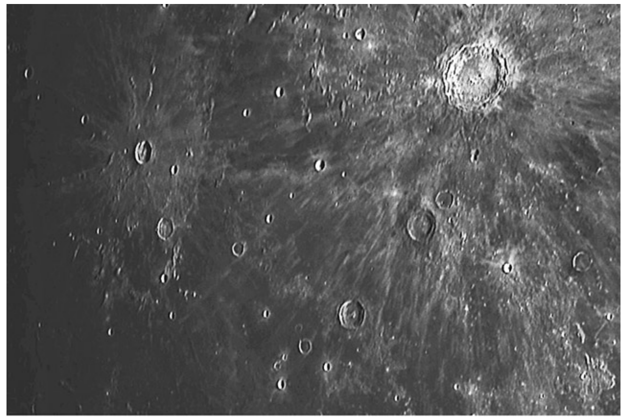


Figure 3. ***High Sun Overview of Mare Insularum.*** *Bill Dembowski-Windber, Pennsylvania, USA. August 29, 2012 00:59 UT. Seeing 5/10, Colong 54.2º. C-9.25 f/10 SCT, DMK41, UV/IR filter.*

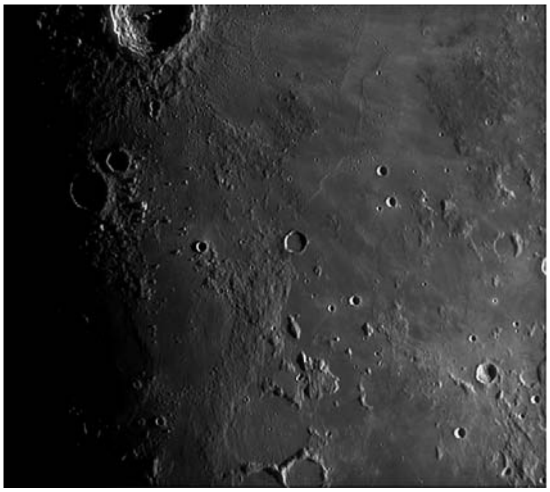


Figure 4. **Southeast Mare Insularum**-Howard Eskildsen-Ocala, Florida, USA. April 20, 2013 UT 01:54 UT. Seeing 7-8/10, Transparency 0-3/6 (holes & cirrus). 6” f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.

Howard wrote in the commentary accompanying this image:

“The image ‘Copernicus-Fra Mauro’ reveals the lower 2/3 of Copernicus with its ruffled ejecta blanket coarsely sloping southward from the rim to the small double crater Fauth and then feathering out into the rugged regions beyond. Look back and forth between the two images and imagine Copernicus magically swelling to the size of the Imbrium basin with its southern boundaries becoming the Carpathian and Apennine Mountains, and its ejecta blanket extending proportionally farther and farther southward. Can you see the remains of the Imbrium ejecta blanket that was partly buried by mare basalts, just like the portion the southern Imbrium rim? They are visible in the central photo and also on the upper right margin.

“Near the southern central edge of the image rests the tired, worn crater, Fra Mauro, which is about the same size as Copernicus. It was badly battered by the Imbrium impact. The island of rugged Imbrium ejecta just north of Fra Mauro is known as the Fra Mauro formation and was the intended target for Apollo 13 and the landing site of Apollo 14, which gave us vital clues to understanding the Imbrium impact event.

“Finally, notice how tired and worn the Fra Mauro formation appears compared to the sharp, distinct features of the Copernican rima and ejecta. Also notice how Copernicus has left its marks on the older ejecta and the basaltic formations, and how these older formations previously altered the appearance of the once Copernicus-like Fra Mauro. Can you begin to sense the flow of time though the varying freshness of these features and their relative emplacements? “

The area west of Copernicus is also a very interesting area to observe. Figure 5 shows this region under low sun illumination, just after sunrise. West of Copernicus, the smooth mare surface is marred by small peaks and numerous blocks. Crater chains and furrows are visible, most of which are radial to Copernicus. Although it’s not part of Mare Insularum, I’ll point out that T. Mayer A (on the east wall of T. Mayer) is a banded crater. Just south of T. Mayer there’s an conspicuous arc of small peaks, open to the west. Within this arc several low domes can be seen. At least one has a visible summit pit.

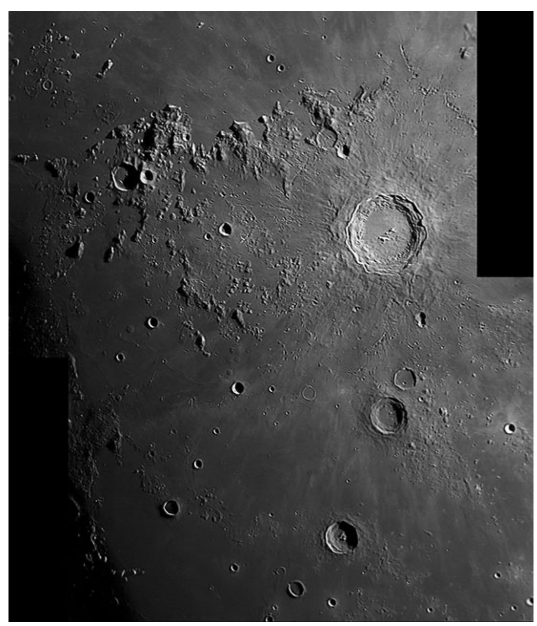
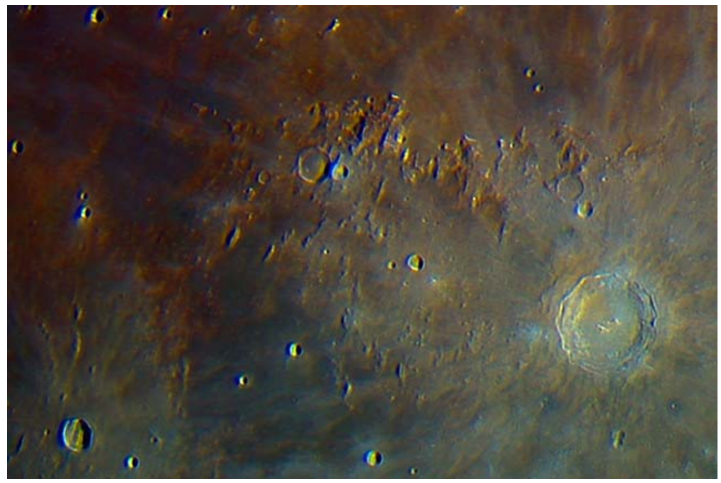


Figure 5. ***Northwest Mare Insularum****-Robert Reeves-San Antonio, Texas USA. April 25, 2013 UT. C-8 SCT, f/25.*

Several more shallow domes may be visible near the entrance to this embayment, which seems to be marked by two parallel, elongated massifs. More conspicuous domes can be found farther south, near Milichius and Hortensius . Milichius pi, one of the best known domes, is visible with its summit pit west of Milichius. A slightly larger, but less conspicuous, dome, with two summit pits is located to the northwest. North of Hortensius is a field of six domes, five of which have summit pits. Rima Milichius runs north-south west of Milichius A, but is very difficult to see. It appears to alternate between a rille and a ridge along its length.

One technique to distinguish among features of different composition or age that is not widely used in amateur imaging is color enhancement. Figure 6 is an enhanced color image of the area from Copernicus to Kepler, including northwest Mare Insularum. Typically, the freshest material appears bluish, while older material becomes progressively redder. Composition, and to some extent surface texture, also contribute to the color differences. Even though domes are widely accepted as volcanic features, there's no obvious color difference at this resolution. Copernicus rays, which are young, show up well. The dark blue mare surface also appears distinctly different than the highland or debris covered areas.



<u>Figure 6</u> Northwest Mare Insularum in Color. *John Duchek-Carrizozo, New Mexico, USA. March 4,* ***2012 10" Newtonian. Canon Tli 500D. North up.***

Although there may be little scientific justification for Mare Insularum as a distinct area, it is an easily located area with an abundance of interesting features. The fact that it's well positioned for convenient observation by those with other obligations, such as a job and family, should enhance its appeal.

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.

Bussey, Ben & Paul Spudis. 2004. The Clementine Atlas of the Moon. Cambridge University Press, New York.

Byrne, Charles. 2005. Lunar Orbiter Photographic Atlas of the Near Side of the Moon. Springer-Verlag, London.

Chu, Alan, Wolfgang Paech, Mario Wigand & Storm Dunlop. 2012. The Cambridge Photographic Moon Atlas. Cambridge University Press, New York.

Gillis, Jeffrey J. ed. 2004. Digital Lunar Orbiter Photographic Atlas of the Moon.. Lunar & Planetary Institute, Houston. Contribution #1205 (DVD). (http://www.lpi.usra.edu/resources/lunar_orbiter/).

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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.

Wlasuk, Peter. 2000. Observing the Moon. Springer-Verlag, London.

Wood, Charles. 2003. The Moon: A Personal View. Sky Publishing Corp. Cambridge.

Wood, Charles & Maurice Collins. 2012. 21st Century Atlas of the Moon. Lunar Publishing, UIAI Inc., Wheeling.

The-Moon Wiki. http://the-moon.wikispaces.com/Introduction

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LUNAR TOPOGRAPHICAL STUDIES

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

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

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

OBSERVATIONS RECEIVED

JAY ALBERT – LAKE WORTH, FLORIDA, USA. Digital image of Mare Insularum.

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 12 & 13 day Moon, northwest Limb, Pythagoras & southwest Limb.

WILLIAM DEMBOWSKI – WINDBER, PENNSYLVANIA, USA. Digital image of Mare Insularum.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Albategnius, Byrd-Eudoxus, Cassini, Conan, Quarter Moon,Heraclitus, Hipparchus, Hyginus, Pitiscus, Sacrobosco & Stoffler.

PETER GREGO – ST. DENNIS, CORNWALL, UK. Drawing of Hippalus.

ROBERT HAYS, Jr. - WORTH, ILLINOIS, USA. Drawings of Damoiseau-A, Santbech & Sinas.

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

ROBERT REEVES-SAN ANTONIO, TEXAS, USA. Digital image of Hortensius.

MICHAEL SWEETMAN – TUCSON, ARIZONA USA. Digital images of 28 hour Moon, Hipparchus & Petavius.

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RECENT TOPOGRAPHICAL OBSERVATIONS

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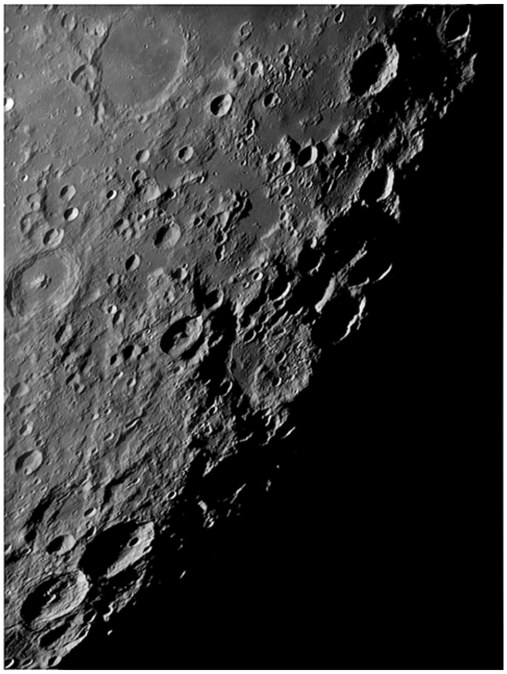
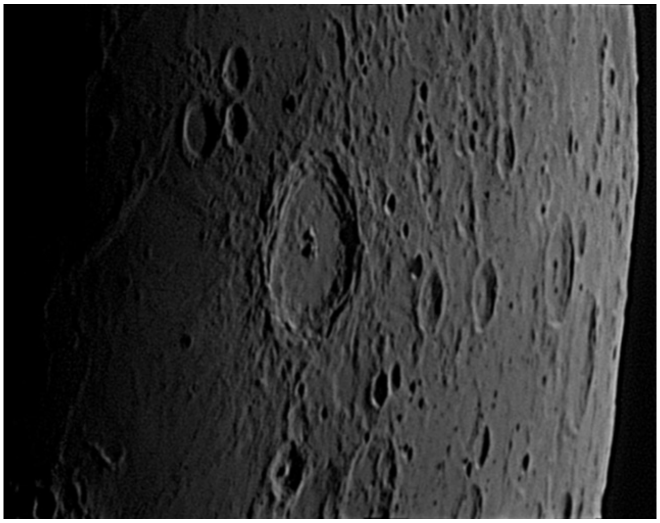
NORTHWEST LIMB - Maurice Collins-Palmerston North, New Zealand. April 23, 2013 11:30 UT. WO FLT-110, Refr, f/21(3x barlow), LPI.



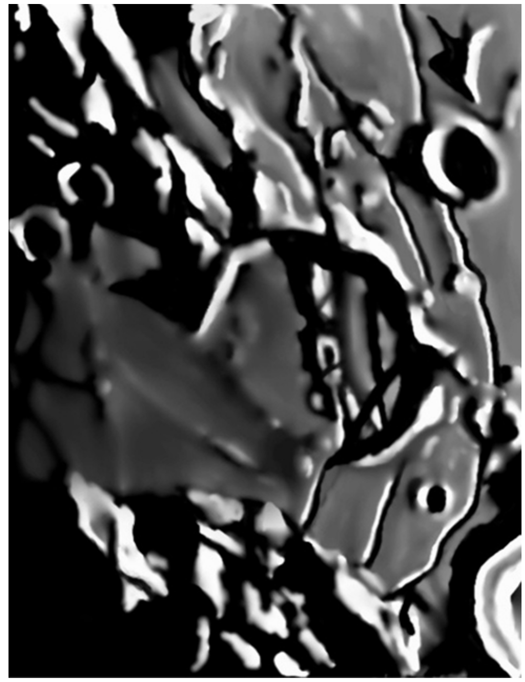
NEANDER - Howard Eskildsen-Ocala, Florida, USA. March 30, 2013 UT 08:42 UT. Seeing 6-7/10, Transparency 5/6. 6” f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.



LANGRENUS – Richard Hill – Tucson, Arizona, USA April 14, 2013 01:52 UT. Seeing 6/10. TEC 8” f/20 MAK-CASS.. DMK21AU04. Wideband 656.3 nm filter.

It is dominated by the great crater Langrenus and its surrounding ejecta. This was a good libration for this region. Traveling towards the limb from Langrenus we see Barkla and Kapteyn and further on the not-often-seen La Perouse and Ansgarius. I don't think I've ever captured these last two in years of lunar imaging.

RECENT TOPOGRAPHICAL OBSERVATIONS



HIPPALUS- Peter Grego, St. Dennis, Cornwall, UK. April 20, 2013. Seeing AII, good, slight mist. Colong. 33.9-34.4º. 200 mm SCT, 150-200x.

This observational drawing, centred on Hippalus (58 km) took in Hippalus A and D plus part of Loewy (24 km) in the northwest, Agatharchides A to the northeast, Promontorium Kelvin in the southwest and a small part of Campanus (its inner western wall) in the southeast. My previous observation of Hippalus took place on 2008 December 7, when the crater had just begun to emerge from the morning terminator and most of its interior was in shadow. This time the Sun was several degrees higher, and much of Hippalus' interior was illuminated. The numerous arcuate rilles of the Rimae Hippalus were immediately obvious owing to the favourable illumination. Hippalus' interior northwestern wall appeared as a bright line, and its rim cast a broad triangular shadow west, its apex pointing towards Hippalus A. Rima I Hippalus was clearly traceable from a shadowed junction on the north edge of Rupes Kelvin, northward across the plain south of Hippalus and through Hippalus itself, missing the tip of the remnants of its northern rim and proceeding east of Hippalus B and the central `spine' of hills to its north; continuing, it cut across Hippalus' northern wall, passing west of Agatharchides A and faded out as it approached the hills south of Agatharchides. The eastern floor of Hippalus appeared to contain a north-south aligned ridge. Rima II Hippalus was traceable from the foot of the northern edge of Rupes Kelvin, but its continuation further south through the mountains was not clear; it headed north across the plain south of Hippalus and faded as it approached the foot of Hippalus' outer southeastern wall. Rima II Hippalus took up again near a small hill just beyond the eastern rim of Hippalus. It proceeded north and entered the shadow cast by the west rim of Agatharchides A, and then passed between two mountains and on to the hills south of Agatharchides. No sign of the smaller rille between Rima I and Rima II Hippalus was seen. Yet further east, Rima III Hippalus emanated from a complex junction at the edge of Rupes Kelvin, though it was uncertain whether the rille could actually be traced across the mountains; at any rate it was disjointed here. Following a slightly less arcuate path across the plain it entered a shadowed area south of Campanus A but it did not appear to cut through the crater; it took up again north of it, curving around the eastern flanks a small mountain and entered shadow cast by the western rim of Agatharchides A; it did not intrude upon the crater and on its emergence from the shadow continued across the plain beyond the edge of the area sketched. The terminator appeared to shift during the observing session, causing more subtle features to be seen in the mare to the north of Promontorium Kelvin; these consisted of numerous wrinkle ridges and low elevations, in themselves worth a study of their own.

PETAVIUS – Michael Sweetman, Tucson, Arizona, USA, October 30, 2011 01:18 UT, Seeing 5-6/10 transparency good. 4” f/20 refr. DMK21. Orion IR cut off filter.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

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SOUTHWEST LIMB - Maurice Collins-Palmerston North, New Zealand. April 23, 2013 11:20 UT. WO FLT-110, Refr, f/21(3x barlow), LPI.

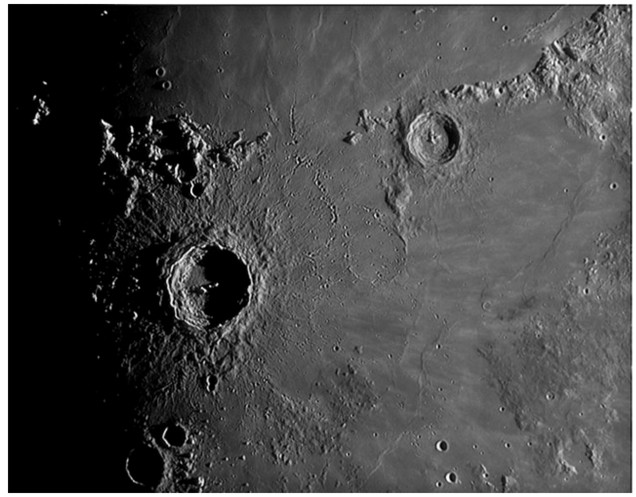
BURG- Howard Eskildsen-Ocala, Florida, USA. March 30, 2013 UT 08:30 UT. Seeing 6-7/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.

At first this mundane region appears relatively featureless compared to the rugged terminator, but on closer inspection, it is seen to be covered with wrinkles and rilles. In the center of the image, western Mare Frigoris hints at tectonic movement, however slight, with its wrinkled folds betraying subtle settling of its basaltic covering. North of the wrinkled Frigoris plains, the ruined half-crater Gärtner reveals ancient subsurface swellings with the dark rille that arcs northeastward.

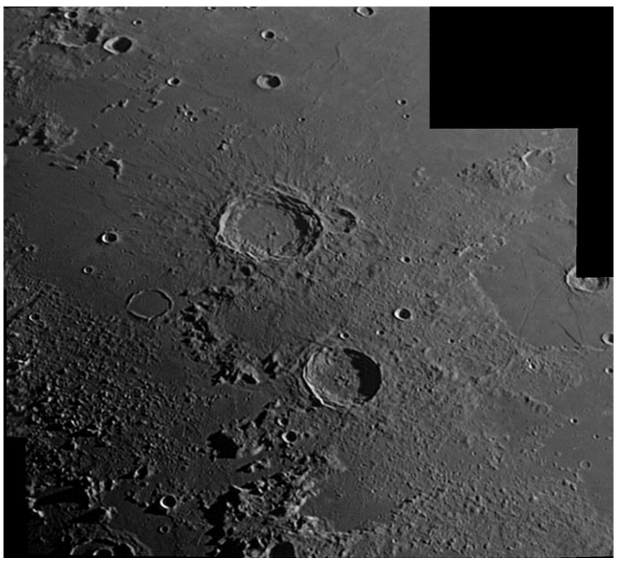
South of the Frigoris plains the crater, Burg, forms an off-center bull's eye in the angular sea of death, Lacus Mortis. To the left of Burg, rills can be seen creasing the northern, western, and southern portions of the deathly hollows (with apologies to J.K. Rowling). A wrinkle ridge passes roughly south to north through the center of the region and distorts the western edge of Burg which raises the question: Which came first, the wrinkle or the Burg? On close inspection, the wrinkle does not appear to distort the sharp rim margin, and views from LROC QuickMap show Burg's ejecta covering portions of the wrinkle ridge, so I vote for the wrinkle being in place prior to Burg's emplacement, with asymmetrical slumping of a rille-deformed crust producing the distortion of Burg's western crater wall.

To the right of Lacus Mortis a sleepy Hercules yawns in anticipation of the setting sun, perhaps bored "to death" with the discussion of its less glamorous neighbors.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



COPERNICUS-ERATOSTHENES- Howard Eskildsen- Ocala, Florida, USA. April 20, 2013 UT 01:52 UT. Seeing 7-8/10, Transparency 0-3/6 (holes & cirrus). 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.



ARISTOTELES-EUDOXUS – Richard Hill – Tucson, Arizona, USA April 18, 2013 02:12 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. Wideband 656.3 nm filter

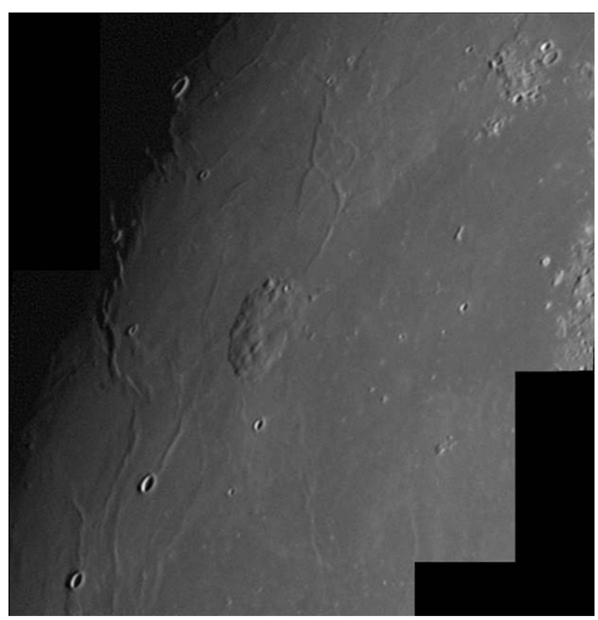
Have you ever had one of those moments when you come across a lunarscape (selenoscape?) and it takes your breath away? That's what happened when I saw Aristoteles and Eudoxus on this night. The ejecta is so nicely shown as are the wonderfully terraced walls. Secondary crater chains can be traced almost to Sheepshanks. I also like ghost crater Egede to the left of Aristoteles.

Using LROC quick map I determined that the smallest discernible craters are about 1.5-2.0km.

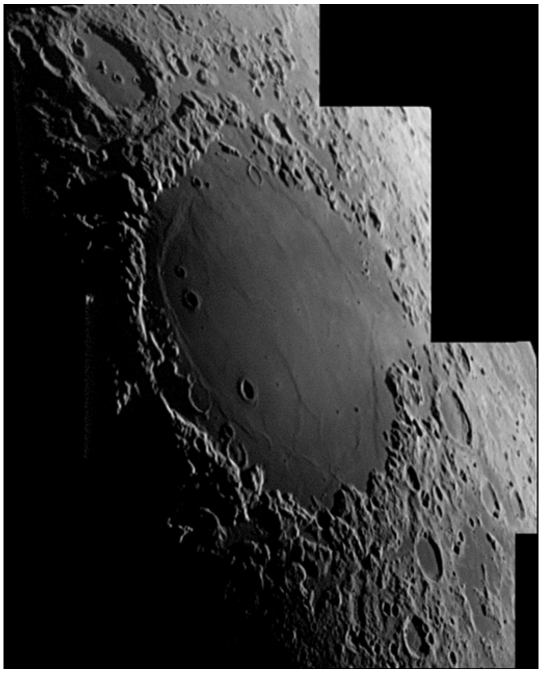
MONS RUMKER- Richard Hill – Tucson, Arizona, USA March 25, 2013 02:05 UT. Seeing 7/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. Wideband 656.3 nm filter

When I was a youngster in the early 1960s with my 2.4" refractor just starting my study of the moon, I recall being disappointed as full moon approached and, to my mind then, things would get boring. For a time there would be no easily observed terminator with all it's topography only bright and dark blotches which at that time were much less interesting to me. But before the full phase there was this isolated odd lump on the terminator that I could spot. At that time my lunar library was limited to Patrick Moore's "Survey of the Moon" and Flammarion's "Astronomy" and neither made mention of it. I later found that it was Mons Rumker.

Seen here Mons Rumker is not a featureless lump but a dome-like mound with separate rounded peaks standing solitary in the flat plain of Sinus Roris. I cannot for the life of me understand how earlier lunar observers saw this as a ruined crater! Notice the sinuous dorsa to the south and complex braiding of dorsa to the north, one branch of which seems to pass right through (or under?) Rumker as seen in this image. If under it would certainly indicate that Rumker is younger than the plain.



ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



MARE CRISIUM- Richard Hill – Tucson, Arizona, USA April 14, 2013 01:58 UT. Seeing 6/10. TEC 8” f/20 MAK-CASS.. DMK21AU04. Wideband 656.3 nm filter

Early in every lunation one of the first things we notice is the huge Mare Crisium. It can be seen with the naked eye as a big notch on the terminator if the lighting is right. I love the walls of this overgrown crater especially to the north and south.

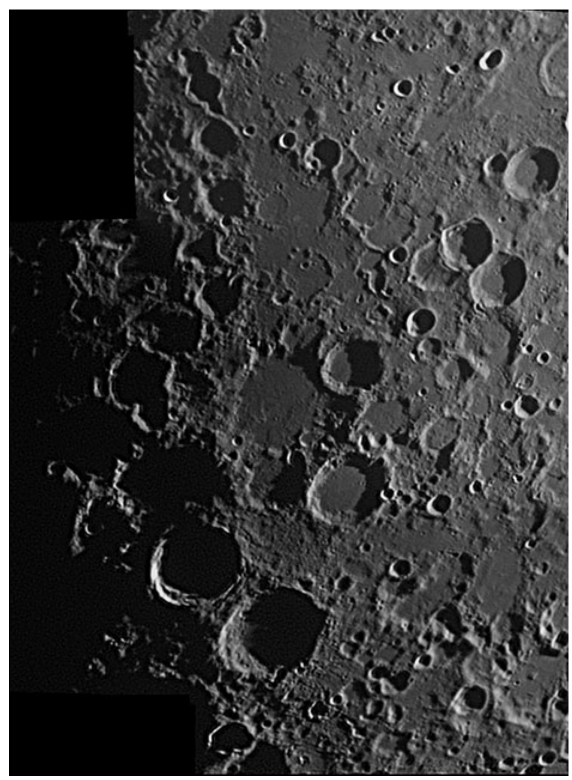
A couple things to notice here. On the terminator side of Crisium to the south, is the crater Lick. Notice how prominent the bulge is on the floor of Lick in this image. Promintorium Olivium, normally not very obvious is very much so at this lighting.

It's hard to get good images on the sunrise terminator because it is so low in the sky where the seeing is less than optimal so most images, including my own, are taken just after full moon. This time the Moon's ecliptic position made the altitude high enough to tempt me and I'm glad it did.

WERNER- Richard Hill – Tucson, Arizona, USA April 18, 2013 01:40 UT. Seeing 8/10. TEC 8” f/20 MAK-CASS.. DMK21AU04. Wideband 656.3 nm filter

When I was out Wednesday night one of the things that first caught my eye was the famous "X" on the terminator. I've seen it before but not this well shown so I did a few AVIs (1500 frames each). The "X" is formed from the walls of Blanchinus on the right, Purbach on the left and still in shadow and La Caille to the north.

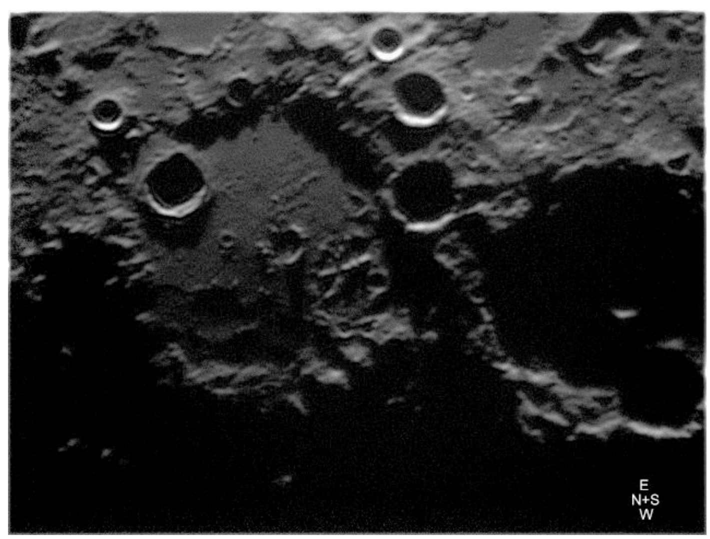
Notice the straight shared wall between Abenezra and Azophi on the right side of this image. It looks so thin and fragile I'm surprised it's withstood the eons. At the top left of the image is Vogel merged with Vogel A above and what looks to be the remnants of a short ejecta scar between Vogel and Argelander.



ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

28 hour MOON – Michael Sweetman, Tucson, Arizona, USA, March 13, 2013 01:54 UT, Seeing 4/10, transparency clear.. 4” f/8.6 refr. DMK21. Orion IR cut off filter.

HIPPARCHUS – Michael Sweetman, Tucson, Arizona, USA, January 19, 2013 04:54 UT, Seeing 3/10, transparency 3/6.. 6” f/24 Mak. DMK21. Orion IR cut off filter.



LUNAR TRANSIENT PHENOMENA

Coordinator – Dr. Anthony Cook – atc@aber.ac.uk
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LTP NEWSLETTER – MAY 2013

Dr. Anthony Cook - Coordinator

Despite the terrible weather conditions for studying the Moon, observations for March were received from the following observers: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Agrippa, Alphonsus, Archimedes, Aristarchus, Aristillus, Plato, Promontorium Laplace, Taruntius, and the west limb in Earthshine. Maurice Collins (New Zealand - RASNZ) observed: Aristarchus, Clavius, Copernicus, Mare Humorum, Mare Orientale, and imaged several features. Marie Cook (Mundesley, UK) observed Aristarchus and Mare Tranquilitatis. Rik Hill (Tucson, AZ, USA) imaged: Copernicus. Martin Pyka (Katowice, Poland) imaged part of Oceanus Procellarum. Paul Zeller (Indianapolis, IN, USA) observed: Aristarchus.

LTP Reports: No LTP reports were received in March, although it is worth mentioning a couple of images that were sent to me, that might look like LTP, but are definitely “not”. I have included them here to help observers avoid making interpretation mistakes that have occurred in the past.

The first report was from Martin Pyka (Katowice, Poland) concerning his observation that Aristarchus appeared “strongly” bright on 2013 Mar 29 UT 02:15-02:39, as seen visually, and lesser so in images (See Fig 1). Now I have checked, and Aristarchus can certainly be extremely bright at this phase, even more so than Copernicus and Kepler. The real test on whether this brightness is unusual is whether it varies over time periods of minutes or hours. An earlier image by Maurice Collins from 2013 Mar 28 UT 08:22-08:39 confirmed this bright appearance to be normal. Time lapse imaging can be useful in this respect.

Figure 1. *Aristarchus imaged by Martin Pyka on 2013 Mar 29 UT with north towards the top. Image has been sharpened slightly and contrast stretched.*

The second non-LTP report, albeit still spectacular, was made by Raffaello Brago on 2013 Apr 14 UT 18:45-18:48. Bright sunlit peaks beyond the cusps have tricked some astronomers in the past into thinking that they have spotted a LTP - but once again this is a perfectly normal appearance from sunlight catching the local slopes. Now if the peak had been brighter than any other part of the Moon, or had undergone short term variability, then this might have made it a LTP, but this was not the case in Raffaello's image (See Figure 2).

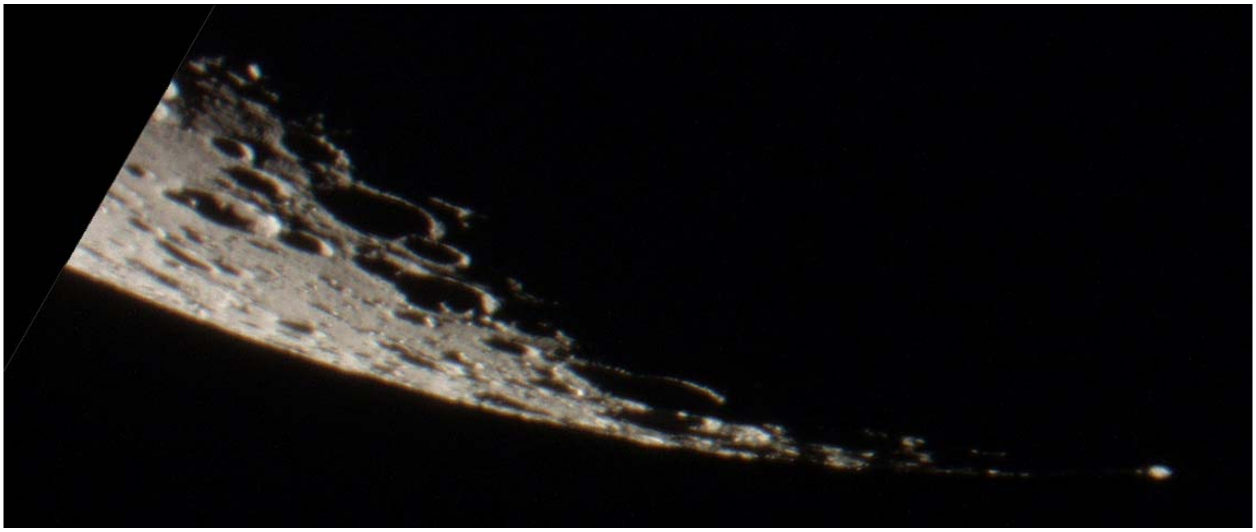

Figure 2. *A nice bright isolated mountain near to the lunar south pole, by Raffaello Braga, with north towards the top. Image measurements reveal that other parts of the Moon, nearby, are brighter than the spot near the south pole.*

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

Agrippa: On 2013 Mar 22 UT 00:40-01:15 Jay Albert (C11, seeing 8/10, transparency magnitude 4) observed visually Agrippa at a similar illumination to the following LTP reports below. He noted that shadow of the central peak was very short, thin, and black and very much darker (not grayish) than the crater's floor, contrary to Bartlett's description. There was also some thin, black shadow along the interior eastern wall, and the central peak shadow was at least as black as this shadow. Except for the central peak, Jay's observation matched Bartlett's descriptions.

On 1962-09-09 UT 01:42-02:00 Bartlett (Baltimore, MD, USA, 5" reflector, x180, S=5-4, T=3) observed in Agrippa the shadow of the central peak to be grayish, not much darker than the floor, estimated at 3deg bright, whereas on 1962 Jul 12, at col 28deg, in the 5" telescope the shadow was a normal black and sharply defined against the floor which was 3 deg bright. The Cameron 1978 catalog ID=768 and the weight=4. The ALPO/BAA weight=1.

On 1966-8-26 *UT 01:52-02:24 Observer: Bartlett (Baltimore, MD, USA, 5" reflector x437) "Shadow of C.p. was grayish, wall shad. was normal black, C.p. itself barely disting. from floor" S=5, T=3. NASA catalog weight=4 (high). NASA catalog ID #966. ALPO/BAA weight=1.*

On 1967-7-17 UT 01:23-01:47 Bartlett (Baltimore, MD, USA) *observed the shadow of central peak barely distinguishable. Residual wall shadow normal black. Landslip very conspicuous, 10 deg bright. Cameron 1978 catalog LTP ID=1040 and weight=4. Cameron 2006 Catalog Extension ID=12 and weight=4. ALPO/BAA weight=1.*

In view of the differences of the appearance of the central peak, I will cautiously raise the weights of all three LTP observations to 2 (but no further) for now as Jay's telescope had a larger aperture, and his seeing and transparency were better in two out of the three examples.

Aristarchus: In 2013 March 26 UT 08:59-09:28 Maurice Collins took a series of images to make up a Full Moon mosaic (See figure 3). This corresponded to a similar illumination (+/-0.5°) to a Patrick Moore LTP report from 1983 Oct 20 (see below). According to Moore, the order of brightness from bright to dark went: Aristarchus, Censorinus, Menelus, Proclus. However Maurice's image mosaic shows almost the opposite going from bright to dark: Proclus, Censorinus, Meneaus, Aristarchus. Some readers may remember the April and June LTP newsletter where we had an image mosaic by Rolf Hempel for the same 1983 repeat illumination. However on that occasion the ranking of the crater brightness, going from bright to dark, was: Proclus, Censorinus, Aristarchus, Menelaus. This almost agrees with Maurice's result, except that Menelaus and Aristarchus have switched places. The differences are possibly explained by libration effects, but we need more observations to see if this is the case, hence for now the weight of the 1983 LTP will remain at 2.

On 1983 Oct 20 at UT23:40 P. Moore (Selsey, UK) observed that Aristarchus was brighter than normal (as measured with a CED) and much more so that Censorinus, Menelaus, and Proclus craters (in turn). Cameron comments that Moore is a very experienced observer. The Cameron 2006 catalog ID=231 and the weight=4. The ALPO/BAA weight=2.

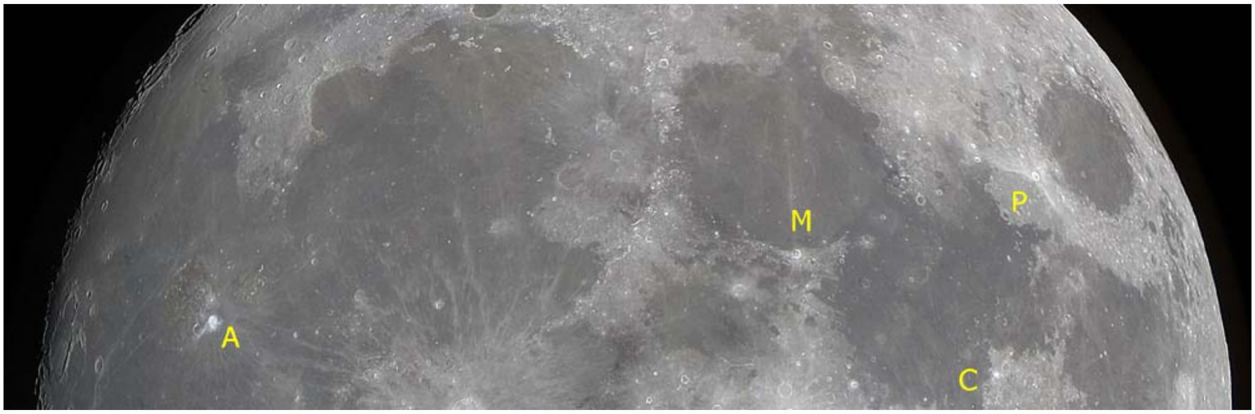

Figure 3. *Part of a Full Moon mosaic by Maurice Collins from 2013 Mar 27 with north towards the top. The following craters are labelled by their corresponding letters: (A) Aristarchus, (C) Cenorinus, (M) Menelaus, and (P) Proclus. The measured brightness of these features in the CCD mosaic are A=230, C=252, M=227, and P=255.*

Mare Tranquillitatis: On 2013 Mar 28 UT 00:05-00:15 Marie Cook (90mm Questar, x80, seeing III, transparency good) observed this area under both similar (+/-1°) illumination, and libration to the 1988 LTP report listed below. Needless to say, she did not detect any flashes. The original 1988 report sounds slightly like seeing effects on bright point-like craters, but as we have only the abridged version from the Cameron extended catalog, I would not like to try lowering the weight. If anybody has further details about Culver's observation, please let me know.

On 1988 Apr 03 at UT02:25-02:30 Culver (Harker Heights, USA, Meade 2045 reflector, x40, seeing=turbulent) detected flashes coming from just north of the centre of Mare Tranquilitatis. Some of these flashes were of a duration of seconds whilst others were several minutes. Altogether ~20 flashes were seen, and not in the same place. "5 small star-like points could be located - and there were lots of craterlets". The spots were "lined up E-W at N of 10 deg latitude." Color was not visible on these nor variations. Apparently the observer had seen this type of LTP before but had not reported them. The Cameron 2006 catalog ID=323 and weight=2. the ALPO/BAA weight=2.

Aristarchus: On 2013 Mar 30 UT 05:25-05:45 Paul Zeller (10" Meade, x203, seeing 7/10, transparency: magnitude 3) observed Aristarchus under the similar illumination (+/-0.5°) conditions to a 1964 report listed below. Paul found two of the dark bands in the glare of Aristarchus, but neither had any color. An image was taken at 05:40 UT, but shows nothing unusual. Although no color was seen this time, which adds support to the 1964 LTP, in view of the smaller scope that Paul used, and the *"tho't he saw it"* confirmation nature of the 1964 LTP, I will leave the ALPO/BAA weight at a 3 – it certainly does not deserve a 5, as was recorded in the Cameron catalog, at least until we can find more information about the original observations.

Aristarchus 1964 Aug 26 UT 02:00-03:00 Observed by Genatt, Reid,(Greenbelt, MD, 16" reflector, x360, S=P-G), and Lindenblad (Washington, DC, USA, 26" refractor) "Red and Blue bands. Grew thinner & shorter. Alerted Naval Obs. One obs. tho't he saw Phenom. but not sure. (confirmation ?). (prof. astronomers, but not lunar observers)" NASA catalog weight=5 (very high). NASA catalog ID #844. ALPO/BAA weight=3.

Suggested Features to observe in May: 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. **Archimedes**
2. **Aristoteles**
3. **Burg**
4. **Copernicus**
5. **Hippalus**
6. **Hipparchus**
7. **Langrenus**
8. **Mare Crisium**
9. **Mare Insularum**
10. **Neander**
11. **Petavius**
12. **Santbech**
13. **Tycho**
14. **Werner**

FOCUS ON targets

Domes (July)

X = Mons Rumker (September)