The Lunar Observer

A publication of the Lunar Section of ALPO

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Back issues: http://www.alpo-astronomy.org/

March 2021

Online readers, click on images for hyperlinks

In This Issue

Hoping that this finds all healthy and doing well. In this issue of *The Lunar Observer*, Rik Hill and Alberto Anunziato take us on some lunar expeditions through essays and images. As I put these articles together, I am amazed at how many interesting features of the Moon that there are to explore. Many of the terrains discussed have hidden treasures in plain sight! This issue also works deeper into the Focus On Lunar 100 by Jerry Hubbell. This time it is the lunar features 51-60 such as Baco, Kies pi, and the Hippalus Rilles. Alberto Anunziato adds some commentary on each of these features as he transitions into future Focus-On articles (see page 2). Lunar observers from around the globe contributed to the Focus On images and Recent Topographic Studies. Tony Cook explores Lunar Geologic Change with another thorough report. Many thanks to all who contributed. This is a nice time of year to get out and gaze at our nearest neighbor in space.

Announcements: Of Exoplanets and the Moon

As 2021 is well underway, it comes with pleasure to announce some changes to *The Lunar Observer*. Jerry Hubbell, the assistant coordinator of the ALPO Lunar Topographic Section is moving on to become the coordinator of the ALPO Exoplanets Section. Isn't it amazing that a group of amateur astronomers can even have such a section? As Jerry has lead the ALPO Lunar Topographic Section's Focus-On articles for several years. These bi-monthly articles select certain lunar targets for lunar observers to image, draw and report on. These articles have focused on select lunar features, landing sites of the Apollo missions, and currently the Lunar 100, a list of targets drawn up by Charles Wood. These Focus-On articles have become more and more popular as noted by the increasing size of *The Lunar Observer*. We thank Jerry for all of his hard work with us over the years and congratulate him on his Exoplanet Section.

Jerry may be moving on to exoplanets, but he is still with us. Currently, we are in the middle of the Lunar 100. We will continue this topic for the rest of the year under his guidance. Plus, Jerry continues to send wonderful lunar images that we look forward to in the future.

It comes with great please to announce that Alberto Anunziato of Paraná, Argentina will be the assistant coordinator of the ALPO Lunar Topographic Studies Section. Alberto is well known to readers of *The Lunar Observer* as he regularly contributes articles, drawings and images of very high quality. A number of his lunar submissions have been published in the Journal of the Association of Lunar and Planetary Observers. Alberto will lead the Focus-On section after Jerry finishes the Lunar 100 late this year. Already, Alberto is contributing much to the Focus-On articles with supplemental test. Welcome aboard Alberto! Alberto Anunziato was born in Paraná, in the Argentine state of Entre Ríos, where he has always lived. He is 50 years old and father of a girl and a boy. He's an attorney by profession and also an Italian translator and a teacher at the Universidad Autónoma de Entre Ríos. For many years he was an sporadic amateur until the purchase of his telescope, a small Maksutov-Cassegrain, transformed him into a passionate observer of the Moon. Since 2015 he regularly reported his lunar observations to "*The Lunar Observer*". He also like cometary observation and he carries on the blog "Cometaria. Cometas desde Entre Ríos". He is an occasional observer of meteors and variable stars. Since 2015 he is the Coordinator of the Lunar Section of the Liga Iberoamericana de Astronomía and, since 2019, its Secretary General. In 2019 he was a founding member of the Sociedad Lunar Argentina, the

Lunar Calendar March 2021

Date	UT	Event
2	0500	Moon at perigee 365,423 km
6	0130	Last Quarter Moon
8		Greatest southern declination -25.1°
10		East limb most exposed +5.0°
13		North limb most exposed +6.6°
13	1021	News Moon lunation 1215
18	0500	Moon at apogee 405,252 km
19	1800	Mars 1.9° north of Moon
21	1440	First Quarter Moon
21	1700	Moon 0.7° north of M35
22		Greatest northern declination +25.2°
24		West limb most exposed -7.3°
27		South limb most exposed -6.6°
28	1848	Full Moon
30	0600	Moon at perigee 360,309 km

The Lunar Observer welcomes all lunar related images, drawings, articles, reviews of equipment and reviews of books. You do not have to be a member of ALPO to submit material, though membership is highly encouraged. Please see below for membership and near the end of *The Lunar Observer* for submission guidelines.

Comments and suggestions? Please send to David Teske, contact information page 1. Need a hard copy, please contact David Teske.

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.

Lunar Topographic Studies

Coordinator – David Teske - david.teske@alpo-astronomy.org
Assistant Coordinator– Alberto Anunziato albertoanunziato@yahoo.com.ar
Assistant Coordinator – William Dembowski - dembowski@zone-vx.com
Assistant Coordinator – Jerry Hubbell – jerry.hubbell@alpo-astronomy.org
Assistant Coordinator-Wayne Bailey– wayne.bailey@alpo-astronomy.org
Website: http://www.alpo-astronomy.org/

Observations Received

Name	Location and Organization	Image/Article
Alberto Anunziato	Paraná, Argentina	Articles *Focus-On The Lunar 100: Features 51-60, Dark Bands, Bands and the Bright Rays of Thales, The Wrinkle Ridge that Ends in Herodotus A (Visually and Photographically),* image of Crüger, drawings of Lamont, Reiner Gamma and Kies Pi.
Sergio Babino	Montevideo, Uruguay	Images of Catena Davy, Baco, Vallis Rheita.
Juan Manuel Biagi	Paraná, Argentina, SLA-LIADA	Image of Reiner Gamma (2), Schiller-Zucchius Basin.
Francisco Alsina Cardinalli	Oro Verde, Argentina	Images of Catena Davy, Crüger, Rima Hippalus, Schiller-Zucchius Basin.
Michel Deconinck	Artignosc-sur-Verdon, Provence, France	Pastels of Catena Davy, Lamont, Baco, Hippalus Rills, Vallis Rheita (2) and Schiller Zucchius Basin.
Walter Riccardo Elias	Oro Verde, Argentina	Images of Alphonsus, Curtis (2), Montes Apenninus, Pickering (4), Proclus (2), Waxing Gibbous Moon, Full Moon, Aristarchus (2) and Kepler (2)
Howard Eskildsen	Ocala, Florida, USA	Image of Marius, the Airy Swirl, Mairan and Herodotus omega.
Nick Evetts	Kempston Rural, Kempston Bedfordshire Great Britain	Image of the waxing crescent Moon.
César Fornari	Oro Verde, Argentina	Images of Catena Davy and Mare Australe.
Martín Queirolo Gomez	SAO-LIADA Montevideo, Uruguay	Image of the Schiller-Zucchius Basin.
Marcelo Mojica Gundlach	Cochabamba, Bolivia	Images of Catena Davy, Hippalus Rilles and the Schiller-Zucchius Basin
Robert H. Hays, Jr.	Worth, Illinois, USA	Articles and drawings *Reiner and Reiner Gamma* and *Crüger.*
Rik Hill	Loudon Observatory, Tucson, Arizona, USA	Article and image *More Trenching, Sinus Condition, Magnificent Gash* and *Three Domes.*

Lunar Topographic Studies

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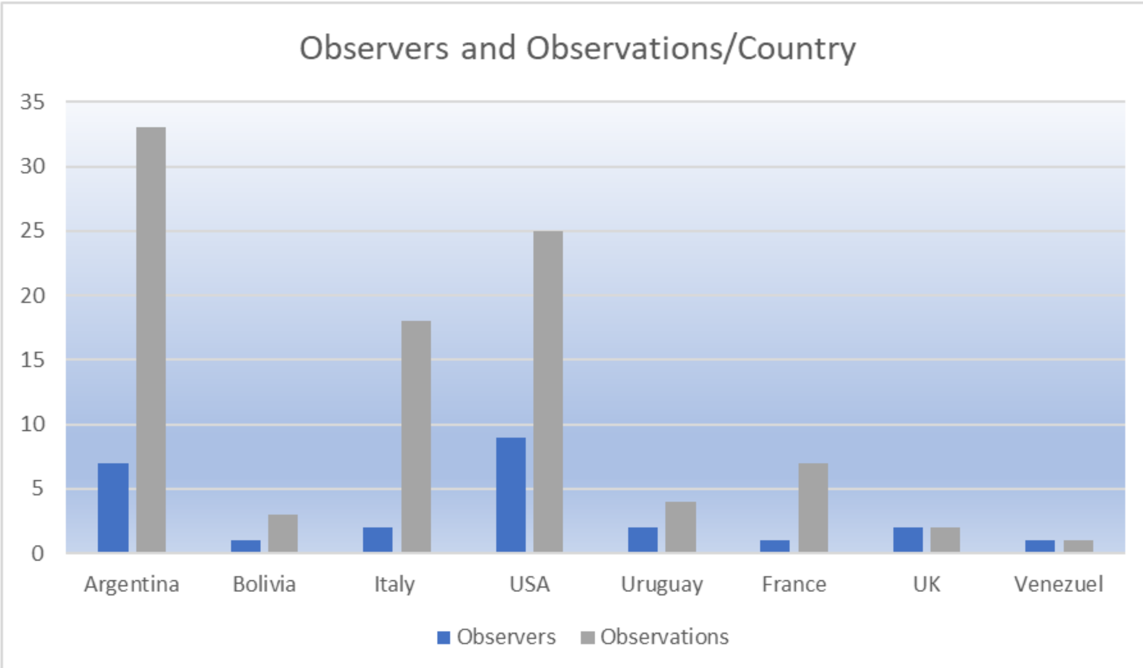
Observations Received

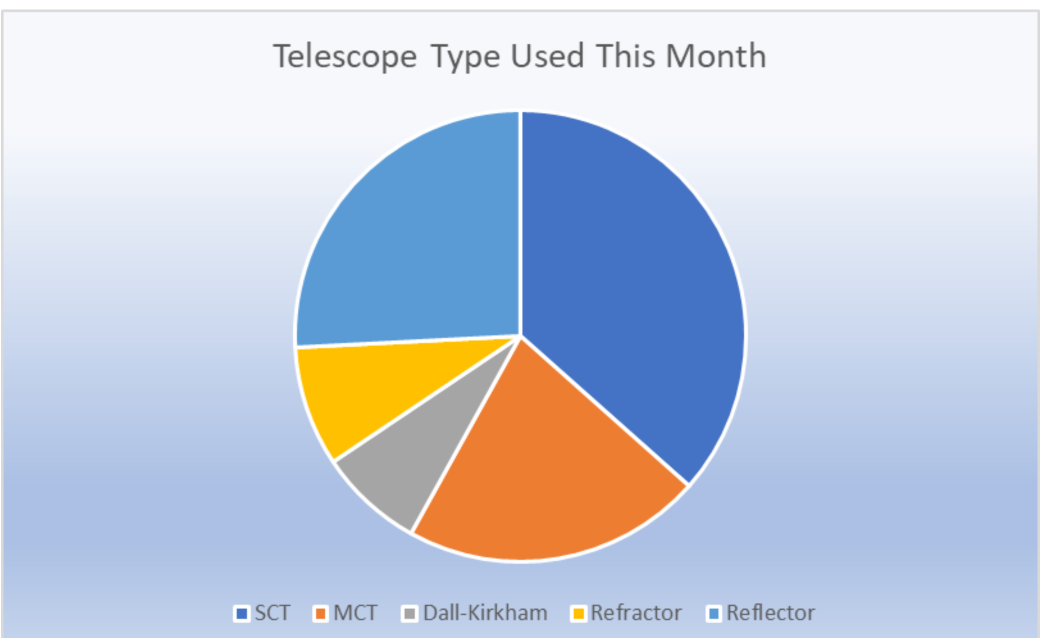
Name	Location and Organization	Image/Article
Jerry Hubbell	Wilderness, Virginia, USA	Article*: Focus-On The Lunar100: Features 51-60.*
Daniel Marcus	Plainfield, Vermont, USA	Painting of Catena Davy and Rima Hippalus.
Luigi Morrone	Agerola, Italy	Images of Sömmering, Rupes Recta, Moretus (2), Hadley, Gambart, Davy, Arzachel, Vallis Alpes, Gassendi, Sinus Iridum, Clavius, Anaxagoras and Vitello.
Phil Parslow	West Berkshire, UK	Report and drawing of Kies Pi.
Jesús Piñeiro	San Antonio de los Altos, Venezuela	Image of Theophilus.
Guido Santacana	San Juan, Puerto Rico, USA	Images of Cassini, Hipparchus, Mons Piton, Rima Hyginus (2), Aristillus and Copernicus.
Leandro Sid	Oro Verde, Argentina	Image of Aristarchus.
Fernando Surà	San Nicolás de los Arroyos, Argentina	Mons Gruithuisen Delta and Gamma.
Michael E. Sweetman	Tucson, Arizona, USA	Image of the Alpine Valley.
David Teske	Louisville, Mississippi, USA	Article and image *Rheita Valley and that Bend,* images of Crüger, Reiner Gamma, Schiller Zucchius Basin, Kies.
Fabio Verza	SNdR Luna, Milan, Italy	Images of Mare Humorum, Schiller, Hainzel and Montes Apenninus.
Darryl Wilson	Marshall, Virginia, USA	Image of Clavius.

Many thanks for all these observations, images, and drawings.

March 2021 *The Lunar Observer*
By the Numbers

This month there were 93 observations by 25 contributors in 8 countries.





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 :

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 "-". Spaces within a feature name should be replaced by "-".)

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

Sinus-Iridum_2018-04-25-0916.jpg

(Feature Sinus Iridum, Year 2018, Month April, Day 25, UT Time 09 hr16 min)

Additional information requested for lunar images (next page) should, if possible, 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 changes prior to uploading the image(s). However, use of the recommended format, reduces the effort to post the images significantly. 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:
David Teske – david.teske@alpo-astronomy.org
Jerry Hubbell –jerry.hubbell@alpo-astronomy.org
Wayne Bailey—wayne.bailey@alpo-astronomy.org

Hard copy submissions should be mailed to David Teske at the address on page one.

CALL FOR OBSERVATIONS: FOCUS ON: Lunar 100

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 May 2021 edition will be the Lunar 100 numbers 61-70. 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
David Teske – david.teske@alpo-astronomy.org

Deadline for inclusion in the Lunar 100 numbers 61-70 article is April. 20, 2021

FUTURE FOCUS ON ARTICLES:

In order to provide more lead time for contributors the following future targets have been selected: The series of the Lunar 100 will follow on the schedule below:

Subject	TLO Issue	Deadline
Lunar 100 (numbers 61-70)	**May 2021**	**April 20, 2021**
Lunar 100 (numbers 71-80)	**July 2021**	**June 20, 2021**

Focus-On Announcement

We are pleased to announce the future Focus-On topics. These will be based on the Lunar 100 by Charles Wood. Every other month starting in May 2020 , the Focus-On articles will explore ten of the Lunar 100 targets. Targets 61-70 will be featured in the May 2021 *The Lunar Observer*. Submissions of articles, drawings, images, etc. due by April 20, 2021 to David Teske or Alberto Anunziato.

L	Feature	Significance	Rükl
61	Mösting A	Simple crater close to the center of the lunar near side	43
62	Rümker	Large volcanic dome	8
63	Imbrium sculpture	Basin ejecta near and overlying Boscovich and Julius Caesar	34
64	Descartes	Apollo 16 landing site; putative region of highland volcanism	45
65	Hortensius Domes	Dome field north of Hortensius	30
66	Hadley Rille	Lava channel near Apollo 15 landing site	22
67	Fra Mauro Formation	Apollo 14 landing site on Imbrium ejecta	42
68	Flamsteed P	Proposed young volcanic crater and Surveyor 1 landing site	40
69	Copernicus secondary craters	Rays and craterlets near Pytheas	20
70	Humboldtianum basin	Multi-ring impact basin	7

Explore the Lunar 100 on the link below:

https://www.skyandtelescope.com/observing/celestial-objects-to-watch/the-lunar-100/

The Lunar 100: Features 1-10	May 2020 Issue – Due April 20, 2020
The Lunar 100: Features 11-20	July 2020 Issue – Due June 20, 2020
The Lunar 100: Features 21-30	September 2020 Issue – Due August 20, 2020
The Lunar 100: Features 31-40	November 2020 Issue – Due October 20, 2020
The Lunar 100: Features 41-50	January 2021 Issue – Due December 20, 2020
The Lunar 100: Features 51-60	March 2021 Issue – Due February 20, 2021
The Lunar 100: Features 61-70	May 2021 Issue – Due April 20, 2021
The Lunar 100: Features 71-80	July 2021 Issue – Due June 20, 2021
The Lunar 100: Features 81-90	September 2021 Issue – Due August 20, 2021
The Lunar 100: Features 91-100	November 2021 Issue – Due October 20, 2021

Jerry Hubbell –jerry.hubbell@alpo-astronomy.org
David Teske – david.teske@alpo-astronomy.org

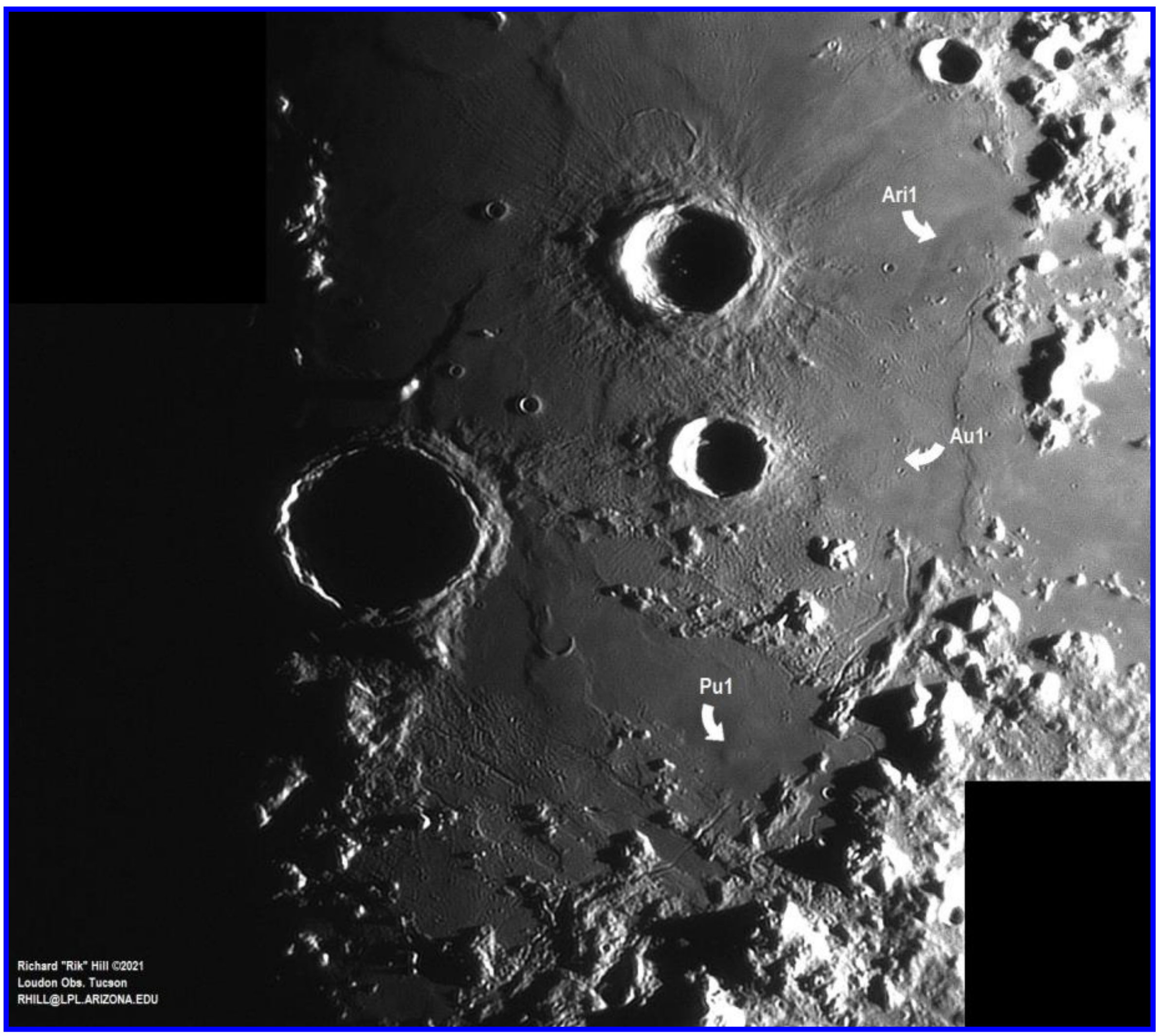
Three Domes

Rik Hill

Catching sunrise on Archimedes, the largest crater in this image at 85 km, gave me an opportunity to catch 3 domes, two of which I had nor observed before. Each is named after a different parent crater. To the lower right of Archimedes is a flat area, Palus Putredinis. Our first dome, the one that I had observed before, is pointed out as Pu1, and pretty obvious being 7 km in diameter, 90 m high and having slopes of 1.5° according to the Lunar Domes Atlas (GLR group) by Raffaello Lena (Domes Coordinator for the Association of Lunar and Planetary Observers – ALPO). You can clearly see the 2 km centra pit on top of the dome. To the right of Pu1 you can just see a small crater Bela (12 km) just coming out of the shadows of the Montes Apenninus. Above and below it partially obscured by shadow is Rima Hadley or the Hadley Rille where Apollo 15 touched down at the upper end.

The crater just above the Palus is Autolycus (4 km). Its dome, Au1, is a large low swelling some 28 km in diameter, more than half the diameter of Autolycus itself and only 75 m in height with 0.3° slopes. Then finally, an even lower dome, but much larger, is to the right of the last in this trio of craters, Aristillus (56 km) north of Autolycus. This dome labelled Ari1, is nearly the size of Aristillus listed as 54 x 35 km in size, 85 m high with 0.2° slopes. It's a tough one to see here and would have been a bit more obvious a couple hours earlier.

Archimedes Domes *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 20 February 2021 01:32 UT, colongitude 06.2°. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Skyris 132M camera. Seeing 7-8/10.*



Dark Spots, Bands and the Bright Rays of Thales

Alberto Anunziato

The reason for taking this image was to show the prominent bright rays of Thales, which visually looked spectacular at 96.2º colongitude (image 1), although not so much in the image. Similarly, the ray system is the attraction of the image, extending for hundreds of kilometers from a crater barely 31 kilometers in diameter. Apparently, the rays would be asymmetrical, extending south and not north, but probably the rays heading north could be seen on the far side, not from Earth, of course. To the left we find the Tycho of the north, Anaxagoras, and its spectacular bright rays. Towards the right (image 2), I find very attractive the dark spots, both 10 kilometers in diameter, in the interior of Atlas, much darker in the south than in the north. The floor of the neighboring Hercules, on the other hand, is much more homogeneously dark, and inside we find Hercules G (13 km in diameter) and its beautiful bands on the eastern rim. A curiosity: the origin of the splendid bright ray that we see dominating the Mare Serenitatis in Bessel is a matter of speculation, and one of the most plausible hypotheses is that it comes from Thales. In image 3 we see Giovanni Cassini's famous map of 1679, in which we understand the origin of this opinion: from Thales a ray arises that passes through Bessel, Manilius and ends south of Arzachel, a kind of simplification of several rays. Let us remember that the geological nature of bright rays was an enigma until a few decades ago, for Cassini they would be part of the lunar relief, since his "big ray" is drawn with relief and shadow.

Figure 1. Thales, *Alberto Anunziato, Paraná, Argentina. 01 November 2020 04:48 UT. 180 mm Newtonian reflector telescope, QHY5-ll camera.*

Figure 2. Atlas-Hercules, *Alberto Anunziato, Paraná, Argentina. 01 November 2020 04:48 UT. 180 mm Newtonian reflector telescope, QHY5-ll camera.* ***Figure 3 below****, Moon map by Giovanni Cassini 1679.*

Magnificent Gash

Rik Hill

The Aristarchus Plateau is irresistible whenever it's available whether sunrise or sunset. Dominated by the bright crater Aristarchus (41 km), the brightest crater on the visible disk of the Moon, it is home to a plethora of fascinating features. The crater was the subject of an article by BAA Lunar Section Director Bill Leatherbarrow in the most recent BAA Journal (131, 1, 2021) where he discussed the historical "banding" appearance of this crater. If you can get a copy of this article, it's worth the read.

The second most dramatic feature vis the magnificent gash to the left of Aristarchus, Vallis Schröteri. It winds its way across 165 km of the lunar surface from the crater Herodotus (36 km) getting thinner and thinner until it passes through the mountains to the left of Herodotus. Above Aristarchus are some odd little rimae with craters at one end, the Rimae Aristarchus, and one vertical dark slash, Rupes Toscanelli pointing up to the crater Toscanelli (7 km). To the right of this are a few more rimae above the ruined crater Prinz (49 km) to the upper right of Aristarchus, appropriately named Rimae Prinz. These wind their way off into the Montes Harbinger on the far right of the image.

There is more to discover in this area, but before leaving notice the sparkling peal catching the morning light to the upper left of Vallis Schröteri. Though being about 200 km away from its parent crater, this is Mons Herodotus, well worth looking for with the first light of the Aristarchus Plateau.

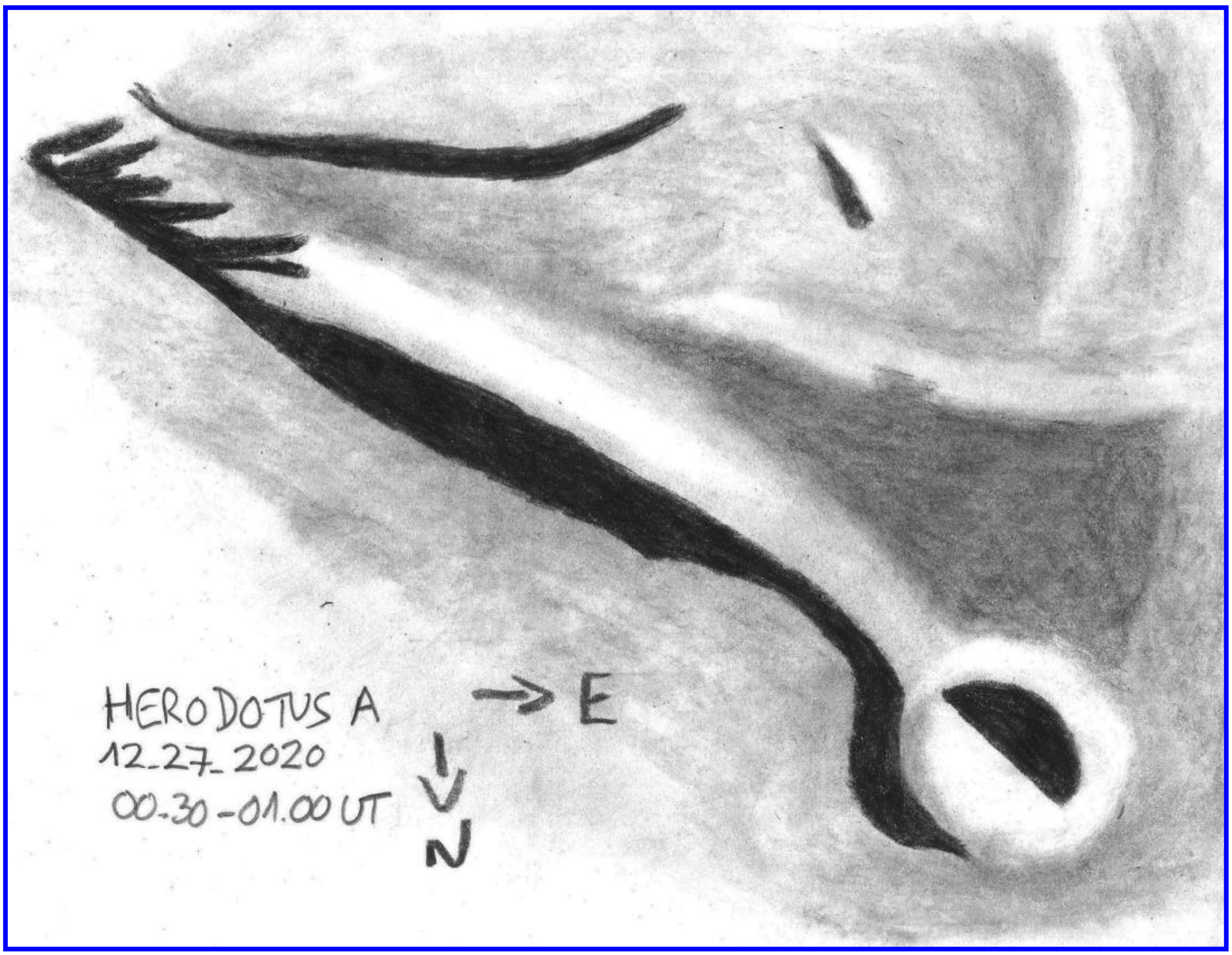
Aristarchus Plateau, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 24 February 2021 04:55 UT, colongitude 56.6°. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Skyris 132M camera. Seeing 7/10.*

The Wrinkle Ridge that Ends in Herodotus A (Visually and Photographically)

Alberto Anunziato and Sergio Babino

Herodotus A is a bowl-shaped crater 10 kilometers in diameter that at 56.8º colongitude (IMAGE 1) shows a floor half shadowed and half illuminated, in which no details are distinguished because it has a rounded shape, without the central peak characteristic of larger craters. An anodyne crater, except for the stupendous wrinkle ridge that seems to end, or begin, on its west wall. This ridge curves to the south, and in that curve, there is a noticeably brighter segment, which would indicate the highest structural part called the "crest". That higher, brighter segment casts the thickest shadow to the north. Towards the south our ridge seems to be in contact with other elevations: one of which we only perceive the shadow to the west and another that is observed bright without shadow, with an irregular shape. Between this and the main ridge the surface is darker. Two other elevations run from south to north, a small one that casts a shadow and a more extensive one. At the extreme opposite Herodotus A, to the west, there are a series of shadows, like teeth of a saw, which could indicate a segment of less height and a steep north slope. To clearly identify the area drawn, we looked for an image in which it would appear and we found this wonderful image of Sergio Babino (IMAGE 2).

Image 1, Herodotus A, *Alberto Anunziato, Paraná, Argentina. 27 December 2020 00:30-01:00 UT. 105 mm Meade EX105 Maksutov-Cassegrain telescope, 154 x.*



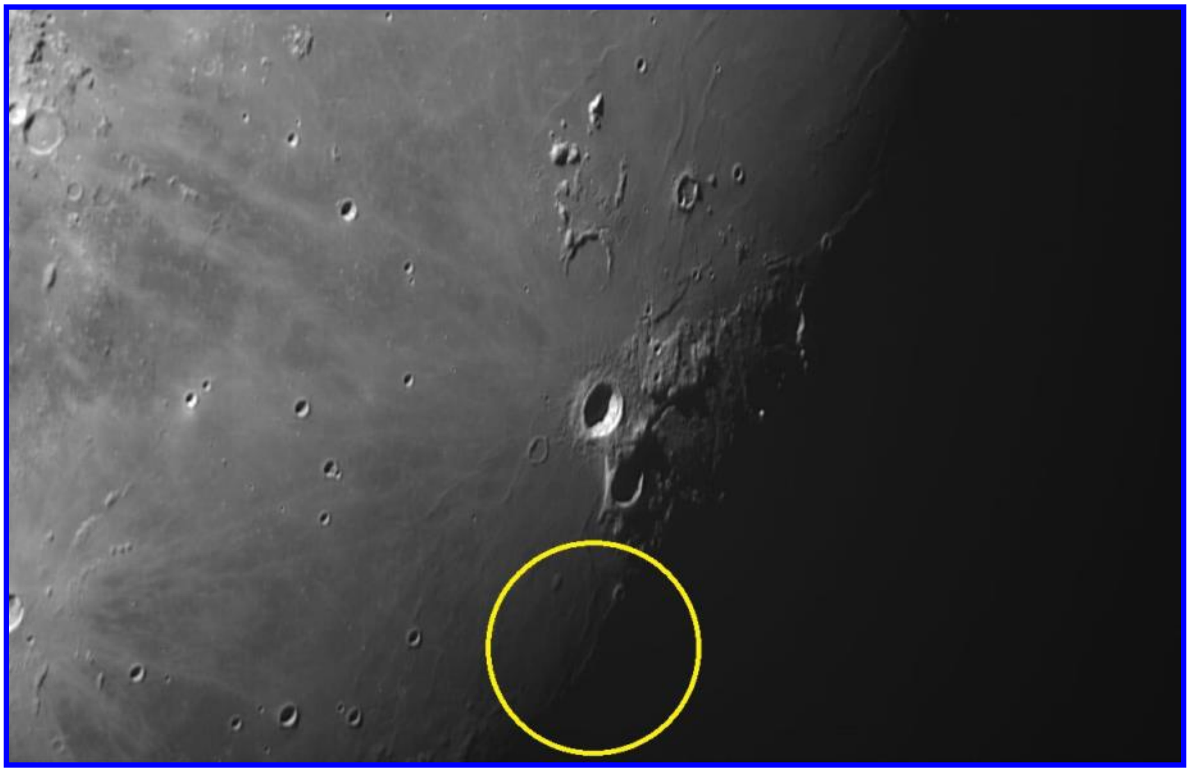
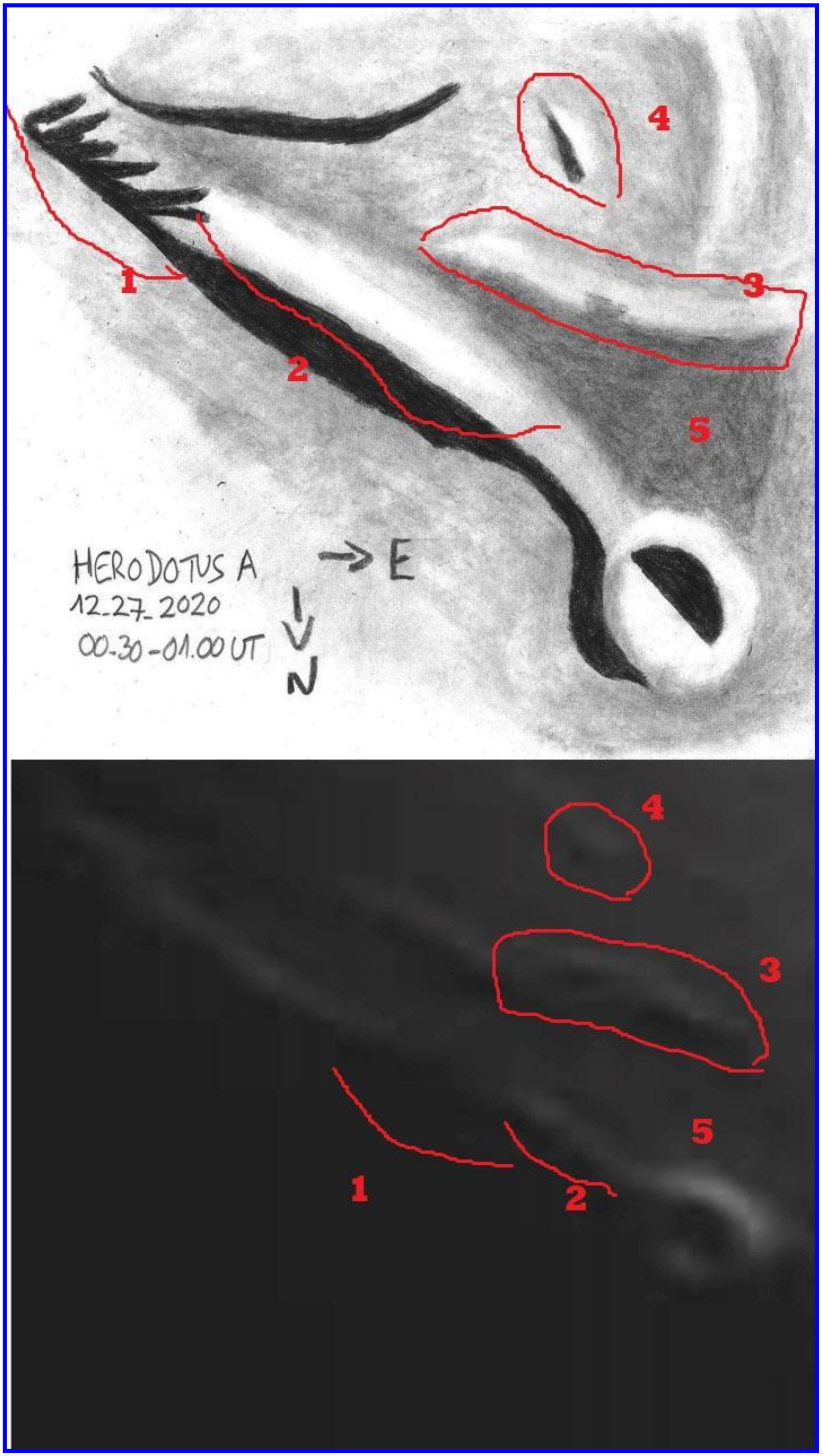


Image 2, Herodotus A, *Sergio Babino, Montevideo, Uruguay. 08 April 2020 00:27 UT. 203 mm. catadrioptic telescope, ZWO ASI 174 camera.*

Image 2 even presents an illumination very similar to that of our observation (colongitude 52.4º). The area that interests us appears in the yellow circle. Our first thought was to illustrate the observed area with a photograph, then we realized that by zooming in on Sergio's image we could compare the details with our observation, and then that the comparison was more valuable, because the colongitudes of both images were so similar that we could even extend the analysis of what can be observed from a wrinkle ridges visually and with a photographic image. For this analysis we composed IMAGE 3. In the extreme west, which we had identified with a segment of lower height, we can see how the ridge loses height in the segment that we marked in red with the number 1. To the right is the higher segment, marked with the number 2. This would correspond to what is known as a "crest". Visually the crest was very bright, as bright as the southern rim of Herodotus A. In Sergio's image we cannot distinguish that there is a brighter segment. Point for visual observation, which is a valuable tool to deepen the knowledge of the structure of the wrinkle ridges. The dorsum that runs parallel to the south, marked with the number 3, is seen in much more detail in Sergio's image (point for photographic image). In point 4 we see what can be a small ridge or a simple elevation. In both images we see, marked with a 5, a much darker area between the two backs (perhaps more clearly visible in the visual image). The comparison of the visual and photographic observations of the same wrinkle ridge, in very similar colongitudes, allows some provisional conclusions: 1) there are details that are better visually appreciated, such as the structurally highest part ("crest"); 2) the photographic observation allows to capture more details of the lower parts (for example, the segment marked in red with the number 1 in IMAGE 3); 3) the photographic observation is very useful to confirm the visual observations and also the photographic confirmation of the structural features of a wrinkle ridge that were observed visually would allow to presume the veracity of the structural features that do not appear in the photograph but in visual observation (like the crest in this case), if they correspond to the geological structure of the ridge; 4) visual observation, carried out using as a basis the analysis of the structural features of a dorsum observed in a photographic image, can enrich the photographic observation, refining its details. That is what we plan to do with this magnificent ridge: try to observe it again, using Sergio's image and our visual observation as a basis, to try to observe more details, especially on its crest and in the lower area of the extreme west.

Image 3
Herodotus A

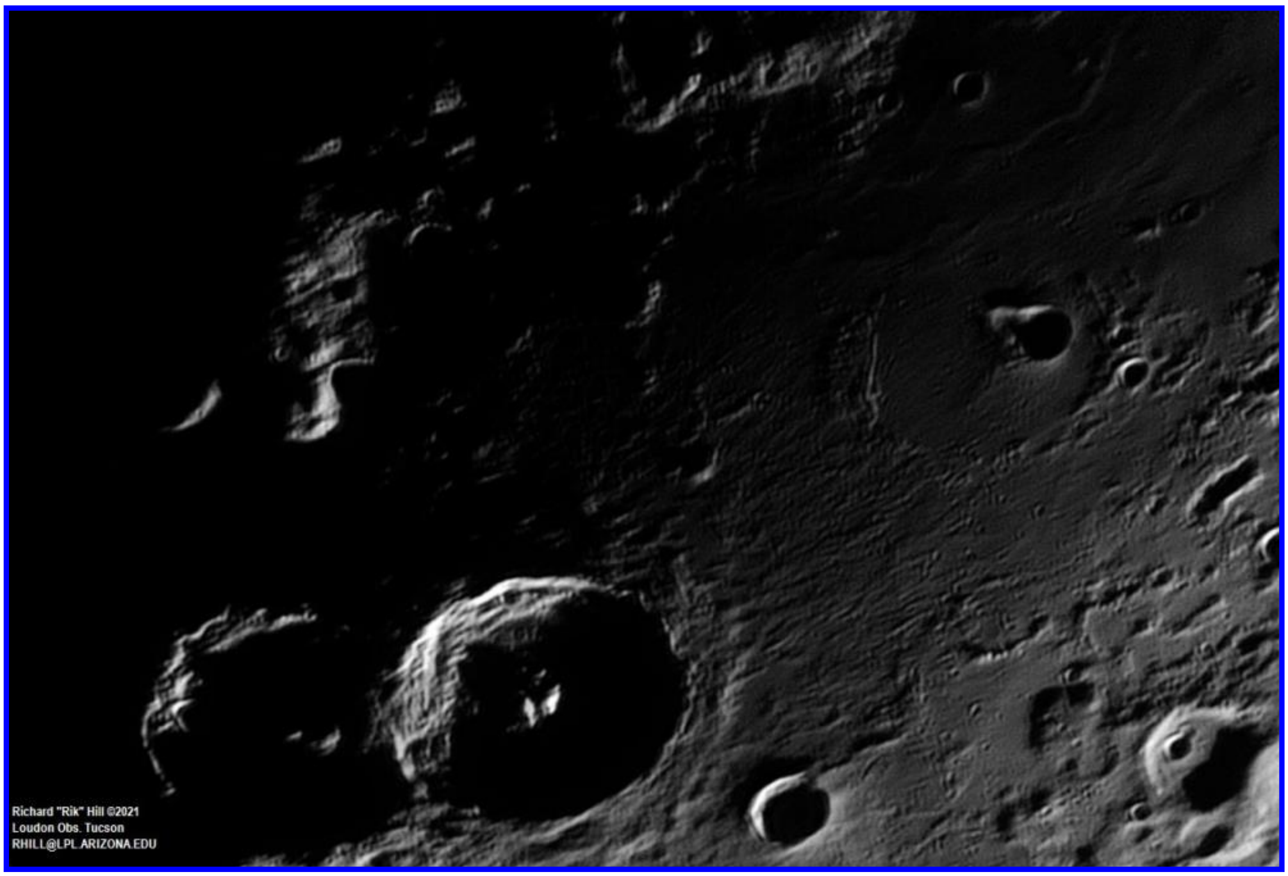


A Sinus Condition

Rik Hill

North and east of the great crater Theophilus (104 km) is Sinus Asperitatis ("Bay of roughness") that opens towards Mare Tranquillitatis to the north. Right in the middle of the sinus is the pear-shaped crater Torricelli (roughly 20x30 km) sitting off center in the ruins of an ancient unnamed crater about 90 km in diameter. Torricelli is undoubtedly the product of a two-crater merger. The U-shaped feature at the top middle of this image is the crater Hypatia (43 km), an old, partially ruined crater.

Of course, the "elephant in the room" is Theophilus catching the first rays of the morning sunlight with its central peaks casting shadows across the floor of the crater. The low sun angle displays details in the ejecta blanket to the right of the crater down to Mädler (29 km) below Theophilus with a little dorsum for a tail. To the left of Theophilus is a similar sized, impressive crater, Cyrillus (100 km). With Theophilus on top of Cyrillus it's easy to say that Cyrillus is older, in this case by a billion years. Above these two craters is the magnificent Mons Penck (4000 m tall). What a great view one would have from the top of this mountain looking over this sunrise selenoscape!



Sinus Asperitatis*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 18 January 2021 01:03 UT, colongitude 336.5^o. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 665 nm filter, Skyris 132M camera. Seeing 8-9/10.*

Focus On: The Lunar 100
Features 51 through 60

Jerry Hubbell
Assistant Coordinator, Lunar Topographical Studies

This is the sixth article of ten in a series on Chuck Wood's Lunar 100 list. Chuck Wood, the founder of the Lunar Photo of the Day (LPOD) (Ref.), first discussed this list of lunar features in a Sky & Telescope article published in 2004, and later published on the Sky & Telescope website (Ref.). This series will run from May 2020 until January 2022. I may insert a few other topics in between this series so the end date for this series may extend out to the end of 2022. Chuck wanted this list of lunar features (L1 to L100) to be like the well-known list of Messier objects that would give lunar observers a way to progress in their study of the moon and become life-long observers. The list contains all the diverse features of the Moon including Mare, Craters, Rilles, Mountains, and Volcanic Domes. The list starts out with the naked eye view of the full disk of the Moon and progresses through more difficult features.

This series of Focus On articles is meant to be the basis for a lunar visual observing program but is not limited to that. It can be the basis for starting your own image-based study of the Moon, which will enable you to use the *Lunar Terminator Visualization Tool (LTVT)* (Ref.), a sophisticated software program used to do topographical measurements of the lunar surface. These articles will introduce and show each of the Lunar 100 features as observed and submitted by our members through drawings, images, and narrative descriptions. Although you can use your naked eye and binoculars to start observing objects L1 – L20, observing objects L21 – L80 will require the use of a 3-inch (76-mm) telescope. Features at the end of the list (L81 – L100) will require a 6 to 8-inch (152 to 203-mm) telescope. Many of the features are best observed at different phases of the Moon.

One of the best ways to help you learn the features of the Moon is through sketching the lunar surface. During this series of articles, we will highlight drawings of many of the Lunar 100 features. Springer Books publishes an excellent book, released in 2012, called *Sketching the Moon* (Handy, et al.) (Ref.). There are other resources on the Internet to help you get started observing and sketching the Moon including the ALPO's excellent *Handbook of the ALPO Training Program* (Ref.)

In this article we continue with features 51 through 60 on Chuck's list. This article highlights the excellent drawings of each of these features submitted by Michel Deconinck from Provence, France and paintings from Daniel Marcus of Plainfield, Vermont, USA. Here is a list of features 51 – 60:

L	Feature	Significance	Rükl
51	Davy crater chain	Result of comet-fragment impacts	43
52	Crüger	Possible volcanic caldera	50
53	Lamont	Possible buried basin	35
54	Hippalus rilles	Rilles concentric to Humorum basin	52, 53
55	Baco	Unusually smooth crater floor & surrounding plains	74
56	Australe basin	A partially flooded ancient basin	76
57	Reiner Gamma	Conspicuous swirl & magnetic anomaly	28
58	Rheita Valley	Basin secondary-crater chain	68
59	Schiller-Zucchius basin	Badly degraded overlooked basin	70, 71
60	Kies Pi	Volcanic dome	53

This month we had a great response to our request for images and drawings for the fifth set of 10 features of the Lunar 100 (L41 – L50). I am grateful for all the submissions we received. Most of the images came from Alberto Anunziato's groups, SAO-SLA, and LIADA. Early on he prefaced the images he sent on behalf of his group this way:

> *"LUNAR 100 PROGRAM Sociedad Astronómica Octante-Sociedad Lunar Argentina*
>
> *When we found out that the next objectives of the Focus On Section would be the features listed in the Charles Wood's famous Lunar 100, the members from Sociedad Lunar Argentina (SLA) and Sociedad Astronómica Octante (SAO) of the República Oriental del Uruguay, we considered interesting to join the initiative of "The Lunar Observer" (TLO) and therefore we launched our Lunar 100 Program, under the auspices of the Lunar Section of the Liga Iberoamericana de Astronomía (LIADA). The objective is twofold. We will report the images submitted to the program to "The Lunar Observer". And we will also publish them in all the media of SLA, SAO and LIADA. We think it is a great opportunity to stimulate amateur lunar observation and if the call is successful, we can dream of some final joint publication."*

We look forward to future drawings and images submitted by ALPO, SLA, SAO, LIADA members and others from across the world. Please share with us any images you have in your image catalog; we hope to see everyone participate in these Focus On articles.

– Jerry Hubbell

COMPUTER PROGRAMS

Virtual Moon Atlas
https://sourceforge.net/projects/virtualmoon/

Lunar Terminator Visualization Tool (LTVT) http://www.alpoastronomy.org/lunarupload/LTVT/ltvt_20180429-HTML.zip

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Focus On: The Lunar 100
Features 51 through 60

Alberto Anunziato
Assistant Coordinator, Lunar Topographical Studies

We continue to advance with the classification of our lunar images in the "Lunar 100" list made by Charles Wood. From number 51 on, lunar features are smaller and more difficult to find. Until number 50 most of the included lunar features were the focus of photographic images. Starting with number 51, the reference that the Lunar 100 list has to the Lunar Atlas Rükl charts becomes essential to identify several of the very little-known lunar features (L 52 Crüger, L 55 Baco, for example), or that occupy a corner of the image and only by zooming in on the images can we identify them (L 51 Catena Davy, L56 Mare Australe). We found it interesting, for this Focus-On Section, to comment on the characteristics of the lunar features that Wood chose for numbers 51 to 60 based on the information provided by the author about them in a previous work "Modern Moon. A Personal View." Quotes are from the 2003 Sky Publishing Corporation edition.

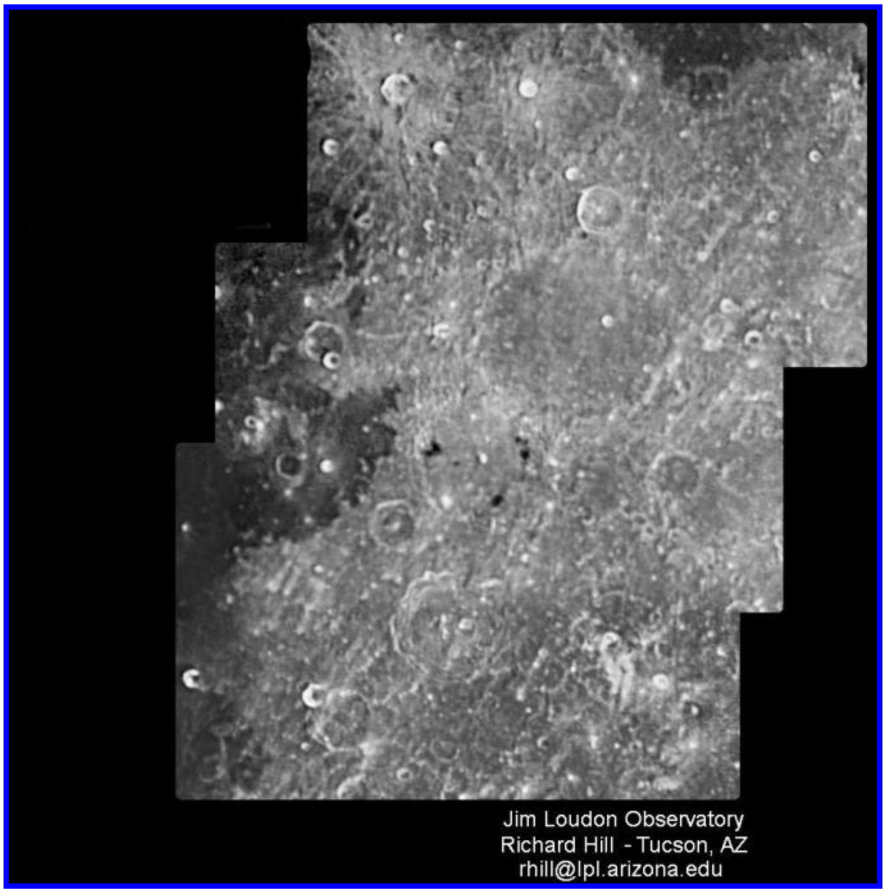
L	Feature	Significance	Rükl
51	Davy crater chain	Result of comet-fragment impacts	43
52	Crüger	Possible volcanic caldera	50
53	Lamont	Possible buried basin	35
54	Hippalus rilles	Rilles concentric to Humorum basin	52, 53
55	Baco	Unusually smooth crater floor & surrounding plains	74
56	Australe basin	A partially flooded ancient basin	76
57	Reiner Gamma	Conspicuous swirl & magnetic anomaly	28
58	Rheita Valley	Basin secondary-crater chain	68
59	Schiller-Zucchius basin	Badly degraded overlooked basin	70, 71
60	Kies Pi	Volcanic dome	53

Focus –On Lunar 100, Number 51: Catena Davy

Catena Davy, *Daniel Marcus, Plainfield, Vermont, USA. As usual with my work, I started with sketches I did of the area during the eight day moon, viewed through my 8" Meade LX90. I then stitched them together using various photographs as reference materials. (The same lunation, of course.) The magnifications varied according to seeing. (Usually 154x) I know that this isn't the usual way lunar sketches are done, but it's working well for me and I hope you can use the painting. I'm also sending you some of the pencil sketches that formed the basis of the finished picture.*

Lunar 51: Catena Davy
Result of comet-fragments impacts

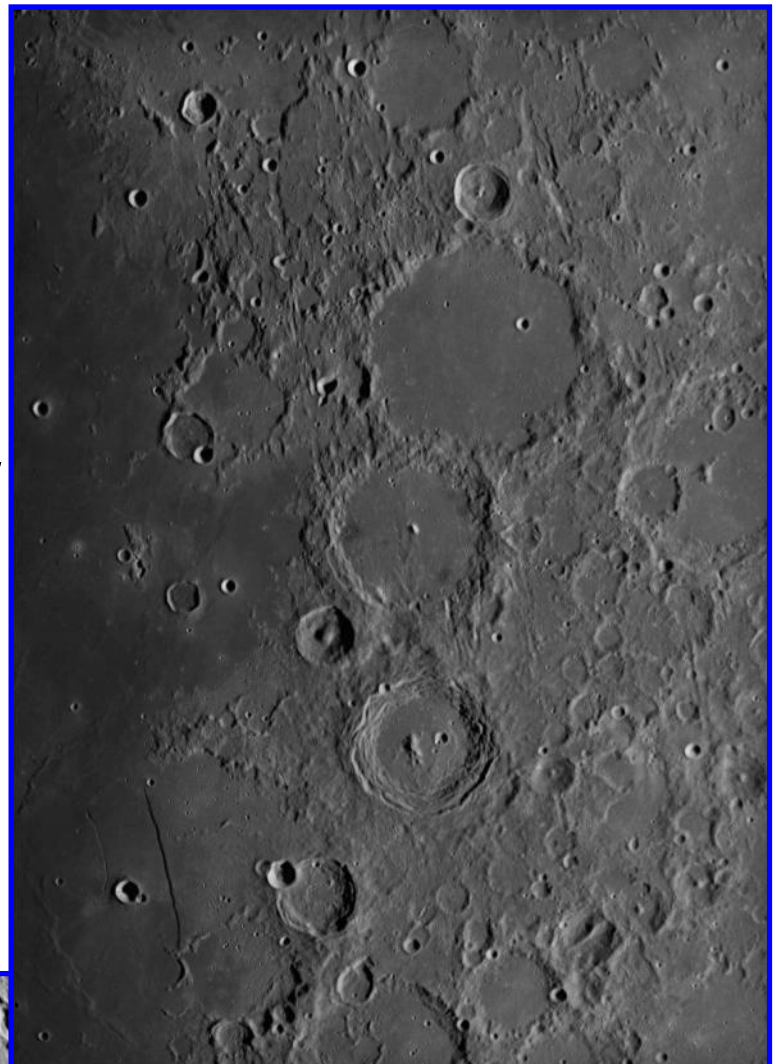
Lunar 51 is a recently revealed mystery. It is a chain of craters (with diameters between 1 and 3 kilometers) that extends about 45 kilometers on Davy Y, from Davy G to Davy C. The first explanation for this line of craters was volcanic: a line of calderas. But these craters don't look like typical lunar calderas (like some pits in Marius Hills, for example). Nor could they be secondary craters arranged in a straight line by a whim of chance, because there is no main crater. Charles Wood give the explanation (page 143) of the origin of the Catena Davy: "Robert Wichman (then at the University of North Dakota) and I proposed an explanation, as did Melosh and Whitaker of the University of Arizona. Suppose a comet or small asteroid passed so closet to Earth that it was torn apart by Earth's gravity, with the resulting pieces dispersing into a line. If such a train of particles hit the Moon, it could produce a crater chain like the one near Davy". Since the fragmentation of Comet Shoemaker-Levy in 1992 by the gravity of Jupiter and the impact of the fragments in 1994 in a rectilinear pattern identical to that of Catena Davy, chains of craters were identified in Callisto, Ganymede, Mars, Mercury and other bodies of the solar system.



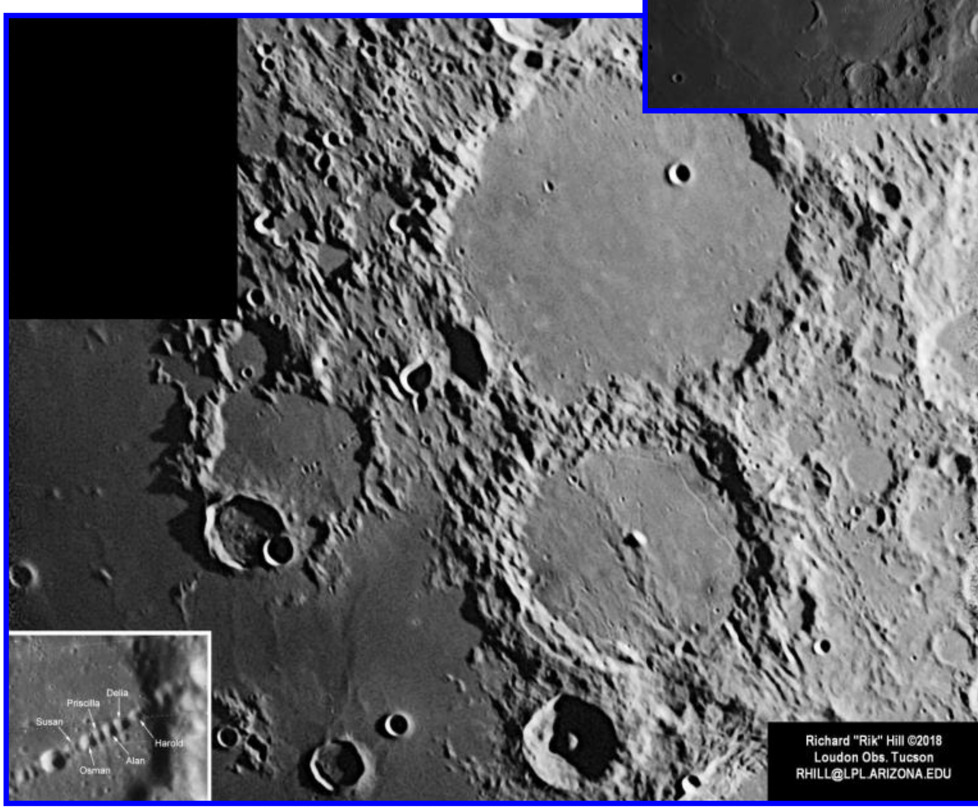
Thebit to Oppolzer*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 13 September 2008 06:24 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 2 x barlow, UV/IR block filter, SPC900NC camera. Seeing 5/10.*

Catena Davy, *Francisco Alisa Cardinalli, Oro Verde, Argentina. 15 December 2015 00:31 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

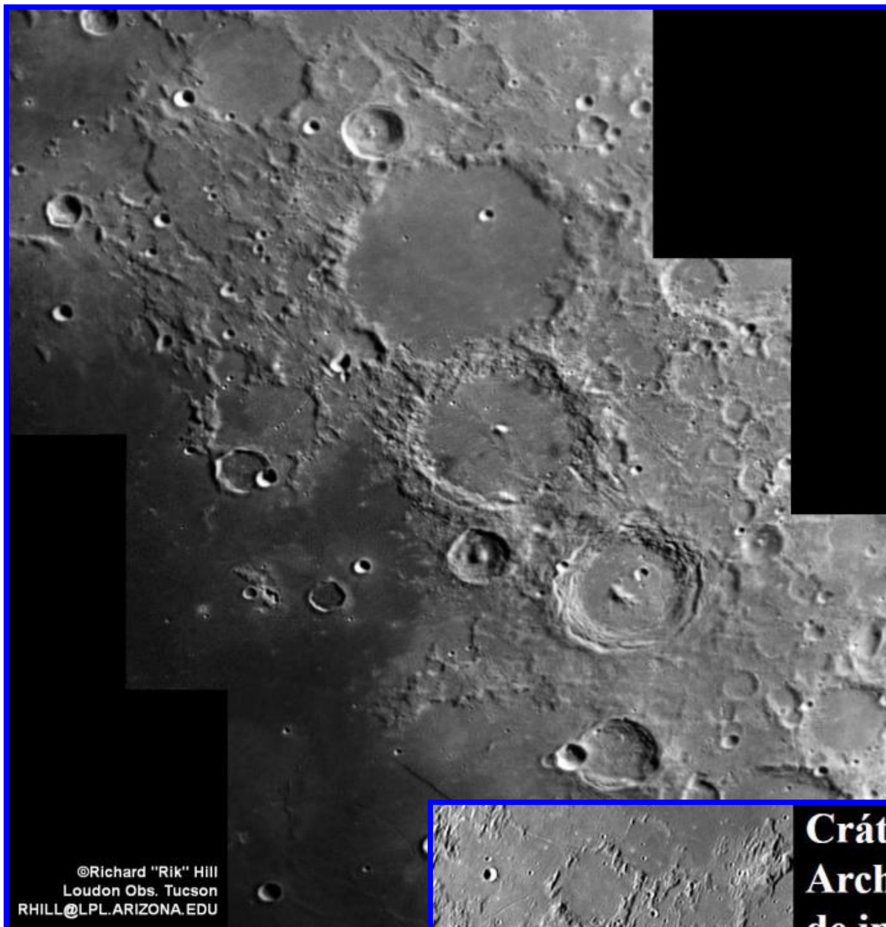
Focus –On Lunar 100, Number 51: Catena Davy



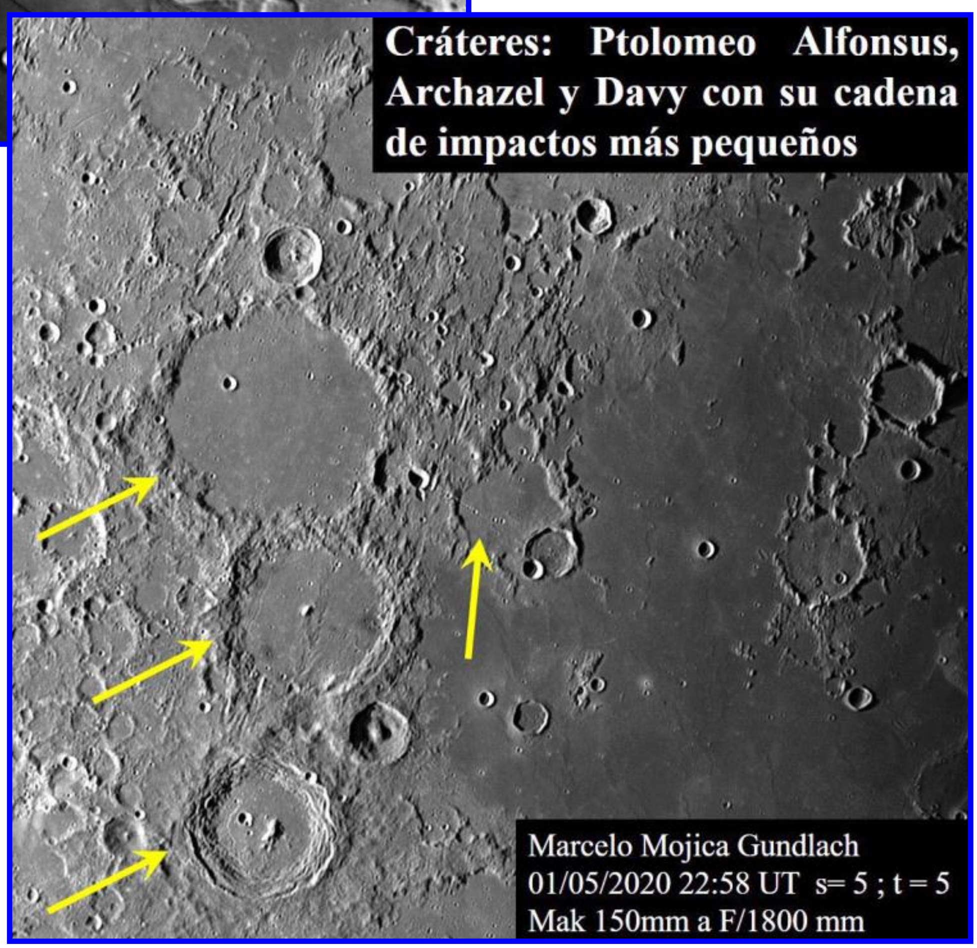
Catena Davy, *César Fornari, Oro Verde, Argentina. 10 September 2016 21:48 UT. Celestron 11 inch Edge HD Schmidt-Cassegrain telescope, QHY5-ll camera.*



Catena Davy*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 24 April 2018 02:08 UT, colongitude 12.9º. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Skyris 445M camera. Seeing 8/10.*

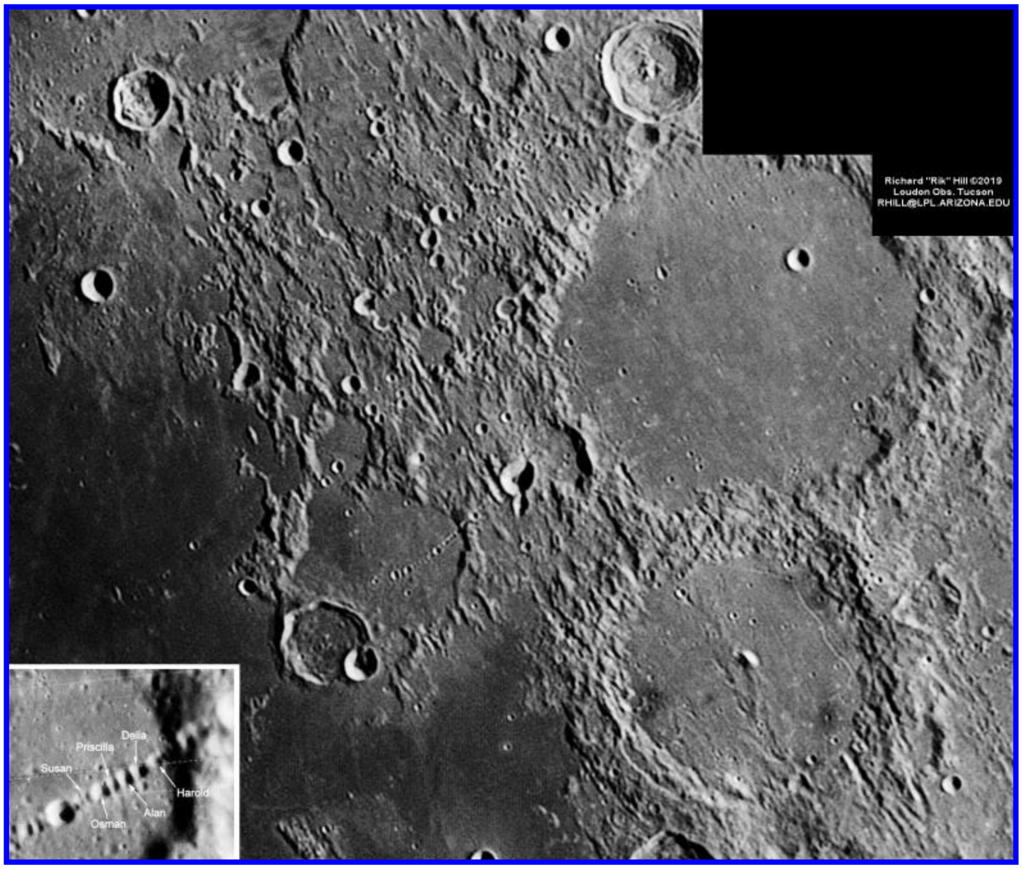


***Rupes Recta to Ptolemaeus**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 09 May 2014 03:50 UT . TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 8/10.*



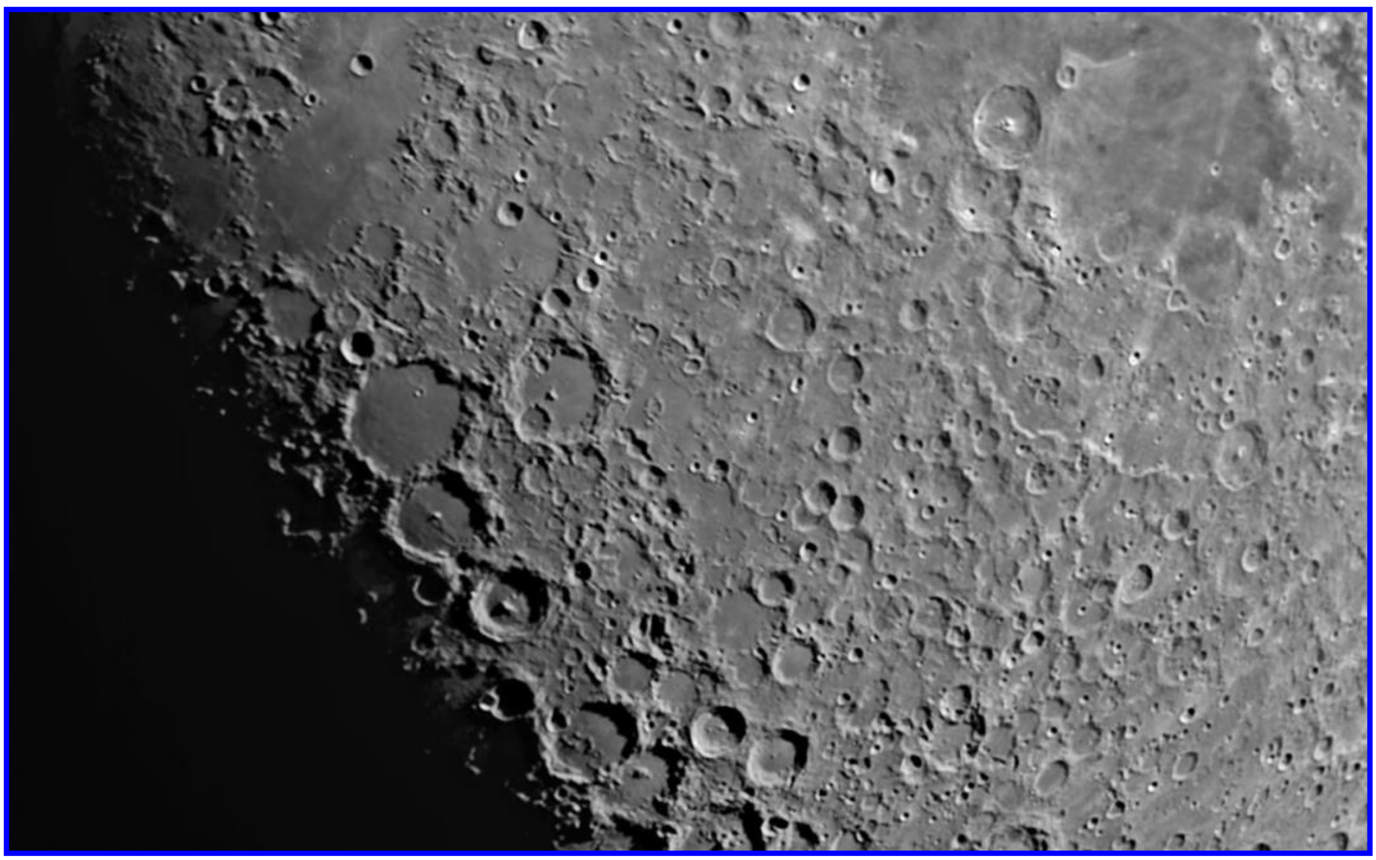
***Catena Davy,** Marcelo Mojica Gundlach, Cochabamba, Bolivia. 01 May 2020 22:58 UT. Skywatcher 6 inch f/15 Maksutov-Cassegrain telescope, ZWO ASI 178 b/w camera. Seeing 5/10, transparency 5/6. Arrows on left top to bottom are Ptolemaeus, Alphonsus and Arzachel. Center arrow points to Catena Davy.*

Focus –On Lunar 100, Number 51: Catena Davy

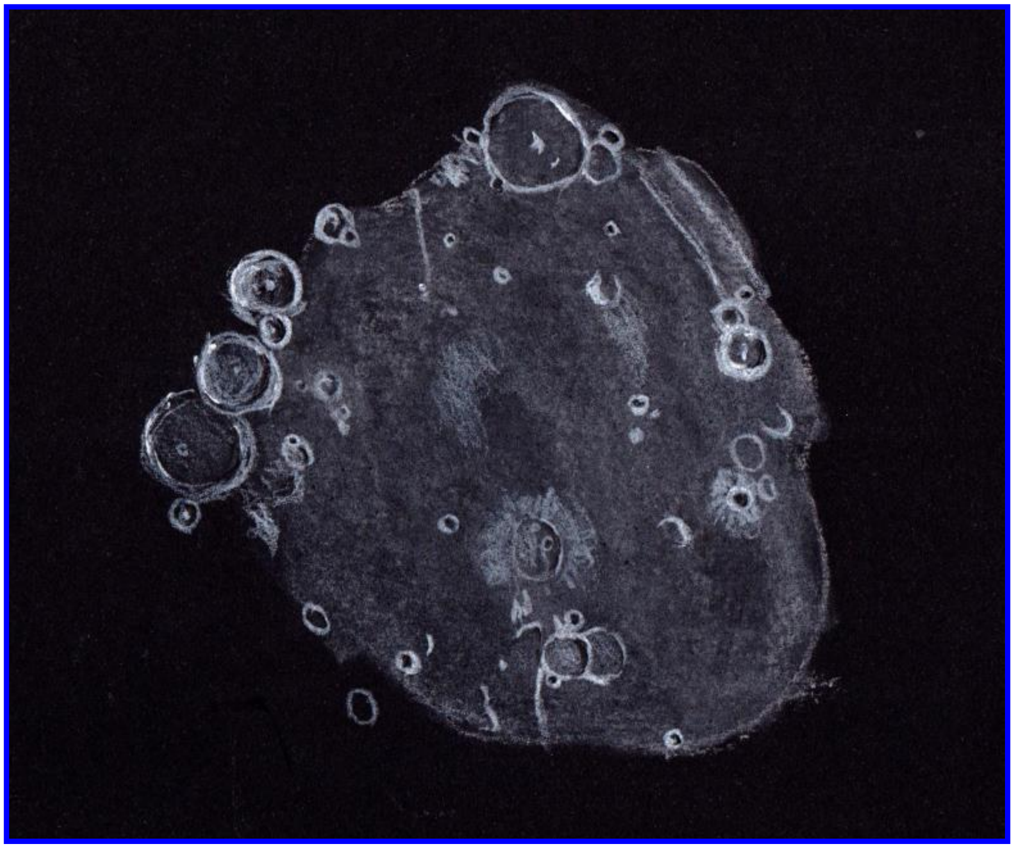


Catena Davy, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 14 May 2019 02:33 UT, colongitude 27.0°. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Skyris 445M camera. Seeing 9/10.*

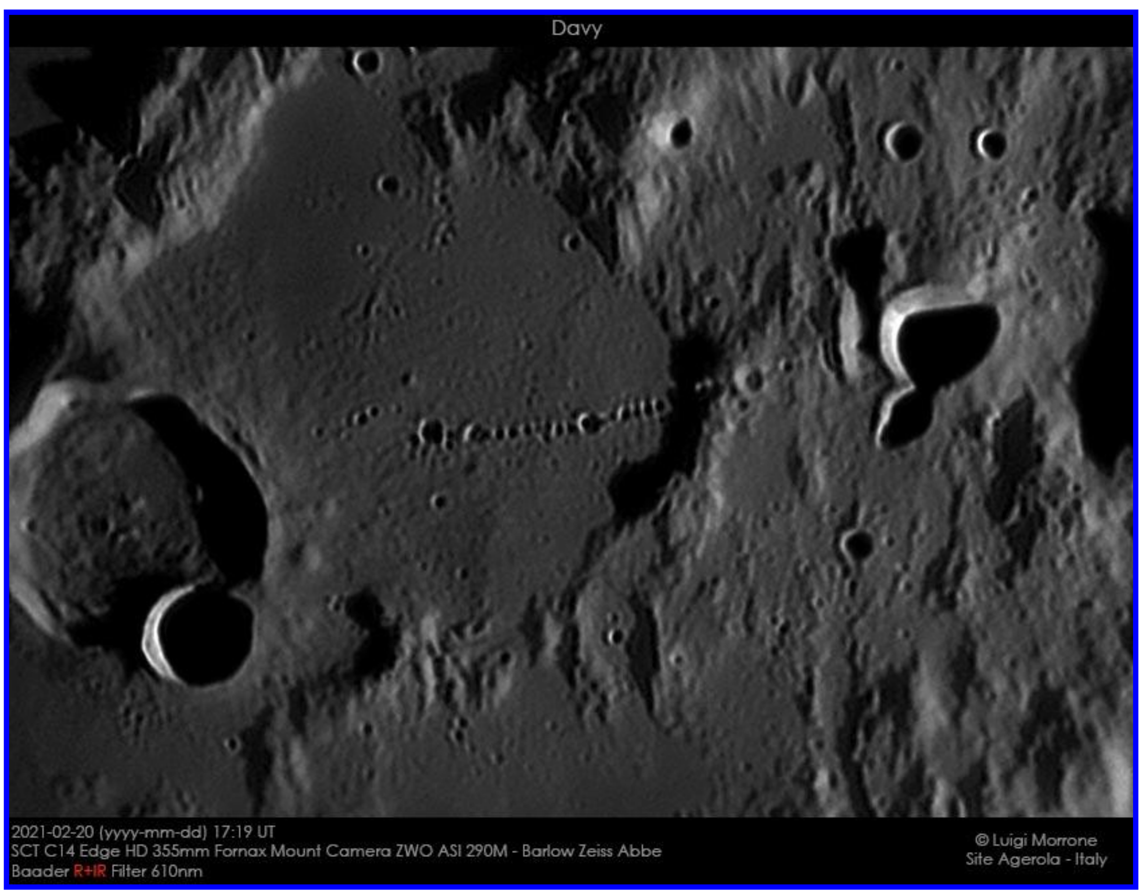
Catena Davy, *Sergio Babino, Montevideo, Uruguay. 05 December 2019 01:10 UT. 203 mm. catadrioptic telescope, ZWO ASI 174 camera.*



Focus –On Lunar 100, Number 51: Catena Davy



Catena Davy, *Michel Deconinck, Menton - French Riviera - France . 24 June 2019 02:30 UT. 102mm x 1000 mm Bresser refractor telescope, zoom eyepiece, 75 x.*



Catena Davy, *Luigi Morrone, Agerola, Italy. 20 February 2021 17:19 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

Lunar 52: Crüger
Possible volcanic caldera

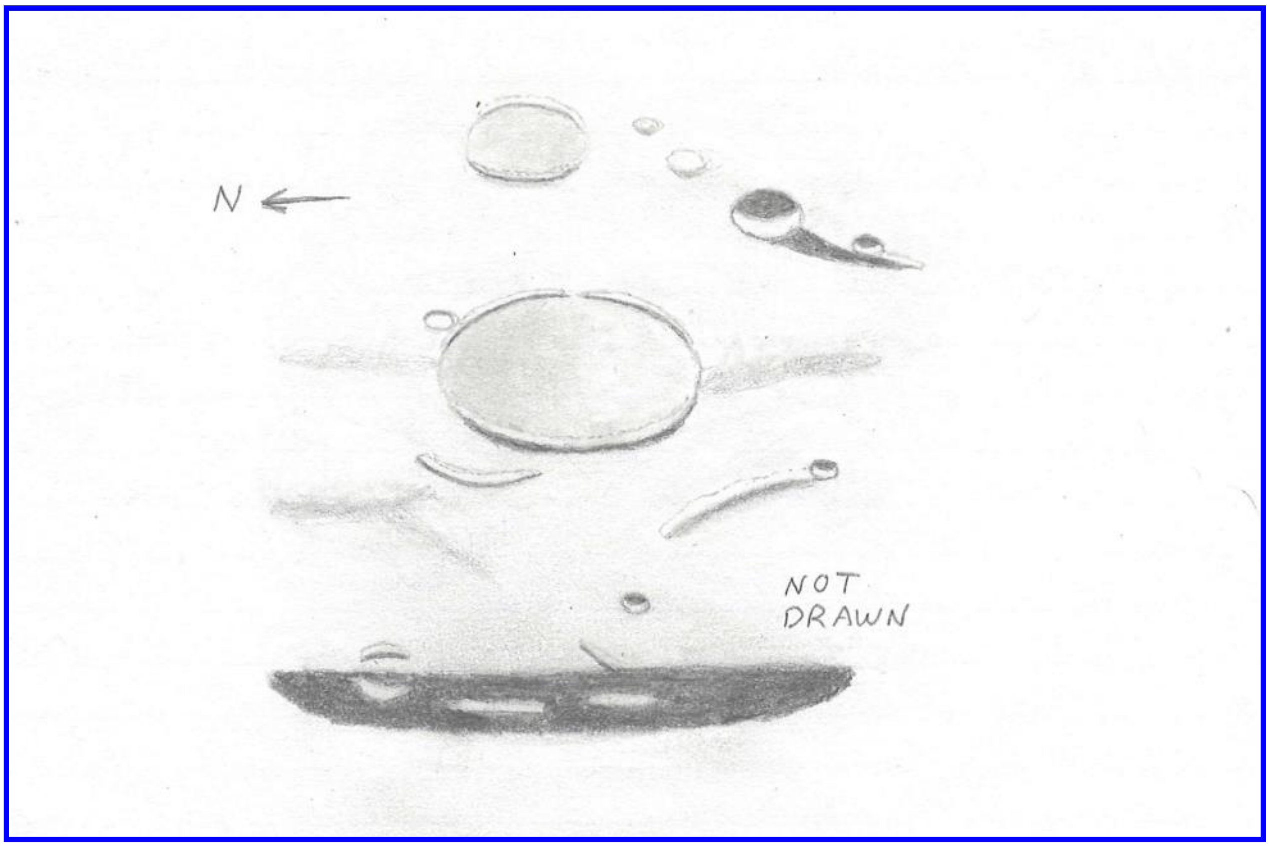
In the highlands of the eastern limb there are a series of dark spots that contrast with the brightness of the landscape bombarded by craters. The largest and best known is Grimaldi crater and the nearby Riccioli. Towards the south we find a smaller one: Crüger. It is a crater 45 kilometers in diameter that has a depth much less than normal for that diameter, just 500 meters: "Is it a standard impact crater flooded with lava nearly to its rim crest, like a Wargentin wannabe? Or is it perhaps a large secondary crater formed from debris excavated during the Orientale impact? Or is it entirely of volcanic origin-a collapsed caldera flooded with lava from its last eruption? We don't know: any of these origins is possible" (page 182)

***Crüger to Byrgius**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 01 November 2009 03:11 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 1.6 x barlow, UV/IR block filter, DMK21AU04 camera. Seeing 8/10.*

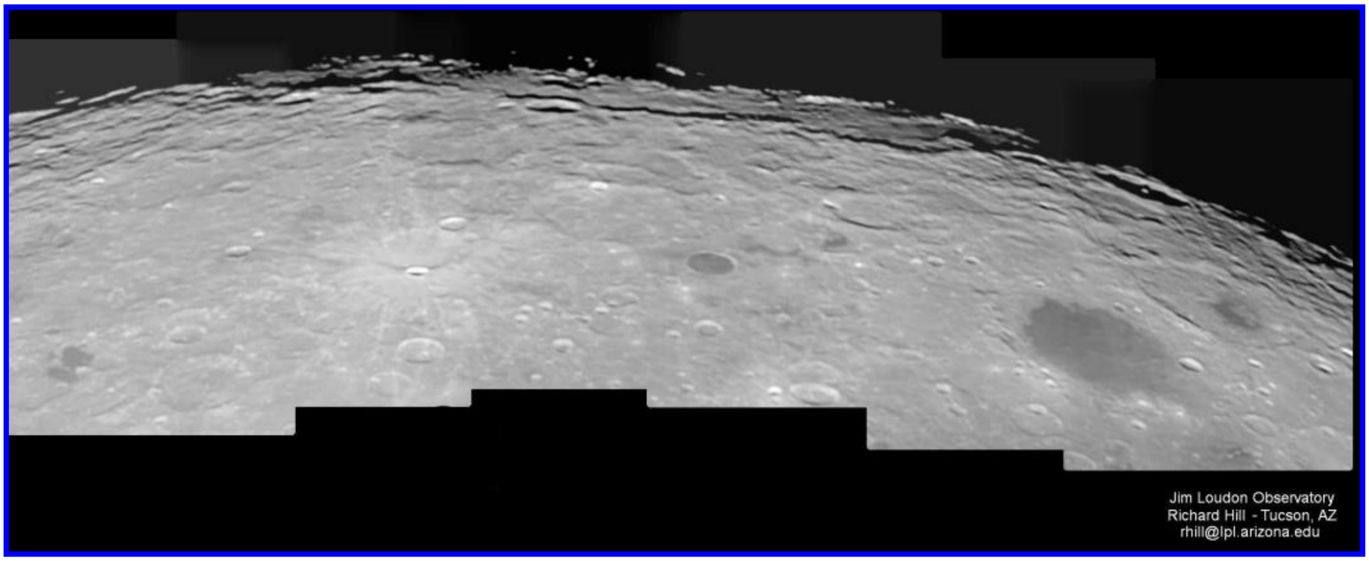
Crüger

Robert H. Hays, Jr.

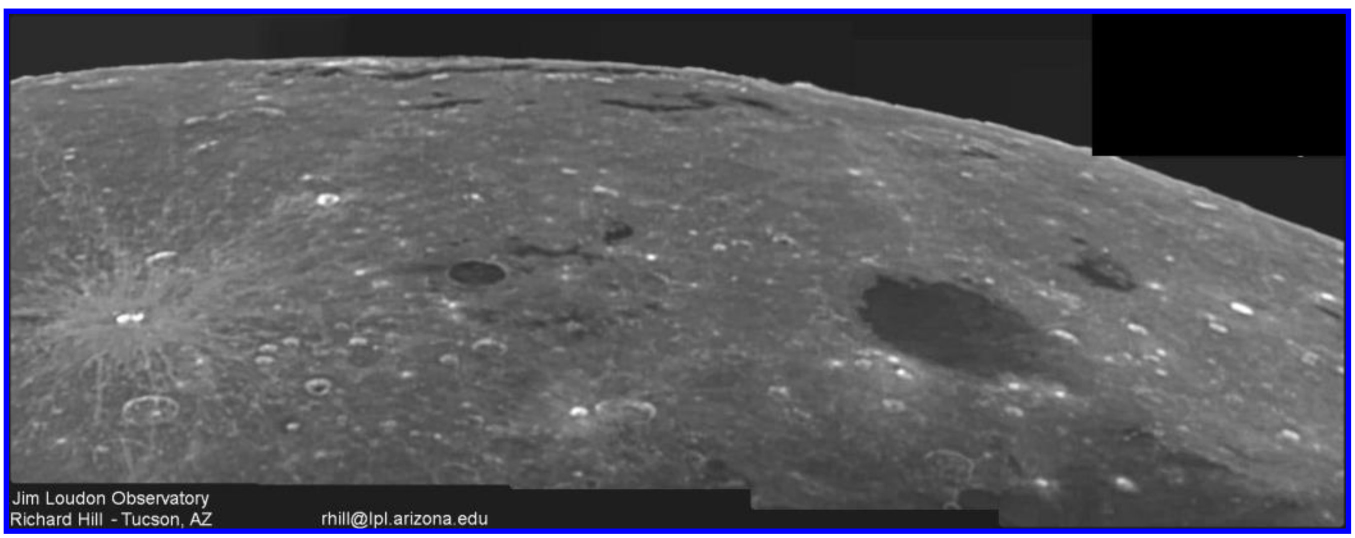
I drew this crater and vicinity on the night of September 7/9, 2014. The Moon was about 21 hours before full. This crater is to the south of Grimaldi. It is a shallow crater completely filled with mare material, though it is not near any of the lunar 'seas.' The northwest rim of Crüger is its highest, and there may be a tiny gap in its east rim. The north end of Crüger's interior is slightly darker than its south end. A short, curved ridge is outside the northwest rim of Crüger, but is not concentric with it. A short spur protrudes from its southeast rim, and what appears to be a shallow saucer is on Crüger's northeast side. Crüger E is the fairly large, deep crater southeast of Crüger, and Crüger H is south of E. A strip of dark shadow abuts the west sides of these craters. A dusky area east of Crüger appears to be a ghost ring. This feature's west rim (nearest to Crüger) has a narrow, nearly straight, dark shadow. Its other rims were very low or absent. This dusky area was quite well defined, however, and was tinted like the southern half of Crüger. Two hills lie between this ghost ring and Crüger E. The small craters Crüger G and BA are south and west of Crüger respectively. A slightly curved ridge extends northward from Crüger G. This ridge had lighter shadowing than the one northwest of Crüger. Some vague strips of shadow were north and south of Crüger. The one northwest of Crüger may be part of the ruined ring Rocca Q, according to the Lunar Quadrant map. This area appeared relatively smooth considering its proximity to the terminator. Some things noted in this area were bright ridges in dark shadow and what appears to be a broken crater.



***Crüger**, Robert H. Hays, Jr., Worth, Illinois, USA. 08 September 2014 04:22-05:12 UT. 15 cm reflector telescope, 70 x. Seeing 7/10, transparency 6/6. This first appeared in The Lunar Observer in December 2014.*



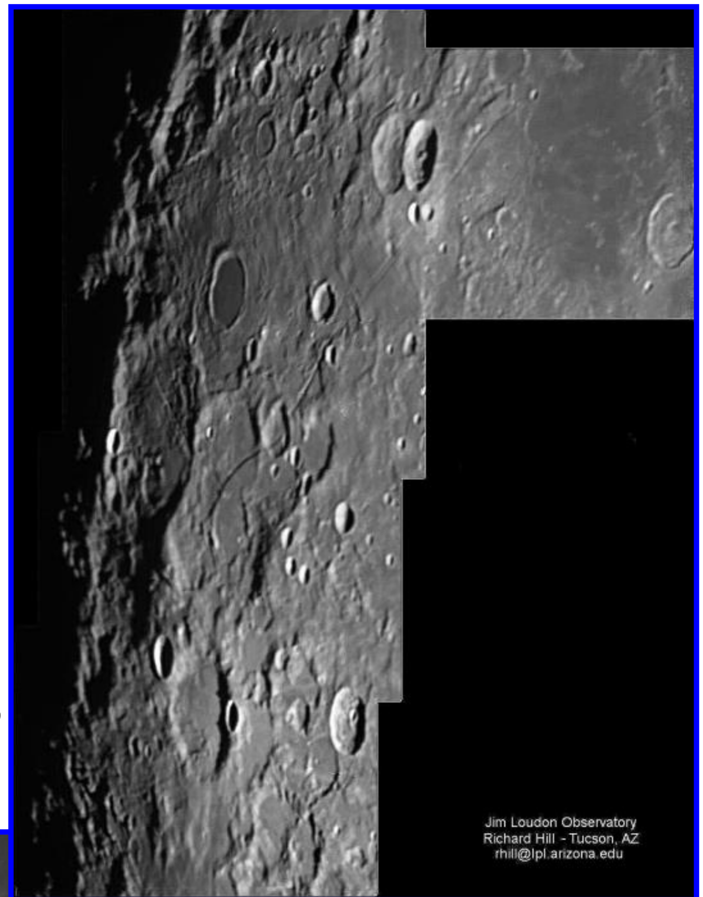
***Mare Orientale to Crüger**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 26 September 2007 05:30 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 1.6 x barlow, UV/IR block filter, SPC900NC camera. Seeing 6/10.*



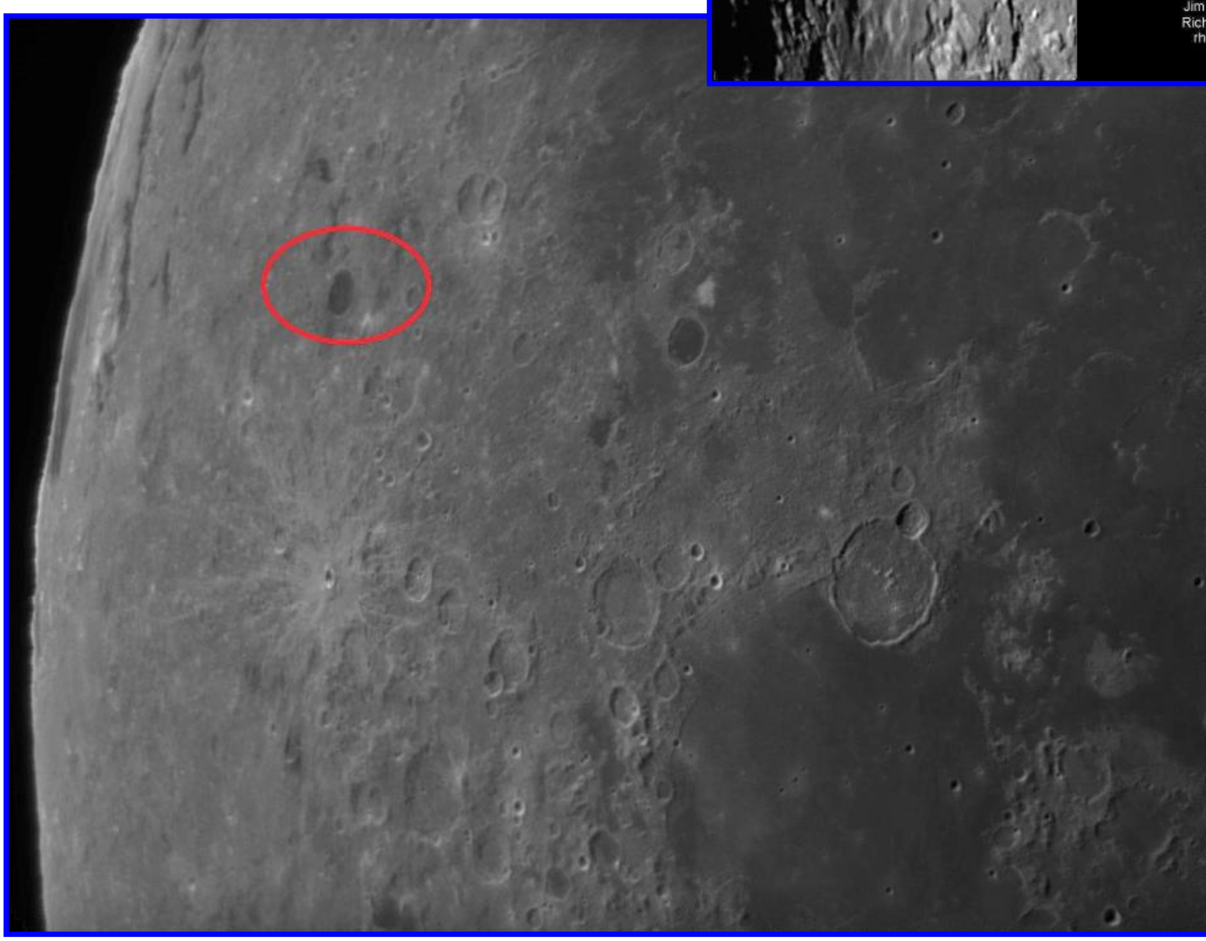
***Mare Orientale to Crüger**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 27 September 2007 05:358UT. Celestron 14 inch Schmidt-Cassegrain telescope, 1.6 x barlow, UV/IR block filter, SPC900NC camera.*

Focus –On Lunar 100, Number 52: Crüger

***Crüger**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 25 September 2007 04:01 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 1.6 x barlow, UV/IR block filter, SPC900NC camera. Seeing 7/10.*



***Crüger,** Alberto Anunziato, Oro Verde, Argentina, 30 April 2016 09:02 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, QHY5-ll camera.*



Focus –On Lunar 100, Number 52: Crüger

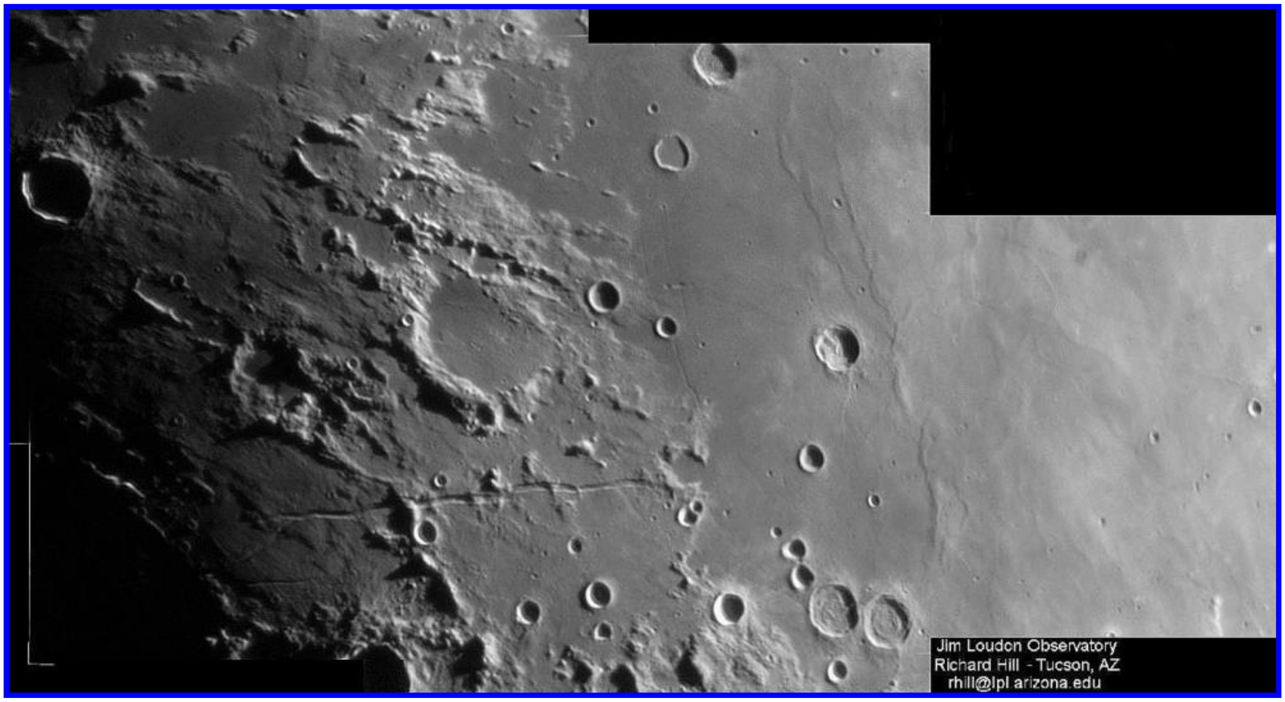
Crüger, *David Teske, Louisville, Mississippi, USA. 04 January 2021 11:07 UT, colongitude 156.3°. 180 mm Takahashi Mewlon Dall-Kirkham telescope, IR block filter, ZWO ASI 120 mms camera. Seeing 6/10.*

Crüger, *Francisco Alisa Cardinalli, Oro Verde, Argentina. 30 April 2016 08:57 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, QHY5-ll camera.*

Lunar 53: Lamont
Possible buried basin

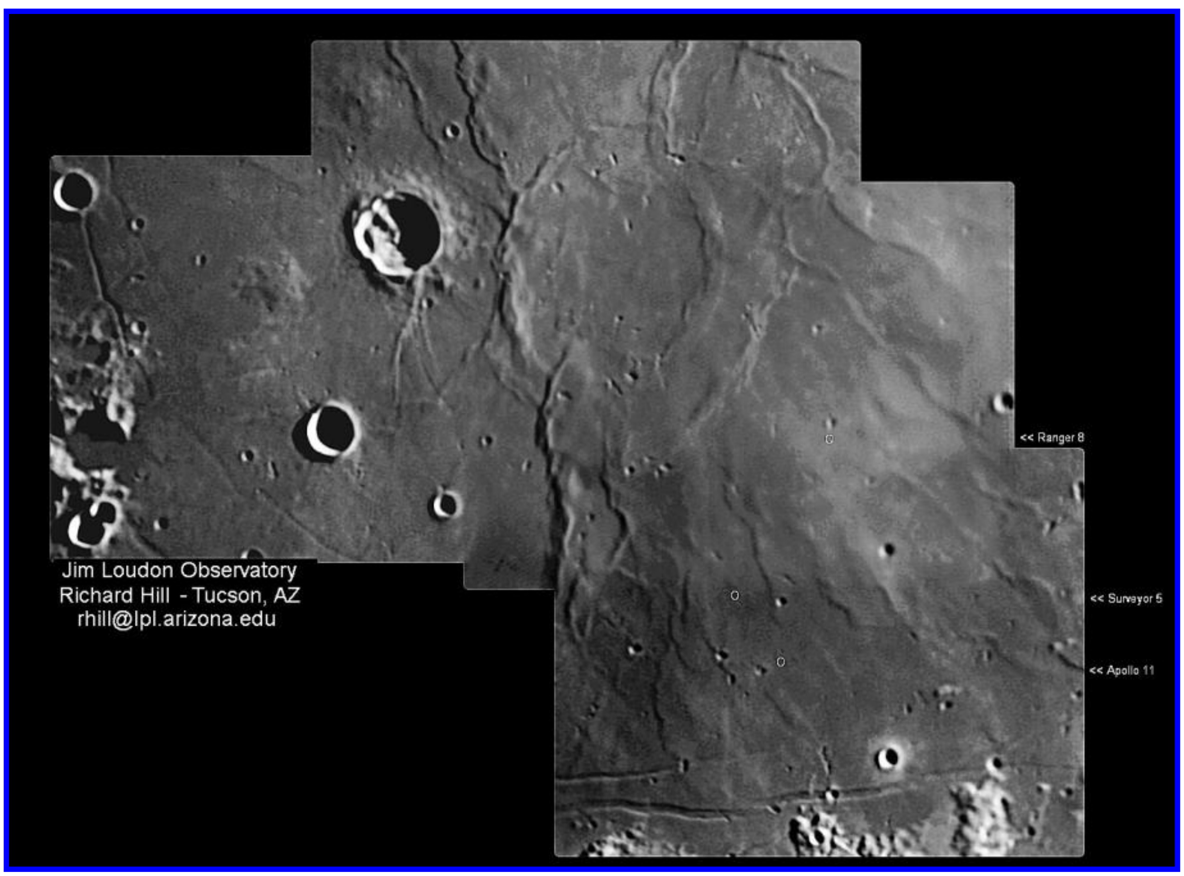
To the observer, Lamont looks like a ghost crater… when the illumination allow the different ridges that make up a pattern similar to a submerged impact crater to be distinguished. Is it just a pareidolia with the shape of a submerged impact crater? For Charles Wood (page 86) is "A buried mystery… it is a 75 km. wide oval ridge surrounded by a wrinkle-ridge ring approximately 135 km in diameter. Classical selenographers considered it an "imperfect ring" and generally ignored it. But when the Lunar Orbiter spacecraft circled the Moon, Lamont's position was found to correspond to a moderate size mascon". The mascons are associated with large craters or impact basins, so it seems that Lamont is a crater submerged by the lavas that form the Mare Tranquillitatis.

Lamont, *Michel Deconinck, Artignosc-sur-Verdon - Provence - France. 02 February 2021 05:00 UT. Mewlon 250/2500 Dall-Kirkham telescope, 13 mm Ethos eyepiece, 192 x.*



Rima Ariadaeus, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 28 April 2012 02:33 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, Wratten 23 filter, DMKAU04 camera. Seeing 7/10.*

Lamont, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 09 June 2008 03:31 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 2 x barlow, UV/IR block filter, SPC900NC camera. Seeing 8/10.*



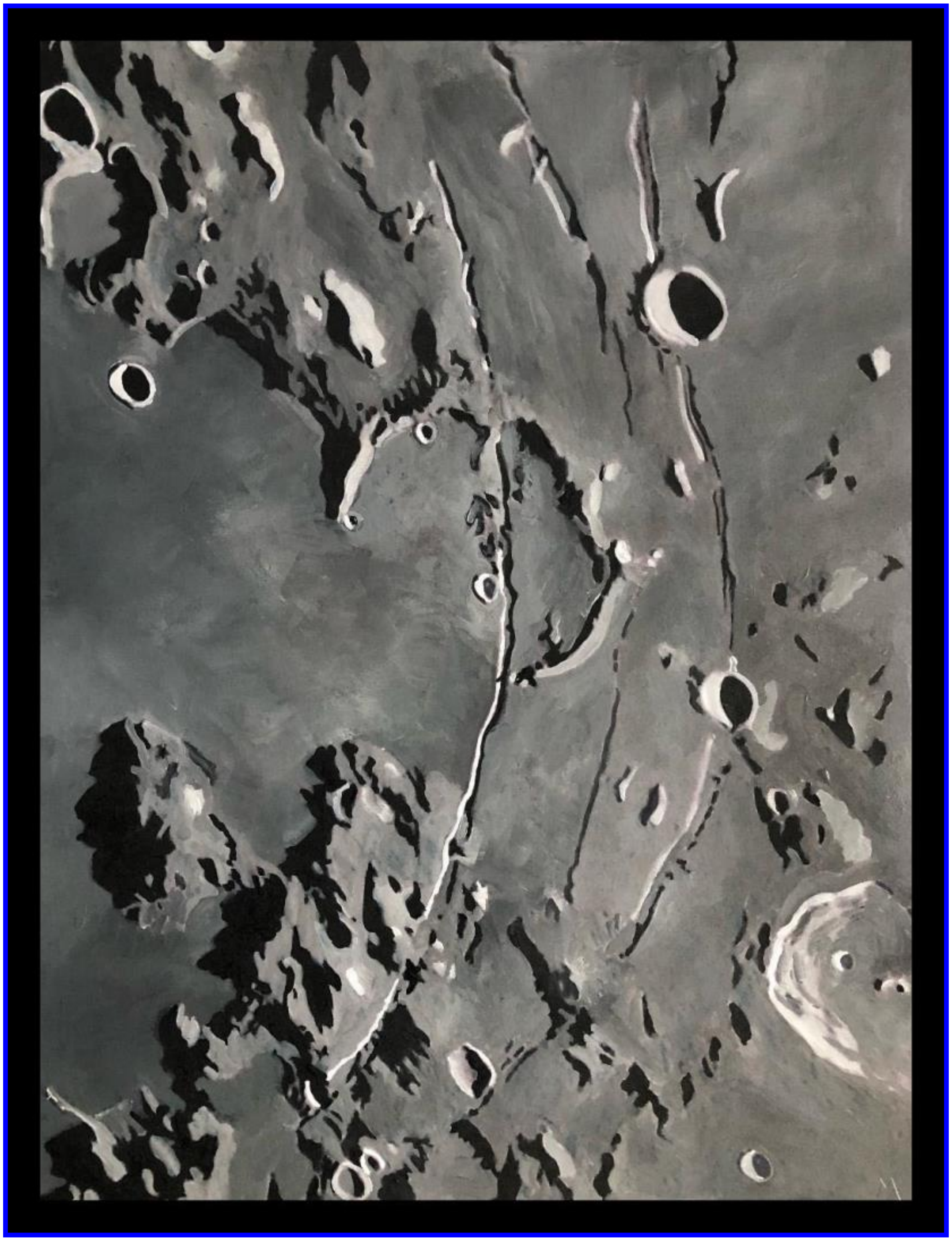
***Lamont**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 20 May 2010 02:46 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 2 x barlow, f/22, 656.3 nm filter, DKM21AU04 camera. Seeing 8/10.*

***Lamont,** Alberto Anunziato, Oro Verde, Argentina. 14 February 2020 02:53-03:10 UT. 105 mm Meade EX Maksutov-Cassegrain telescope, 154 x.*

Lunar 54 Hippalus Rilles
Rilles concentric to Humorum basin

Upon reaching number 54, we have seen a sinuous rille (Lunar 17 Schröter's Valley) linear rilles (L 24 Hyginus Rille, L29 Ariadaeus Rille, L 35 Triesnecker Rille) and an arcuate rille that runs parallel to the rim of a crater (L40 Rima Janssen). L 54 is also a system of arcuate rilles, but parallel to an impact basin, the Mare Humorum. They look like three parallel roads abandoned eons ago. "Low light angles clearly show three arcuate rilles just east of Humorum and obviously related to it. Each of the curving rilles between Hippalus and Campanus is 3.0 to 3.5 km wide and roughly 200 km long- there are no troughs of this size on Earth. These arcuate rilles formed by the extension or stretching of the crustal rocks as the center of the Humorum basin subsided, probably due to loading from the weight of early EHB (East Humorum Basalt) and WHB (West Humorum Basalt) lava flows" (page 156).

Mare Humorum, *Fabio Verza, Milan, Italy, 24 January 2021 20:46 UT. Celestron CPC800 Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik IR 807 nm filter, ZWO ASI 290 mm camera.*

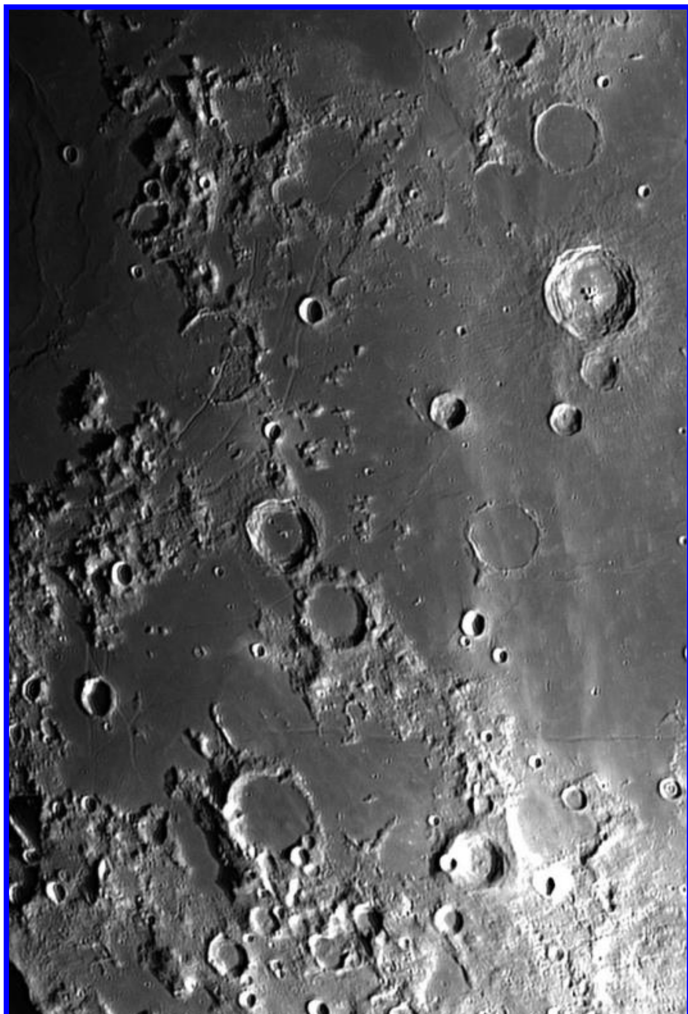


Rima Hippalus and its Neighborhood*, Daniel Marcus, Plainville, Vermont, USA. Daniel writes:*

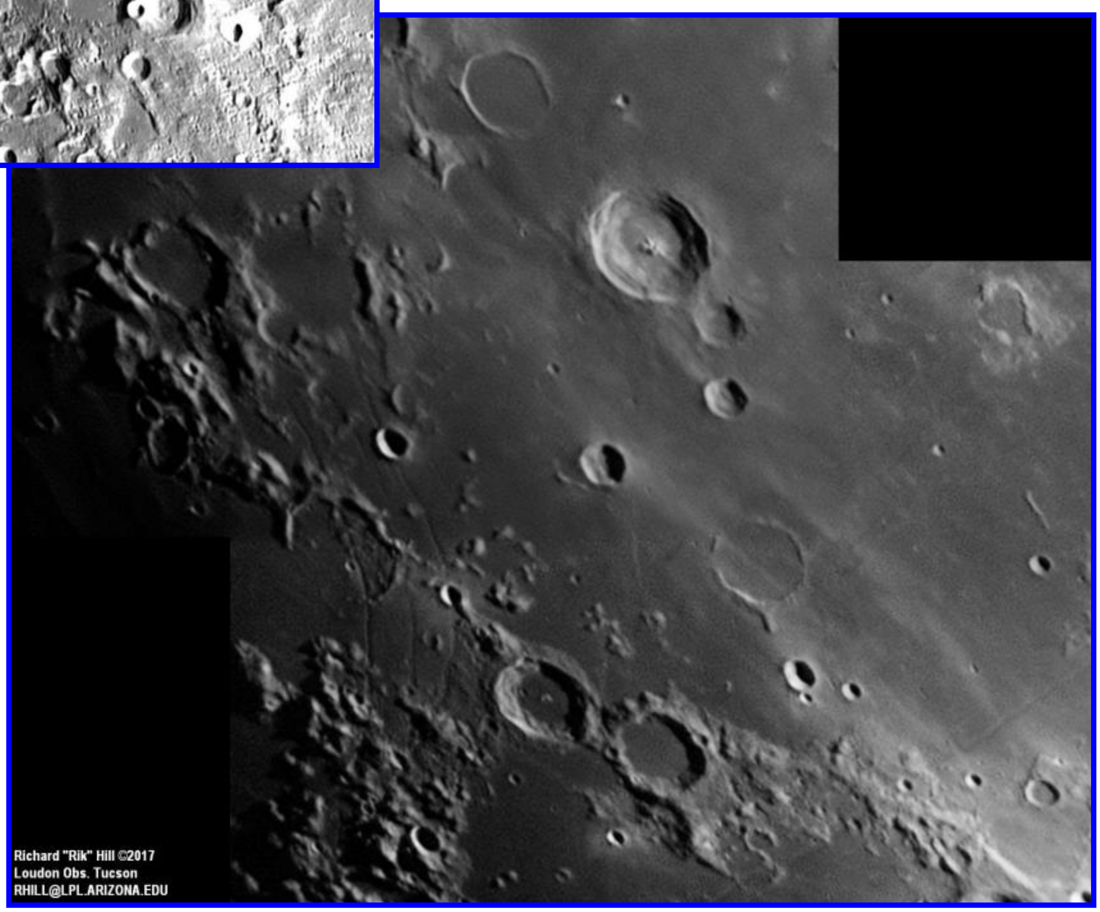
A network of striking concentric arcuate rilles on the eastern shore of Mare Humorum. These graben rilles run roughly 200km northeast to southwest. Rille I cuts across the floor of the flooded Imbrium-age crater Hippalus. Rille III passes to the west of Campanus. Promontorium Kelvin is a jumbled mass of low peaks and craters, attached to Rupes Kelvin by a narrow mountain ridge. The breached and flooded crater Lowry lies to the northwest. This is a beautiful and fascinating area of the lunar landscape, ever changing as the light moves across the surface....

Rimae Hippalus and its Neighborhood. Acrylic on paper, 8 x 10 1/2”.
Based on observations of the 8-day moon. 8” Meade LX90 SCT. 154 & 227x.

Focus –On Lunar 100, Number 54: Hippalus Rilles

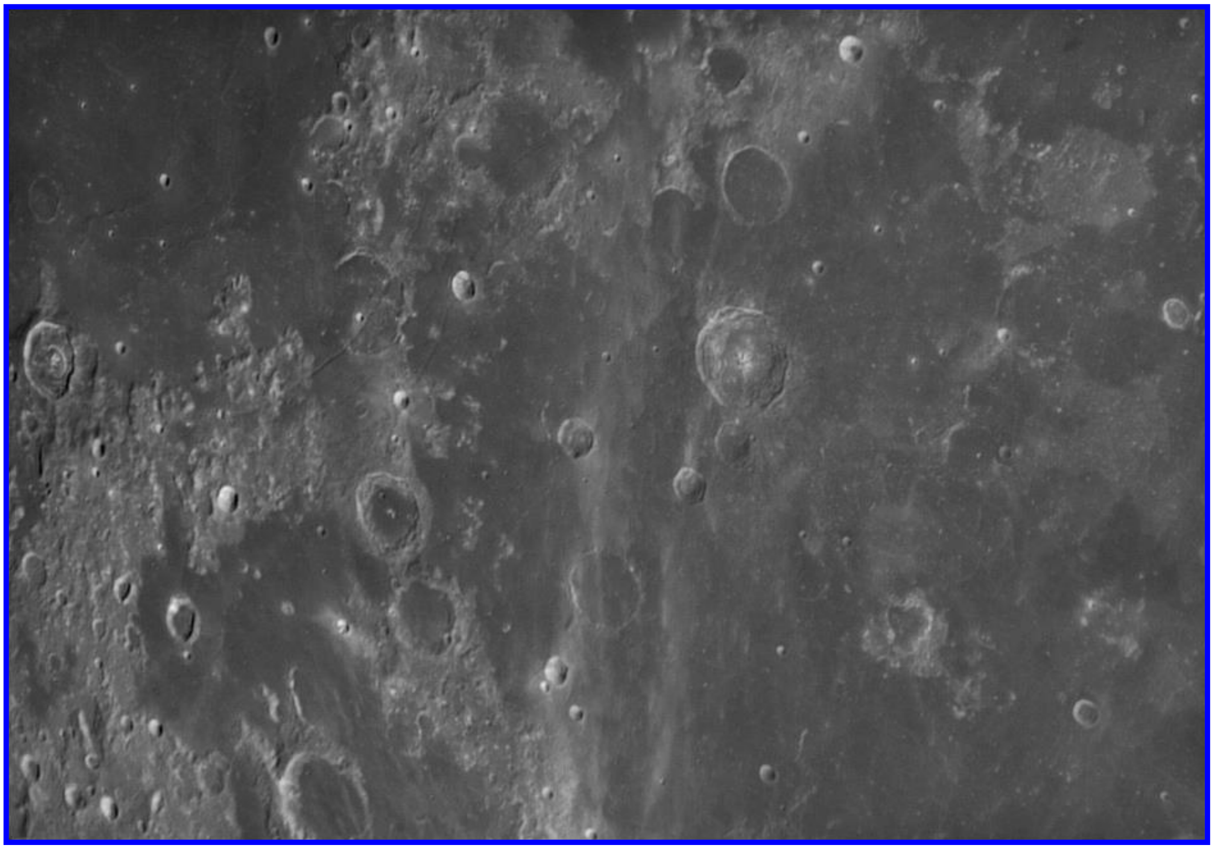


Hippalus Rilles, *Marcelo Mojica Gundlach, Cochabamba, Bolivia. 03 April 2020 23:30 UT. Skywatcher 6 inch f/15 Maksutov-Cassegrain telescope, ZWO ASI 178 b/w camera.*



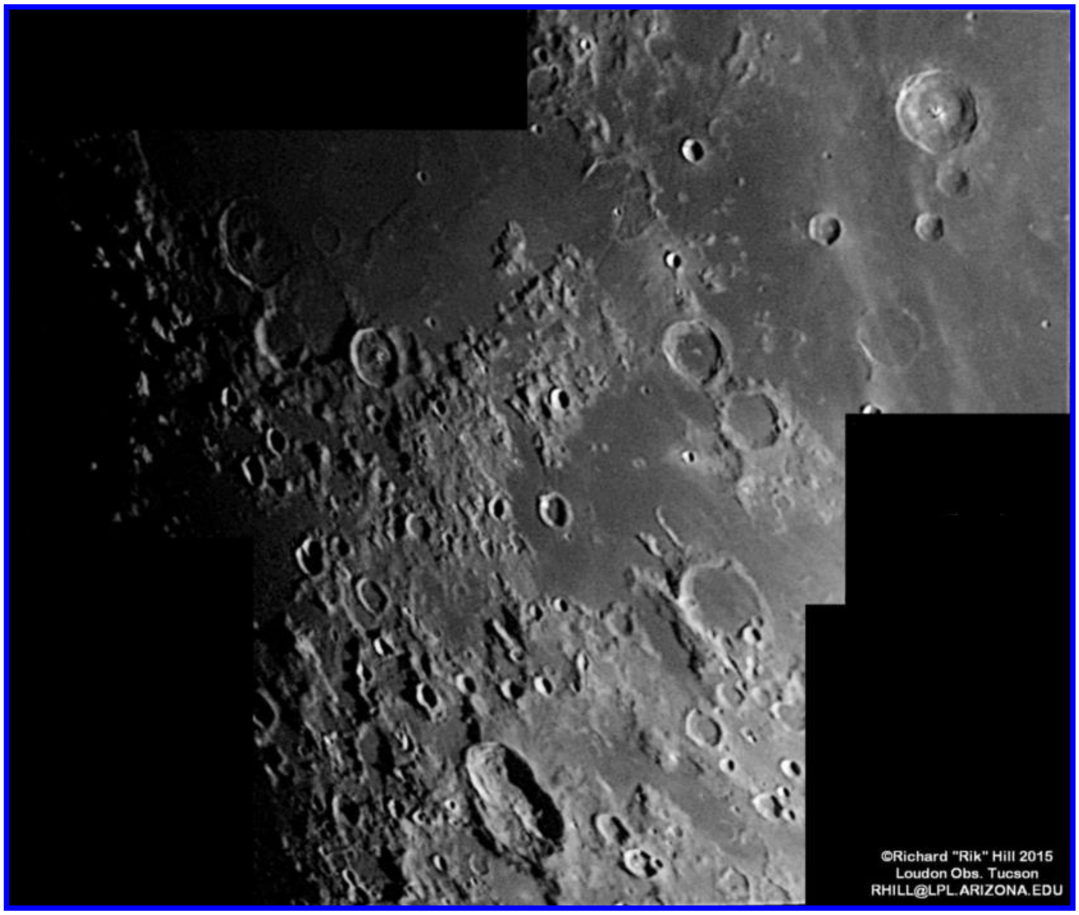
Bullialdus*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 08 April 2017 04:03 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 665 nm filter, Skyris 445M camera. Seeing 7/10.*

***Bullialdus to Gassendi**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 04 April 2020 03:57 UT, colongitude 41.7^o. Dynamax 6 inch Schmidt-Cassegrain telescope, 2x barlow, 665 nm filter, Skyris 445M camera. Seeing 7-8/10.*



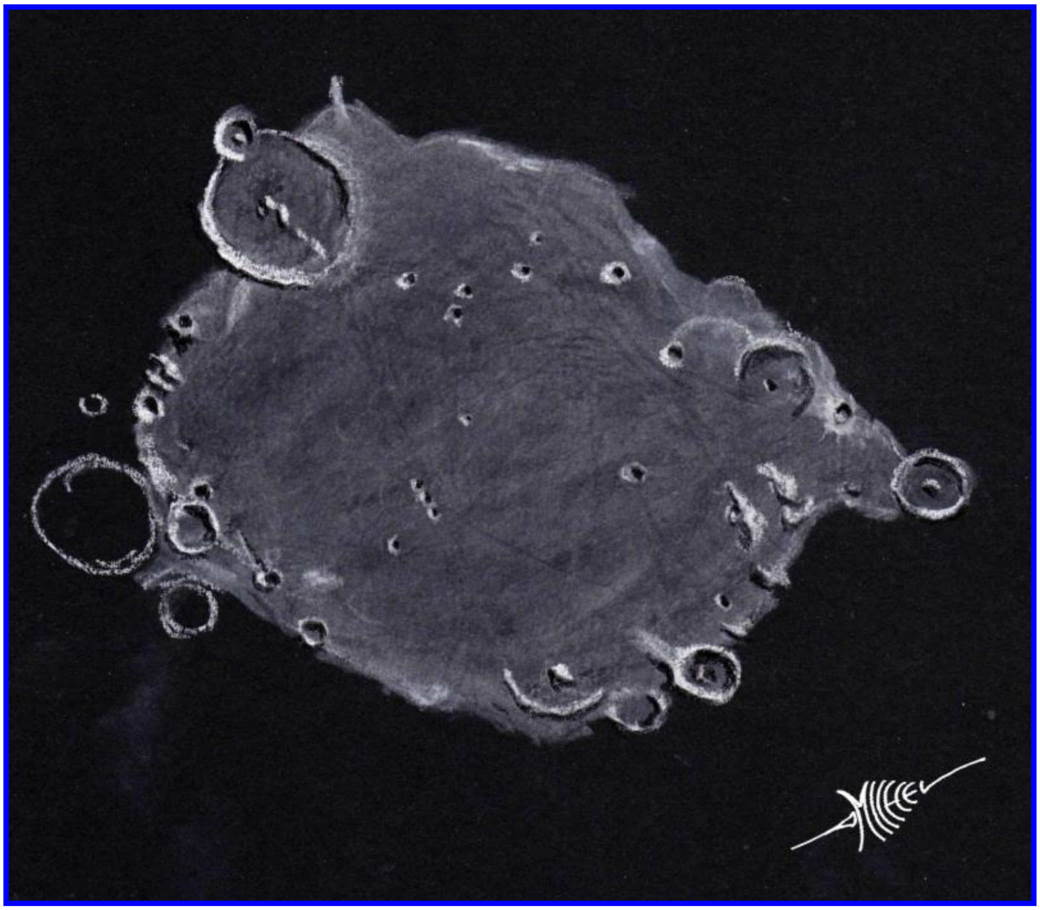
***Rima Hippalus,** Luis Francisco Alisa Cardinalli, Oro Verde, Argentina. 12 December 2016 00:30 UT. Meade Starfinder 8 inch reflector telescope, Astronomik Pro-Planet 742 nm IR pass filter.*

Focus –On Lunar 100, Number 54: Hippalus Rilles



Palus Epidemiarum, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 24 October 2015 02:51 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 7/10.*

Focus –On Lunar 100, Number 54: Hippalus Rilles

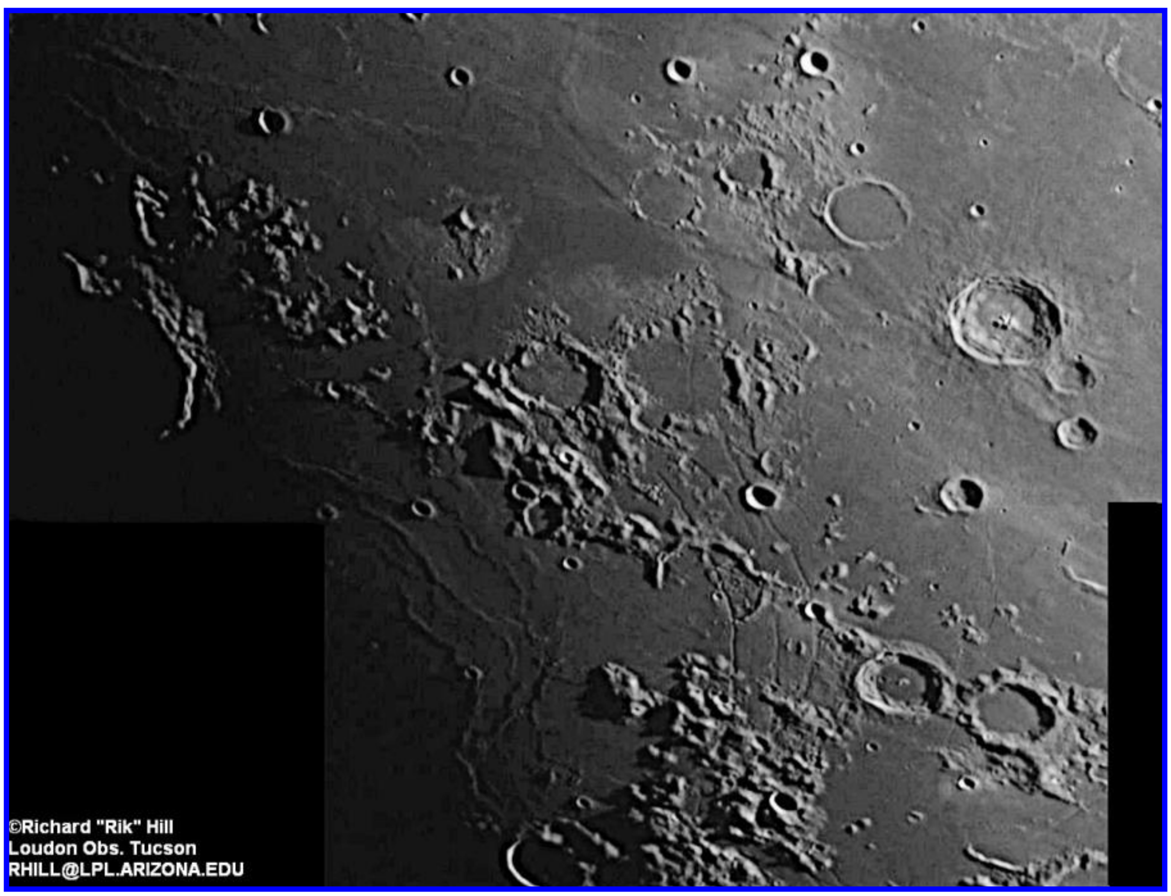


Hippalus Rilles, *Michel Deconinck, Artignosc-sur-Verdon - Provence - France. 18 March 2019 19:30 UT. Mewlon 250/2500 Dall-Kirkham telescope, 13 mm Ethos eyepiece, 192 x.*

Vitello*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 09 March 2017 04:29 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 8/10.*

Focus –On Lunar 100, Number 54: Hippalus Rilles

***Bullialdus**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 26 October 2012 04:02 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, DMK21AU04 camera. Seeing 8/10.*

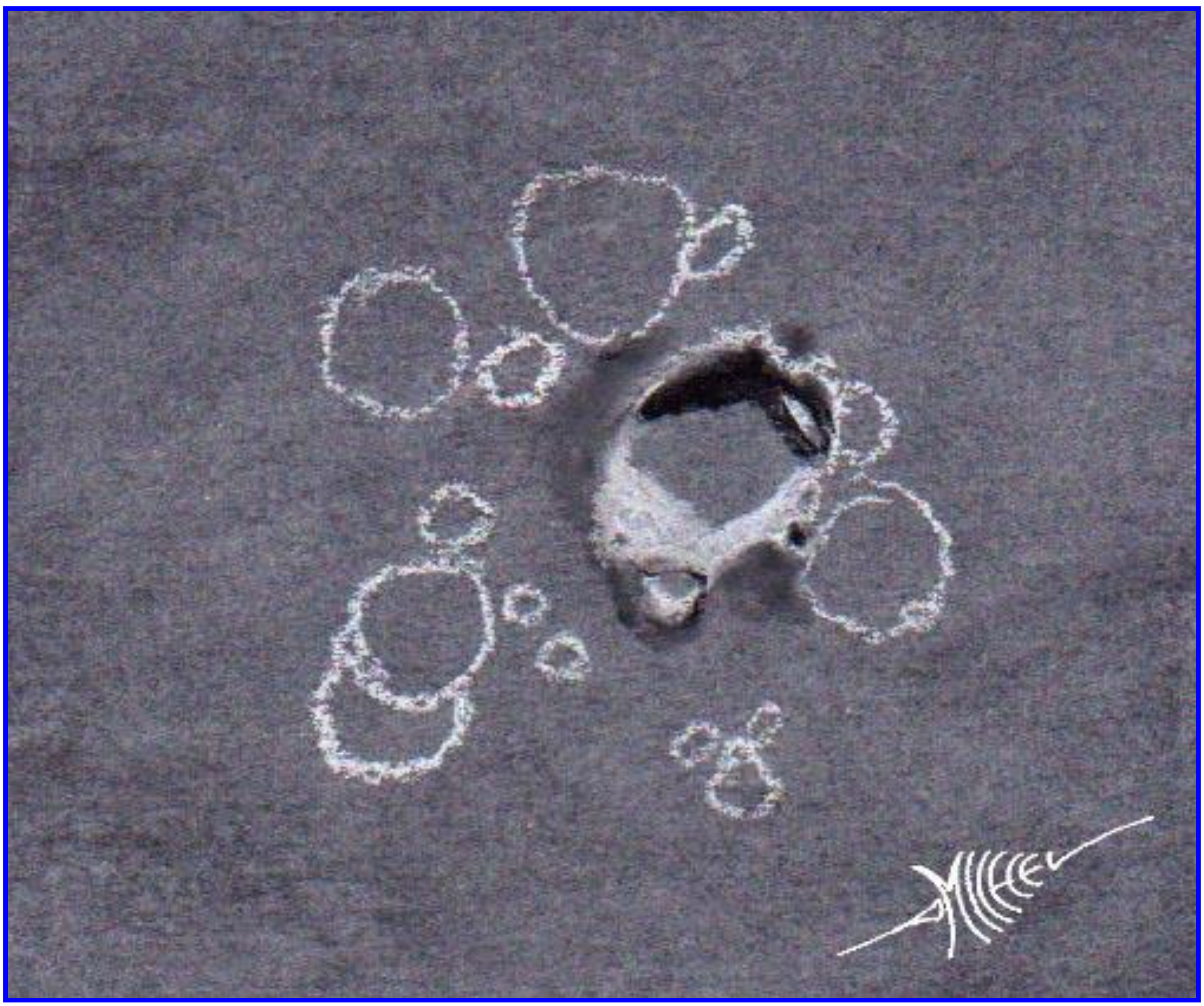


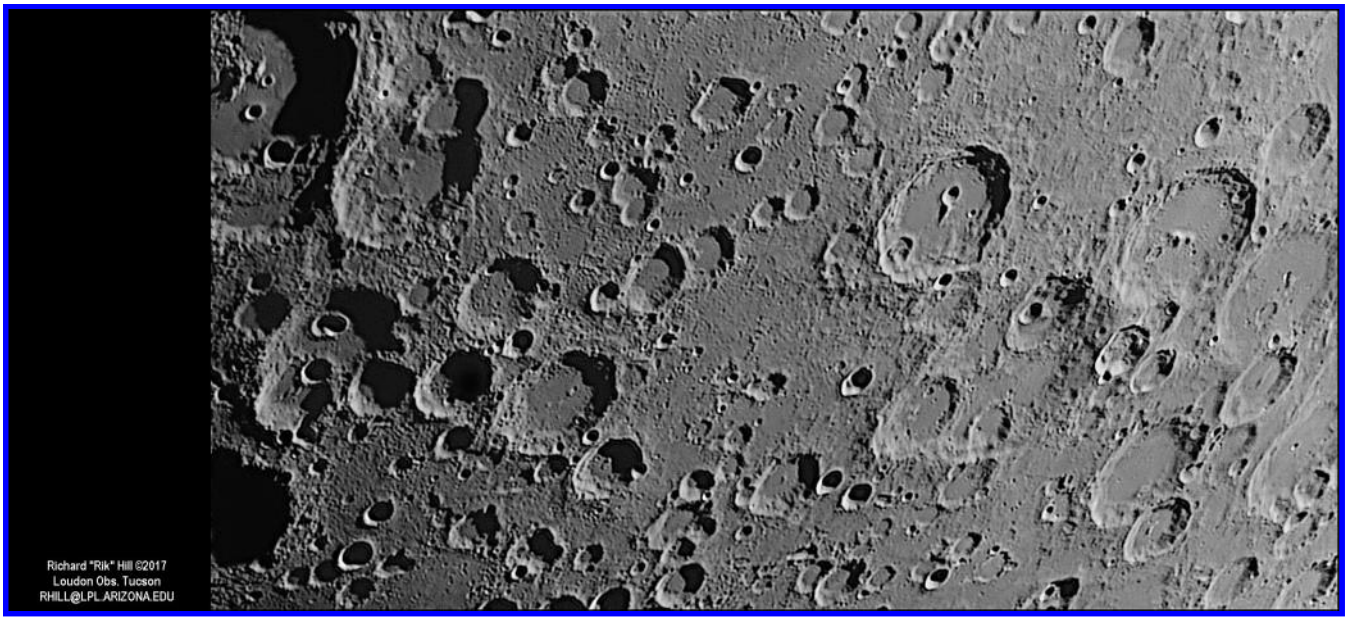
***Rimae Hippalus**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 10 May 2014 02:14 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 8/10.*

Lunar 55: Baco
Unusually smooth crater floor and surrounding plains

Wood does not refer to this crater in the book we analyzed, but its inclusion in Lunar 100 seems to refer to the fact that in the "overall monotony of this stretch of the highland moon" (the southeast quadrant) there is a geological enigma: the "bright intercrater plains (…) Are these ancient plains the remains of the Moon's original crust that floated to the Surface during the magma-ocean stage 4.5 billion years ago? Or are they light-hued lava flows that predate the mare? (…) We still don't know what they are made of. I believe that some of the smooth highland plains, and specially the smooth floor of most of the craters in the cratered highlands, may be old volcanic lava flows" (pages 128/129). Baco is the example of smooth crater floor from the southeast quadrant that Wood chose for number 55 on his list.

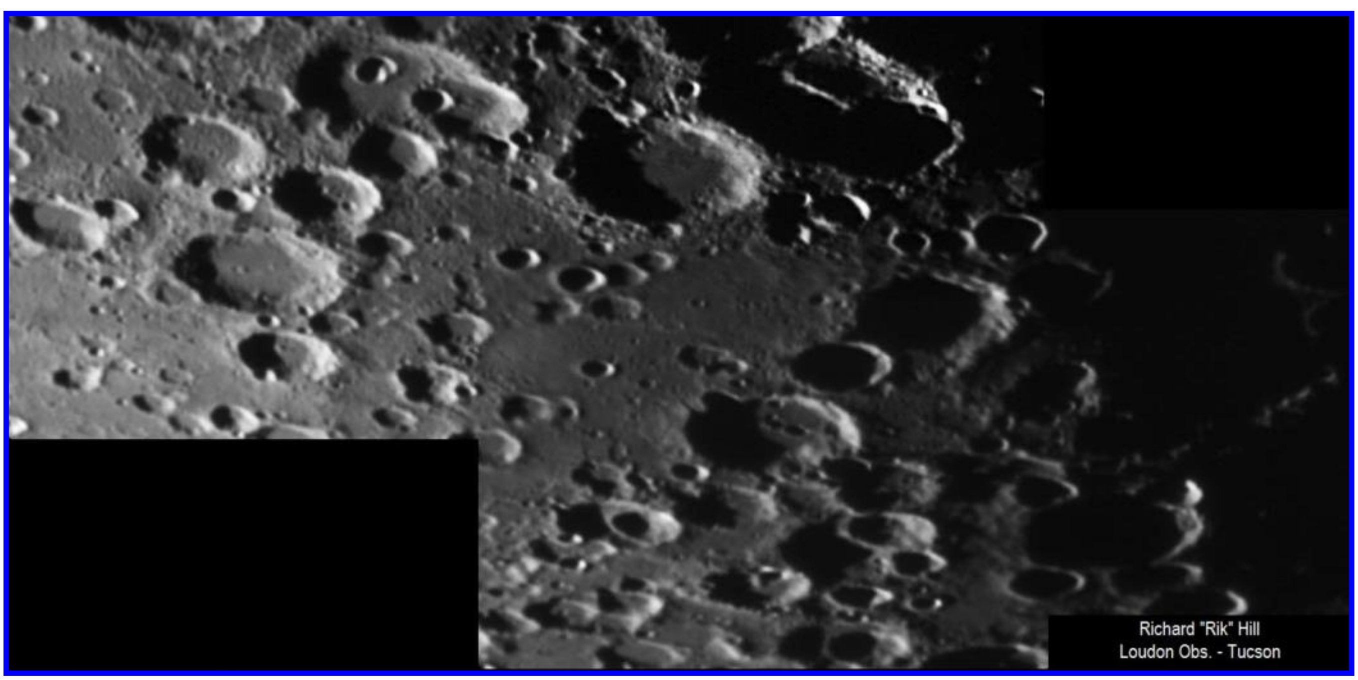
Baco, *Michel Deconinck, Artignosc-sur-Verdon - Provence - France. 02 February 2021 05:30 UT. Mewlon 250/2500 Dall-Kirkham telescope, 13 mm Ethos eyepiece, 192 x.*

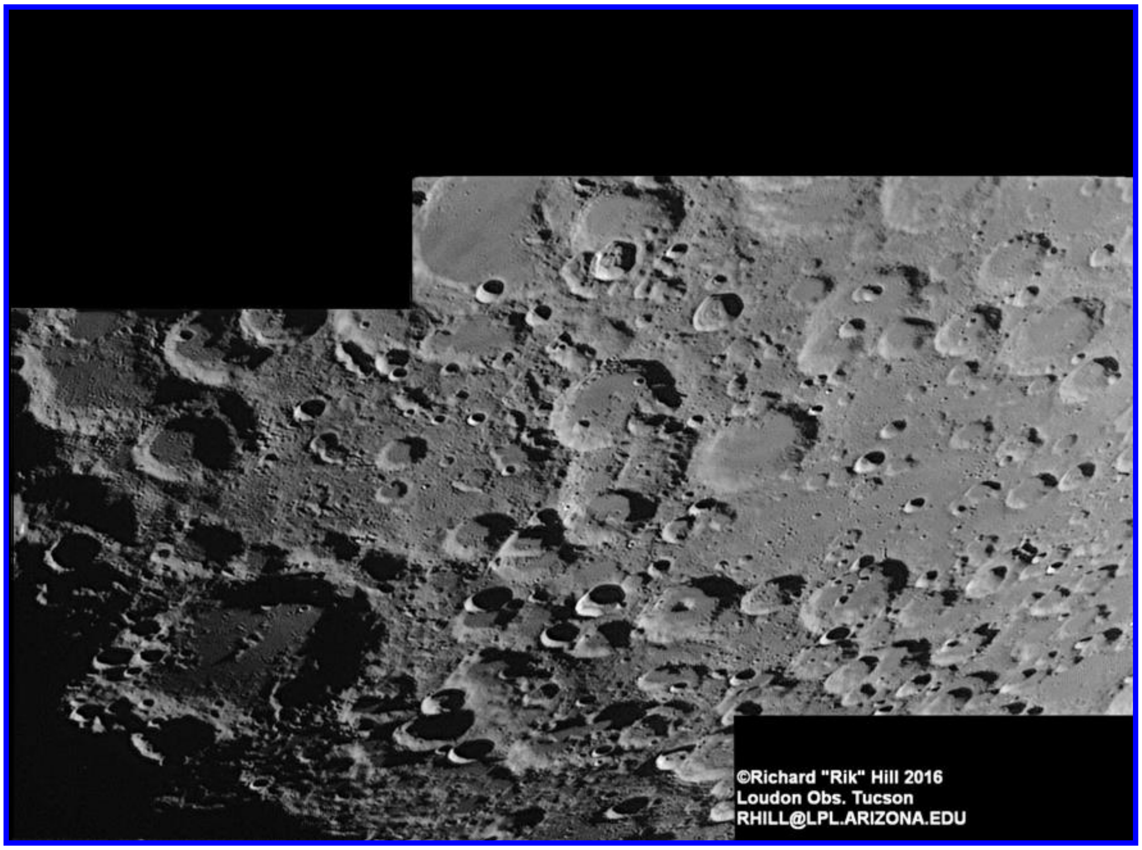




***Pitiscus**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 01 July 2017 02:35 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 8/10.*

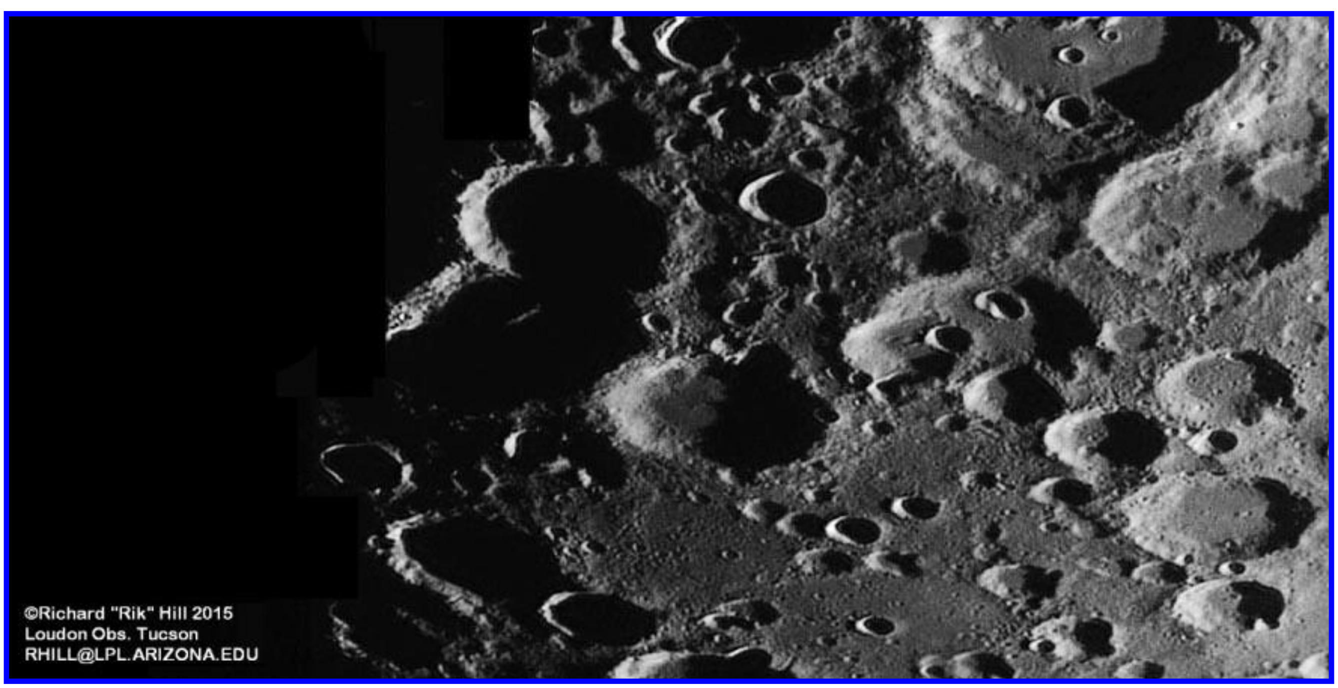
***Baco to Heraclitus**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 17 November 2007 01:26 UT. Celestron 14 inch Schmidt-Cassegrain telescope, UV/IR block filter, SPC900NC camera. Seeing 710.*

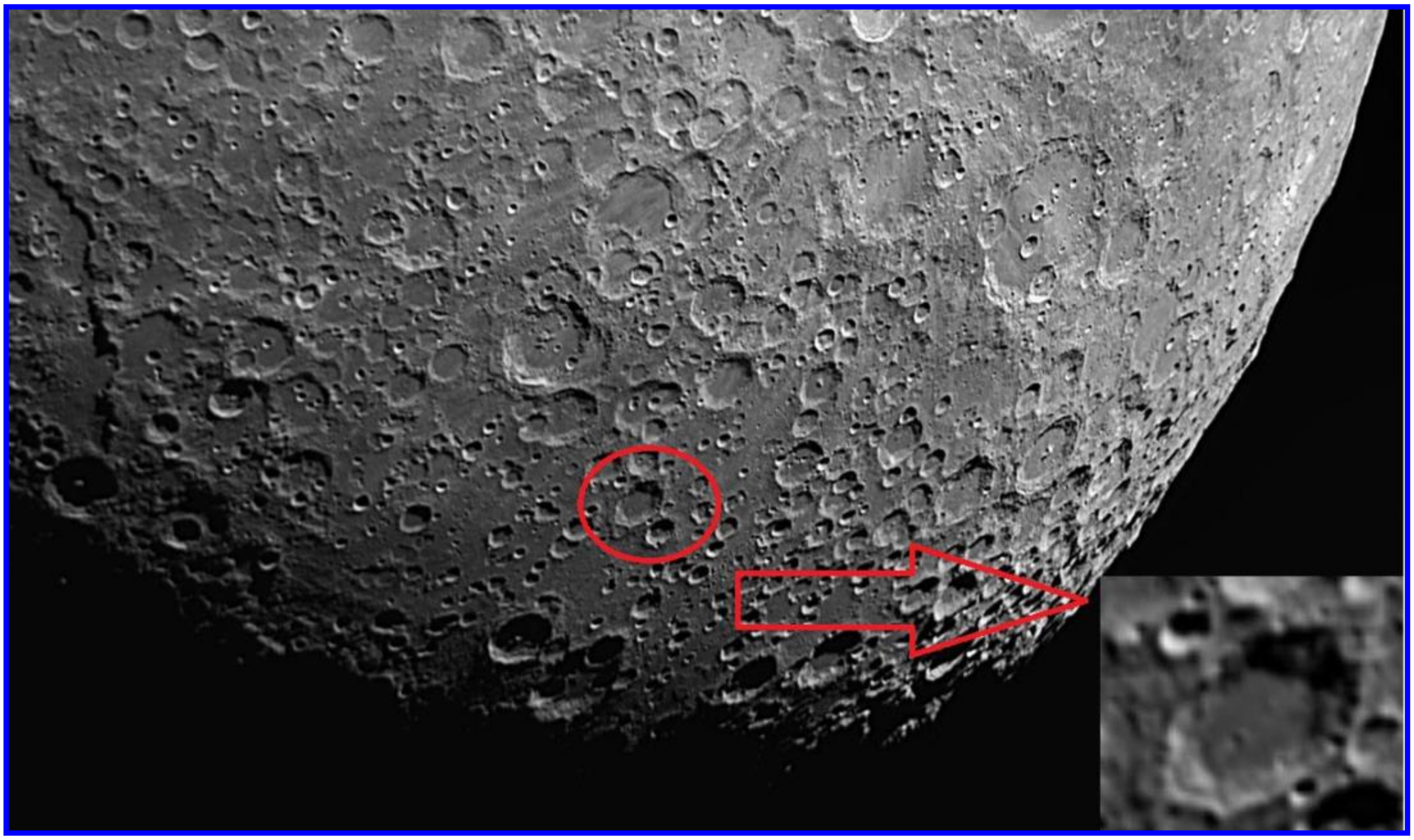




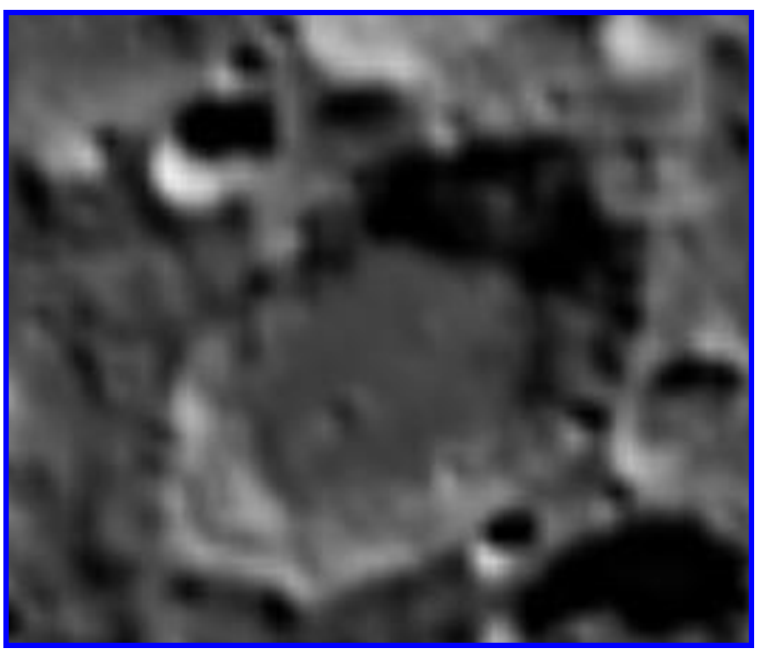
Heraclitus, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 17 March 2016 02:30 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 8-9/10.*

Heraclitus to Baco, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 26 February 2015 02:21 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 8/10.*





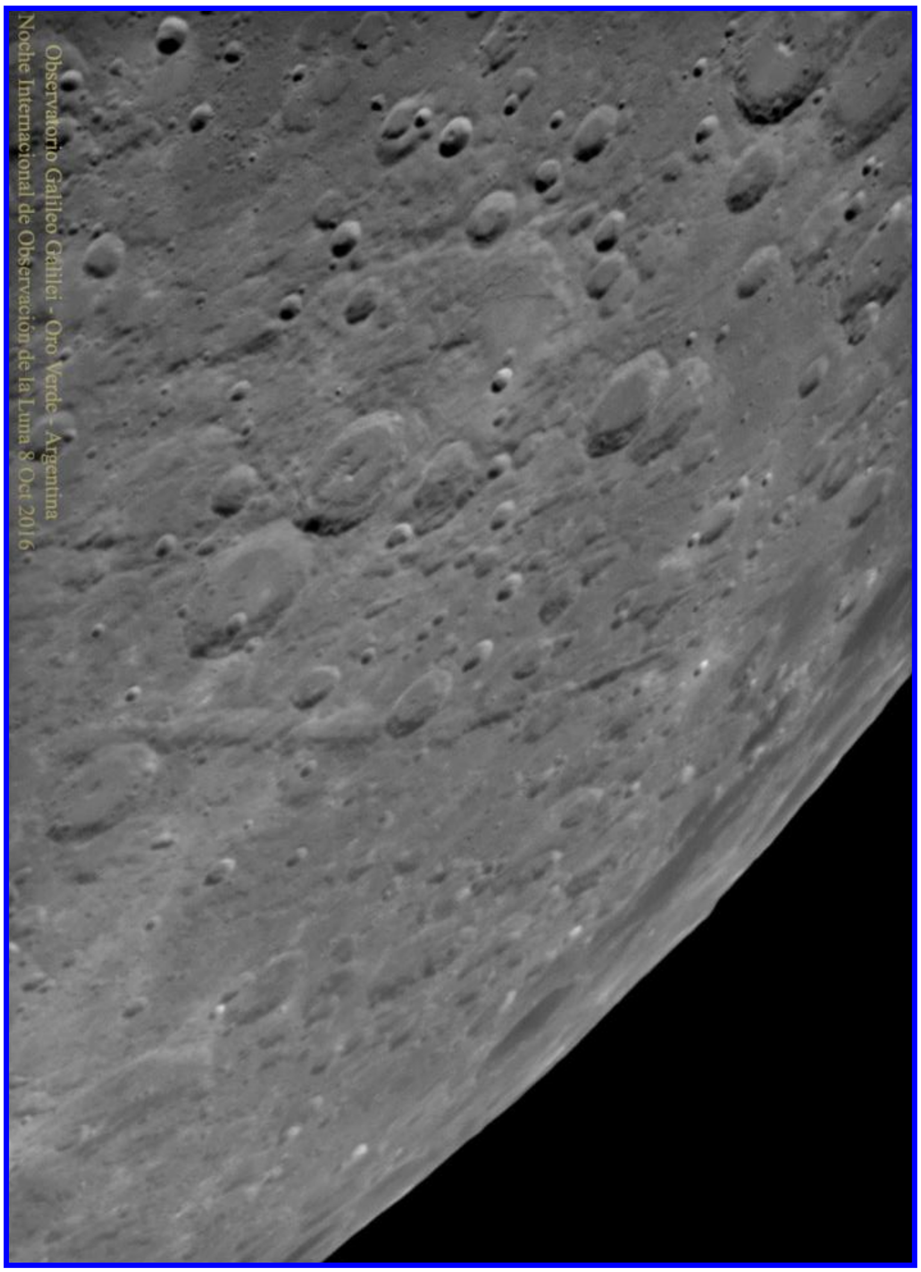
Baco, *Sergio Babino, Montevideo, Uruguay. 14 March 2020 01:37 UT. 203 mm. catadrioptic telescope, ZWO ASI 174 camera. Detail below.*



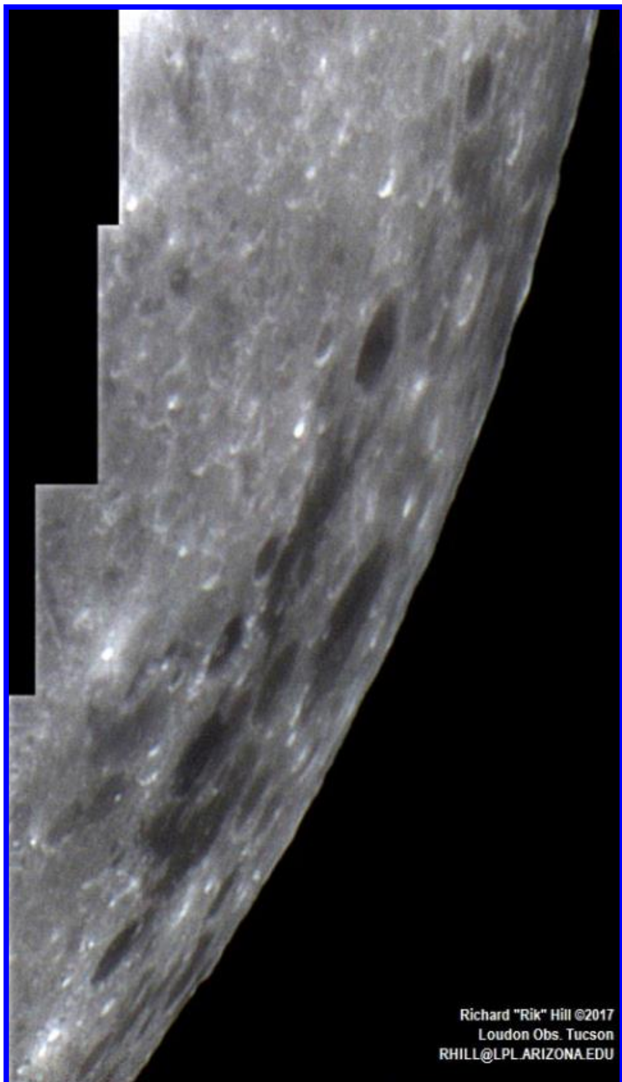
Lunar 56: Australe basin
A partially flooded ancient basin

The true nature of the Australe basin was elucidated by the Lunar Orbiter mission in the 1960s: a 997 km diameter impact basin very old, impossible to recognize, since it is partly on the near side and partly on the dark side and it was also almost completely destroyed by impacts before it was flooded, what was left of it, by the lava that formed this Mare Australe so difficult to recognize, and to observe when the libration is not favorable. “Australe provides a model of how the most ancient basins would be battered beyond recognition unless their low spots were later filled by Mare Lavas” (page 104).

Mare Australe, *César Fornari, Oro Verde, Argentina. 09 October 2016 01:28 UT. Celestron 11 inch Edge HD Schmidt-Cassegrain telescope, Astronomik ProPlanet 742 nm IR pass filter, QHY5-ll camera.*

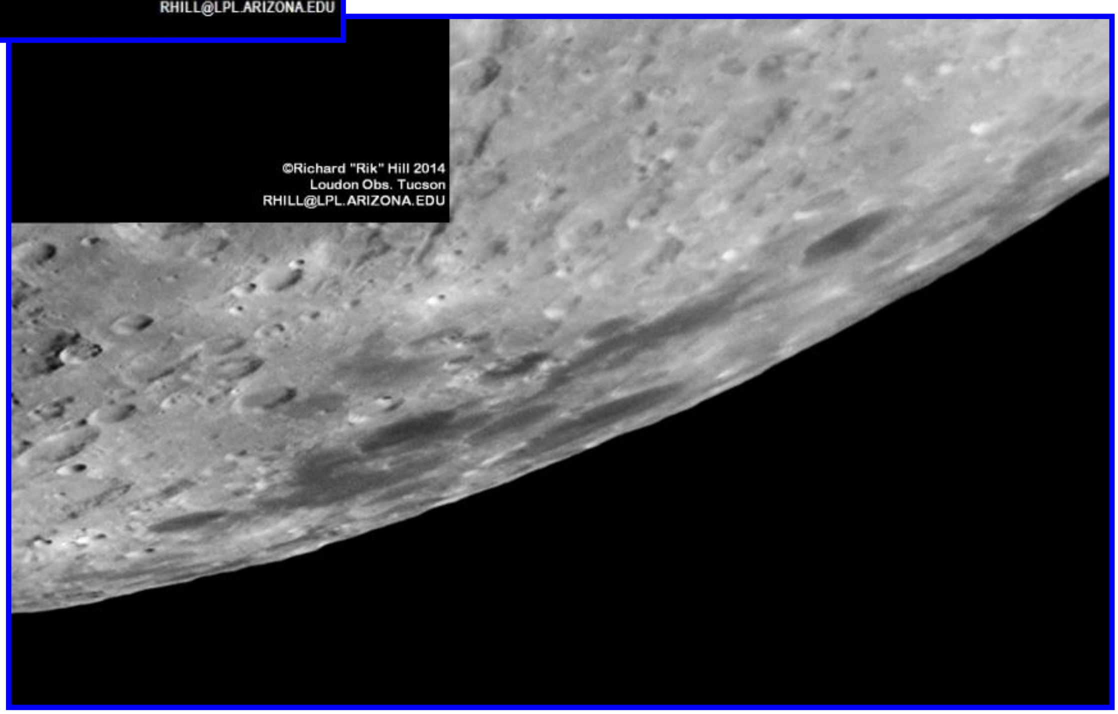


Focus –On Lunar 100, Number 56: Australe Basin



Mare Australe, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 04 June 2017 02:57 UT. 3.5 inch Questar f/14.4 Maksutov-Cassegrain telescope, UV/IR block filter, NexImageb10 camera. Seeing 6-7/10.*

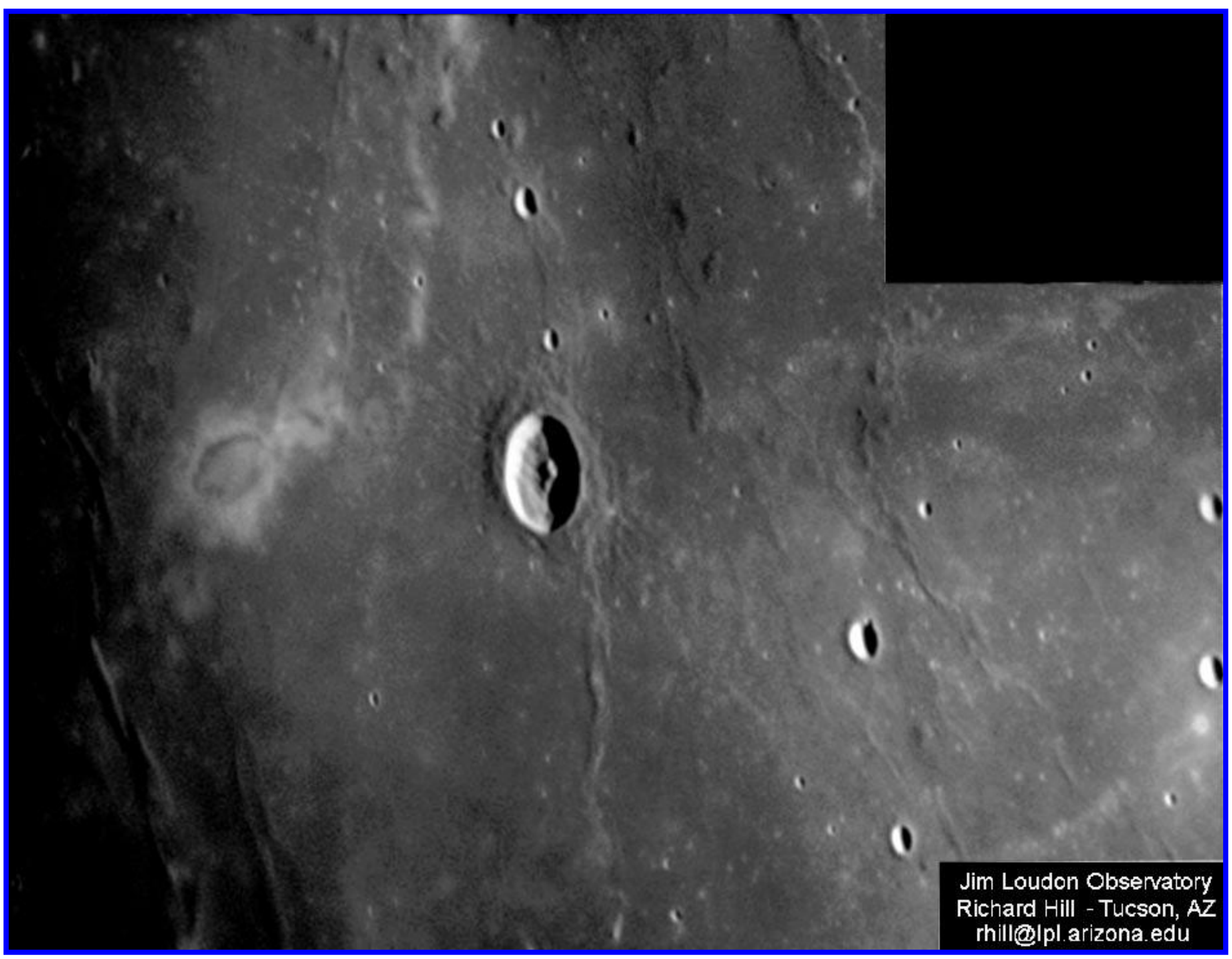
Mare Australe, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 29 November 2014 23:57 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 8/10.*



Lunar 57: Reiner Gamma
Conspicuous swirl and magnetic anomaly

Without a doubt, one of the most fascinating lunar features. It is easily visible with medium-sized telescopes, but also at low magnification it is easily mistaken for a crater with bright walls, except that it does not cast shadows or present relief, as if it were a crater painted on the surface. There are other lunar swirls, but Lunar 57 is the only one visible to us. The swirls of Mare Marginis (Lunar 100) and Mare Ingenii had to be discovered in lunar orbit, because they are on the far side. This is how Wood refers to this mystery (page 171): “Thirty years after the Apollo missions there still is no compelling explanation for Reiner Gamma and the other swirls, but there are some interesting ones. Peter Schultz and Lynn Srnka of the Lunar and Planetary Institute in Houston, Texas, proposed that the splotches and magnetic anomalies were the result of cometary impacts. But if the speculative and complex hypothesis is correct, why aren’t there bright swirls all over the Moon? Various studies have shown that impacts from comets should be just as common as those from asteroids. An alternative theory for splotches came from Lonnie Hood and his colleagues. They noticed that most of the areas with unusual magnetic fields and bright swirls are located on exactly the opposite side of the Moon from the most recent impacts… But now for the “oops factor”-Reiner Gamma, the best know swirl, is not antipodal to any impact basin! So how do we explain its magcon? We can’t. Reluctantly, we must leave Reiner Gamma with Elger’s summary description: “ill-defined White spots of doubtful nature”

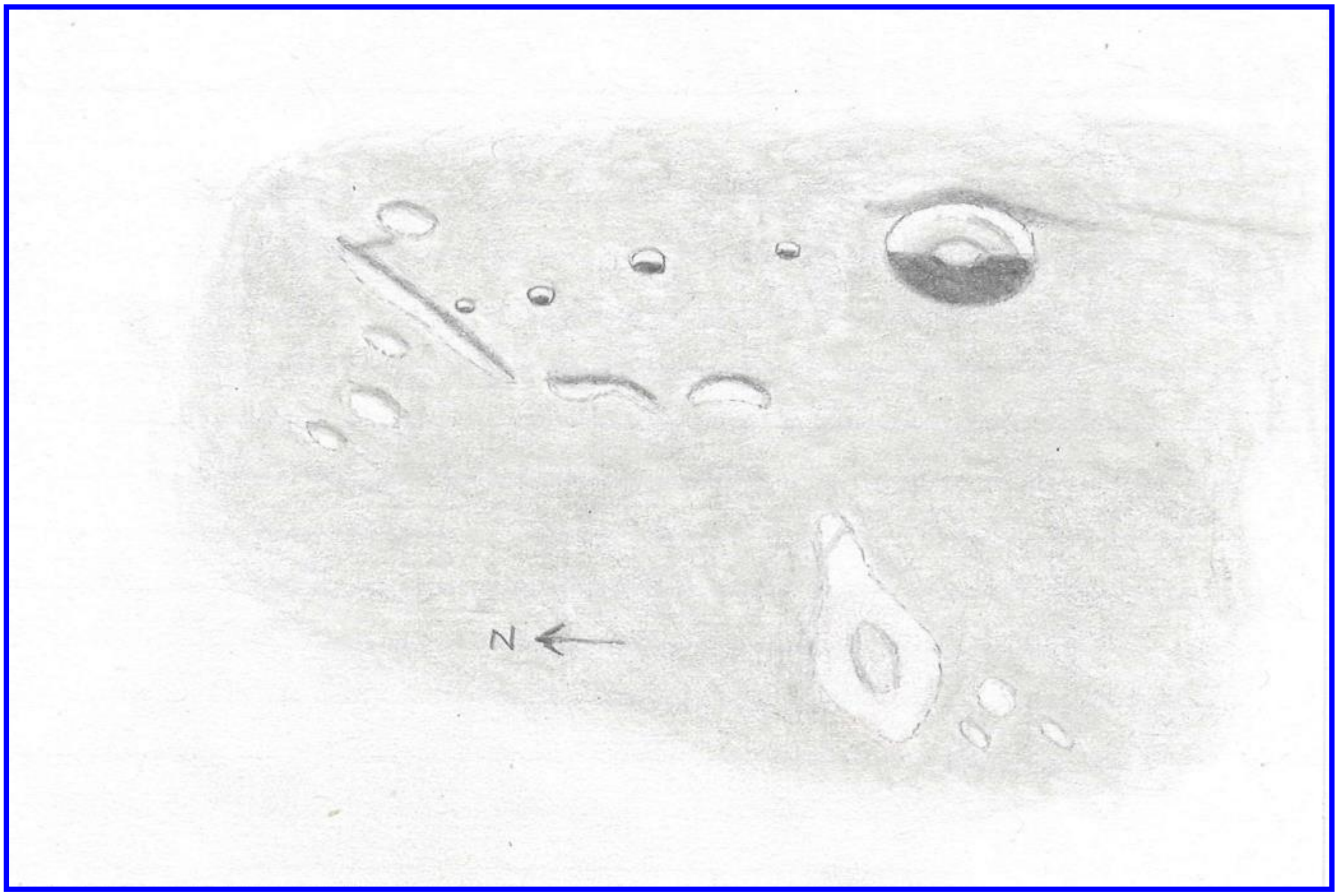
Reiner Gamma*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 02 February 2011 04:49 UT. Celestron 14 inch Schmidt-Cassegrain telescope, UV/IR block filter, DMK21AU04 camera. Seeing 7/10.*



Reiner and Reiner Gamma

Robert H. Hays, Jr.

I observed this area on the morning of September 23, 2011. This area is in western Oceanus Procellarum. Reiner itself is a relatively large crater with a substantial central peak. The exterior shading on Reiner's east side does not look like ordinary shadowing, but may be from additional sloping. A long, straight strip of shadow is just south of Reiner near some of the east side shading. A chain of four small craters extends north from Reiner. The second largest of them is Reiner H. The pit Reiner L is between Reiner H and Reiner, and Marius X is north of Reiner H. The craterlet north of Marius X is not shown on the Lunar Quadrant map. Along, low ridge is just north of this pit, and there are several other low ridges and mounds in this area. The long ridge may be Marius tau, and the curved feature just to its south may be Marius sigma, according to the LQ map. The bright, diamond-shaped area Reiner gamma is to the west. This strange feature has a bright extension on its east side and a dusky oval in its middle. This oval has dark edge on its north and south sides. The eastward extension is crossed by a narrow, dark line, appearing like a crack. Three small bright patches are southwest of Reiner gamma, and like this feature, appear shadowless. The main diamond area of Reiner gamma looks smooth with no mottling.

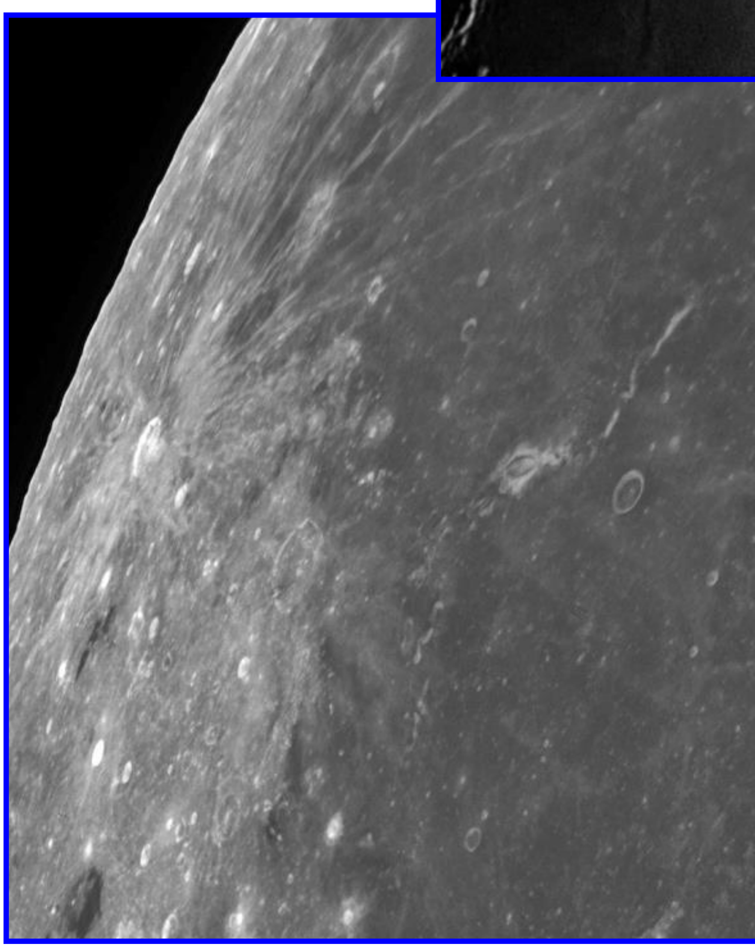


Reiner and Reiner Gamma, *Robert H. Hays, Jr., Worth, Illinois, USA. 23 September 2011 10:18-10:40 UT. 15 cm reflector telescope, 70 x. Seeing 6-7/10, transparency 6/6. This originally appeared in the February 2012 The Lunar Observer.*

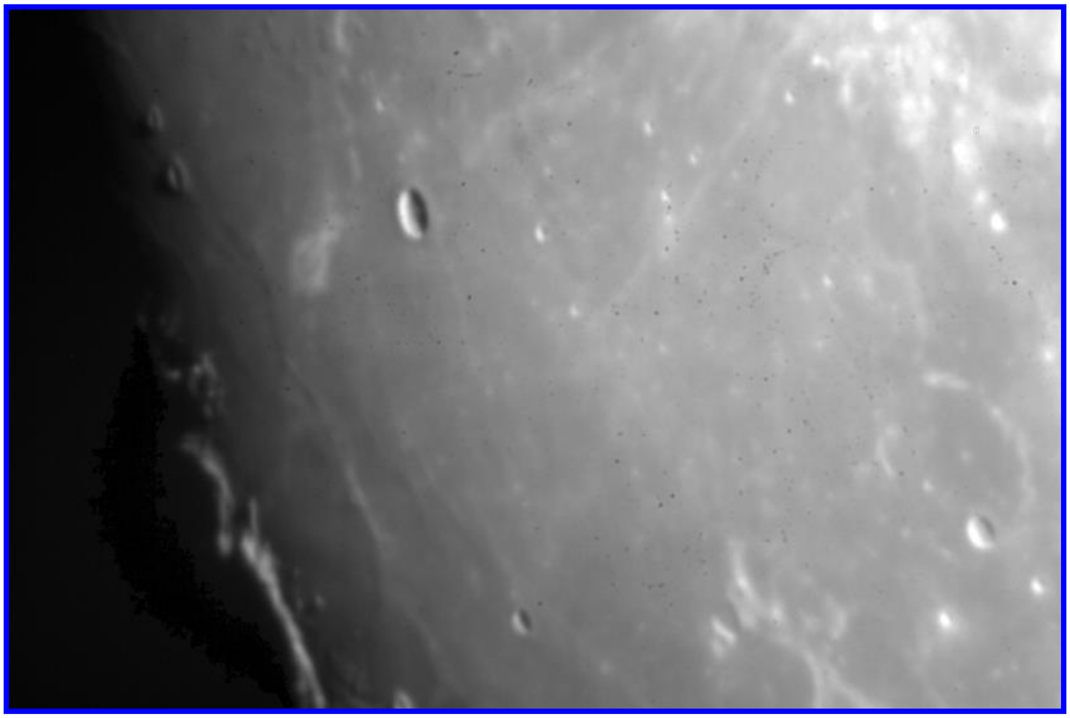
Robert adds "Reiner Gamma recently made an appearance on 'Jeopardy!' The category was 'A' in astronomy, and the answer was "What is albedo?' The image of a bright area on the Moon was shown, and it was Reiner Gamma."

Focus –On Lunar 100, Number 57: Reiner Gamma

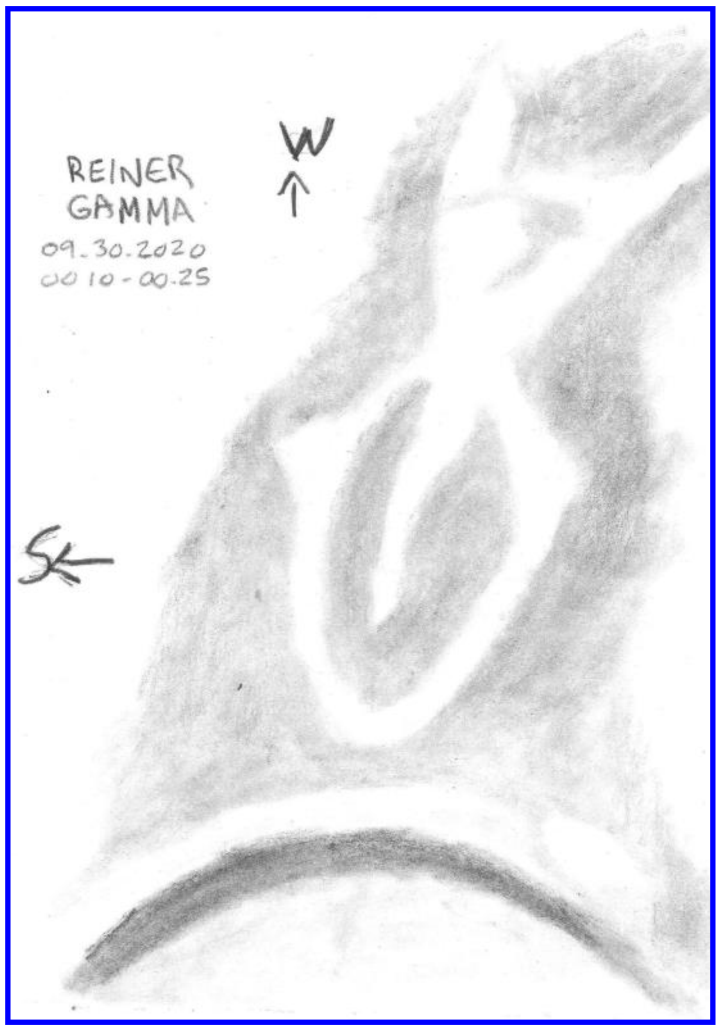
***Reiner Gamma**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 26 September 2015 04:24 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 7/10.*



***Reiner Gamma,** David Teske, Louisville, Mississippi, USA. 04 January 2021 11:09 UT, colongitude 156.3º. 180 mm Takahashi Mewlon Dall-Kirkham telescope, IR block filter, ZWO ASI 120 mms camera. Seeing 6/10.*



Reiner Gamma, *Juan Manuel Biagi, Oro Verde, Argentina, SLA-LIADA . 21 September 2014 05:59 UT. 10 inch Meade LX 200 Schmidt-Cassegrain telescope, Canon EOS 400 Rebel camera.*

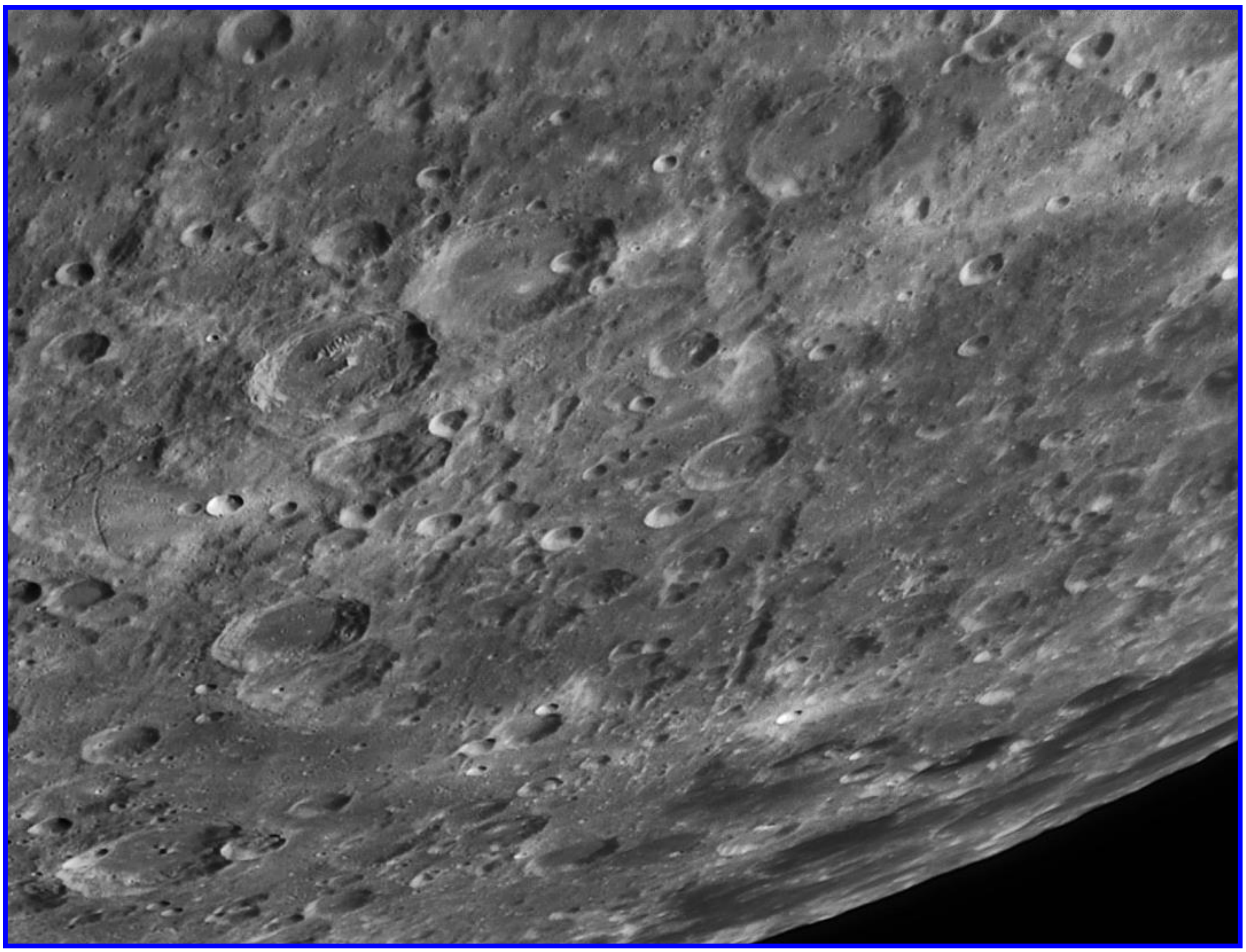


Reiner Gamma, *Alberto Anunziato, Oro Verde, Argentina. 30 September 2020 00:10-00:25 UT. 105 mm Meade EX Maksutov-Cassegrain telescope, 154 x.*

Reiner Gamma, *Juan Manuel Biagi, Paraná , Argentina, SLA-LIADA . 01 November 2020 04:20 UT. 7 inch Newtonian telescope, QHY5-ll camera.*

Lunar 58: Rheita Valley
Basin secondary-crater chain

Rheita Valley is Lunar 51 Catena Davy's older brother - a line of craters, but on steroids. A 330-kilometer-long valley formed by craters up to 30 kilometers in diameter. But there are two differences with Lunar 51. First, the craters in Rheita Valley share walls with their neighbors, forming a valley. Second, the craters that form it are secondary, fragments detached from a main impactor, although this impactor has colossal dimensions (the meteorite that formed the Mare Nectaris basin): "megacrater alignments such as the Rheita Valley are essentially just secondary crater chains-monstrous versions of the lines of small secondaries radiating from young craters like Copernicus. The region around Janssen has emerged as a well-preserved museum of grooves and secondary craters formed by ejecta from the Nectaris impact basin" (page 106).



Rheita Valley, *Sergio Babino, Montevideo, Uruguay. 24 October 2020 22:31 UT. 203 mm. catadrioptic telescope, ZWO ASI 174 camera.*

Focus -On Lunar 100, Number 58: Rheita Valley

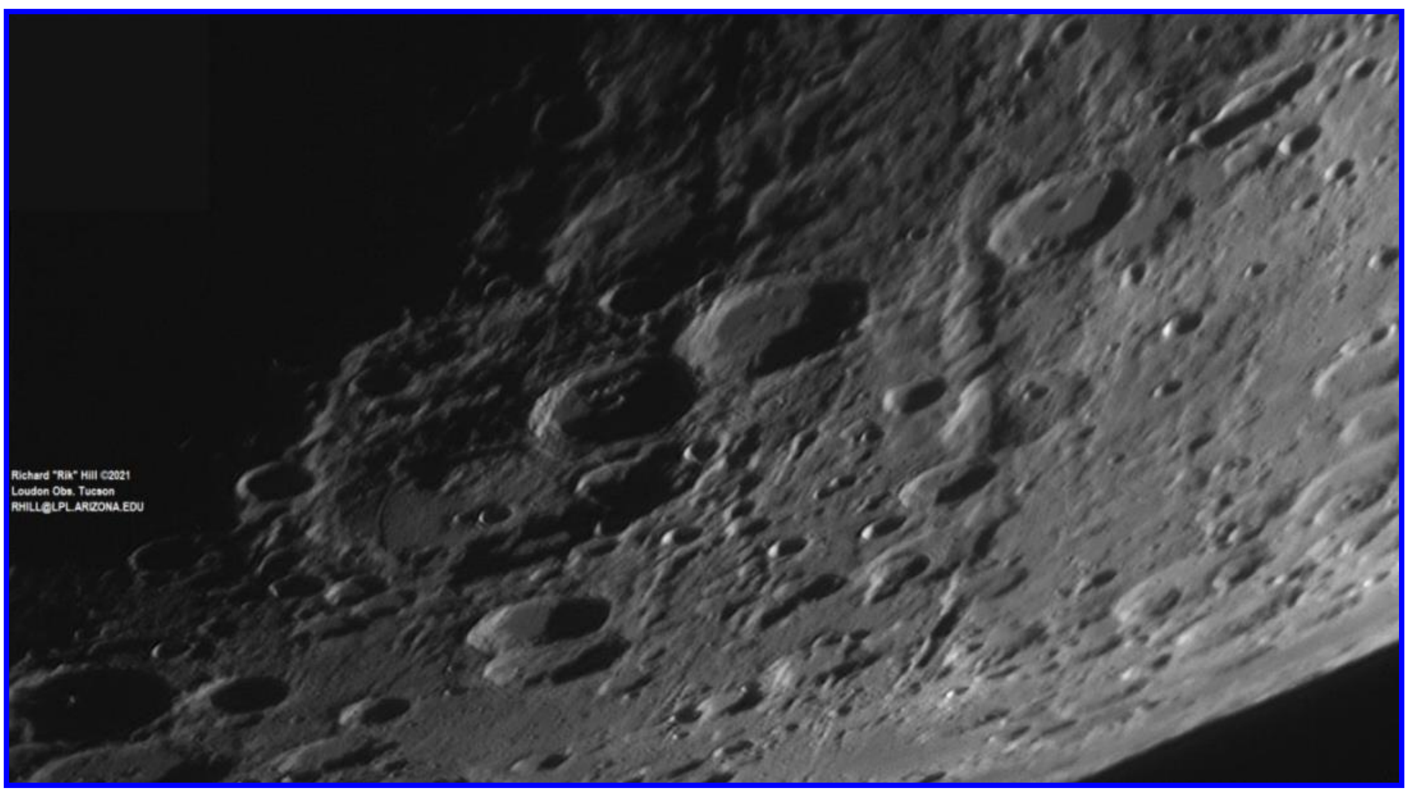
Rheita Trench

Rik Hill

The area on either side of the crater Metius (90 km) seen near the center in this image, is complex and fascinating. To the right is the obvious Vallis Rheita, formed when ejecta from Mare Nectaris impact created a line of over a dozen craters. The crater Rheita (71 km), itself can be seen at the top of this line in the image with its little central peak. Some lunar researchers see Vallis Rheita as two separate but overlapping troughs as evidenced by the bend in the middle with the farther portion coming from the impact of Nectaris that it points back to, while the western portion (nearer the terminator) points south of the Mare on a line with Fracastorius and Theophilus. Before we move on, notice the odd crater to the right of Rheita, Rheita E, obviously formed from 4 or 5 craters being merged.

To the immediate left of Metius is a slightly smaller crater Fabricius (80 km), known for the odd ridge of mountains on its floor to one side of the central peak, the tops of which are just catching the early morning sunlight here. This ridge may be the remnants of an ancient crater wall that was destroyed by later impacts, but this is speculation. The walls of Fabricius have slumped to a large degree, onto the crater floor and make for interesting exploration under slightly higher sunlight. Fabricius sits on the floor of a much larger oblong crater (probably the result of another merger) Janssen (196 km) with a long curvilinear rimae on its floor, the Rimae Janssen. These rimae are unusual in that they are the only known rimae in the lunar highlands. Lastly below Janssen are twin craters, Steinheil (70 km) and farther on is Watt (68 km), another crater with slumping caused by the proximity to the Steinheil impact.

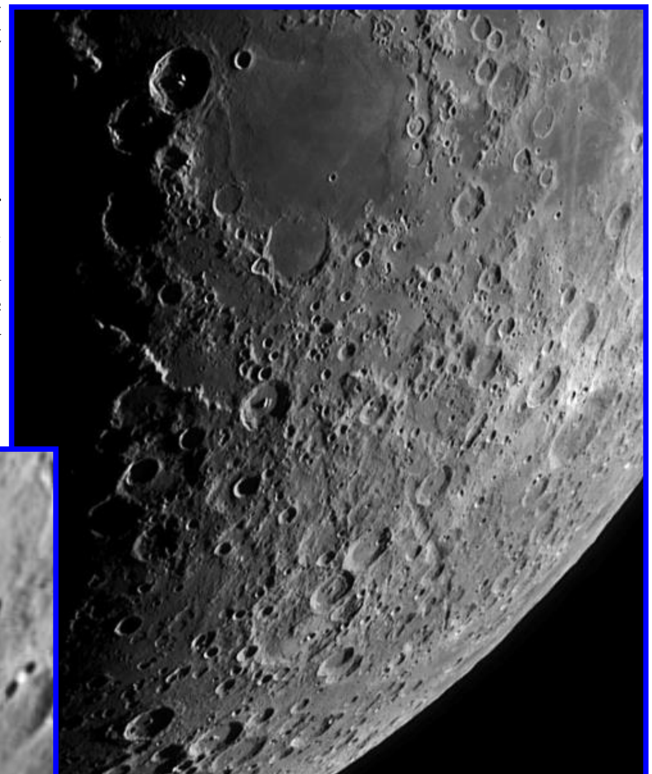
Janssen to Vallis Rheita*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 01 January 2021 01:49 UT, colongitude 324.8º. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 665 nm filter, Skyris 132M camera. Seeing 8-9/10.*

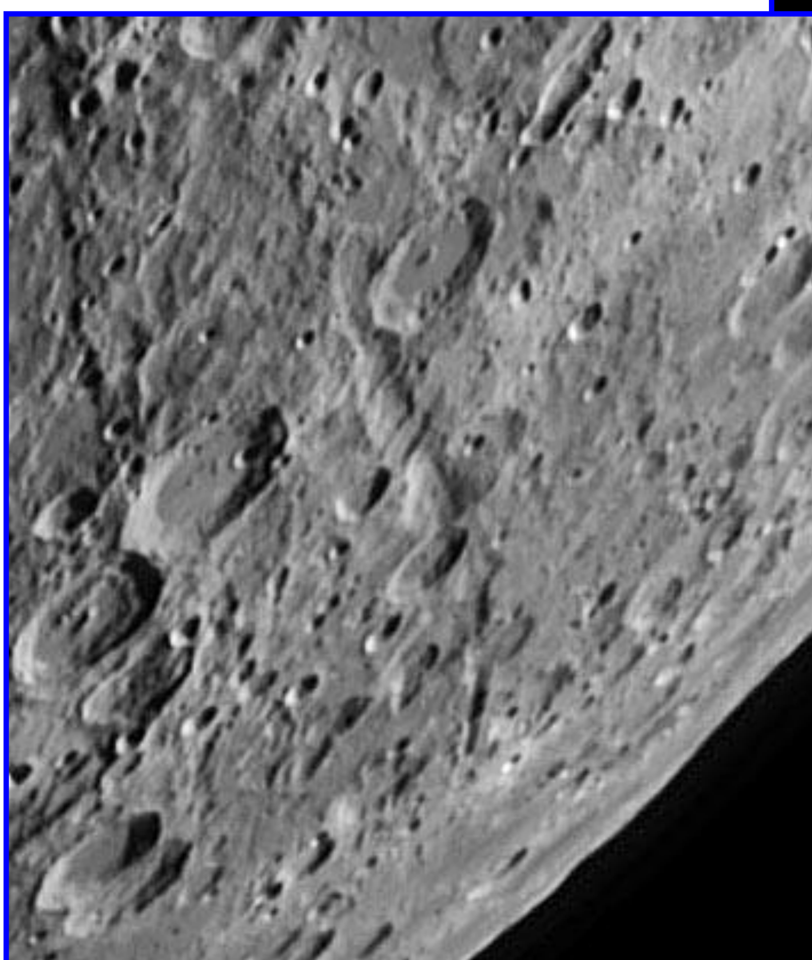


Rheita Valley and that Bend

David Teske

In this image we see the lovely Rheita Valley in the southeast of the Moon south of Mare Nectaris. On first look, it appears to be the result of the formation of the Nectaris Basin, as material excavated from its formation splatted down as secondary craters in a line to form the Rheita Valley. This valley is ancient, about 3.92 billion years old. There are wonderful, more youthful examples of the Rheita Valley on the lunar far side as a result of the Orientale Basin formation. The Leuschner chain of craters is an excellent example of this. Close inspection of the Rheita Valley does present viewers with a puzzle, in that between the craters Mallet and Young, the valley changes both direction and character as the craters are smaller and lack common walls. This smaller "Mallet Valley" is exactly radial to the center of Nectaris and the Rheita Valley is tangential to the basin's inner ring. I have looked at all of my many lunar resources, and none really explain this odd bend. The closest that they come is in Charles Wood "The Modern Moon" that "thus the change in direction and shape of the Rheita-Mallet Valleys must be due to some particularity of the distribution of Nectaris ejecta". Sounds like a mystery to me.





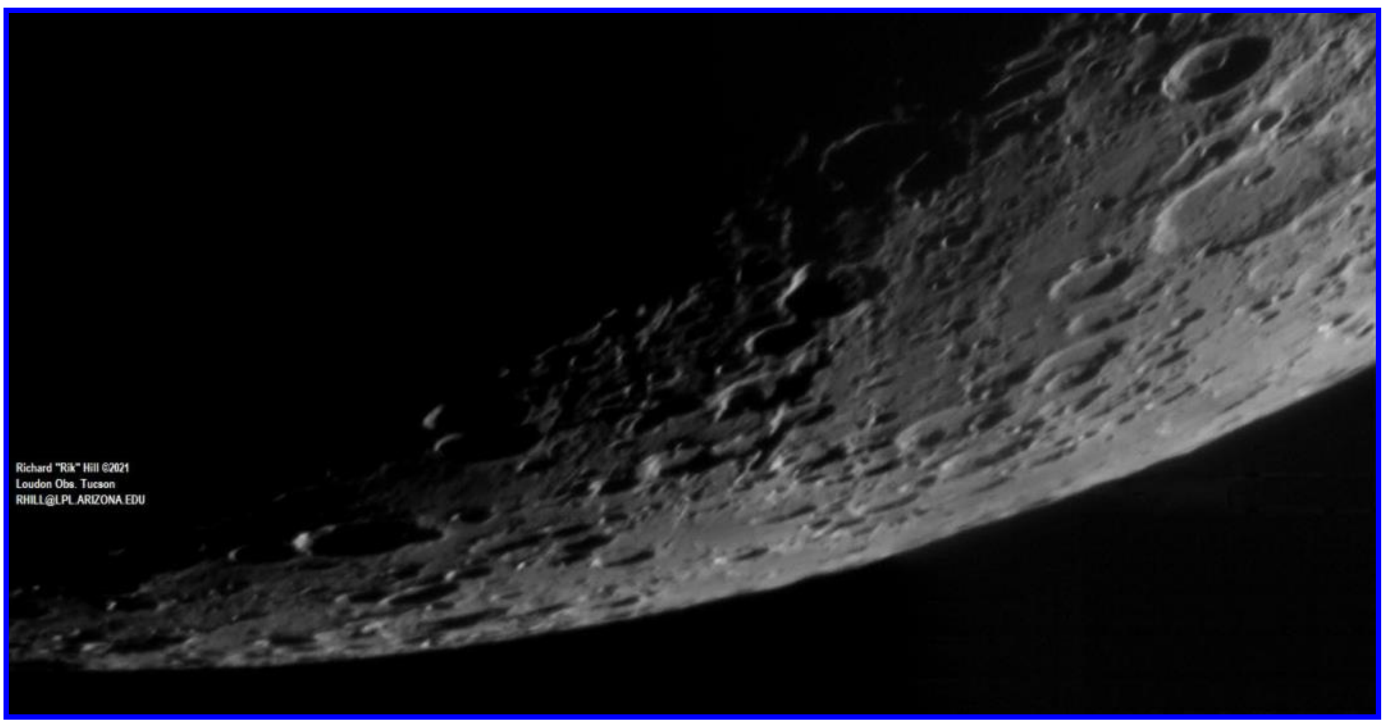
Janssen, *David Teske, Louisville, Mississippi, USA. 19 January 2021 00:57 UT, colongitude 333.7°. 4 inch f/15 refractor telescope, IR block filter, ZWO ASI 120 mms camera. Seeing 6-7/10. Close –up to the left.*

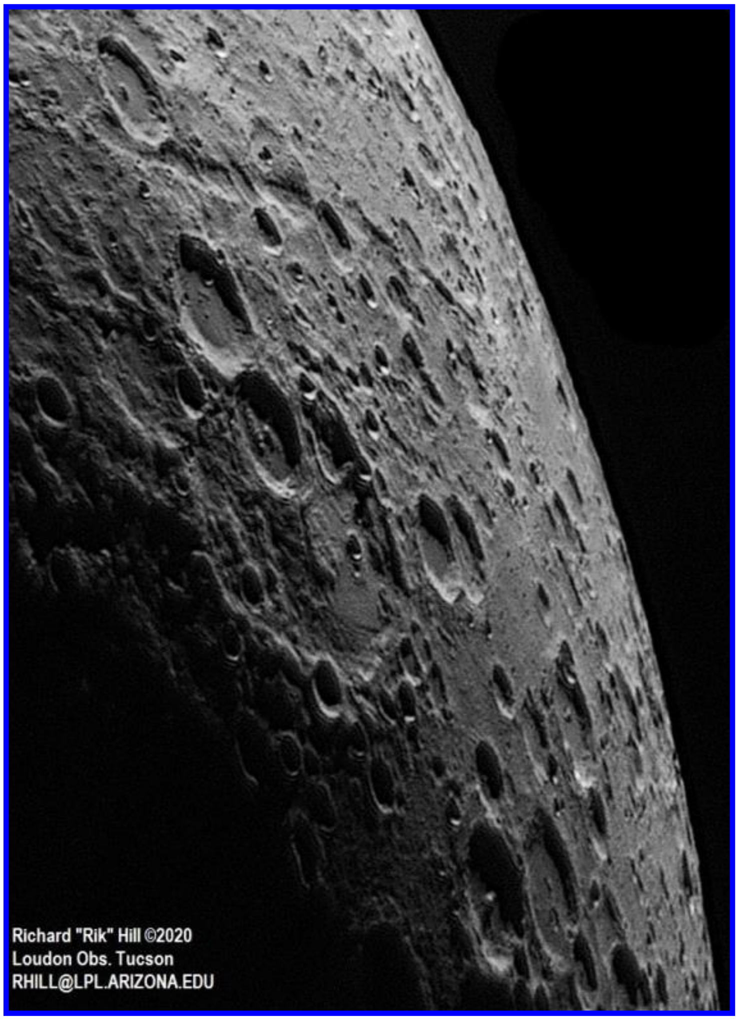
More Trenching
Rik Hill

Here's the Janssen - Vallis Rheita region of the Moon that I featured in my last posting, but this is a day earlier. To show the limits of this image, near the right edge we see Furnerius (129 km dia.) and above it Stevinus (77 km) and the shadow filled Biela (78 km) left of center. In the center you can see the southeastern leg of Vallis Rheita that points towards the center of Mare Nectaris (in shadow here) and the other leg, barely discernible, in shadow above it. This latter portion points back towards Fracastorius and then Theophilus. Chuck Wood offers several possible origins for these two seemingly separate branches of the Vallis in his book *The Modern Moon - A Personal View*.

While processing this image some fine scale features were noticed including a linear feature that runs parallel to the right of the lower leg of the Vallis. A search on LROC QuickMap confirmed its reality as a thin ridge. Another feature below the crater Young (75 km) right on the terminator and overlain by the upper leg of the Vallis, looked like a processing artifact from the stacking program I used but again a look at QuickMap acted as confirmation that this was a linear low cliff. Ridges, rimae, wrinkles and cliffs abound in this chaotic region!

***Rheita**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 17 January 2021 00:53 UT, colongitude 312.2º. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 665 nm filter, Skyris 132M camera. Seeing 7/10.*

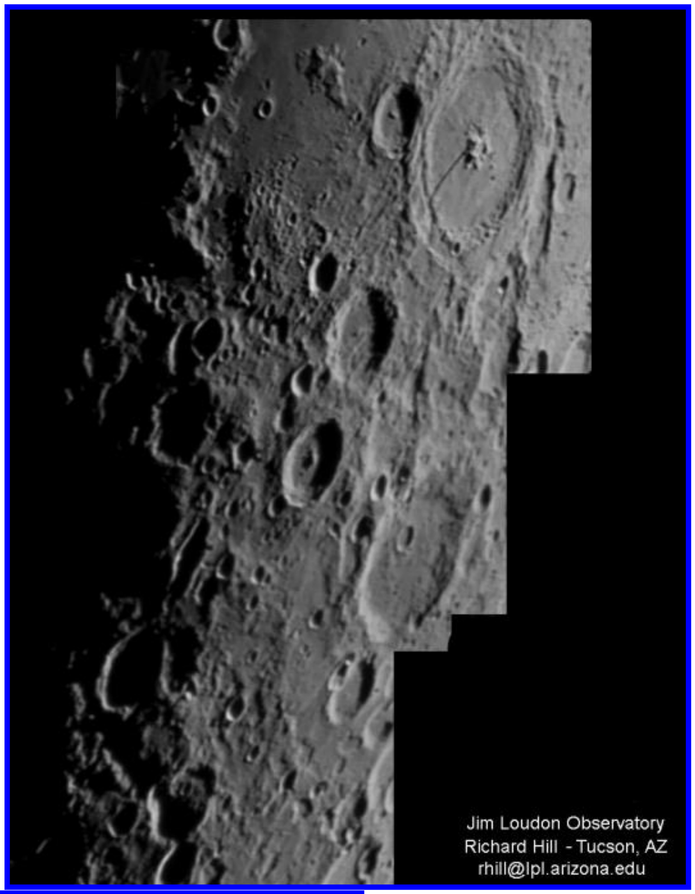




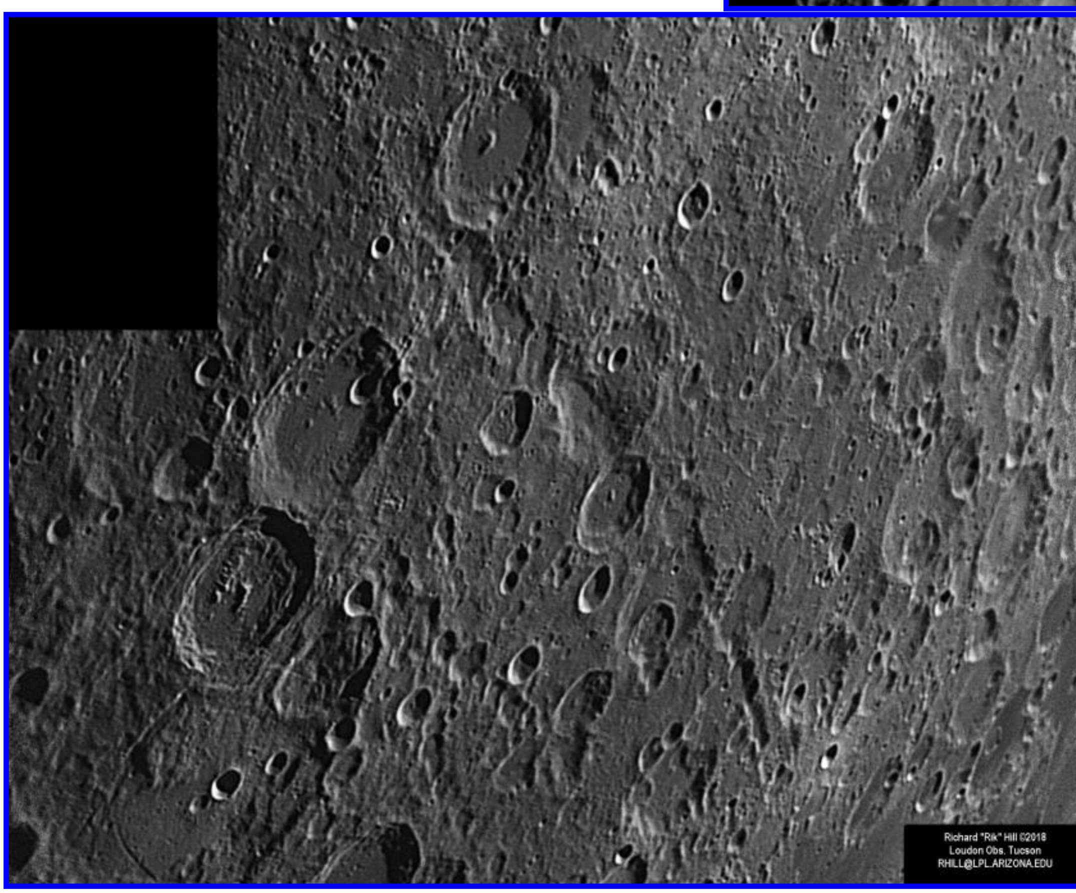
***Janssen**, Richard Hill, Loudon Observatory, Tucson, Arizona. 29 March 2020 02:37 UT, colongitude 329.2°. Dynamax 6 inch Schmidt-Cassegrain telescope, Goodwin barlow, 610 nm filter, Skyris 445M camera. Seeing 6/10.*

***Janssen**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 02 February 2017 01:49 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 7/10.*

Focus –On Lunar 100, Number 58: Rheita Valley



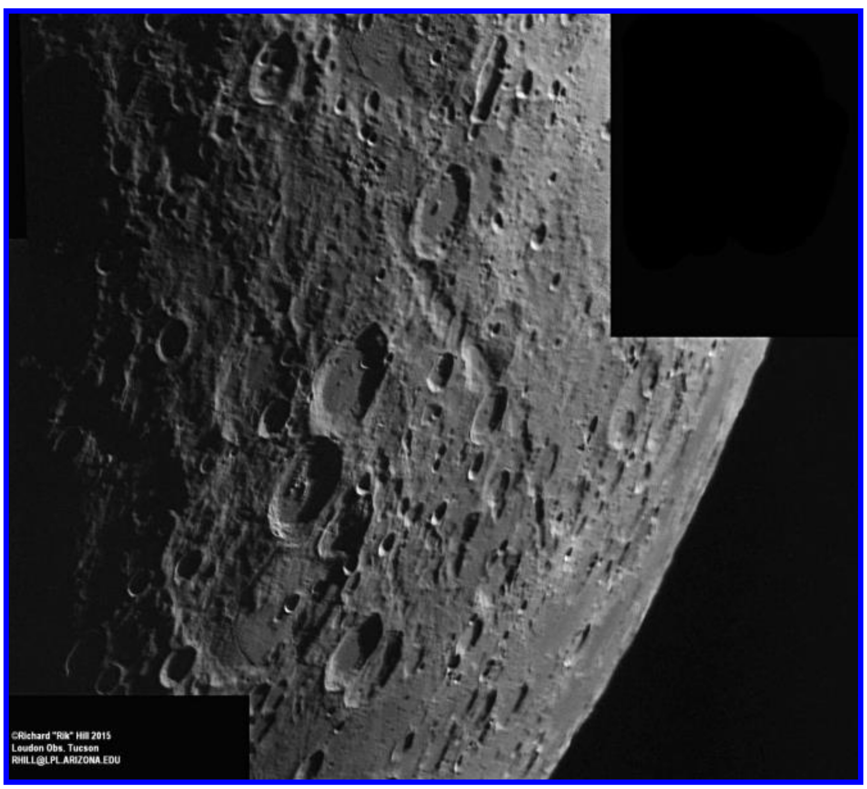
***Petavius to Rheita**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 19 June 2007 03:50 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 1.6 x barlow, UV/IR block filter, SPC900NC camera. Seeing 610.*



***Vallis Rheita**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 19 June 2018 02:31 UT, co-longitude 337.3^o. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Skyris 445M camera. Seeing 8/10.*

Focus –On Lunar 100, Number 58: Rheita Valley

Vallis Rheita, **Michel Deconinck**, *Artignosc-sur-Verdon - Provence - France. 18 November 2020 17:20 UT. Mewlon 250/2500 Dall-Kirkham telescope, 13 mm Ethos eyepiece, 192 x.*



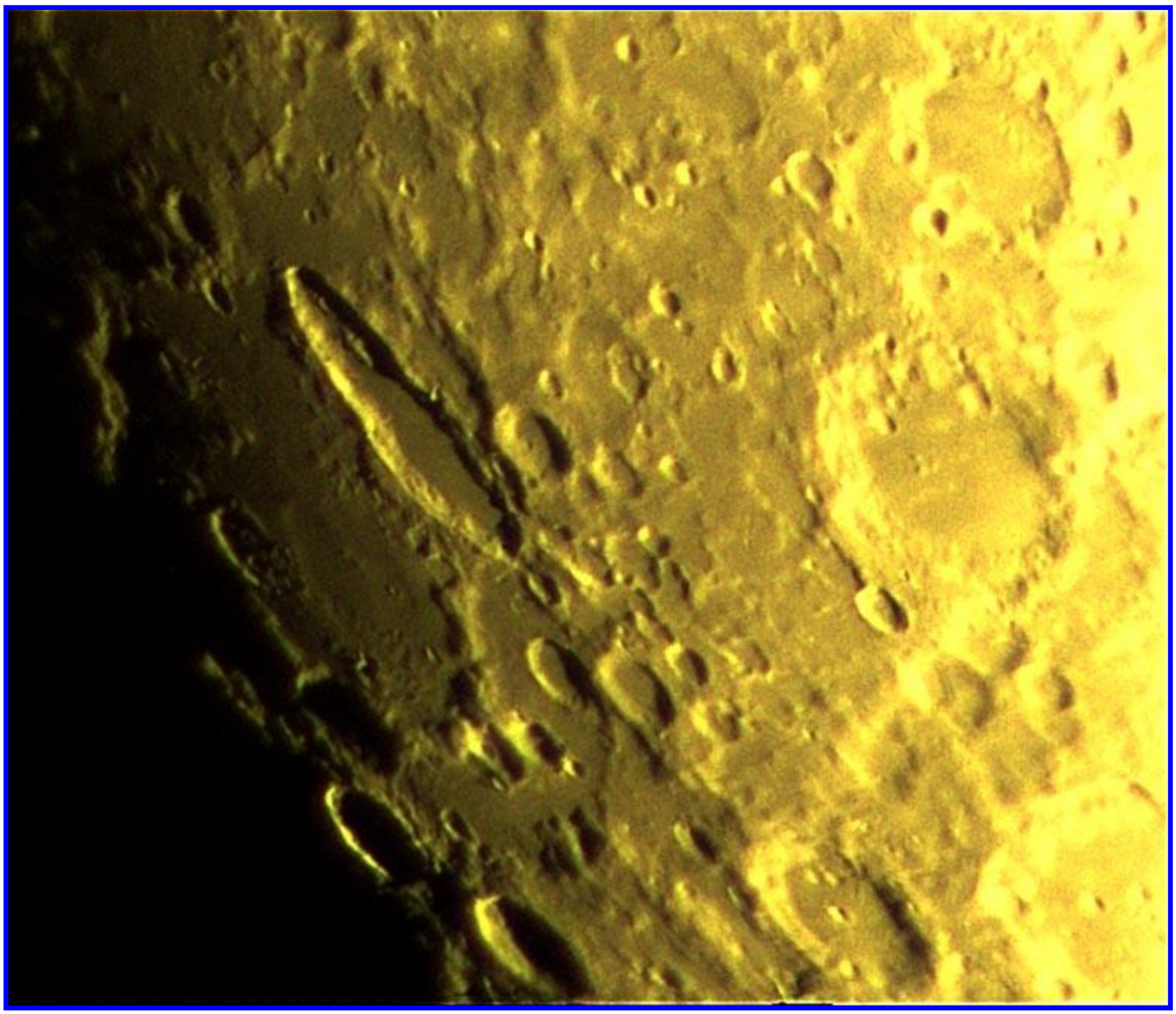
Vallis Rheita*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 21 July 2015 02:38 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Skyris 445M camera. Seeing 7-8/10.*

Vallis Rheita, *Michel Deconinck, Artignosc-sur-Verdon - Provence - France. 19 November 2020 18:00 UT. Mewlon 250/2500 Dall-Kirkham telescope, 13 mm Ethos eyepiece, 192 x.*

Vallis Rheita*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 22 April 2007 03:00 UT. Celestron 14 inch Schmidt-Cassegrain telescope, Wratten 21 filter, SPC900NC camera.*

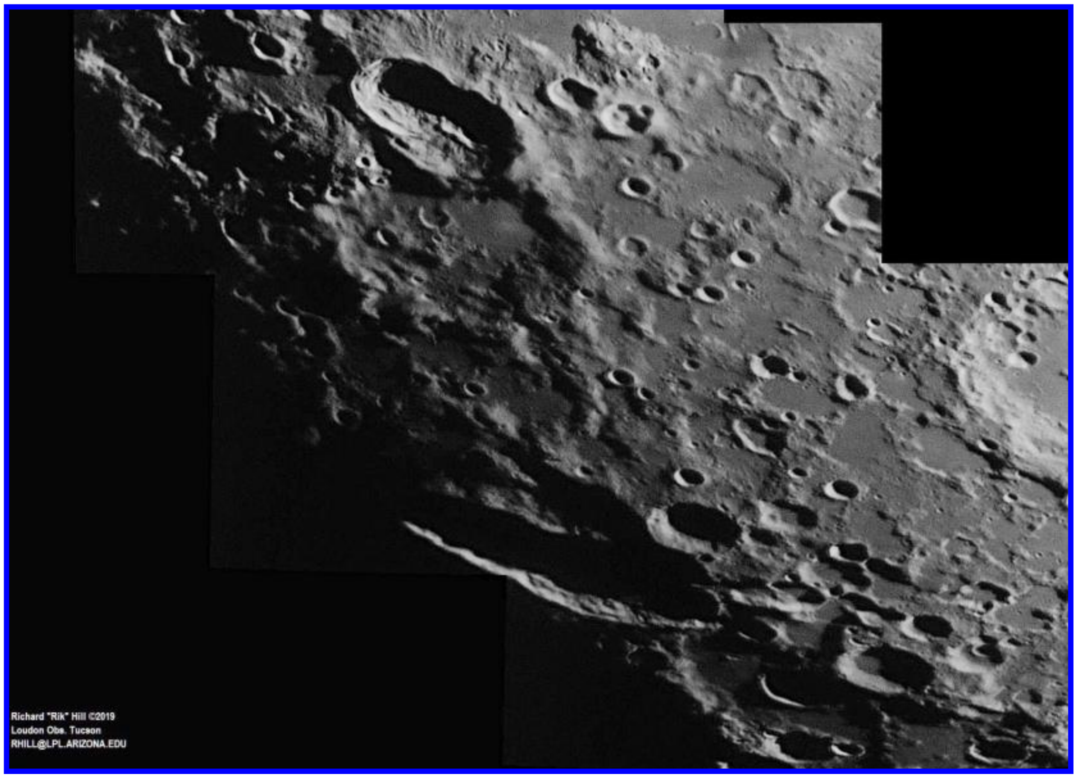
Lunar 59: Schiller-Zucchius basin
Badly degraded overlooked basins

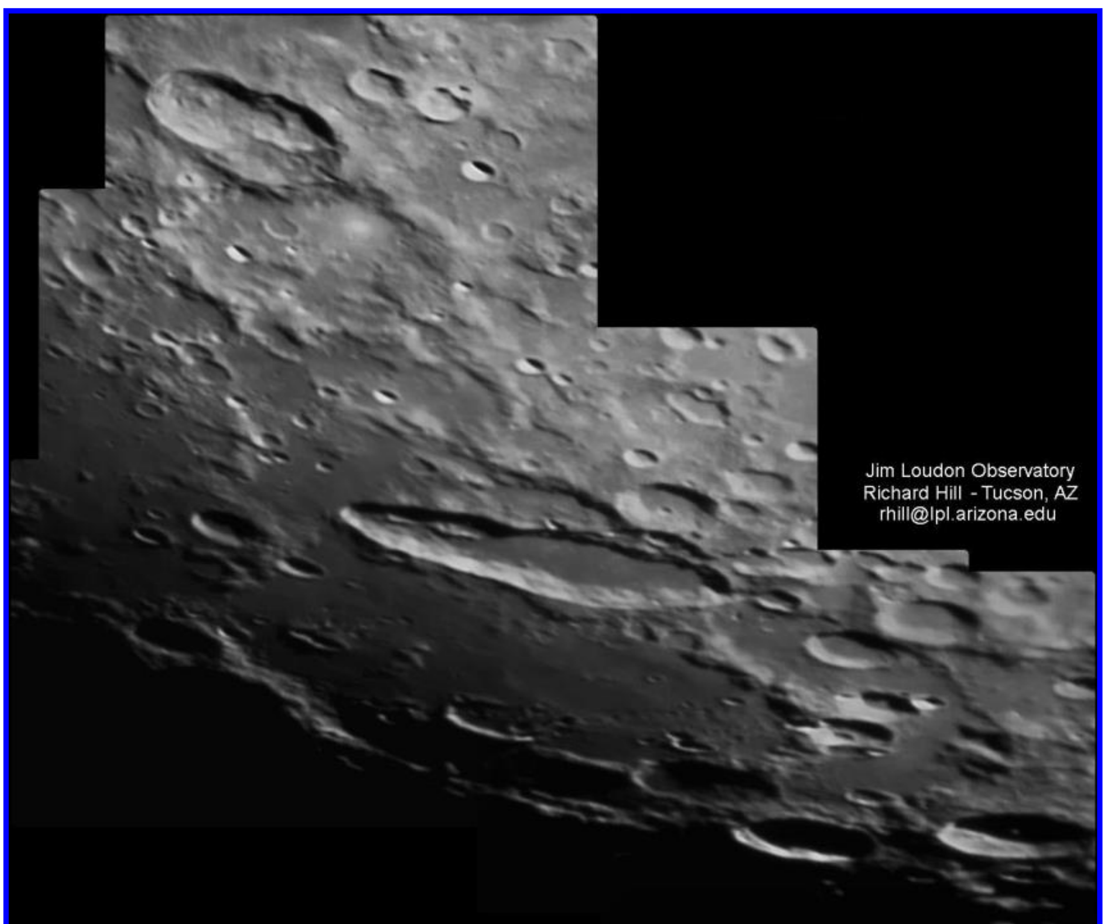
Lunar 59 is a heavily eroded Pre-Nectarian impact basin, in the center of which is a mascon detected by the Lunar Prospector mission. It runs east to west from the notorious elongated crater Schiller to Zucchius and Phocylides, and north to south from Weigel to Nöggerath. "This Basin Near Schiller, as Hartmann and I called it (renamed the Schiller-Zucchius basin by USGS mappers) is most conspicuous as an anomalous patch of light-hued, smooth, mare-like material. Closer inspection reveals a semicircular ridge cut by Segner and partially surrounded by a larger, more poorly defined scarp-like ring. Under a low Sun a possible third ring is suggested by a shallow depression in the basin center. Thus, the Schiller-Zucchius basin is a two-ring structure with diameters of 165 and 325 km. and a possible third 85 km-wide inner ring. The basin is fairly heavy battered by craters that are probably large secondaries from the Orientale basin just over the limb to the west" (page 176).



Schiller-Zucchius Basin, *Marcelo Mojica Gundlach, Cochabamba, Bolivia. 16 May 2019 02:52 UT. 150 mm refractor telescope, ZWO ASI 120 camera.*

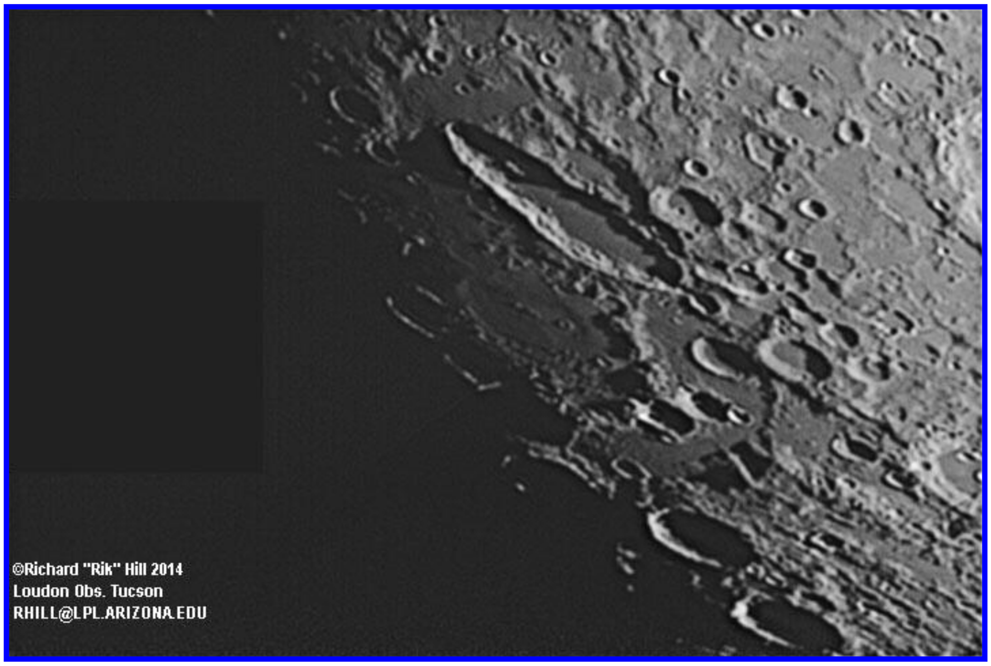
Hainzel to Schiller, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 17 March 2019 03:42 UT, colongitude 39.8°. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Skyris 445M camera. Seeing 8/10.*





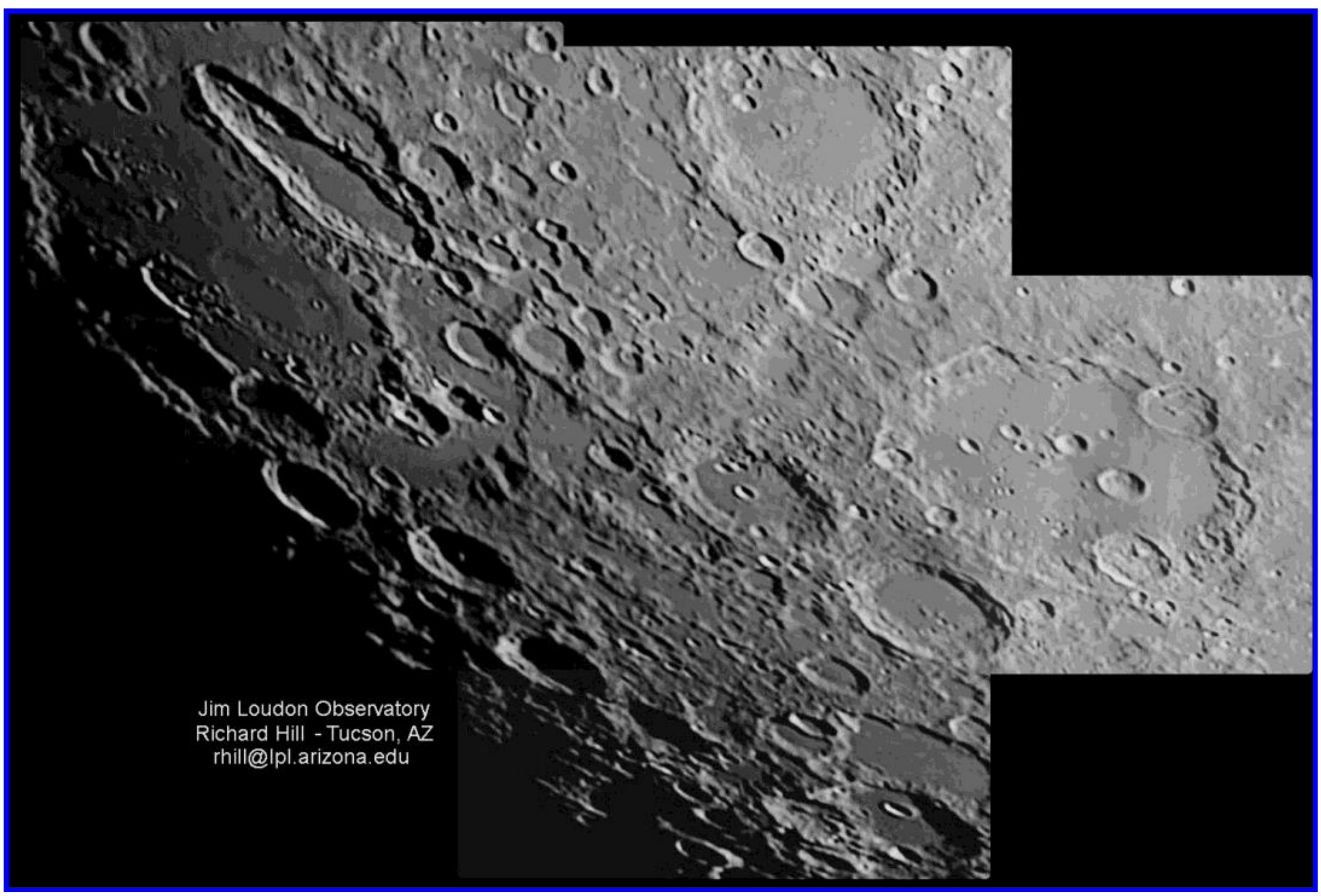
Schiller, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 19 March 2008 04:45 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 1.6 x barlow, UV? IR block filter, SPC900NC camera. Seeing 6/10.*

Focus –On Lunar 100, Number 59: Schiller-Zucchius Basin

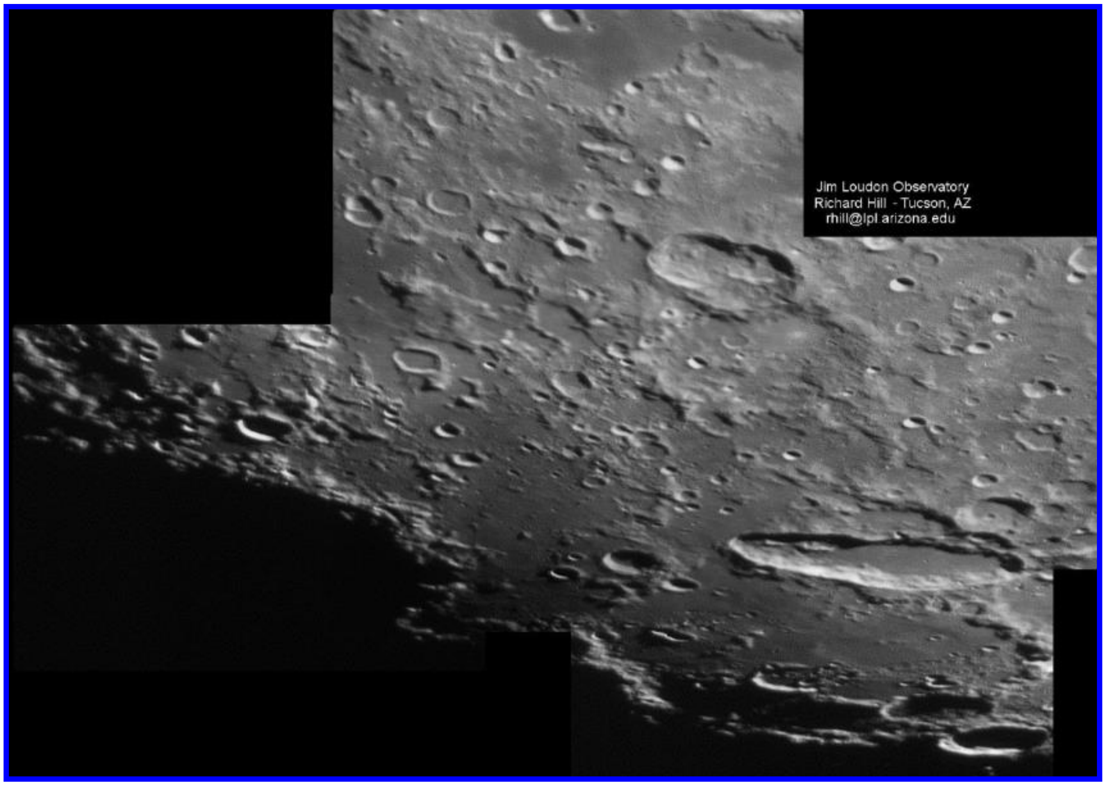


***Schiller**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 07 August 2014 03:20 UT. 3.5 inch Questar Maksutov-Cassegrain telescope, 1.7 x barlow, 656.3 nm filter, Skyris 445M camera. Seeing 7-8/10.*

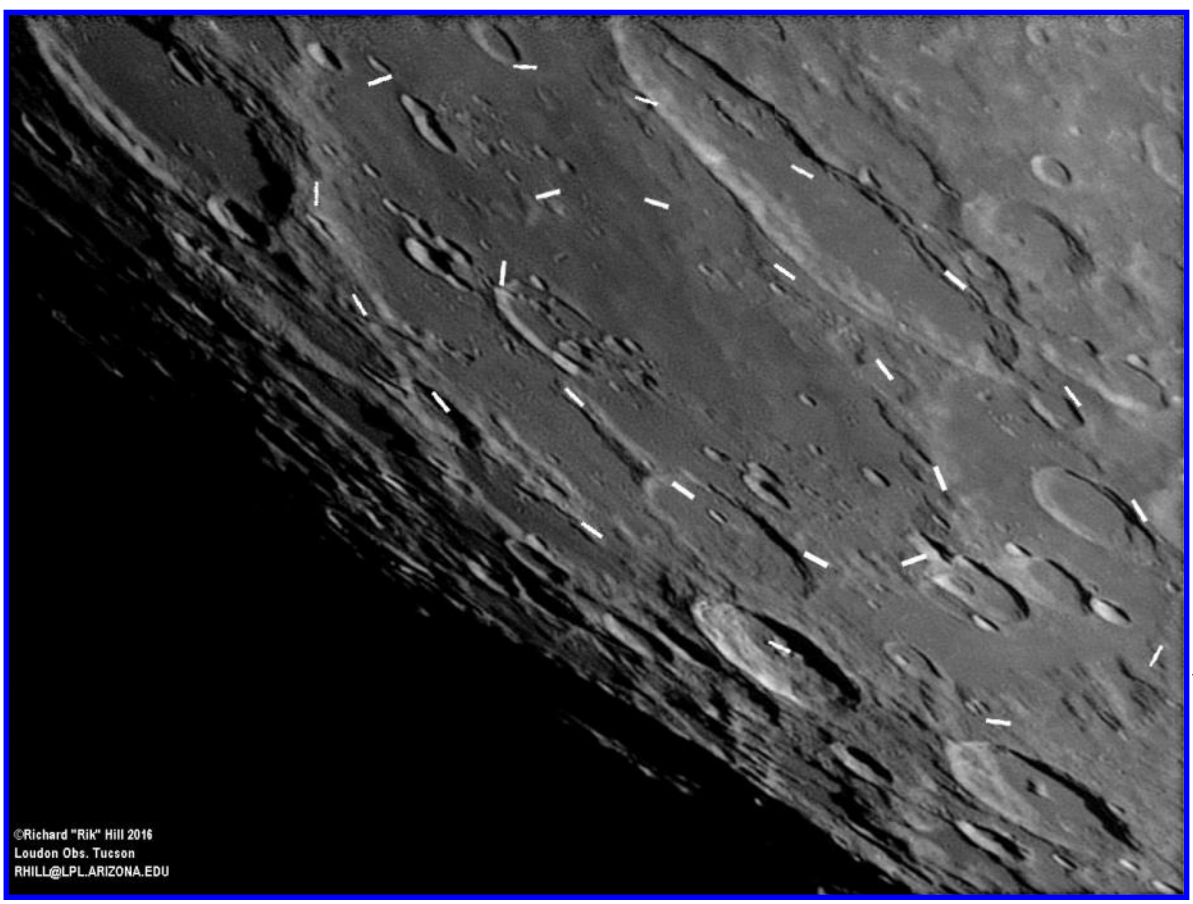
***Schiller to Clavius**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 08 January 2009 02:17 UT. Celestron 14 inch Schmidt-Cassegrain telescope at f/11, UV?IR block filter, SPC900NC camera. Seeing 5/10.*



Focus –On Lunar 100, Number 59: Schiller-Zucchius Basin



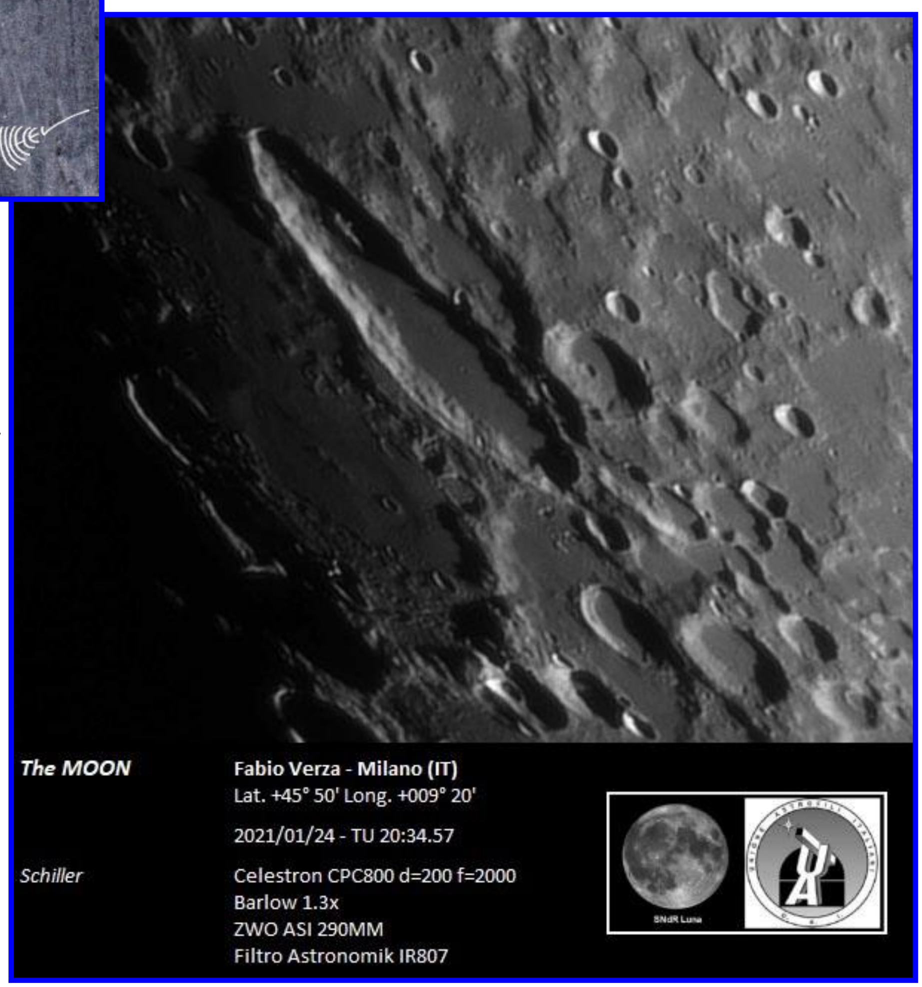
***Schiller to Hainzel**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 03 May 2012 04:05 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, Wratten 23 filter, DMK21AU04 camera. Seeing 7/10.*



***Schiller Zucchius Basin**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 14 October 2016 05:04 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 665 nm filter, Skyris 445M camera. Seeing 8/10.*

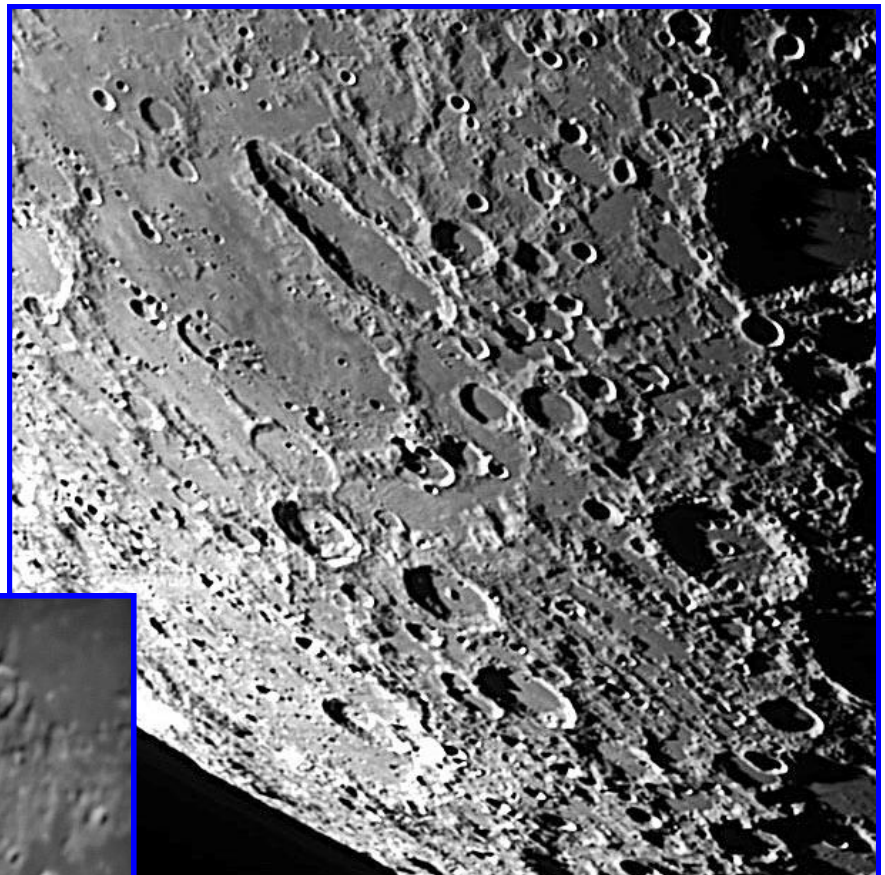
Focus –On Lunar 100, Number 59: Schiller-Zucchius Basin

Schiller-Zucchius Basin, *Michel Deconinck, Artignosc-sur-Verdon - Provence - France. 02 August 2020 02:00 UT. 152 mm x 1200 mm Bresser refractor telescope, zoom eyepiece, 100 x.*



Schiller, *Fabio Verza, Milan, Italy, 24 January 2021 20:34 UT. Celestron CPC800 Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik IR 807 nm filter, ZWO ASI 290 mm camera.*

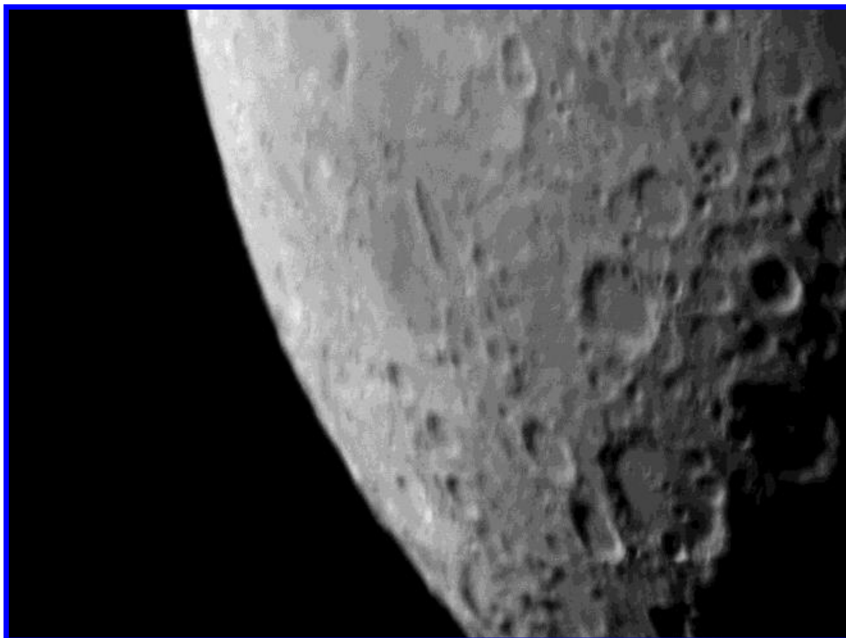
Focus –On Lunar 100, Number 59: Schiller-Zucchius Basin



Schiller-Zucchius Basin, *David Teske, Louisville, Mississippi, USA. 09 November 2020 10:04 UT, colongitude 194.8°. 4 inch f/15 refractor telescope, IR block filter, ZWO ASI 120 mms camera. Seeing 7-8/10.*

Schiller-Zucchius Basin, Luis *Francisco Alisa Cardinalli, Oro Verde, Argentina. 11 December 2016 03:33 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Astronomik ProPlanet 742 nm IR pass filter.*

Focus –On Lunar 100, Number 59: Schiller-Zucchius Basin



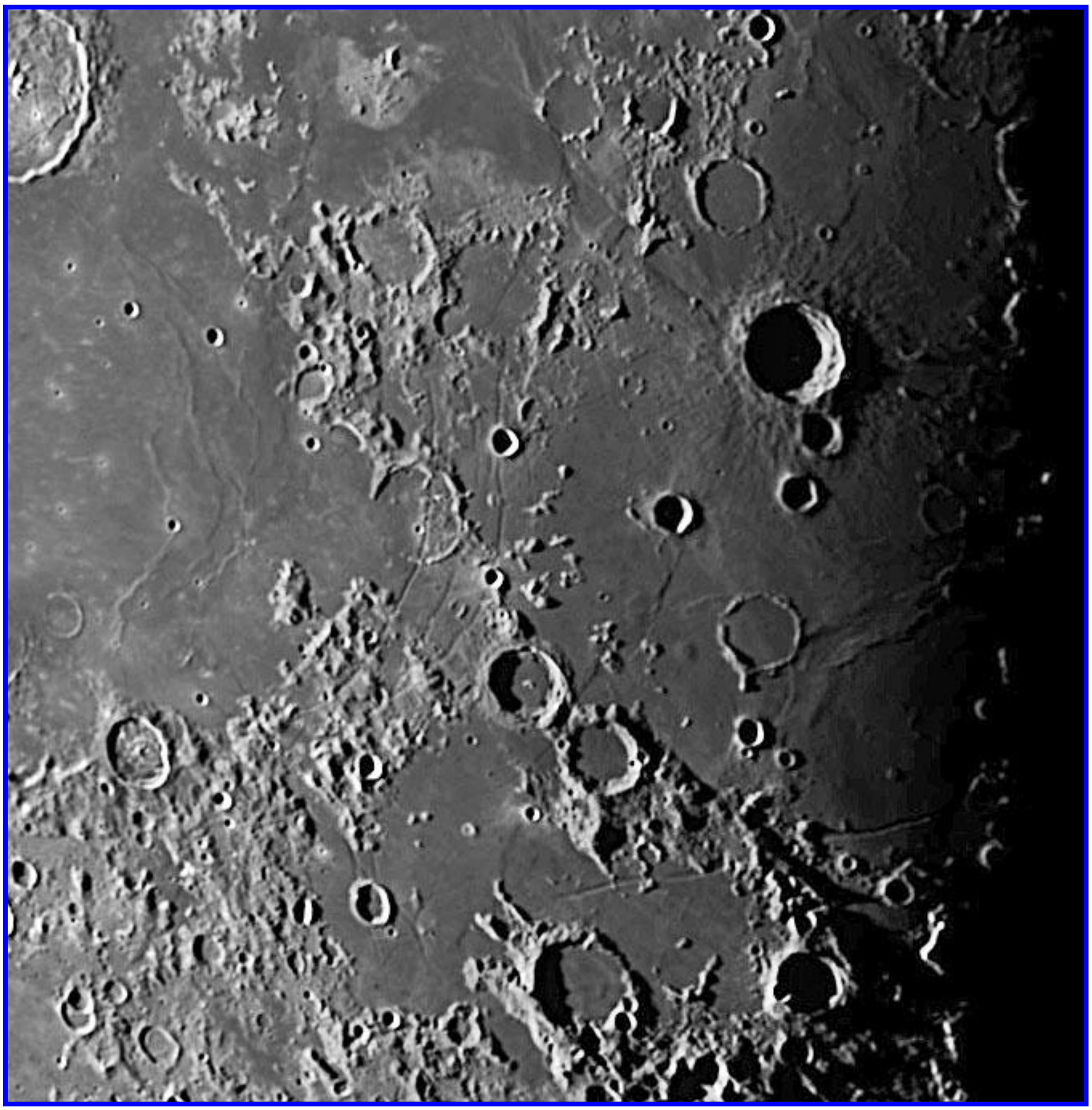
Schiller-Zucchius Basin, *Juan Manuel Biagi, Oro Verde, Argentina, SLA-LIADA . 18 January 2020 06:31 UT. 105 mm Meade LX 105 Maksutov-Cassegrain telescope, QHY5-ll M camera.*

Schiller-Zucchius Basin, *Martín Queirolo Gomez, SAO -LIADA, Montevideo, Uruguay. 21 January 2016 23:18 UT. 114 mm Newtonian reflector telescope, Nikon D5100 camera.*

Lunar 60: Kies Pi
Volcanic dome

"Kies is famous as the guidepost to one of the easiest volcanoes to find on the Moon. Just west of the crater is an 11-km-wide dome called Kies Pi, which contains a tiny summit pit. Kies Pi, a few other nearby domes, and another low dome described later in this chapter are the only known structures of this kind south of the lunar equator" (page 145). Kies Pi is easily recognizable because its enormous diameter allows a medium-sized telescope to capture albedo differences on its gentle slopes and the shadow of the volcanic crater at its top.

Kies π, *David Teske, Louisville, Mississippi, USA. 09 November 2020 10:09 UT, colongitude 194.9°. 4 inch f/15 refractor telescope, IR block filter, ZWO ASI 120 mms camera. Seeing 7-8/10.*

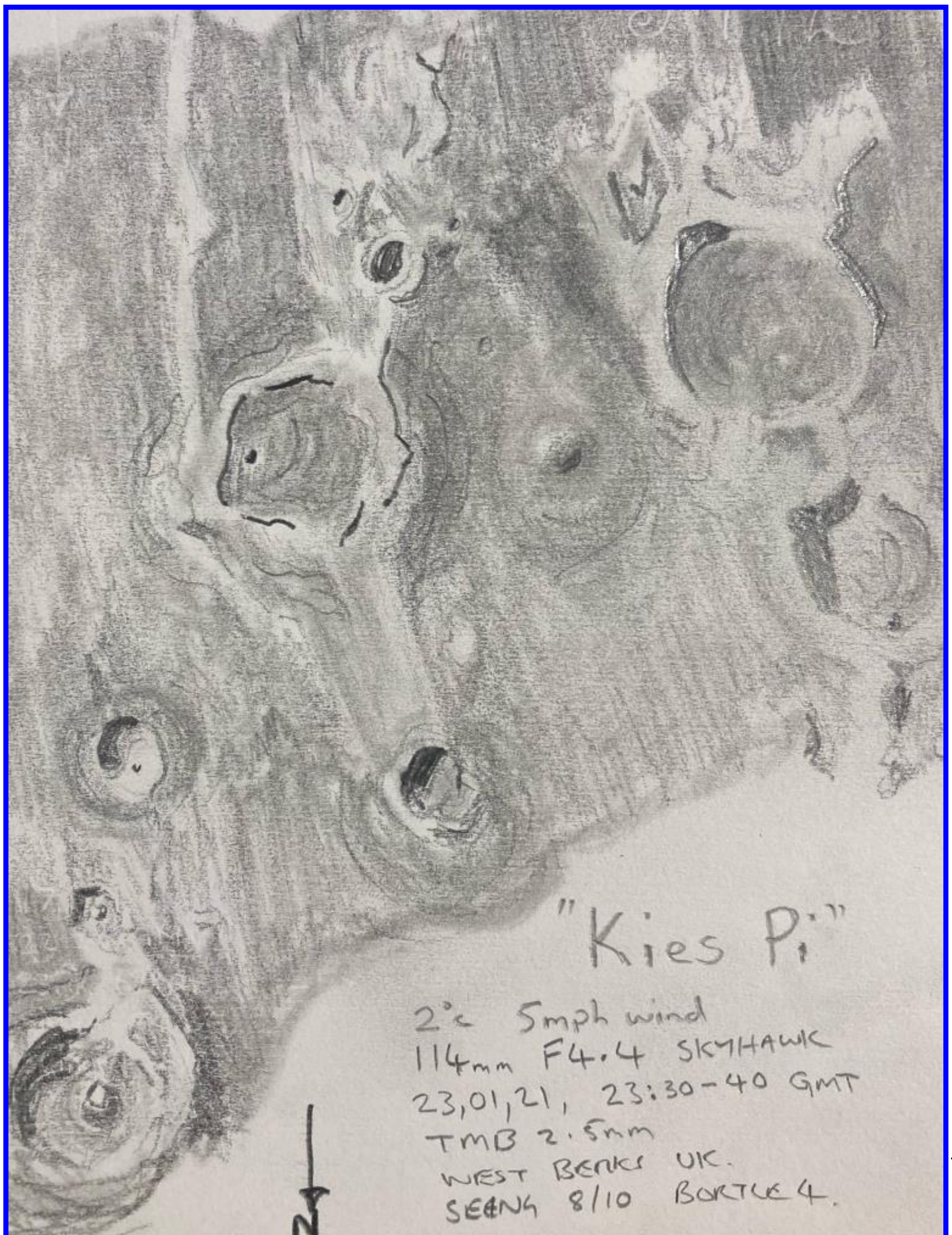


An Observation of Kies Pi

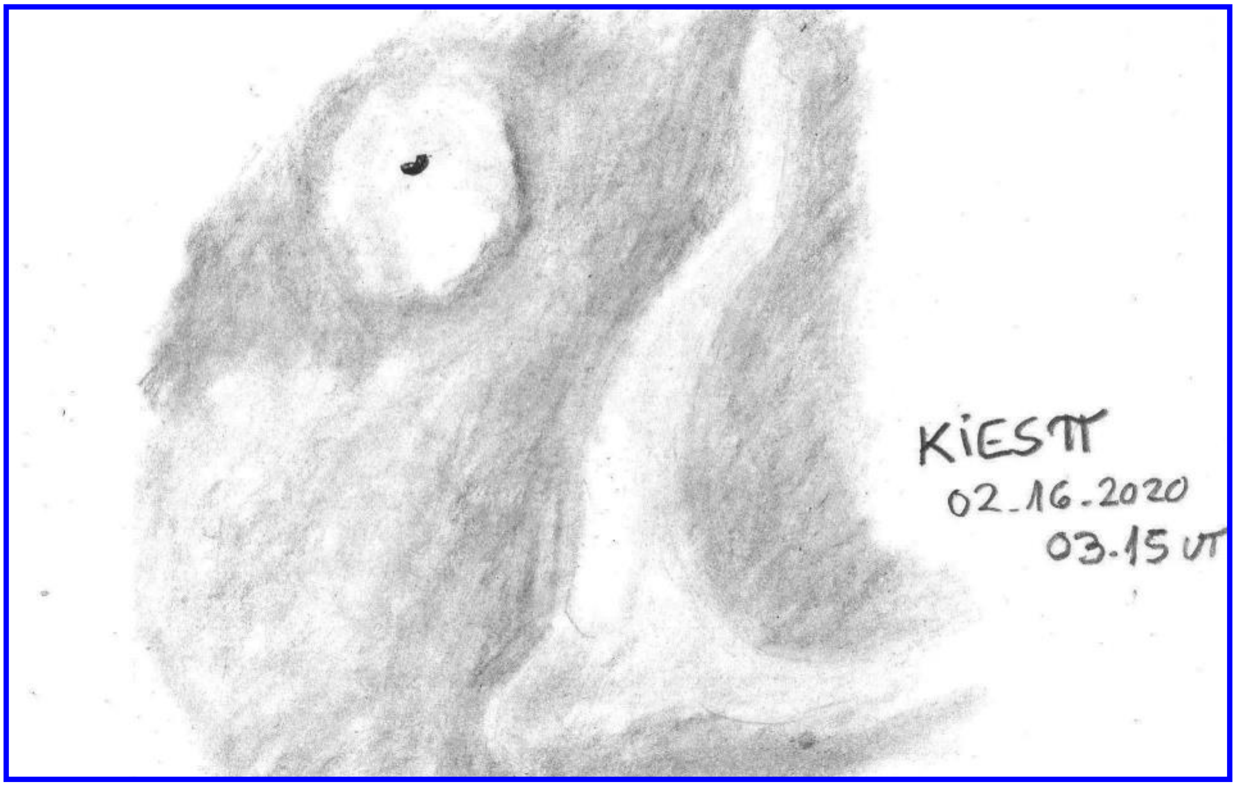
Phil Parslow

With observation limited due to heavy cloud cover, I decided to seize the opportunity of this subject with the terminator relatively localized giving low light on the subject, this being my first observation worthy of note in this area. I trained my 4.5” reflector at the localized area. Following the identification of the crater Kies in Mare Nubium with my 4mm TMB II I switched out to the 2.5 mm TMB II to achieve a greater understanding of the subject.

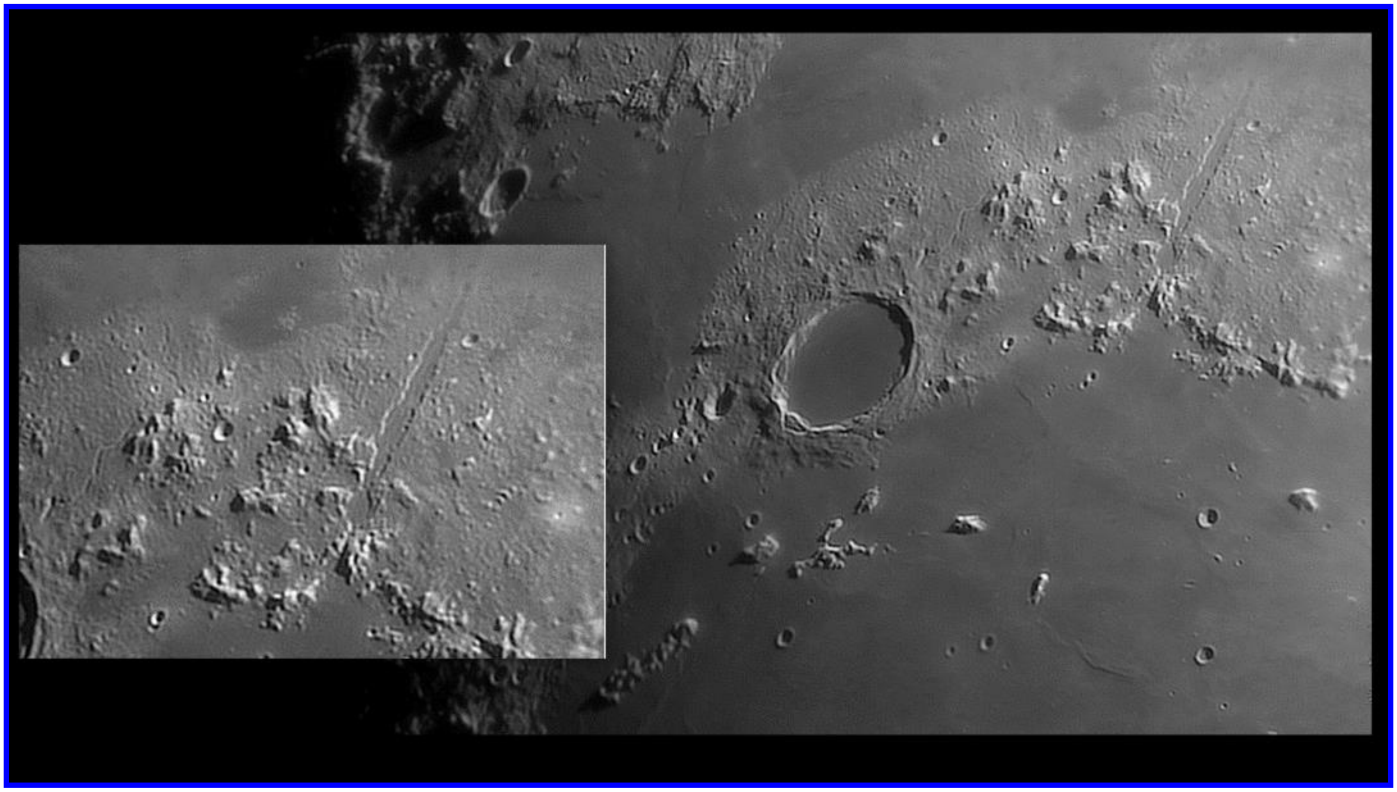
Approximately 10 km east of my recognition point (Kies) I found the subtle dome of Kies pi, the light conditions were not the best, but the gentle fading topography was visible; although only just barely. The surrounding features of the dome was conducive to the pictures I had seen with Mercator and Campanus showing some beautiful contrast and detail that I was able to pick up in the sketch also. Crater Kies also gave up some subtle detail too highlighting the outer broken rim, flooded with basaltic lava to a depth of 400m. It has an unusual northern feature and is 44 km in diameter, being approximately 4 times the size of the localized volcanic dome (Kies pi) which itself is 10 km in diameter with a boiler hole on the dome ridge approximately 300 m in elevation which unfortunately I was unable to see on this observation. The surrounding area has obvious evidence of ejecta from the nearby and well-known crater Tycho and visibly ran through my whole subject area even with the low light levels.



Kies Pi, *Phil Parslow, West Berkshire, UK. 23 January 2021 23:30 -23:40 UT. 4.5 inch Skyhawk f4.4 reflector telescope, 2.5 mm TMB eyepiece. Seeing 8/10, Bortle 4*

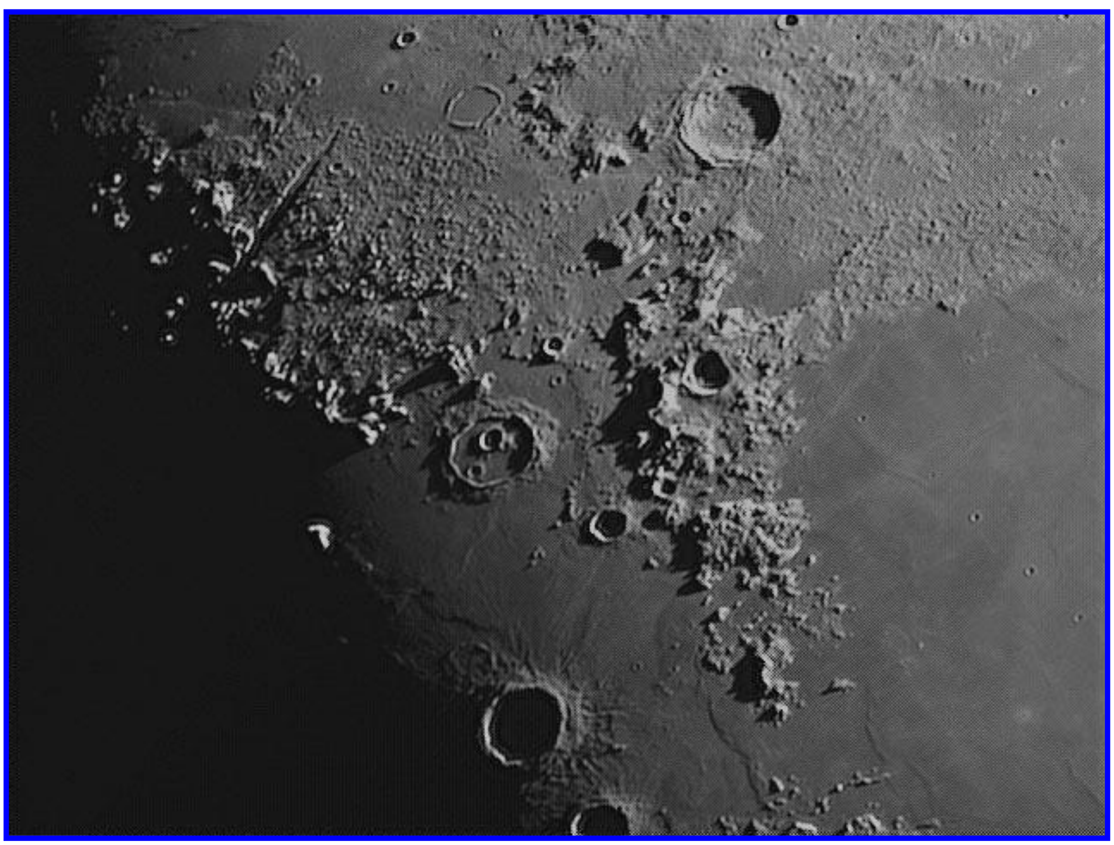


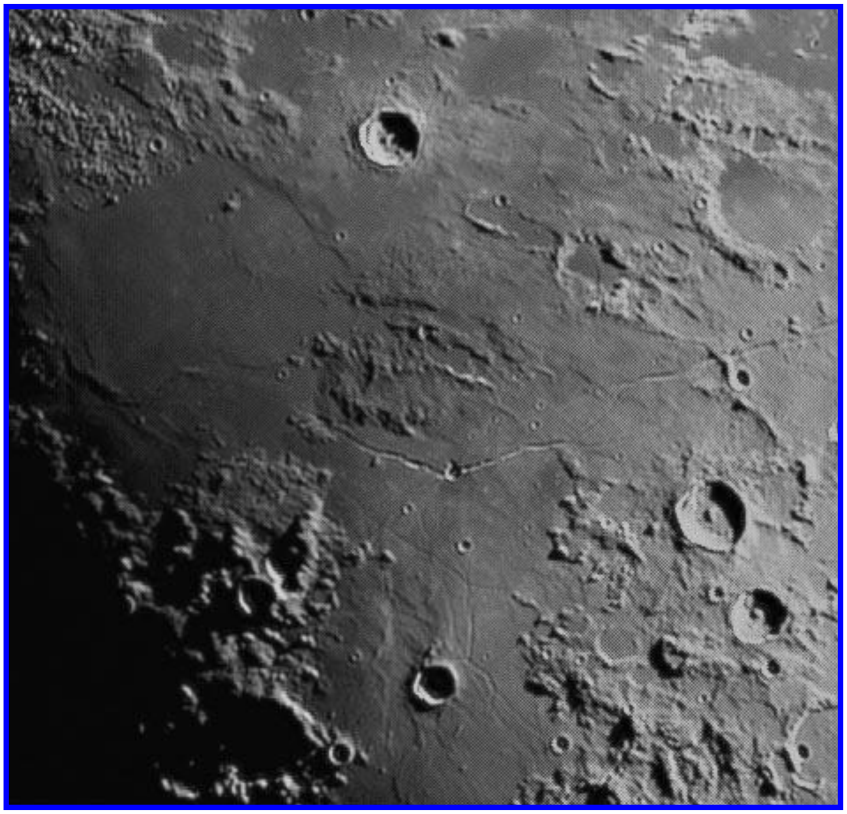
Kies Pi, *Alberto Anunziato, Paraná , Argentina. 16 February 2020 03:15-03:30 UT. 105 mm Meade EX Maksutov-Cassegrain telescope, 154 x.*



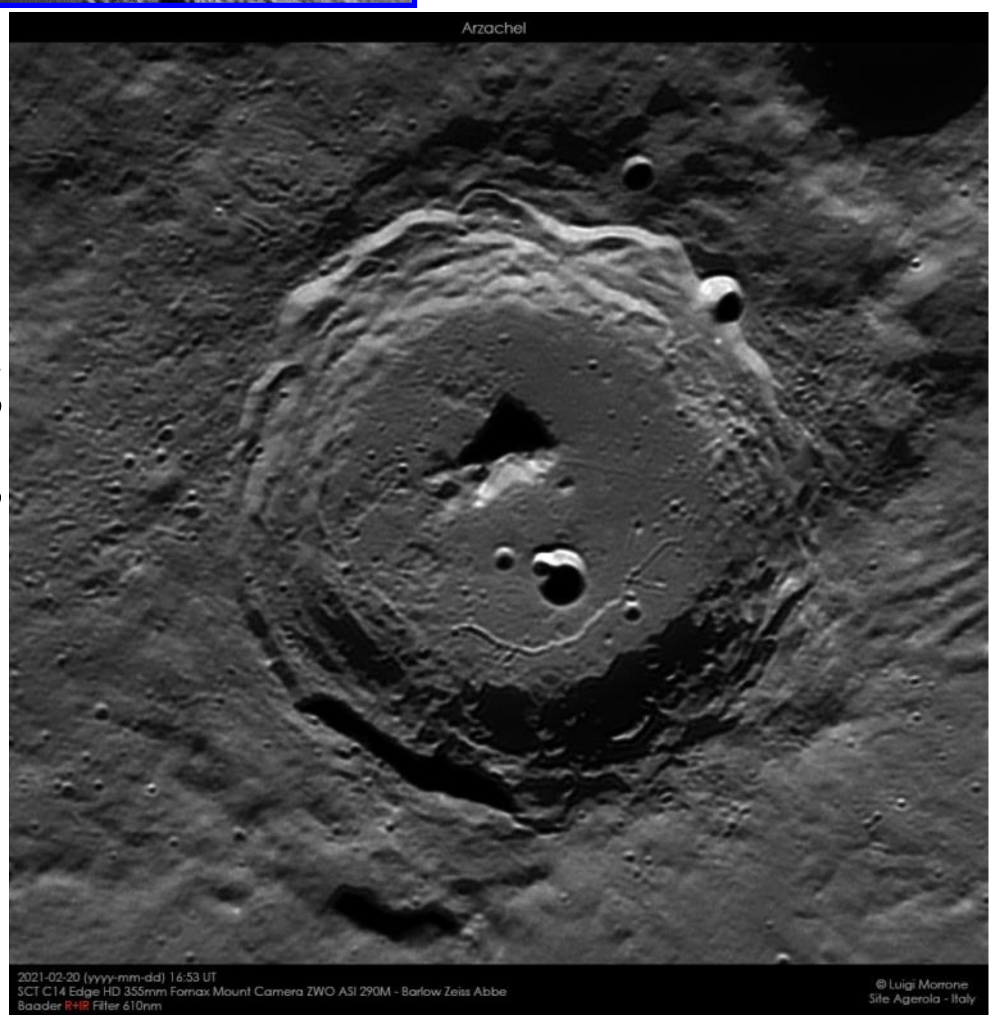
Alpine Valley, *Michael E. Sweetman, Tucson, Arizona, USA. 24 February 2018 06:59 UT. Celestron/Vixen 4 inch achromatic refractor telescope f/10 at f/20, Baader fringe killer filter, Skyris 132 M camera. Seeing 4/10, transparency 3/6.*

Cassini, *Guido Santacana, San Juan, Puerto Rico, USA. 21 January 2021 01:17 UT. 3.5 inch Questar Maksutov-Cassegrain telescope, ZWO ASI 224 mc camera. Seeing 5-7/10 and transparency 3/6.*





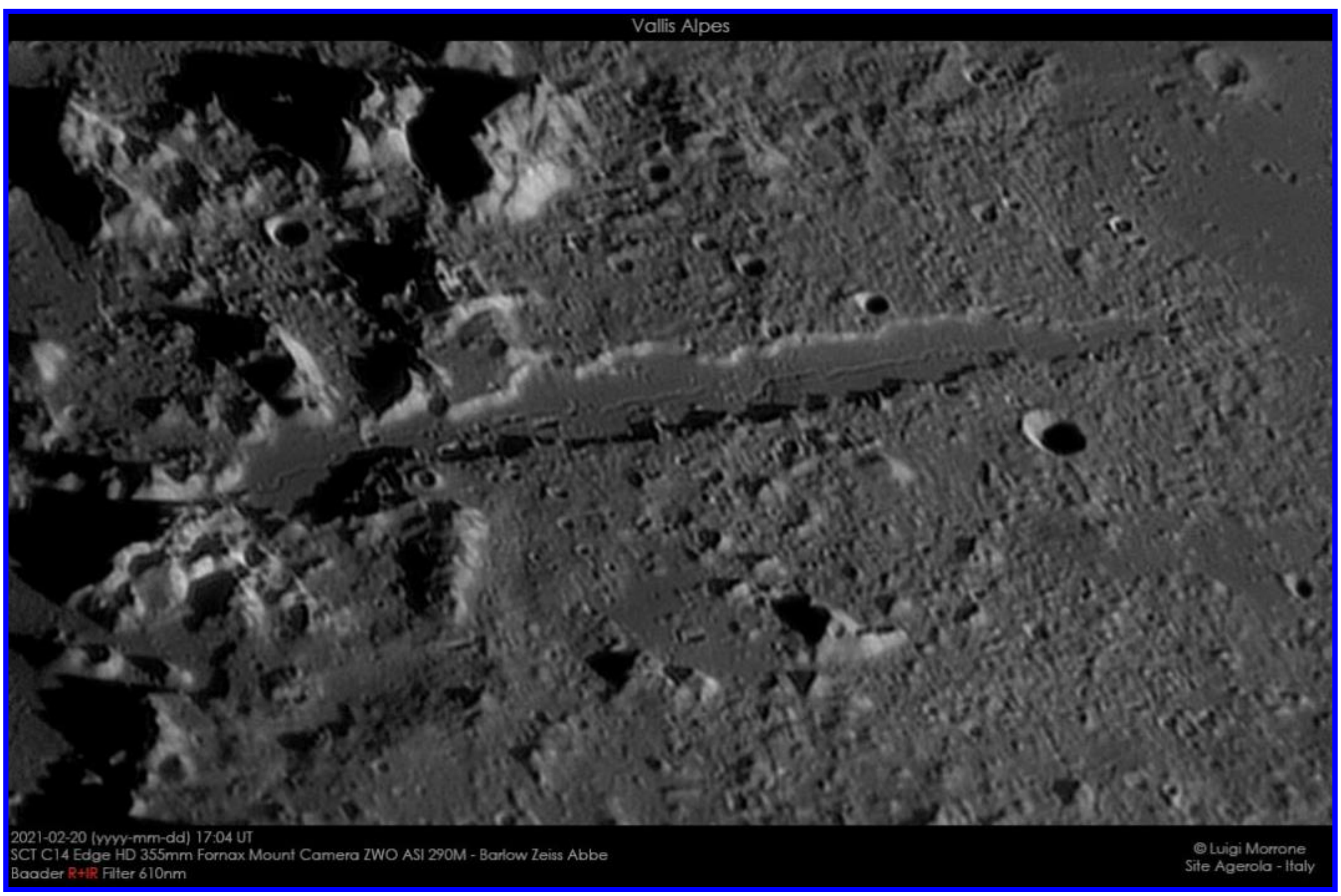
Rima Hyginus, *Guido Santacana, San Juan, Puerto Rico, USA. 21 January 2021 01:14 UT. 3.5 inch Questar Maksutov-Cassegrain telescope, ZWO ASI 224 mc camera. Seeing 5 -7/10 and transparency 3/6.*

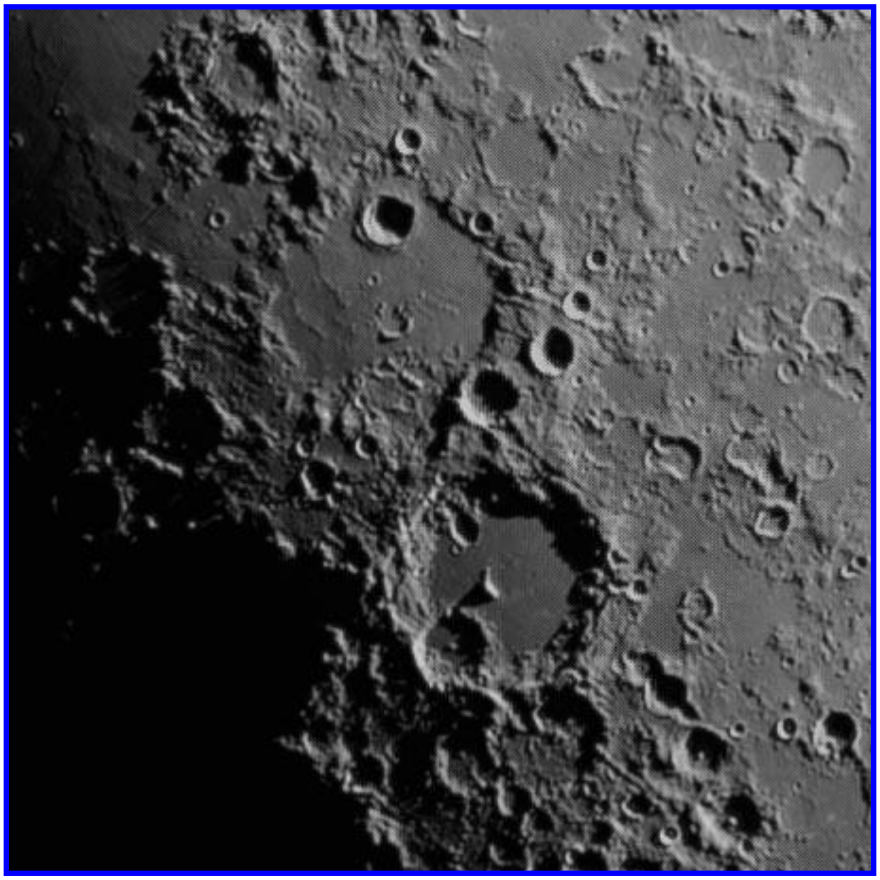


Arzachel, *Luigi Morrone, Agerola, Italy. 20 February 2021 16:53 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

Copernicus, *Guido Santacana, San Juan, Puerto Rico, USA. 06 July 2021 02:00 UT. 6 inch Maksutov-Cassegrain telescope, 2x barlow, f/24 Logitech Quickcam Pro 4000 camera.*

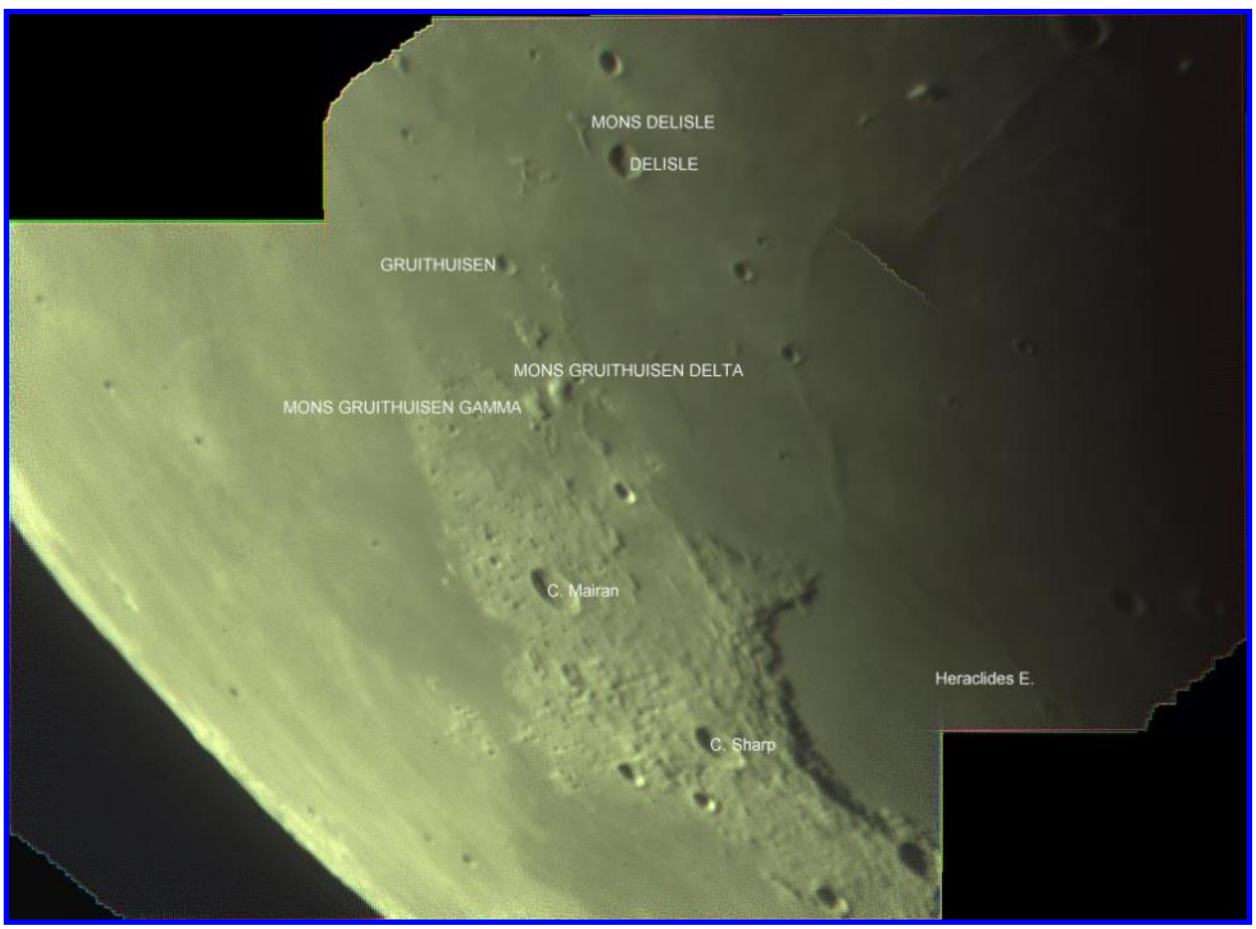
Vallis Alpes, *Luigi Morrone, Agerola, Italy. 20 February 2021 17:04 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

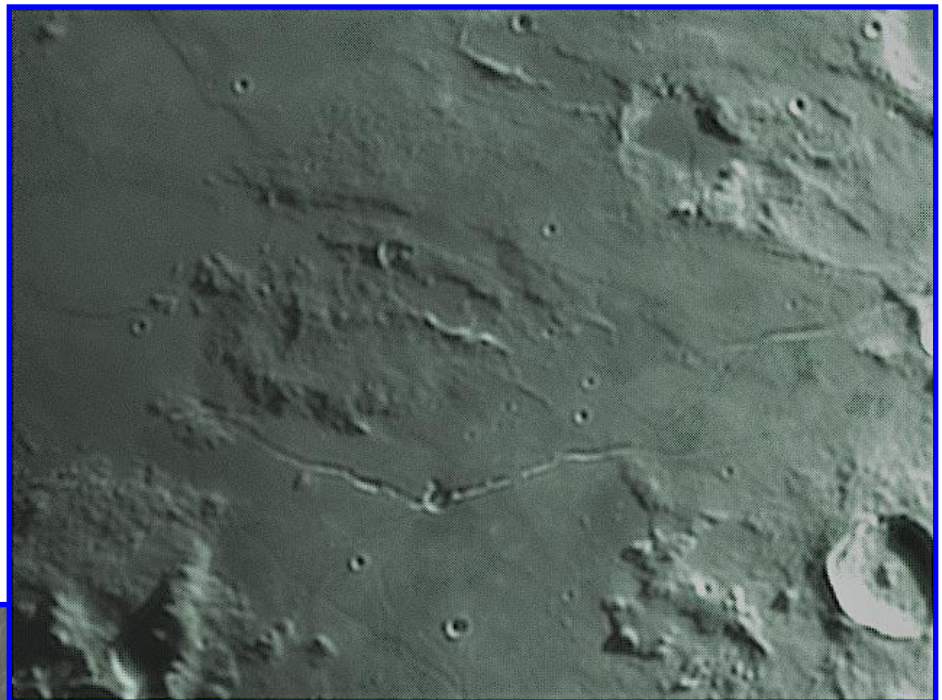




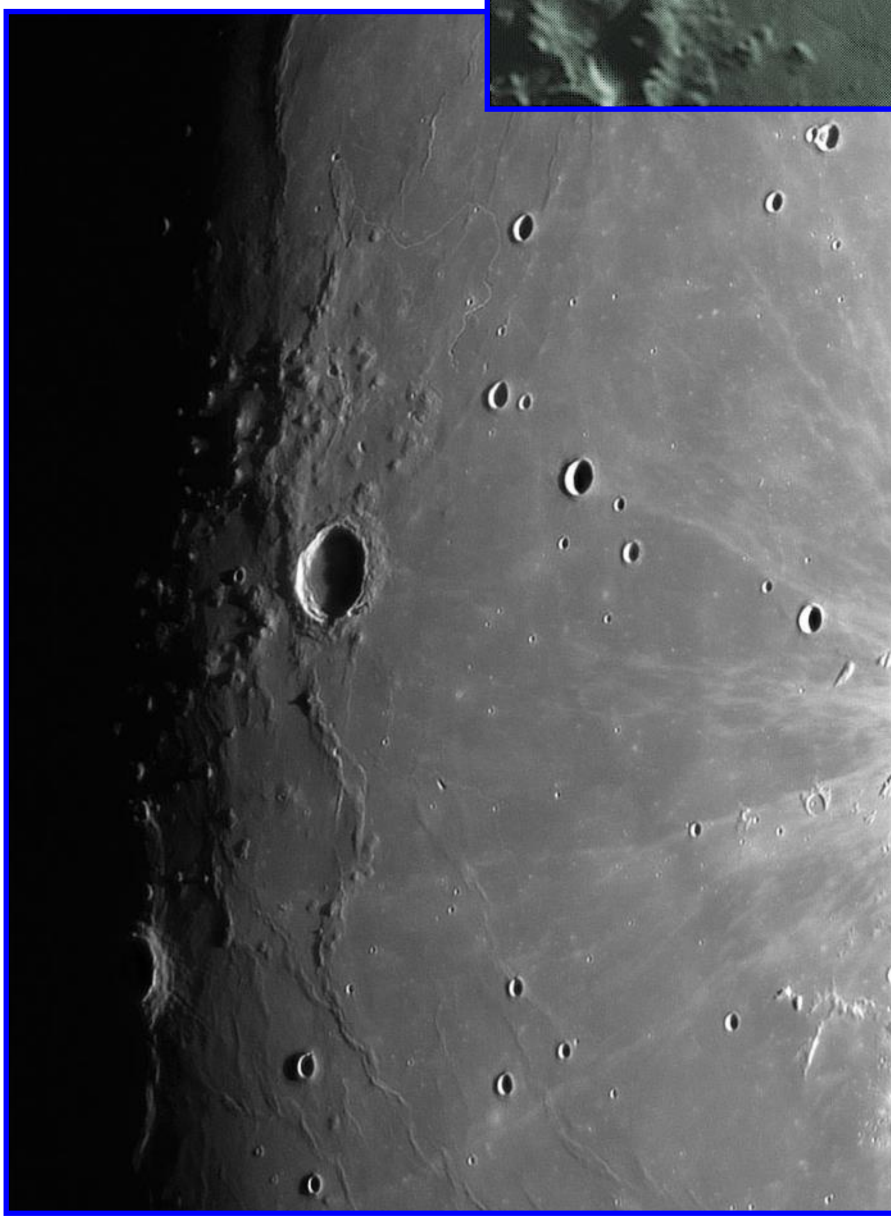
***Hipparchus,** Guido Santacana, San Juan, Puerto Rico, USA. 21 January 2021 01:21 UT. 3.5 inch Questar Maksutov-Cassegrain telescope, ZWO ASI 224 mc camera. Seeing 5-7/10 and transparency 3/6.*

***Mons Gruithuisen Delta and Gamma,** Fernando Surà, San Nicolás de los Arroyos, Argentina. 06 February 2021 06:45 UT. 127 mm Maksutov-Cassegrain telescope, Neximage 5 camera.*



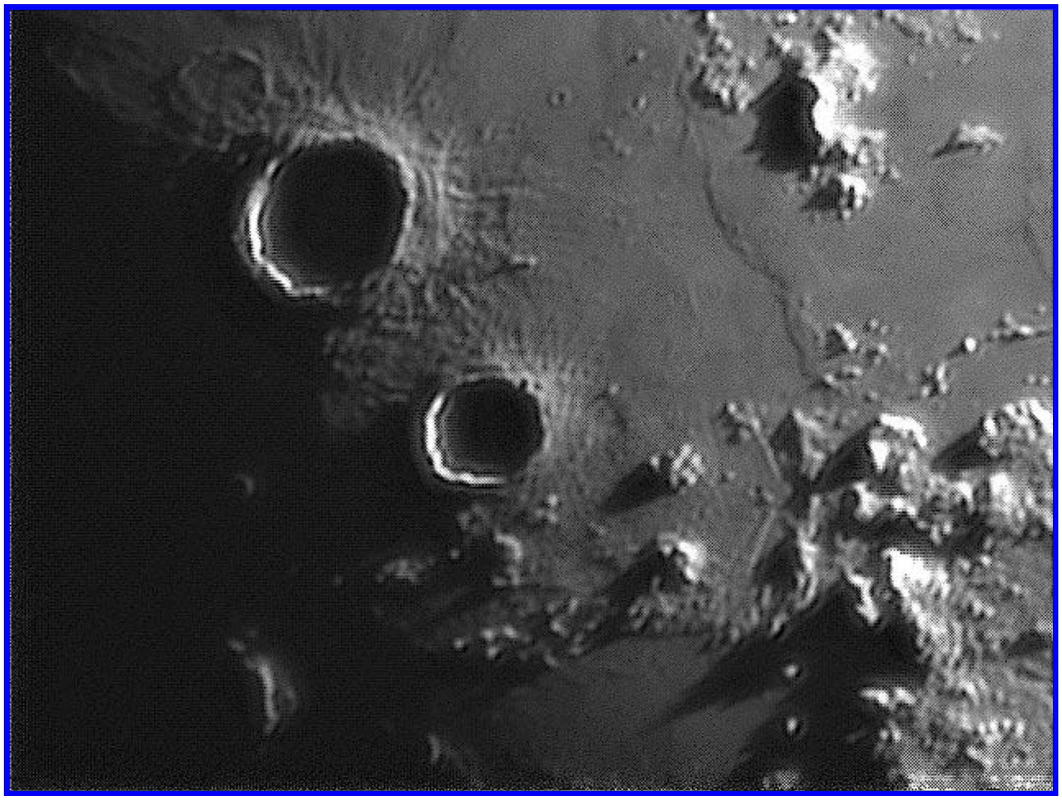


Rima Hyginus, *Guido Santacana, San Juan, Puerto Rico, USA. 21 January 2021 01:25 UT. 3.5 inch Questar Maksutov-Cassegrain telescope, 2x barlow, ZWO ASI 224 mc camera. Seeing 5-7/10 and transparency 3/6.*

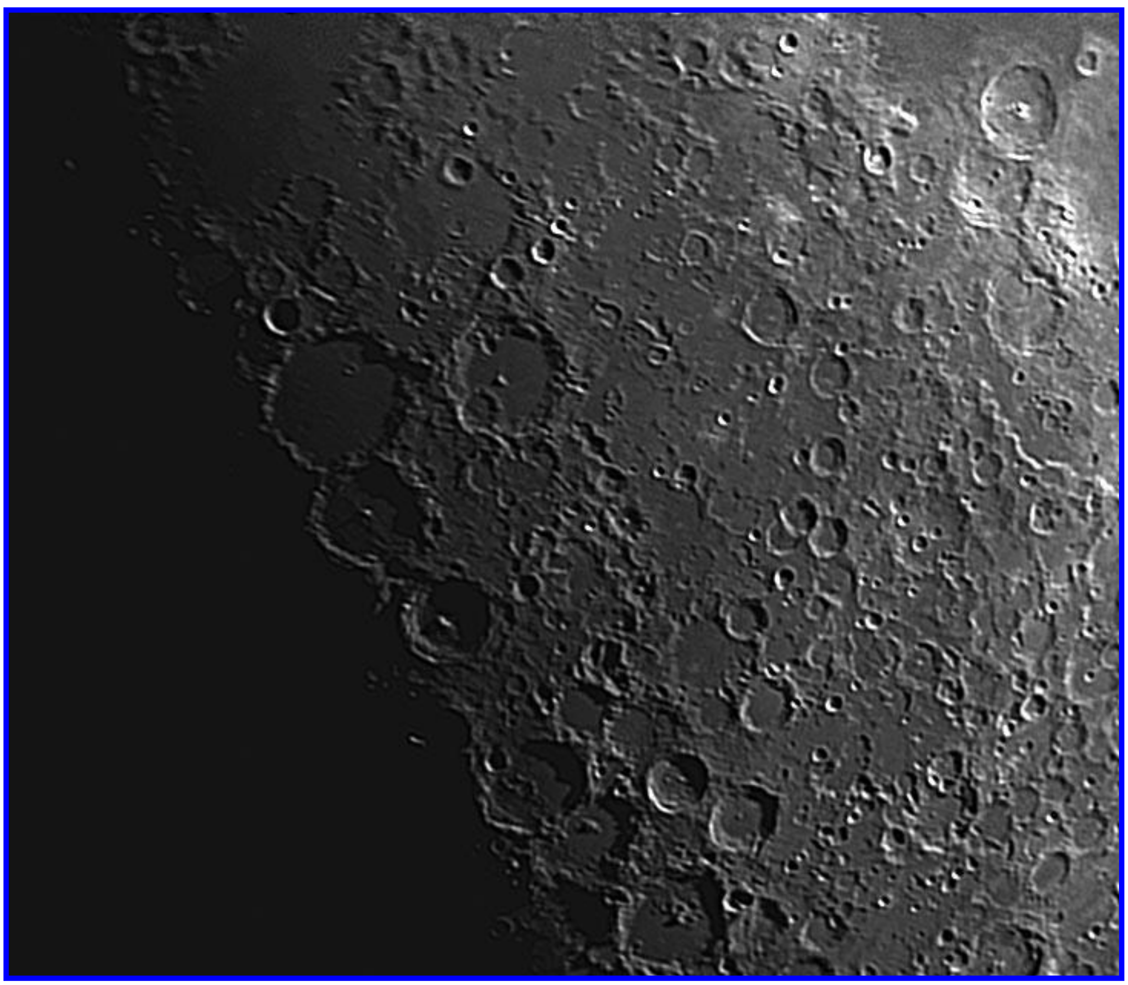


Marius, *Howard Eskildsen, Ocala, Florida, USA. 24 February 2021 01:30 UT, colongitude 54.2º. Celestron 9.25 inch Schmidt-Cassegrain telescope, f/10, Celestron Skyris 236M camera. Seeing 8/10, transparency 4/6. Howard writes:*

Sunrise reveals exciting views of the Marius Hills with Rima Marius snaking along the northeast margin of the hills. About two crater diameters south and slightly east of crater Marius, a small, oblong collapse pit is visible and close inspection shows the faint Rima Suess angling downward and to the right. Its namesake crater is the lowest of the trio forming a right triangle at the bottom center of the image. On the upper right, Bessarion B shows some slumping from the common wall between the larger and smaller crater of this double-impact feature.

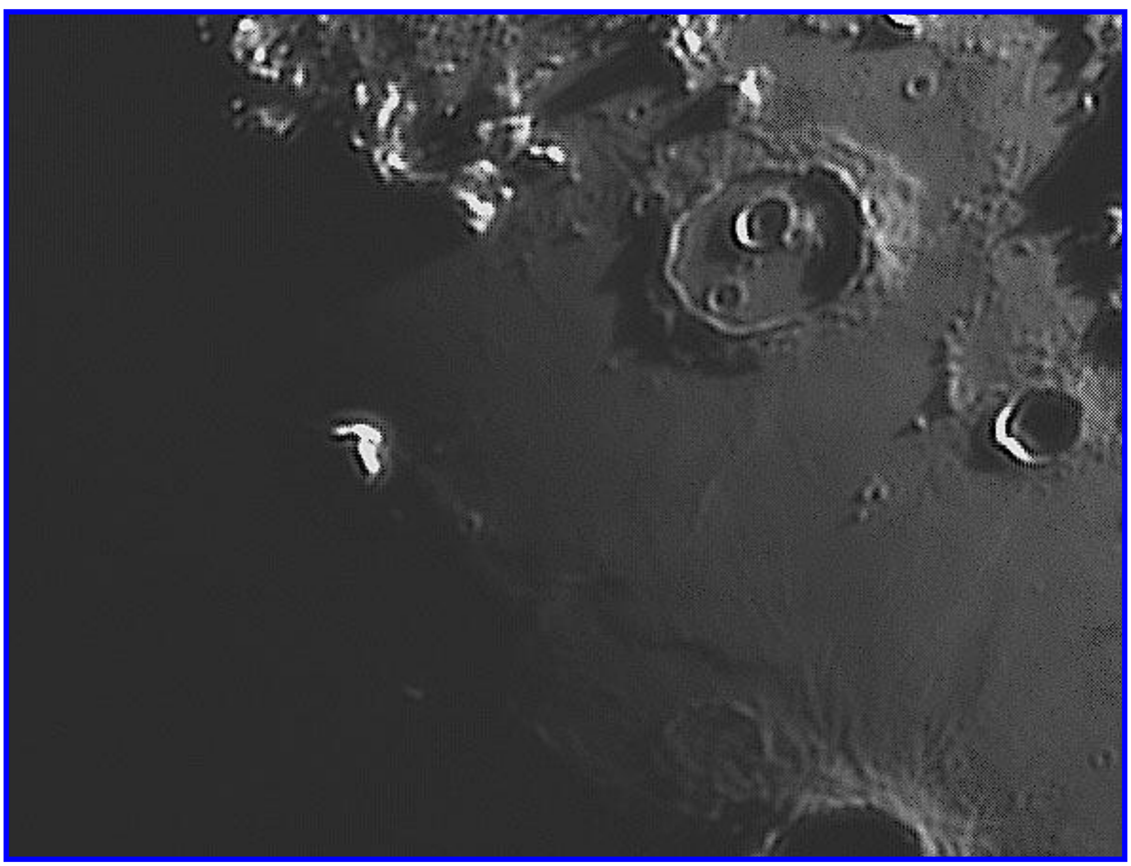


Aristillus and Autolycus, *Guido Santacana, San Juan, Puerto Rico, USA. 21 January 2021 01:39 UT. 3.5 inch Questar Maksutov-Cassegrain telescope, 2x barlow, ZWO ASI 224 mc camera. Seeing 5-7/10 and transparency 3/6.*

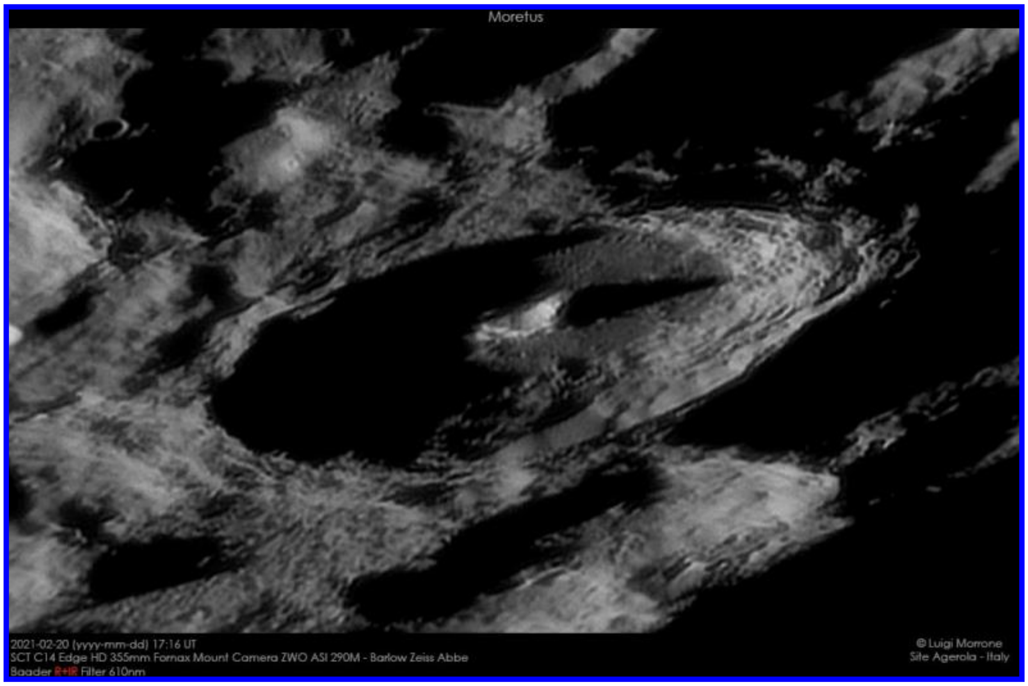


Alphonsus, *Walter Riccardo Elias, Oro Verde, Argentina. 19 February 2021 23:50 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.*

Nectaris and Theophilus, *Jesús Piñeiro, San Antonio de los Altos, Venezuela. 28 January 2016 06:35 UT. 10 inch Meade Schmidt-Cassegrain telescope, Canon EOS 50D camera.*



Mons Piton, *Guido Santacana, San Juan, Puerto Rico, USA. 21 January 2021 01:31 UT. 3.5 inch Questar Maksutov-Cassegrain telescope, 2x barlow, ZWO ASI 224 mc camera. Seeing 5-7/10 and transparency 3/6.*



Moretus, *Luigi Morrone, Agerola, Italy. 20 February 2021 17:16 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

Pickering, *Walter Riccardo Elias, Oro Verde, Argentina. 19 February 2021 23:49 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.*

Montes Apenninus, *Walter Riccardo Elias, Oro Verde, Argentina. 19 February 2021 23:53 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.*

Sömmering, *Luigi Morrone, Agerola, Italy. 20 February 2021 17:36 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

Rupes Recta, *Luigi Morrone, Agerola, Italy. 20 February 2021 16:57 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

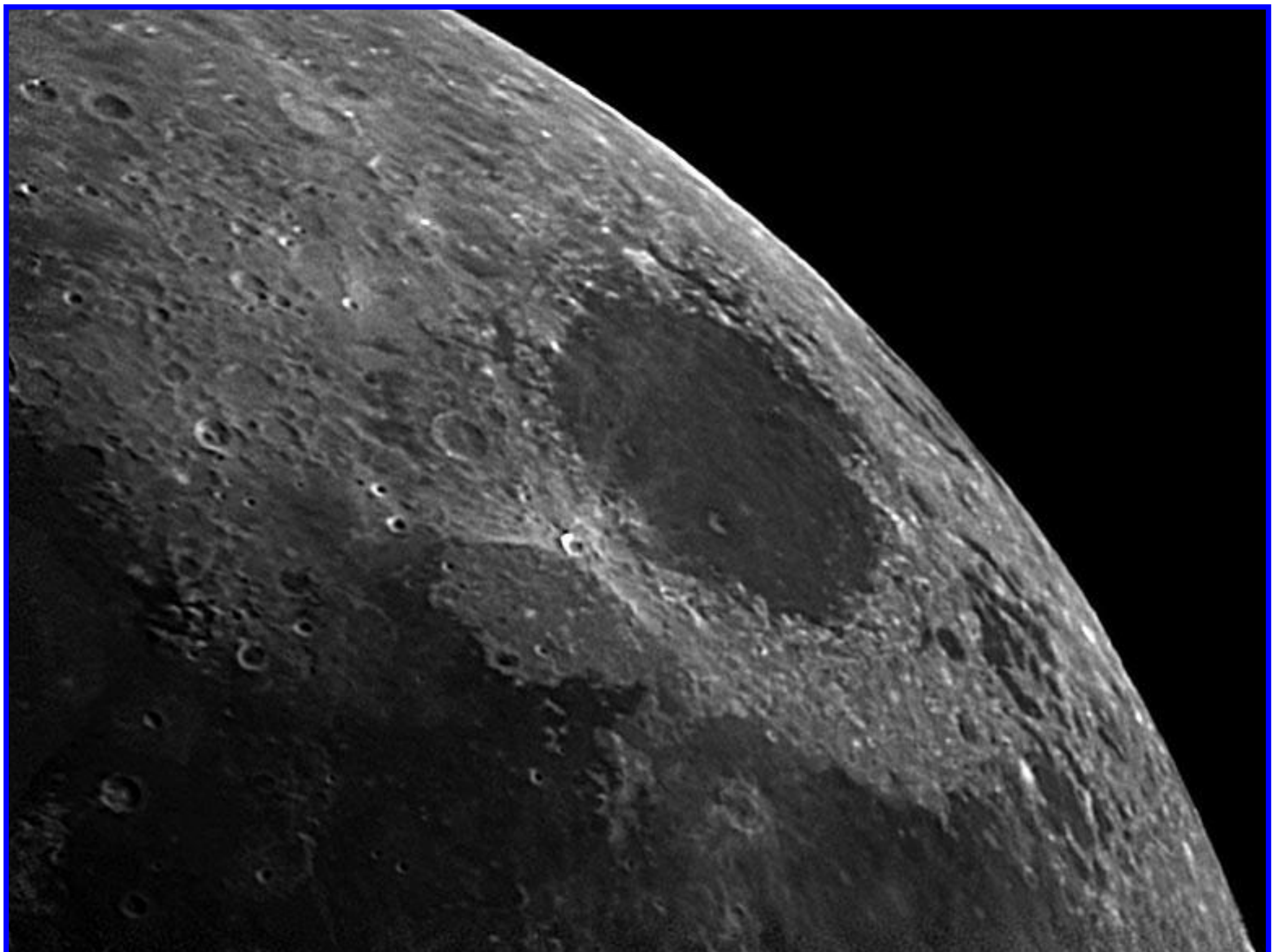
Pickering, *Walter Riccardo Elias, Oro Verde, Argentina. 19 February 2021 23:33 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.*

Waxing Crescent Moon, *Nick Evetts, Kempston Rural, Kempston Bedfordshire Great Britain. Albert George Childs Observatory. 15 February 2021 19:49 UT. Canary 2 Ultra-Wide-Field Canary Islands Observatory, Observatory code G40. Tele Vue 85 Apochromatic refractor telescope at f/5.6, Luminance, Red, Green, Blue, Ha (Hydrogen Alpha) filters, SBIG ST-10XME camera.*

Gassendi, *Luigi Morrone, Agerola, Italy. 23 February 2021 19:28 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

Hadley, *Luigi Morrone, Agerola, Italy. 20 February 2021 17:32 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

Proclus, *Walter Riccardo Elias, Oro Verde, Argentina. 19 February 2021 23:47 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.*



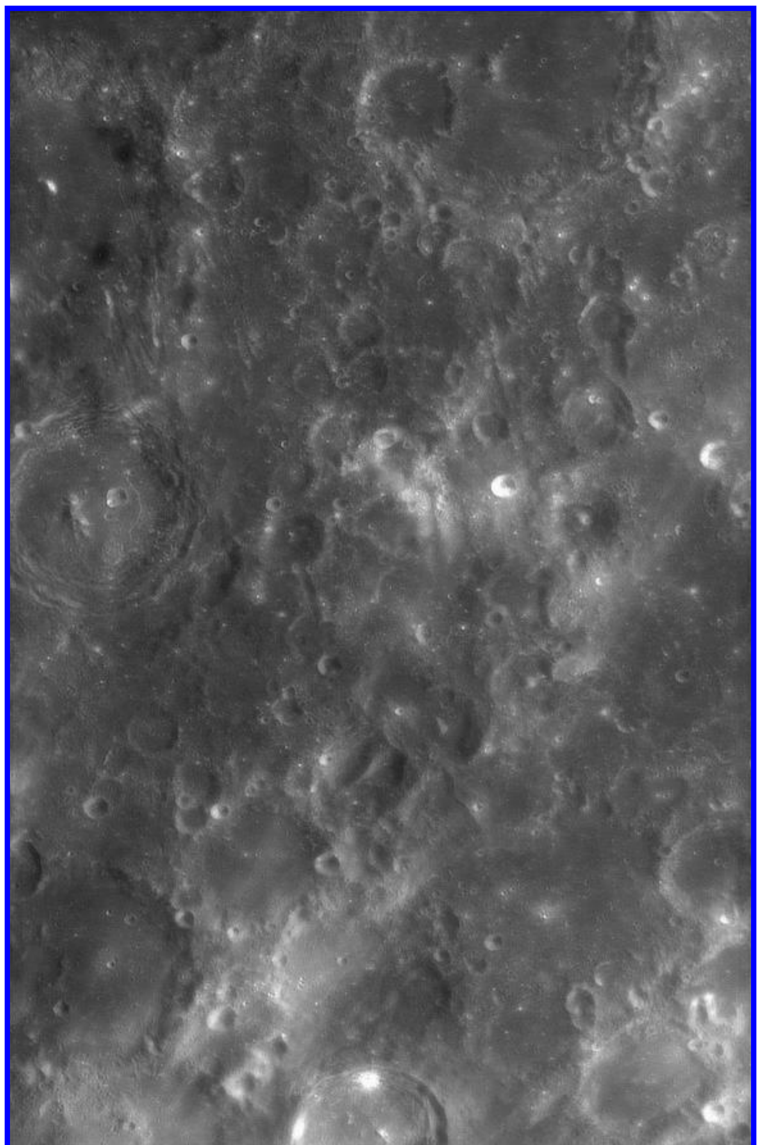
Gambart, *Luigi Morrone, Agerola, Italy. 20 February 2021 17:23 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

Waxing Gibbous Moon, *Walter Riccardo Elias, Oro Verde, Argentina. 19 February 2021 23:37 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.*

***Aristarchus,** Leandro Sid, AEA, Oro Verde, Argentina. 24 February 2021 00:09. Meade StarNavigator NG 90MAK Maksutov-Cassegrain telescope, Motorola One Fusion camera.*

***Airy Swirl,** Howard Eskildsen, Ocala, Florida, USA. 25 January 2021 02:11 UT, colongitude 50.1°. Celestron 9.25 inch Schmidt-Cassegrain telescope, f/10, 2x barlow, IR cut filter, Celestron Skyris 236M camera. Seeing 9/10, transparency 5/6. Howard writes:*

The image shows a dark lane, outlined by bright margins, running vertically in the upper central image with a bend to the left near its upper end. This has been described as a lunar swirl and is associated with a magnetic anomaly with force lines coursing downwards and focusing on the dark central lane. The vertical magnetic field lines would have little effect on the incoming solar wind. The magnetic field lines are more horizontal over the brighter lanes, possibly decreasing weathering from solar wind in the brighter regions that outline the dark lane.



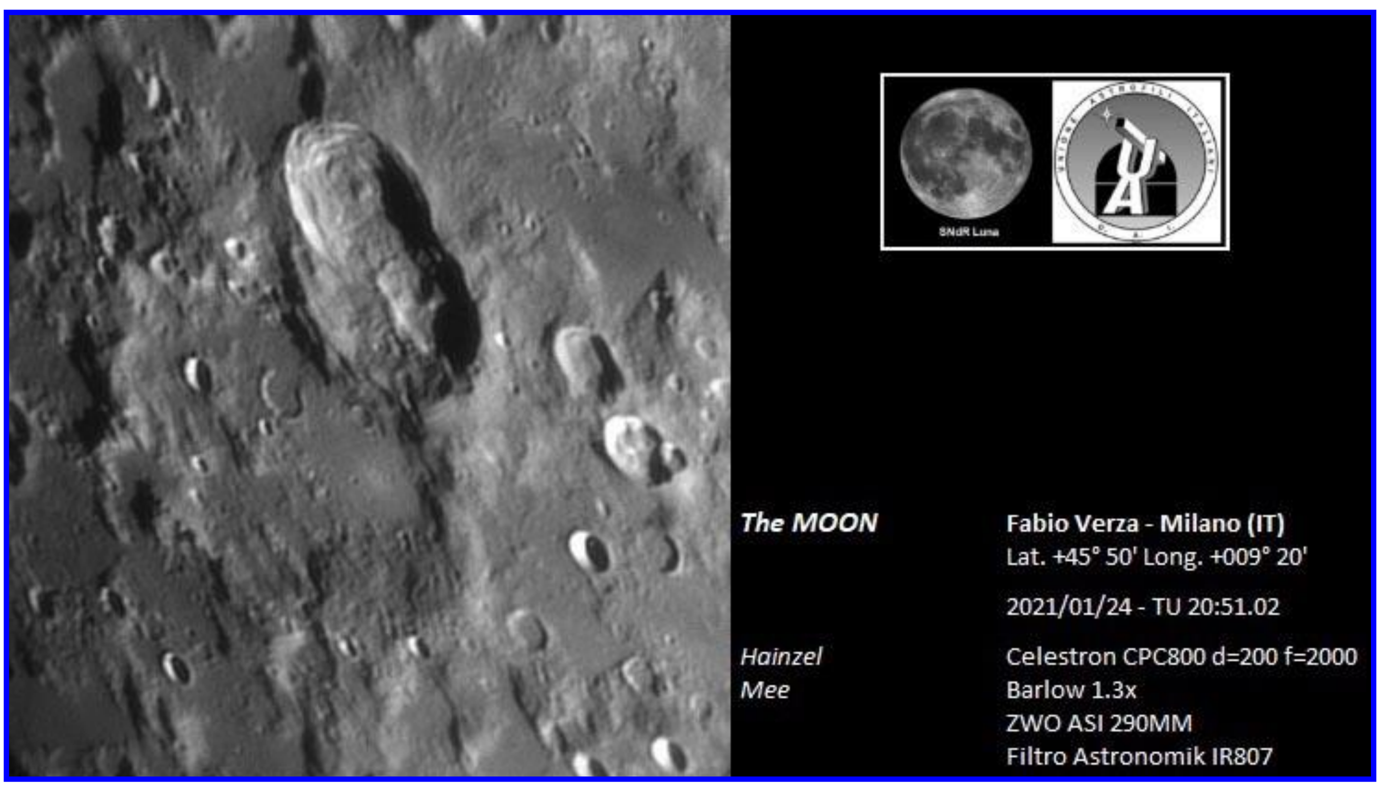
See:
INSIGHTS INTO LUNAR SWIRL MORPHOLOGY AND MAGNETIC SOURCE GEOMETRY: MODELS FOR THE REINER GAMMA AND AIRY ANOMALIES. Doug Hemingway (djheming@ucsc.edu) and Ian Garrick-Bethell, Earth & Planetary Sciences, University of California, Santa Cruz, 1156 High Street, Santa Cruz, California, 95060 (2012)

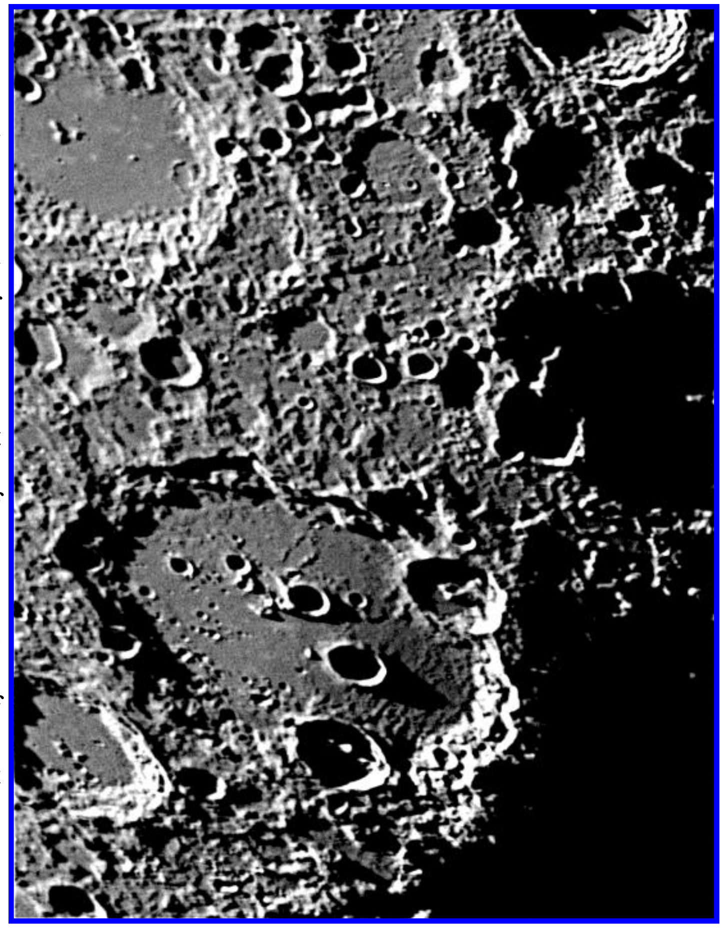
__Curtis,__ Walter Riccardo Elias, Oro Verde, Argentina. 19 February 2021 23:36 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.

__Clavius,__ Luigi Morrone, Agerola, Italy. 23 February 2021 19:43 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.

Vitello, *Luigi Morrone, Agerola, Italy. 23 February 2021 20:20 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*

Hainzel, *Fabio Verza, Milan, Italy, 24 January 2021 20:51 UT. Celestron CPC800 Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik IR 807 nm filter, ZWO ASI 290 mm camera.*

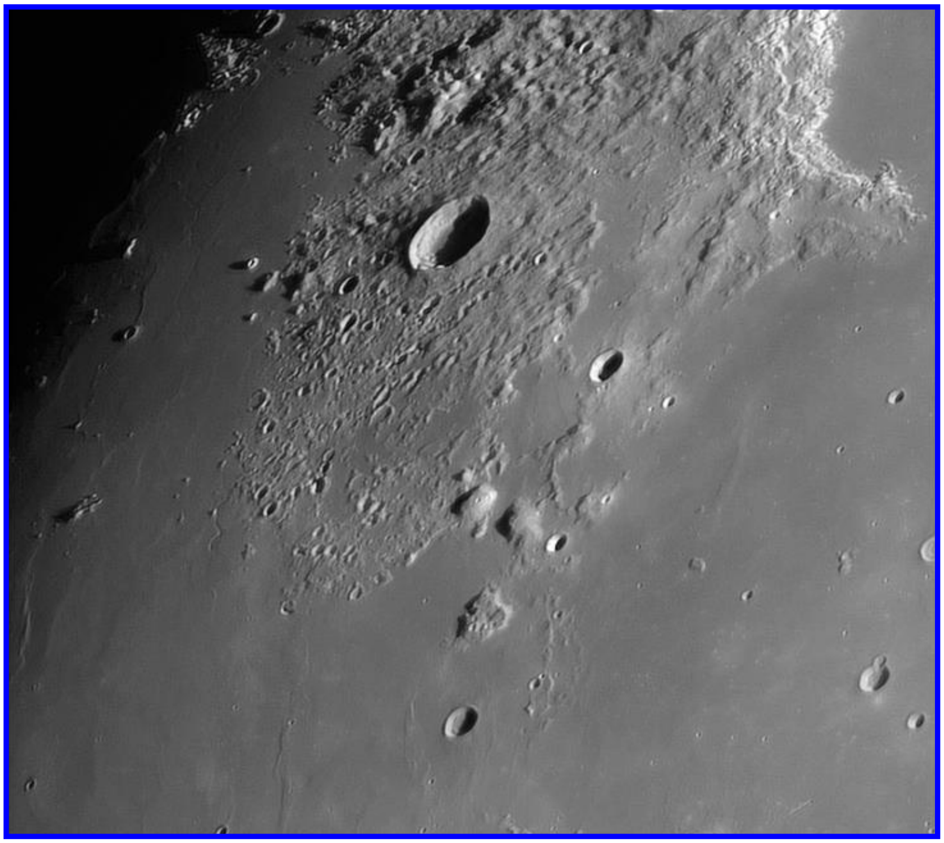




***Clavius**, Darryl Wilson. 08 November 2020 07:15 UT. 18 inch Obsession reflector telescope, Celestron Skyris 274 camera. Darryl adds:*

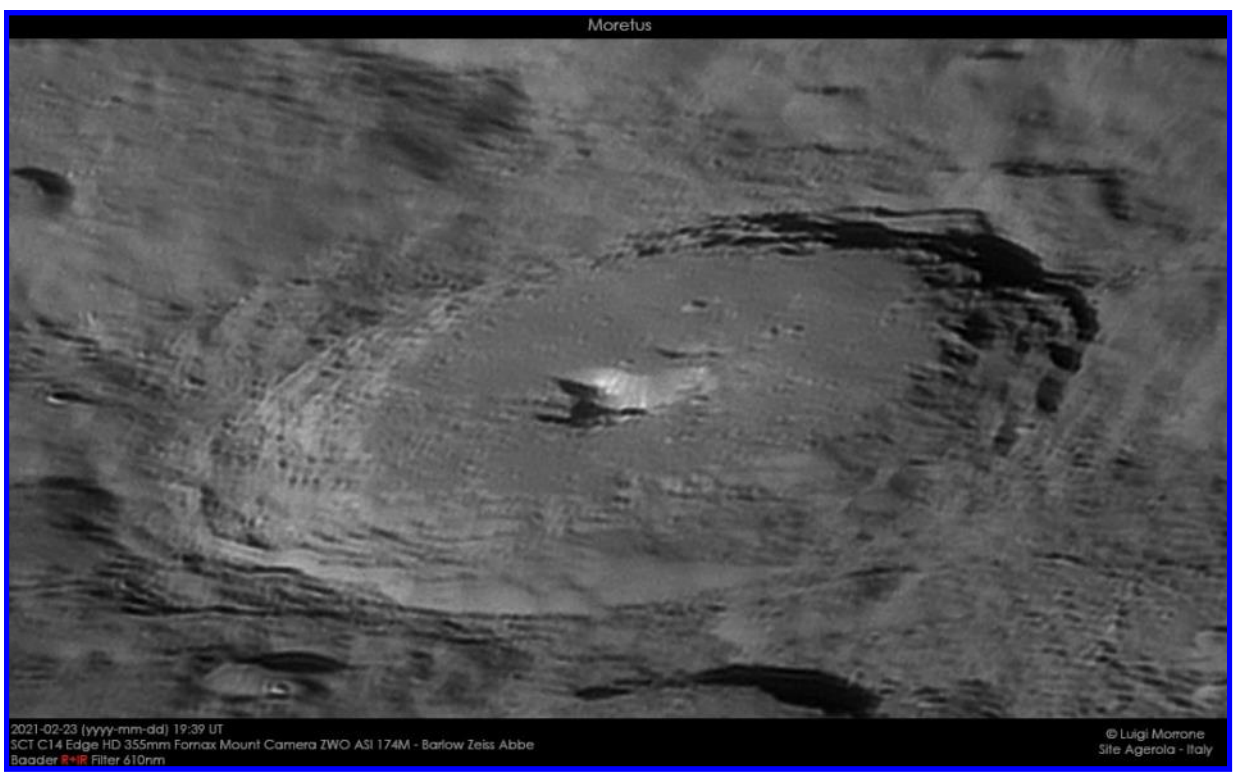
The image of Clavius on the cover of JALPO Vol. 63, No. 1, Winter 2021 is a beautifully detailed view of sunrise on the crater. Figure 1, taken November 8, 2020 at 0715 UT shows its appearance at sunset. One can more fully appreciate subtle terrain features if images illuminated from both the east and the west are simultaneously available. At the top right of the image, sunlight skims the top of Tycho's central peaks, casting a shadow reaching to the base of the inner crater wall. At upper left, several small craterlets, a cluster of three small peaks, and a separate tiny peak are all resolved on the floor of Longomontanus. A word of caution - although this image shows considerable detail, a close examination of the lower 15% shows horizontal striations indicative of electronic noise during the imaging process. Although the noise may be contained to that area, it could also be present elsewhere in the image, so some of the very smallest features could be distorted.

***Sinus Iridum,** Luigi Morrone, Agerola, Italy. 23 February 2021 20:34 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*



Mairan and Gruithuisen, *Howard Eskildsen, Ocala, Florida, USA. 24 February 2021 01:33 UT, colongitude 54.7°. Celestron 9.25 inch Schmidt-Cassegrain telescope, f/10, Celestron Skyris 236M camera. Seeing 8/10, transparency 4/6.*

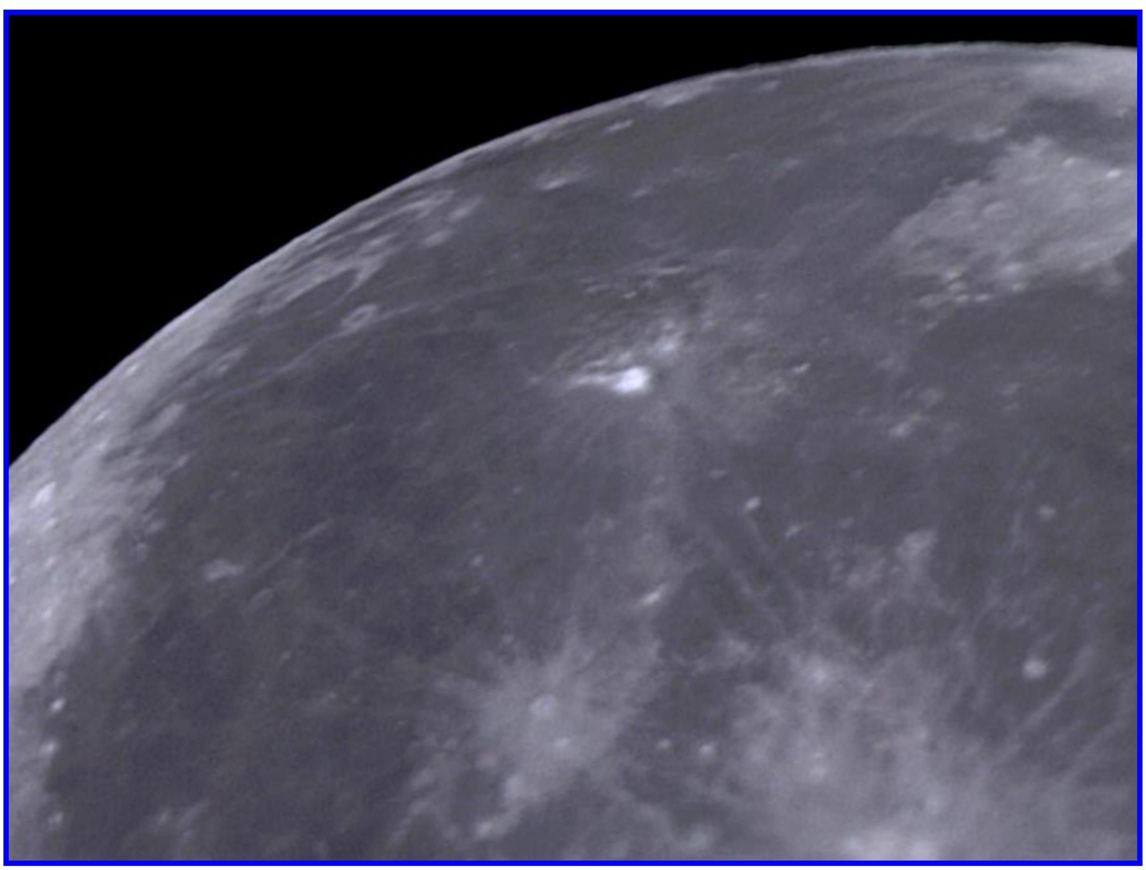
Moretus, *Luigi Morrone, Agerola, Italy. 23 February 2021 19:39 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*



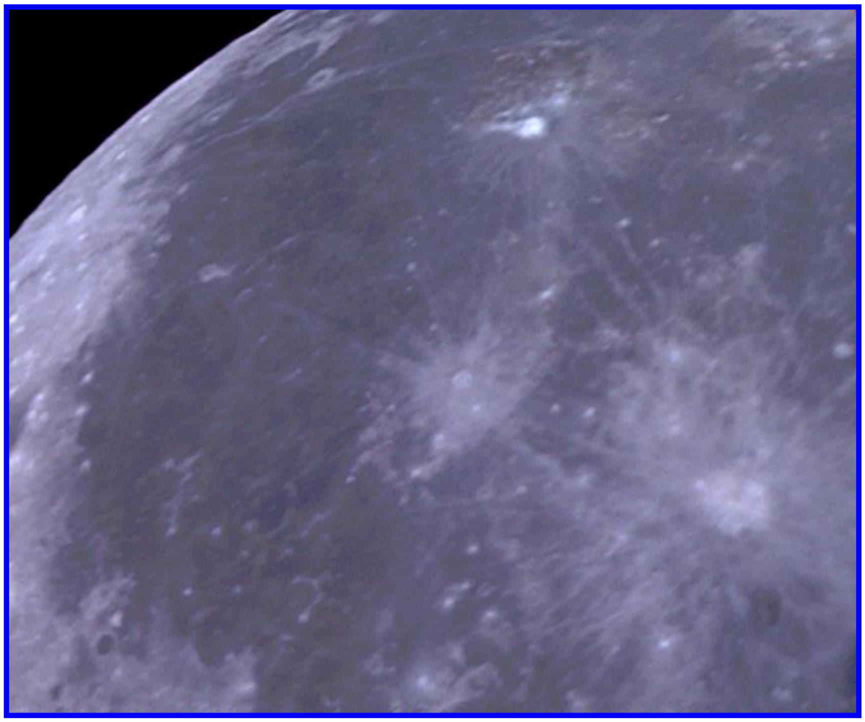
Full Moon, *Walter Riccardo Elias, Oro Verde, Argentina. 28 February 2021 02:30 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.*

Montes Apenninus, *Fabio Verza, Milan, Italy, 24 January 2021 21:39 UT. Celestron CPC800 Schmidt-Cassegrain telescope, 1.3 x barlow, ZWO ASI 120 MC camera.*

Anaxagoras, *Luigi Morrone, Agerola, Italy. 23 February 2021 19:53 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Zeiss Abbe Barlow, Fornax mount, Baader R + IR 610 nm filter, ZWO ASI 290 M camera.*



Aristarchus, *Walter Riccardo Elias, Oro Verde, Argentina. 28 February 2021 03:32 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.*



Kepler, *Walter Riccardo Elias, Oro Verde, Argentina. 28 February 2021 04:31 UT. Helios 114 mm reflector telescope, QHY5-ll C camera.*

Herodotus Omega, *Howard Eskildsen, Ocala, Florida, USA. 24 February 2021 01:30 UT, colongitude 54.7º. Celestron 9.25 inch Schmidt-Cassegrain telescope, f/10, Celestron Skyris 236M camera. Seeing 8/10, transparency 4/6. Howard writes:*

Lunar Geologic Change Detection Program

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2021 March

Introduction: In the set of observations received in the past month, these have been divided into three sections: Level 1 is a confirmation of observation received for the month in question. Every observer will have all the features observed listed here in one paragraph. Level 2 will be the display of the most relevant image/sketch, or a quote from a report, from each observer, but only if the date/UT corresponds to: similar illumination (±0.5º), similar illumination and topocentric libration report (±1.0º) for a past LTP report, or a Lunar Schedule website request. A brief description will be given of why the observation was made, but no assessment done – that will be up to the reader. Level 3 will highlight reports, using in-depth analysis, which specifically help to explain a past LTP, and may (when time permits) utilize archive repeat illumination material.

LTP reports: No LTP reports were received in January.

Level 1 – All Reports received for January: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Aristarchus, Censorinus, Daniell, Mons Piton, Plato, Ptolemaeus, Ross D, Timocharis, and Torricelli B. Alberto Anunziato (Argentina - SLA) observed: Aristarchus, Eratosthenes, and Plato. Massimo Alessandro Bianchi (Italy – UAI) imaged several features. Maurice Collins (New Zealand – ALPO/BAA/RASNZ) imaged: several features. Rob Davies (Devil's Bridge, UK – BAA/NAS) imaged: Bullialdus, Copernicus, Palus Epidemiarum, and Sinus Iridum. Anthony Cook (Newtown, UK – ALPO/BAA/NAS) videoed: several features. Daryl Dobbs (Risca, UK - BAA) observed: Alphonsus, Birt, and Proclus. Les Fry (West Wales, UK – NAS) imaged: Anaxagoras, Atlas, Bullialdus, Janssen, Lacus Timoris, Montes Carpatus, Montes Riphaeus, Palus Epidemiarum, Palus Somni, Plato, Promontorium Kelvin, Promontorium Laplace, Santbech, Sinus Iridum, and Vlacq. Rik Hill (Tucson, AZ, USA – ALPO/BAA) imaged: Archimedes, Aristarchus, Petavius, Sinus Asperitatis, Vallis Rheita and several features. Davide Pristritto (Italy – BAA) imaged: Eudoxus. Trevor Smith (Codnor, UK – BAA) observed: Alphonsus, Aristarchus, Bullialdus, Censorinus, Curtis, Eratosthenes, Herodotus, Hyginus N, Mons Piton, Plato, Proclus, Sinus Iridum, and Vallis Schroteri. Bob Stuart (Rhayader, UK – BAA/NAS) imaged: Atlas, Capella, Carmichael, Clavius, Macrobius, Maskelyne, Romer and several features. Franco Taccogna (Italy – UAI) imaged: Eudoxus. Aldo Tonon (Italy – UAI) imaged: Aristarchus and several features. Gary Varney (Pembroke Pines, FL, USA – ALPO) imaged Theophilus. Fabio Verza (Italy – UAI) imaged: Aristarchus.

Level 2 – Example Observations Received:

Eudoxus: On 2021 Jan 19 UT 16:26, 16:28 Franco Taccogna (UAI) and at 18:19 UT Davide Pristritto (BAA) imaged this crater for a repeat illumination request for the following LTP report:

On 1881 May 04 at UT 20:00? Trouvelot (Meudon, France) observed an unexplained light inside Eudoxus crater. The Cameron 1978 catalog ID=222 and the weight=3. The ALPO/BAA weight=3.

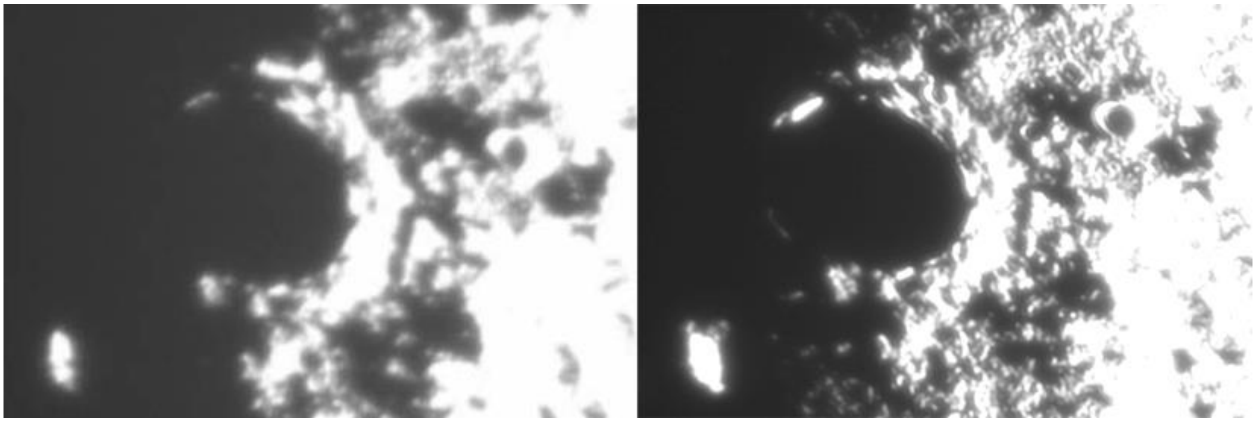

Figure 1. Contrast stretched views of Eudoxus, taken on 2021 and orientated with north towards the top. (Left) As imaged by Franco Taccogna (UAI) at 16:28UT. (Right) As imaged by Davide Pristritto (BAA) at 18:19UT.

There is nothing unusual in the shadowed area of either image in Fig 1, despite contrast stretching, though there is a filament from the south western rim starting to appear in Davide's image, though whether Trouvelot would have been tricked by this is doubtful?

Ptolemaeus: On 2021 Jan 21 UT 02:40-03:00 Jay Albert (ALPO) observed visually and imaged this crater for a repeat illumination request for the following report:

Ptolemaeus 2020 Feb 01 UT 19:40-19:50 P. Sheperdson (York, UK, 102mm Mak - BAA) saw an "ashen" sliver of bright light across the floor. Images taken. This maybe normal appearance - though observer re-observed in May and found the effect different in that there was no "ashen" like effect. Visual sketches and time lapse image sequences welcome. If doing visual work – try using a polaroid filter and rotate it to see if that makes any difference. For imaging work, please over-expose slightly to bring out detail on the floor; you could also try color imaging of the floor as an interesting experiment - though for comparison purposes image other terminator features exhibiting shadow spires. ALPO/BAA weight=1.

Figure 2. *Ptolemaeus as imaged by Jay Albert (ALPO) with an iPhone held up to the eyepiece on 2021 Jan 21. Color saturation increased to 60% and orientated with north towards the top.* ***(Left)*** *Taken at 02:53UT.* ***(Right)*** *Taken at 02:56UT with a slightly longer exposure to bring out detail in the shadow.*

Jay commented that he easily saw what he regarded as the “ashen sliver of light” on the shadowed floor of the crater. The sliver ran roughly E-W and was located S of the central part of the floor, but not close to the S wall. He used 290x to observe visually and used the same eyepiece for iPhone images (See Fig 2) of Ptolemaeus. The nature of the original LTP report depends upon what an observer’s definition of Ashen Light” means. There are several references to past “ashen” light effects on flat floored craters e.g., the floor of Plato and Ptolemaeus. I sent the images to Phil Sheperdson for his comments and he replied: *“What intriguing images. My recollection is how ghostly white and stark the streak was across the floor and these two images certainly come very close to what I observed that night. If only it had been a better night for me, I would have taken better images.“*

Proclus: On 2021 Jan 21 UT 19:35-20:05 Daryl Dobbs (BAA) viewed this crater under similar illumination to the following reports:

On 1995 Jul 06 at UT 03:22-03:57 R. Spellman (Los Angeles, USA found that the floor of Proclus appeared to darken slightly through a blue filter. The ALPO/BAA weight=2. Source of this observation came from Spellman's web site.

Proclus 1972 Aug 17 UT 20:05-21:10 Observed by Haiduk (13.25E, 52.5N, 60mm refractor, S=1, T=3) "Well visible bright area at the NE wall, end of event uncertain for seeing became poor" Hilbrecht & Kuveler Moon & Planets (1984) Vol 30, pp53-61.

Daryl comments that: with respect to the first report that he had observed this area many times, it appeared perfectly normal, a dark area under the SE wall was observed, but had seen this feature before and it looked like lava. It was easier to see through a blue filter than the others he used but this was more down to reducing the glare – in his opinion. If this was the feature in the above report then it was normal, A blue filter did enhance the view more so than through yellow, green or red in which he found it harder to see.

With respect to the second report, he noted that: the NE wall was indeed bright, but no brighter than usual, filters didn't make any difference, perhaps with a small refractor and poor seeing the observer had internal reflections in his telescope/eyepiece combination. Daryl certainly didn't see anything unusual.

Plato: On 2021 Jan 21 UT 23:30-23:35 and 23:45-00:07 Alberto Anunziato (SLA) observed visually this crater under similar illumination to the following report:

Plato 1925 Jun 20 UT 20:00? Observed by Markov (Russia) "Light bands in bottom seen in shadow & did not seem to be elevations. These have been seen 5X from 1913-1922." NASA catalog weight=3. NASA catalog ID #391. ALPO/BAA weight=2.

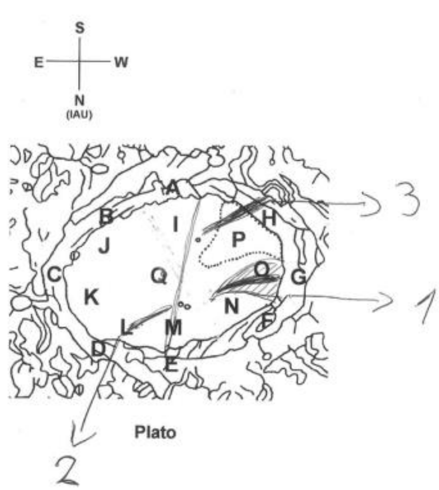

Figure 3. *Plato with the locations of annotated stripes indicated by Alberto Anunziatio from 2021 Jan 21 UT 23:30-23:35 and 23:54-00:07. Orientated with north towards the bottom.*

Alberto comments that he could distinguish a narrow stripe which was not too bright, in the dark part of the crater, marked as “a” in Fig 3. There was another stripe, but even less bright (almost invisible at times) in the brighter part of the floor, and marked as (2) in Fig 3.At 23:54-00:07UT a new stripe was seen in the darker (west) section of the floor and is indicated by a 3 in Fig 3. Stripe No. 1 was the widest of the stripes and could be an extension.

Copernicus: On 2021 Jan 23 UT 19:28 Rob Davies (BAA) imaged this crater under similar illumination to the following report:

Observed by G.H. Johnstone of Albuquerque, NM, USA on 1954 Nov 05 UT 20:00 (according to Cameron), but 02:00-04:00 according to the original observation and at colongitudes 34.7 to 35.7 deg. 4" reflector, x150 used. The observer reported that the western part (about 1/3rd of the interior) was pitch black with shadow. However, there was a zone about as wide, or perhaps only a fourth of the total width that was distinctly a lighter bluish shade, almost like twilight. The shadows of the peaks on the western edge of the rim were clearly seen crossing this bluish shadowed area. Then this area ended sharply, and the far side was bathed in light from the rising sun. The shadows of the peak were sharply defined across the twilight zone, and the edge of the pitch-black shadow was easily defined but not as sharp as the darker shadows crossing the blue twilight zone. The observer checked other craters but did not see this condition in any of them - they all had the abrupt division between black and white that we would normally expect to see. Cameron 1978 catalog ID=579 and weight=2. Reference 1962 edition of ALPO's Journal: The Strolling Astronomer. ALPO/BAA weight=3.

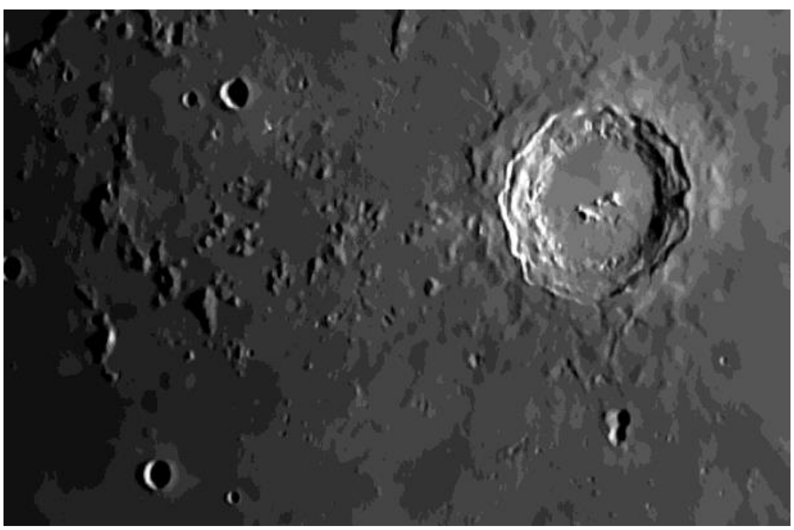

Figure 4. *Copernicus as imaged by Rob Davies (BAA) on 2021 Jan 23 UT 19:28 and orientated with north towards the top.*

As you can see from Fig 4, although the quoted colongitudes are correct (see p142 of the “Hatfield Lunar Atlas: Digitally Enhanced Version”), the description is not typical for the colongitudes given indeed it would have been closer to a colongitude of ~26°.

Plato: On 2021 Jan 23 UT 19:23-20:00, 20:23-20:40, 22:07-22:25 Trevor Smith observed and at 20:16 Les Fry imaged this crater under similar illumination to the following two reports:

1981 Jun 12 Palo: P. Moore at 21:10 found the southern wall (and onto the southern floor) of the crater to be indistinct. Elsewhere in the crater everything was sharp. The effect was still seen at 21:42UT, but less strong. A check was made for color with a Moonblink device, but none was seen. There was still a trace of this effect at 21:44UT, although detail was now becoming visible. By 21:48UT vertical streaks were seen crossing the floor from the obscuration area and these were more visible in the red filter and not in the blue. Cameron comments that undefined patches on the floor of Plato are not normal. By 21:55UT some craterlets on the floor started to become visible and the LTP for Moore ended by UT22:23. P.Foley was alerted by Moore and saw a "massive dense obscuration on the south wall, south floor and south outer glacis to the Mare". Foley noted that by 21:50UT the effect was fading and finished by 22:03UT. Foley reported an orange translucent haze covering half of the floor, but floor craterlets could be seen on and off - however his atmospheric seeing conditions were IV. At 22:00 UT Foley reported the floor close to the north wall to be "milky or misty". No detail was visible at 21:15UT and variability in the floor continued until 23:10UT. Hedley-Robinson was alerted at 21:35UT and found no difference between red and blue views of the area, however he did find that the south rim was indistinct although this effect had lessened by 22:00 UT and was normal by 22:17UT. M. Mobberley saw a white spot on the floor at 21:20 UT, whereas he normally would have expected to see craterlets. Mobberley was alerted at 21:40 UT and took some color photos. He also made sketches that showed variability in the floor and dark lines and patches in the north west corner. However, the altitude of the Moon was low. Cameron mentions that two of the photos show loss of detail at the south wall and beyond, and also a change in the floor markings. The north wall at 21:50UT was strangely reddish (didn't think this was spurious color). The rest of the wall was sharp at 22:20UT through a yellow filter. Large bright patch in the centre and rest of the floor was apparently of the same shading as Mare Imbrium. The above notes are based upon the Cameron 2006 catalog extension LTP ID 145 and weight=4. ALPO/BAA weight=3.

Plato 1870 May 10 UT 22:00 Observed by Birt (England) "Extraordinary display of lights. Says not effect of sunlight" NASA catalog weight=4). NASA catalog ID #167. ALPO/BA|A weight=3.

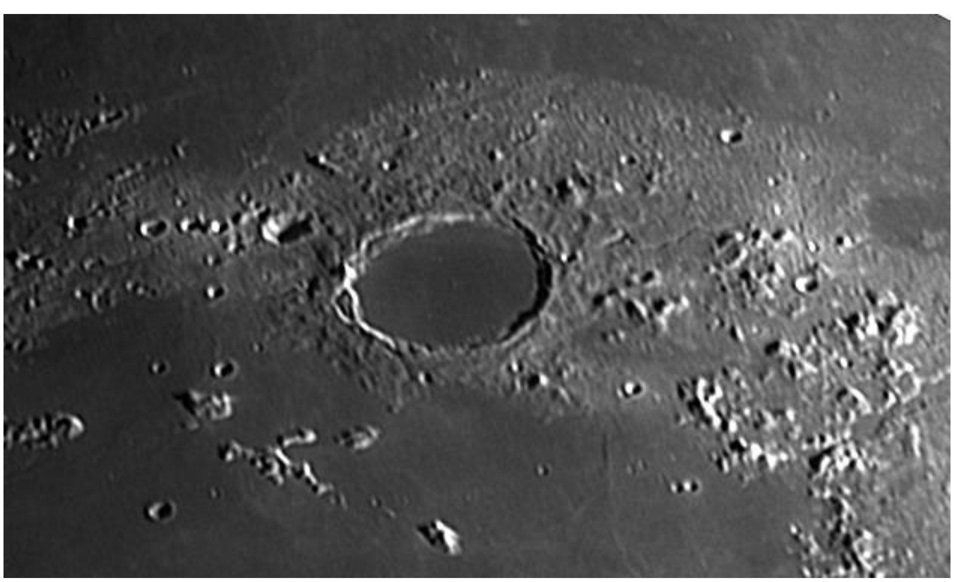

***Figure 5.** Plato as imaged by Les Fry (NAS) on 2021 Jan 23 UT 20:16.*

Trevor comments that (observing from 19:40-20:05UT) that unlike the Patrick Moore report, the southern wall was NOT indistinct indeed the whole of Plato was quite sharp and the central craterlet was quite clearly visible, indeed the Les Fry image (Fig 5) shows at least 3 craterlets visible on the floor and the southern rim sharp, although less contrasty than other parts of the rim. Trevor goes on to add that at times four or five craterlets came into view visually and he could see much detail on the floor in the form of lighter streaks and patches. Indeed, during the best moments of seeing he thought he could glimpse half or dozen or so radial lines/bands stretching all the way across the floor from the NW-SE. These were only impressions (not too sure) seen about five times and were only there for a fraction of a second between 19:40 and 20:05UT.

Aristarchus: On 2021 Jan 24 at 21:46 UT Aldo Tonon (UAI) and at 21:21 and 22:23 Fabio Verza (UAI) imaged (See Fig 6) this crater for the following repeat illumination request:

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 .

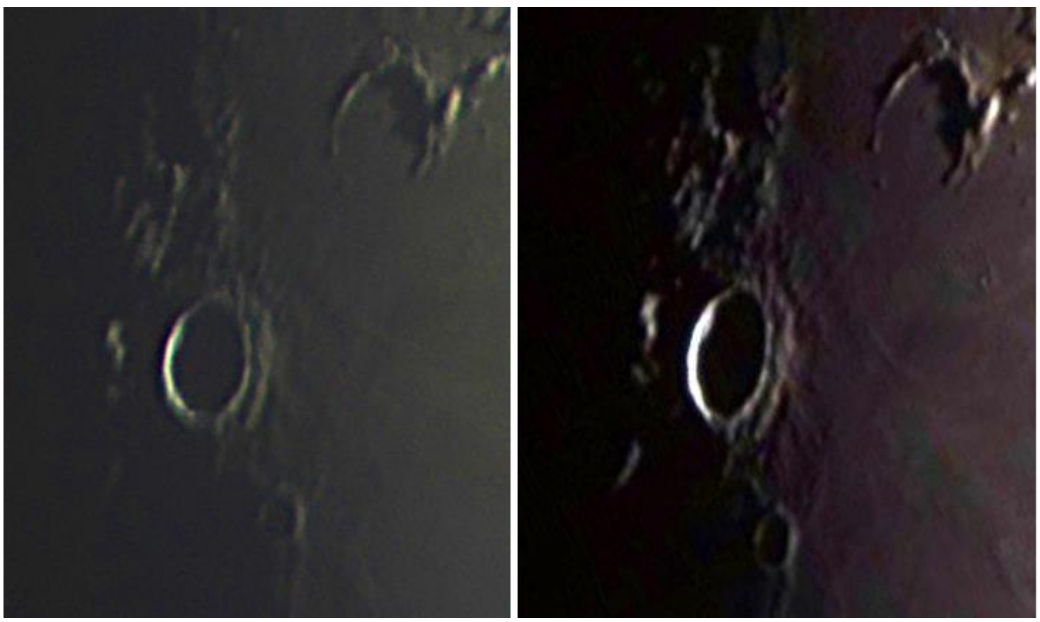

Figure 6. *Aristarchus as imaged on 2021 Jan 24, by UAI observers, orientated with north towards the top and color saturation increased to 60%.* ***(Left)*** *image by Aldo Tonon at 21:46 UT.* ***(Right)*** *image by Fabio Verza at 22:23.*

Full Moon: On 2021 Jan 28 UT 21:42 Massimo Alessandro Bianchi (UAI) imaged (Fig 7) the Moon for the following repeat illumination request:

ALPO Request: Please take images of the Full Moon, but make sure you under expose as we want to avoid bright ray craters like Aristarchus, Tycho, Proclus etc from saturating. The purpose behind this is we want to compare with images of Earthshine which are essentially zero phase illumination images, like at Full Moon. There have been reports in the past that Aristarchus varies greatly in brightness compared to other features. David Darling (a past LTP coordinator) has suggested this was simply due to libration effects, i.e., viewing angles, so we would naturally like to test this theory out. Also, if you have any past images of close to Full Moon, please send these in too if the above-mentioned craters are not saturated. Pretty much any size telescope can be used to take these images so long as we can clearly see the above craters. Obviously do not attempt this if the sky is cloudy or hazy. Observations will be presented in the "Lunar Observer" - a monthly publication of the Lunar Section of ALPO. All reports should be emailed to: a t c @ a b e r . a c . uk

Figure 7. *The Full Moon as imaged by Massimo Alessandro Bianchi (UAI) on 2021 Jan 28 UT 21:42 and orientated with north towards the top.*

In terms of relative brightness, we have: Censorinus (214), Tycho (207), Proclus (187), Aristarchus (171), Copernicus (166). Kepler (143), Plato (102).

Level 3 - In Depth Analysis:

Note that no level 3 analysis has been possible this month due to pressure of work. Hopefully I can resume this next month, but I think you can judge for yourselves whether the weights need changing by comparing the images/observations to the original reports.

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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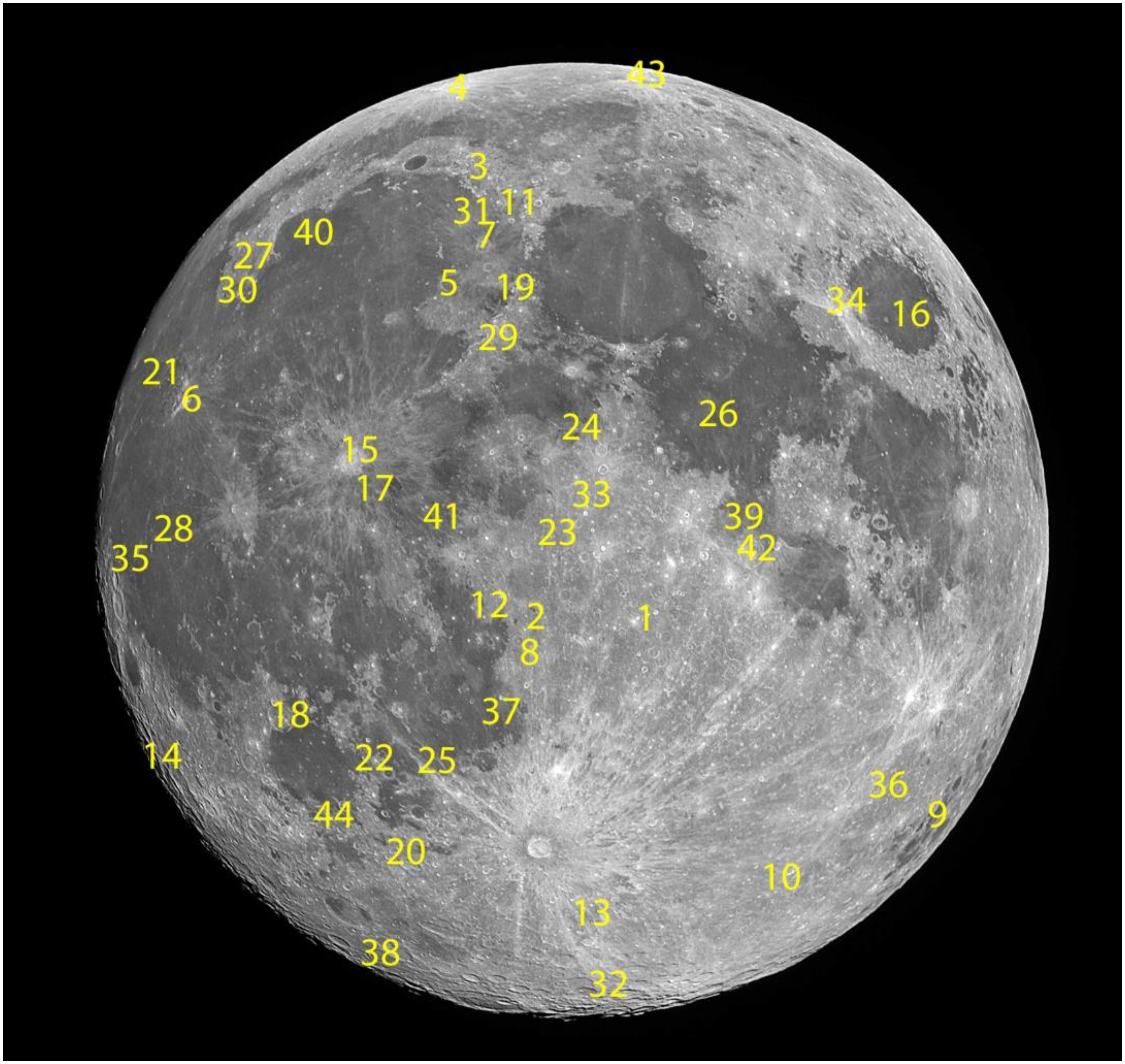
Key to Images In This Issue



1. Airy
2. Alphonsus
3. Alpine Valley
4. Anaxagoras
5. Archimedes
6. Aristarchus
7. Aristillus
8. Arzachel
9. Australe Basin
10. Baco
11. Cassini
12. Catena Davy
13. Clavius
14. Crüger
15. Copernicus
16. Curtis
17. Gambart
18. Gassendi
19. Hadley
20. Hainzel
21. Herodotus
22. Hippalus Rilles
23. Hipparchus
24. Hyginus
25. Kies
26. Lamont
27. Mairan
28. Marius
29. Montes Apenninus
30. Mons Gruithuisen
31. Mons Piton
32. Moretus
33. Pickering
34. Proclus
35. Reiner Gamma
36. Rheita Valley
37. Rupes Recta
38. Schiller-Zucchius Basin
39. Sinus Asperitatis
40. Sinus Iridum
41. Sömmering
42. Theophilus
43. Thales
44. Vitello