THE LUNAR OBSERVER

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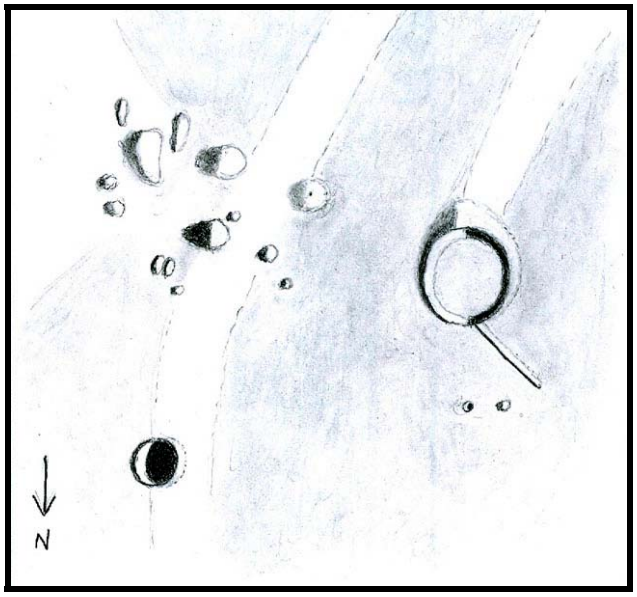
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – DECEMBER 2011

KUNOWSKY



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
August 23, 2011 08:40-09:05 UT, 15 cm refl, 170x, seeing 7-8/10

I observed this crater and vicinity on the morning of Aug. 23, 2011 while watching three stars reappear from occultation. Kunowsky is located in Oceanus Procellarum, and is the largest crater between Encke and Lansberg. This is a shallow crater with a featureless floor. It appears to have been flooded with mare material, though the rim is unbroken. There is a low swelling along the south rim of Kunowsky, and a low ridge extending to the northwest from Kunowsky's north rim. Two tiny features are north of Kunowsky. One appears to be a pit, and the other one a peak; the peak is nearer the aforementioned ridge. Hortensius A is the conspicuous deep crater northeast of Kunowsky. There is a jumble of hills east of Kunowsky. A large peak with dark shadow makes almost a right angle with Kunowsky and Hortensius A. Several small but crisp peaks with dark shadows are nearby. The hills farther to the south have lighter shadowing. The largest

one is triangular-shaped, and the others range from slightly oval to elongated. A very low, nearly round swelling is relatively close southeast from Kunowsky (Its shadowing may be exaggerated on the sketch). I could glimpse a tiny bit of shadow at its center. I have read of lunar domes and their summit craterlets, and I have to wonder if this is what I was seeing. Surprisingly, the Lunar Quadrant map identifies only two of these hills, neither one among the major peaks. Kunowsky sigma is the elongated hill just west of the large triangular feature, and Kunowsky kappa is probably the more northerly of the two peaks just east of the triangular hill. In contrast to this group of peaks, the terrain near Hortensius A appears very smooth. The area east of the peaks is relatively light. Two bright streaks, looking like rays, extend southwestward from Kunowsky, and from Hortensius A through the peaks and southwestward. They don't appear to be associated with Copernicus or Kepler.

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LUNAR CALENDAR

DECEMBER 2011 - JANUARY 2012 (UT)

Dec. 01	11:00	Moon 5.6 Degrees NNW of Neptune
Dec. 02	09:52	First Quarter
Dec. 04	03:00	Moon 5.8 Degrees NNW of Uranus
Dec. 06	01:14	Moon at Apogee (405,412 km – 251,911 miles)
Dec. 06	19:00	Moon 5.0 Degrees N of Jupiter
Dec. 10	13:36	Extreme North Declination
Dec. 10	14:37	Full Moon (Total Eclipse of the Moon)
Dec. 17	07:00	Moon 7.9 Degrees SSW of Mars
Dec. 18	00:48	Last Quarter
Dec. 20	06:00	Moon 6.3 Degrees SSW of Saturn
Dec. 22	02:58	Moon at Perigee (364,800 km – 226,676 miles)
Dec. 22	02:00	Moon 2.7 Degrees SSW of Mercury
Dec. 22	18:07	New Moon (Start of Lunation 1101)
Dec. 23	17:24	Extreme South Declination
Dec. 25	01:00	Moon 1.9 Degrees S of Pluto
Dec. 27	06:00	Moon 6.1 Degrees NNW of Venus
Dec. 28	22:00	Moon 5.6 Degrees NNW of Neptune
Dec. 31	12:00	Moon 5.7 Degrees NNW of Uranus
Jan. 01	06:15	First Quarter
Jan. 02	20:20	Moon at Apogee (404,579 km – 251,394 miles)
Jan. 02	24:00	Moon 4.8 Degrees NNW of Jupiter
Jan. 06	21:48	Extreme North Declination
Jan. 09	07:31	Full Moon
Jan. 14	01:00	Moon 8.4 Degrees SSW of Mars
Jan. 16	09:08	Last Quarter
Jan. 17	17:00	Moon 6.1 Degrees S of Saturn
Jan. 17	21:29	Moon at Perigee (369,882 km – 229,834 miles)
Jan. 20	02:12	Extreme South Declination
Jan. 21	13:00	Moon 1.8 Degrees SSE of Pluto
Jan. 22	11:00	Moon 4.7 Degrees NNW of Mercury
Jan. 23	07:41	New Moon (Start of Lunation 1102)
Jan. 25	07:00	Moon 5.5 Degrees NNW of Neptune
Jan. 26	14:00	Moon 6.3 Degrees NNW of Venus
Jan. 27	23:00	Moon 5.5 Degrees NNW of Uranus
Jan. 30	12:00	Moon 4.4 Degrees NNW of Jupiter
Jan. 30	17:43	Moon at Apogee (404,324 km – 251,235 miles)
Jan. 31	04:11	First Quarter

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 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.

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 has 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 Humorum

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 **January 2012** edition will be **Copernicus**. 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 Copernicus and its ray system to your observing list and send your favorites to:

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

Deadline for inclusion in the Copernicus article is December 20, 2011

FUTURE FOCUS ON ARTICLES:

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

Archimedes	**March 2012**	**February 20, 2012**
Pyrenees Mts.	**May 2012**	**April 20, 2012**

FOCUS ON: Mare Humorum

By Wayne Bailey
Coordinator: Lunar Topographical Studies

.Mare Humorum is an easily located feature on the southwestern quadrant of the moon. Since it's on the western side, sunrise occurs after 1st quarter, with the terminator crossing the Mare on days 10 and 11 of the lunation. At this time, the moon is high in the sky in the early evening, easily acessible for viewing. The corresponding sunset conditions occur when the moon is in the early morning sky, a time when fewer people are observing.

One of the seldom recognized characteristics of lunar lighting is well illustrated in this area. It's well known that when the terminator is near, shadows are long and low relief features are visible. At full moon, the shadows disappear because the light source is essentially directly behind us, so the surface appears flat due to the lack of shadows. What is not so widely recognized is that, except at the sub-solar point, shadows still exist at full moon because the surface is not perpendicular to the sun-line, they just aren't visible from our vantage point. Shadows disappear when the sun is overhead, as viewed from the moon's surface. Noon at Mare Humorum occurs about 3 days after full moon, during this interval, the lighting conditions only slowly change. This is followed by about 7 days of decreasing sun altitude until the sun sets. The interval from sunrise to full moon at Mare Humorum is only about 4 days. Illumination conditions change much more rapidly, at Humorum, prior to full moon than after. Near the lunar equator, shadows disappear at both local noon and full moon, with a period of increasing then decreasing shadow in between.

Howard Eskildsen put together a nice set of charts of the Mare Humorum region that are shown in Fig. 1. Comparing the chart of magma types to Fig. 2, notice that only the flows labeled SHB are easily distinguished in typical images.

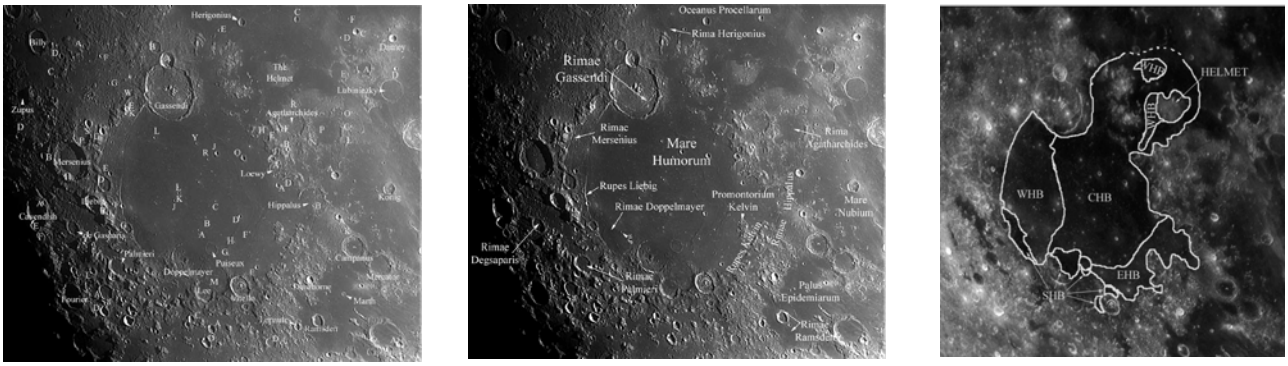

Figure 1. ***Mare Humorum Region Features****. Howard Eskildsen-Ocala, Florida, USA. Left 2 images: September 11, 2009 02:01 UT. Seeing 8/10, Transparency 5/6, no filter. Right image: November 25, 2010, 11:13. Seeing 6/10, Transparency 6/6, W-15 Yellow filter. 6" f/8 refractor, Explore Scientific lens 2X Barlow, DMK 41AU02.AS. Basalt flow identifications in the right image from Wood (2003) (additional information is on the linked image).*

The Mare Humorum basin is one of the oldest as indicated by the lack of visible ejecta from its formation. However, the basin filling magmas are among the youngest on the moon, as indicated by the low density of craters (Fig. 3). This only says that the final, topmost, flows occurred later than on much of the rest of the moon. There likely were older, now buried, flows.

The basin is better defined on the west side, where distinct scarps, grabens and rilles bound it. The eastern side is less well defined, with lower relief, and several connections to neighboring Mare Nubium, Palus Epidemiarum and Oceanus Procellarum. A series of wrinkle ridges parallel the eastern rim (Fig. 4).

Interestingly, the corresponding features on the western floor are not ridges but a system of rilles. The impression that I get is a basin that has been tilted slightly down toward the east, whose contents have shifted slightly compressing the east side and stretching the west. A more likely explanation is that the eastern wrinkle ridges were formed in a later deposit. The Rimae Hippalus, to the southeast, are probably a better comparison to the western rilles.

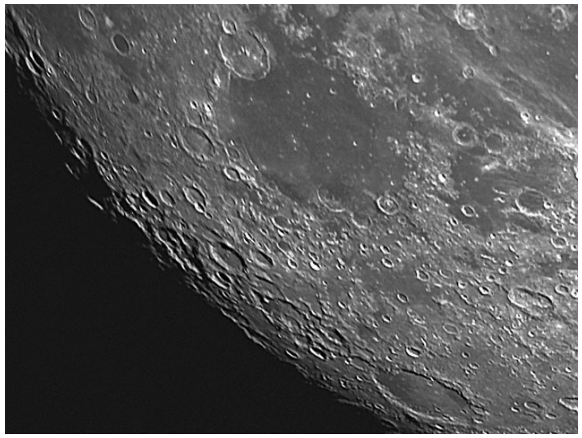

Figure 2. ***Mare Humorum.*** *William Dembowski, Windber, Pennsylvania, USA. August 12, 2011 01:54 UT Colongitude 65.2º, Seeing 4/10. Celestron 9.25" SCT f/10, DMK41 UV/IR filter.*

Notice that the linear rilles west of Mare Humorum are not curved, following the outline of the western wall, but straight, pointing towards Oceanus Procellarum (Fig. 5). They are apparently unrelated to the Humorum basin. The line of small craters crossing the raised floor of Mersenius may be related to these since it points in approximately the same direction.

Tonal differences can be detected on the mare surface, but they are not as distinct as on other mare, such as Serenitatis. Several distinct flows have been mapped. An interesting feature near the western shore is Rupes Liebig

Figure 3. ***Mare Humorum.*** *Maurice Collins-Palmerston North, New Zealand. September 9, 2011 09:25 UT. ETX-90 SCT, 2x barlow, LPI. (North down)*

which arcs to the north, then continues as a rille, which leads to a long curving scarp that connects to the southwest wall of Gassendi. Promontorium Kelvin is an impressive peak rising out of the southeast mare floor.

Since it's in the general area, we should mention the flooded crater Kies located south of Bulliardius. Just to its west is Kies Pi, probably the easiest lunar dome to view. And it even has a summit crater.

Mare Humorum is surrounded by several interesting craters, but only one moderate sized crater is on its surface, Puiseux. Vitello is well preserved compared to Gassendi, Mersenius,

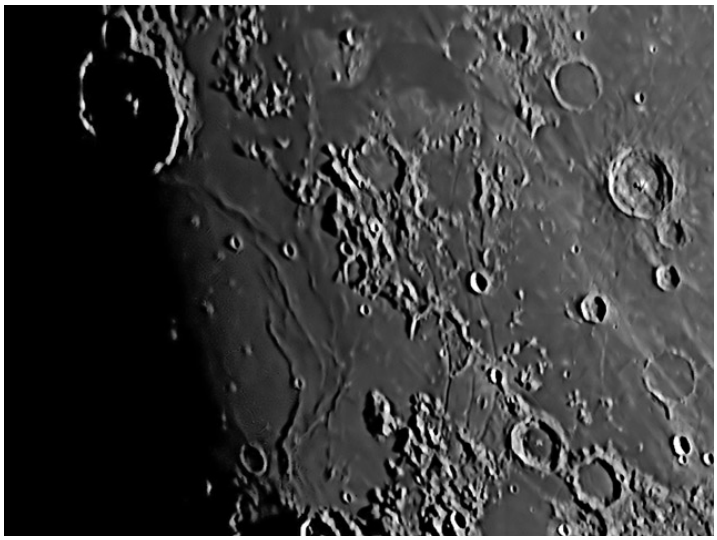

Figure 4. ***Wrinkle Ridges and Rilles.*** *William Dembowski, Windber, Pennsylvania, USA. October 8,, 2011 01:02 UT Colongitude 40º, Seeing 5/10. Celestron 9.25" SCT f/10, DMK41 UV/IR filter.*

Dopplemayer, Puiseux, Hippalus and Agatharchides. The latter have all experienced significant flooding. Dopplemayer and Hippalus are only partially visible. Gassendi is the largest of these and exhibits a variety of different features.

The first thing to notice about Gassendi is that it is very shallow for its size. This immediately tells us that its interior has been flooded. It's floor is also marked by systems of rilles, and it has a noticeable central mountain. It is a classic example of a floor-fractured crater: One in which magmas rose through the impact fractured material beneath its floor, raising and flooding the floor.

An arc of the south floor is distinctly darker than the rest, matching the appearance of the adjacent mare. Since this dark section adjoins an apparent notch in the south wall, it appears that mare basalt flowed in through the gap, flooding part of Gassendi's floor. However, spacecraft imagery showed that there is no channel through the notch, so this section must have been flooded by mare basalt that entered through the crater floor. The crater floor is quite complex with many low relief features whose visibility changes considerably at various sun angles. Gassendi is well worth examining anytime it's visible.

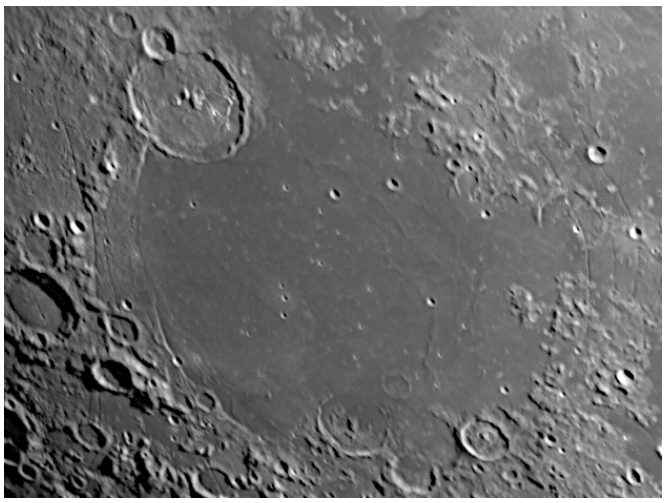

Figure 5. ***Western Rilles.*** *Klaus Petersen – Glinde, Germany. January 16, 2011 18:17 UT. Seeing 6/10, transparency 5/6, Meade 8" SCT, f/10, DMK 21AF04.AS.*

This only touches on the many interesting features in the Mare Humorum area. It's a region that is convenient to observe, easy to locate, and easy to navigate within. The books by Grego , North, Wlasuk and Wood all describe many additional features. I strongly recommend reading at least one of these.

ADDITIONAL READING

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.
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/).
Grego, Peter. 2005. The Moon and How to Observe It. Springer-Verlag, London.
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.
Schultz, Peter. 1976. Moon Morphology. University of Texas Press, Austin.
Shirao, Motomaro & Charles A. Wood. 2011. The Kaguya Lunar Atlas. Springer, New York
Wlasuk, Peter. 2000. Observing the Moon. Springer-Verlag, London.
Wood, Charles. 2003. The Moon: A Personal View. Sky Publishing Corp. Cambridge.
The-Moon Wiki. http://the-moon.wikispaces.com/Introduction

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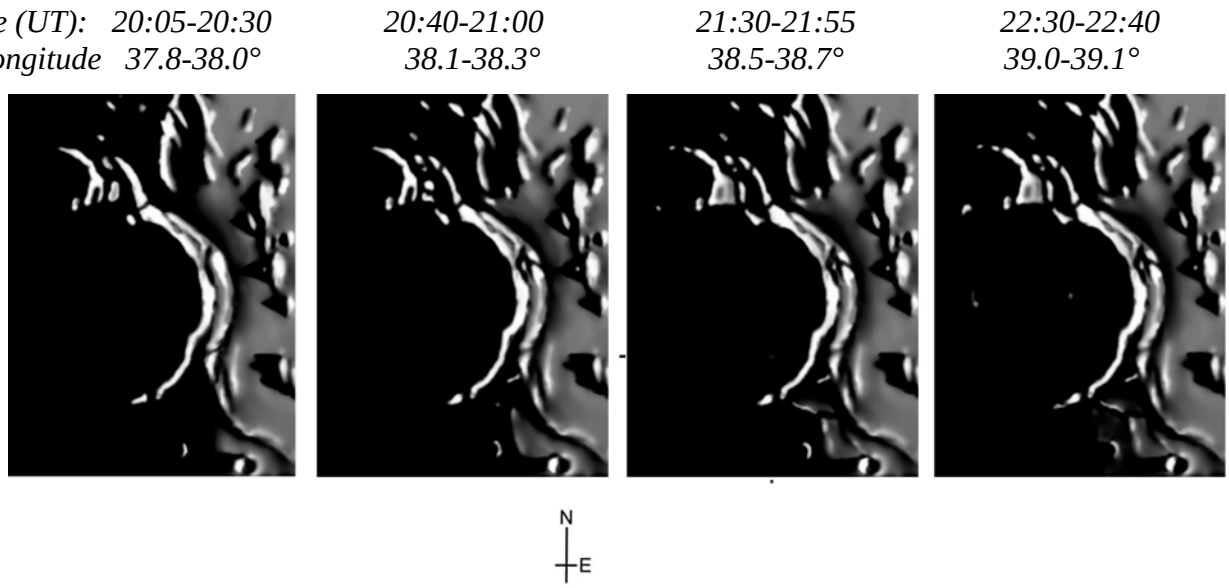
SUNRISE OVER GASSENDI

Peter Grego

At the beginning of the observation (Figure 1) it was decided to take in the shadowed area (about half of the area of the observational drawing) west of Gassendi in order to observe and record any high topographical points which might later become illuminated by the rising Sun. The floors and inner western walls of Gassendi and Gassendi A were initially completely shadowed. The eastern outer walls of Gassendi and Gassendi A were well illuminated, set off by the fact that the terrain at the base of the walls was still in shadow. A great amount of detail was visible east of Gassendi, the mare here being dotted by an unnamed series of mountains and mountain clusters; as the Sun rose their westward shadows became shorter. Extending south of Gassendi, curving north of Gassendi Y and Gassendi J, were several wrinkle ridges which became easier to discern as lighting conditions became less oblique. By 21:30 a small section of the inner western wall of Gassendi A had become illuminated. At around 21:45 there appeared to be a minute, barely-illuminated point on the southeastern floor of Gassendi (indicated on the drawing); this was only just

visible initially, but the more I checked on its reality the more I became uncertain about it. Seeing and intermittent cloud did not help. I was interested by this feature because it was not where I had presumed that

Figure 1. ***Gassendi.*** *– Peter Grego, St. Dennis, Cornwall, UK. October 7, 2011 00:20-01:05 UT. Seeing AII-III, intermittent cloud, no wind. Colongitude 124.9-125.3°. 300 mm Newtonian, 150X, integrated light.*



the first touchdown of solar illumination on Gassendi's floor would be – it was nowhere near the central peaks, but more in the vicinity of Gassendi M, a feature of little topographical eminence. Cloud cover interrupted the view until the eyepiece was returned to at 22:30. By this time there was no sight of the feature in question, although seeing conditions had declined a little and very frequent cloud cover was plaguing the final session. However, two distinct points of illumination were visible amid Gassendi's internal shadow – one at the location of the more easterly central peak, and another brighter one on the mid-point of where Gassendi's western wall lay. Deteriorating weather prevented further examination.

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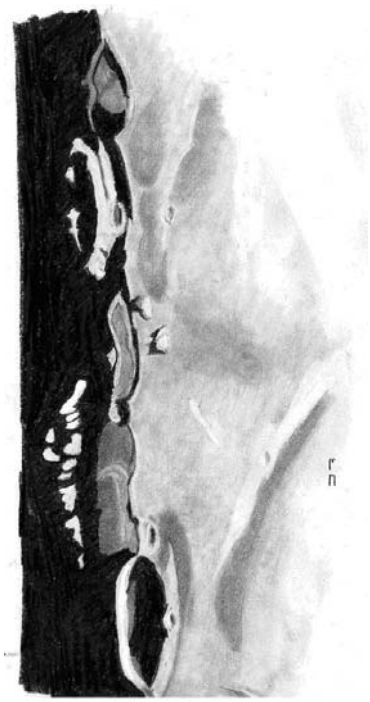
CLOSE TO THE NORTH-WESTERN LIMB

Fred Corno

Regions close to the western lunar limb are often neglected by observers: craters or other features there appear under a severe foreshortening, caused by the perspective they are observed from, and the brightness of the nearly full Moon discourages a prolonged observation.

I am no exception to the typical observer. Nevertheless, on the night of the 26th of February 2010, the beauty of the scenery between Briggs and Seleucus caught my eye: the terminator lay just behind the two craters, and the ramparts of the most degraded circus Eddington shone as sparkling ice-fields on top of mountains (see Figure 1).

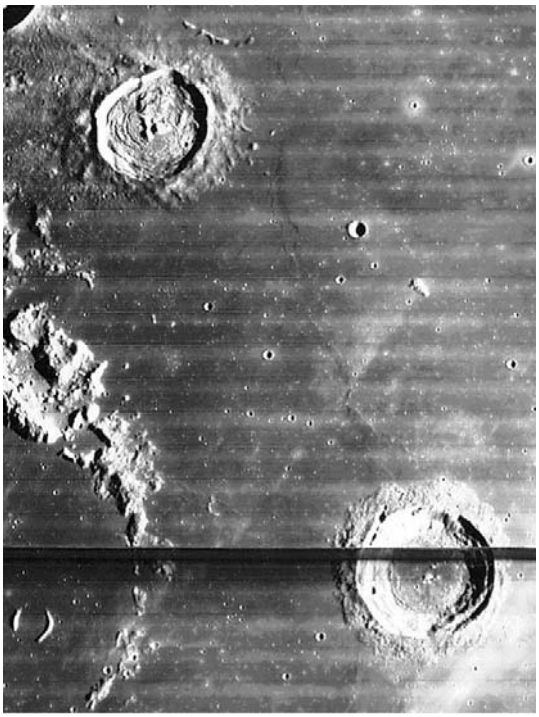
Seleucus (21.0° N, 66.6°W) is the southernmost of the two craters: at a diameter of 43 km, it sits on the plains of extreme western Oceanus Procellarum, and sports a distinct apron of ejecta just outside the rim (see Lunar Orbiter image Figure 2, (Bowker D. E.)). The lack of a definite ray system dates it in the Erathostenian period at least. The inside of the crater is quite typical, with a flat floor, low relieves and a



prominent central peak. The iron content of the area the crater sits on is generally high and homogeneous, while appreciable differences can be found in the titanium content: in Clementine images (see Figure 3) it is, for the section where Seleucus lies, intermediate between the higher of the mare plain

Figure 1. *Observation taken by the author on the 26th of February 2010 with a 5" apochromatic refractor at 208x from 23.15 UT. The southernmost crater is Seleucus, the one on top is Briggs. Also visible are the ridge running among the two craters, the low elongated hill and the ray from Glushko discussed in text. In the background, ramparts of Eddington shone bright. The drawing has been mirrored in order to place north up and east to the right.*

to the east, and the lower of the highlands to the west. This observations is supported by the description of Procellarum lava geology by Whitford-Stark and Head (cited by Wood, 2003): Seleucus sits on a separate geological unit, the Hermann Formation (dating 3.3±0.3 billion year ago) at the boundary with the Sharp Formation (2.7±0.7 billion year), stretching to the east. Both the units contribute to the Oceanus plain in the area.

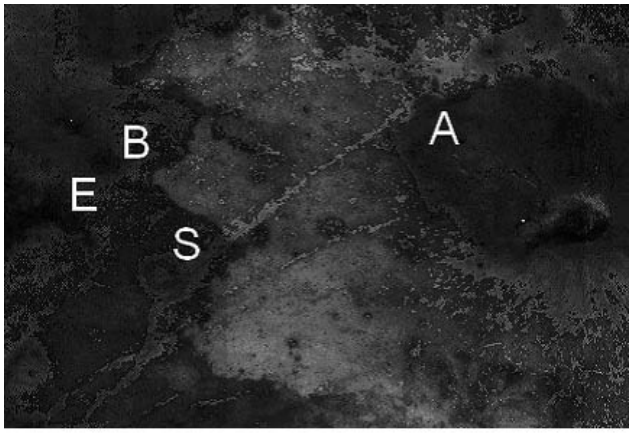


Briggs (26.5° N, 66.1° E) lies not far north from Seleucus (see Figure 2): the 37 km wide ring looks just a bit more degraded than its southern companion, but the outer ejecta apron is still well defined. The floor is peculiar: arcuate cracks fracture it, relevant hills are spread across its north-western quadrant and it

Figure 2. *Crop from Lunar Orbiter image IV-169-H3. At the low right sits Seleucus, at the top left Briggs. Eddington ramparts are on the center left. Between the two craters the mentioned ridge. The elongated hill is above Seleucus, approximately three crater radius apart.*

is shallower than it could be expected from the diameter. Briggs belongs, as Taruntius (see Corno, 2011), to the Floor Fractured Craters (FFCs) class: after the impact, surging magma raised the floor, pushing it to a convex and fractured form and dotting it with hills of probable volcanic origin.

Between the two craters runs a low ridge, proceeding beyond Briggs to the north and fronted by a low and elongated hill. The hill apparently shows one craterlet at the summit in Lunar Orbiter picture. Unfortunately Apollo or Lunar



Reconnaissance Orbiter images are not clear enough to confirm its presence, but it looks evident to me in the

Figure 3: *Titanium abundance image by Clementine: the higher the titanium content, the brighter the hue. S indicates Seleucus, B Briggs, E Eddington and A the Aristarchus plateau. Notice how titanium content changes from the highlands (Eddington ramparts) to the older Hermann Formation (around Seleucus and south of it) to the younger Sharp Formation (surrounding the Aristarchus plateau to the west).*

Clementine high resolution image (see Figure 4). Could the hill be volcanic in its origin? The area presently under investigation is within an impressive triangle of volcanic landforms: Mons Rumker to the north, Aristarchus

Plateau to the east and Marius Hills to the south-east. Still, the hill is isolated, not fitting at all with a typical volcanic district, usually featuring several cones at a time.

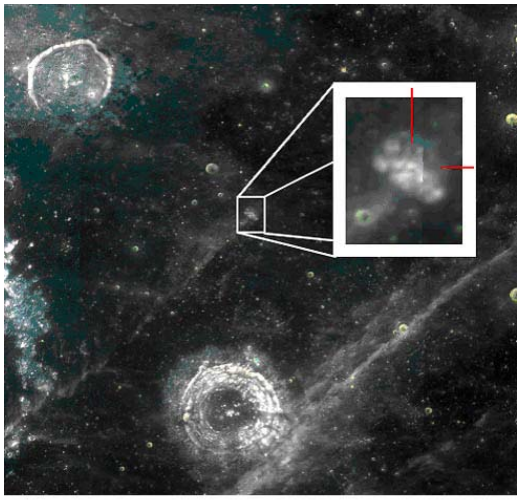


Figure 1. *UV-Vis image by Clementine. The frame surrounds the elongated hill discussed in text, enlarged in the insert. The red lines indicate the summit craterlet.*

A bright ray crosses the plain and skims Seleucus on its south-eastern side: it probably originates from the crater Glushko (named Olbers A on the Rükl atlas, (Rükl, 1990)), but its discontinuous profile makes difficult to uniquely trace its original source (see Figure 5). Glushko is barely visible on the western limb, to the south.

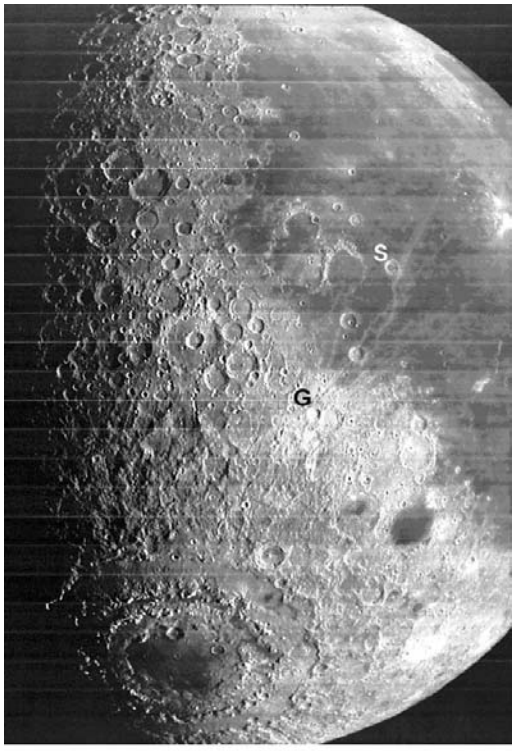


Figure 2. *Crop from Lunar Orbiter image IV-188-M: G indicates the crater Glushko, likely the source of the ray skimming Seleucus (S).*

The wealth of different landforms and details makes therefore the region stretching between Seleucus and Briggs worth of an accurate investigation rather than the dismissive glance often thrown to objects affected by an oblique view.

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Rükl, A. (1990). *Atlas of the Moon.* Waukesha Wisconsin USA: Kalmbach Books.

Wood, C. A. (2003). *The Modern Moon - a Personal View.* Cambridge, Massachusetts: Sky Publishing Corp.

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

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 4(2), 5, & day moon, 1st Qtr Moon.

FRED CORNO - SETTIMO TORINESE, ITALY. Drawing of Seleucus.

ED CRANDALL – LEWISVILLE, NORTH CAROLINA, USA. Digital images of Archimedes, Gambart domes, W. Bond & Pallas-Murchison.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Anaxagoras(2), Aristillus, Arzachel, Catena Sylvester, Conon, Montes Alpes, Montes Caucasus, Northwest Moon, Pytheas, Sinus Aestuum(2).

PETER GREGO – ST. DENNIS, CORNWALL, UK. Drawings of Doppelmayer, Hesiodus & Ramsden..

JERRY HUBBELL – LOCUST GROVE, VIRGINIA, USA. Digital images of Copernicus-Kepler, Copernicus-Kepler-Tycho rays, Langrenus, Mare Humorum, Mare Crisium-Fecunditatis, Montes Harbinger elevation measurements, Petavius.

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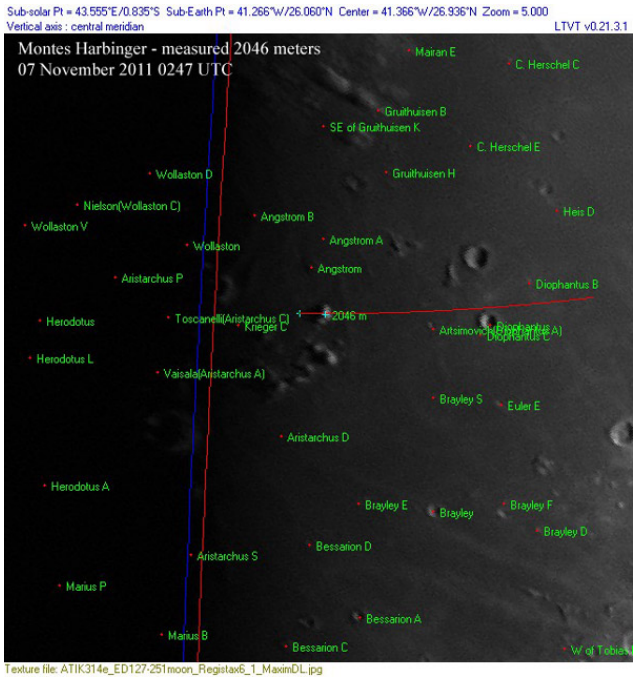
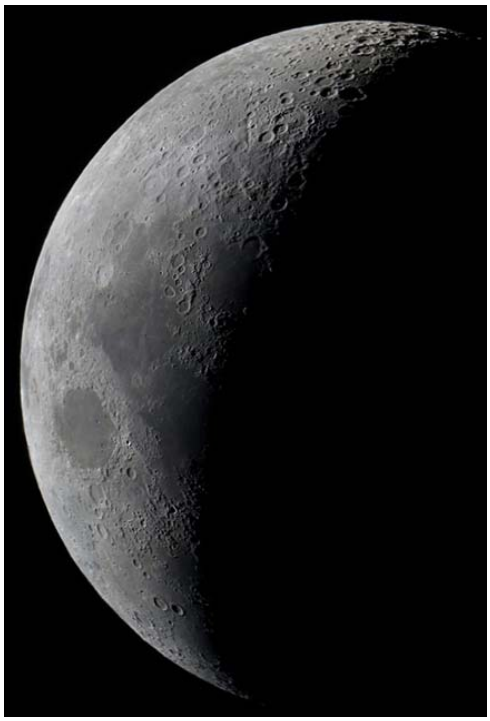
HEIGHT MEASUREMENTS



MONTES HARBINGER– Jerry Hubbell, Locust Grove, Virginia, USA. November 7, 2011 02:47 UT. Colongitude 46.6º, Seeing 6-7/10, Transparency 5/6. 0.13m Refractor f/7.5, TEC CCD.

RECENT TOPOGRAPHICAL OBSERVATIONS



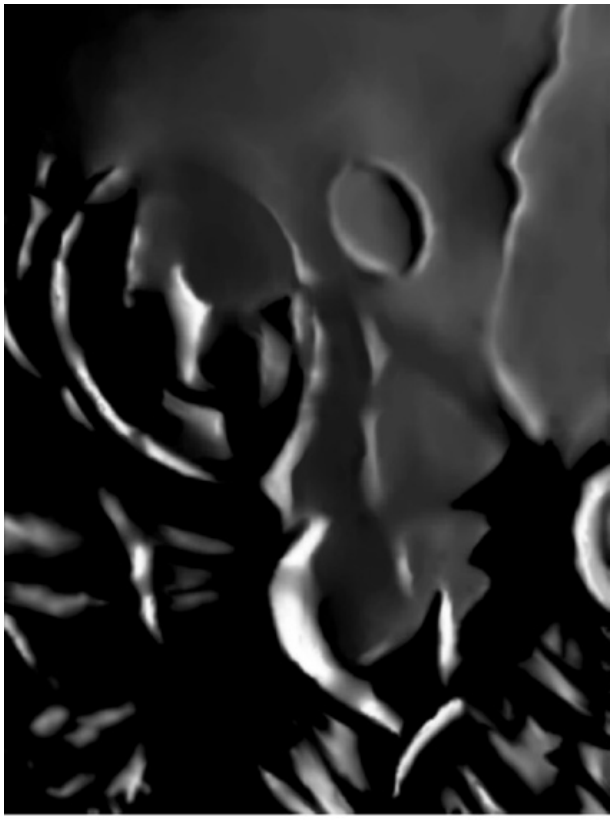
5 day MOON - Maurice Collins-Palmerston North, New Zealand. November 30, 2011 08:08-08:24 UT. Seeing A-IV, windy. C-8 SCT, LPI.

GAMBART DOMES – Ed Crandall – Lewisville, North Carolina, USA. October 7, 2011 23:24 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam

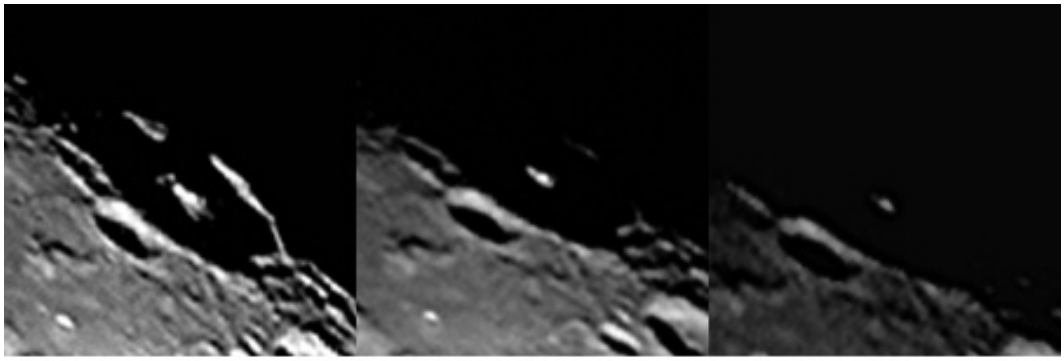
CATENA SYLVESTER - Howard Eskildsen-Ocala, Florida, USA. November 20, 2011 10:53 UT. Seeing 8/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens 2X Barlow, DMK 41AU02.AS, IR block & V block filters.

RECENT TOPOGRAPHICAL OBSERVATIONS

DOPPELMAYER – Peter Grego, St. Dennis, Cornwall, UK. November 6, 2011 20:20-21:10 UT. Seeing AIII clear but much turbulence. Colongitude 43.1-43.6°. 200 mm SCT, 160X, binoviewer, integrated light.



The area was chosen prior to the observing session and a low-contrast drawing template was prepared using LTVT to ensure positional accuracy. This template was transferred to the PDA and directly drawn over at the telescope eyepiece. Doppelmayer, on the southern shoreline of Mare Humorum, presented a wonderful visual sight as it emerged from the morning terminator. The western half of its floor was covered in shadow cast by its large central peak and ridge to its northwest, and much of the southern half of Doppelmayer's floor was also shadow-filled. The inner western wall's upper reaches were illuminated and ran around the crater in a near-continuous band with some subtle shadings here and there. Beyond it to the west were several illuminated arcs of high terrain parallel to the western wall. Doppelmayer's northwestern flanks have been largely obliterated by lava flows from Mare Humorum, but it appeared that the northeastern sector of the crater's floor bounded by the wall remnants was slightly darker than the adjoining mare. South of Doppelmayer, west of Lee, were numerous areas catching sunlight, some representing higher relief, some defined by surrounding shadow. The mid-inner western wall of Lee was very bright. Vitello, whose illuminated inner western wall can just be seen at right, cast a wide multi-pronged shadow towards Lee. The terrain south of Lee and Vitello was very complicated and only roughly portrayed in this observation. Low ridges ran north of Lee towards Puiseux, and another low ridge ran north of Vitello across Mare Humorum.

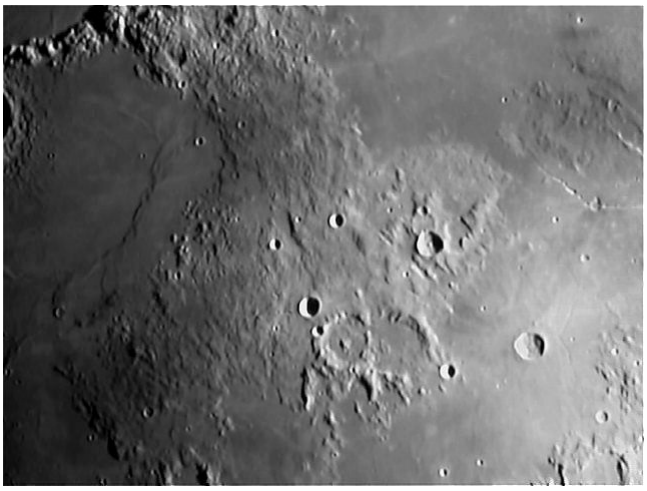


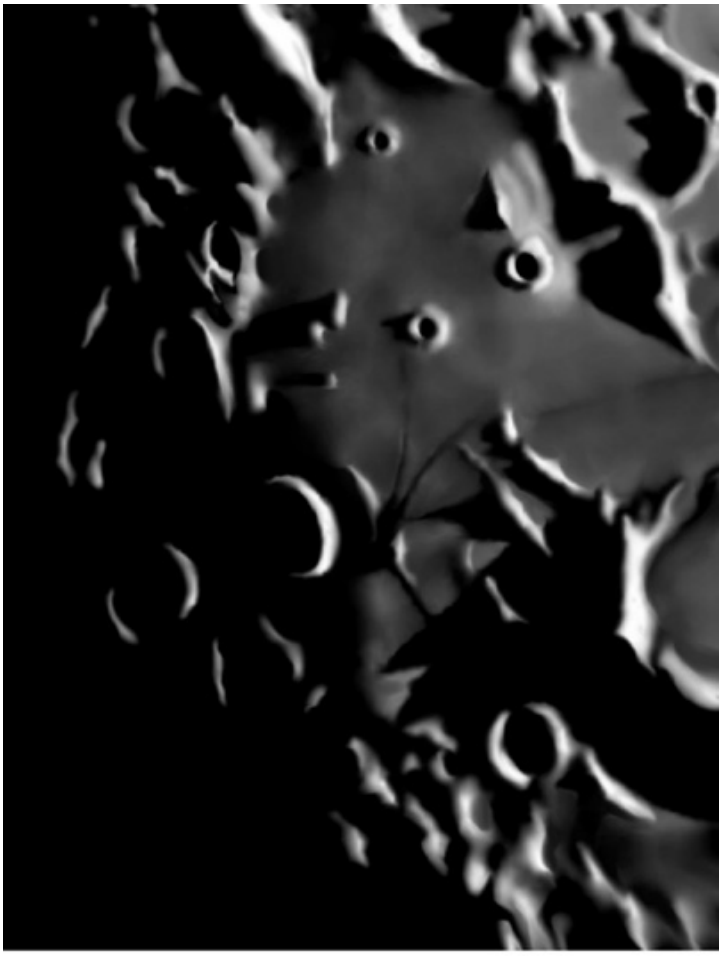
0159 UTC 0330 UTC 0346 UTC

PETAVIUS SUNSET– Jerry Hubbell, Locust Grove, Virginia, USA. November 13, 2011 01:58 UT. Colongitude 119.2º, Seeing 5/10, Transparency 5/6. 0.13m Refractor f/7.5, webcam based CCD.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

PALLAS-MURCHISON – Ed Crandall – Lewisville, North Carolina, USA. October 7, 2011 23:25 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam





RAMSDEN & RIMAE RAMSDEN – Peter Grego, St. Dennis, Cornwall, UK. November 5, 2011 21:15-22:00 UT. Seeing AII-III, slight mist, occasional smoke. Colongitude 31.5-31.9°. 300 mm Newtonian, 170X, integrated light

The area was chosen prior to the observing session and a low-contrast drawing template was prepared using LTVT to ensure positional accuracy. This template was transferred to the PDA and directly drawn over at the telescope eyepiece. One of the objective of this session was to observe the Rimae Ramsden network of rilles to the east of Ramsden as they emerged into the lunar morning light. It transpired that seeing, plus slight mist and some interference from bonfire smoke reduced the contrast so that fine detail was difficult to discern. Only the eastern outer wall of Ramsden itself was illuminated. Two hills to the east of Ramsden formed the junction of the rilles running across Palus Epidemiarum. The two north-branching rilles were only seen during moments of better seeing, one running north towards Marth, the other northeast towards a mountain ridge radial to Capuanus (only Capuanus' western half is depicted in this observation). The shadow cast by Capuanus' western rim was extensive and covered Capuanus P save for its inner western wall. Nearby, Elger was largely full of shadow. To the south was a complicated mass of north-south trending hills and mountains. Several craters were noted in Palus Epidemiarum, one of which, southwest of Mercator, was set in brighter surroundings than the rest of the mare. Mercator, at top right in this observation, was one-third filled with shadow, and the portion of floor visible was smooth and featureless. A large mountain ridge extended south from Mercator, casting a broad shadow westward. Westward from the southern tip of this mountain appeared a faint dusky line which was the ill-defined western reaches of Rima Hesiodus. Beyond the morning terminator were numerous high points catching sunlight, including the outer eastern wall of Lepaute, west of Ramsden.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

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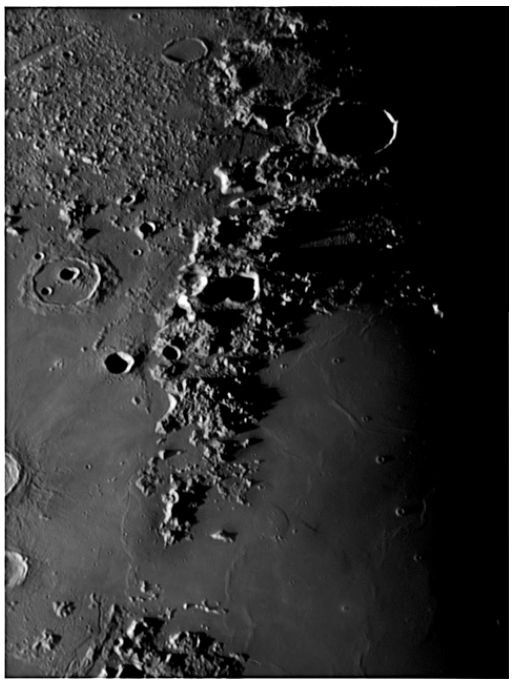


MONTES CAUCASUS - Howard Eskildsen-Ocala, Florida, USA. April 24, 2011 10:03 UT. Seeing 8/10, Transparency 4/6. 6" f/8 refractor, Explore Scientific lens 3X Barlow, DMK 41AU02.AS, IR block & V block filters.

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

COPERNICUS, KEPLER & TYCHO RAYS– Jerry Hubbell, Locust Grove, Virginia, USA. November 13, 2011 03:37 UT. Colongitude 120.1º, Seeing 5/10, Transparency 5/6. 0.13m Refractor f/7.5, webcam based CCD.

LUNAR TRANSIENT PHENOMENA

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

LTP NEWSLETTER – DECEMBER 2011

Dr. Anthony Cook - Coordinator

Firstly I would like to wish all our observers a Happy Holidays at this festive time of the year. Observations for October 2011 were received from the following observers: Jay Albert (Lake Worth, FL, USA) observed: Archimedes, Aristarchus, Atlas, Censorinus, Copernicus, Earthshine, Fracastorius, Gassendi, Grimaldi, Petavius, Plato, and Proclus.. Gary Beal (New Zealand) obtained images of the whole Moon. Maurice Collins (New Zealand) observed: Mare Orientale, and took whole disk images of the Moon. Marie Cook (Mundesley, UK) observed: Aristarchus, Kepler, Madler, Mare Imbrium, Mons Pico, and Plato. I took time lapse video of the Moon through narrow band filters from Aberystwyth University. Peter Grego (St Dennis, UK) observed Gassendi. Norman Izitt (New Zealand) took images of the large areas of the Moon. Kerry Koppert (New Zealand) took whole disk images of the Moon. Piotr Malinksi (Poland) took images of the whole Moon. Fran Power (Ireland) took nearly whole disk images of the Moon. Brendan Shaw (UK) observed: Aristarchus, Furnerius, Janssen K, Kant, Messier, and Torricelli B.

News: I have a couple of 3rd year Physics students working for me at Aberystwyth University looking for impact flashes in Earthshine from now until April. If anybody (in Europe) would like to join in and observe, to help us combine light curves to improve signal to noise ratios in the impact flash data, please let me know. All you need is a light sensitive CCTV camera, like the Watec 902H and the ability to capture digital video at say 10-15 GB/hour (but not MPEGed like one gets on DVD recorders). This work would be ideal for occultation observers as one can kill two birds with one stone.

LTP Reports: Two suspected LTPs were reported during October and I would welcome observations from observers who were out on the nights concerned.

Apianus D on 2011 Oct 03 at UT 21:00-21:20: Fran Power (Meath, Ireland) was out looking at the Moon through his 11" SCT, when he noticed on the inner western rim of a crater, (the name of the crater was unknown to him at the time) an apparent changing color: blue, white and red. He changed the eyepieces and moved the telescope around to different parts of the Moon, but found there was no other feature behaving similarly. As a test, he called out his wife to have a look without telling her that there was anything unusual to see, and she noticed the effect too. Five digital camera images were taken of most of the illuminated disk (only a subsection is shown in figure 1) – the first image was saturated. Most of the images had focus issues, but on the sharpest one, it is possible to see a distinct orange wedge shape of dimensions ~35 km long by ~11 km wide (at the north end). I have checked all the other whole images very thoroughly and can see no similar effects on any other craters. There was evidence for atmospheric spectral dispersion in the original images, but I have calibrated this out in Figure 1 above and the colored rim remains. As there is one picture only showing this effect, I have no way of knowing if this is the same crater as was seen visually, but if it was then the crater was Apianus D, a site not known for LTPs. Now on the downside, at the time of the LTP, the Moon was between 6°-4° above the horizon and in general this is an exceedingly low altitude to be observing the Moon at. However this low altitude does not explain really why the changing color effect was

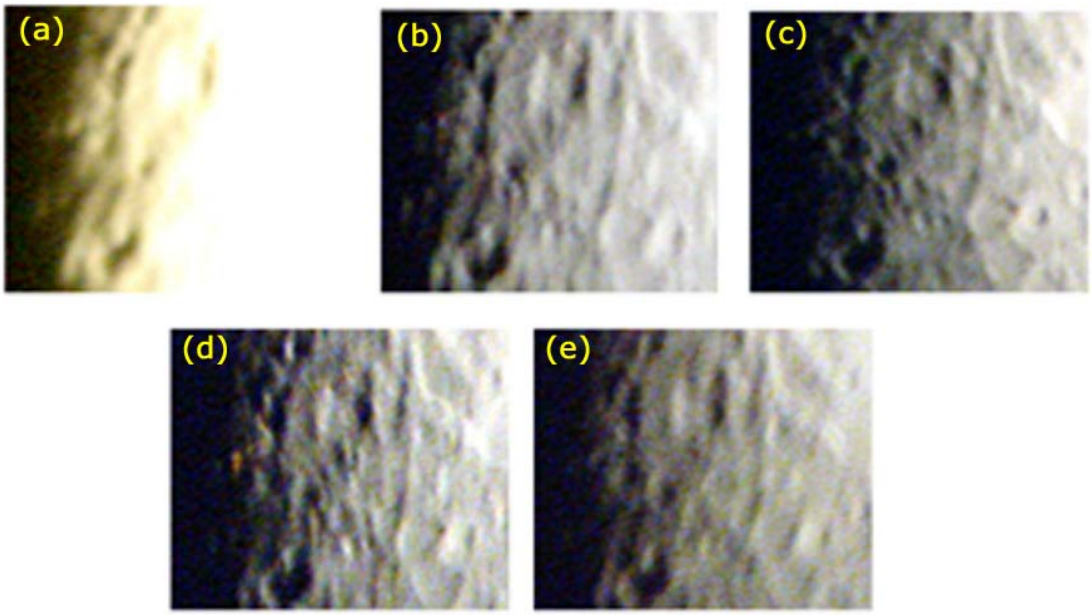


Figure 1. Image sequence taken by Fran Power of the Moon's terminator region. This has been corrected to remove spurious color effects from our atmosphere and/or optics. The LTP is visible in image (d) as an orange area on the inner illuminated rim of a crater. North is towards the top.

seen at one particular feature and not anywhere else, and furthermore remained visible in a different eyepiece. Without the low altitude issue this report would have received a weight of 3-4 out of 5, as it had an element of independent confirmation (albeit with the same scope) and also may have been caught on CCD. However I am going to be extremely cautious and assign a weight of 1 to reflect two facts: a) it was seen very close to the horizon – and this would normally imply a weight of 1 or less, b) I cannot think of any physical process on the Moon that could cause the colour changes that were seen visually. Because I cannot account fully for what was seen, and possibly imaged, not affecting other craters apparently – this remains an intriguing image. The chosen weight will have a relatively minor effect on future LTP statistical analysis, but does not rule the effect being a real LTP. I would urge Fran to repeat the experiment, with the same equipment to see if the effect shows up on other craters, especially with the Moon at low altitude. The only chance we have of increasing the weight of this LTP report would be if somebody else was observing that night around the same time e.g. perhaps some southern European observers?

Gasseendi on 2011 Oct 07 at 21:45 UT. Peter Grego (St Dennis, UK, 30 cm Newtonian, x150, seeing III, intermittent cloud) was producing some PDA sketches of the floor of Gassendi emerging from shadow. A faint point of light was seen inside the shadow filled interior, two thirds of the way from where the central peak was towards the SE rim (See figure 2). At the time, Peter mentioned some uncertainty in being sure about this spot, and after some interruption by cloud the spot was no longer seen later in the evening at 22:30UT. In view of Peter's expressed uncertainty I am assigning a weight of 1 to this LTP too.

Routine Reports: Back in 1974 Aug 03, Travnik and Vianna observed a huge dark ink-like splotch on the very bright sunlit floor of Atlas. The Cameron 1978 catalog assigns this a weight of 1 on the wishful assumption that perhaps the spot was darker than normal. Below in Figure 3 is a copy of the original LTP report:

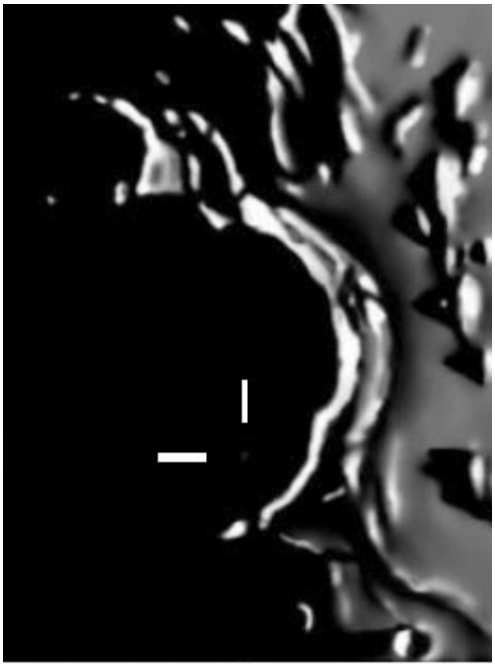
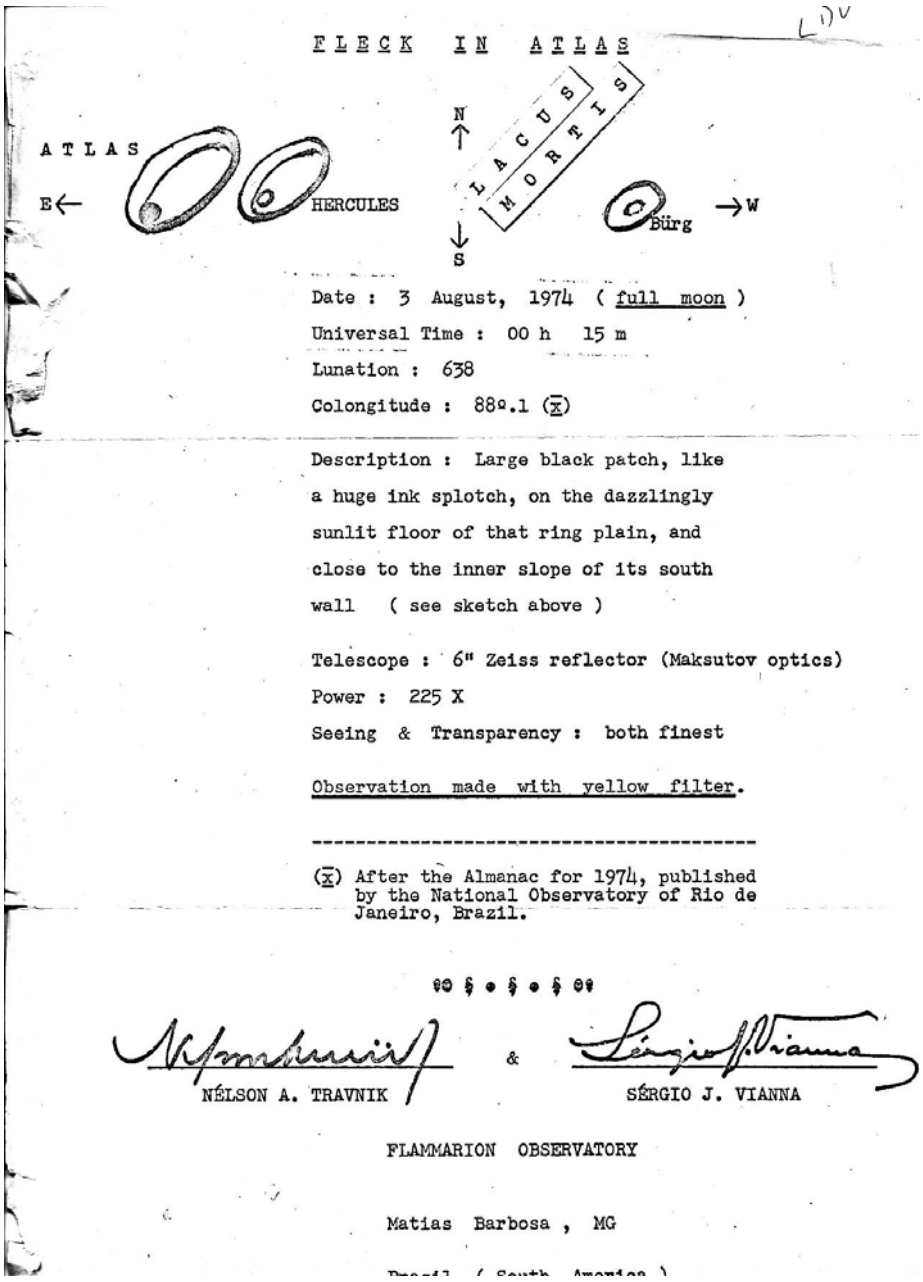


Figure 2. Sketch by Peter Grego showing a suspected spot, on 2011 Oct 07, in the shadow filled floor of Gassendi (as indicated by the two markers). Sketch covers 21:30-21:55 UT. North is towards the top.

On 2011 Oct 10, Jay Albert (Lake Worth, FL, USA) re-observed Atlas under similar illumination conditions to the above LTP report. Jay noted the following: *"Atlas - the large, "black" (more like a very dark grey) patch was immediately seen on the SE floor of the crater at the foot of the crater wall. The patch was obvious, even at 70x and was almost circular at 311x. The patch was the darkest feature in the 311x eyepiece field and was darker than the darkest part of Hercules' floor. I've often seen this patch before and it is not an LTP. I observed from 01:43 to 01:57 UT."* I have now removed this LTP from the BAA/ALPO LTP database by assigning a weight of 0.

On 1985 Dec 29 at UT 23:23-23:58 Martin Mobberley captured some video of the Moon and this contained a LTP recorded in the 2006 LTP extension Cameron catalog:

M. Mobberley (Bury St. Edmunds, Suffolk, UK, seeing II-III) made a video scan of the Moon. P.W. Foley examined the tape and noted something that Mobberley had not seen visually. Two scans of Torricelli B had taken place, one at 23:23 and the other at 23:58UT. In the first a brilliant point appeared briefly, on the western rim, positioned at 3 o'clock. In the second video sequence this brilliant spot was present continuously and wandered along the rim. It was possible to monitor frequency of turbulence present, this apparent movement did not appear to conform, although judgement here was extremely difficult as the feature was at absolute point of resolution, a little better than 0.5 mile. Also considered was the implication of the equipment effect, this did not seem to fit either as other nearby craters in the same configuration, 30% shadow filled with sunlight on exterior of western walls. A point to watch for in future. ALPO/BAA weight=3.



FLECK IN ATLAS

ATLAS

E←

HERCULES

N

LACUS MORTIS

S

Bürg →W

Date : 3 August, 1974 (full moon)

Universal Time : 00 h 15 m

Lunation : 638

Colongitude : 88º.1 (x̄)

Description : Large black patch, like a huge ink splotch, on the dazzlingly sunlit floor of that ring plain, and close to the inner slope of its south wall (see sketch above)

Telescope : 6" Zeiss reflector (Maksutov optics)

Power : 225 X

Seeing & Transparency : both finest

Observation made with yellow filter.

(x̄) After the Almanac for 1974, published by the National Observatory of Rio de Janeiro, Brazil.

NÉLSON A. TRAVNIK & SÉRGIO J. VIANNA

FLAMMARION OBSERVATORY

Matias Barbosa , MG

Figure 3. The original Atlas LTP report by Travnik and Vianna from 1974.

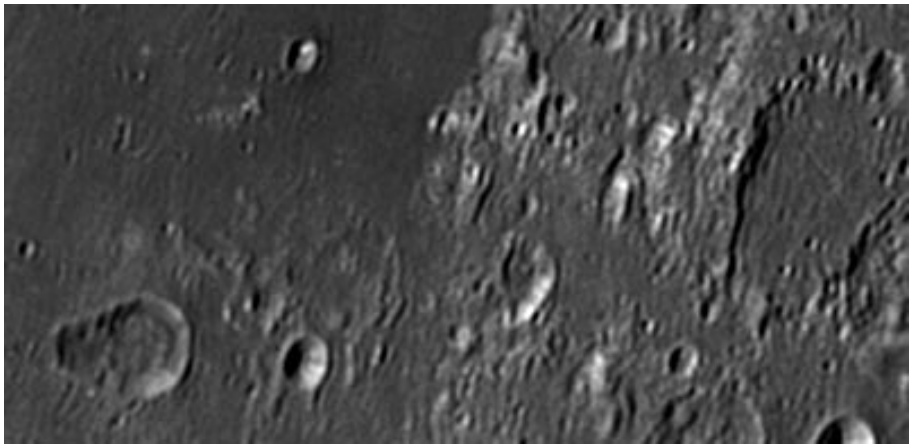


Figure 4 Subsection of a CCD image by Brendan Shaw from 2011.Oct 15 of the Torricelli (bottom left corner) and Torricelli B (near top edge and slightly left of centre) area. North is at the top.

On 2011 Oct 15 at 03:43 UT Brendan Shaw made a repeat illumination CCD image (see figure 4). This does not show any point like effect on the western rim, only the usual white land slide spot on the NE, therefore for now the weight for this LTP shall stand at 3. Unfortunately we do not appear to have the VHS tapes concerned in our archives, so cannot comment any further on this LTP report.

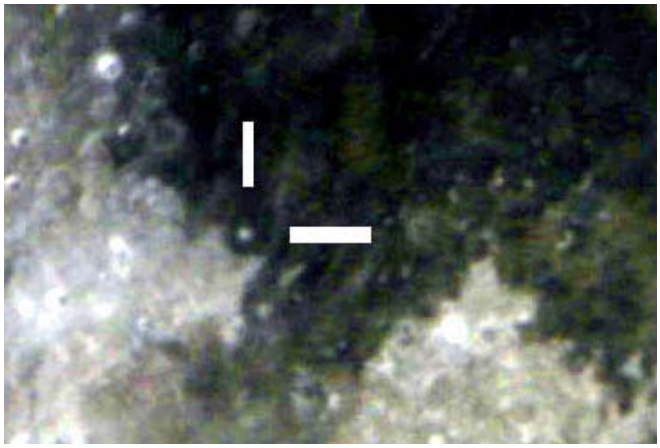


Figure 5 Section of a CCD image by Normal Izitt taken 2011 Oct 07 UT 07:13-07:33 with Moltke highlighted. This image has been contrast stretched, color normalized and color saturation enhanced. North is at the top.

On 1984 Feb 12 KP Marshall reported the following concerning Moltke (extract from the Cameron 2006 LTP extension catalog):

Moltke observed by Marshall_KP on 1984-2-12. ***The UT given in the Cameron 2006 extension catalog are: 20:58, 23:25-02:20 and 01:40-04:00, however it is not clear what UT applies to which of the observers or the two features (Moltke and Plato) reported as having LTP on that night. On 1984 Feb 12-13 Marshall (South America, seeing=III-II) noticed that Moltke was very bright with a fuzzy violet hue - he had never seen it like this before. Cameron 2006 catalog extension LTP ID=240 and weight=2. ALPO/BAA weight=3.***

Norman Izitt took an image of the Moon, close to one of repeat illuminations, and found that Moltke was not very bright, nor did the image show up a violet haze. An image taken after Norman's image, by Maurice Collins, also did not show anything unusual about Moltke. For now the Moltke LTP will remain at a weight of 3.

Suggested Features to observe in December*:* 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.

N.B. There will be the remains of a total lunar eclipse at Moon rise, on Dec 10th but visibility will vary with where you are in the world. 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.

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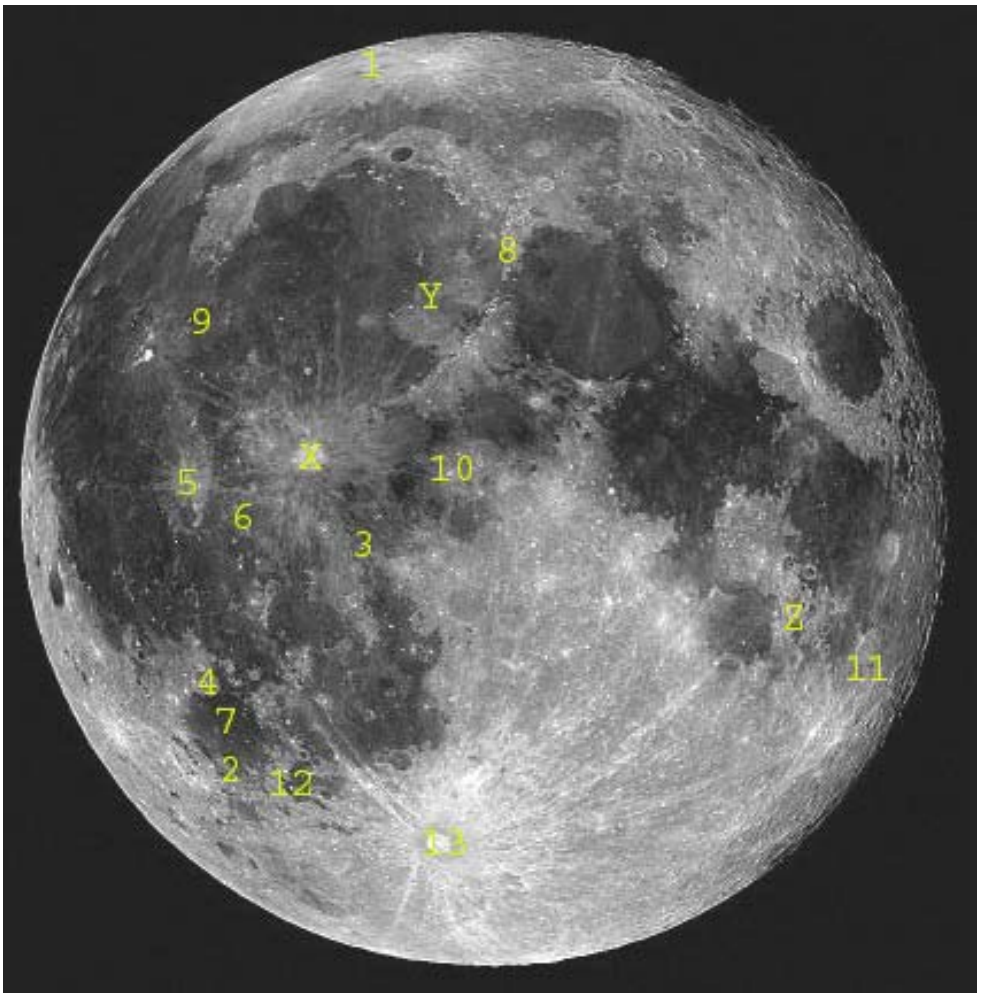
KEY TO IMAGES IN THIS ISSUE

1. **Catena Sylvester**
2. **Doppelmayer**
3. **Gambart**
4. **Gassendi**
5. **Kepler**
6. **Kunowsky**
7. **Mare Humorum**
8. **Montes Caucasus**
9. **Montes Harbinger**
10. **Pallas & Murchison**
11. **Petavius**
12. **Ramsden**
13. **Tycho**



FOCUS ON targets

X = Copernicus (January)
Y = Archimedes (March)
Z = Pyrenees Mts. (May)