



THE LUNAR OBSERVER

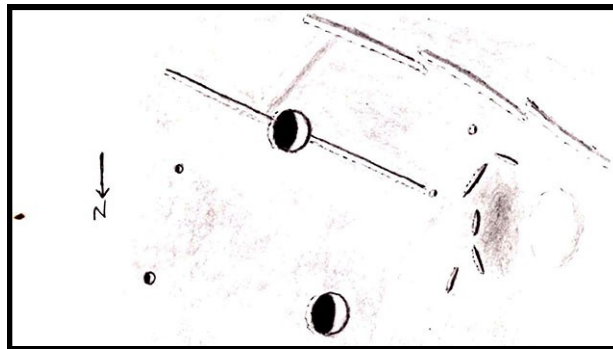
A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.

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

FEATURE OF THE MONTH – OCTOBER 2018 **EUCLIDES B & C**



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

April 26, 2018 02:10-02:58 UT, 15 cm refl, 170x,

seeing 8-9/10, transparency 6/6.

I drew these craters and vicinity on the night of April 25/26, 2018. These are two very similar, crisp craters between Mares Cognitum and Humorum. Euclides B is the more northerly of the pair. The Lunar Quadrant map depicts a ghost ring surrounding this crater, but I saw nothing like that there. Euclides CC is the small pit east of Euclides B and Euclides CA is the smaller pit east of Euclides C. None of these craters shows a halo. Five small ridges are west of the main craters. They appear like tiny needles. The largest one is Herigonius tau. Another 'needle' makes a right angle with tau to its southeast, and three more are to the north. The one farthest northeast (nearest Euclides B) looks less bright than its neighbors. Two other tiny peaks are near Herigonius tau. A very narrow straight ridge or wrinkle has its western end near one of the tiny peaks and extends southeastward to south of Euclides CA. It appears to go right through Euclides C, but the crater does not seem to be affected. Another group of ridges/wrinkles are southwest of the narrow feature, and are approximately parallel to it. They are somewhat wider, and the individual segments do not quite mesh. A low, wide wrinkle connects them just east of Euclides C. A mound is north of one of the segments and west of the 'needles', and a relatively dark area is between the mound and 'needles.'

LUNAR CALENDAR

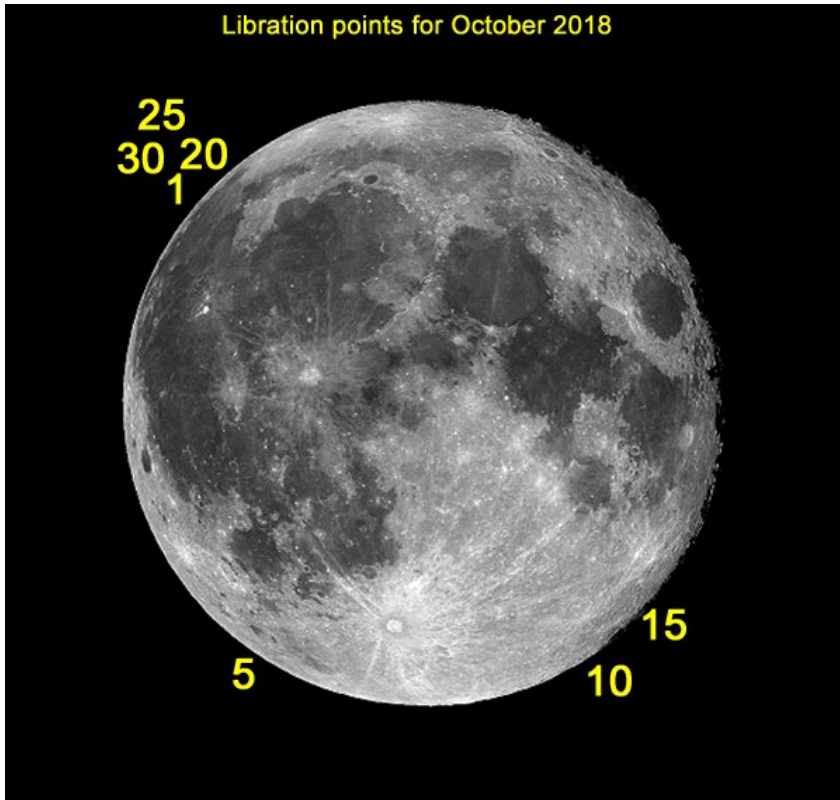
| 2018 | U.T. | EVENT |
|--------|-------|----------------------------------|
| Oct 02 | 09:45 | Last Quarter |
| 02 | 13:03 | Moon Extreme North Dec.: 21° N |
| 04 | 03:10 | Moon Ascending Node |
| 05 | 22:29 | Moon Perigee: 366400 km |
| 09 | 03:47 | New Moon |
| 11 | 21:21 | Moon-Jupiter: 4.3° S |
| 15 | 03:01 | Moon-Saturn: 2° S |
| 15 | 17:26 | Moon Extreme South Dec.: 21.2° S |
| 16 | 18:02 | First Quarter |
| 17 | 12:03 | Moon Descending Node |
| 17 | 19:16 | Moon Apogee: 404200 km |
| 18 | 13:01 | Moon-Mars: 2.2° S |
| 24 | 16:45 | Full Moon |
| 29 | 18:34 | Moon North Dec.: 21.3° N |
| 31 | 03:46 | Moon Ascending Node |
| 31 | 16:40 | Last Quarter |
| 31 | 20:05 | Moon Perigee: 370200 km |

| 2018 | U.T. | EVENT |
|--------|-------|----------------------------------|
| Nov 07 | 16:02 | New Moon |
| 11 | 15:46 | Moon-Saturn: 1.6° S |
| 12 | 02:21 | Moon Extreme South Dec.: 21.4° S |
| 13 | 14:04 | Moon Descending Node |
| 14 | 15:57 | Moon Apogee: 404300 km |
| 15 | 14:54 | First Quarter |
| 16 | 04:16 | Moon-Mars: 1.1° N |
| 23 | 05:39 | Full Moon |
| 26 | 01:48 | Moon North Dec.: 21.5° N |
| 26 | 12:10 | Moon Perigee: 366600 km |
| 27 | 00:18 | Moon Ascending Node |
| 30 | 00:19 | Last Quarter |

LUNAR LIBRATION

OCTOBER-NOVEMBER 2018

Libration points for October 2018



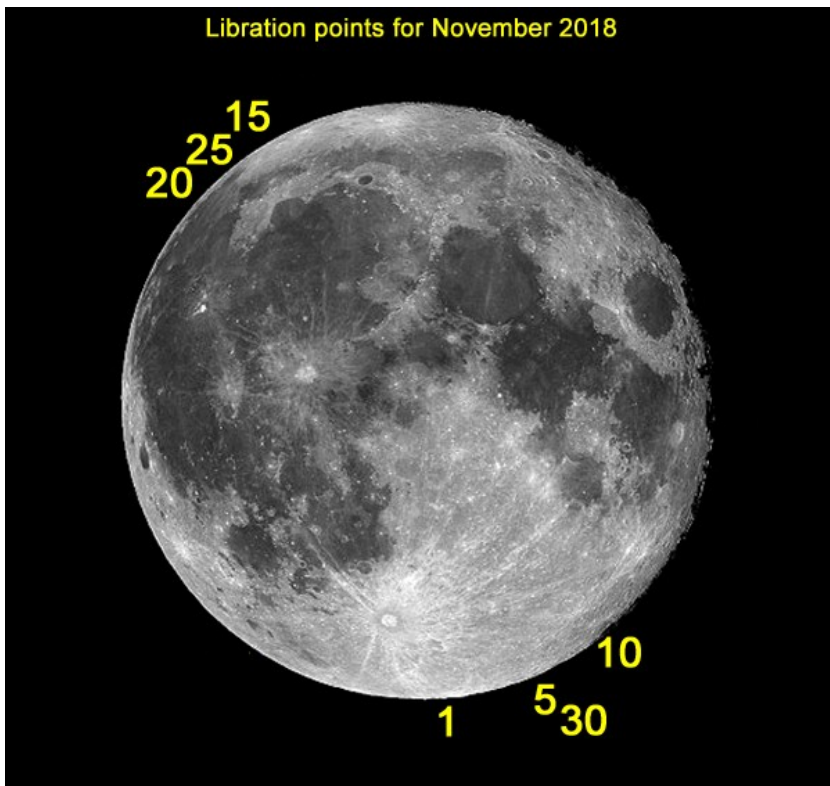
Size of Libration

| | | |
|-------|-------------|--------------|
| 10/01 | Lat +04°35' | Long -04°15' |
| 10/05 | Lat -01°27' | Long -00°43' |
| 10/10 | Lat -06°33' | Long +05°03' |
| 10/15 | Lat -03°17' | Long +04°02' |
| 10/20 | Lat +03°16' | Long -02°33' |
| 10/25 | Lat +06°32' | Long -04°56' |
| 10/30 | Lat +01°52' | Long -01°41' |

NOTE:

Librations are based on a geocentric position at 0 hr. Universal Time.

Libration points for November 2018



Size of Libration

| | | |
|-------|-------------|--------------|
| 11/01 | Lat -01°21' | Long +00°03' |
| 11/05 | Lat -06°06' | Long +03°32' |
| 11/10 | Lat -04°36' | Long +04°34' |
| 11/15 | Lat +01°53' | Long -01°05' |
| 11/20 | Lat +06°28' | Long -05°49' |
| 11/25 | Lat +03°35' | Long -02°34' |
| 11/30 | Lat -04°13' | Long +02°55' |

NOTE:

Librations are based on a geocentric position at 0 hr. Universal Time.

JOHN WESTFALL

1938 – 2018

John Westfall died July 26, 2018 at age 79. He was an ALPO member since his teens, who served in many capacities over the years: starting by submitting observations, then at various times serving as Lunar Recorder, Associate Director, Director, Editor, member of the Board of Directors, and coordinator of the Mercury & Venus Transit section and the Galilean satellite eclipse-timing program. He also received the ALPO Walter H. Haas Observer's Award (1988), and the Peggy Haas Service Award (1998)..

He had a wide range of interests, but among his contributions Lunar studies are his development of a classification system for lunar domes, his Atlas of the Lunar Terminator, and his occultation work leading to mapping the lunar South Polar Region.

Professionally, John was Professor of Geography and Environmental Sciences at San Francisco State University. He was a modest, calm, soft-spoken man who mentored many others. He could be relied upon to be a voice of reason in any discussion.

John will be missed.

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 Journal of the Association of Lunar and Planetary Observers-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.alpo-astronomy.org>. 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.

SUBMISSION THROUGH THE ALPO IMAGE ARCHIVE

ALPO's archives go back many years and preserve the many observations and reports made by amateur astronomers. ALPO's galleries allow you to see on-line the thumbnail images of the submitted pictures/observations, as well as full size versions. It now is as simple as sending an email to include your images in the archives. Simply attach the image to an email addressed to

lunar@alpo-astronomy.org (lunar images).

It is helpful if the filenames follow the naming convention which, for the lunar gallery is:

FEATURE-NAME_YYYY-MM-DD-HHMM.ext

YYYY {0..9} Year

MM {0..9} Month

DD {0..9} Day

HH {0..9} Hour (UT)

MM {0..9} Minute (UT)

.ext (file type extension)

(NO spaces or special characters other than “_” or “-”)

As an example the following file name would be a valid filename:

Copernicus_2018-04-25-0916.jpg

(Feature Copernicus, Year 2018, Month April, Day 25, UT Time 0916)

Additional information requested for lunar images (next page) should be included on the image. Alternatively, include the information in the submittal e-mail, and/or in the file name (in which case, the coordinator will superimpose it on the image before archiving). As always, additional commentary is always welcome and should be included in the submittal email, or attached as a separate file.

If the filename does not conform to the standard, the staff member who uploads the image into the data base will make the correction prior to uploading the image(s). However, if they come in the recommended format, it would reduce the effort to post the images a lot.

Observers who submit digital versions of drawings should scan their images at a resolution of 72 dpi and save the file as a 8 1/2' x 11" or A4 sized picture.

Finally a word to the type and size of the submitted images. It is recommended that the image type of the file submitted be jpg. Other file types (such as png, bmp or tif) may be submitted, but may be converted to jpg at the discretion of the coordinator. Use the minimum file size that retains image detail (use jpg quality settings. Most single frame images are adequately represented at 200-300 kB). However, images intended for photometric analysis should be submitted as tif or bmp files to avoid lossy compression.

Images may still be submitted directly to the coordinators (as described on the next page). However, since all images submitted through the on-line gallery will be automatically forwarded to the coordinators, it has the advantage of not changing if coordinators change.

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:

Name and location of observer

Name of feature

**Date and time (UT) of observation (use month name or specify mm-dd-yyyy-hhmm
or yyyy-mm-dd-hhmm)**

Filter (if used)

Size and type of telescope used Magnification (for sketches)

Medium employed (for photos and electronic images)

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

Seeing: 0 to 10 (0-Worst 10-Best)

Transparency: 1 to 6

Resolution appropriate to the image detail is preferred-it is not necessary to reduce the size of images. *Additional commentary accompanying images is always welcome.* **Items in bold are required. Submissions lacking this basic information will be discarded.**

Digitally submitted images should be sent to both

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

and Jerry Hubbell – jerry.hubbell@alpo-astronomy.org

Hard copy submissions should be mailed to Wayne Bailey at the address on page one.

CALL FOR OBSERVATIONS:

FOCUS ON: Apollo 16 Region – Descartes and Cayley Plains

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 **November 2018** edition will be the **Apollo 16 Region – Descartes and Cayley Plains**. 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 these features to your observing list and send your favorites to (both):

Jerry Hubbell – jerry.hubbell@alpo-astronomy.org

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

Deadline for inclusion in the Apollo 16 Region – Descartes and Cayley Plains article is Oct. 20, 2018

FUTURE FOCUS ON ARTICLES:

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

| <u>Subject</u> | <u>TLO Issue</u> | <u>Deadline</u> |
|--|------------------|-------------------|
| Apollo 15 Region – Mare Imbrium and Hadley Rille | January 2019 | December 20, 2018 |
| Apollo 14 Region – Fra Mauro | March 2019 | February 20, 2019 |
| Apollo 12 Region – Ocean of Storms | May 2019 | April 20, 2019 |
| Apollo 11 Region – 50th Anniversary – Sea of Tranquility | July 2019 | June 20, 2019 |

COPERNICUS IN THE TERMINATOR IN **"SELENOGRAPHIA" BY JOHANNES HEVELIUS**

Alberto Anunziato-Juan Manuel Biagi

One of the most exciting astronomical books is undoubtedly "Selenographia" by Johannes Hevelius. Even if it was not the first lunar atlas (Francesco Fontana's was published a year earlier) it was the most influential for more than a century. Its four general maps of the Moon and its forty drawings of the different phases of the lunation, all accompanied by meticulous descriptions resulting from his observations between November 1643 and April 1645, were only surpassed by nineteenth century selenographers. Authentic work of the era of discoveries, Hevelius's observations discovered a new world, totally different from the Aristotelian conception of the smooth and brilliant Moon that Galileo Galilei had dynamited with his telescopic observations of 1609. In this 1647 book the paradigm of the Moon is that of a world similar to our Earth ("The Moon can be called with foundation "Antichtona", because it is similar to our Earth with oceans, islands, swamps, fields, mountains and valleys", page 225). In fact, the Baroque conception of a Moon that could be inhabited as in the "Journey to the Moon" by Cyrano de Bergerac is scientifically based on our author. But it is not just a mere atlas, it is also a compendium of the theories about the constitution of our satellite, from the Greeks to the state of the art of the time. The author also tells us how he built his telescopes, how he made the observations and even how he dealt with what lunar observers know very well: the limitations of our drawings with respect to what we observe with our eyes ("you will understand how much attention and diligence of the artist is needed ... the astronomer knows that more important than the eyes are the hands to draw what the eyes see ", pages 210/211). Hevelius was the first to understand the importance of terrestrial geography as a mean to know the new world and the need for a common scientific nomenclature that would allow the communicability of the observations "there would be no astronomy if we could not distinguish the objects with a proper name", page 223). He desisted from his idea of using the names of ancient and modern astronomers and proposed to name the lunar features with the names of the terrestrial geographical features, in order to avoid the "envy and enmity" that could arise from their forgetfulness or omissions (years later Giovanni Riccioli hadn't the same fear and bequeathed us the current nomenclature).

The chapter we chose to translate ("Caput XX", pages 344/345) illustrates two important theoretical issues at the time of the publication of our work: the existence of mountains on the Moon and the nature of the large dark spots (our maria). Galileo had already deduced the existence of mountains from the shape of the shadows in the area of the terminator. At the moment of the lunation (21.6° colongitude, 68.4° illumination) to which Hevelius refers in the chapter that we translate the terminator crosses straight by Mare Imbrium. Galileo had reflected on the nature of the "maculae magnae" (large dark spots): were they jungles? were they seas? In "Dialogo dei massimi sistemi" he assures that they are plains (pages 136/137). Hevelius seems not to risk judgment in the translated chapter: "Per aquas, aut si mavelis, per spatiosissimam quandam planitiem" ("by water or, if you like, by spacious plains", page 344), perhaps out of respect for his revered Galileo, but his opinion was that "the illuminated surface of the Moon is earth, the great dark areas are waters" (page 151, quoting Kepler). The description of the area in which the terminator runs straight starts from the north of the Mare Imbrium (Mediterraneum) passing through the Montes Recti (Insula Majorica), the nimbus of Copernicus (Insula Sicilia), and Bullialdus (Insula Creta). In the nomenclature of Hevelius Mons Aetna is Copernicus and its nimbus is called Insula Sicilia. Copernicus serves as an argument to prove the existence of mountains: if it belongs to the mainland (today we would say "highlands")

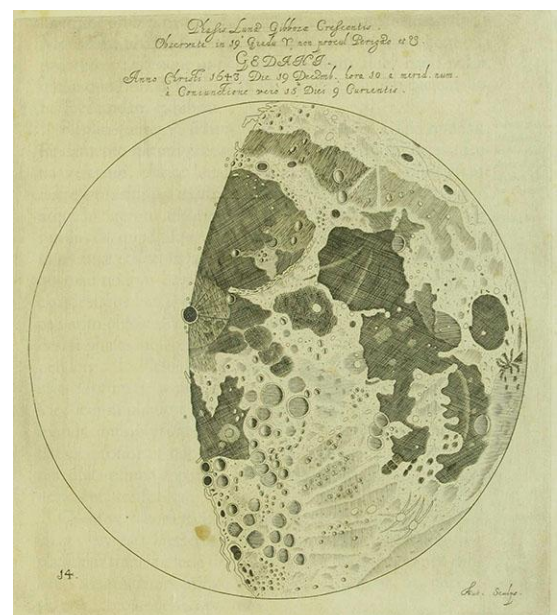
it should be bright but the valley (the crater) is dark due to the shadows cast by the mountains that surround it (today we would say its walls).

“If there is a moment in which the border between the dark and illuminated parts is drawn in a regular and minimally rough and winding way, it is certainly in this phase, in which it is clearly distinguished as it cuts the Mare Mediterraneum around the Insula Majórica, Sicilia, Zacynthum and intersect Creta, then you can see the longest straight line crossing a lunar sea. By the places that this line crosses, almost always by water or, if you like, by spacious plains, this line extends precisely, very straight and very flat. The minor areas that shine outside the terminator zone are the summits of mountains and islands. The great bright circle in the approximate center of the illuminated area is the Mons Aetna of Sicily, whose valley at this time is completely dark, you can never see it darker, since the Sun (properly speaking) is rising and only the slopes of these mountains touch lightly with their light. This Insula Sicilia appears precisely in this phase darker, to the point that there is no great difference between its color and that of the Mare Mediterraneum. We ask ourselves: what will be the cause of appearing much darker than it should be, being part of the continental part of the Moon? We can answer that this occurs because the "Terra Lunae", more than an opaque body, reflects the sun's rays more effectively and can appear brighter, hiding innumerable and diverse mountains that, part in the neighboring islands, part in the same Sicilia, in large numbers can be observed, of which there are undoubtedly many in that place: Truly, the smaller they are the less you can discern their appearance. These mountains, so close to the terminator that project a huge and dark shadow at this time, as in all of Insula Sicilia are innumerable and of different heights, create an almost continuous shadow, which is the reason why we see this island in the most complete darkness. To which it is possible to answer: if what we referred is right, it is necessary that Insula Sicilia with Crescent Moon appear more clear and luminous, because the shadows decrease in relation to an increasingly higher Sun; it can not be otherwise, as I will show with precise observations with Crescent and Waning Moon. In the same way, in Crescent Moon Insula Sicilia is clearer and brighter and, on the contrary, in Waning Moon, every day gradually it becomes darker, as can be seen in phases 15, 16, 17, 18 and 19. In Full Moon and shortly after it is very bright. When the decreasing phases like 26 begin, slowly and regularly it begins to darken until it reaches phases 34 and 35, when it appears again very dark, because once again it is then in the terminator. Therefore the terminator below Sicily is not seen flat and smooth, as it is observed when it extends over waters or plains, but when it passes through the vicinity of Creta and Monte Sepher is necessarily winding ”

A mere comparison between the lunar chart that accompanies our Chapter XX (Figure 1), testimony of the lunar observation of December 19, 1643 at 10.00 pm Danzig time, and the image obtained with the software

Figure 1 Lunar Chart, from Selenographia Chapter XX.

Virtual Moon Atlas, representing with images obtained by the Lunar Reconnaissance Orbiter the same date and time of the Hevelius observation (Figure 2). The first thing that impresses is the ability of observation and drawing of our author with telescopes with very little resolving power. This impressionist analysis is confirmed by Rodolfo Calanca's study that shows that Hevelius maps have an average error of distance





between craters only superior to the Geminiano Montanari map of 1662, made with the help of the recently invented reticle, they are even more precise than the maps of Grimaldi, appeared in 1651 in the "Almagestum novum", drawn on the basis of the charts of Hevelius.

Figure 2. Lunar Image. Modeled using Virtual Moon Atlas with Lunar Reconnaissance Orbiter data.

References

Calanca, Rodolfo. La Luna nell'immaginario seicentesco. Parte V. en:

www.win.eanweb.com/selenografia_parte_5.htm

Galileo Galilei. Dialogo dei massimi sistemi. Rizzoli Editore. Milano, 1959.

Hevelius. Selenographia. Gdansk. 1647. En: www.e-rara.ch/zut/content/titleinfo/160230

THREE RILLES NEAR MARE VAPORUM

Alberto Anunziato

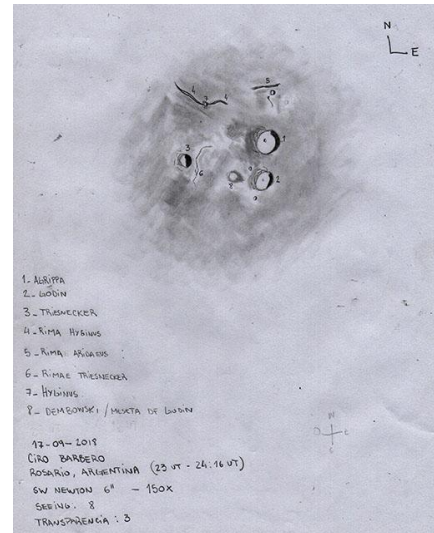
No doubt that rilles are one of the most interesting features to observe. These common features appear all along trough the entire moon surface in different ways, varying depth, length, structure, origin, etc. All along the astronomy's history were studied by the scientists but the origin is undetermined yet.

In our case, the first rille we see (fig. 1) is: Rima Hyginus. This particular rille is interrupted in the middle of its path by the crater Hyginus. This crater has 11km of diameter and a wall about of 800 metres. Rima Hyginus its about 220 km length and 4 km wide. It is estimated that its origin is in the west-side, going through Hyginus, to the east where loses depth. At its Eastern end it reaches another rille called Rima Aridaeus, located at the north. Both are connected with another 40 km long rille practically imperceptible at 150x

The origin of Rima Hyginus is such a bit enigmatic like interesting. One of the hypothesis is that were formed by lineal meteorites impacts, building that way a kind of mysterious passageway, what is unlikely. Another could be a fault suffering multiple collapses consecutively.

Figure 1. Rima Hyginus. *Ciro Barbero, Rosario, Argentina. September 12, 2018 23:00-00:16. 6" reflector, 150x.*

At last, we have Rimae Triesnecker. This fault is interesting because it is not a single rille like the others. This feature is conformed at least of ten littled rilles, branched in random ways, with differents sizes. Rima Triesnecker (220 km long) is the most important and it is located in the southern part of the Hyginus crater. I enjoyed observing this kind of rilles beacause in the eyepiece they are shown as if they were small delicate veins. It is presumed that the origin of this groups of rilles are underground tunnels where lava circulated to the moon surface.



Craters Frozen in Time

Howard Eskildsen

Around 3.85 billion years ago a massive impact formed the Imbrium basin, obliterating any pre-existing craters within the basin. Remnants of the outer rim of this basin can be seen on the lower right of the image (fig. 1) as the Montes Apenninus, and on the upper right of the image as the Montes Caucasus.

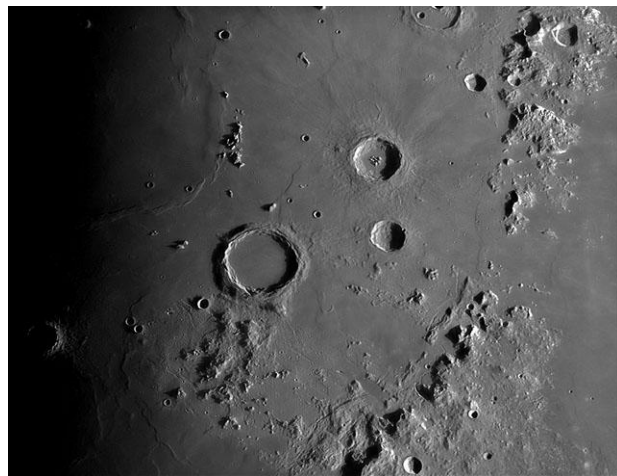


Figure 1. Archimedes-Aristillu. *Howard Eskildsen, Ocala, Florida USA. February 24, 2018 00:55 UT. Seeing 10/10, transparency 5/6. 6\"/>*

Later impacts created Archimedes, Spurr, and Cassini, which were subsequently partially buried by basalt lava flows. North of Aristillus, a faint ring reveals the remains of a crater that was nearly lost in the lava. The volcanic flows produced the flat surfaces which embayed the mountains and isolated other peaks such as the Montes Spitzbergen.

After the volcanic activity ceased, further craters pocked the flattened terrain. A few such as Aristillus, Autolycus, and Theaetetus, exceed 25 km diameter, but most of the later craters are less than 15 km in diameter.

Aristillus is the largest fresh-appearing crater with central peaks, terraced walls, sharp rim, and hints of rays visible on this image. It is considered "Copernican" in age, or less than 1.1

billion years old. In other words, all of the features and events discussed occurred eons ago, and were already frozen in time before there were eyes on Earth to marvel at the Moon.

Aestuum-Vaporum Region

Howard Eskildsen

The central part of the image (fig. 1) shows rugged material ejected from Mare Imbrium, part of which lies just north of Eratosthenes in this image. The ejecta is embayed by basalt lava flows in Sinus Aestuum on the left and Mare Vaporum on the right, forming what resembles an isthmus of rubble in the upper central image. This ejected rubble fans out in the central image, where it encounters other lava flows including Sinus Medii, which is near the center of the Moon.



Figure 1. Sinus Aestuum-Mare Vaporum.

Howard Eskildsen, Ocala, Florida USA.

*February 24, 2018 00:55 UT. Seeing 10/10,
transparency 5/6.6" f/8 refractor, 2x barlow,
W-8 Yellow filter. DMK 41AU02.AS.*

Pallas and Murchison show scars from the fluidized Imbrium ejecta and obviously predate the Imbrium basin. Since the lava flows have covered parts of the ejecta, they obviously came later. Signs of volcanic activity are also

apparent by the collapse pits along Rima Hyginus, and one north of Rima Bode II (name from LAC-59). Faint Rima Bode I is barely visible as a pale outline that resembles a "thumbs up," with the thumb pointing to the upper left. I would not have noticed it had it not been listed on LAC-59.

Other signs of volcanic activity appear as pyroclastics; one north of Rima Hyginus, One in the region of Rima Bode I and II, and one north of Schroter. The pyroclastics are darker than their surroundings and are more easily seen with higher sun angles. Such areas have been suggested as targets for future Moon exploration due to high potential for scientific yield and as possible sources of hydrogen and oxygen. If such resources exist in quantities that can be recovered to make water and rocket fuel, it would have profound implications for space exploration and colonization

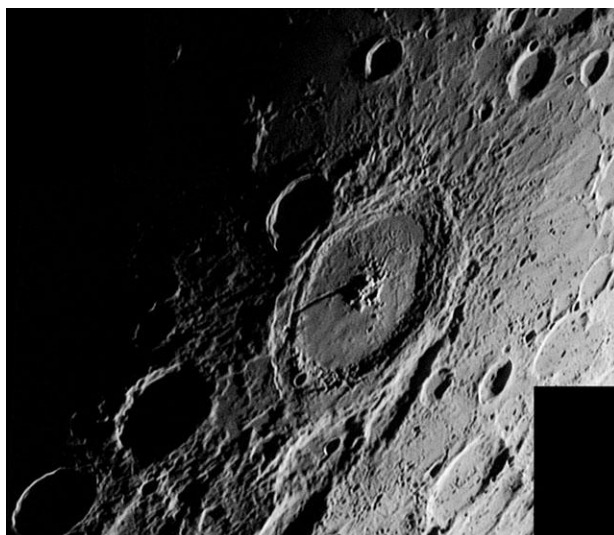
A Pet Crater

Rik Hill

I remember back in 1972 when I took my first lunar image on Tri-X film, trying to identify things in that image. I saw a crater with a line in it and found it in the images in my Lunar Atlas by Dinsmore Alter which I still have! It was the 182 km diameter crater Petavius and did indeed

have a crack in it, in fact a system of rimae in it. I have imaged it many times since then (fig. 1) including this week with the 3 day old crescent was just above Venus forming a right triangle with Jupiter. The beautiful terraced walls were dramatic with little Petavius C (11 km dia.) a black circle on the southern wall. Just inside

FIGURE 1. *Petavius* – Richard Hill – Tucson, Arizona, USA September 13, 2018 01:53 UT. Colongitude 306.1°. Seeing 8/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 610 nm filter.



the wall on the southern floor of Petavius just to the right of Petavius C you can see the dome Petavius-1 (abbreviated in the Lunar Domes Atlas by the GLR Group as Pe-1). Below and to the left (west) of Petavius are two large shadow filled craters. The one nearest Petavius is Snellius (85 km) and beyond that is Stevinus (77 km). Directly below Petavius is the ruined crater Hase (85 km) with little Hase A (14 km) on it's floor. Adjacent to the right is the crater Palitzch (43 km) with Vallis Palitzch stretching to the north along the east wall of Petavius. This is a real odd-ball valley that appears to be a mash of old craters, possible faulting and ejecta from the Petavius impact. On the opposite side of Petavius is the shadow filled crater Wrottesley (60 km) and in the upper right corner is Holden (49 km). Before leaving, take a moment to enjoy the ejecta splash on the north side of Petavius between it and Holden.

Another Overlooked Treat

Rik Hill

South of Petavius is an interesting crater that is often missed because of its magnificent big brother to the north. This crater is 129 km diameter Furnerius seen left and below center in this

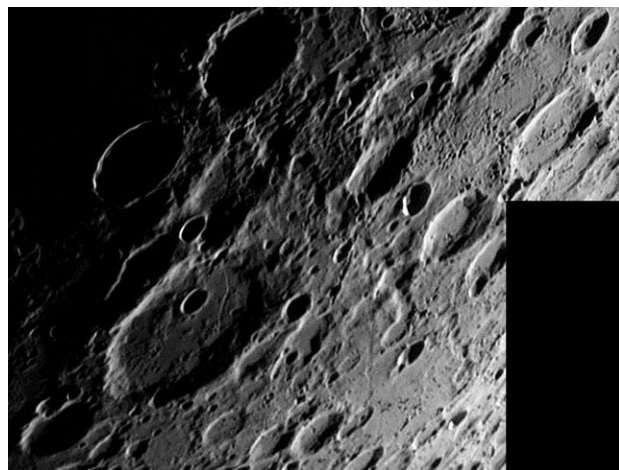


image (fig. 1). This is an unusually good view of this crater as most of the time it is much closer to the limb and thus more foreshortened (oval) due to libration. I came to know this

Figure 1. *Furnerius* – Richard Hill – Tucson, Arizona, USA September 13, 2018 01:57 UT. Colongitude 306.1°. Seeing 8/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 610 nm filter.

crater a few decades ago when involved with a small project to try and confirm the reported low swelling or dome in the southern floor of this crater first reported by Johann Heronymus

Schroeter in 1791. Locating this crater was a bit of a challenge for me at the time! On the floor of this crater is a nice rima, Rima Furnerius, a graben-like fault about 50km long winding among the low hills on the floor.

Above Furnerius are two craters in deep shadow. The one on the left is Stevenus (77 km) and on the right is Snellius (85 km). Notice the valley coming down from the latter diagonally across the image almost to the lower right corner. This is Vallis Snellius and it's similar in structure to Vallis Rheita which is not far away and they may have a common origin in the Nectaris impact. Crossing this valley is a thin rima almost vertical here. This is Rima Hase and it seems to emanate from Hase D (56 km) with Hase (85 km) being above and contiguous with it and having a 14km crater on its floor, Hase A. There is another very interesting rima crossing it almost orthogonally just below Hase D. Unfortunately this one has no name that I can find.

Overlooked and Overlapped Cyrillus

Rik Hill

Another great view of the big three craters of the 5-6 day terminator (colongitude 335°). Theophilus (104 km diameter) just above right from the middle with its pingo-like central peak dominates the image (fig. 1) but the interesting crater this time is Cyrillus (100 km) just below and to the left. Of the two Cyrillus is the older crater as might be inferred from the overlap of Theophilus. It's about a billion years older so it was already ancient when the Theophilus impact occurred! Note the nice rimae on the floor of Cyrillus and also Cyrilus A on the left (west) side of Cyrillus, a pear shaped crater that looks like a flipped twin to the nearby Torricelli. Due north of Cyrillus is a mountain I've mentioned before that I particularly like. It points down towards Cyrillus. This is Mons Penck and must be an impressive sight if you are looking towards it from

Ibn Rushd (34 km) the crater just to north of the north wall of Cyrillus. Forming a rough equilateral triangle to the west with Penck and Rushd is the crater Kant (32 km) still deep in shadow.

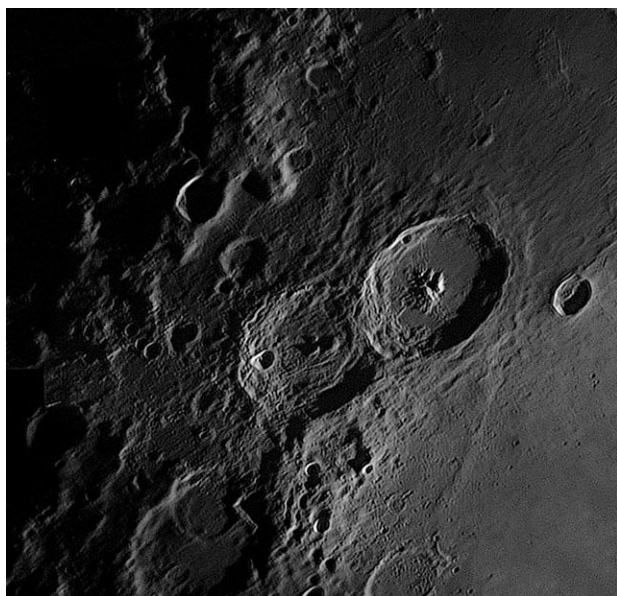


Figure 1. Cyrillus – Richard Hill – Tucson, Arizona, USA January 23, 2018 00:44 UT. Colongitude 357.9°. Seeing 8-9/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 610 nm filter.

Notice east of Theophilus the crater Madler (29 km) and what looks to be a ledge on the inside west wall. This is just an effect of lighting as there is a slumped region there but nothing as sharp as is shown here. The whole area south of Theophilus is peppered with 1-3 km secondary craters from ejecta

from the Theophilus impact.

Vallis Rheita

David Teske

South of Mare Nectaris, my eyes are drawn to Vallis Rheita (fig. 1) when the sunlight grazes the area at low angles. Vallis Rheita is a linear valley around 450 km long and up to 30 km wide. It is made of numerous overlapping craters that are oriented towards the Nectaris Basin, which suggest that it

Figure 1. Vallis Rheita - David Teske, Louisville, Mississippi, USA, August 28, 2018 06:18 UT. Colongitude 112.3°, Seeing 5/10, 4 inch APO refractor, 2.5 x Powermate.

was formed by secondary events following the Nectaris impact. When the Nectaris Basin was formed 3.92 billion years ago, more than a dozen mountain sized chunks of debris took flight in a straight line. Then they landed, they formed the Vallis Rheita, the longest valley on the Moon (fig. 2). By this interpretation, Vallis Rheita is a chain of secondary craters, which would be monstrous versions of lines of small secondaries radiating from young craters like Copernicus. The Vallis Rheita is



as long and as wide as the Grand Canyon. The Grand Canyon, however, took millions of years to form by the slow erosion of water and a rising Colorado Plateau. The Vallis Rheita on the other hand took only seconds to form!

Figure 2. Vallis Rheita - David Teske, Louisville, Mississippi, USA, May 20, 2018 02:19 UT. Colongitude 328°, Seeing 5/10, 4 inch APO refractor, 2.5 x Powermate.

The crater chain begins northwest of the crater Rheita, crosses the crater Young with a diameter of 72 km then the crater Mallet with a diameter of 58 km and ends southeast of the crater Reimaruss diameter 48 km. The crater Rheita is a typical, somewhat degraded impact crater 70 km in diameter which is much younger than either the valley or most of its neighboring craters. This crater was named after Anton Maria Schyrllaes of Rheita, a Czech astronomer and optician who lived from 1597 to 1660.

A bit of a mystery about Rheita Valley is that between the craters Young and Mallet the valley changes direction, bending towards the south (fig. 3). The valley also changes, becoming



a series of small craters that lack common walls. This narrower “Mallet Valley” is exactly radial to the center of the Nectaris Basin, whereas Rheita Valley is tangential to the basin’s inner ring. Thus the change in direction and shape of the Rheita-Mallet valleys must have been due to some peculiarity of the distribution of Nectaris ejecta. Perhaps, however, the Vallis Rheita is a better fit to the center of Mare Imbrium rather than the center of Mare Nectaris.

Figure 3. Vallis Rheita - David Teske, Louisville, Mississippi, USA, May 19, 2018 01:58 UT. Colongitude 315.5°, Seeing 5/10, 4 inch APO refractor, 2.5 x Powermate.

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LUNAR TOPOGRAPHICAL STUDIES

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OBSERVATIONS RECEIVED

ALBERTO ANUNZIATO - ORO VERDE, ARGENTINA. Digital images of Aristarchus & Lavosier A, Menelaus. Drawing of Rima Hyginus.

FRANCISCO CARDINALLI - ORO VERDE, ARGENTINA. Digital images of Copernicus, MonsPico & Schickard.

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 6, 9 & 10 day Moon, Alphonsus, Apennine Mountains, Copernicus(2), Mare Nubium, Plato(2), Sinus Iridum, Theophilus & Tycho.

JOHN DUCHEK – St. LOUIS, MISSOURI, USA. Digital image of 3rd quarter Moon.

WALTER ELIAS - ORO VERDE, ARGENTINA. Digital images of Aristarchus, Brenner(2), Fapricius, Gassendi, Grimaldi, Langrenus, Mare Crisium & Petavius.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Archimedes, Montes Apennines & Sinus Aestuum-Mare Vaporum.

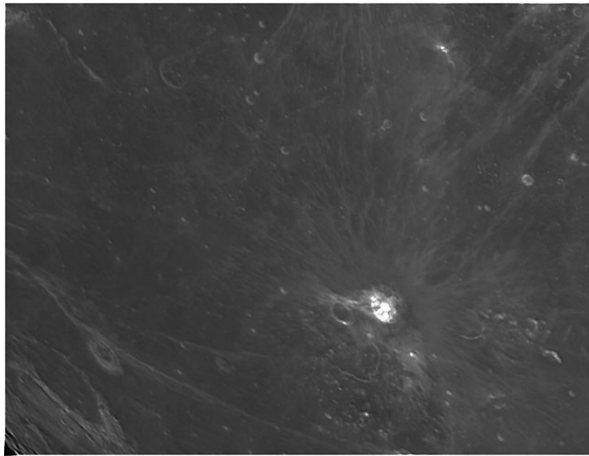
JUAN CRUZ FRONTÁN - ORO VERDE, ARGENTINA. Digital image of Aristarchus.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Furnerius, Petavius & Theophilus.

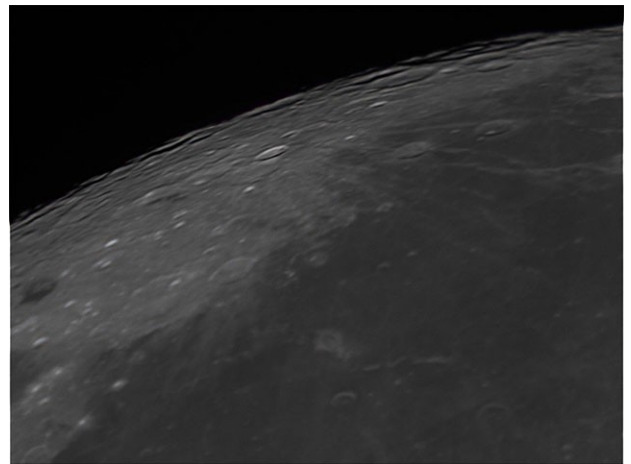
JERRY HUBBELL – LOCUST GROVE, VIRGINIA, USA. Digital image of 25 day Moon.

DAVID TESKE - LOUISVILLE, MISSISSIPPI, USA. Digital image of Vallis Rheita.

RECENT TOPOGRAPHICAL OBSERVATIONS



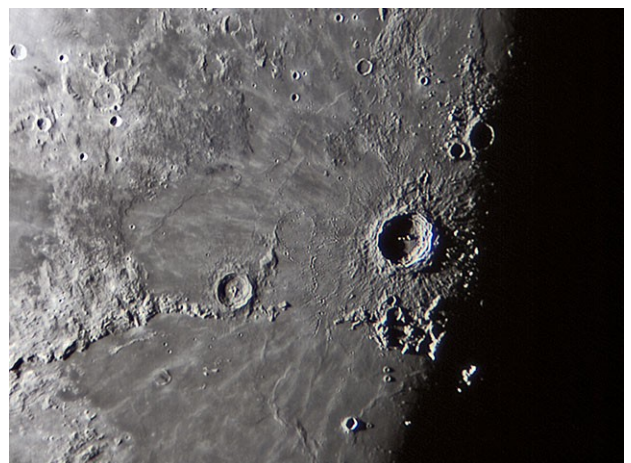
ARISTARCHUS– Alberto Anunziato, Oro Verde, Argentina. August 26, 2018 03:13 UT. CPC-1100 f/10, ZWO ASI 120 MM/S.



LAVOSIER A – Alberto Anunziato, Oro Verde, Argentina. August 26, 2018 05:20 UT. CPC-1100 f/10, Astronomic 742 IR filter, ZWO ASI 120 MM/S.



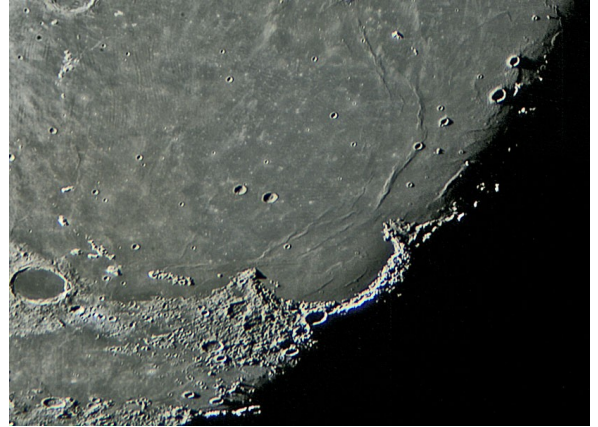
MONS PICO - Luis Francisco Alsina Cardinalli, Oro Verde, Argentina, August 26, 2018, 03:59 UT. CPC-1100 f/10, ZWO ASI 120 MM/S.



COPERNICUS - Maurice Collins,- Palmerston North, New Zealand. September 19, 2018 07:27 UT. FLT-110 f/14. ASI120M.C .

RECENT TOPOGRAPHICAL OBSERVATIONS

SINUS IRIDUM - Maurice Collins, - Palmerston North, New Zealand. September 20, 2018 07:32 UT. FLT-110 f/14, ASI120MC .



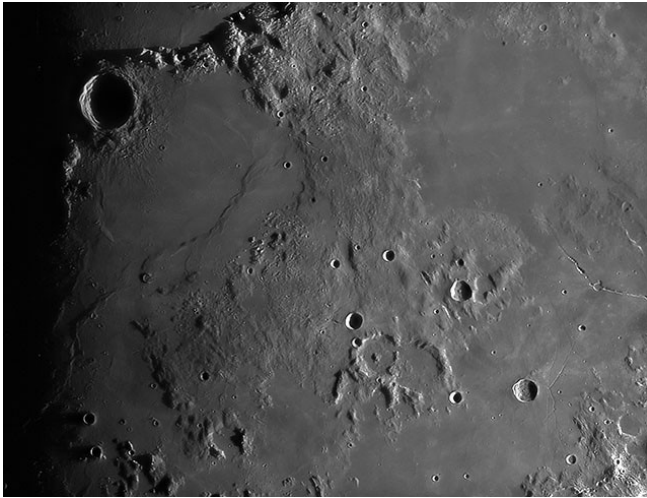
TYCHO - Maurice Collins, - Palmerston North, New Zealand. September 19, 2018 07:26 UT. FLT-110 f/14. ASI120M.C North down.

3rd Quarter MOON – John Duchek - Carrizozo, New Mexico USA. August 5, 2018 13:56 UT. Seeing 7/10, Transparency 5/6. Orion ED-80. ZWO-ASI-120-MM , IR pass filter.



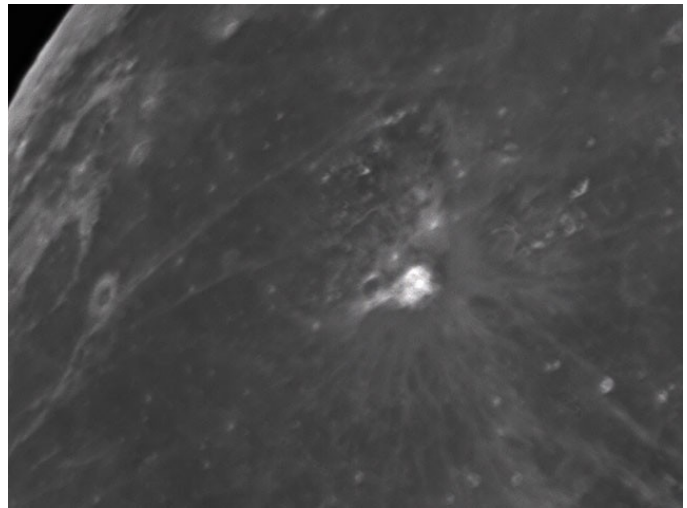
BRENNER F - Walter Elias, Oro Verde, Argentina. August 15, 2018 21:38 UT. Celestron CPC-1100, f/10, ZWO ASI 120 MM/S.

RECENT TOPOGRAPHICAL OBSERVATIONS



MONTES APENNINES - Howard Eskildsen, Ocala, Florida, USA. February 24, 2018 00:59, UT. Seeing 10/10, transparency 5/6. 6" Refractor, f/8, 2x barlow, W-8 Yellow filter, DMK41AU02.AS.

ARISTARCHUS – Juan Cruz Frontán, Oro Verde, Argentina. August 28, 2018 01:05 UT. CPC-1100, f/10, ZWO ASI 120 MM/S.



25 day MOON - Jerry Hubbell · Wilderness, Virginia USA.. September 5, 2018 10:03 UT. 0.165m APO refractor, f/5, 0.7x FR. Seeing 7/10, transparency 5/6. QHY174M-GPS.

BRIGHT LUNAR RAYS PROJECT

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

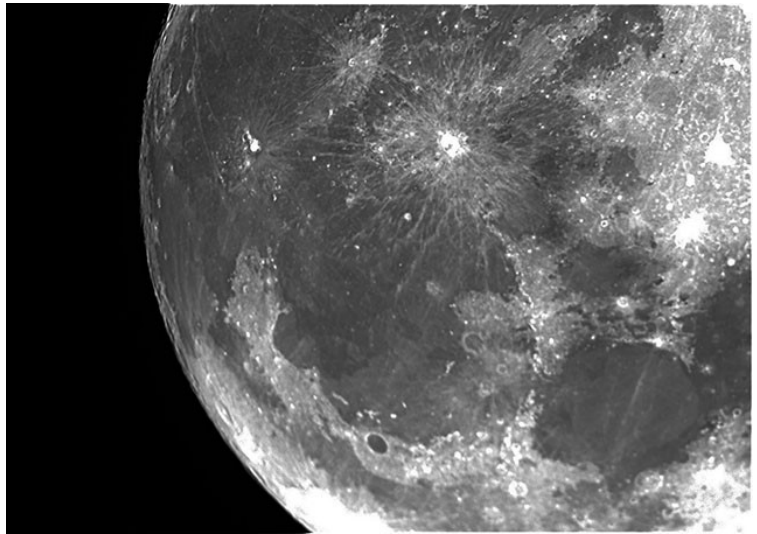
Assistant Coordinator – Jerry Hubbell – jerry.hubbell@alpo-astronomy.org

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

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

RECENT RAY OBSERVATIONS

COPERNICUS-KEPLER- Luis
Francisco Alsina Cardinalli, Oro Verde,
Argentina, August 26, 2018, 04:24 UT,
Celestron CPC-1100 SCT. ZWO ASI
120 MM/S.



PROCLUS - Walter Elias, Oro Verde,
Argentina. August 27, , 2018 01:04 UT.
Celestron CPC-1100 SCT, f/10. ZWO
ASI 120 MM/S.

LUNAR GEOLOGICAL CHANGE

DETECTION PROGRAM

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

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

Reports have been received from the following observers for August: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Archimedes, Aristarchus, Madler, Mare Crisium, Plato, Proclus, Ross D, Sinus Iridium, Theophilus and several features. Alberto Anunziato (Argentina - AEA) observed/imaged: Alpetragius, Alphonsus, Copernicus, Fracastorius, Mare Crisium, Mons Pico, and Plato. Ciro Barbero (Argentina – LIADA) observed/imaged: Aristarchus and several features. Thomas Bianchi and Liviano Betti (Italy – UAI) imaged several features. Francisco Alsina Cardinali (Argentina – UAI) imaged Aristarchus and Schickard. Jario Andres Chevez (Columbia - LIADA) imaged Kepler and several features. Maurice Collins (New Zealand – ALPO/BAA/RASNZ) imaged: Clavius, Copernicus, Ptolemaeus, Theophilus, and several features. Marie Cook (Mundesley, UK – BAA) observed Alphonsus. Pasquale D'Ambrosio (Italy – UAI) imaged Aristarchus. John Duchek (Carrizozo, NM, USA - ALPO) videoed Earthshine. Collin Ebdon (Colchester, UK – BAA) observed Montes Teneriffe. Walter Elias (Argentina – AEA) imaged Brenner, Grimaldi, Kepler, and Plato. Valerio Fontani (Italy – UAI) imaged Plato, Tycho, and several features. Juan Cruz Frontan (Argentina – AEA) imaged Aristarchus. Rik Hill (Tucson, AZ, USA – ALPO/BAA) imaged: Lacus Mortis, Theophilus, and several features. Jean Marc Lechopier (France – UAI) imaged Copernicus. Leonardo Mazzei and Luca Nerli (Italy – Gruppo Astrofili Montagna Pistoiese / UAI) imaged the Cichus area and Jansen. Camilo Satler (Argentina – UAI) imaged several features. Franco Taccogna (Italy – UAI) imaged Montes Teneriffe. Aldo Tonon (Italy – UAI) imaged Aristarchus, Copernicus, Montes Teneriffe, Plato, Tycho, and several features. Gary Varney (Pembroke Pines, FL, USA, ALPO) imaged several features.

News: As I am now into the most busy teaching time of the year, at University, you may find that from next month onwards I may have to give up on the analysis of observations - at least until January. I will still show observations received and the descriptive statements from the predictions, but will leave it upto the reader to interpret any significance.

LTP Reports: No LTP reports were received for August.

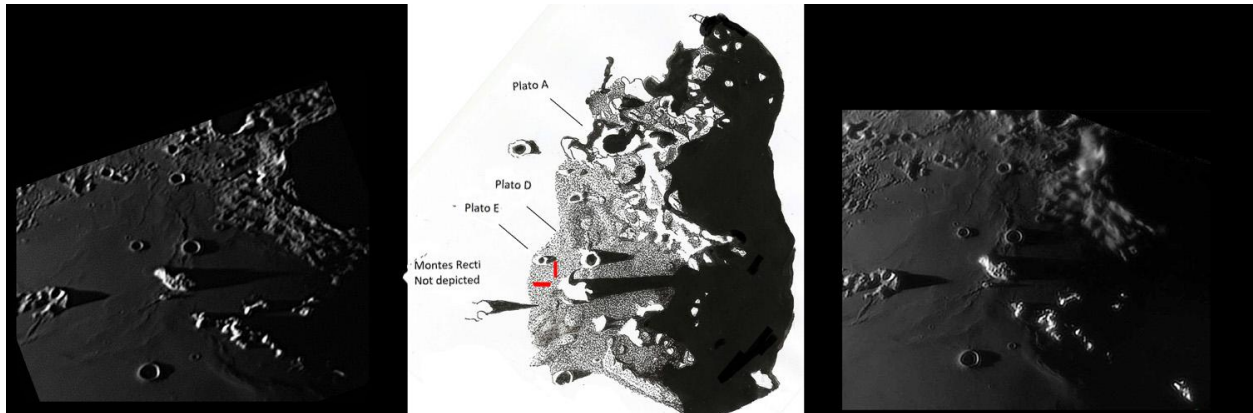


Figure 1. The Montes Teneriffe area, on 2018 Aug 05, orientated with north towards the top. **(Left)** An image by Franco Taccogna (UAI), taken at 00:40 UT. **(Center)** A Sketch by Collin Ebdon (BAA), made during 02:45-03:45 – note that the sketch has been rotated to put north at the top and annotation edited. The red ticks highlight the location of a candidate low lying dome shown in images to the left and right, **(Right)** An image by Aldo Tonon (UAI) taken at 04:14 UT.

Routine Reports: Below is a selection of reports received for August that can help us to re-assess unusual past lunar observations – if not eliminate some, then at least establish the normal appearance of the surface features in question.

Montes Teneriffe 2018 Aug 05 two UAI observers: Franco Taccogna and Aldo Tonon imaged, and the BAA's Collin Ebdon sketched the area following a repeat illumination request. Although not exactly to do with lunar change, as nobody else is looking into this in the ALPO/BAA Lunar Section's, and the original request was put out by the UAI Lunar Section, we shall just show the sketch and images (Fig 1), without comment, in order to highlight the candidate lunar dome area in case anybody else is interested in hunting for this low relief feature?

UAI Request: please image or sketch the area covering part of Montes Teneriffe in the vicinity of Pico B, Plato E and D. The UAI are interested in confirming a suspected volcanic dome-like structure in this area, observed by Maurizio Cecchini, a member of the UAI Lunar Section. Scopes of 6" diameter, or preferably larger, should be used. Any sketches or images, in the vicinity of Pico B, Plato E and D, should be emailed to: u a i . l u n a . l g c @ g m a i l . c o m

.....from: http://users.aber.ac.uk/atc/lunar_schedule.htm

Mare Crisium 2018 Aug 15 UT 00:16 Gary Varney (ALPO) imaged this area under the same illumination, to within $\pm 0.5^\circ$ to the following report that features in an ALPO Strolling Astronomer:

On 1991 Jun 16/17 at UT 20:30-00:30 T. Castro (Sao Paulo, Brazil, 24" reflector, x500) observed "Large white spot with a comet-like tail extending eastwards (celestial) on /of the shore of Mare Crisium at 52.5E, 21.5N." This was confirmed by several other observers and apparently video recorded. The effect was seen on several nights but had faded completely by 20th June. J. Westfall (San Francisco, CA, USA) also videod the spot but on Jun 21. The Cameron 2006 catalog ID=429 and the weight=5. The ALPO/BAA weight=1.



Figure 2. Mare Crisium, orientated with north towards the top. **(Left)** Color image by Gary Varney (ALPO) from 2018 Aug 15 UT 00:16. **(Right)** A video frame by John Westfall (ALPO) taken on 1991 Jun 21 UT 04:32, under slightly different illumination conditions, but showing the location of a bright spot on the NW shore of Mare Crisium – from JALPO Vol 35, No. 3, p143.

Fig 2 (Left) shows what Gary captured, and this should represent what Junior Torres de Castro said they saw on 1991 Jun 16 UT 20:30-00:30, along with Julio Lubo, using a large 24" telescope. However Gary's image shows no sign of this white spot, which was captured four days later by John Westfall (Fig 2 – Right). Also there is nothing I can see in Gary's image that resembles a comet-like tail. We have previously had an ALPO/BAA weight for this report of 2, but it was reduced to 1 after John Westfall emailed to say that this was probably normal to see a white spot here, as you can see in his image. However as there is no white spot on the NW shore in Fig 2 (Left), nor tail, I am tempted to put the weight back upto 2, just to encourage some early phase images such as this in order to find out when the NW spot becomes visible?

Brenner F: 2018 Aug 15 UT 21:38 Walter Elias (AEA) imaged this crater under similar illumination to a report of a bright spot seen in Brenner F:

On 2012 May 25 UT 05:35 Brenner F crater was recorded in a larger area image by M. Collins (Palmerston North, New Zealand, ETX-90 with LPI imager (monochrome mode) - seeing not good). He took a sequence of 108 images from 05:35-05:40UT, and in the 65th frame, a light spot, approximately 4 pixels wide can be seen just outside the western illuminated rim of Brenner F. It is not visible in any other frames. The exposure time was 0.125 Sec. Because the western edge of the spot is very sharp, and the rest of the Moon is slightly blurred

due to seeing, it is thought that this was most likely a cosmic ray event in the CCD camera - the 4 pixel width was perhaps contributed to by the image compression. It could also be some bright surface spot that was made invisible most of the time by poor seeing, and then during a brief period the atmosphere is sharp enough at that locality to make it visible. ALPO/BAA weight=1.

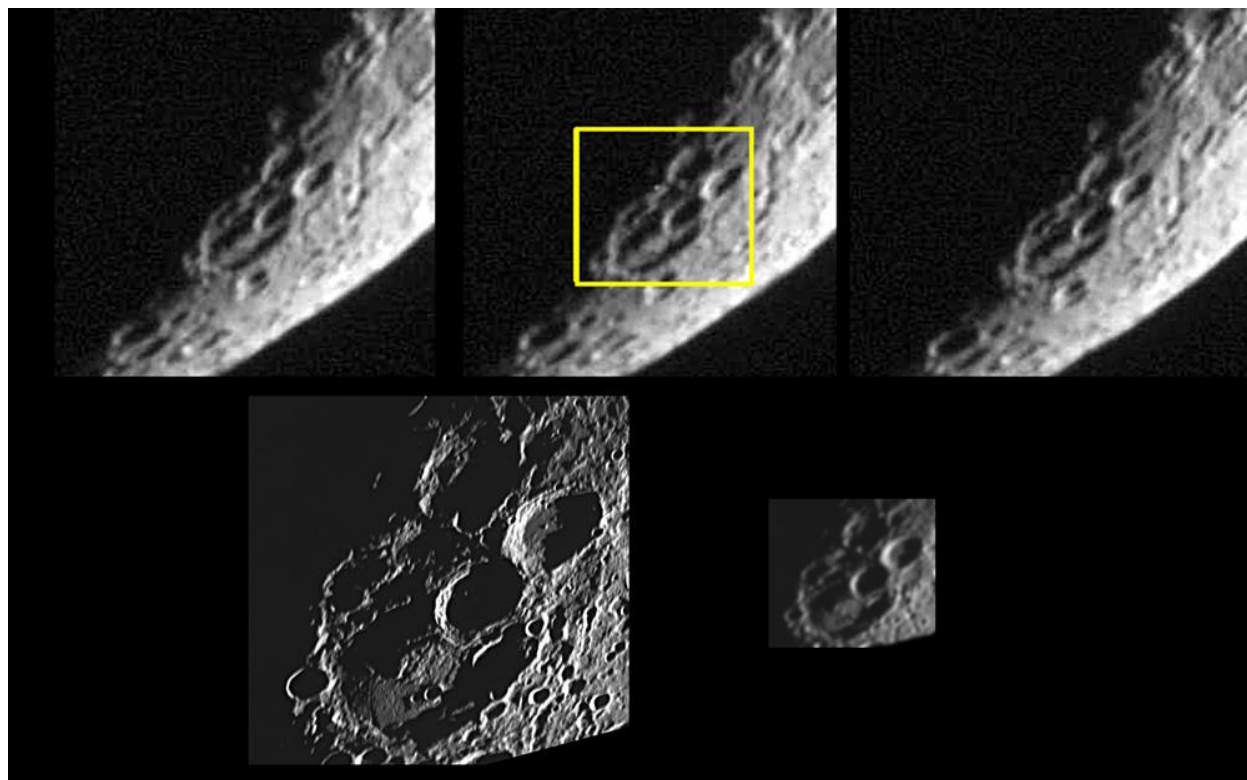


Figure 3. The Janssen area of the Moon orientated with north towards the top. **(Top Left – Top Right)** An image sequence by Maurice Collins (ALPO/BAA) obtained on 2012 May 25 UT 05:35, with the central image showing an area with a bright spot on Brenner F. **(Bottom Left)** An image by Walter Elias (AEA) taken on 2018 Aug 15 UT 21:38 which covers the area indicated in the yellow box above. **(Bottom Right)** The same image by Walter, but blurred and shrunk to match the resolution and image scale in the images by Maurice Collins.

Although the bright spot shown in Fig 3 (Top Center) is probably a cosmic ray, there is a hint of a faint spot at the same location in Fig 3 (Bottom Right) which could suggest that Maurice picked up an atmospheric scintillation which made that small part of the crater look brighter than normal. We shall keep the weight at 1 for a bit longer to gather some more example images, perhaps even some at a similar libration too?

Theophilus 2018 Aug 17 UT 00:50-01:25 and 01:40-01:50 Jay Albert (ALPO) observed and imaged the crater under similar illumination and topocentric libration (to within $\pm 1^\circ$) to a Phil Ringsdore report from 1971:

Theophilus 1971 Mar 02 UTC 20:30-22:50 Observed by Ringsdore (Stoneleigh, England, 15" reflector, x360, seeing=good) "Suspected LTP on c.p. 2 other obs. (using the same instrument) did not confirm. Orange-pink glow. Faded for 10 min then reappeared." NASA catalog weight=2. NASA catalog ID 1286. ALPO/BAA weight=1.

Jay was using a Celestron NexStar Evolution 8" SCT, under transparency 2-3 and seeing 6-4/10 conditions. He found that the east wall shadow covered the floor, upto and around the sides of the central peak. The latter was sunlit, bright, and cast a shadow to the bottom of the west wall. He saw no obvious signs of an orange or pink glow, or indeed any other colors on the central peaks, or indeed elsewhere in the crater. He re-checked the crater again at 01:45-01:50 UT and saw a very faint hint of light orange on the east facing slopes of the brightest central peaks. However as the Moon was reaching his roof (along the line of sight), the haze was much thicker and the seeing had deteriorated, this tint was most likely due to these inferior observing conditions. Jay took a color image with an iPhone at 01:16 UT, held upto the eyepiece (See Fig 4 – Left). This does show some atmospheric spectral dispersion effects, so I have attempted to remove these in Fig 4 (Right). Curiously a faint trace of orange/brown remains on the floor between the illuminated west wall and central peaks? However witching between color channels I have seen that some features stay where they are, but others shift – this may be due to the data

compression used in the image, or the RGB Bayer filter on the camera. Needless to say the effect was seen elsewhere on other craters outside the area shown in Fig 4. - so I have come to the conclusion that it is an imaging artefact and not lunar related.



Figure 4. Theopilus, Cyrillus and Catherina, as imaged by Jay Albert (ALPO) using an iPhone on 2018 Aug 17 UT 01:18, orientated with north towards the top. Images have been color normalized and color saturation increased to 70%. **(Left)** Original image, after these preprocessing steps. **(Right)** Same as Left, but red and blue color channels have been shifted in an attempt to remove atmospheric spectral dispersion effects.

Censorinus: On 2018 Aug 20 UT 01:26 Camilo Satler (AEA) imaged the area around this crater under similar illumination, and topocentric libration, to within $\pm 0.5^\circ$, to the following report:

On 1988 Mar 26 at UT20:00 M.C. Cook (Frimley, UK, Frimley, UK, 12" reflector, seeing=III) reported Censorinus to be "foggy/fuzzy" and that this effect was not seen in other adjacent regions. The Cameron 2006 catalog ID=320 and weight=4. The ALPO/BAA weight=2.

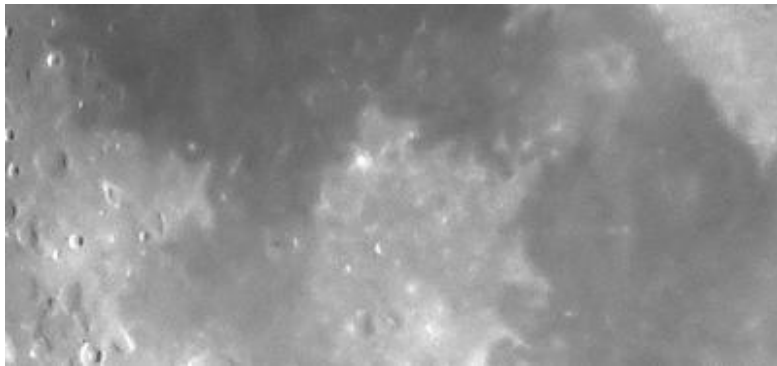


Figure 5. Censorinus on 2018 Aug 20 UT 01:26 as imaged by Camilio Satler (AEA), and orientated with north towards the top.

Camilio's image is limited in terms of resolution, but at least, as far as we can see, there is some slight fuzziness to the crater. We shall keep the weight at 2.

Aristarchus: On 2018 Aug 22 Pasquale D'Ambrosio (Italy – UAI) imaged this area under Lunar Schedule predicted times for similar selenographic colongitude to the following report:

ALPO Request: On 2013 Apr 22 Paul Zellor noticed that the two closely spaced NW dark bands in Aristarchus had some (non-blue) color to them. Can we confirm his observation of natural color here? Ideally you should be using a telescope of 10" aperture, or larger. Please send any high resolution color images, detailed sketches, or visual descriptions to: a t c @ a b e r . a c . u k .

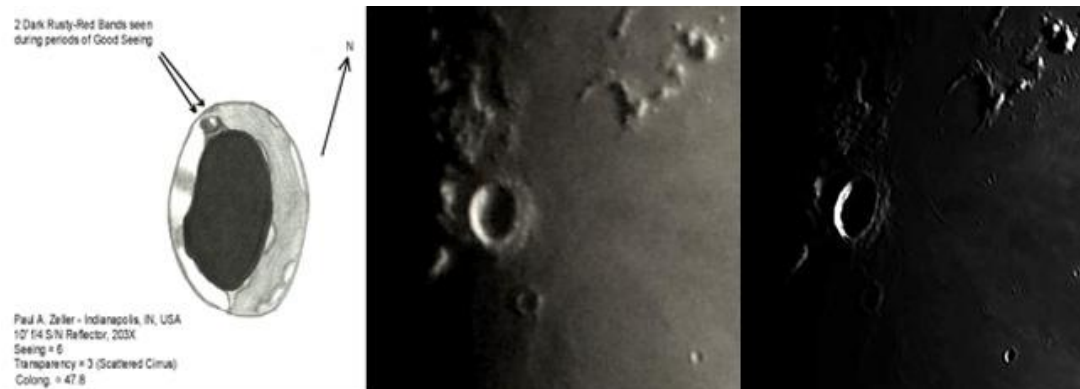


Figure 6. Aristarchus orientated with north towards the top. **(Left)** a sketch by Paul Zeller (ALPO) from 2013 Aug 22 UT 01:43. **(Center)** an image by Paul Zeller taken on 2013 Apr 22 UT 02:37. **(Right)** An image by Pasquale D'Ambrosio (UAI) imaged on 2018 Aug 22 UT 20:57.

Pasquale's image (Fig 6 Right) helps to confirm the lighting conditions recorded by Paul Zeller, although the libration is different. You can also see the shaded area on the NW rim which is highlighted in Paul's sketch (Fig 6 – Left). We would need color imagery to check out the validity of the 2013 observation, though at least Pasquale has given us a good time sequence of images (not shown here) to help us study the retreat of the interior floor shadow. We shall keep the ALPO/BAA weight at 2.



Figure 7. The northwestern limb of the Moon as imaged by Maurice Collins on 2018 Aug 24 UT 09:17 with color saturation increased to 60% and orientated with north towards the top.

Oenopides-Seleucus: On 2018 Aug 24 UT 09:17 Maurice Collins (ALPO/BAA) took a color image of the Moon that matched the illumination, to within $\pm 0.5^\circ$ to the following report from Japan:

Oenopides-Seleucus 1951 Aug 15 UT 13:11 T.Osawa (Japan, 6" reflector) suspected a brownish tone to the terminator region between these two craters. ALPO/BAA weight=1.

The 1951 report, which appears at the bottom on p6 of JALPO Vol 5 No 11, is described in just a single sentence. There is no sign of such a color along the terminator in Maurice's image (Fig 7). Though some craters do have a slight yellow cast, though as this is not just on the terminator, but affects other small elongated features, it is presumably some sort of camera artifact, perhaps to do with the effect of the RGB Bayer filter on narrow-like objects in the scene. We shall keep the ALPO/BAA weight at 1 for now.

Mare Tranquilitatis: On 2018 Aug 24 UT 10:03 Jario Andres Chavez imaged the Moon under similar illumination, to within $\pm 0.5^\circ$ to the following report from Russia:

On 1985 Sep 04 at UT 22:15 A.V. Arkhipov (Russia) detected a bright flash in Mare Tranquilitatis that lasted < 1 second and had a diameter of < 2 arc seconds i.e. the limit of seeing resolution. The Cameron 2006 catalog ID=280 and the weight=3. The ALPO/BAA weight=3.

Mare Tranquilitatis is to the right in Jario's image in Fig 8, and although we obviously should not expect to

see a flash of light, as was reported in 1985, at least it shows us a context image and also that Mare Tranquilitatis was in the dark, in which case a meteor impact (if that was what it was?) would be much more easier to see.



Figure 8. The Region between Mare Cognitum and Mare Tranquilitatis, with north towards the top left. Observation details given in the image.

Aristarchus: On 2018 Aug 25 UT 03:40-04:35 Ciro Barbero (LIADA) observed visually this crater under similar illumination ($\pm 0.5^\circ$) to a 1979 observation:

On 1979 Oct 04 at UT21:05-23:40 P.W. Foley (Kent, UK, 12" reflector, x360, seeing=II) detected color in Aristarchus (and also in Bullialdus - there was a LTP alert at this time for Bullialdus) but nowhere else on the Moon. Aristarchus had a CED brightness value of 3.8 at 21:05 (though at this time no color) and 3.4 at 23:40 and the floor was now slate blue/gray in color. Other features remained constant in brightness. The Cameron 2006 catalog ID=72 and the weight=0. The ALPO/BAA weight=1.

Ciro reported that “no abnormal coloring is perceived in the area, characterized by high fluorescence throughout the surface in a uniform manner”. We have covered this event previously in the [2015 Feb ALPO TLO](#), p14. We shall keep the weight at 1 for now as it would be helpful to have an image in addition to these two repeat illumination visual reports.

Copernicus: On 2018 Aug 25 UT 20:36 Aldo Tonon (UAI) imaged the crater under similar illumination (to within $\pm 0.5^\circ$) to the following report:

On 1994 Apr 25 at UT11:08 B. Soulsby (Australia) found a darkening on the north floor of Copernicus crater. The ALPO/BAA weight=1.

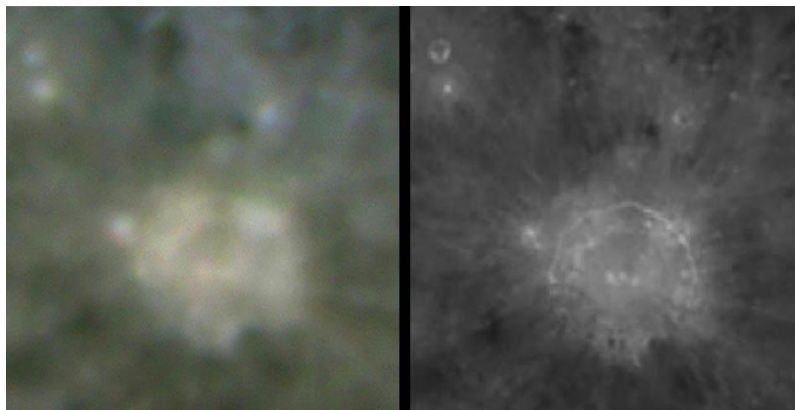


Figure 9. Copernicus orientated with north towards the top. **(Left)** A color image by Aldo Tonon taken on 2018 Aug 25 UT 20:36 – color saturation has been increased to 60%. **(Right)** A monochrome image taken by Jean Marc Lechopier (UAI) on 2018 Aug 27 UT 04:07.

Aldo's image in Fig 9 (Left) can be compared to one taken a couple of days later by Jean Marc Lechopier (UAI) in Fig 9 (Right). I can see little difference to the dark area on the northern floor between these two images, and it is not clear from the above report, that featured in the "Clementine Lunar Transient Phenomena Program" Newsletter from November 1994, whether the term "darkening" meant it was seen to get darker over time, or whether it was just a dark area. We shall keep the weight at 1 for now, but need to search for the original observations if possible.

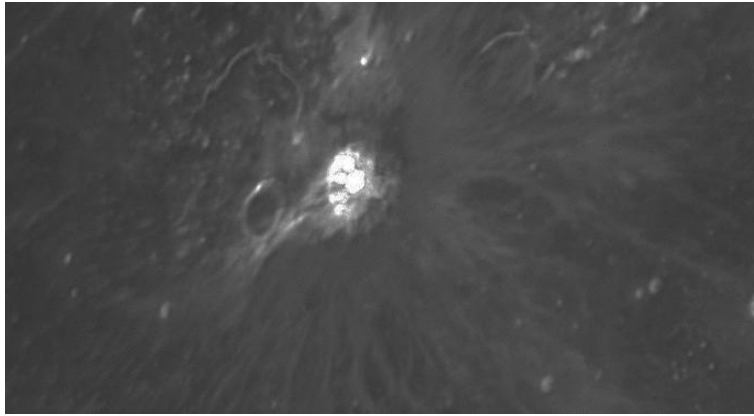


Figure 10. Aristarchus on 2018 Aug 26 UT 03:13, as imaged by Francisco Alsina Cardinali (UAI), orientated with north towards the top.

Aristarchus: On 2018 Aug 26 UT 03:13 Francisco Alsina Cardinali (UAI) imaged this crater within $\pm 0.5^\circ$ illumination to the following report:

On 1897 Jun 14 at UT 23:00 Pickering (Cambridge, Mass. USA) observed in "Schroter's valley and the vicinity variations in vapor column. Break in col. toward F and eruption of crater D. 3.4 d after sunrise". The Cameron 1978 catalog ID=389 and the weight=3. The ALPO/BAA weight=2.

....and close to $\pm 0.5^\circ$ similar illumination to the following:

On 1889 Jul 12 at 20:52-21:00UT, Kruger of Gotha? or Kiel? Germany, using a 6" reflector (x33), saw a brilliant Aristarchus in the surrounding gloom during an eclipse. The brilliance was striking. Cameron 1978 catalog ID=263 and weight=2.

Although the interior of Aristarchus is over exposed, detail is visible elsewhere (albeit low contrast), Fig 10 certainly illustrates the 2nd report about the crater being brilliant – though we did not have an eclipse in August to compare. Francisco's image probably merits a demotion in weight for the 1889 report, from 2 to 1, at least until we can find out more information about Kruger's original report. For the Pickering account - I have never been able to figure out what he meant by "variations in vapor column"? One can certainly see Vallis Schroteri and the Cobra's head, though they are not as constrasty as Aristarchus. Probably, until we get a better understanding of Pickering's descriptions, it would be safer to leave the weight at 2, but at least we now have a good representation of what Pickering would have seen under normal circumstances.

Mare Crisium - East of Picard: On 2018 Aug 26 UT 03:50 Alberto Anunziato (AEA) imaged this region, using a Celestron CPC 1100, equipped with a ZWO ASI 120 MM/S camera, under similar illumination (to within $\pm 0.5^\circ$) to the following Victorian era report:

1865 Apr 10 UT 22:00-00:00 East of Picard, Ingall (Camberwell, UK) observed a minute point of light glittering like a star. Whole of Mare Crisium intersected with bright veins mixed with bright spots (4h before PM). Cameron 1978 catalog ID 138 and weight=2. ALPO/BAA weight=3.

As we can see in Alberto's image, in Fig 11 (Left), there is a hint of veins on the floor of Mare Crisium, though one needs to turn up the contrast in order to get a good view of them (Fig 11 Right). Certainly though there is no sign of a bright point, glittering like a star? Presumably the "vein" effects are related to wrinkle ridges and rays? According to Cameron the Ingall observations was 4 hours before Full Moon, and according to an Eclipse Catalog it was actually just before a partial lunar eclipse which was maximum on 04:38 on 1985 Apr 11. It is

possible that the UTs given in the Cameron catalog are off slightly? In view of the visibility of the vein-like effect I will lower the weight from 3, but keep it at 2 as I see no sign of a very bright point that could be interpreted as a “star” in appearance.

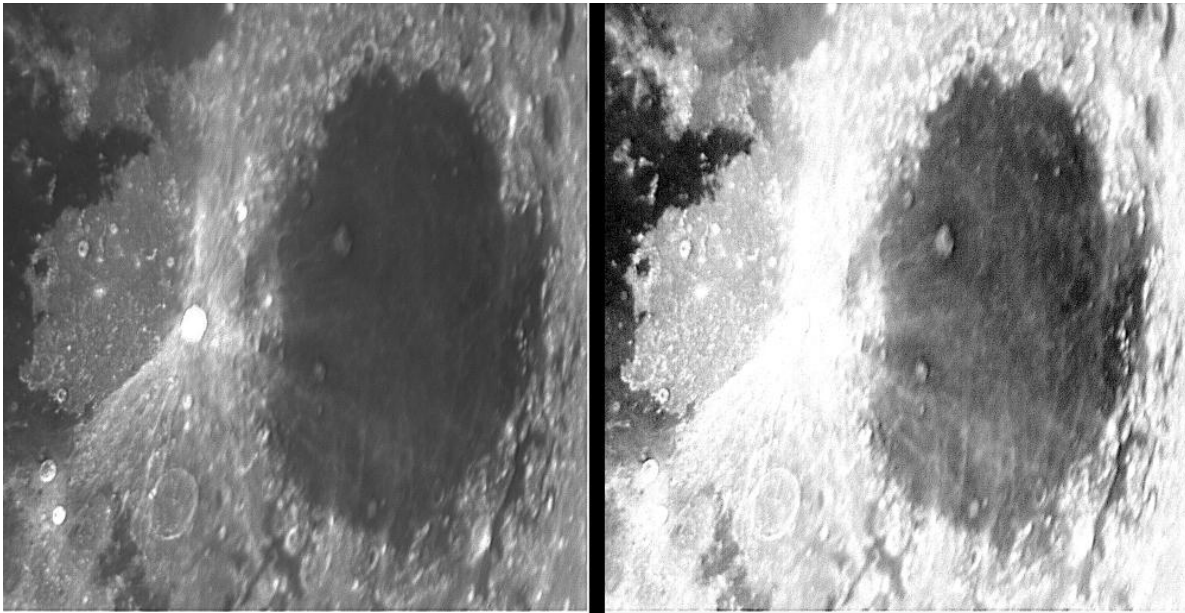


Figure 11. Mare Crisium as imaged by Alberto Anunziato, on 2018 Aug 26 UT 03:50, and orientated with north towards the top. **(Left)** Original image. **(Right)** Non-linearly contrast stretched and high pass filtered version.

Aristarchus: On 2018 Aug 28 UT 01:05 Juan Cruz Frontán (AEA) imaged the crater under similar illumination (to within $\pm 0.5^\circ$) to the following report:

On 1975 Dec 19 at UT22:45 P.W. Foley (Kent, UK) suspected an anomaly in Aristarchus. Cameron 1978 catalog weight=1424 and weight=1. ALPO/BAA weight=1.

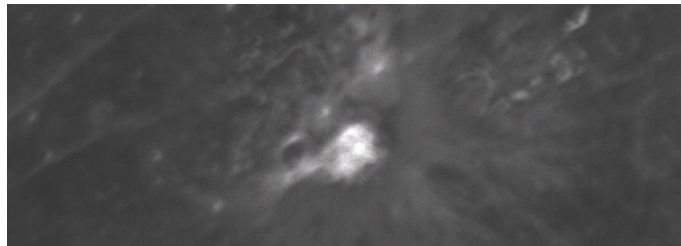


Figure 12. An image of Aristarchus by Juan Cruz Frontán (AEA) taken on 2018 Aug 28 UT 01:05, orientated with north towards the top.

What made the appearance of Aristarchus anomalous in 1975 to Peter Foley is uncertain, but at least we can see what it should have looked like in Fig 12. The weight of 1 seems appropriate to keep for now.

Cassini and Tycho (or Deslandres/Hell?): On 2018 Aug 28 UT 22:08-22:11 and 22:13-22:16 Valerio Fontani (UAI) imaged these areas under the same illumination and topocentric libration, to within $\pm 1^\circ$ to the following report:

Tycho/Cassini 1995 Jan 19 UT 04:35 Observer: R.Livesey (UK) - Tycho appears brighter than Cassini bright spot in red filter. In violet filter Tycho and Cassini bright spot appear equally bright. (Tycho and Cassini bright spot in Deslandres - added at bottom of report?). 2.5" refractor x48 (indoors), seeing Antoniadi II-IV. ALPO/BAA weight=2.

By increasing the color saturation of the images in Fig 13, we can see if there is any evidence of the Cassini bright spot being brighter in the red filter. To be honest Fig 13 (Left) shows no inclination of bright spots in, or near Cassini, so I am wondering if Ron Livesey’s description of “Cassini bright spot” may actually refer to a description by the astronomer Cassini, of a bright spot in Deslandres crater, i.e. the crater Hell, but which may have not had a name in Cassini’s time? This is all speculative, without checking published Cassini observations.

But even if this were the case, as you can see in Fig 13 (Right), the brightest part of Tycho (its central peak) and the bright crater Hell, in Deslandre, both exhibit characteristic blue as one would expect from geologically young impact craters. Though to my eyes, Hell appears the brighter of the two and this is confirmed by measuring the pixel brightness values in the image. We shall leave the ALPO/BAA weight at 2 due to the differences between the 2018 images and the 1995 observation.

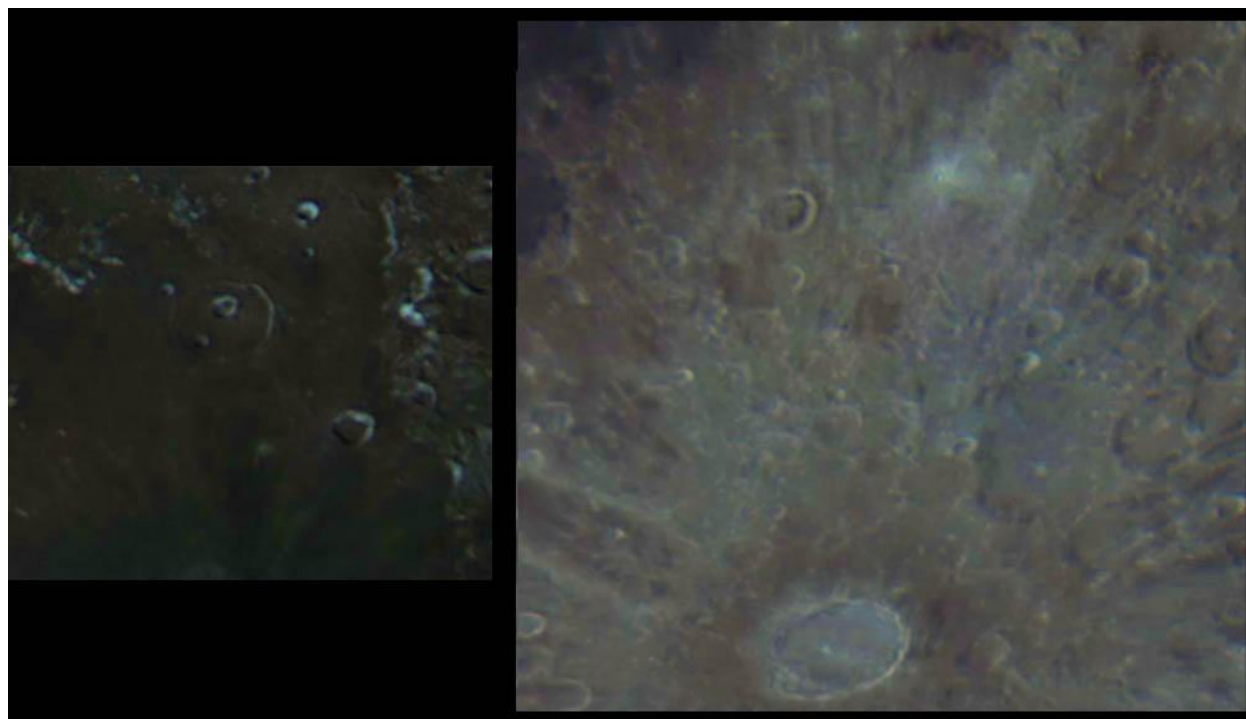


Figure 13. Images by Valerio Fontani (UAI) taken on 2018 Aug 28 with north towards the top left, and color saturation increased to 75%. **(Left)** The area around Cassini taken between 22:08 and 22:11UT through RGB filters. **(Right)** The Tycho-Delsandres area taken between 22:13-22:16UT through RGB filters.

Janssen K: On 2018 Aug 28 UT 23:03 Thomas Bianchi and Liviano Betti (UAI) imaged a large area of the Moon under similar illumination to the following report:

On 1992 Feb 21 at 03:00-03:55UT C. Brook (Plymouth, UK, 3" refractor x116, seeing II) found that Janssen K was very bright. Cameron 2006 catalog extension ID=441 and weight=2. ALPO/BAA weight=1.

We can clearly see Janssen K's eastern rim showing up quite well here, in Fig 14, and it looks about as bright as the NE rim of Fabricius. As a small aperture 3" refractor was used in the 1992 observation, and a 4" aperture was adopted by the UAI observers, we have a good comparison, and I am tempted, without further information available to remove this from the ALPO/LTP catalog.

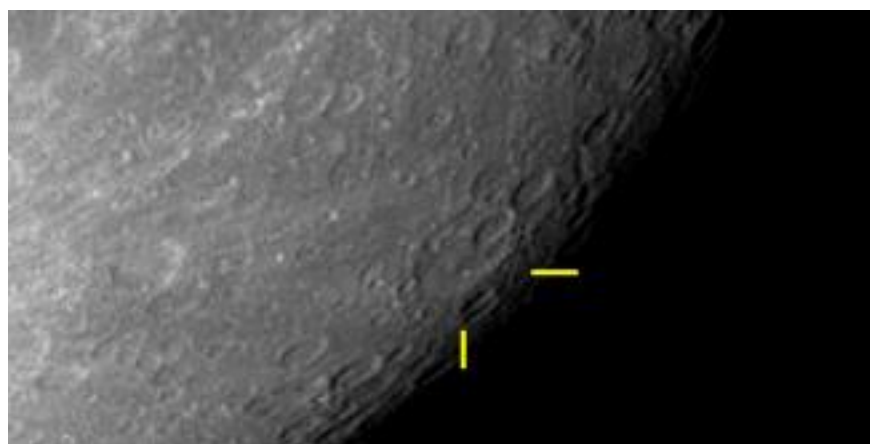


Figure 14. Janssen K as imaged by Thomas Bianchi and Liviano Betti (UAI) on 2018 Aug 28 UT 23:03 and orientated with north towards the top.

Alphonsus: On 2018 Aug 30 UT 00:05-00:25 Marie Cook (BAA) observed visually this crater under similar illumination and topocentric libration to a H.P. Wilkins observation:

Alphonsus 1958 Nov 29 UT 22:00? Observed by Wilkins (Kent, UK, 15" reflector) "Near site of Kozyrev's outbreak saw a circular patch, black pit center, & red, round masses all around it." NASA catalog weight=4. NASA catalog ID #708.ALPO/BAA weight=3.

Jansen D: On 2018 Aug 30 Leonardo Mazzei and Luca Nerli (Italy – Gruppo Astrofili Montagna Pistoiese / UAI) managed to capture some similar selenographic colongitude images, covering the predicted time slot of between 21:43-22:42 of the following Peter Grego report:

BAA Request: On 2013 Aug 26 Peter Grego observed a dark patch just east of Jansen D. He had not seen this before, therefore it is important to repeat this observation under similar illumination conditions. It maybe a buried crater? Ideally suited to scopes of aperture 8" or larger. Please send any high resolution images, detailed sketches, or visual descriptions to: a t c @ a b e r . a c . u k



Figure 15. The area around Jansen with north towards the top. **(Left)** Sketch by Peter Grego made at UT00:30-01:30 on 2013 Aug 26 UT 00:30-01:30. **(Center)** ALVIS simulation for UT00:30 and then contrast enhanced to show up dark areas – hence some shadows have been over-exaggerated. **(Right)** An image by Leonardo Mazzei and Luca Nerli (Italy – Gruppo Astrofili Montagna Pistoiese / UAI) taken on 2018 Aug 30 UT 22:10.

As you can see the ALVIS simulation (Fig 15 Center) and the UAI image (Fig 15 Right) agree well, but neither show the dark patch as depicted in Peter Grego's sketch (Fig 15 Left). So we shall therefore keep the ALPO/BAA weight at 1, but not take it higher as there are some other differences between the sketch and simulation and image.

General Information: For repeat illumination (and a few repeat libration) observations for the coming month - these can be found on the following web site: http://users.aber.ac.uk/atc/lunar_schedule.htm . By re-observing and submitting your observations, only this way can we fully resolve past observational puzzles. To keep yourself busy on cloudy nights, why not try "Spot the Difference" between spacecraft imagery taken on different dates? This can be found on: http://users.aber.ac.uk/atc/tlp/spot_the_difference.htm . If in the unlikely event you do ever see a LTP, firstly read the LTP checklist on <http://users.aber.ac.uk/atc/alpo/ltp.htm> , and if this does not explain what you are seeing, 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 <https://twitter.com/lunarnaut> .

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KEY TO IMAGES IN THIS ISSUE

1. Alphonsus
2. Archimedes
3. Aristarchus
4. Brenner
5. Cassini
6. Copernicus
7. Cyrillus
8. Deslandres
9. Euclides
10. Furnerius
11. Jansen
12. Janssen
13. Lavoisier
14. Mare Crisium
15. Mare Tranquillitatis
16. Mons Pico
17. Montes Apennines
18. Montes Teneriffe
19. Petavius
20. Proclus
21. Rima Hyginus
22. Sinus Aestuum
23. Sinus Iridum
24. Theophilus
25. Tycho
26. Vallis Rheita



FOCUS ON targets

X = Apollo 17 Mare Serenitatis

Y = Apollo 16 Descartes-Cayley Plains

Z = Apollo 15 Mare Imbrium-Hadley Rille