The Lunar Observer

A publication of the Lunar Section of ALPO

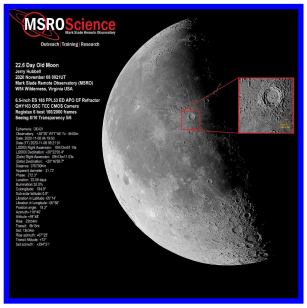
Edited by David Teske: david.teske@alpo-astronomy.org
2162 Enon Road, Louisville, Mississippi, USA
Back issues: http://www.alpo-astronomy.org/

January 2021

Online readers, click on images for hyperlinks

In This Issue

page 83



page 84

A very Happy New Year to all. We look forward to a good year ahead. Thank you contributors for your many contributions to this issue of *The Lunar Observer*. Your excellent submissions is what makes this newsletter possible. If you are reading this issue, welcome aboard! Perhaps you would like to contribute your own lunar observations to us. You can contribute observations if you are not a member of ALPO, but we sure would like you to consider becoming a member (yearly rates start at only $18.00, a great deal!).

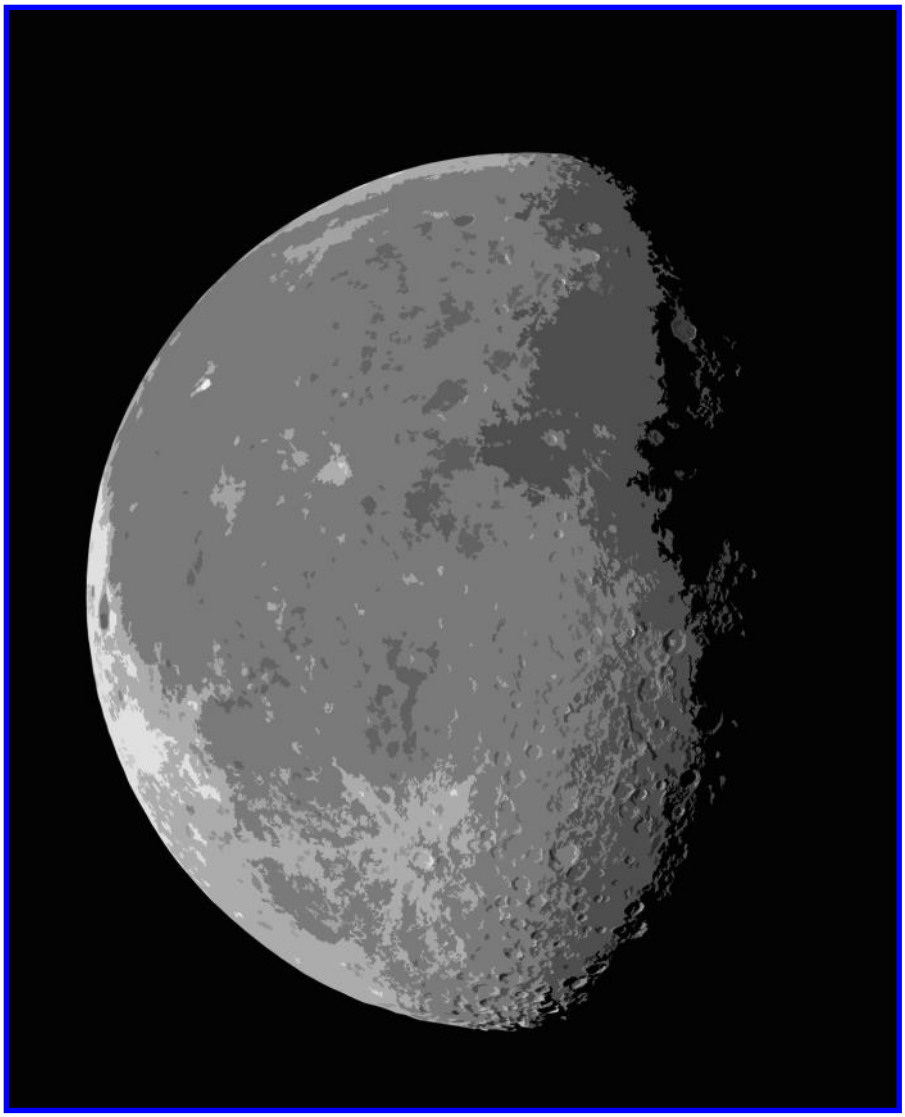
In this issue of *The Lunar Observer*, there are interesting articles about the lunar terrain by Robert H. Hays, Jr., Alberto Anunziato, Rik Hill and Howard Eskildsen. Howard also has done some great imaging of banded lunar craters. The main focus of this issue is the Focus-On Lunar 100 numbers 41-50 by Jerry Hubbell. Once again, this very popular Focus-On article has received a large number of image and drawing submissions from lunar observers around the world. Also, general lunar topography was explored in the Recent Lunar Topographic Studies. As always, Tony Cook has provided us with another report of the Lunar Geologic Change Detection Program.

Announcements: Of Exoplanets and the Moon

Wishing you each a Happy New Year. May it be safe, healthy and productive. As 2021 starts, 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 next year under his guidance. Plus, Jerry continues to send wonderful lunar images to The Lunar Observer (see page 84) and we look forward to more of his images 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 in the next year. 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 first astronomical association dedicated especially to the lunar studies in Latin America.



Lunar Calendar January 2021

Date	UT	Event
1		West limb most exposed -5.2°
4		South limb most exposed -6.7°
6	0937	Last Quarter Moon
9	1600	Moon at perigee 367,387 km
11	2000	Venus 1.5° north of Moon
12		Greatest southern declination -24.8°
13	0500	New Moon, lunation 1213
14	0100	Jupiter 3° north of the Moon
16		East limb most exposed +5.4°
17		North limb most exposed +6.7°
20	2101	First Quarter Moon
21	0600	Mars 5° north of Moon
21	0600	Uranus 3° north of Moon
21	1300	Moon at apogee 404,360 km
25	2300	Moon 0.3° north of M35
27		Greatest northern declination +24.8°
28		West limb most exposed -5.3°
28	1916	Full Moon

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	Article Lunar 41-50, a Personal View, article and drawing A Fleet Vision of Posidonius Y on Dorsa Smirnov, Article Some Wonders on the Shores of Mare Crisium, image of Maurolycus, drawing of Regiomontanus, images of Gruithuisen Delta/ Gamma and Cayley Plains.
Sergio Babino	Montevideo, Uruguay	Images of Bessel (2), Marius Hills, Mersenius, Mare Crisium and Maurolycus.
Steve Berté	Middletown, Maryland, USA	Drawing of Maurolycus, article and sketch Schickard Sunrise Patch.
Ariel Cappelletti	Córdoba, Argentina, SLA	Image of Mersenius.
Francisco Alsina Cardinalli	Oro Verde, Argentina	Images of Bessel (2), Marius Hills, Wargentin, Regiomontanus, Alphonsus (3), Mare Crisium, Gruithuisen Delta/Gamma (5) and Cayley Plains.
Jairo Chavez	Popayán, Colombia	Image of the Moon, Bessel and Maurolycus (3).
Leonardo Alberto Colombo	Molinari, Argentina	Image of the waning gibbous Moon.
Michel Deconinck	Aquarellia Observatory - Artignosc-sur -Verdon - Provence - France	Pastels of the Bessel ray, Cayley Plains, Maurolycus, Regiomontanus and Cauchy.
Walter Ricardo Elias	Oro Verde, Argentina	Images of Agrippa, Alphonsus, Cassini E, Ross D (2), Aristoteles, Capella, Delambre, Isidorus, Mare Nectaris, Maskelyne E, Piccolomini, Plinius, Posidonius and
Howard Eskildsen	Ocala, Florida, USA	Images of banded craters Agatharchides A, Anaxagoras, Aristarchus, Aristillus (2), Messier, Proclus, Pytheas, Rosse, Theaetetus (2), the Marius Dome Field and article and image Aristarchus Plateau Region.
Desiré Godoy	Oro Verde, Argentina, SLA	Images of Alphonsus (3) and Cayley Plains.
Marcelo Mojica Gundlach	Cochabamba Bolivia	Image of Maurolycus (3), Bessel and Alphonsus.
Robert H. Hays, Jr.	Worth, Illinois, USA	Article and drawing of Wargentin.

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/

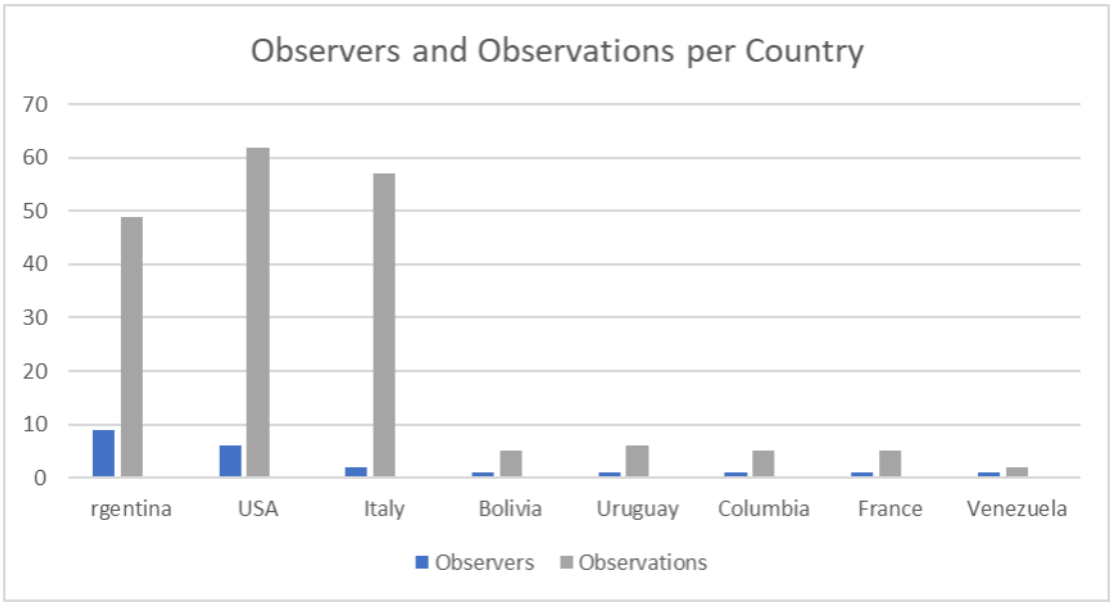
Observations Received

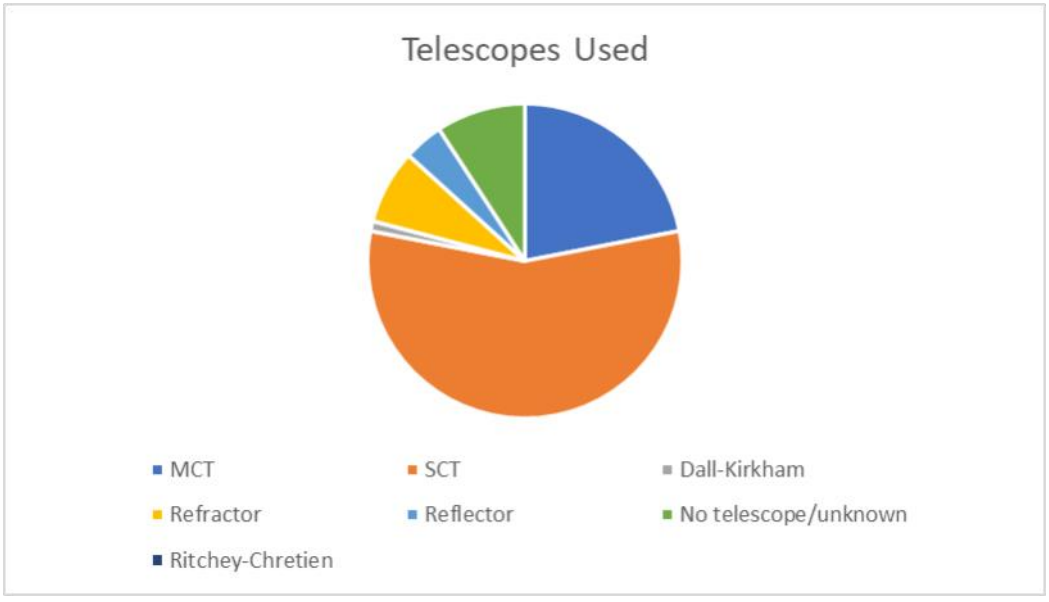
Name	Location and Organization	Image/Article
Rik Hill	Loudon Observatory, Tucson, Arizona, USA	Article and image Another Dome Home, images of the Moon, Jupiter and Saturn, Marius Hills (6), Wargentin (3), Mersenius (5), Maurolycus (3), Regiomontanus, Alphonsus (10), Gruithuisen Delta and Gamma (4) and Cayley (8).
Jerry Hubbell	Wilderness, Virginia, USA	Image of 22.6 day old Moon and article Focus-On Lunar 100 41-50.
Luigi Morrone	Aregola, Italy	Images of Meton, Langrenus, Hayn, Endymion, Atlas and Hercules, Aristoteles and Eudoxus, Abulfeda and Theophilus.
Jesús Piñeiro	San Antonio de los Altos, Venezuela	Image of Copernicus and Bessel.
Leandro Sid	Oro Verde, Argentina, AEA	Images of Herodotus, Aristillus and Aristarchus.
Fernando Surà	San Nicolás de los Arroyos, Argentina	Image of Clavius.
Michael E. Sweetman	Sky Crest Observatory, Tucson, Arizona, USA	Image of Hortensius domes and waxing crescent Moon.
David Teske	Louisville, Mississippi, USA	Images of Cauchy, Cayley Plains and Bes-
Román García Verdier	Paraná, Argentina	Image of Alphonsus, Bessel.
Fabio, Verza	SNdR Luna, Milan, Italy	Images of Albategnius (2), Bailly, Atlas, Arzachel, Apenninus, Briggs, Cardanus, Clavius (3), Copernicus (3), Eddington, Eudoxus, Gutenberg, Hevelius, J. Herschel, Lunar landscapes (9), Mare Nectaris, Mare Serenitatis, Maurolycus, Janssen, waxing crescent Moon, waxing gibbous Moon (2), Moretus, Petavius, Regiomontanus, Schickard (2), Sinus Iridum (3), South Pole (2), Taruntius, Theophilus, Walter(2), Fontenelle, Dark Halo Crater Mare Crisium, Gassendi (2), Kepler, Mare Humorum, North Pole, Plato, Schiller, and Vallis Schröteri.

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

January 2021 *The Lunar Observer*
By the Numbers

This month there were 191 observations by 22 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 March 2021 edition will be the Lunar 100 numbers 51 -60. 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 51-60 article is February. 20, 2021

FUTURE FOCUS ON ARTICLES:

In order to provide more lead time for contributors the following future targets have been selected: The next series of three will concentrate on subjects of the Selected Areas Program.

Subject	TLO Issue	Deadline
Lunar 100 (numbers 51-60)	**March 2021**	**February 20, 2020**
Lunar 100 (numbers 61-70)	**May 2021**	**April 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 51-60 will be featured in the March 2021 *The Lunar Observer*. Submissions of articles, drawings, images, etc. due by February 20, 2021 to David Teske, Jerry Hubbell and Alberto Anunziato.

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

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

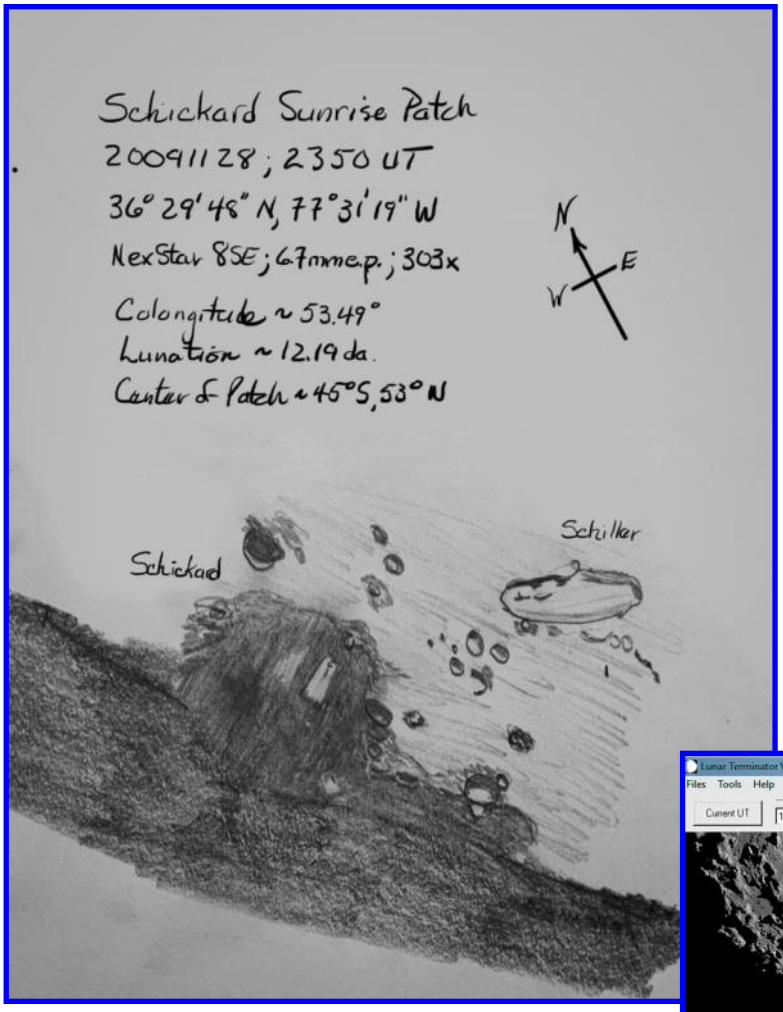
Schickard Sunrise Patch

Steve Berté

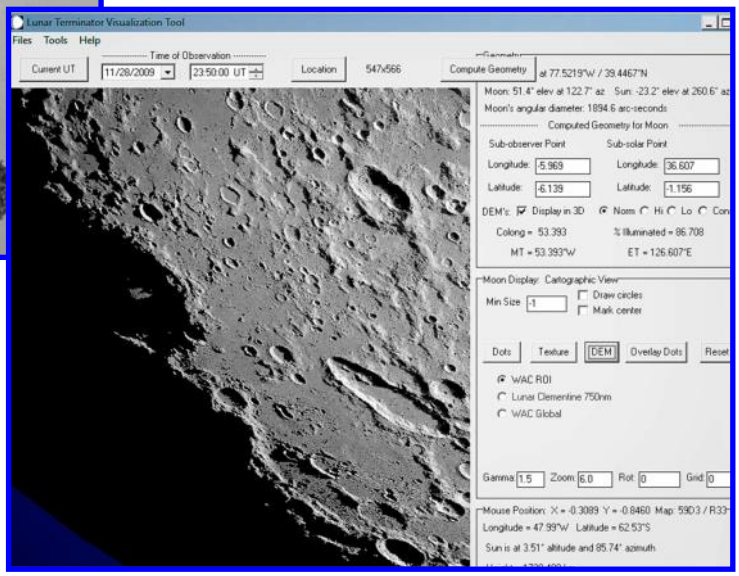
I have been a sporadic lunar sketcher for about a decade now. However, since I got an iPad Pro with the Autodesk Sketchpad Pro app on it, I'm finding I sketch a lot more. The backlit screen and ability to layer drawings is very powerful. At any rate, while gathering some sketches to support the ongoing Focus-On the Lunar 100, I ran across an old sketch of mine from 2009 of the Schickard sunrise patch and thought I'd share it here.

I made the observation on November 28, 2009. The accompanying sketch shows the rectangular to trapezoidal patch of light on Schickard's floor. When I got inside that night, I ran a simulation of the date/time on the Lunar Terminator Visualization Tool (LTVT} which quite accurately reproduced what I'd observed. I've included a shot of the simulation for comparison.

I used LTVT to predict the next time the Schickard sunrise patch should be visible which is from 2200-2230 UT on February 23, 2021. Get out and have a look if you are able. It's a nice effect.



Schickard Sunrise Patch, *Steve Berlé, Middletown, Maryland, USA. 28 November 2009 23:50 UT, co-longitude 53.49°. Celestron NexStar 8SE Schmidt-Cassegrain telescope, 6.6 mm eyepiece, 303 x.*



LTVT Schickard Sunrise Patch.

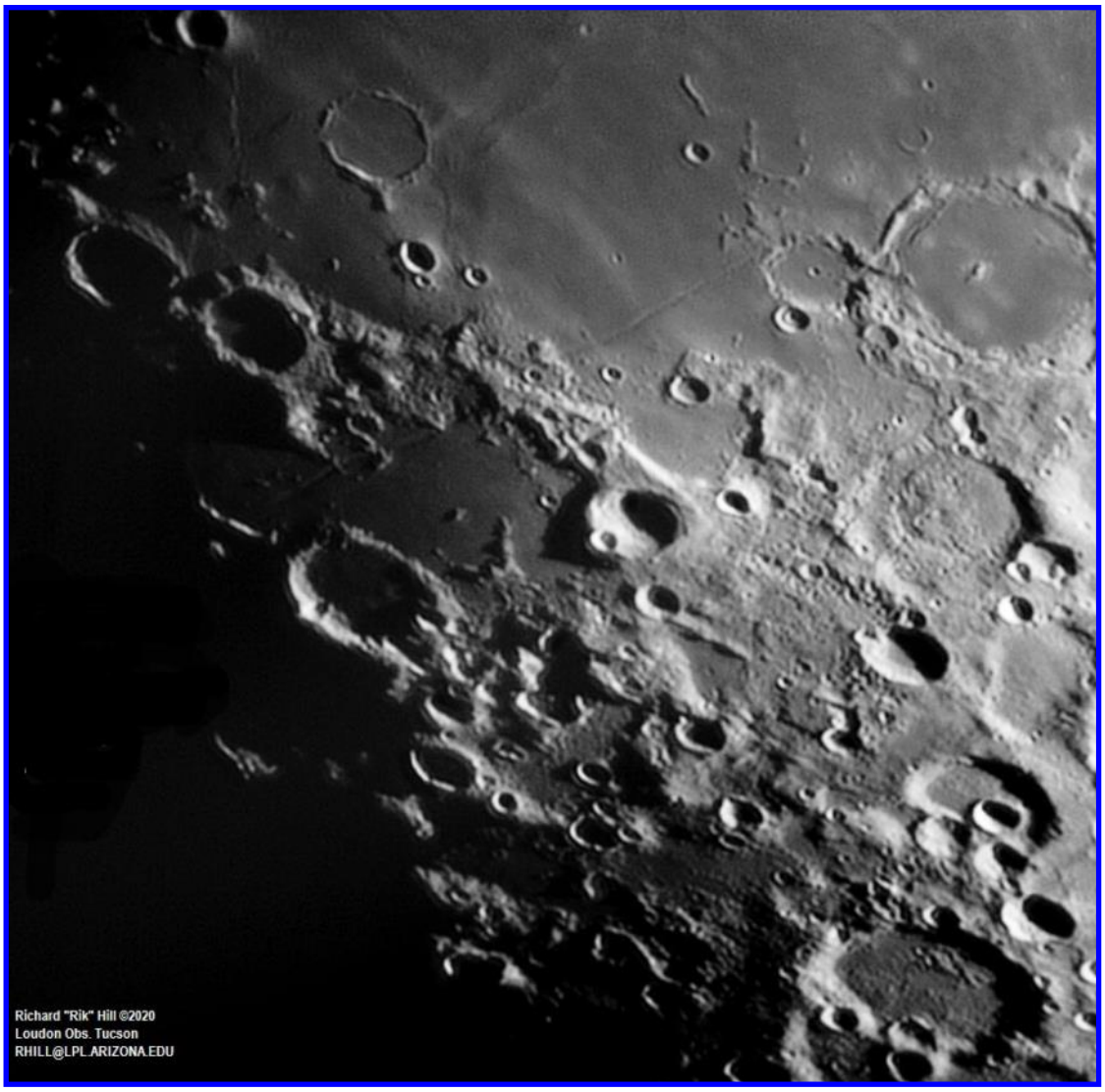
Another Dome Home

Rik Hill

When the Moon is not quite 10 days old you can get a good look at a few of the more obvious domes in the Mare Nubium area south of Bullialdus. The first key is to locate Kies, the 46 km diameter crater at the top of this image with the little tail pointing down. Notice the mild swelling just to the left of the crater. This is Dome Kies Pi or K1. Its 10 km in diameter with a little 2 km craterlet at the summit, just barely visible here. Going further to the left, there are two small cluster of mountains. Just above the further one is another mild swelling, K3. A third dome is just off the end of the tail of Kies but I never have gotten a good image of it. It may be just too low of feature. Below Kies you see a graben-like rima, Rima Hesiodus that runs some 309 km from Hesiodus just south of its eastern (right) terminus, the crater with a small central crater (and the nice double walled crater, Hesiodus A just below) all the way across Palus Epidemiarum north of another crater, Capuanus (61 km). On the floor of this crater, you can see three domes, C1, C2 and C3, as you may have guessed. There are other low swellings around this image near the terminator in this image but I have no guide for any identification beyond these.

In the upper right of this image, adjacent to Hesiodus is the large crater Pitatus (or "Potatoes" as we used to joke). Across from this, on the right side are the twin craters Campanus above and Mercator below, both 49 km in diameter. Then in the lower right is the crater Wilhelm (111 km). It is a very busy area with lots to see, like that strange straight mountain range in the middle of the image with the small plain below it.

You can easily spend a whole evening here!



***Kies to Capuanus**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 25 November, 2020 03:23 UT, colongitude 28.8°. Dynamax 6 inch Schmidt-Cassegrain telescope, 2x barlow, 665 nm filter, Celestron Skyris 132M camera, seeing 8/10.*

Some Wonders on the Shores of Mare Crisium

Alberto Anunziato

It is impossible to stop watching Mare Crisium when it is visible in our telescopes, it is a region that seems almost like a representative collection of all types of lunar features. Since we don't know where to start, we start with one of the brightest craters on the Moon, Proclus. In this detail (image 2) it shows not only how bright its north wall is, but above all how extraordinarily complicated the topography of its bottom is, full of mounds, some high enough to cast a shadow, from one of which seems to emerge one of the conspicuous bright rays of Proclus that projects over the eastern rim and even continues beyond, in a way analogous to what we see in Anaxagoras. In the next detail (image 3) we see how the bright rays from Proclus are projected over the nearby craters, to the west, creating the sensation of a high wall of a banded crater. Another detail (image 4) shows us another system of bright rays, of course much less extensive and less prominent, that of Eimmart A, whose rays project towards the west inside Eimmart, giving it a shape similar to a seashell. I have observed Eimmart on some occasions for the Project for the Verification/Elimination of Historical Reports of Transient Lunar Phenomena (ALPO/ BAA /University of Aberystwyth), and it is visually very bright with frontal light, from its interior I could only observe the rays, they look like very bright bands, and with this image that we discussed I realized that they are rays, but coming from Eimmart A. Finally (image 5), a much older and more classic crater, Macrobius, with its walls and central peaks gently degraded, so that they are preserved as the remains of a sand castle after the passage of a wave.

Mare Crisium, *Sergio Babino, Montevideo, Uruguay. 21 November 2020 22:29 UT. 203 mm. catadrioptic telescope, ZWO ASI 174 camera.*

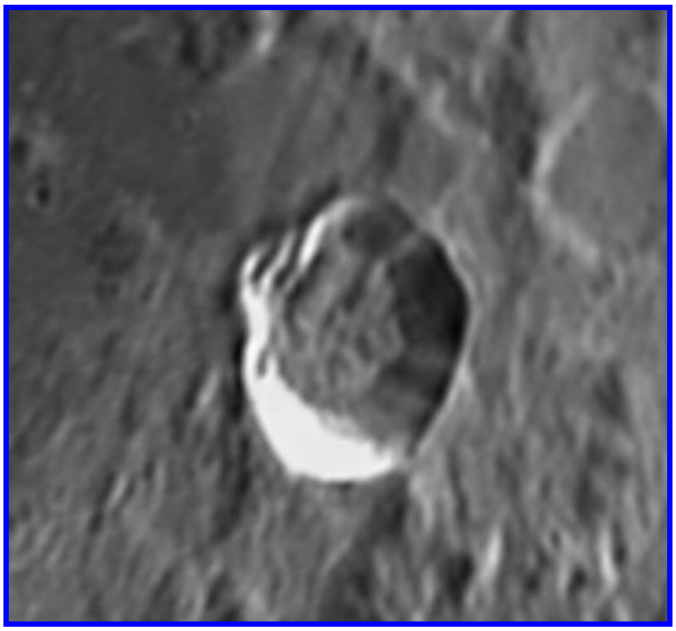


Figure 2. Proclus close-up, *Sergio Babino, Montevideo, Uruguay. 21 November 2020 22:29 UT. 203 mm. catadrioptic telescope, ZWO ASI 174 camera.*

Figure 3 Proclus rays close-up. *Same as above.*

Figure 4 Eimmart close-up. *Same as above.*

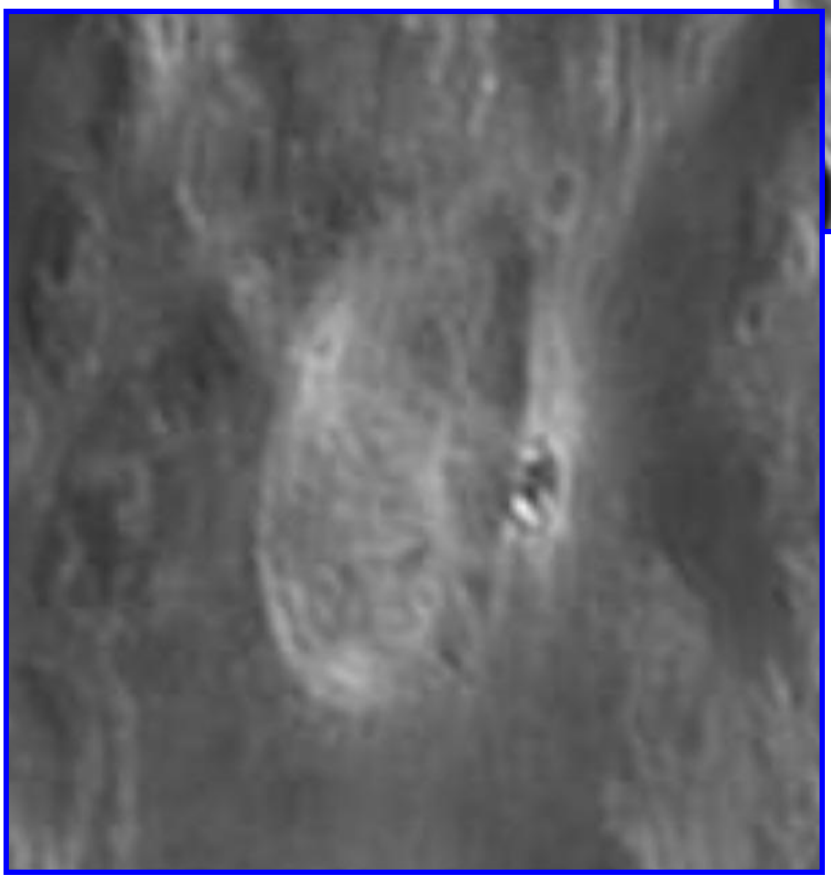


Figure 5 Macrobius close-up. *Same as above.*

Lunar Topographic Studies Program: Banded Craters

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Agatharchides A
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 7/10 Transparency: 5/6
Date (UT): 2020/11/04 Time (UT): 11:04
Colongitude: 137.1°
Position of crater: Selen. Long. Selen. Lat.
28.5° West 23.3° South
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):

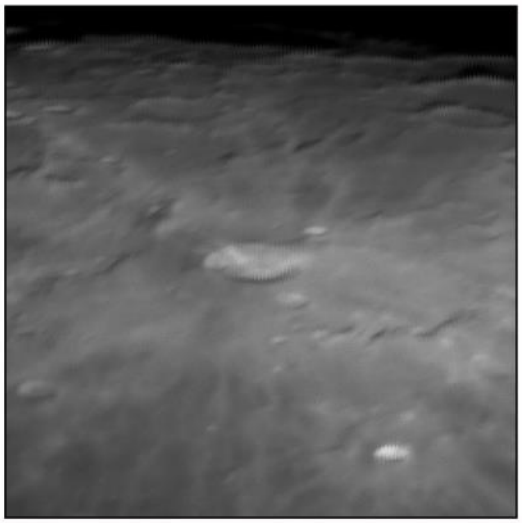
Comments:

Agatharchides A is visible at the center of this image. A dark band crosses horizontally across the crater, slightly above the centerline of the crater. A few bright punctate spots are just visible along the souther half of the crater. A bright lobe is visible in the central crater just above the dark band.

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Anaxagoras
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 4/10 Transparency: 5/6
Date (UT): 2020/10/31 Time (UT): 00:42
Colongitude: 83.3°
Position of crater: Selen. Long. Selen. Lat.
10.2° West 73.5° North
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



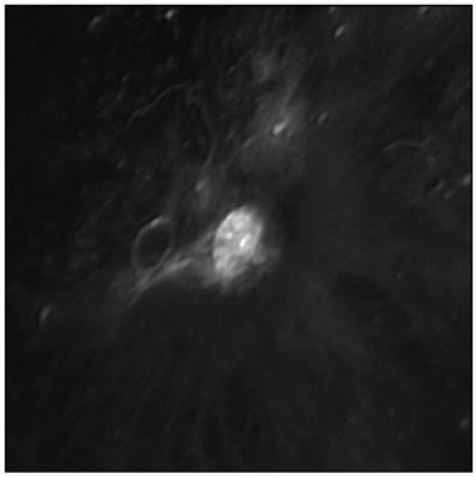
Comments:

A bright band angles to the NW margin of the crater. There is some dark banding on the floor and to the upper center and upper right crater wall.

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Aristarchus
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 4/10 Transparency: 5/6
Date (UT): 2020/10/31 Time (UT): 00:47
Colongitude: 83.3°
Position of crater: Selen. Long. Selen. Lat.
47.5° West 23.7° North
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



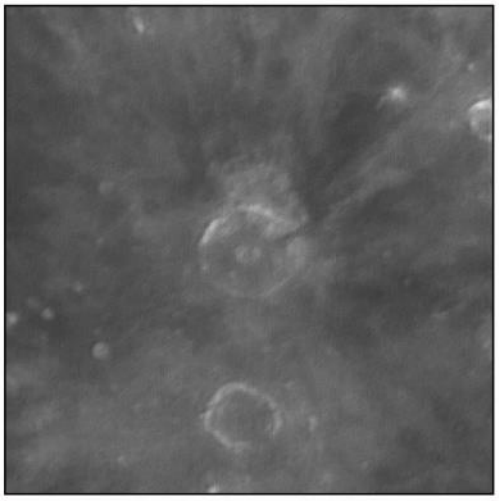
Comments:

The crater floor has a dark area surrounding a bright patch. Dark rays radiate in several directions across. the walls. Some bright patches are seen near the base of the crater wall on the north and northwesta areas. The pattern of shading is complex.

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Aristillus
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 4/10 Transparency: 5/6
Date (UT): 2020/10/31 Time (UT): 00:43
Colongitude: 83.3°
Position of crater: Selen. Long. Selen. Lat.
1.2° East 33.9° North
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



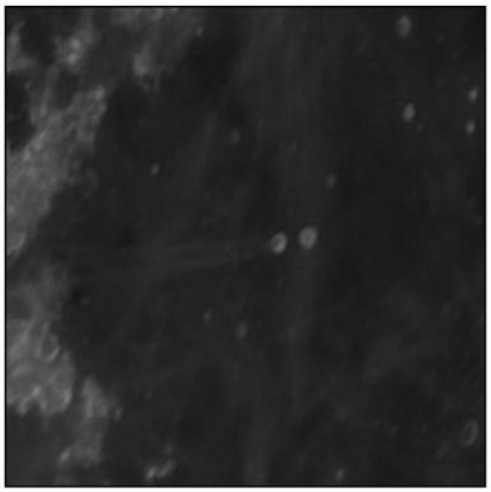
Comments:

A dark band crosses the upper right crater wall and extends beyond.

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Messier and Messier A
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 4/10 Transparency: 5/6
Date (UT): 2020/10/31 Time (UT): 00:49
Colongitude: 83.3°
Position of crater: Selen. Long. Selen. Lat.
47.7° East 1.9° South
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



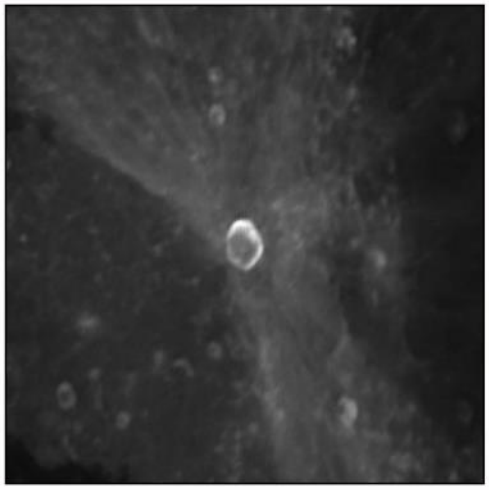
Comments:

Dark areas are visible in the central areas of Messier and Messier A.

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Proclus
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 4/10 Transparency: 5/6
Date (UT): 2020/10/31 Time (UT): 00:50
Colongitude: 83.3°
Position of crater: Selen. Long. Selen. Lat.
46.9° East 16.1° North
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



Comments:

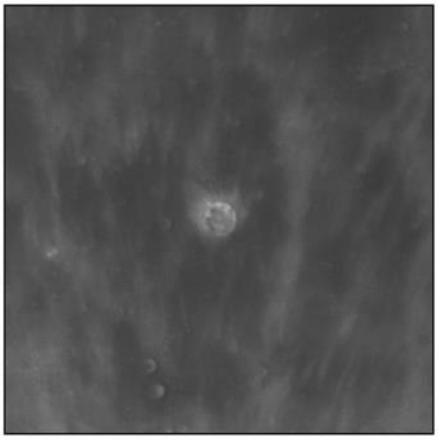
Proclus has a dark, irregular interior with a couple of horn-like projections to the NE on this image.

Lunar Topographic Studies Program: Banded Craters

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Pytheas
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 7/10 Transparency: 5/6
Date (UT): 2020/11/04 Time (UT): 11:03
Colongitude: 137.1°
Position of crater: Selen. Long. Selen. Lat.
20.6° West 20.6° North
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



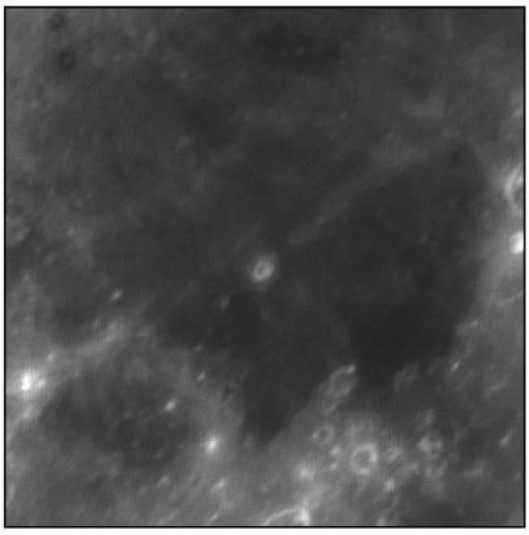
Comments:

Three bright lobes on the crater wall lie at the 10 o'clock, 12 o'clock and 2 o'clock positions. A short, dark radial band lies adjacent to the latter. Between the first two lobes, a bright streak raditates a short distance from the NW crater margin. A punctate spot lies in the central crater and the southern crater floor has a bright band angling towards the WNW.

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Rosse
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 4/10 Transparency: 5/6
Date (UT): 2020/10/31 Time (UT): 00:49
Colongitude: 83.3°
Position of crater: Selen. Long. Selen. Lat.
35.0° East 17.9° South
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



Comments:

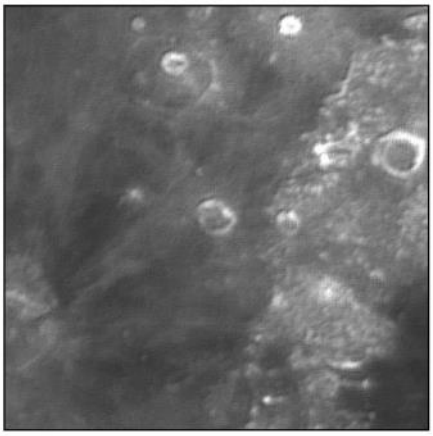
Rosse shows dark central area in the crater but banding is indistinct in this image.

Lunar Topographic Studies Program: Banded Craters

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Theaetetus
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 4/10 Transparency: 5/6
Date (UT): 2020/10/31 Time (UT): 00:43
Colongitude: 83.3°
Position of crater: Selen. Long. Selen. Lat.
6.1° East 37.0° North
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



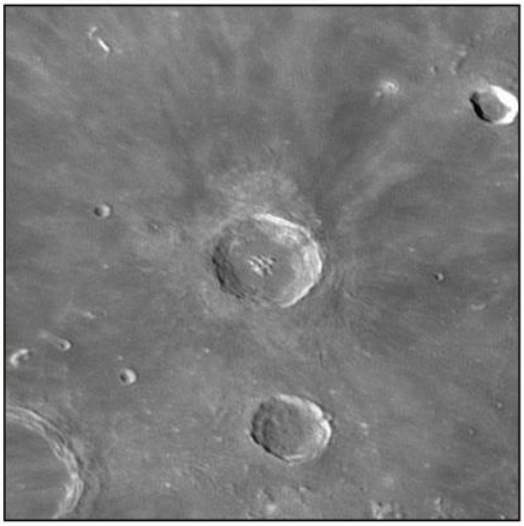
Comments:

Bright areas noted on NE rim and NNW rim. A moderately bright area is seen on the west rim. Four bright areas mark the floor of the crater.

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Aristillus
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 7/10 Transparency: 5/6
Date (UT): 2020/11/04 Time (UT): 11:04
Colongitude: 137.1°
Position of crater: Selen. Long. Selen. Lat.
1.2° East 33.9° North
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



Comments:

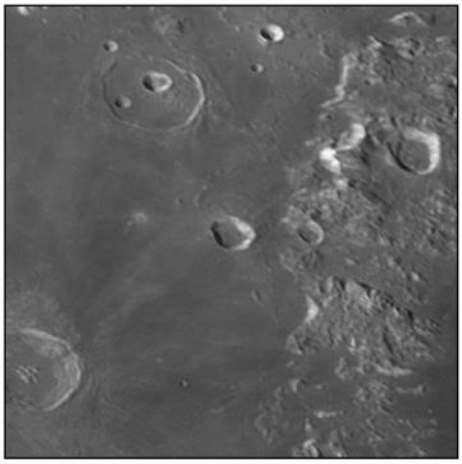
Dark ejecta melt paves the crater floor around the central peak complex. A notable dark band radiates to the NE from the crater, crosses the rim and extends into the surrounding area. It seems to mark the margin of a bright albedo feature partially draped across the northern and NNE crater rim. Markings on the end opposite the dark ray remind me of a palmetto bug that I see so frequently about my observing area.

Lunar Topographic Studies Program: Banded Craters

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Theaetetus
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: Ocala, Florida, 34483
Telescope: C9.25 Schmidt-Cassegrain 239.5 cm f/10
Imaging: Celestron Skyris 236M, No Filter
Seeing: 7/10 Transparency: 5/6
Date (UT): 2020/11/04 Time (UT): 11:00
Colongitude: 137.1°
Position of crater: Selen. Long. Selen. Lat.
6.1° East 37.0° North
Lunar Atlas Used as Reference: Virtual Moon Atlas AtLun 7.0 2020-06-25

Images (north up):



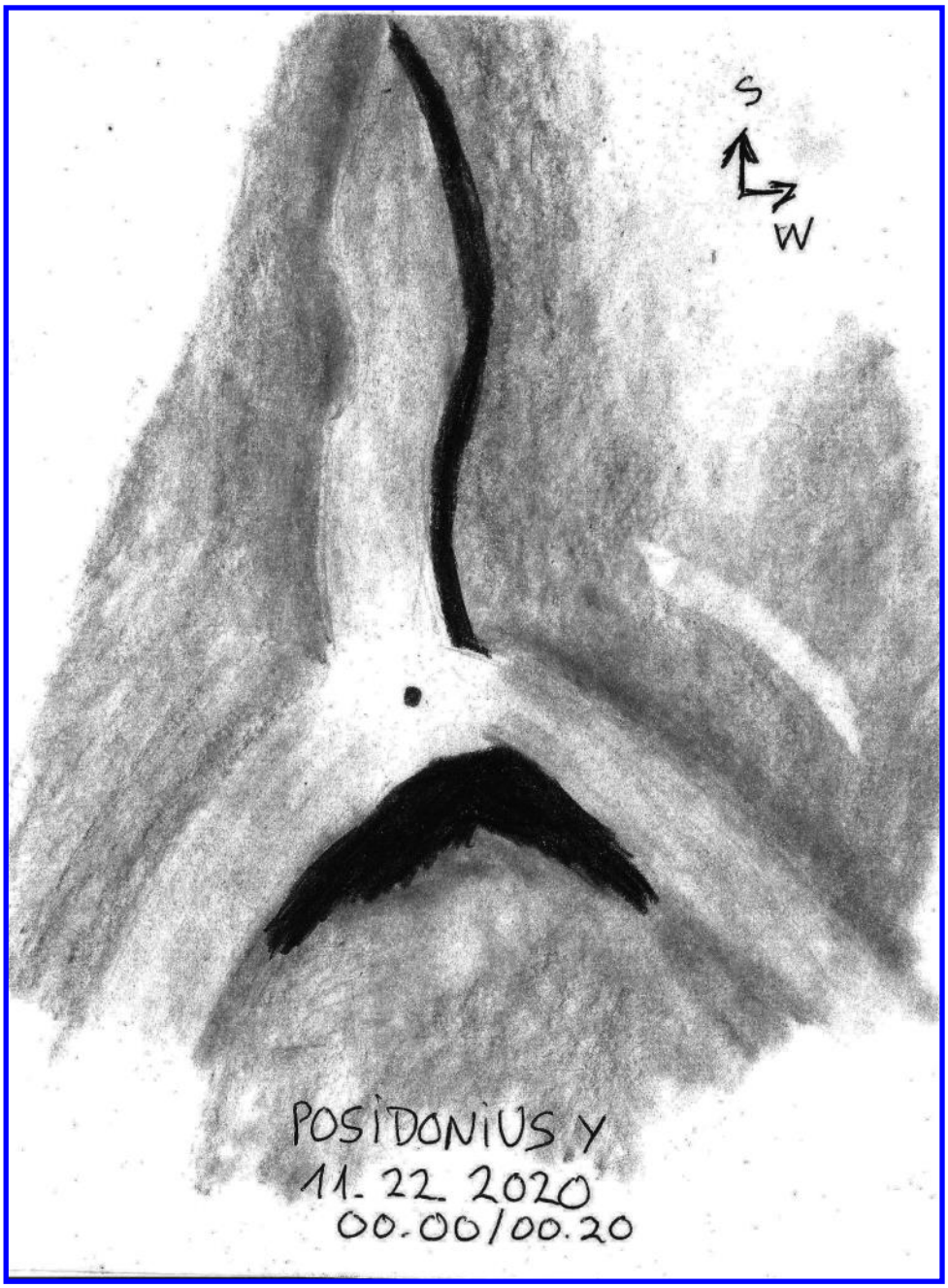
Comments:

The eastern crater wall is brighly illuminated at this colongitude with diverging dark rays on the eastern wall at the 9 o'clock position. The crater floor appears hummocky and the WNW rim is scalloped suggesting partial collapse the crater rim.

A Fleet Vision of Posidonius Y on Dorsa Smirnov

Alberto Anunziato

Dorsa Smirnov, better known as "Serpentine Ridge", is undoubtedly the most prominent wrinkle ridge on our satellite, to the point that it can contain a 2 km diameter crater. Posidonius Y is a Copernican crater, obviously, since it is subsequent than the wrinkle ridge in which it impacted and has a very bright ejection mantle, which makes it very conspicuous, at least on day 6 of the lunation, with the terminator passing through the western edge of Mare Serenitatis. The western shadow of Dorsa Smirnov is not as prominent as the shadow that appears to follow the intersection of two segments to the north, it is probably the shadow of the northern rim of Posidonius Y, although we can only deduce this from the length of the shadow, since with my telescope I cannot resolve a two-kilometer crater, which is visible only by the bright material that surrounds it. In a few astonishing minutes, a tiny black point could be discerned at its center, the shadow of its floor, of unknown depth. Chance caused the Posidonius impact to coincide with the intersection of two Dorsa Smirnov segments, which made astronomers think about the relationship between craters and dorsa. Thomas Elger's "The Moon" is very illustrative: “It is a suggestive peculiarity of many of the lunar ridges, both on the Maria and elsewhere, that they are very generally found in association with craters of every size. Illustrations of this fact occur almost everywhere. Frequently small craters are found on the summits of these elevations, but more often on their flanks and near their base. Where a ridge suddenly changes its direction, a crater of some prominence generally marks the point, often forming a node, or crossing-place of other ridges, which thus appear to radiate from it as a centre”.



Posidonius Y, *Alberto Anunziato, Paraná, Argentina. 22 November 2020 00:00 - 00:20 UT. Meade EX 105 mm Maksutov-Cassegrain telescope, 154 x.*

Aristarchus Plateau Region

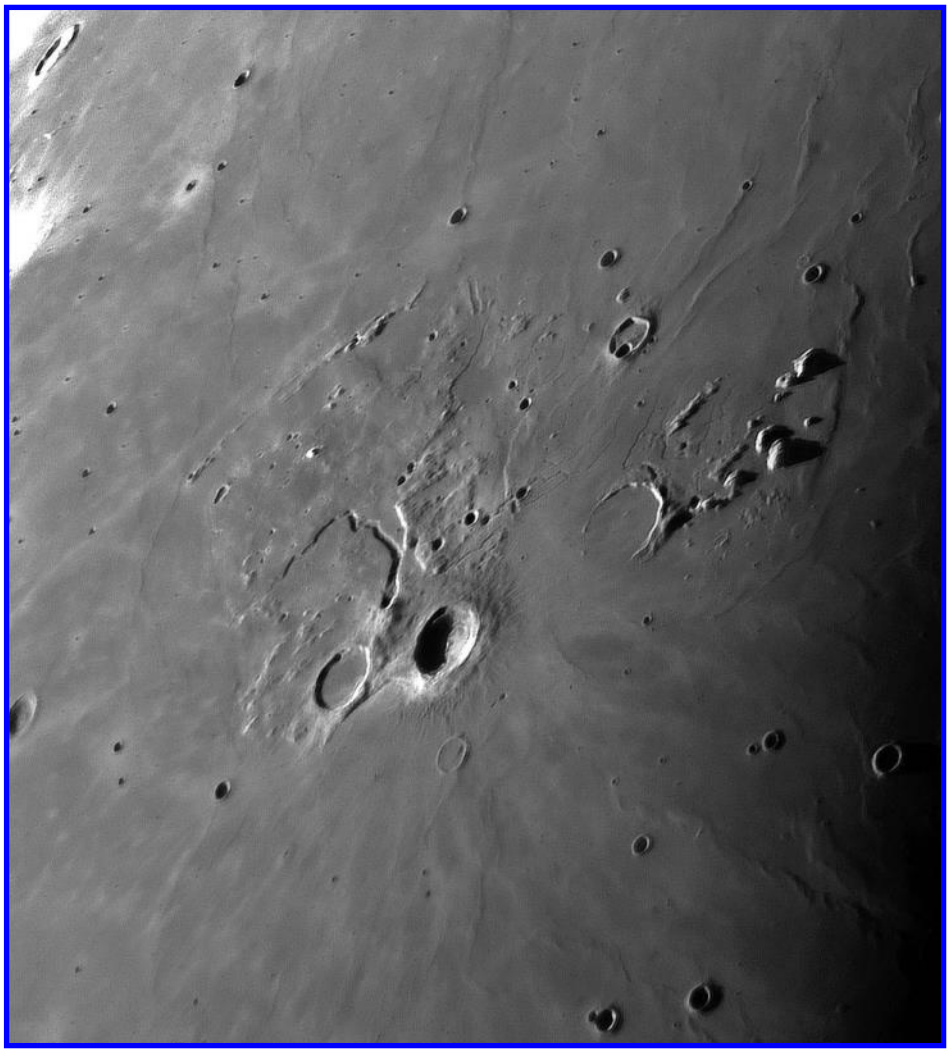
Howard Eskildsen

This image shows the well-known Aristarchus plateau with the young crater Aristarchus on the lower right portion of the plateau with the old, partly filled, Herodotus to the lower left of Aristarchus. The "Cobra Head" of Vallis Schröteri lies just to the north. The valley travels upward on the image for about 29 km (all measurements per LROC QuickMap) and then angles slightly leftward before meandering to the far-left side of the plateau.

To the right of this bend, a bright wall rises about 1200 meters from the smooth surface between the wall and Schroteri. This wall marks the margin of an uplifted block of terrain that the Unified Geological Map of the Moon reveals to be part of the "Iia"-Imbrium Apenninus Unit Formation, and is different than the rest of the plateau. Beyond the northern termination of the wall, the hummocky surface slopes to the northwest suggesting that volcanic flows once traveled in that direction. I wonder if the source of those flows came from the Cobra Head in an old channel that once coursed to that portion of the plateau, before the flow was backed up and overflowed in a different direction to emplace Vallis Schröteri in its final phases of eruption.

The partial remains of another flow channel that must have rivaled the Vallis is visible on the upper right margin of the plateau. Once unofficially named Fossa Caruso, it is about 26 km long and 4-4.5 km wide rim to rim. The location of its "cobra head" is unknown, but likely it rivaled that of Vallis Schröteri in size and volume of flow. Alternatively, is it possible that the center of eruption migrated over time and the existing "Cobra Head" marks the end of that path of migration? There is much to ponder here and it would be really great to get some rock samples to clarify the evolution of the formation.

One last feature must be mentioned, Montes Agricola, which abruptly forms the northwestern margin of the plateau. I wonder if this linear mountain range was caused by buckling along a fault line due to compression caused by the upward angling of the distal portions of the Aristarchus plateau. I don't know if anyone else had had the same idea, but to date, I have been unable to find any explanation of origin of Montes Agricola by those more knowledgeable in this regard.



Aristarchus Plateau, *Howard Eskildsen, Ocala, Florida, USA. 10 December 2020 11:13 UT, colongitude 215.2°. Celestron 9.25 inch f/10 fl 2395 mm Schmidt-Cassegrain telescope, Celestron Skyris 236M camera. Seeing 9/10, transparency 5/6.*

Focus On: The Lunar 100
Features 41 through 50

Jerry Hubbell
Assistant Coordinator, Lunar Topographical Studies

This is the fifth 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 41 through 50 on Chuck's list. This article highlights the excellent drawings of each of these features submitted by Michel Deconinck from Provence, France. Here is a list of features 41 – 50:

L	FEATURE NAME	SIGNIFICANCE	RUKL CHART
41	Bessel ray	Ray of uncertain origin near Bessel	24
42	Marius Hills	Complex of volcanic domes and hills	28, 29
43	Wargentin	A crater filled to the rim with lava or ejecta	70
44	Mersenius	Domed floor cut by secondary craters	51
45	Maurolycus	Region of saturation cratering	66
46	Regiomontanus central peak	Possible volcanic peak	55
47	Alphonsus dark spots	Dark-halo eruptions on crater floor	44
48	Cauchy region	Fault, rilles and domes	36
49	Gruithuisen Delta & Gamma	Volcanic domes formed with viscous lava	9
50	Cayley Plains	Light, smooth plains of uncertain origin	34

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

REFERENCES

Chuck Wood, *The Lunar 100 (November 2012)*, Sky & Telescope Magazine (website), https://skyandtelescope.org/observing/celestial-objects-to-watch/the-lunar-100/ (retrieved April 26, 2020)

Handy R., Kelleghan D., McCague Th., Rix E., Russell S., *Sketching the Moon*, 2012 Springer Books, https://www.springer.com/us/book/9781461409403 (retrieved April 26, 2020)

Association of Lunar and Planetary Observers, *Handbook of the ALPO Training Program*, http://www.cometman.net/alpo/ (retrieved April 26, 2020)

Chuck Wood, *Lunar Photo Of the Day (LPOD)*, https://www2.lpod.org/wiki/LPOD:About (retrieved April 26, 2020)

Lunar Reconnaissance Office ACT-REACT Quick Map, http://target.lroc.asu.edu/q3/ (retrieved October 31, 2017)

Patrick Chevalley, Christian Legrand, *Virtual Moon Atlas*, http://ap-i.net/avl/en/start (retrieved June 30, 2018)

International Astronomical Union Gazetteer of Planetary Nomenclature, *Crater Tycho,* https://planetarynames.wr.usgs.gov/Feature/6163 (retrieved March 1, 2020)

Wikipedia, *The Lunar 100 ,* https://en.wikipedia.org/wiki/Lunar_100 (retrieved April 26, 2020)

Aeronautical Chart Information Center (ACIC), United States Air Force, *LAC Series Chart Reference*, hosted by the Lunar and Planetary Institute, https://www.lpi.usra.edu/resources/mapcatalog/LAC/lac_reference.pdf (retrieved September 1, 2019)

Lunar and Planetary Institute, *Digital Lunar Orbiter Photographic Atlas of the Moon*, http://www.lpi.usra.edu/resources/lunar_orbiter/ (retrieved September 1, 2017).

ADDITIONAL READING

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

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

Chong, S.M., Albert C.H. Lim, & P.S. Ang. 2002. Photographic Atlas of the Moon. Cambridge University Press, New York.

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

Cocks, E.E. & J.C. Cocks. 1995. Who's Who on the Moon: A biographical Dictionary of Lunar Nomenclature. Tudor Publishers, Greensboro

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

Grego, Peter. 2005. The Moon and How to Observe It. Springer-Verlag, London.

IAU/USGS/NASA. Gazetteer of Planetary Nomenclature. (http://planetarynames.wr.usgs.gov/Page/MOON/target).

North, Gerald. 2000. Observing the Moon, Cambridge University Press, Cambridge.

Rukl, Antonin. 2004. Atlas of the Moon, revised updated edition, ed. Gary Seronik, Sky Publishing Corp., Cambridge.

Schultz, Peter. 1972. Moon Morphology. University of Texas Press, Austin. The-Moon Wiki. http://the-moon.wikispaces.com/Introduction

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

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

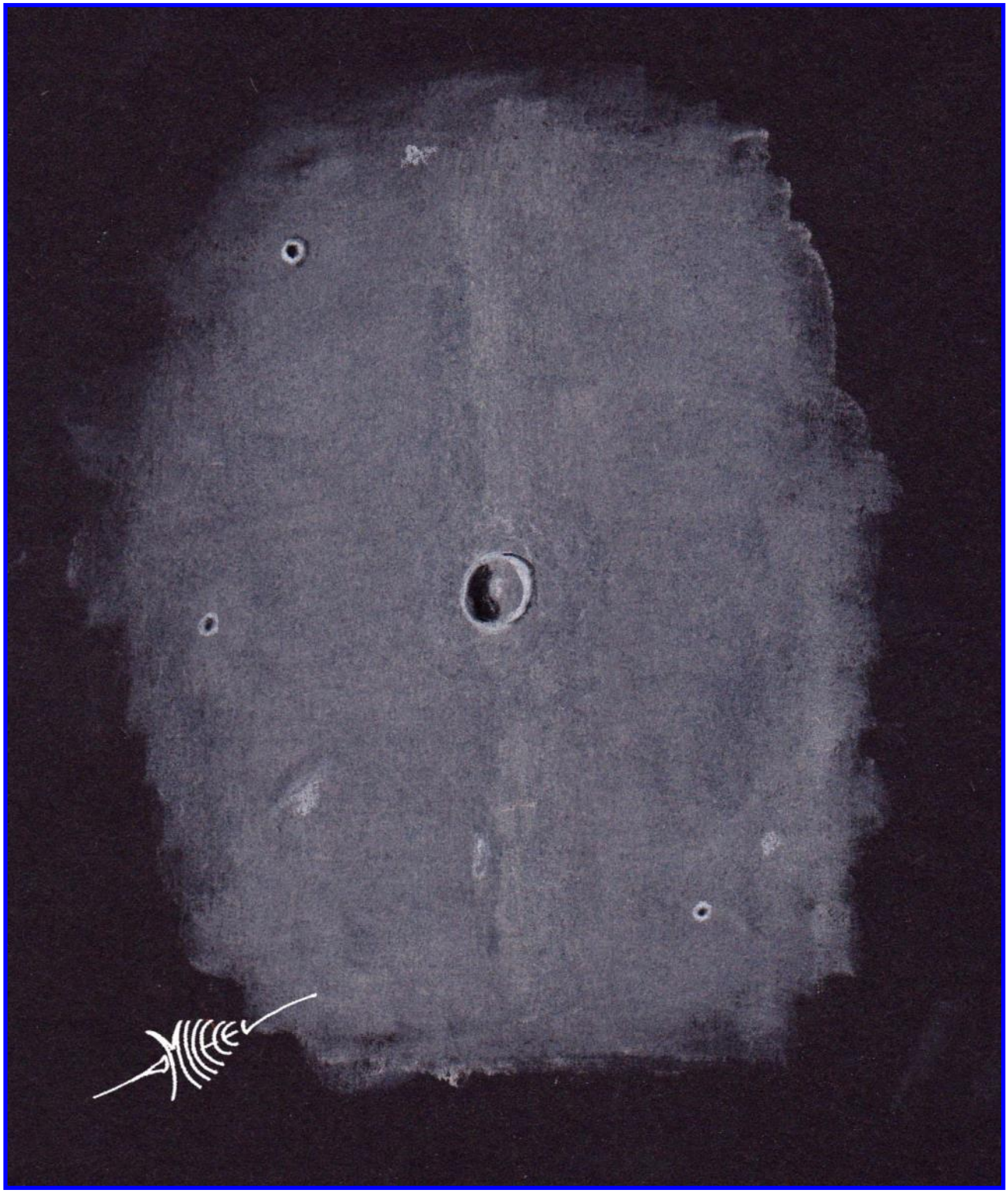
Wood, Charles & Maurice Collins. 2012. 21st Century Atlas of the Moon. Lunar Publishing, UIAI Inc., Wheeling.

Lunar 41 to 50, a Personal View

Alberto Anunziato

Paraphrasing the author of the list that summons us every two months in *The Lunar Observer*, this is my "personal view" on the lunar features included in numbers 41 to 50 of the Lunar 100. It is interesting that up to number 40, selenographic features are known to the attentive amateur. Some may be rarely observed (such as L16 Petavius or L31 Taruntius), and there is one that I find very difficult to observe for the position in which Wood placed it (L37 Bailly). From L41 Bessel Ray, the observation is more complicated and some are quite difficult to locate in the field of most of the cameras used by the members of our Lunar 100 program (Sociedad Lunar Argentina-Sociedad Astronómica Octante). Between the images sent in by our observers and the old images in our archive, we found that we could distinguish four groups of places. The first group are places that are often, to some degree, in the sights of observers. L45 Maurolycus (Region of saturation cratering) always struck me as a “poor relative” of the most spectacular L9 Clavius, which steal all the looks. L41 Bessel Ray (Ray of uncertain origin near Bessel) is a fascinating, almost mysterious, subject for a future small investigation and at the same time a popular objective in his solitude in the center of Mare Serenitatis. L47 Alphonsus dark spots (Dark-halo eruptions on crater floor) is, in my opinion, one of the most fascinating lunar landscapes. The second group are lunar accidents that we “discovered” thanks to the Lunar 100 list, such as L43 Wargentin (a crater filled to the rim with lava or ejecta), L44 Mersenius, although it is very difficult to see their “Domed floor cut by secondary craters”, or the very interesting L46 Regiomontanus central peak (Possible volcanic peak). The third group are the "postponed" L42 Marius Hill (Complex of volcanic domes & hills) and L49 Gruithuisen Delta and Gamma (Volcanic domes formed with viscous lavas), both appear on the edges of images whose objective is another feature, generally Aristarchus, and this has to do with a bias of our observation: it corresponds mainly to the lunar features observed in the framework of the "Project for the Verification / Elimination of Historical Reports of Transient Lunar Phenomena" (ALPO / BAA / University of Aberystwyth), with which we have collaborated for five years, led by Tony Cook, a true mentor for all of us who make up our group. The last group is the regions that do not show much detail in photographic images and would probably gain a lot from close visual observation, with L48 Cauchy Region (Fault, rilles and domes) and L50 Cayley plains (Light, smooth plains of uncertain origin) we were a bit disappointed.

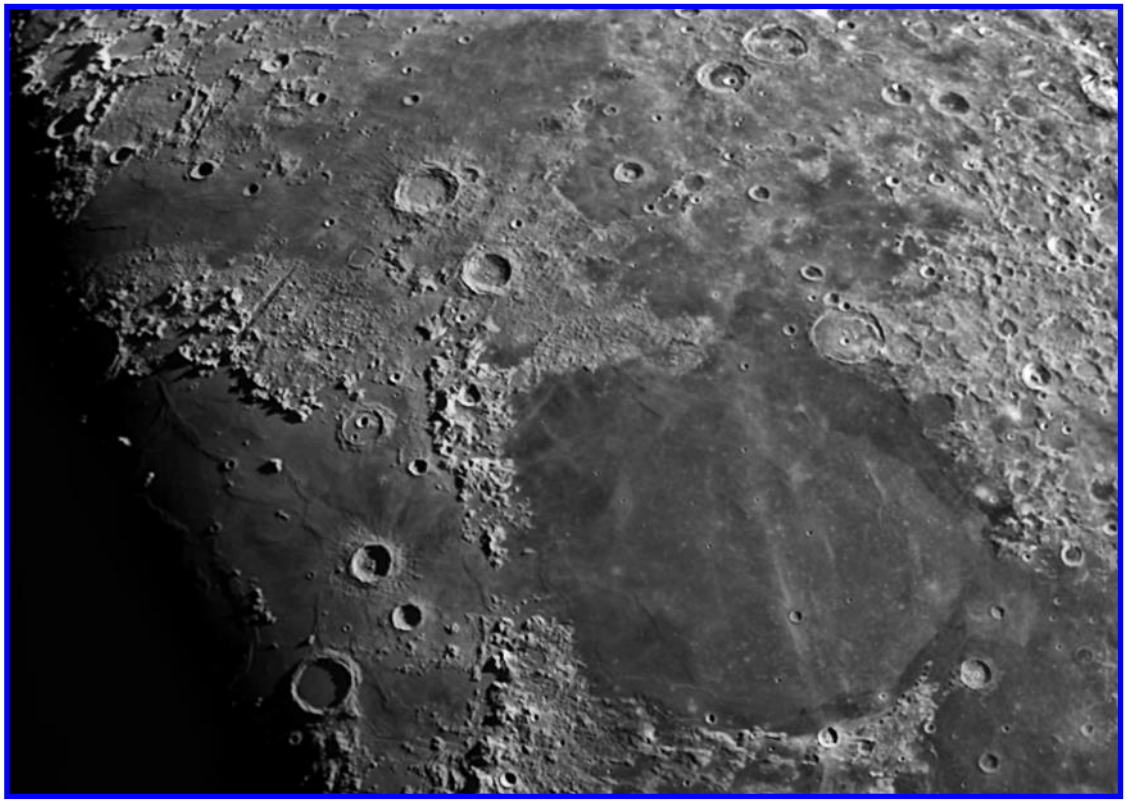
L	FEATURE NAME	SIGNIFICANCE	RUKL CHART
41	Bessel ray	Ray of uncertain origin near Bessel	24
42	Marius Hills	Complex of volcanic domes and hills	28, 29
43	Wargentin	A crater filled to the rim with lava or ejecta	70
44	Mersenius	Domed floor cut by secondary craters	51
45	Maurolycus	Region of saturation cratering	66
46	Regiomontanus central peak	Possible volcanic peak	55
47	Alphonsus dark spots	Dark-halo eruptions on crater floor	44
48	Cauchy region	Fault, rilles and domes	36
49	Gruithuisen Delta & Gamma	Volcanic domes formed with viscous lava	9
50	Cayley Plains	Light, smooth plains of uncertain origin	34



***Bessel Ray**, Michel Deconinck, Aquarellia Observatory - Artignosc-sur-Verdon - Provence, France. 22 November 2020 21:50 UT. 152 mm 1,200 mm fl refractor telescope, 4 mm Tele Vue eyepiece, 300 x. Pastels Conté grey, black and white + blending stump on Frisk paper 350gr black. Seeing 8/10, Transparency 6/6.*

***Bessel Ray**, Francisco Alsina Cardinalli, Oro Verde, Argentina. 14 May 2016 02:32 UT. 10 inch Meade LX200 Schmidt-Cassegrain telescope, 742 IR pass filter, QHY5-ll camera.*

***Bessel Ray,** Sergio Babino, Montevideo, Uruguay. 15 December 2018 00:58 UT. 8"Astrotech RC (Ritchety Chretien) telescope, ZWO ASI 174 camera.*

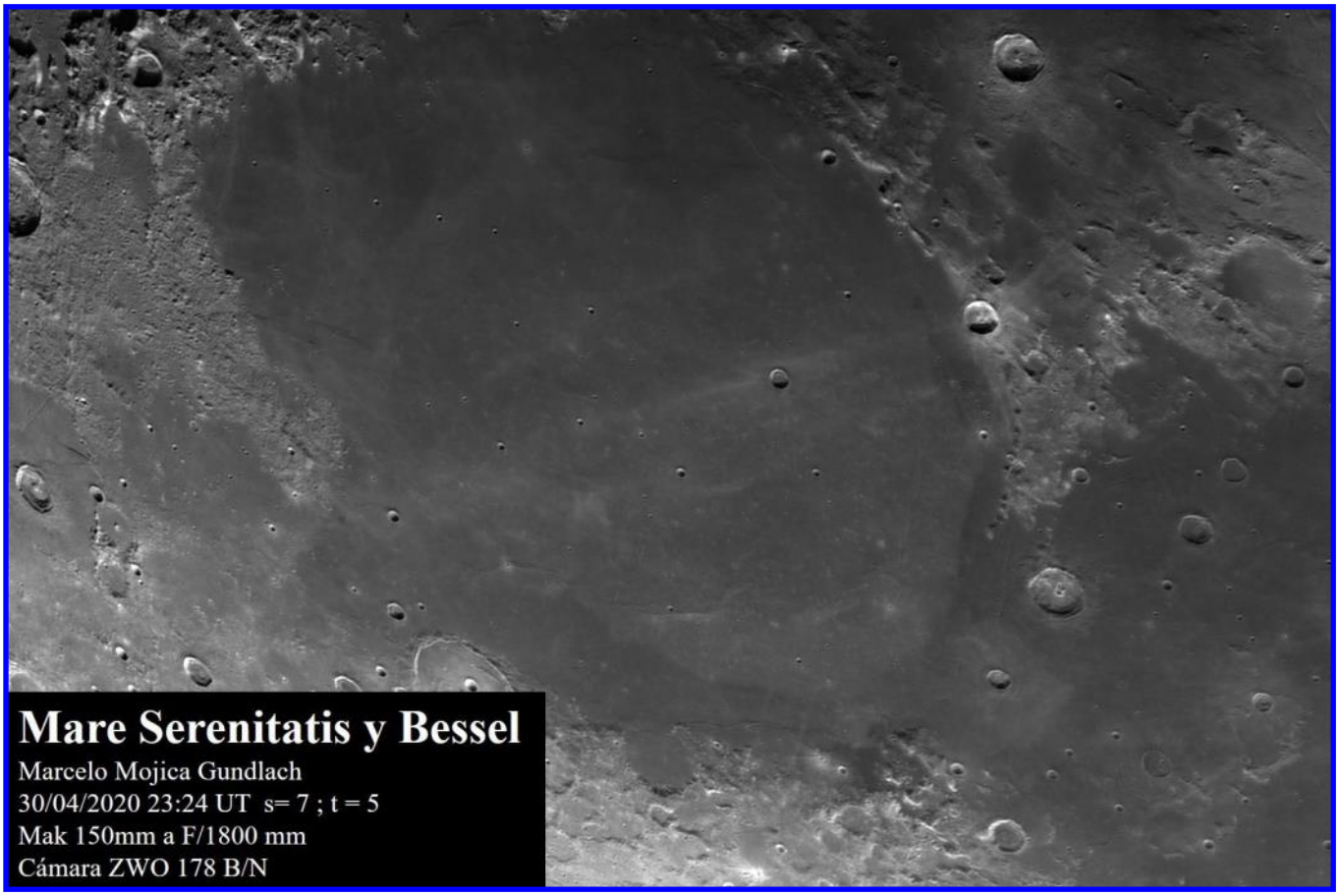


Bessel Ray, *Sergio Babino, Montevideo, Uruguay. 05 December 2019 00:56 UT. 250 mm. catadrioptic telescope, ZWO ASI 174 camera.*

Bessel, *Jairo Chavez, Popayán, Colombia. 12 February 2019 01:46 UT. 10 inch Dobsonian truss reflector telescope, Sony DSC-WX50 camera.*

***Bessel Ray**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 01 July 2017 23:34 UT. 200 mm refractor telescope, QHY5-ll camera.*

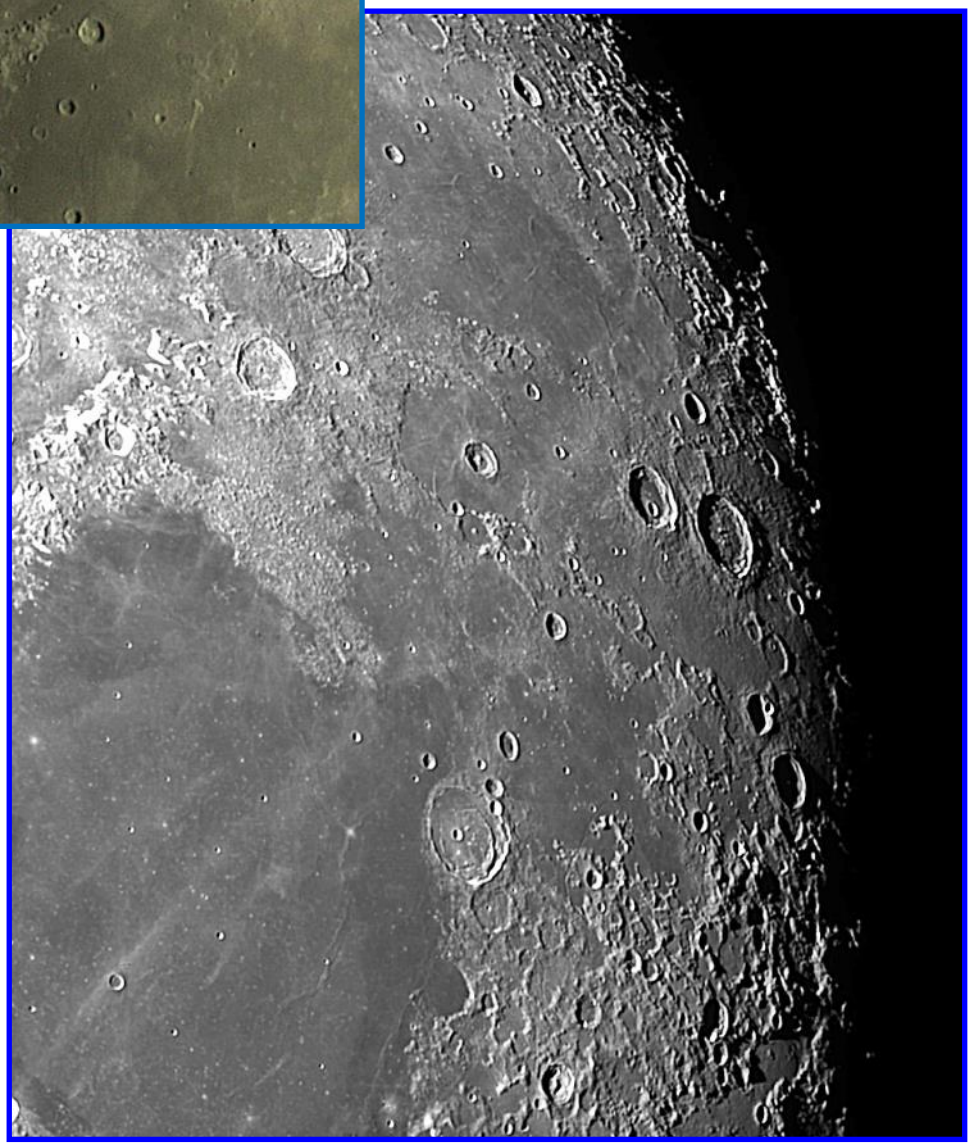
***Bessel,** Marcelo Mojica Gundlach , Cochabamba Bolivia. 30 April 2020 23:264UT. 150 mm Maksutov-Cassegrain telescope, fl 1,800 mm, ZWO ASI 178 B/N camera.*



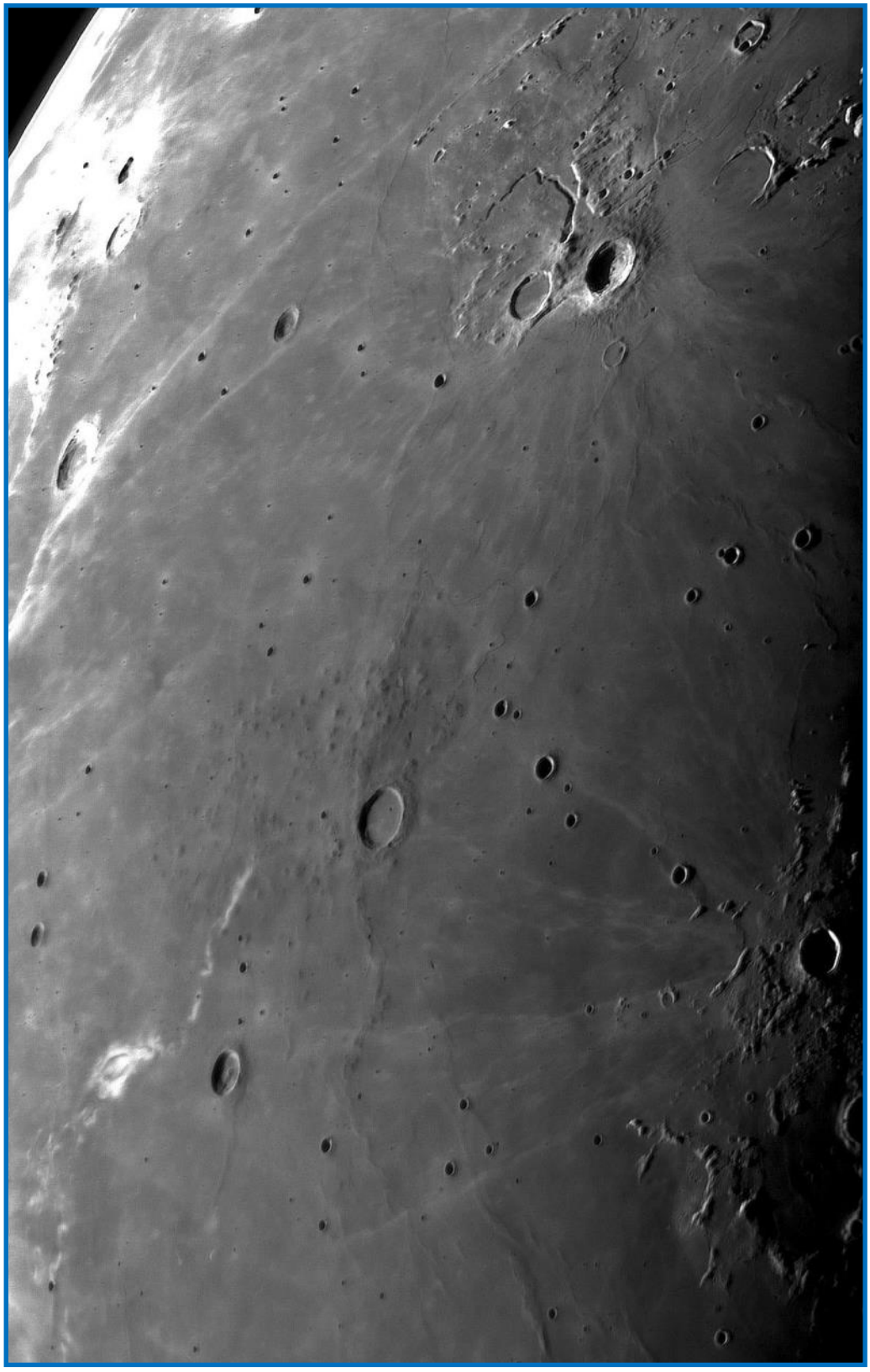
Bessel, *Jesús Piñeiro (San Antonio de los Altos, Venezuela. 23 November 2020 22:27 UT. Meade ETX-90 Maksutov-Cassegrain telescope, Astronomik 807 filter, ZWO ASI 462 MC camera.*

Bessel, *Román García Verdier, Paraná, Argentina. 26 September 2020 23:57 UT. 180 mm Newtonian reflector telescope, QHY5-ll camera.*

Bessel and Cassini, *Walter Riccardo Elias, Oro Verde, Argentina. 22 December 2020 01:28 UT. Helios 114 telescope, QHY5-ll C camera.*



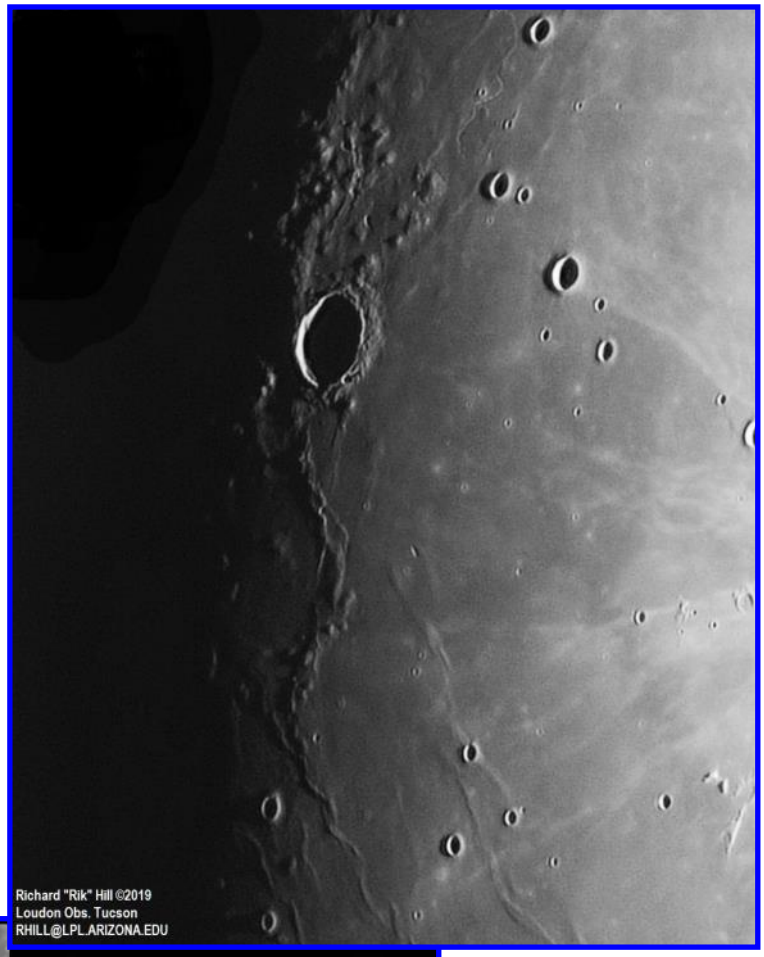
Bessel, *David Teske, Louisville, Mississippi, USA. 05 October 2020 07:11 UT. 4 inch f/15 refractor telescope, IR block filter, ZWO ASI 120 mm/s camera. Seeing 7/10.*



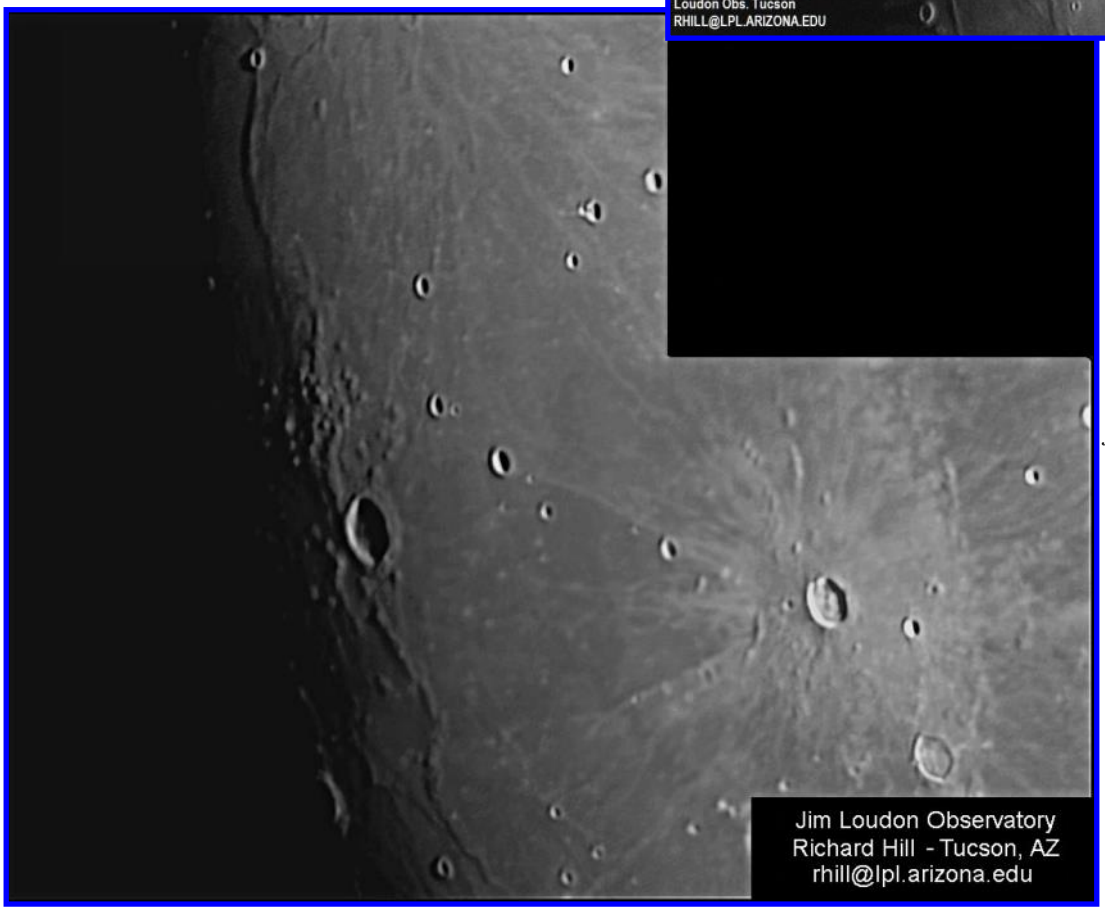
Marius Domes and Herodotus Omega, *Howard Eskildsen, Ocala, Florida, USA. 10 December 2020 11:15 UT, co-longitude 215.2°. Celestron 9.25 inch f/10 fl 2395 mm Schmidt-Cassegrain telescope, Celestron Skyris 236M camera. Seeing 9/10, transparency 5/6.*

Marius Hills, *Sergio Babino, Montevideo, Uruguay. 08 April 2020 00:16 UT. 203 mm. catadrioptic telescope, ZWO ASI 174 camera.*

Marius Hills*, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 19 April 2019 02:08 UT. 105 mm Meade EX Maksutov-Cassegrain telescope, QHY5-ll camera.*



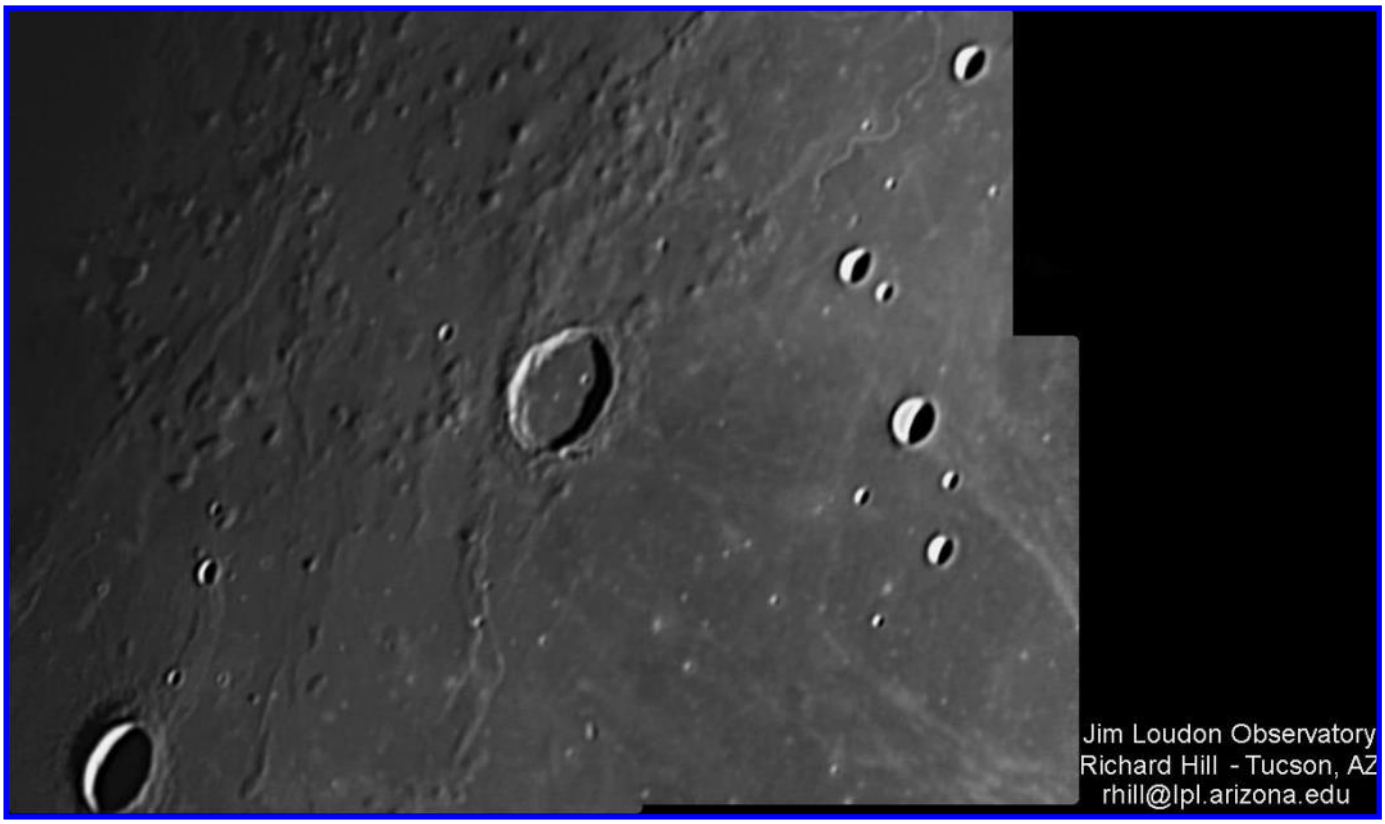
***Marius**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 18 March, 2019 04:38 UT, colongitude 52.2°. 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Celestron Skyris 445M camera, seeing 8/10.*

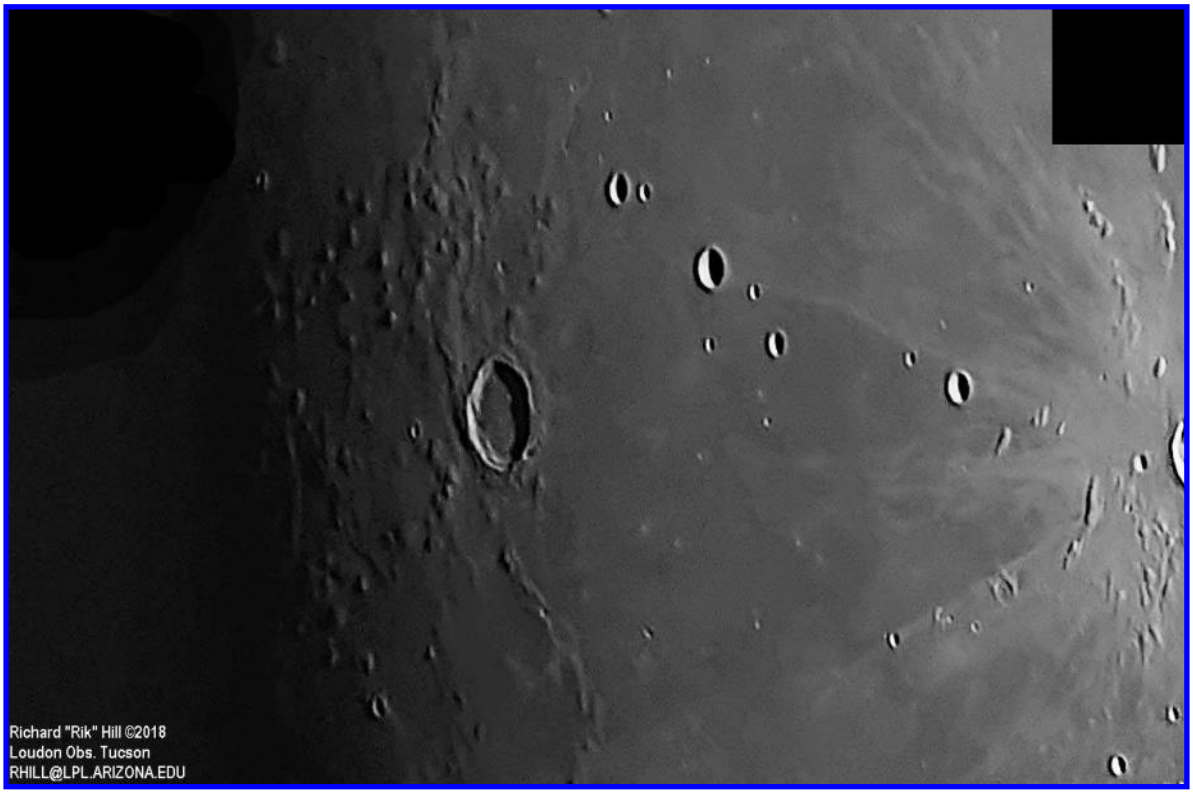


***Kepler to Marius**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 17 May, 2008 04:21 UT. Celestron 14 f/11 prime focus Schmidt -Cassegrain telescope, UV/IR blocking filter, SPC900NC camera, seeing 6/10.*

***Kepler to Marius**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 31 March, 2007 03:52 UT. Celestron 14 f/11 prime focus Schmidt-Cassegrain telescope, Wratten 21 filter, SPC900NC camera.*

***Marius Hills**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 24 September, 2007 03:24 UT. Celestron 14 Schmidt-Cassegrain telescope, 1.6 x barlow, UV/IR block filter, SPC900NC camera, seeing 7/10.*



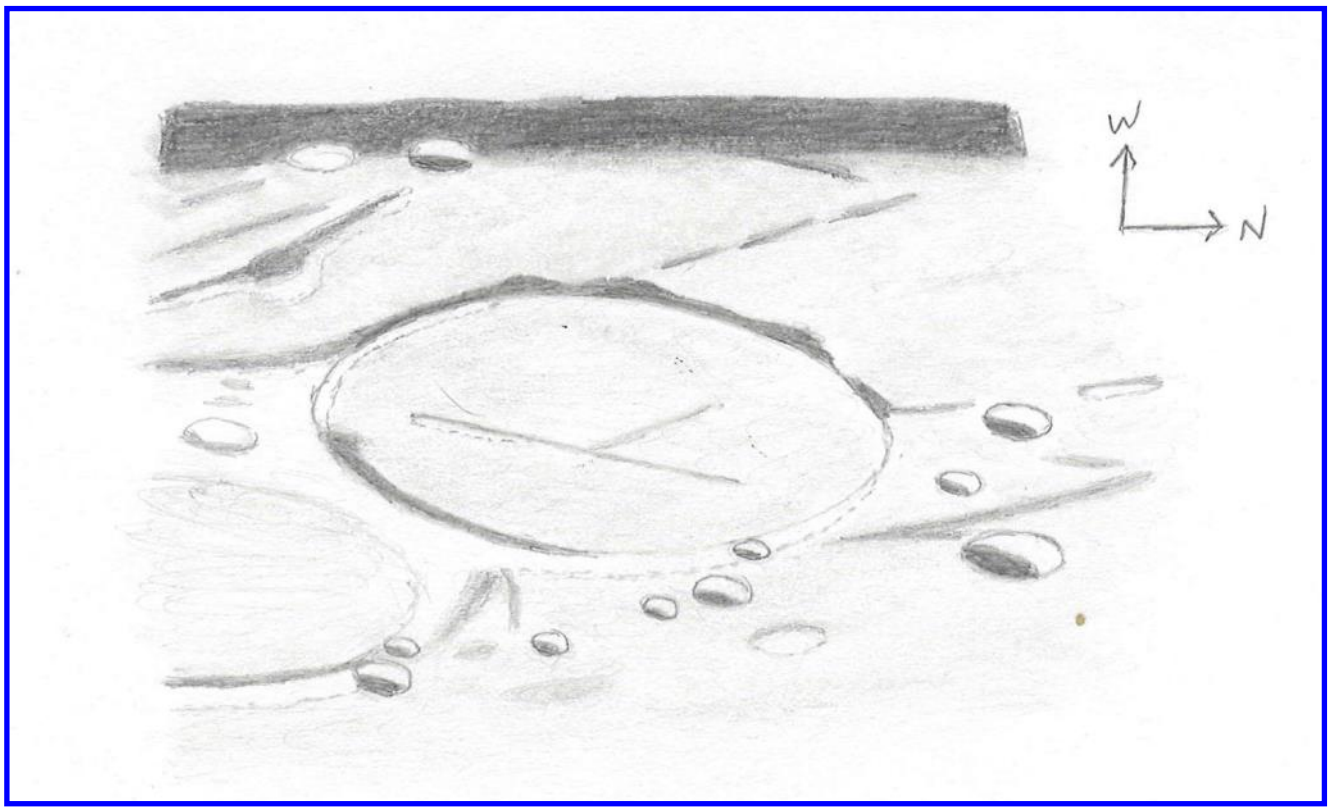


***Marius**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 29 March, 2018 05:05 UT, colongitude 57.3°. 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Celestron Skyris 445M camera.*

***Marius**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 02 April, 2015 03:53 UT. 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera. Seeing 9/10.*

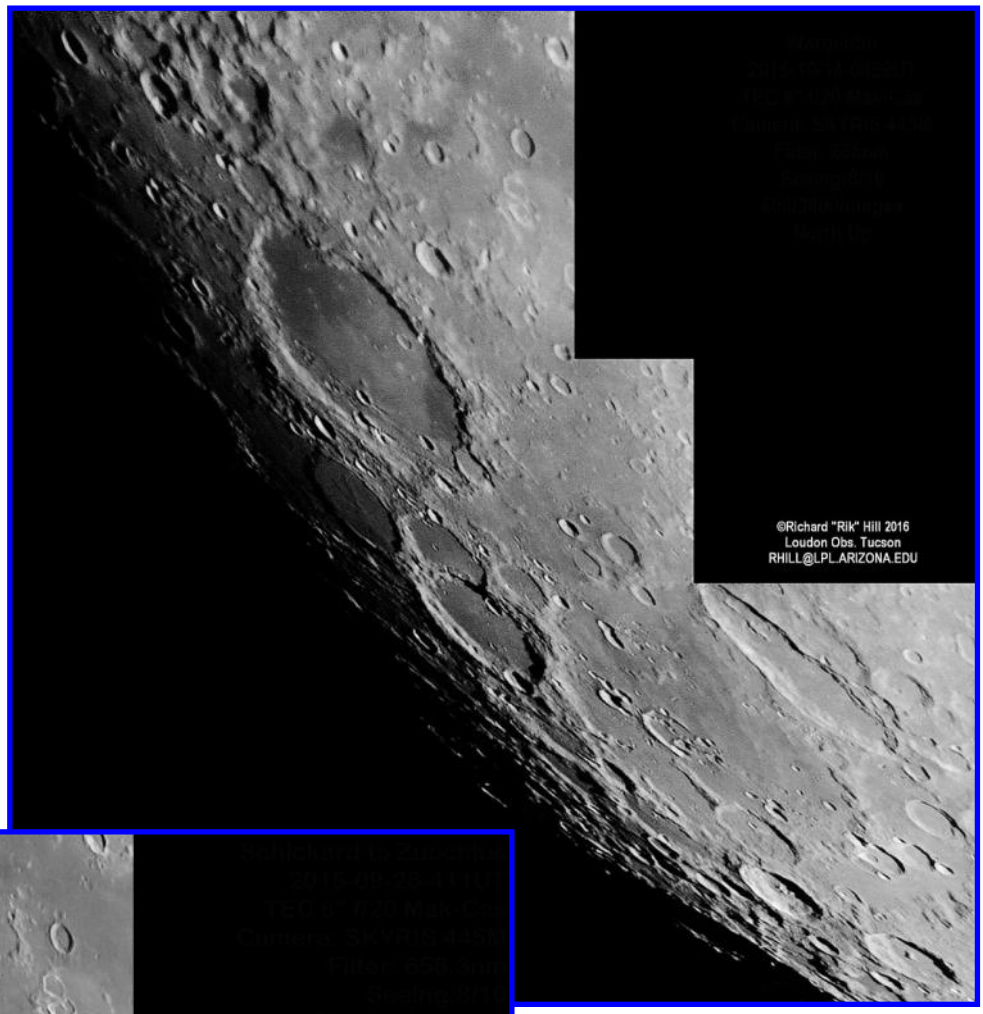
Wargentin

Robert H. Hays, Jr.

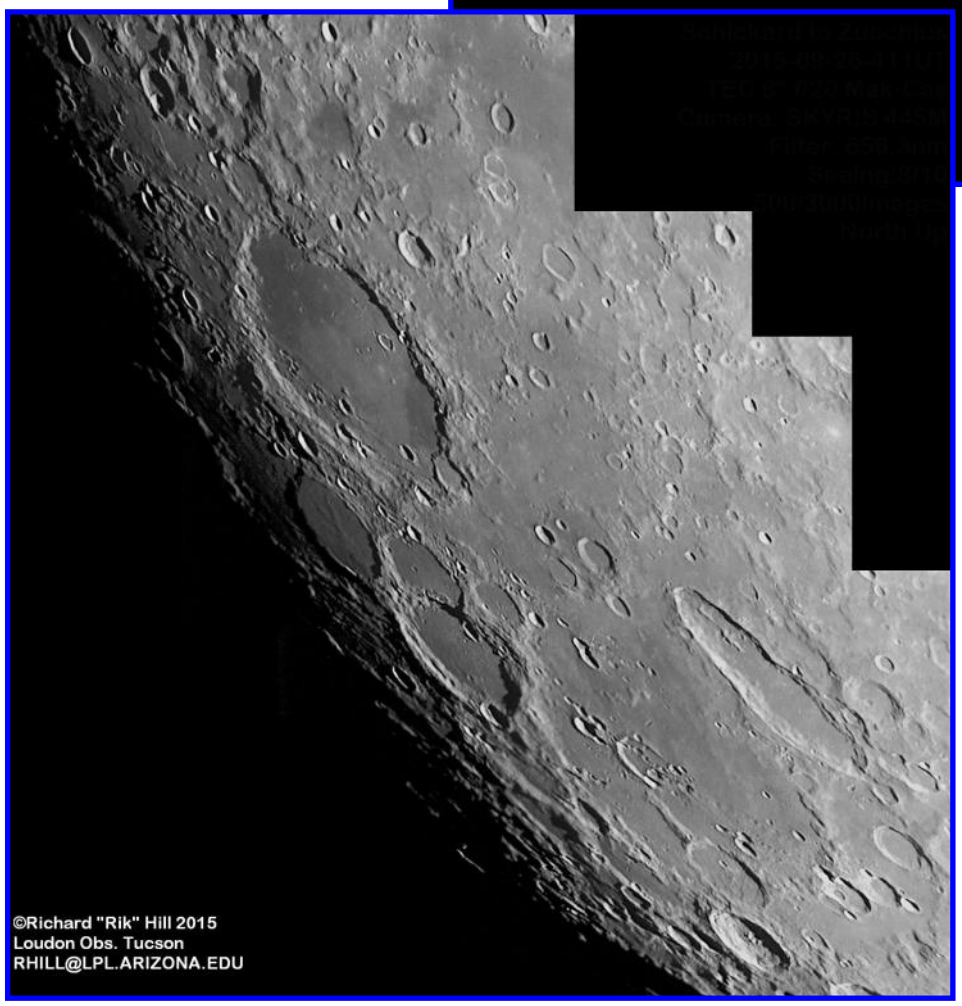


Wargentin, *Robert H. Hays, Jr. Worth, Illinois, USA. 10 October 2011 04:25 UT – 04:59 UT. 15 cm reflector telescope, 170 x. Seeing 6-8/10, transparency 6/6.*

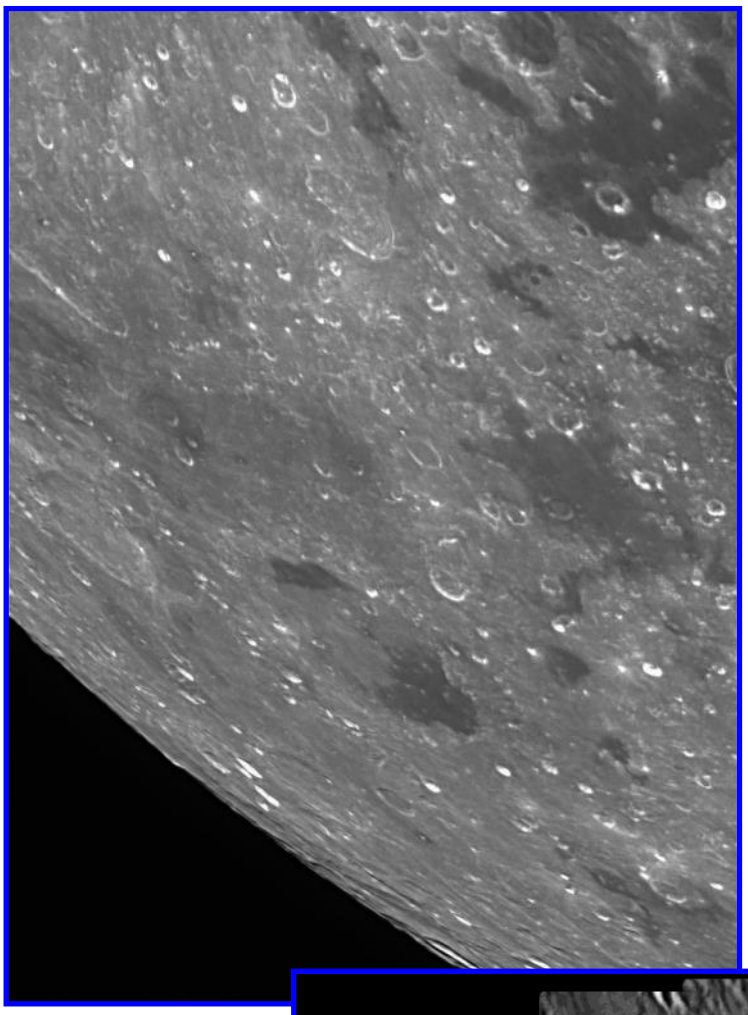
I observed this crater on the evening of October 9/10, 2011 after the Moon hid 16 Piscium. This is a very unusual-looking feature south of Schickard. It appears to be generally a large, round plateau. There is a modest rim, typical of craters, at the south end, but not at its north end. The west side of Wargentin (away from the sun) casts a substantial, serrated shadow expect for a gap near the north end. The east side of Wargentin was bright as it caught the morning sun. There is some interior shadow toward the south end from a likely raised rim there. This interior shadow is widest at the south end where it blends into a bright strip along west side shadow. This may be where a raised rim is catching sunlight. The interior surface of Wargentin is generally dusky. Two narrow, somewhat fuzzy lines make a Y-pattern inside Wargentin. These may be from low ridges since there is slight brightening on the sunward side along this pattern's southern end. A curved feature east of Wargentin is part of the rim of Nasmyth. Two pits at perched on it, the larger being Nasmyth D. A wider rim part of Nasmyth extends south from Wargentin and may have two or three depressions. A crooked line of four craters lies north of Nasmyth D near the east rim of Wargentin. From south to north they are Wargentin P, K, L and M. Wargentin L is the largest of the quartet. Wargentin A is the conspicuous crater to the north; it is the second largest crater completely shown in the sketch. The two smaller craters west of A are Wargentin H and C. I drew an assortment of shadow strips and patches of varying intensity. One bit of shadow is from a low hill near Wargentin L, and another is from a sizable mound southwest of Wargentin. The area very near the terminator was difficult to draw and may be generalized. There appears to be at least one crater in the area west of Wargentin. The area northwest of Wargentin does appear quite smooth and dusky.



Wargentin, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 14 October 2016 04:59 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 665 nm filter, Celestron Skyris 445M camera, seeing 8/10.*



Schickard to Zucchius, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 26 September 2015 04:11 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.8 nm filter, Celestron Skyris 445M camera, seeing 8/10.*



***Wargentin**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 26 August 2018 03:40 UT. Celestron 11 inch CPC 1100 Schmidt-Cassegrain telescope, ZWO ASI 120 mm/s camera.*

***Schickard and Wargentin**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 09 October, 2009 05:42 UT. Celestron 14 Schmidt-Cassegrain telescope, 1.6 x barlow, f/17.6, UV/IR block filter, DMK21AU04 camera, seeing 8/10.*

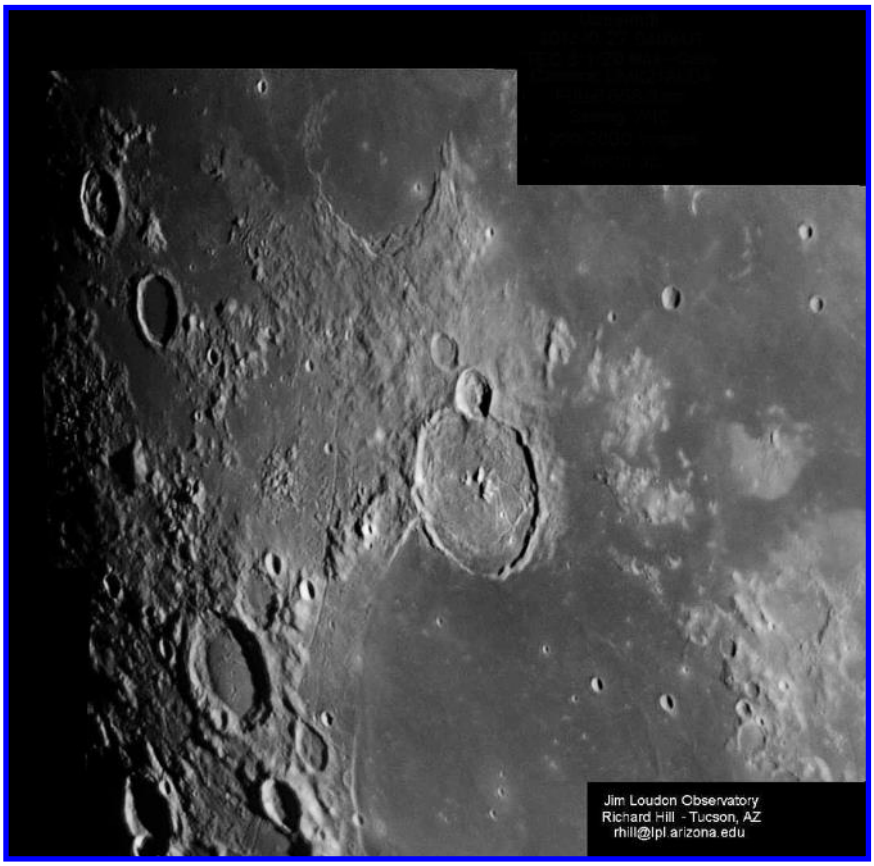
Mersenius, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 12 November 2016 04:11 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera, seeing 8/10.*

Mersenius, *Sergio Babino, Montevideo, Uruguay. 08 March 2020 01:42 UT. 203 mm. catadrioptic telescope, ZWO ASI 174 camera.*

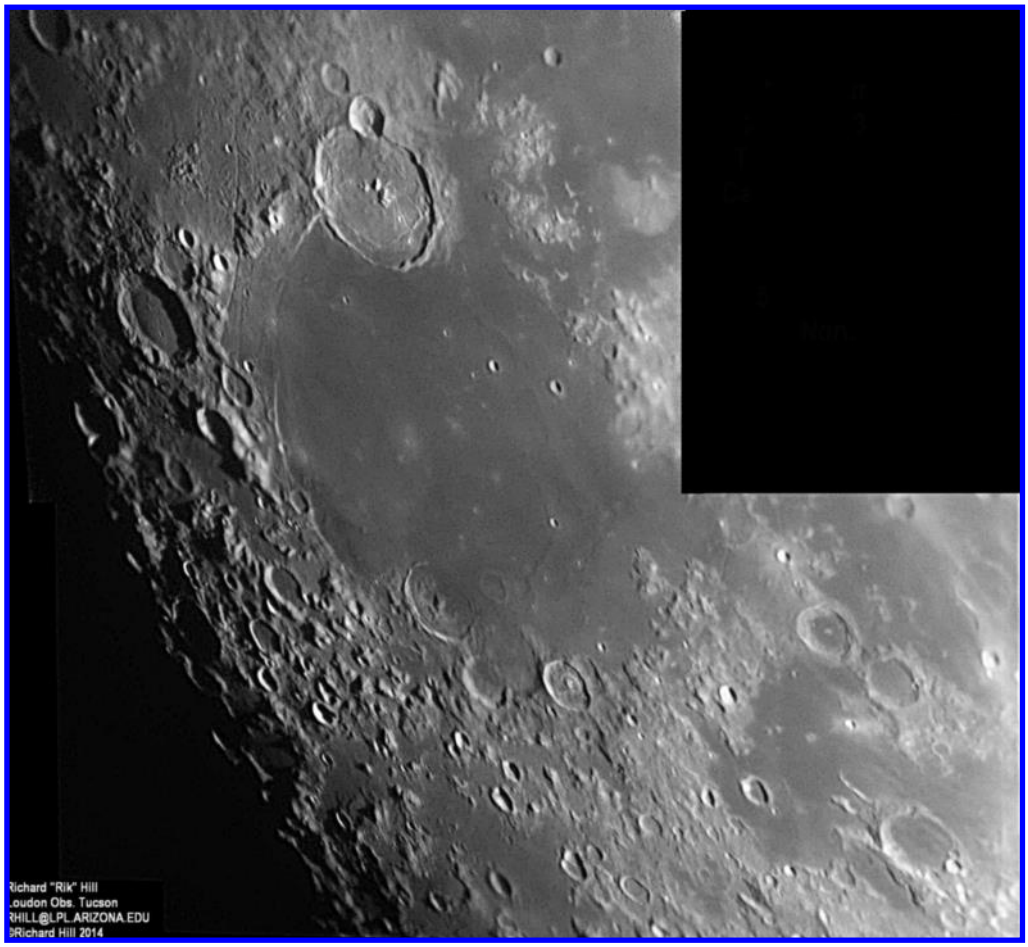
Mersenius, *Ariel Cappelletti, Córdoba, Argentina, SLA. 16 April 2019 23:15 UT. 200 mm Newtonian reflector telescope, IR filter, ZWO ASI 178 mc camera.*

***Gassendi**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 19 March 2008 05:02 UT. Celestron 14 Schmidt-Cassegrain telescope, 1.6 x barlow, UV/IR block filter, SCP900NC camera, seeing 6/10.*

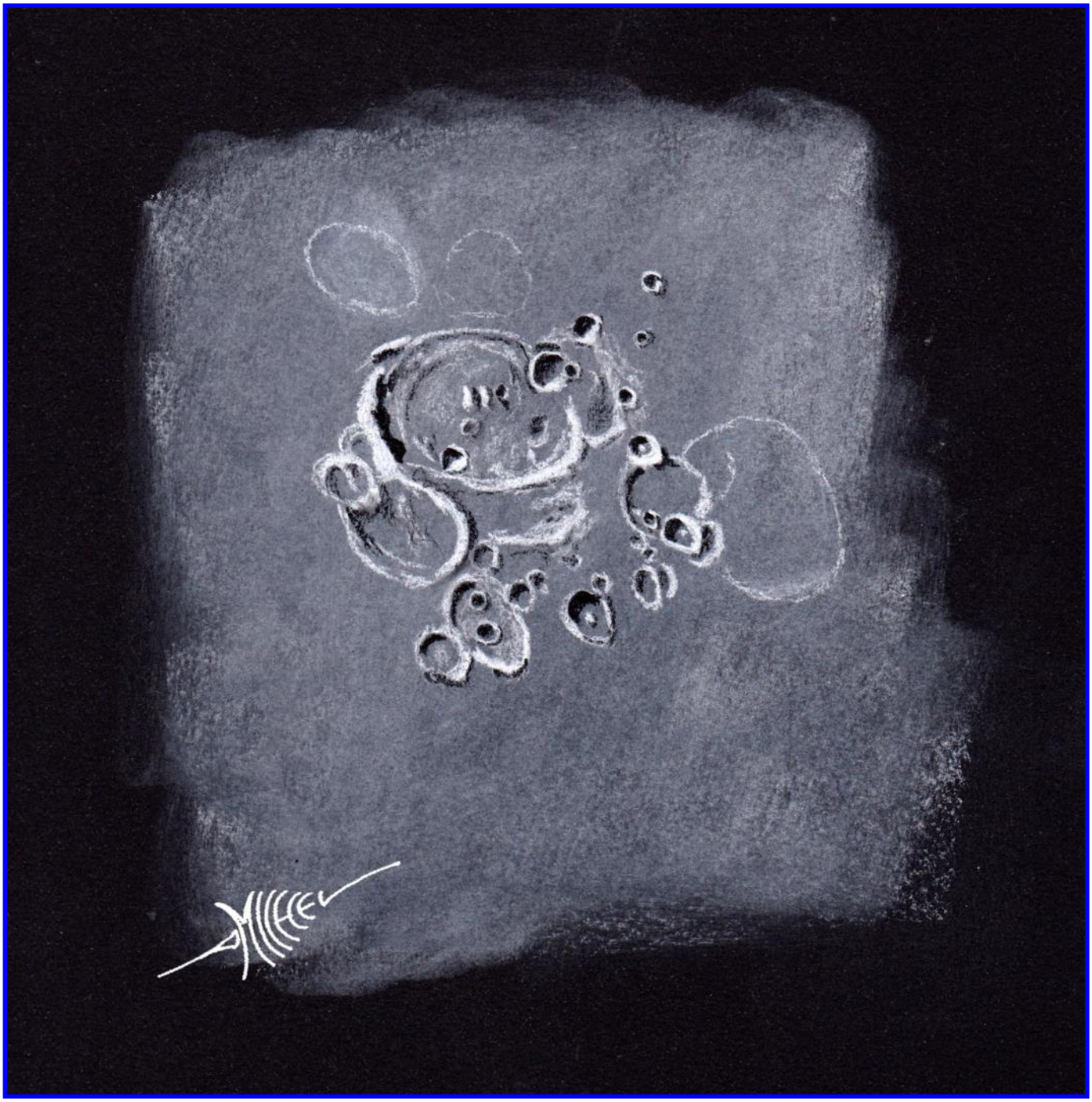
***Gassendi**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 03 May 2012 03:53 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, Wratten 23 filter, DMK21AU04 camera, seeing 7/10.*



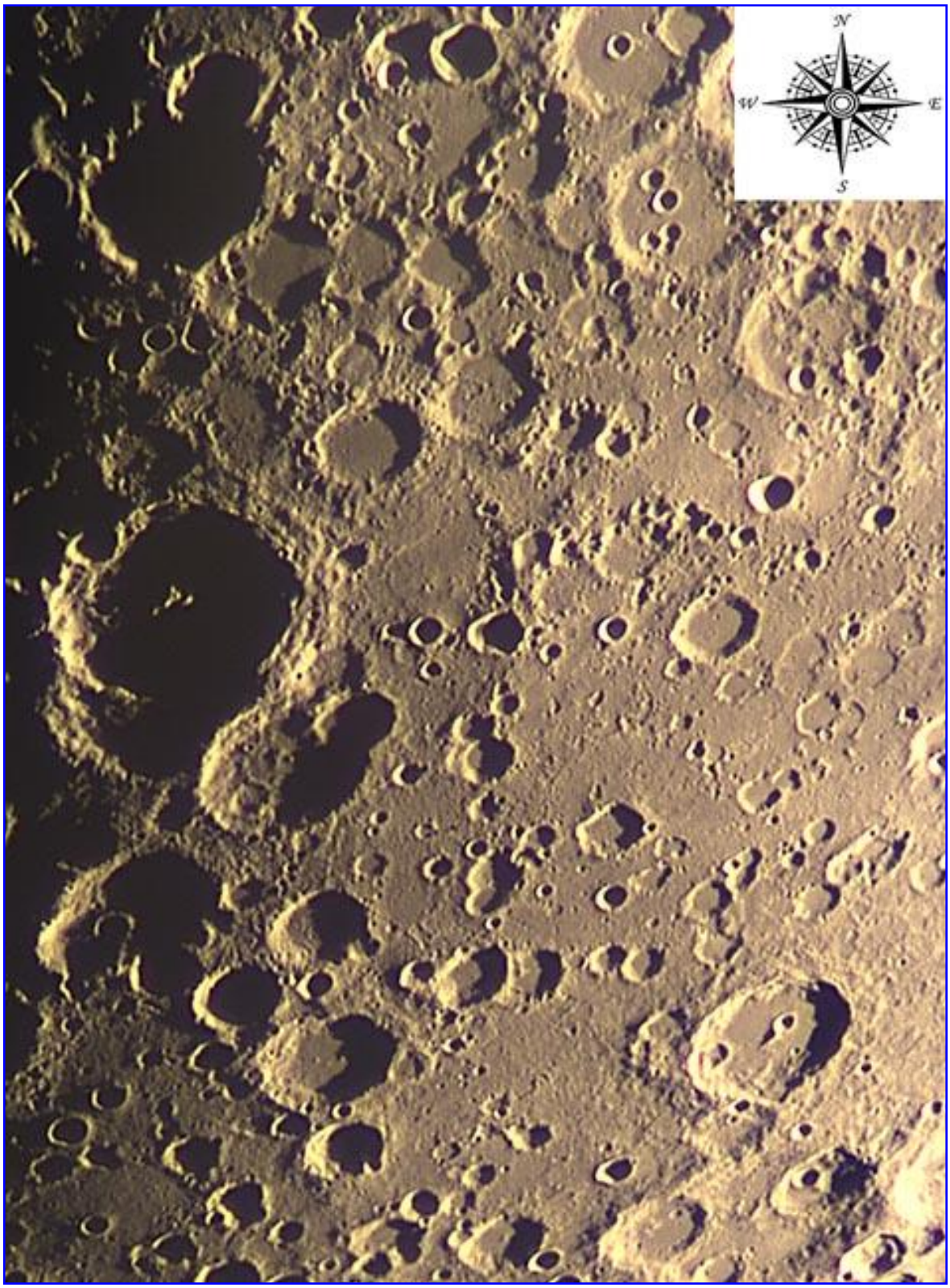
***Gassendi**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 27 October 2012 04:09 UT. TEC 8 inch f/20 Maksutov -Cassegrain telescope, 656.3 nm filter, DMK21AU04 camera, seeing 7/10.*



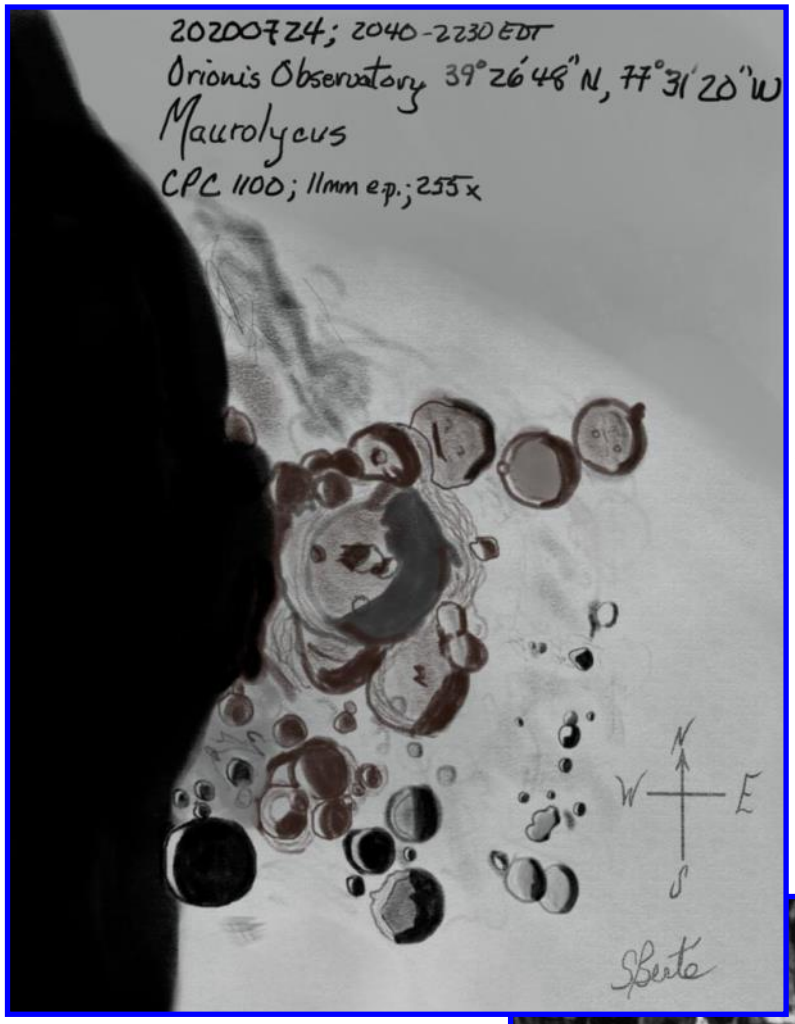
***Mare Humorum**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 13 January 2014 06:47 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera, seeing 7/10.*



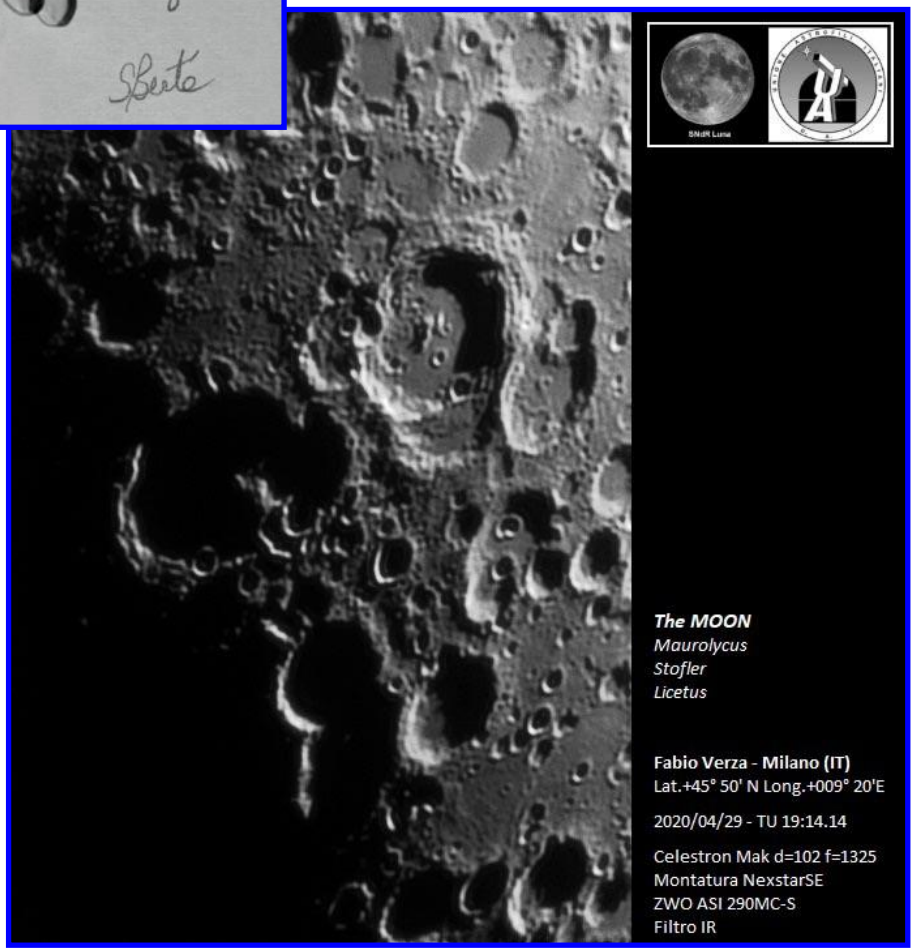
***Maurolycus**, Michel Deconinck, Aquarellia Observatory - Artignosc-sur-Verdon - Provence, France. 23 November 2020 19:15 UT. 152 mm 1,200 mm fl Bresser refractor telescope on Exos 2 motorized EQ mount, 13 mm Tele Vue Ethos eyepiece.*



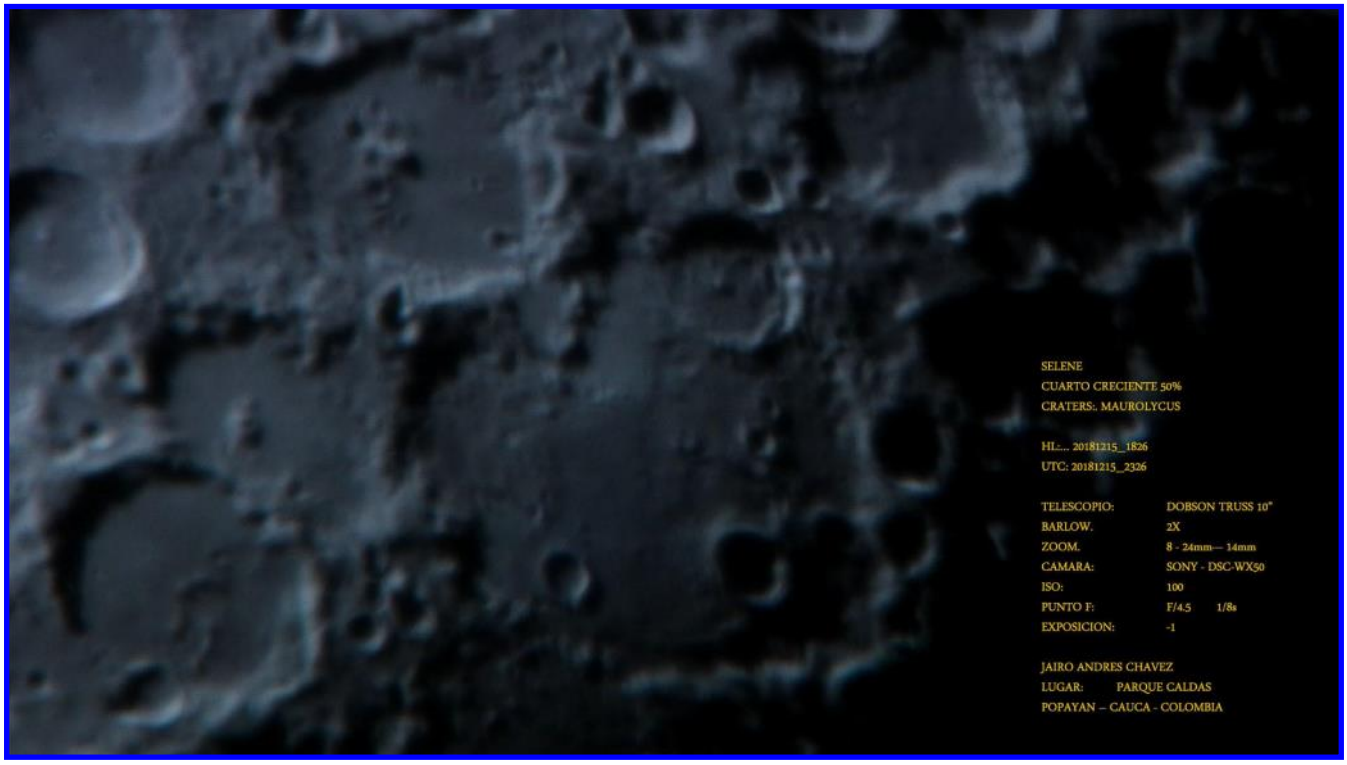
Maurolycus, *Marcelo Mojica Gundlach , Cochabamba Bolivia. 07 August 2019 23:26 UT. 150 mm Maksutov-Cassegrain telescope, fl 1,800 mm, direct focus, ZWO ASI 120 color camera, Registax 6, s8, t5 100 frames stacked.*



Maurolycus, *Steve Berlé, Orionis Observatory, Middletown, Maryland, USA. 24 July 2020 20:40-22:30 UT. Celestron CPC 11 inch Schmidt-Cassegrain telescope, 11 mm eyepiece, 255 x.*

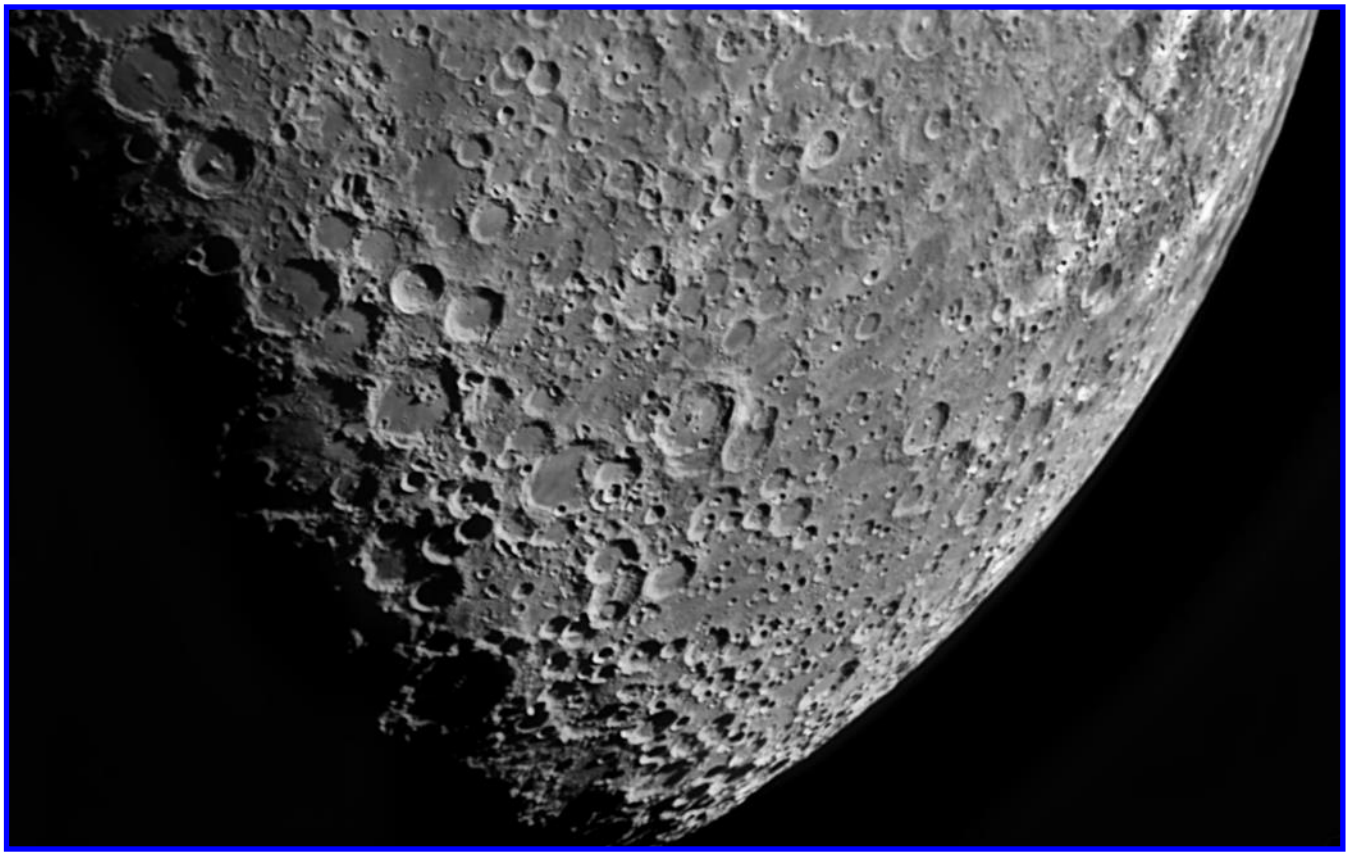


Maurolycus, *Fabio Verza, SNdR Luna, Milan, Italy. 29 April 2020 19:14 UT. Celestron 4 inch Maksutov-Cassegrain Nexstar telescope, IR Block filter, ZWO ASI 290 MC-S camera.*



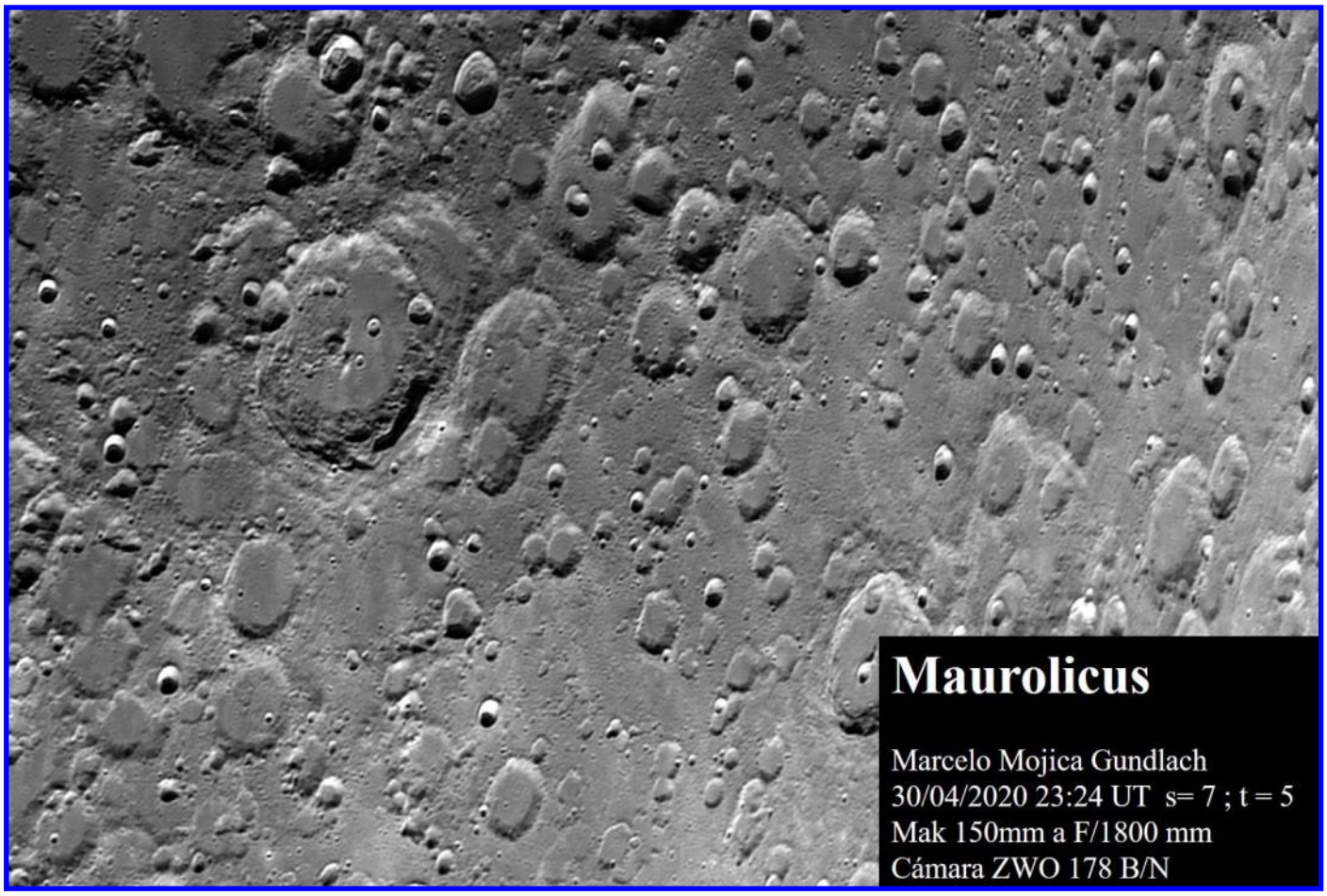
Maurolycus, *Jairo Chavez, Popayán, Colombia. 15 December 2018 23:26 UT. 10 inch Dobsonian truss reflector telescope, Sony DSC-WX50 camera.*

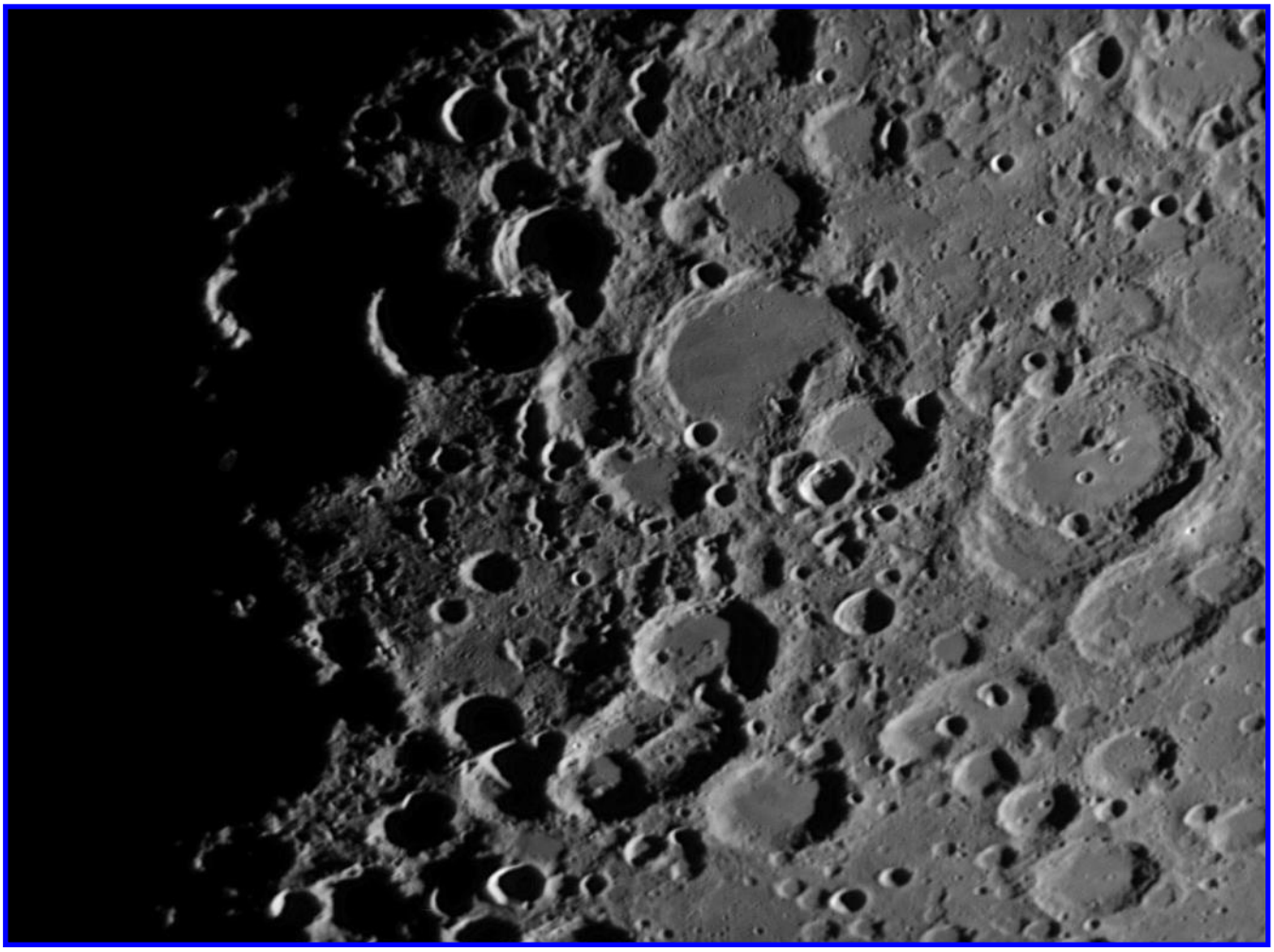
Maurolycus, *Sergio Babino, Montevideo, Uruguay. 10 December 2019 01:50 UT. 250 mm. catadrioptic telescope, ZWO ASI 174 camera.*



Maurolycus, *Jairo Chavez, Popayán, Colombia. 15 December 2018 23:21 UT. 10 inch Dobsonian truss reflector telescope, Sony DSC-WX50 camera.*

Maurolycus, *Marcelo Mojica Gundlach , Cochabamba Bolivia. 30 April 2020 23:24 UT. 150 mm , 1,800 mm fl Maksutov-Cassegrain telescope, ZWO ASI 178 B/N camera. Seeing 7/10, transparency 5/10.*

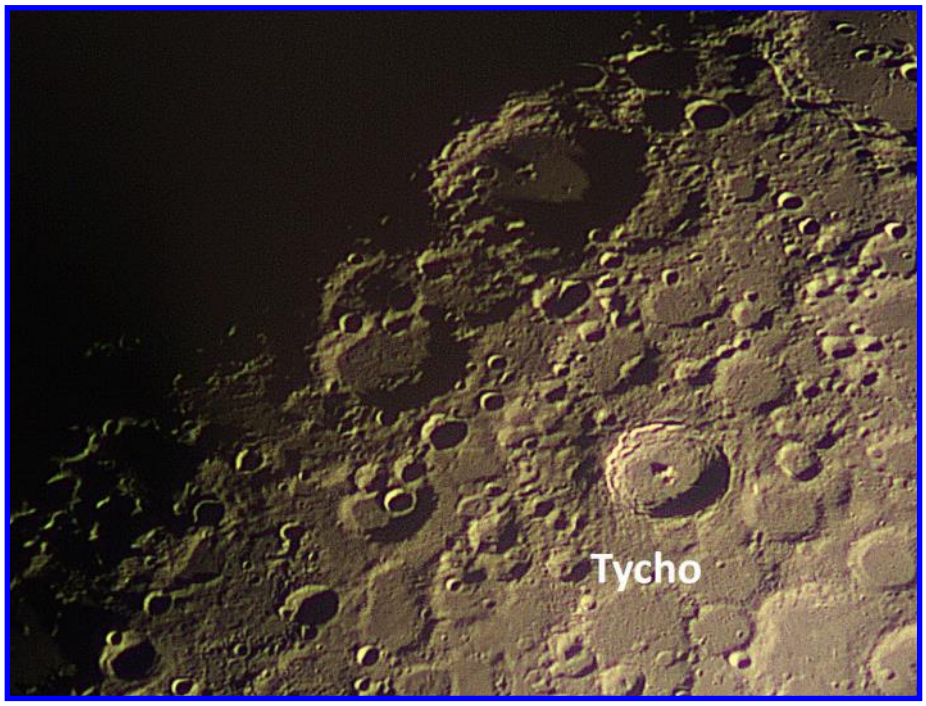




Maurolycus, *Alberto Anunziato, Paraná, Argentina. 09 October 2016 00:36. Celestron 11 inch Edge HD Schmidt-Cassegrain telescope, QHY5-ll camera.*

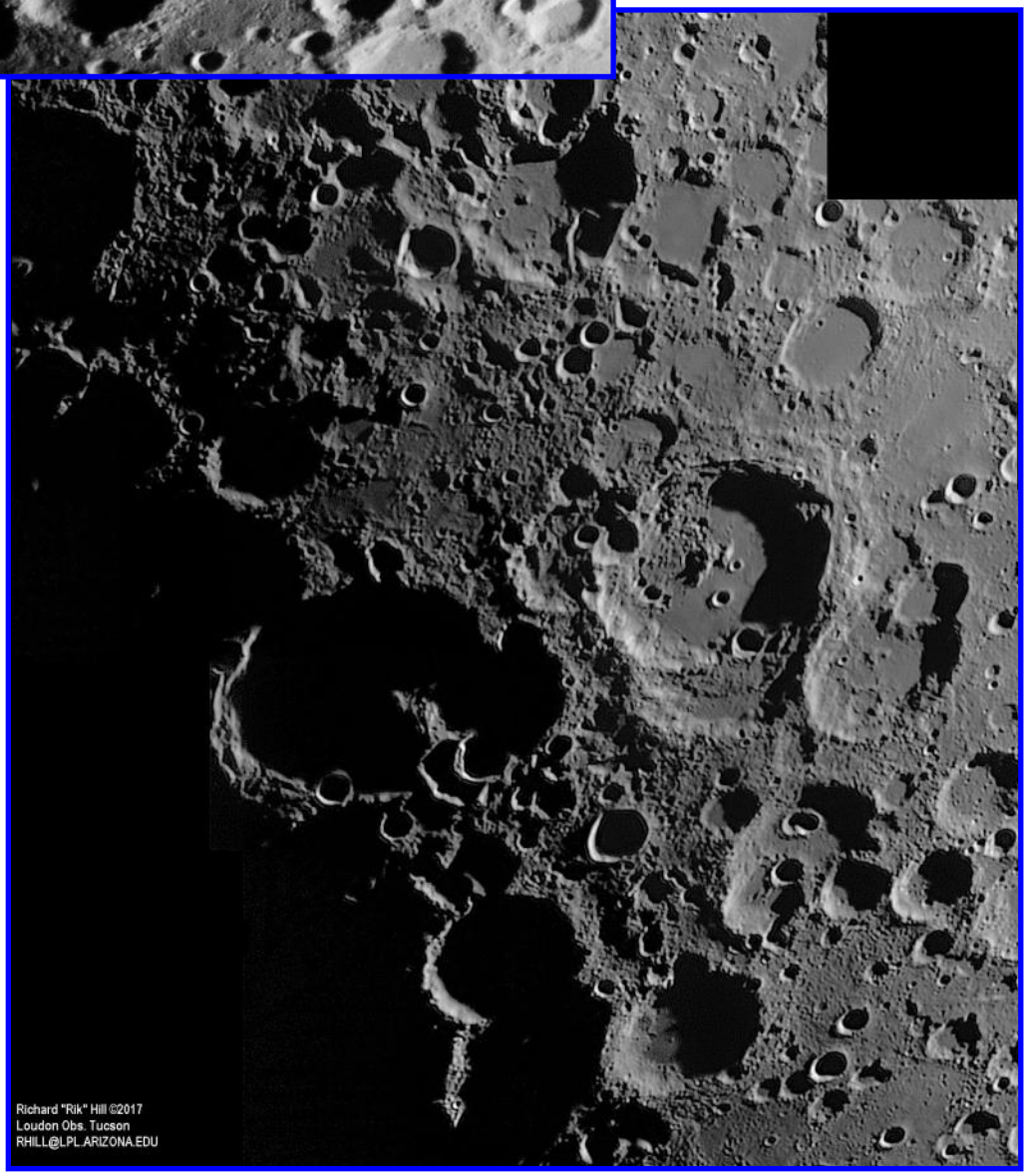
Maurolycus, *Jairo Chavez, Popayán, Colombia. 17 October 2018 02:39 UT. 10 inch Dobsonian truss reflector telescope, Sony DSC-WX50 camera.*

Maurolycus, *Marcelo Mojica Gundlach , Cochabamba Bolivia. 07 July 2020 23:30 UT. 150 mm refractor telescope, ZWO ASI 120 color camera.*

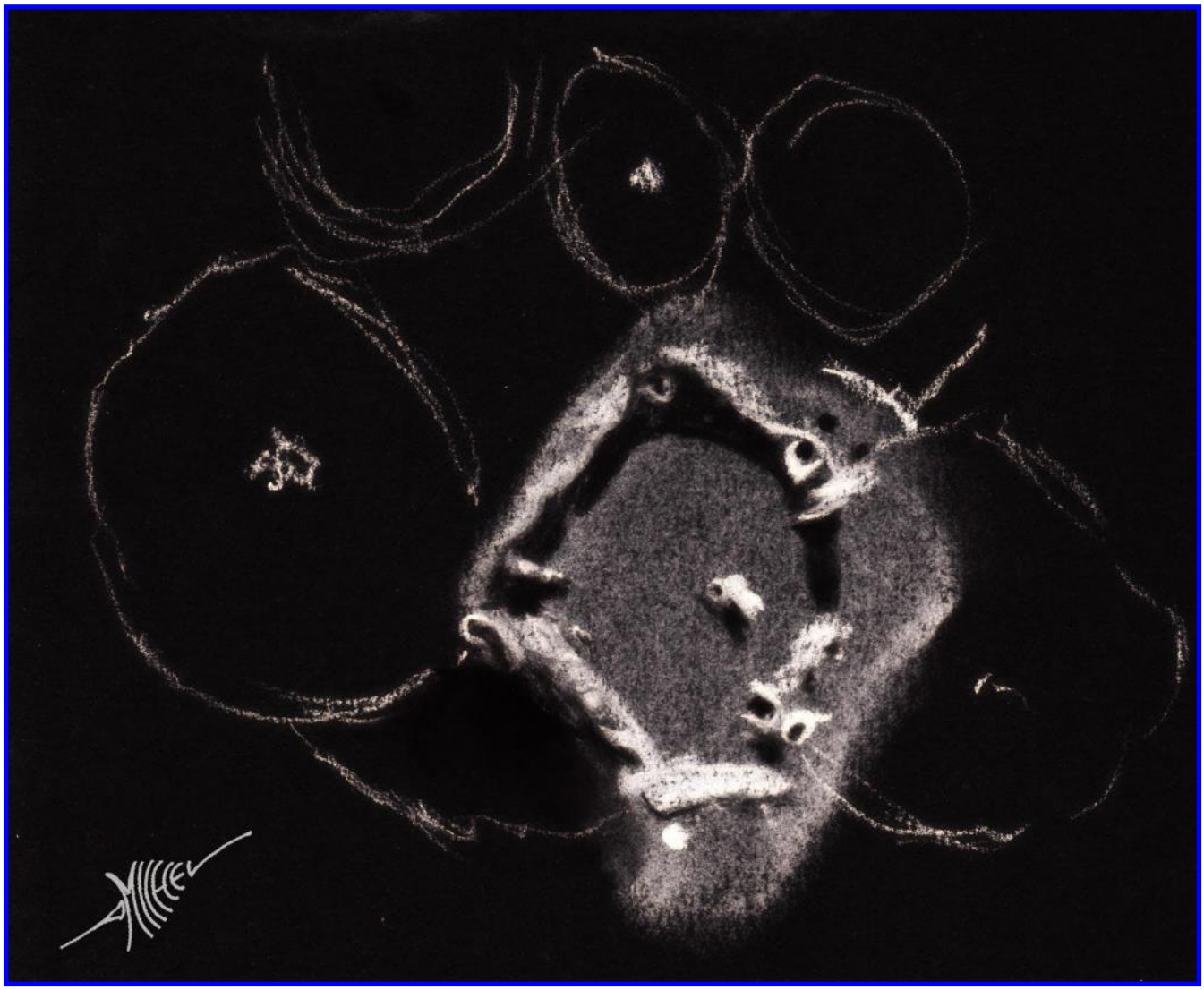


Heraclitus*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 17 November 2007 01:26 UT. Celestron 14 f/11 prime focus Schmidt-Cassegrain telescope, UV/IR blocking filter, SPC900NC camera. Seeing 7/10.*

Maurolycus, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 20 October 2015 01:02 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera, seeing 9/10.*

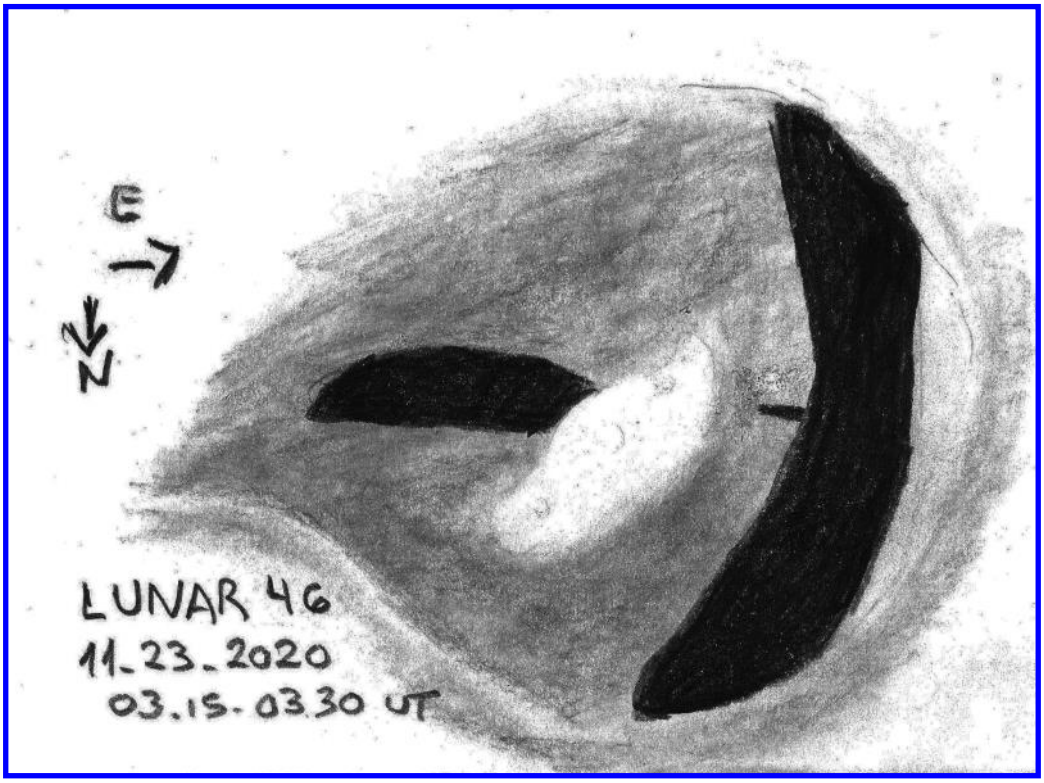


Maurolycus, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 01 July 2017 02:33 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera, seeing 8/10.*

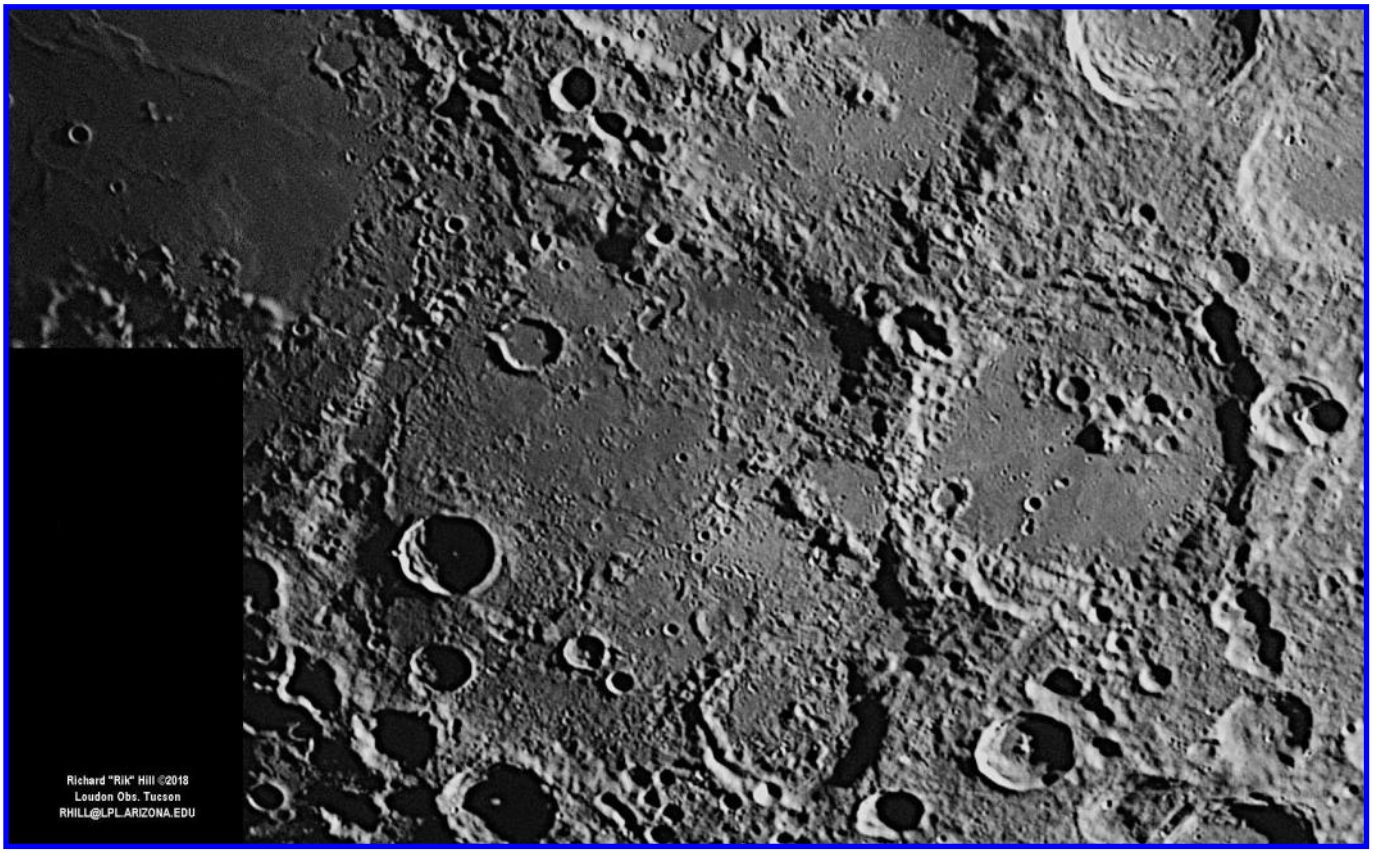


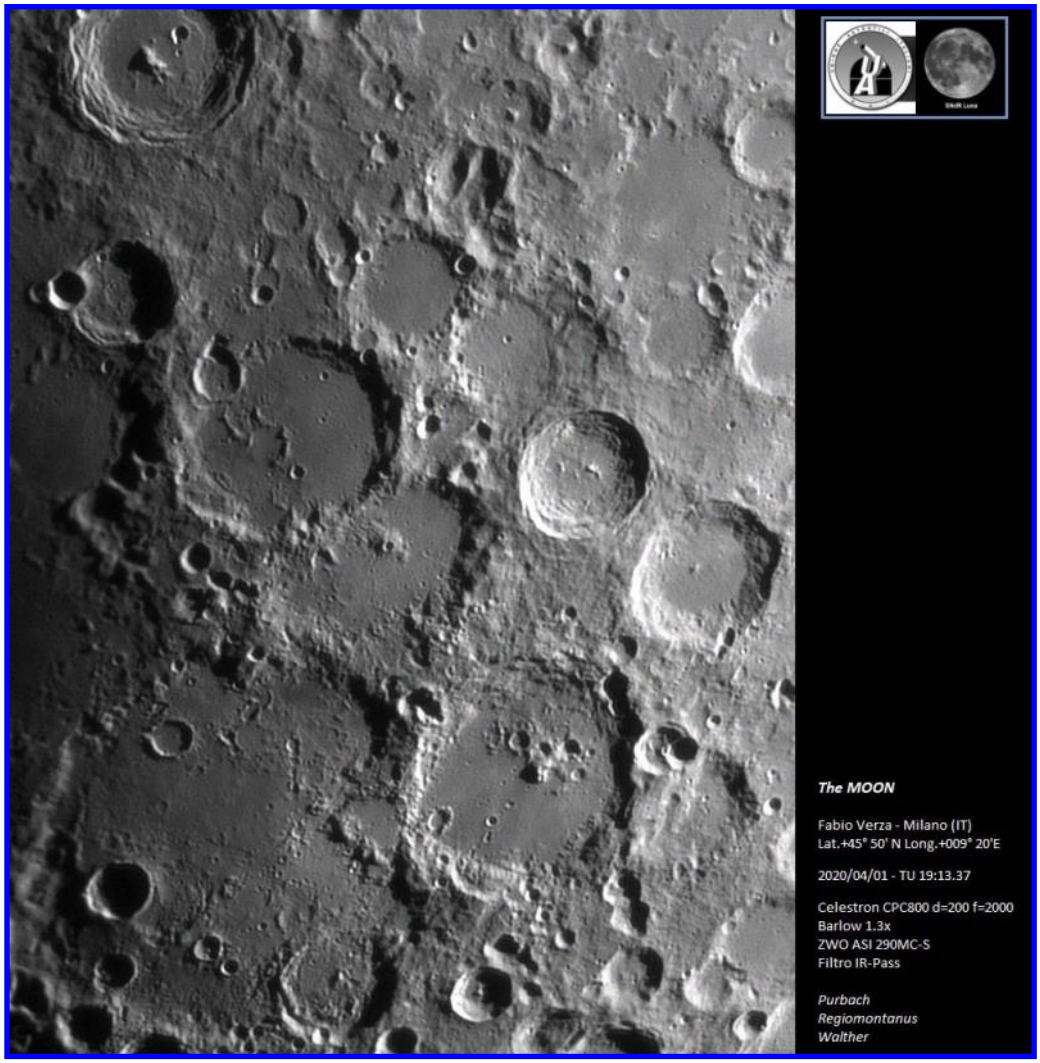
***Regiomontanus**, Michel Deconinck, with my mobile observatory from Comps-sur-Artuby, 750m in the south French Alps. 24 October 2020 18:00 UT. 102 mm 1,000 mm fl Bresser refractor telescope, 10 mm eyepiece, 100 x.*

Regiomontanus, *Alberto Anunziato, Paraná, Argentina. 23 November 2020 03:15 - 03:30 UT. Meade EX 105 mm Maksutov-Cassegrain telescope, 154 x.*

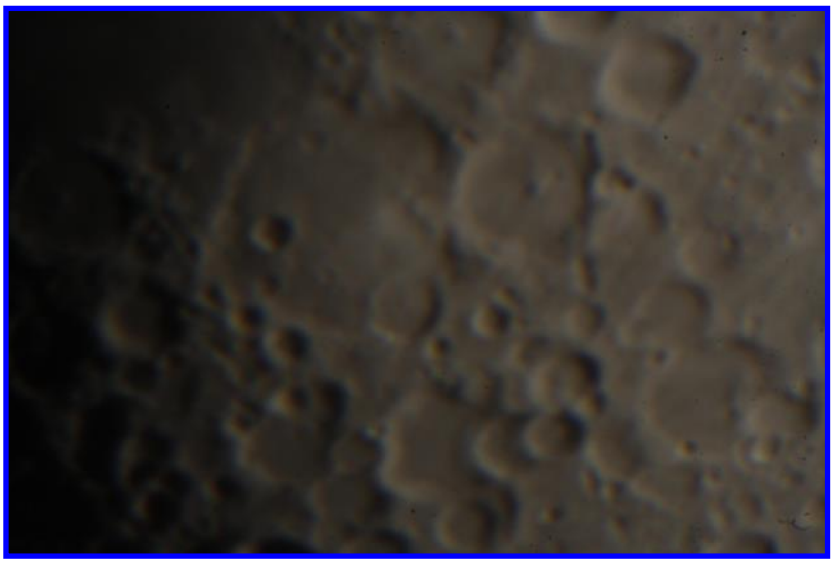


Deslandres and Regiomontanus, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 24 April 2018 02:17 UT, colongitude 12.9°. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Celestron Skyris 445M camera, seeing 8/10.*

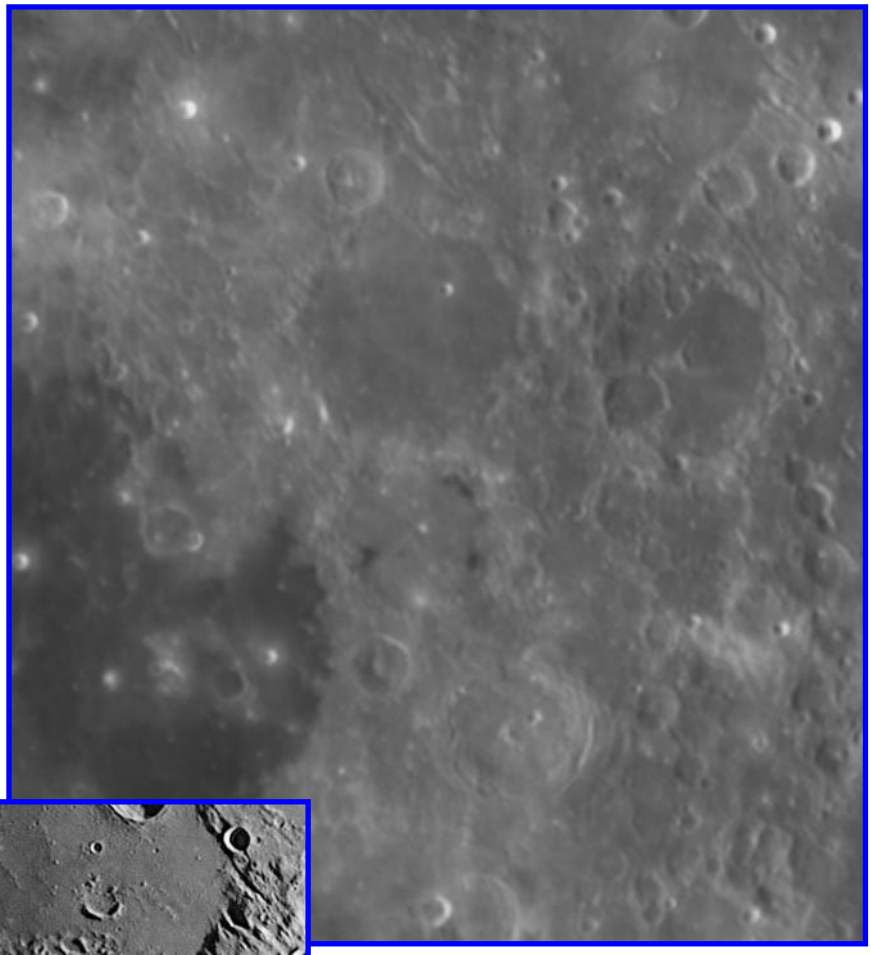




Regiomontanus, *Fabio Verza, SNdR Luna, Milan, Italy. 01 April 2020 19:13 UT. Celestron CPC800 8 inch Schmidt -Cassegrain telescope, 1.3 x barlow, IR pass filter, ZWO ASI 290 MM camera.*

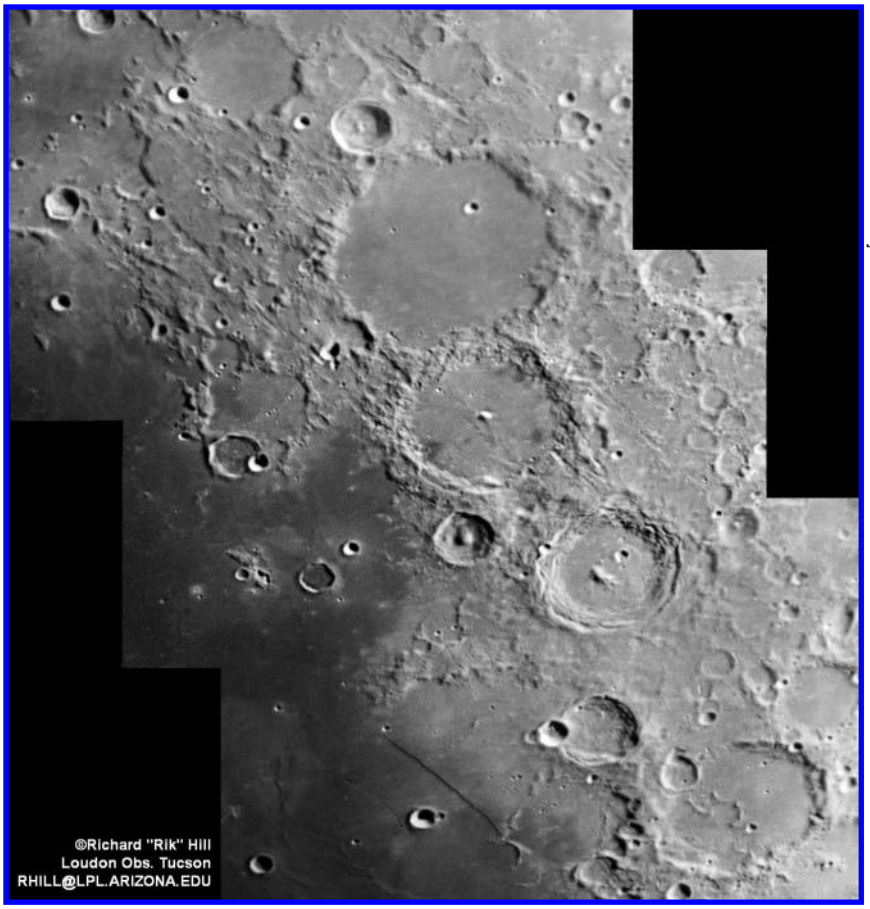


Regiomontanus*, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 26 July 2015 02:03 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

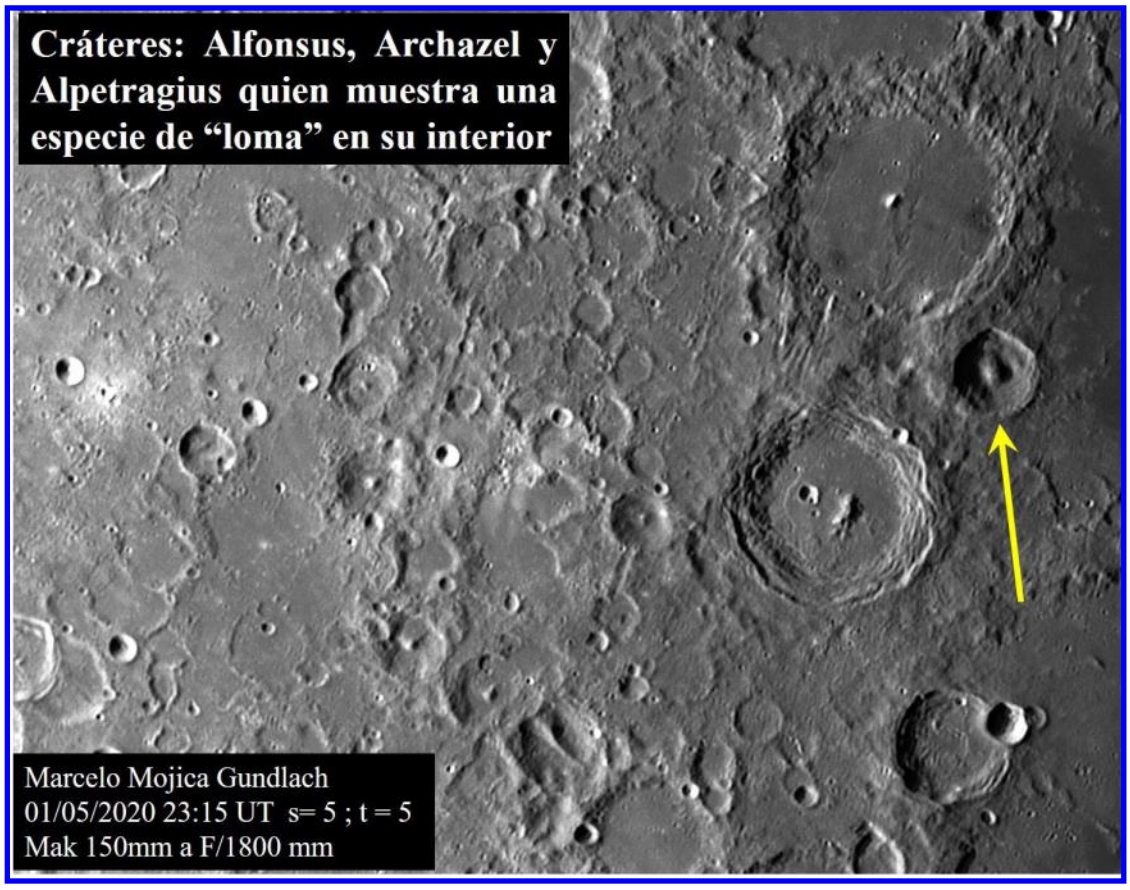


***Alphonsus**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 27 March 2016 04:20 UT. Celestron 11 inch HD Edge Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

***Ptolemaeus, Alphonsus and Arzachel**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 13 June 2016 02:44 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera, seeing 9/10.*

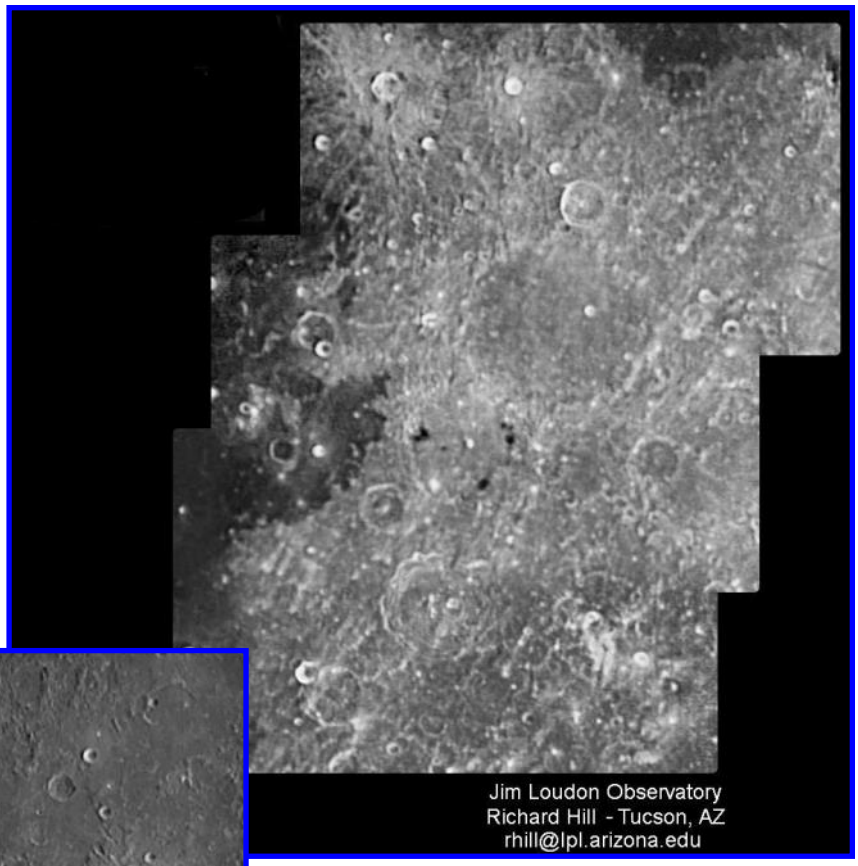


***Rupes Recta to Ptolemaeus**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 09 May 2014 03:50 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera, seeing 8/10.*



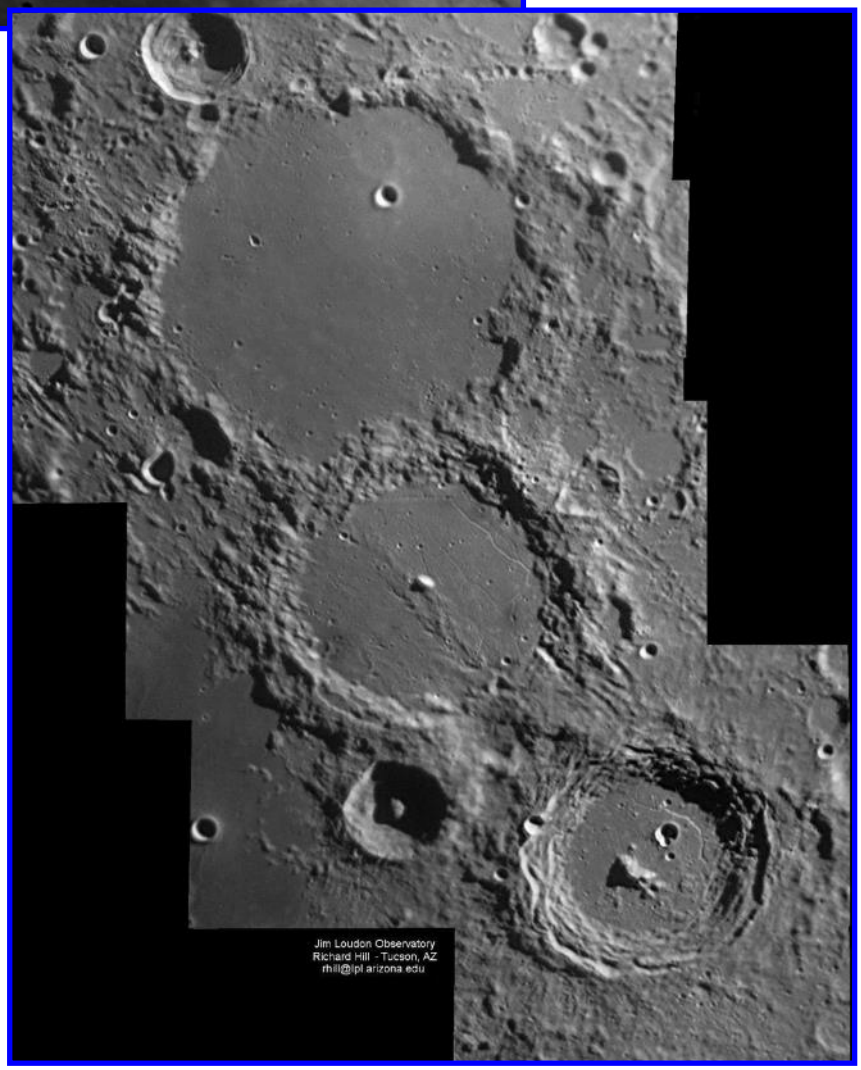
***Alphonsus,** Marcelo Mojica Gundlach , Cochabamba Bolivia. 05 January 2020 23:15 UT. 150 mm , 1,800 mm fl Maksutov-Cassegrain telescope, ZWO ASI 178 camera. Arrow is pointing at the crater Alpetragius.*

***Thebit to Oppolzer**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 13 September 2008 06:24 UT. Celestron 14 Schmidt-Cassegrain telescope, 2 x barlow, UV/IR block filter, SCP900NC camera, seeing 5/10.*

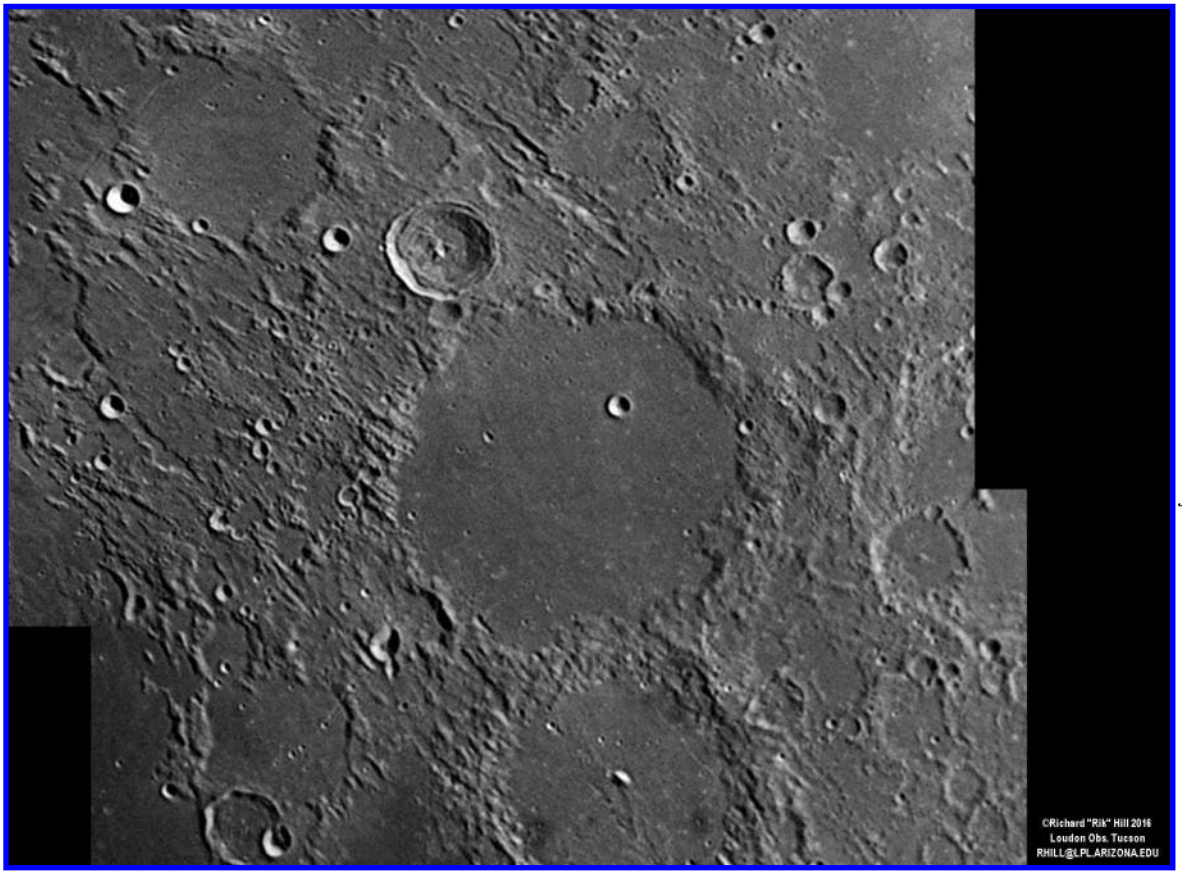


***Alphonsus,** Desiré Godoy, Oro Verde, Argentina, SLA. 08 November 2019 01:04 UT. 200 mm reflector telescope, QHY5-ll-M camera.*

Alphonsus, *Desiré Godoy, Oro Verde, Argentina, SLA. 10 December 2016 01:59 UT. 10 inch Meade LX200 Schmidt-Cassegrain telescope, 742 nm IR pass filter.*



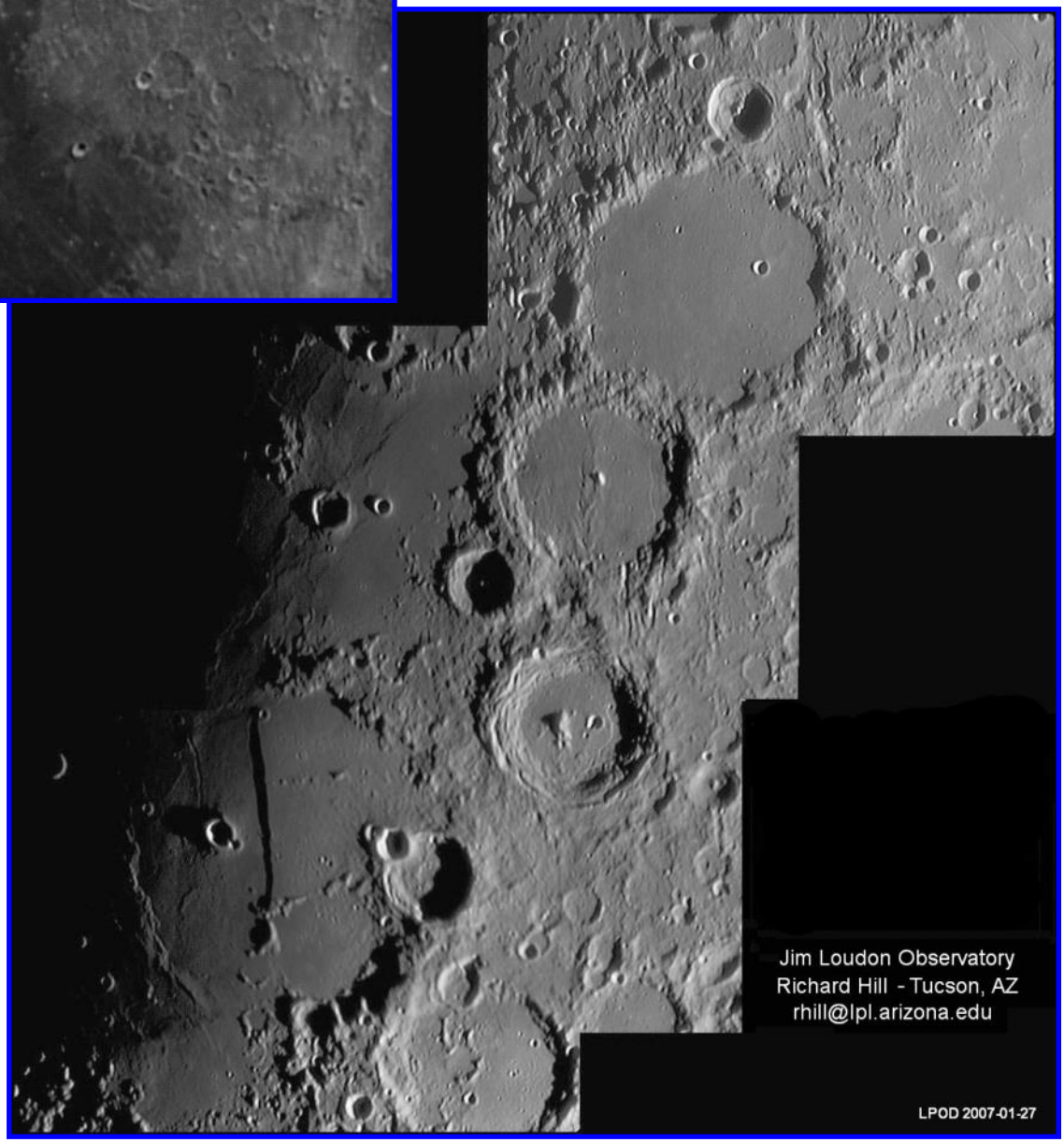
Ptolemaeus, Alphonsus and Arzachel*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 22 May 2010 03:01 UT. Celestron 14 Schmidt-Cassegrain telescope, 2 x barlow, f/22, UV/IR block filter, DMK21AU04 camera, seeing 8/10.*



***Ptolemaeus**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 25 June 2016 02:47 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera, seeing 8/10.*

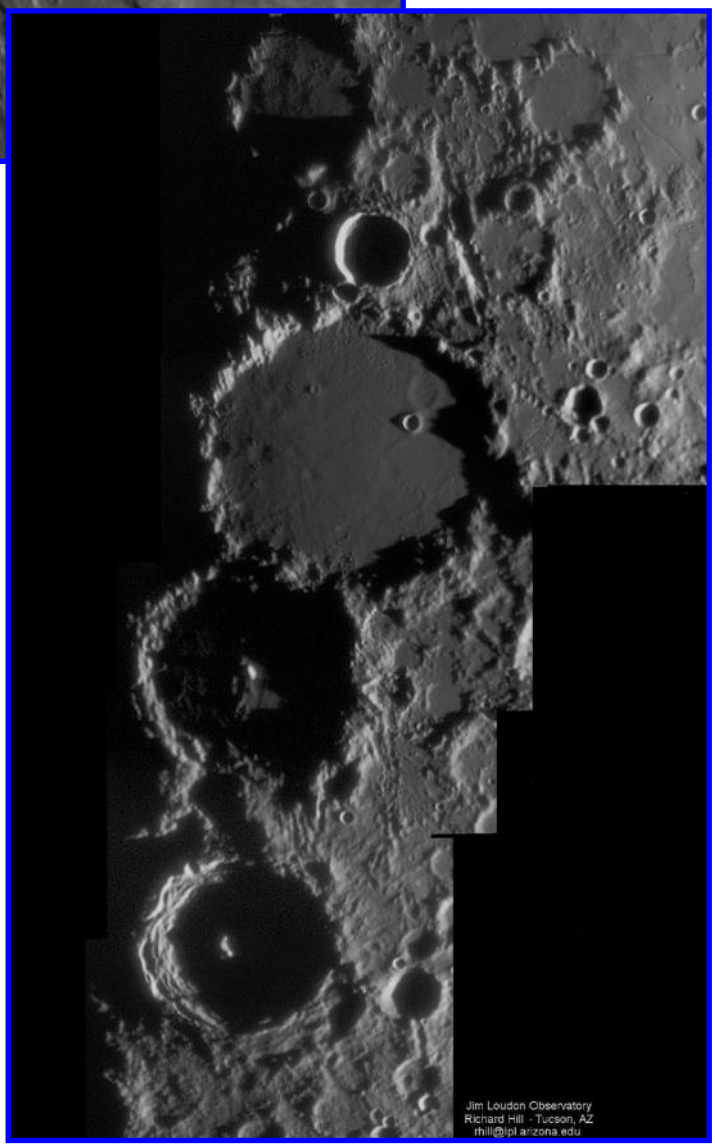
***Alphonsus,** Román García Verdier, Paraná, Argentina. 26 September 2020 23:59 UT. 180 mm Newtonian reflector telescope, QHY5-ll camera.*

***Alphonsus**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 11 December 2016 04:25 UT. 10 inch Meade LX200 Schmidt-Cassegrain telescope, 742 nm IR pass filter.*



***Herschel to Rupes Recta**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 27 January 2007 02:53 UT. Celestron 14 Schmidt -Cassegrain telescope at prime focus, Wratten 21 filter, SPC900NC camera.*

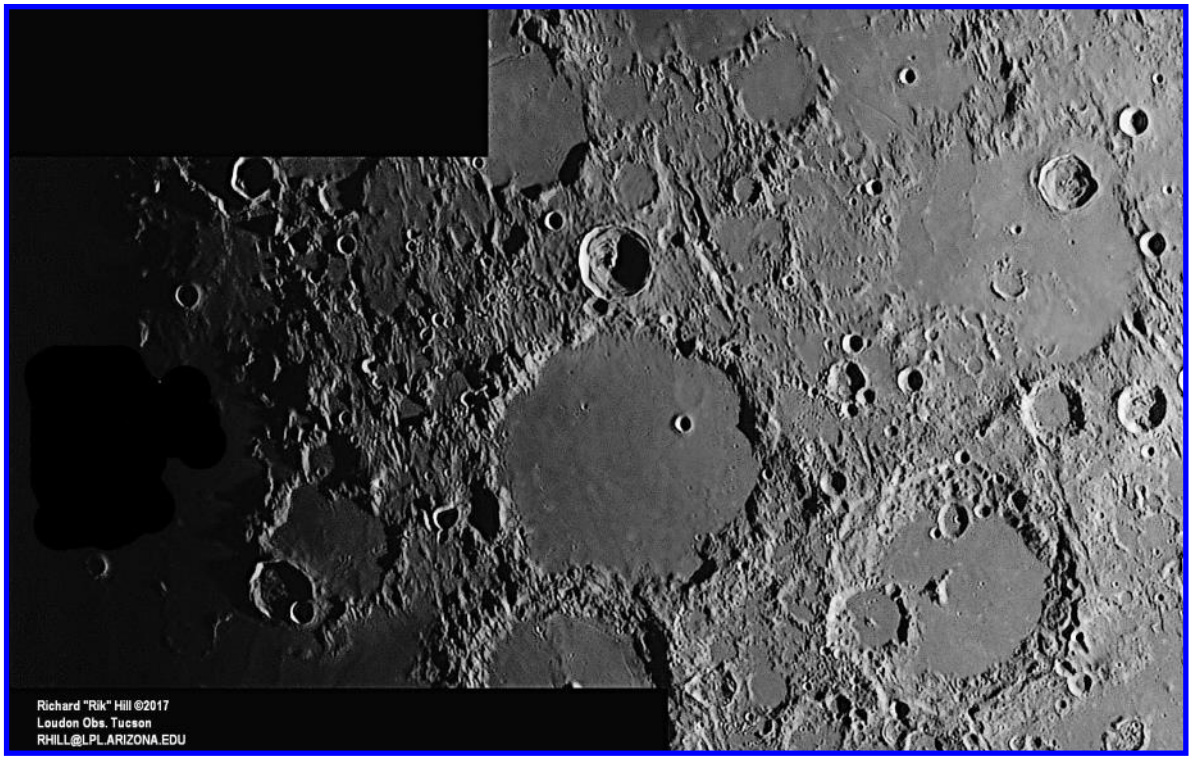
***Alphonsus**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 09 December 2016 04:04 UT. 10 inch Meade LX200 Schmidt-Cassegrain telescope, 742 nm IR pass filter.*

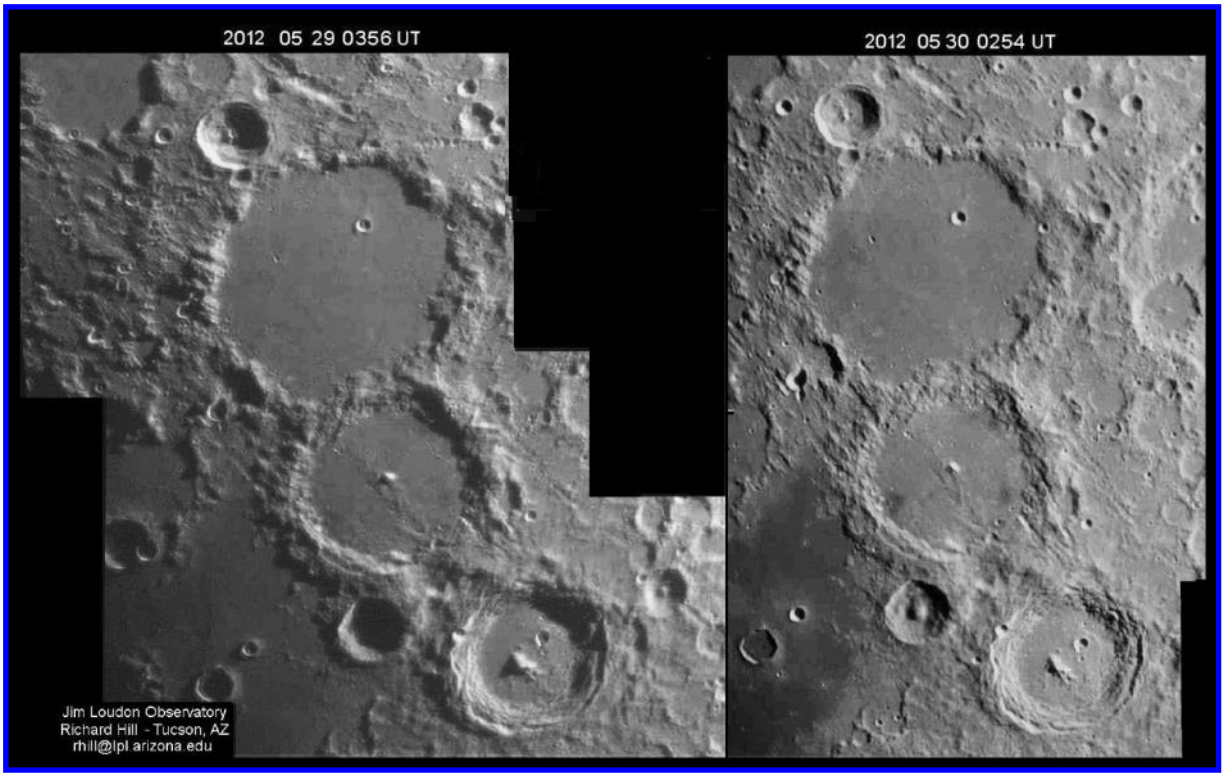


***Flammarion to Arzachel**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 01 March 2012 01:51 UT. 656.3 nm filter, DMK21AU04 camera.*

Alphonsus, *Desiré Godoy, Oro Verde, Argentina, SLA. 28 August 2020 23:41 UT. 200 mm refractor telescope, 742 nm filter, QHY5-ll camera.*

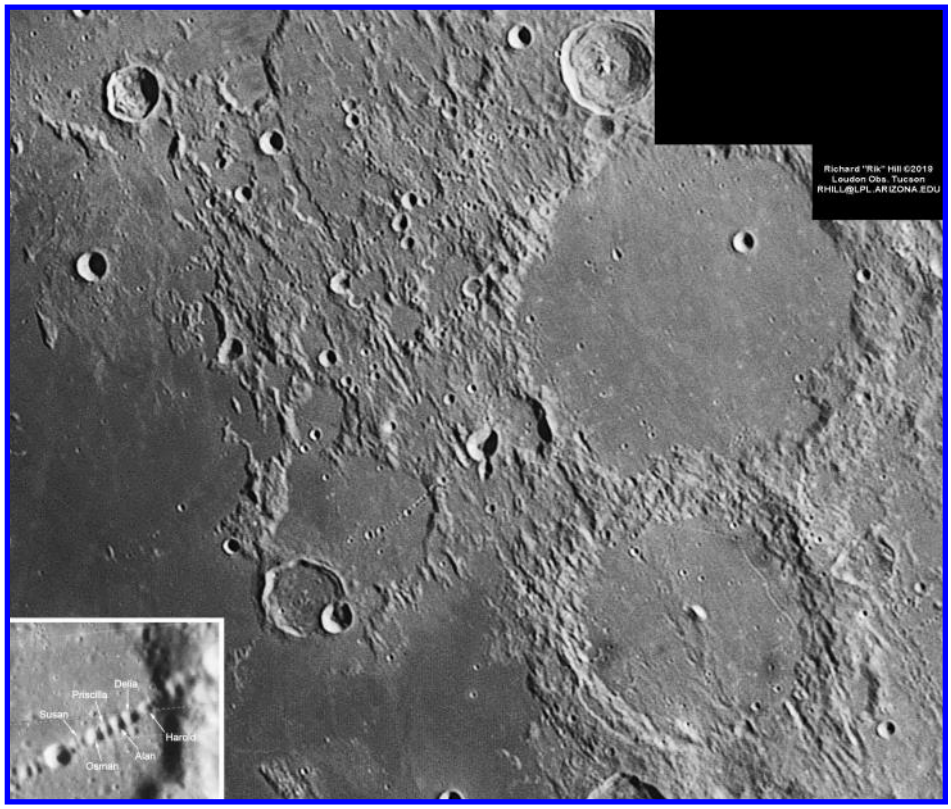
Ptolemaeus*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 05 April 2017 02:12 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera, seeing 8/10.*



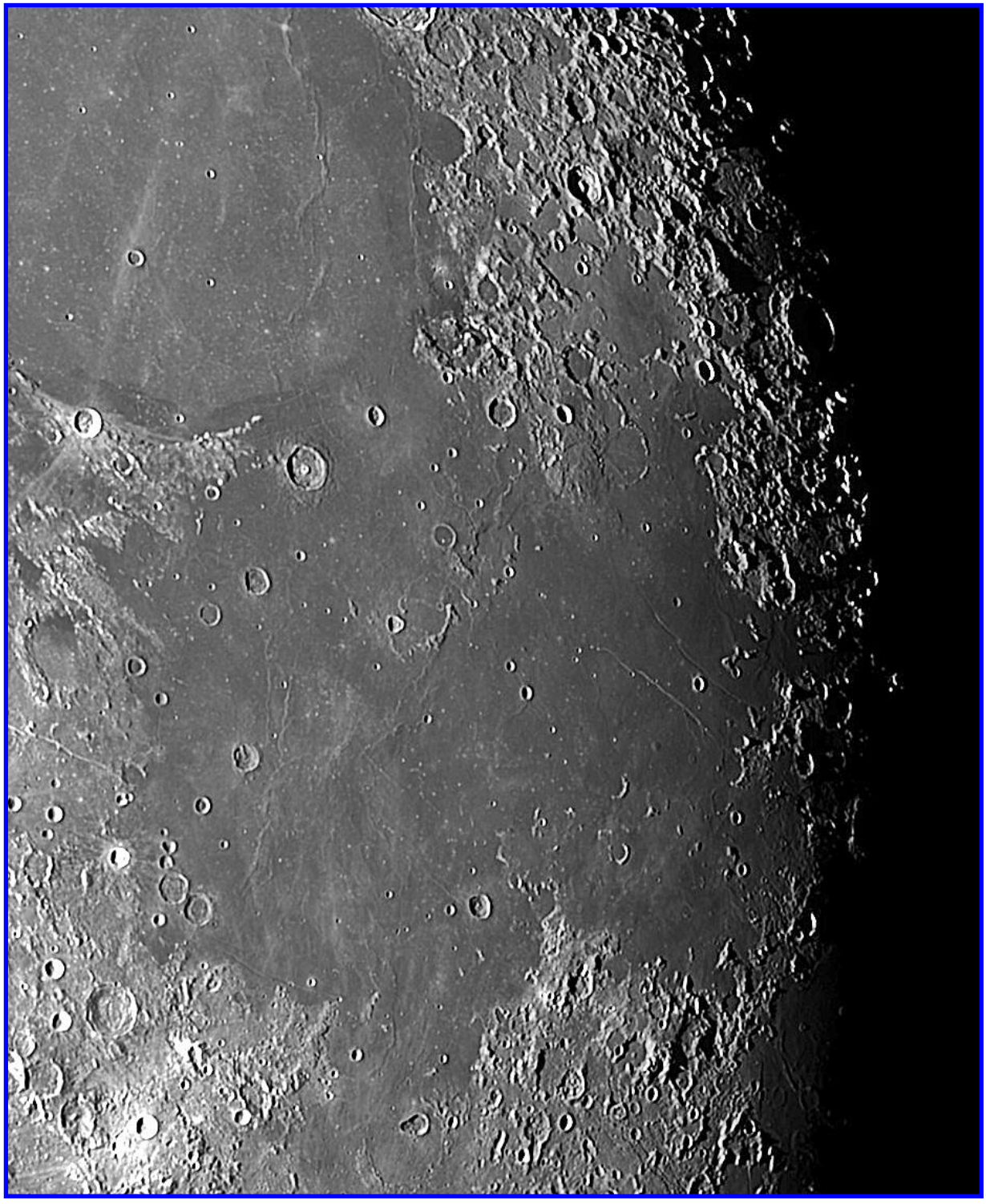


***Ptolemaeus, Alphonsus and Arzachel**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. Dates and times listed. TEC 8 inch f/20 Maksutov-Cassegrain telescope, Wratten 23 filter, DMK21AU04 camera, seeing 8/10.*

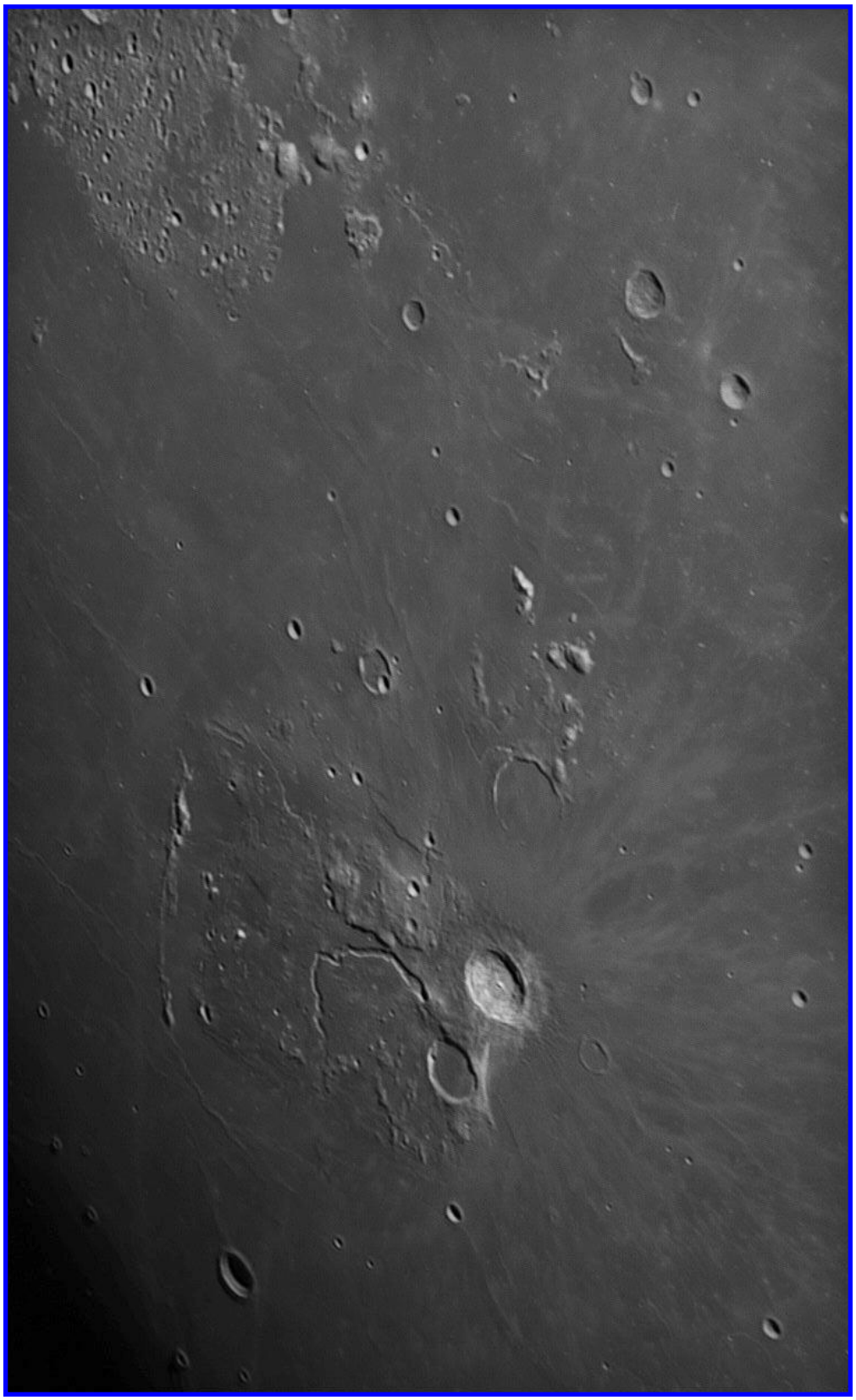
***Catena Davy**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 14 May, 2019 02:33 UT, colongitude 27.0°. 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Celestron Skyris 445M camera. Seeing 9/10.*



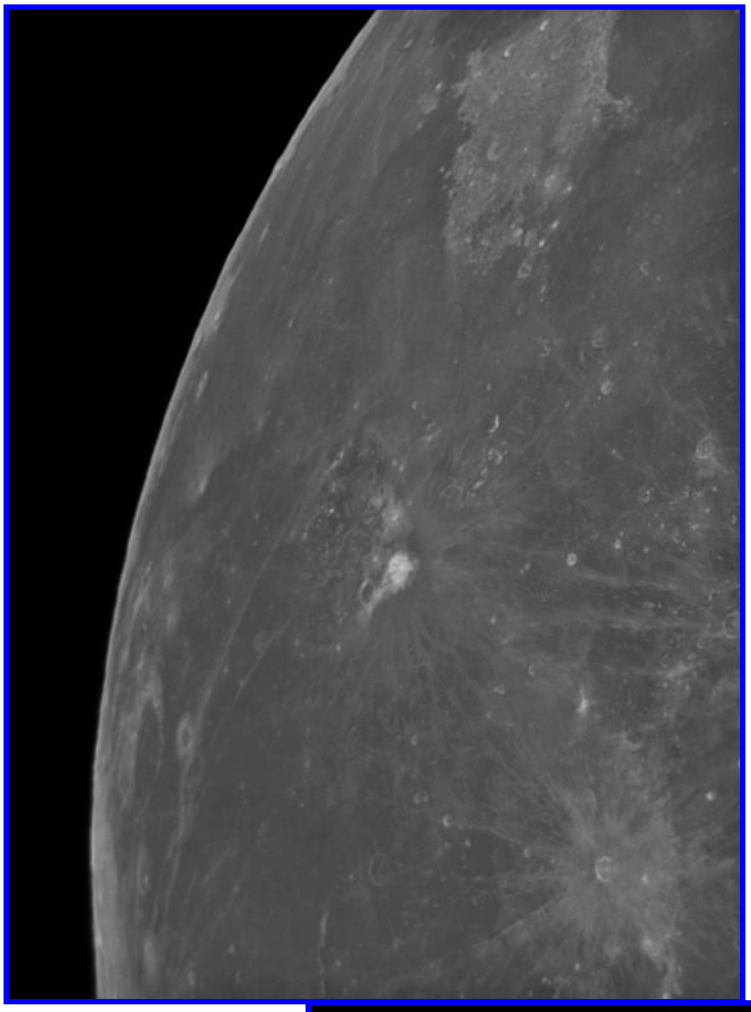
***Cauchy**, Michel Deconinck, Aquarellia Observatory - Artignosc-sur-Verdon - Provence, France. 03 December 2020 03:40-04:30 UT. Takahashi Dall-Kirkham 250mm f10 eyepiece Vixen 7mm, 357x . So-so turbulent sky.*



Cauchy, *David Teske, Louisville, Mississippi, USA. 04 November 2020 06:02 UT. 4 inch f/15 refractor telescope, IR block filter, ZWO ASI 120 mm/s camera. Seeing 9/10.*



***Gruithuisen Delta and Gamma**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 12 December 2016 00:48 UT. 8 inch Meade Starfinder reflector telescope, Astronomik 742 nm IR pass filter.*



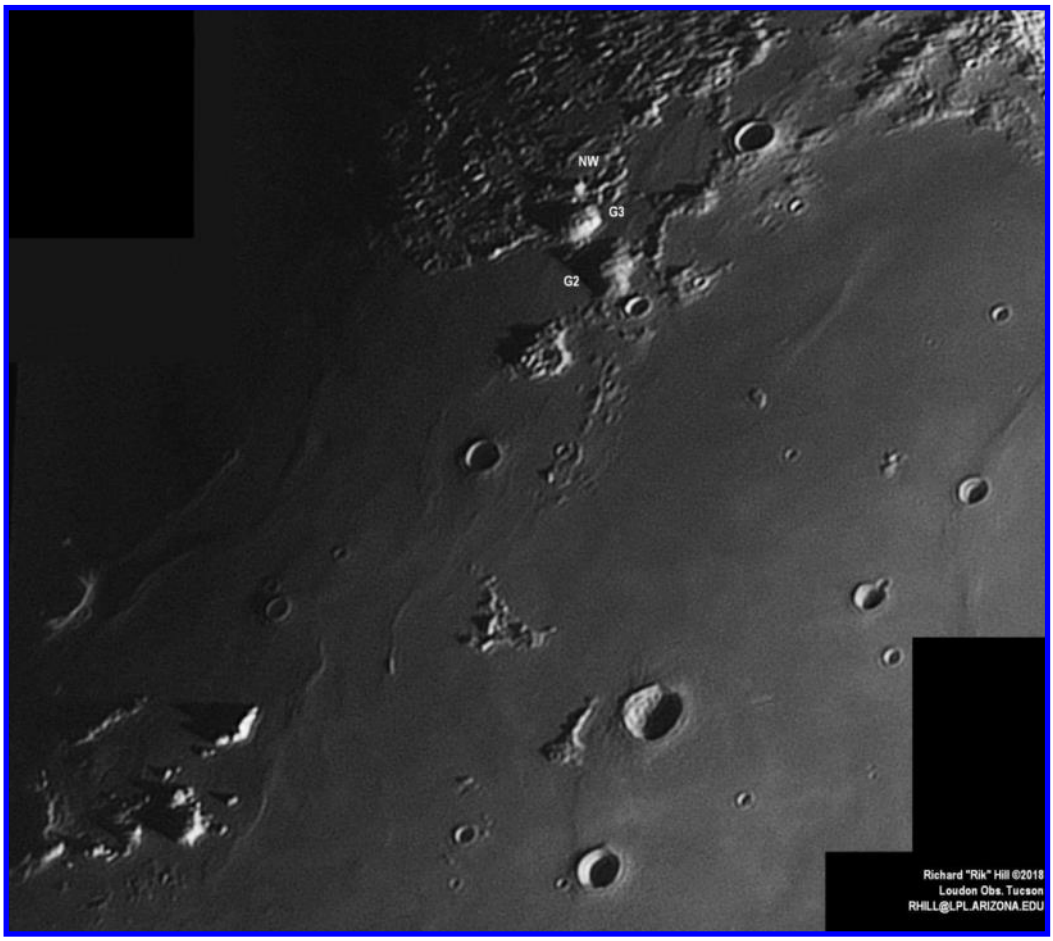
***Gruithuisen Delta and Gamma**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 21 April 2016 22:09 UT. 10 inch Meade LX200 Schmidt-Cassegrain telescope, QHY5-ll camera.*

***Gruithuisen Delta and Gamma,** Alberto Anunziato, Paraná, Argentina. 11 December 2016 02:21. Meade 10 inch LX200 Schmidt-Cassegrain telescope, Astronomik ProPlanet 742 IR-pass filter.*

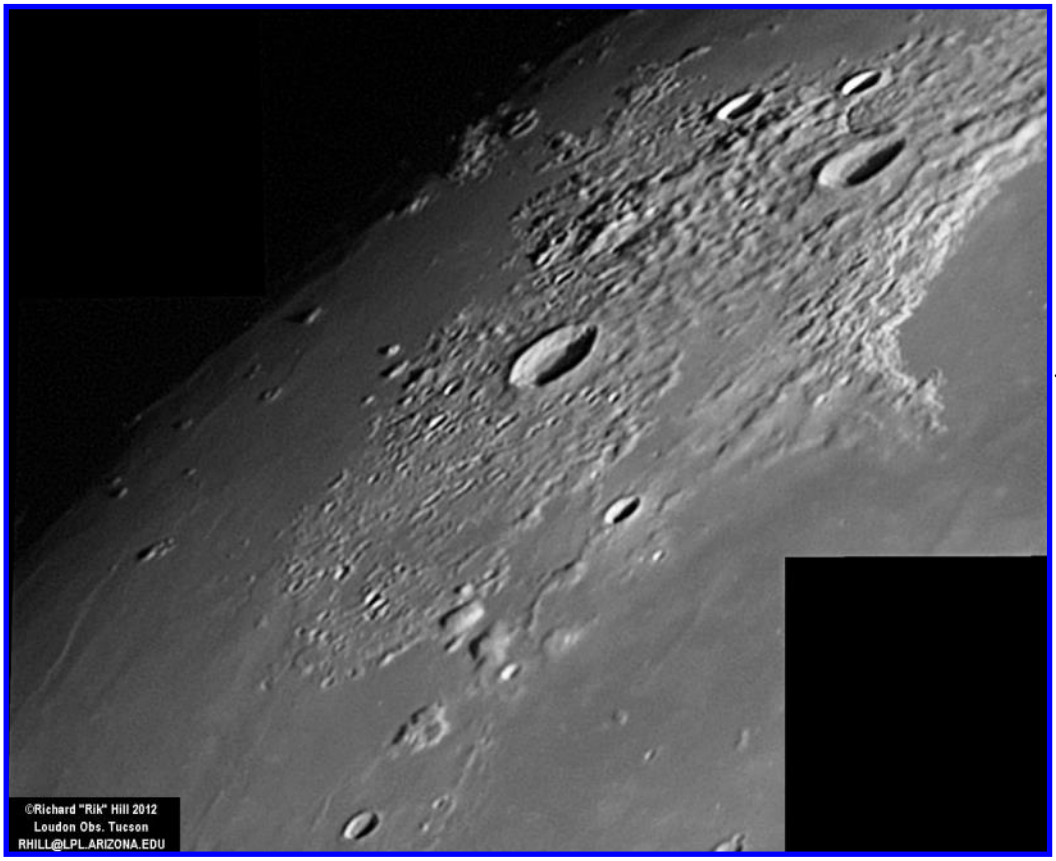
***Gruithuisen Delta and Gamma**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 30 April 2016 05:38 UT. 10 inch Meade LX200 Schmidt-Cassegrain telescope, QHY5-ll camera.*

***Gruithuisen Delta and Gamma**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 11 December 2016 03:17 UT. 10 inch Meade LX200 Schmidt-Cassegrain telescope, Astronomik 742 nm IR pass filter.*

***Aristarchus to Mairan**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 12 August 2019 03:40 UT, colongitude 46.8°. 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, Celestron Skyris 445M camera. Seeing 7/10.*

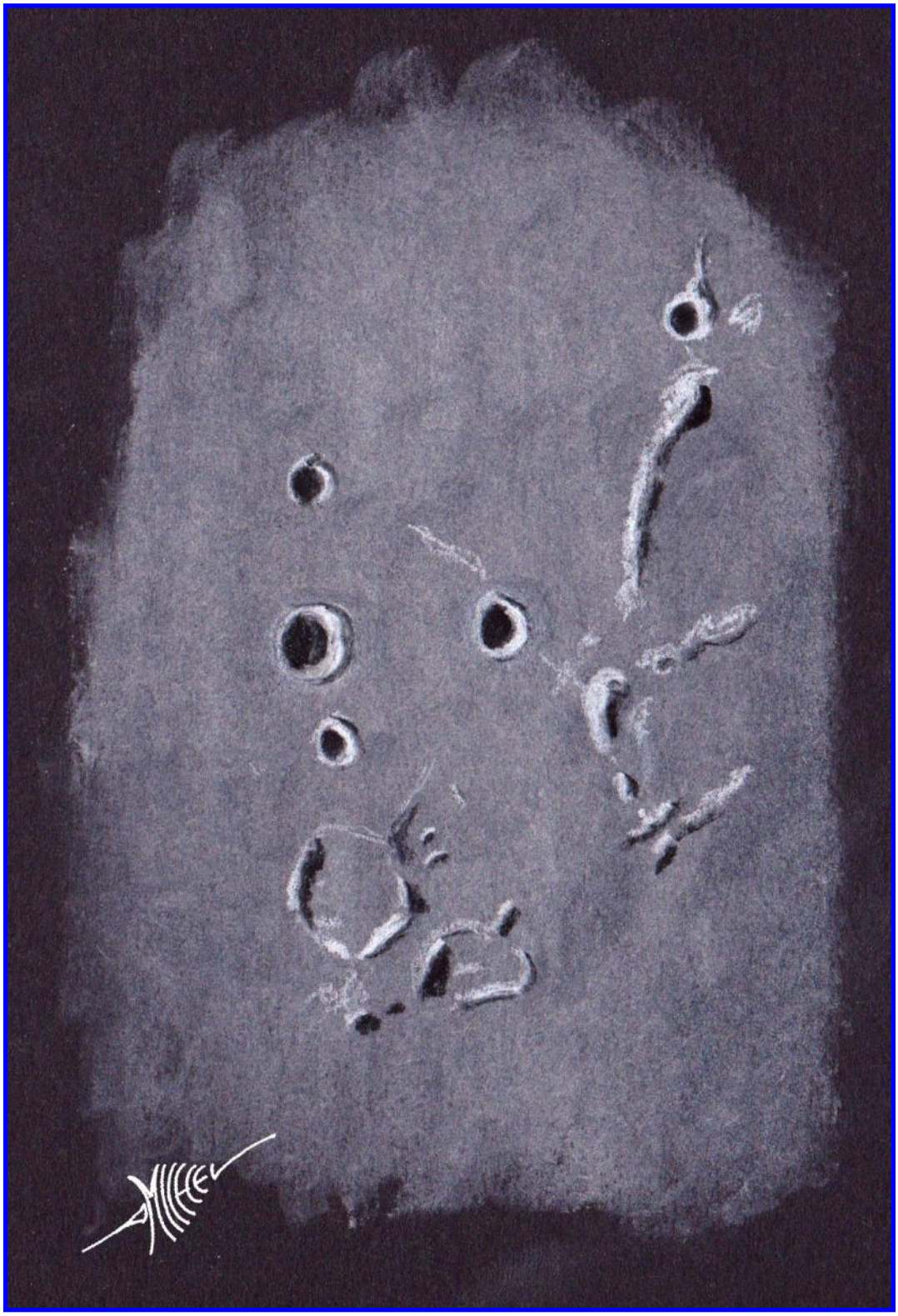


***Gruithuisen**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 19 November 2018 03:14 UT, colongitude 44.5°. 8 inch f/20 Maksutov-Cassegrain telescope, 810 nm filter, Celestron Skyris 445M camera. Seeing 7/10.*



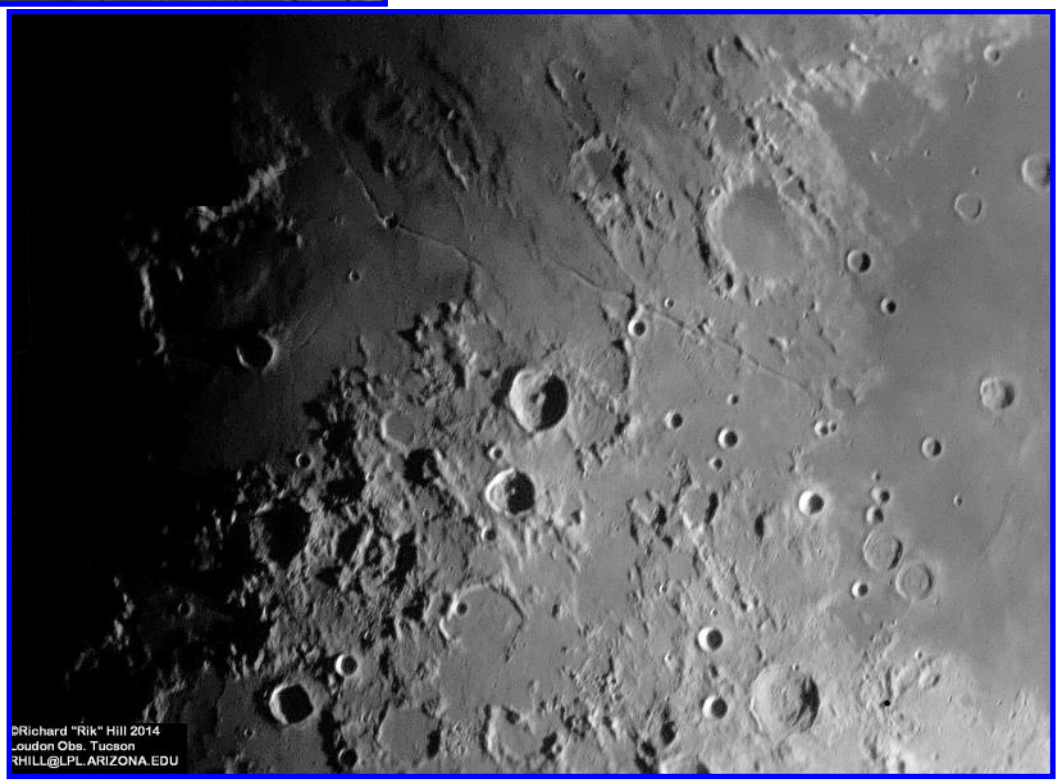
***Mairan**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 27 October 2012 02:25 UT. 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera. Seeing 8/10.*

***Mairan**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 27 March 2010 04:20 UT. Celestron 14 Schmidt-Cassegrain telescope, 2 x barlow, f/22, UV/IR block filter, DMK21AU04 camera, seeing 8/10.*



***Cayley Plains**, Michel Deconinck, Aquarellia Observatory - Artignosc-sur-Verdon - Provence, France. 22 November 2020 21:30 UT. 152 mm 1,200 mm fl refractor telescope, 7 mm Vixen eyepiece, 170 x. Pastels Conté grey, black and white + blending stump on Frisk paper 350gr black. Seeing 8/10, Transparency 6/6.*

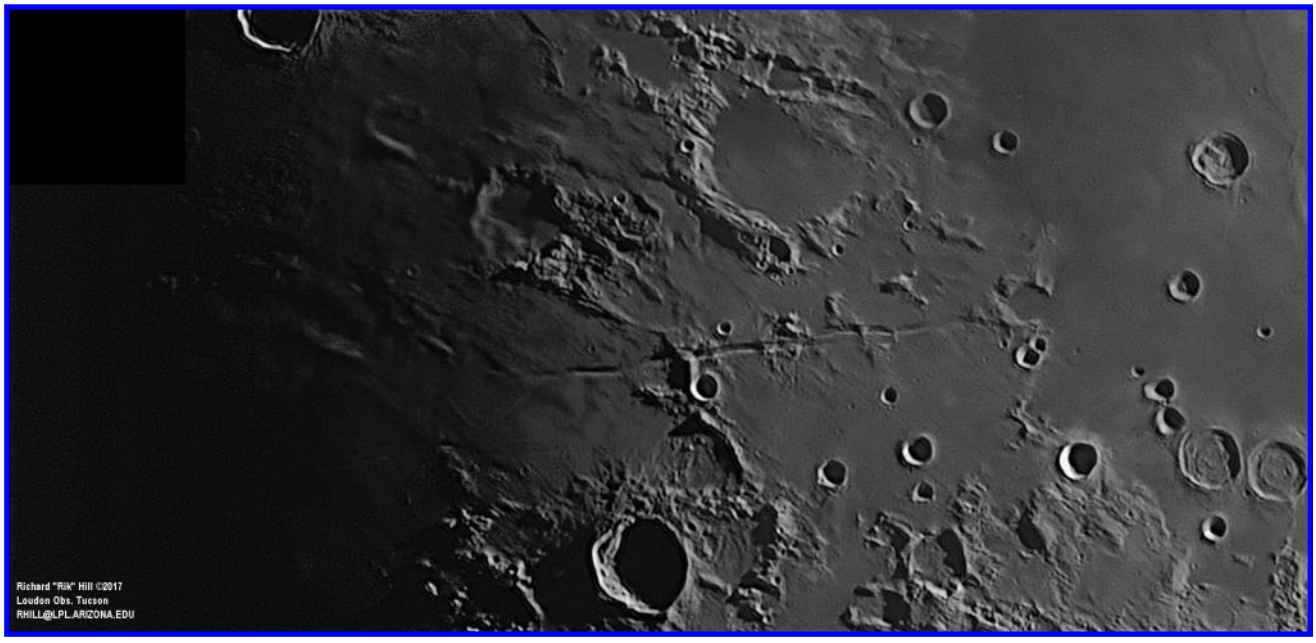
***Cayley Plains**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 25 February 2018 00:48 UT. 200 mm refractor telescope, QHY5-ll camera.*



***Agrippa**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 10 December 2013 00:35 UT. 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera. Seeing 8/10.*

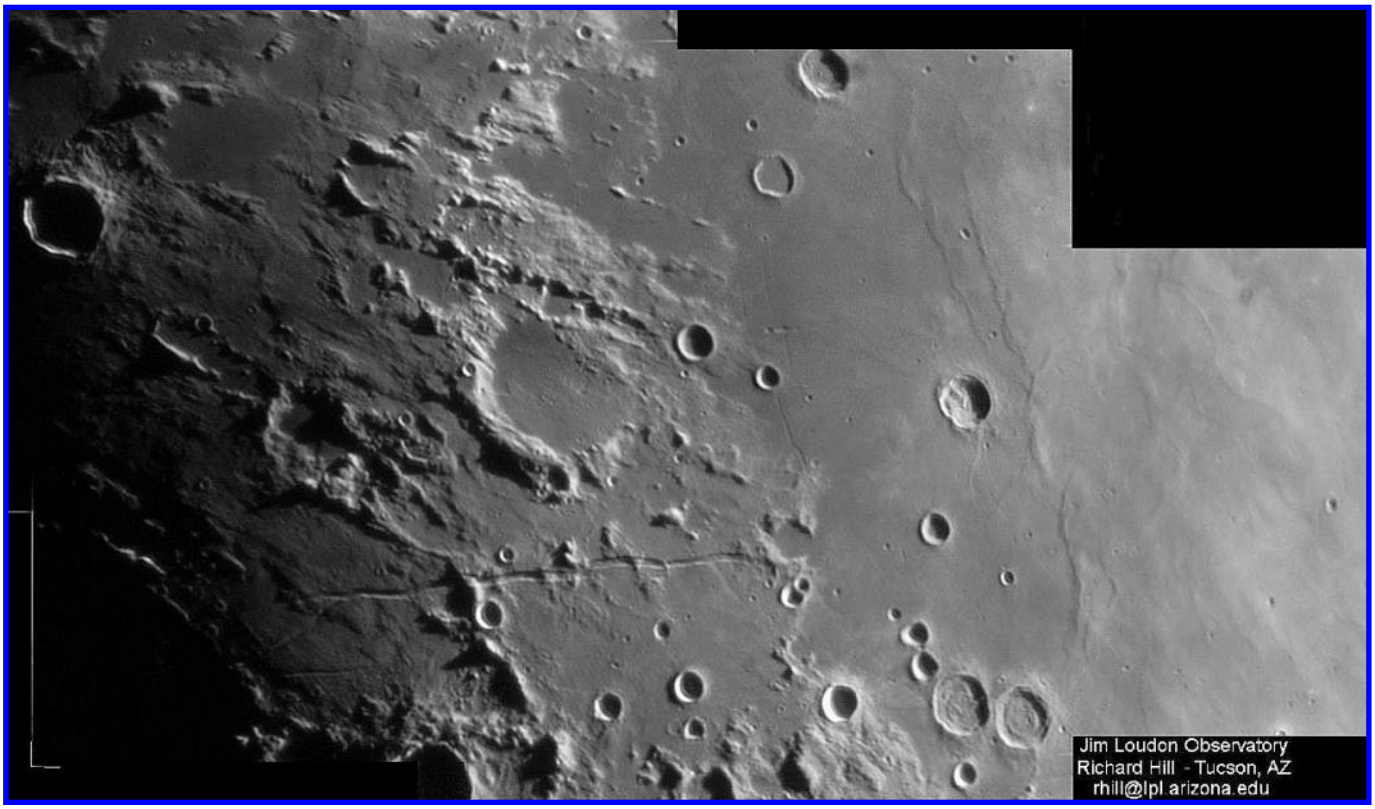
Cayley Plains, *Desiré Godoy, Oro Verde, Argentina, SLA. 16 October 2018 01:07 UT. 200 mm refractor telescope, QHY5-ll camera.*

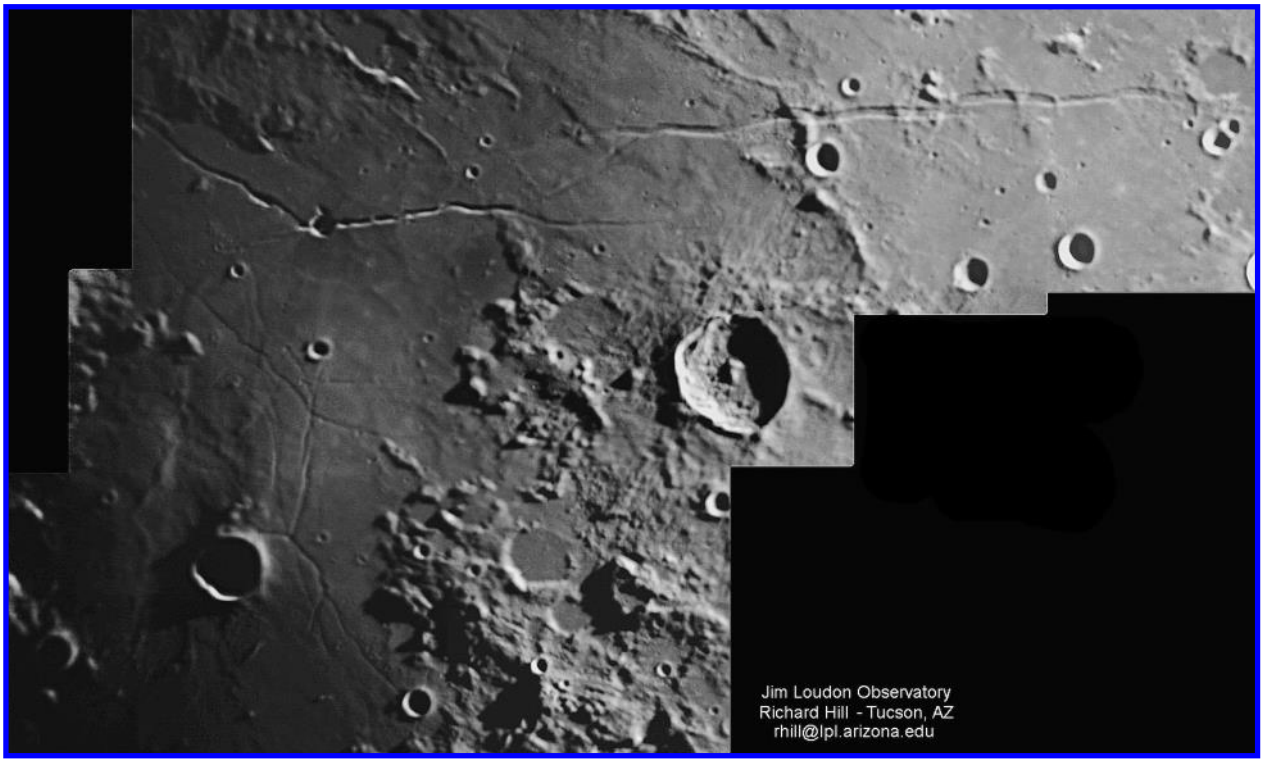
Rima Ariadaeus*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 01 July 2017 02:43 UT. 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera. Seeing 8/10.*



Cayley Plains *Alberto Anunziato, Paraná, Argentina. 09 December 2016 03:51. Meade 10 inch LX200 Schmidt -Cassegrain telescope, Astronomik ProPlanet 742 IR-pass filter.*

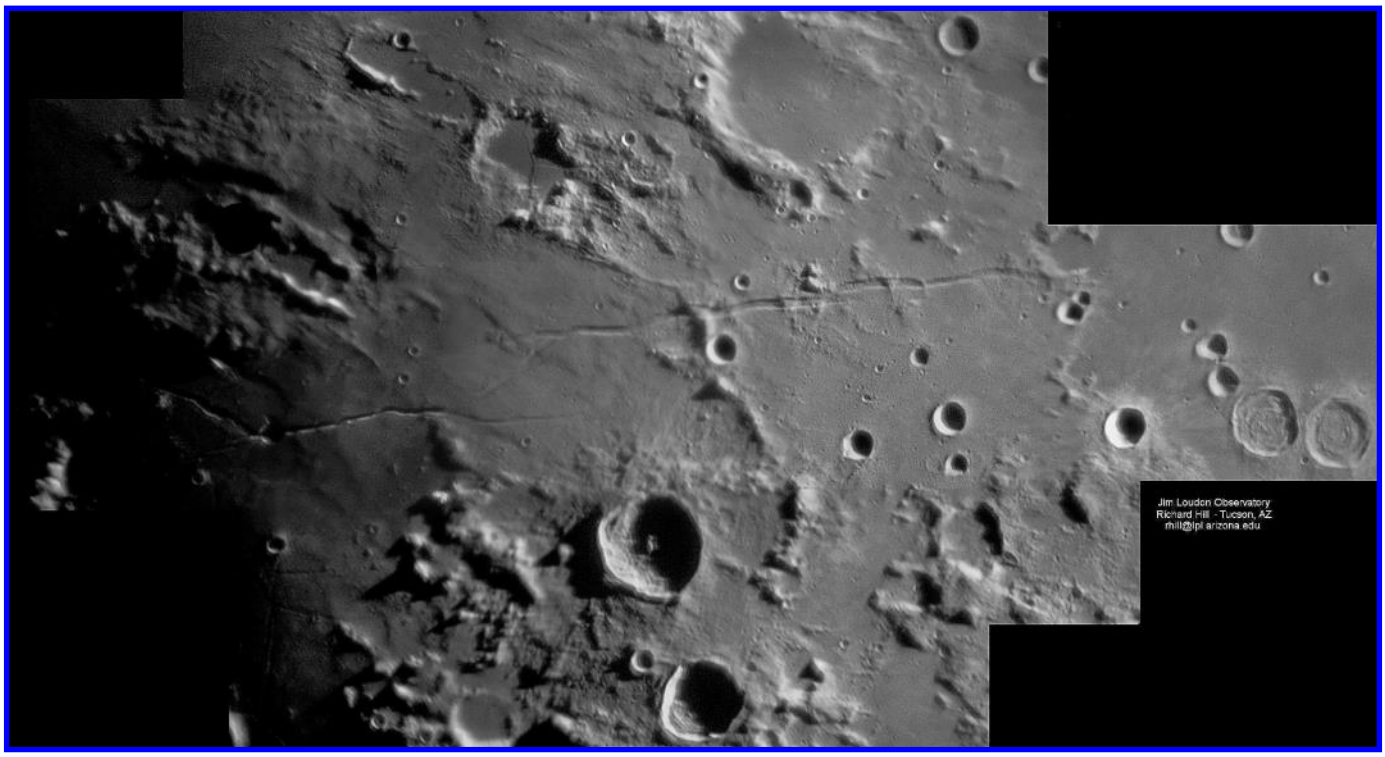
Rima Ariadaeus*, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 28 April 2012 02:33 UT. 8 inch f/20 Maksutov-Cassegrain telescope, Wratten 23 filter, DMK21AU04 camera. Seeing 7/10.*





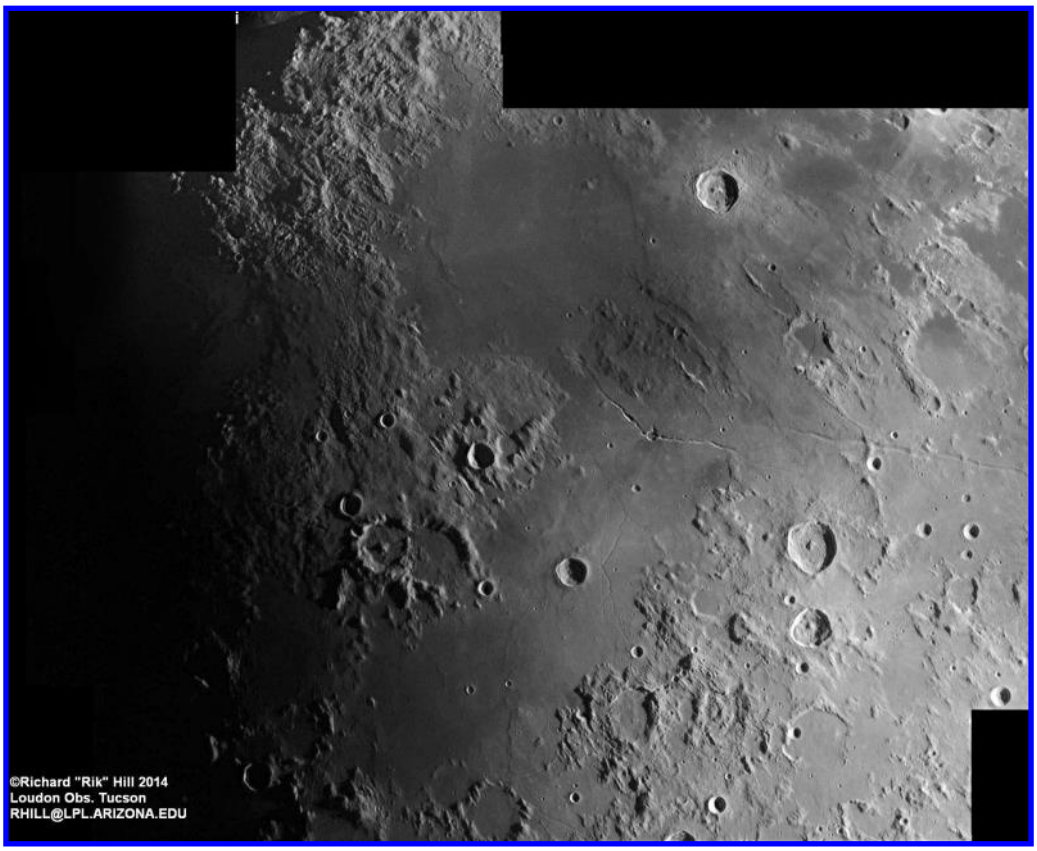
***Ariadaeus to Triesnecker**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 11 June 2008 02:47 UT. Celestron 14 Schmidt-Cassegrain telescope with 2 x barlow, UV/IR block filter, SPC900NC camera. Seeing 8/10.*

***Hyginus to Sabine and Ritter**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 10 June 2010 02:51 UT. Celestron 14 Schmidt-Cassegrain telescope with 2 x barlow, f/22, 656.3 filter, DMK21AU04 camera. Seeing 8/10.*



***Triesnecker**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 02 February 2013 01:38 UT. 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, DMK21AU04 camera. Seeing 8/10.*

***Triesnecker to Ariadaeus**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 24 May 2007 04:12 UT. Celestron 14 Schmidt-Cassegrain telescope with 1.6 x barlow, UV/IR blocking filter, SPC900NC camera. Seeing 7/10.*



***Mare Vaporum and Sinus Medii**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 08 April 2014 02:11 UT. 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, Celestron Skyris 445M camera. Seeing 8/10.*

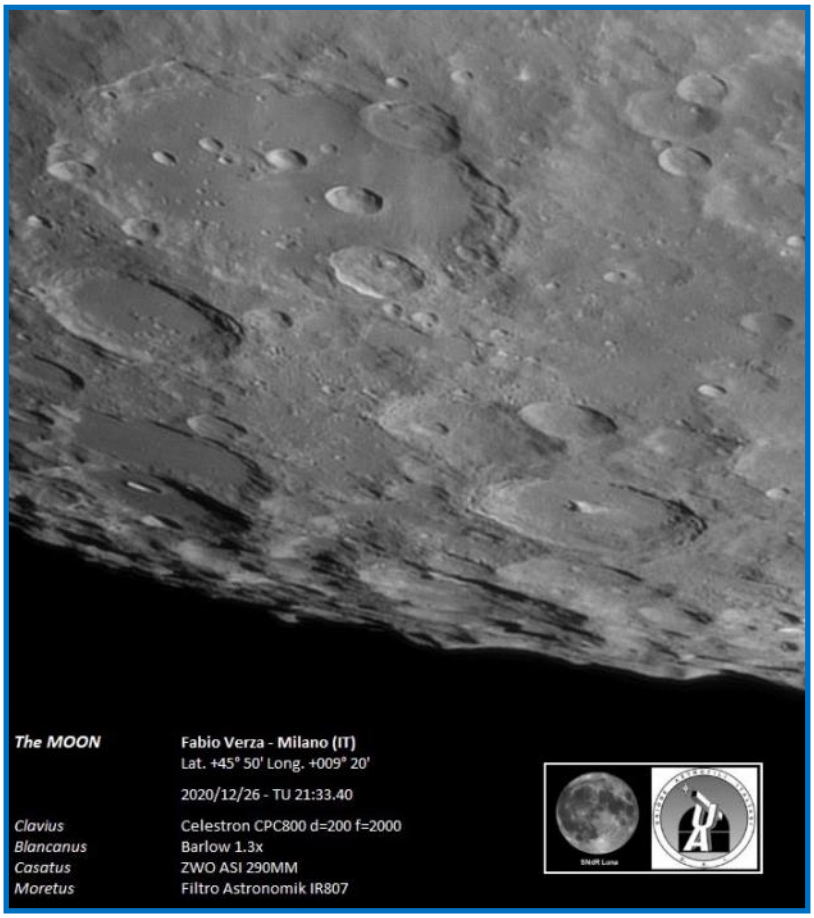
***Agrippa,** Walter Riccardo Elias, Oro Verde, Argentina. 22 December 2020 01:21 UT. Helios 114 telescope, QHY5-ll C camera.*

Ross D, *Walter Riccardo Elias, Oro Verde, Argentina. 21 December 2020 23:13 UT. Helios 114 telescope, QHY5-ll C camera.*

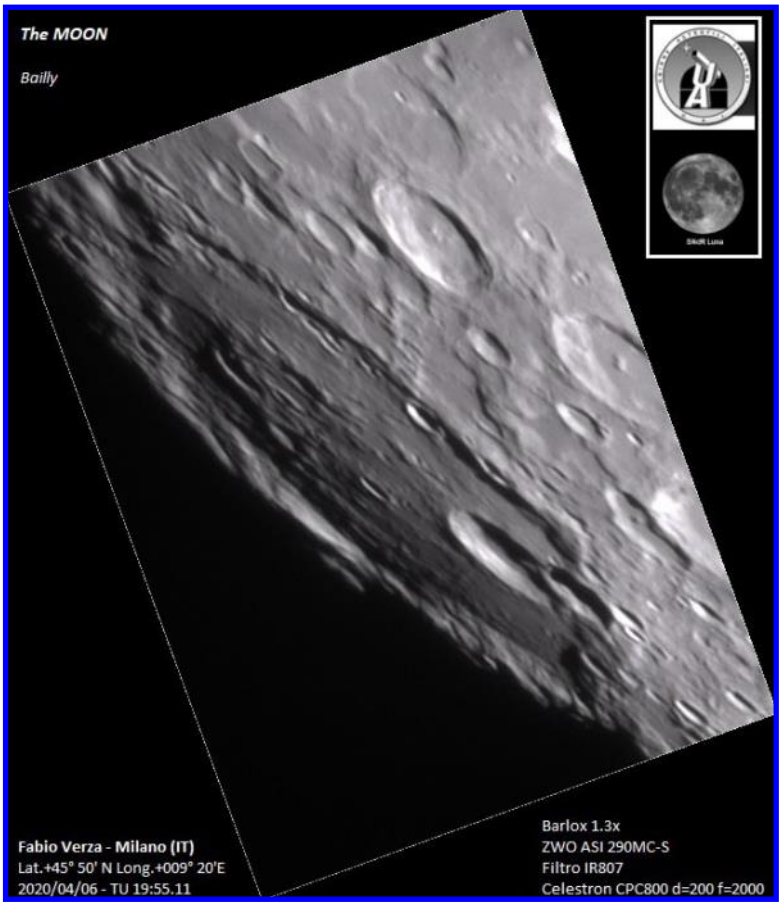
Cayley Plains, *David Teske, Louisville, Mississippi, USA. 07 August 2020 09:44 UT. 180 mm Takahashi Mewlon Dal-Kirkham telescope, IR block filter, ZWO ASI 120 mm/s camera. Seeing 8/10.*

Albategnius, *Fabio Verza, SNdR Luna, Milan, Italy. 31 March 2020 18:10 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR pass filter, ZWO ASI 290 MM camera.*

Aristillus, *Leandro Sid, 27 December 2020 02:10 UT. Meade StarNavigator NG 90MAK 90 mm Maksutov-Cassegrain telescope, Motorola One Fusion camera.*



Clavius, *Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 21:33 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*



Bailly, *Fabio Verza, SNdR Luna, Milan, Italy. 06 April 2020 15:55 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

Atlas, *Fabio Verza, SNdR Luna, Milan, Italy. 28 March 2020 18:20 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR pass filter, ZWO ASI 290 MC-S camera.*

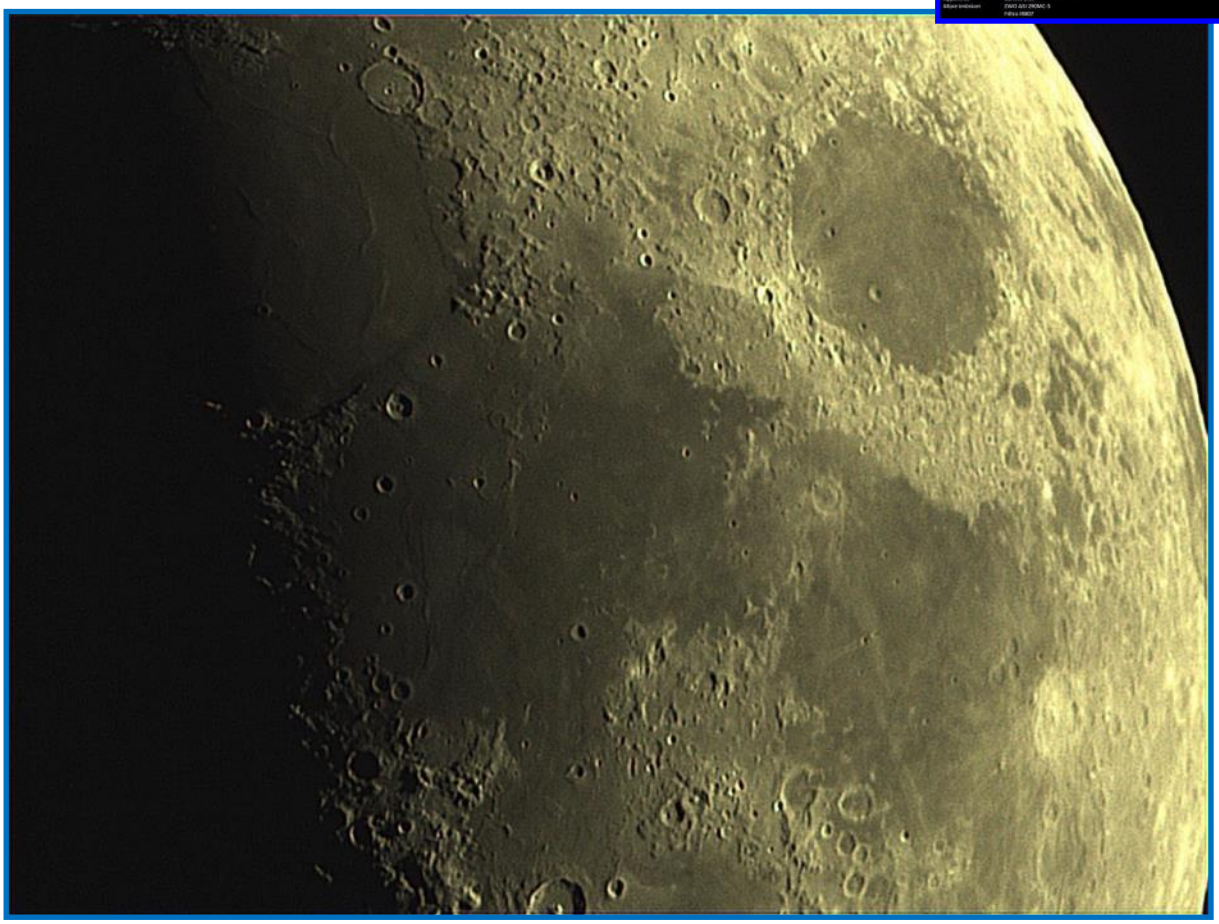
Herodotus, *Leandro Sid, 27 December 2020 02:06 UT. Meade StarNavigator NG 90MAK 90 mm Maksutov-Cassegrain telescope, Motorola One Fusion camera.*

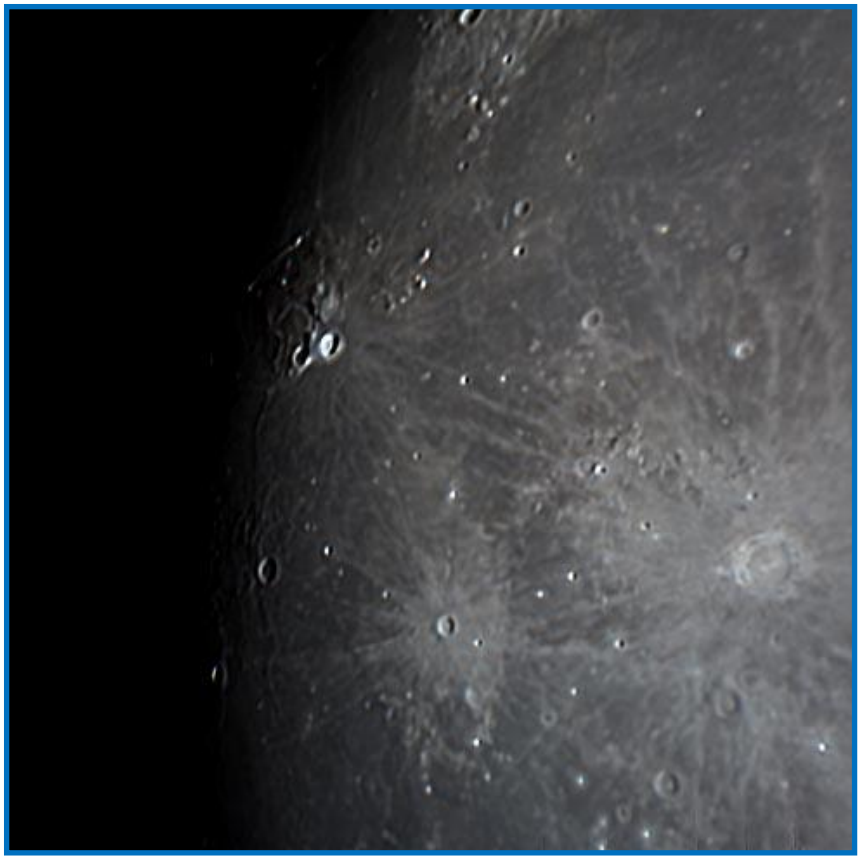
Aristoteles, *Walter Riccardo Elias, Oro Verde, Argentina. 21 December 2020 01:23 UT. Helios 114 telescope, QHY5-ll C camera.*

Arzachel, *Fabio Verza, SNdR Luna, Milan, Italy. 01 April 2020 19:33 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

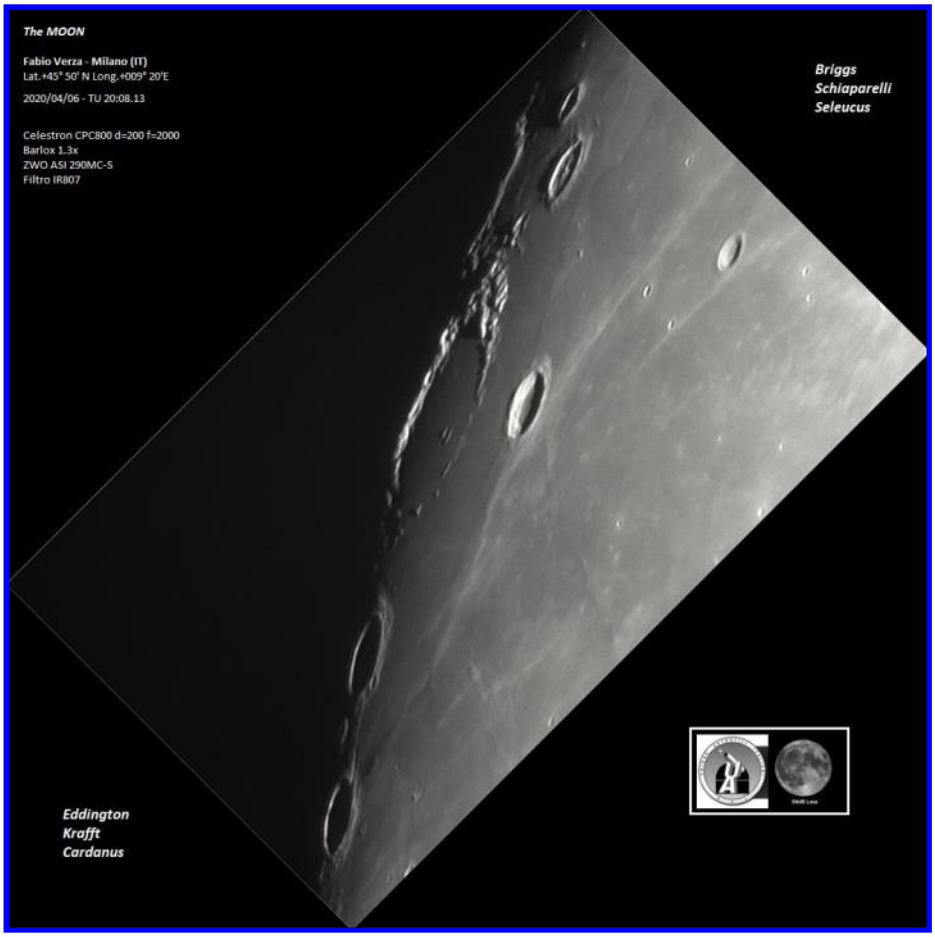
Apenninus, *Fabio Verza, SNdR Luna, Milan, Italy. 01 April 2020 18:53 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

Plinius, *Walter Riccardo Elias, Oro Verde, Argentina. 22 December 2020 01:21 UT. Helios 114 telescope, QHY5-ll C camera.*



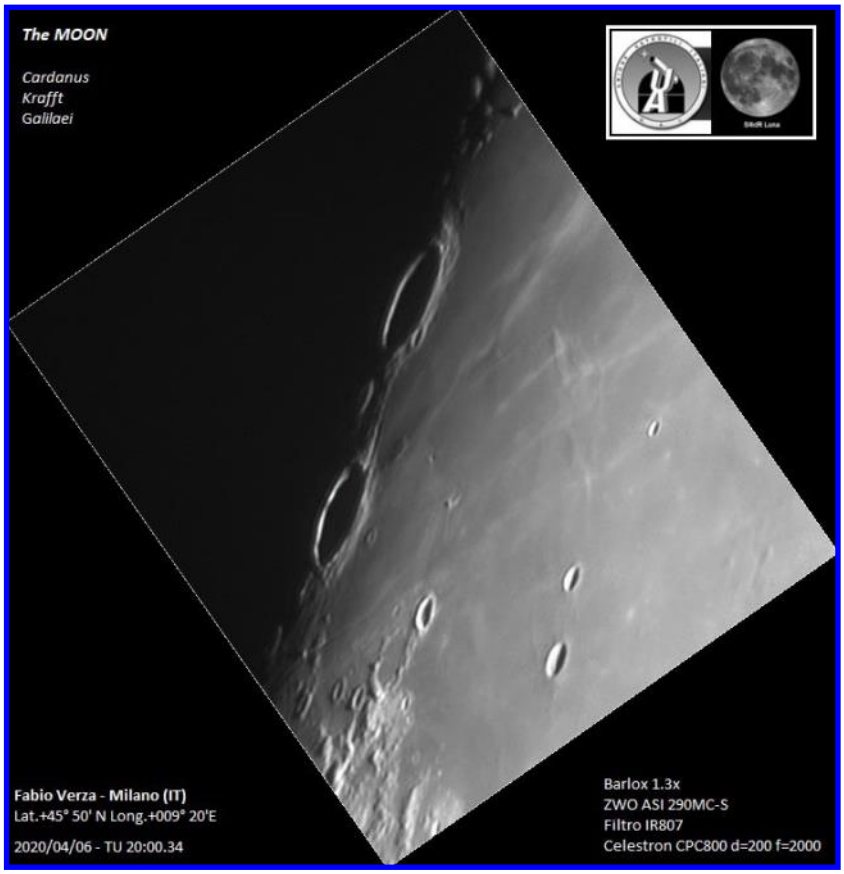


Aristarchus, *Leandro Sid, 27 December 2020 02:41 UT. Meade StarNavigator NG 90MAK 90 mm Maksutov-Cassegrain telescope, Sony DSC-W310 camera.*

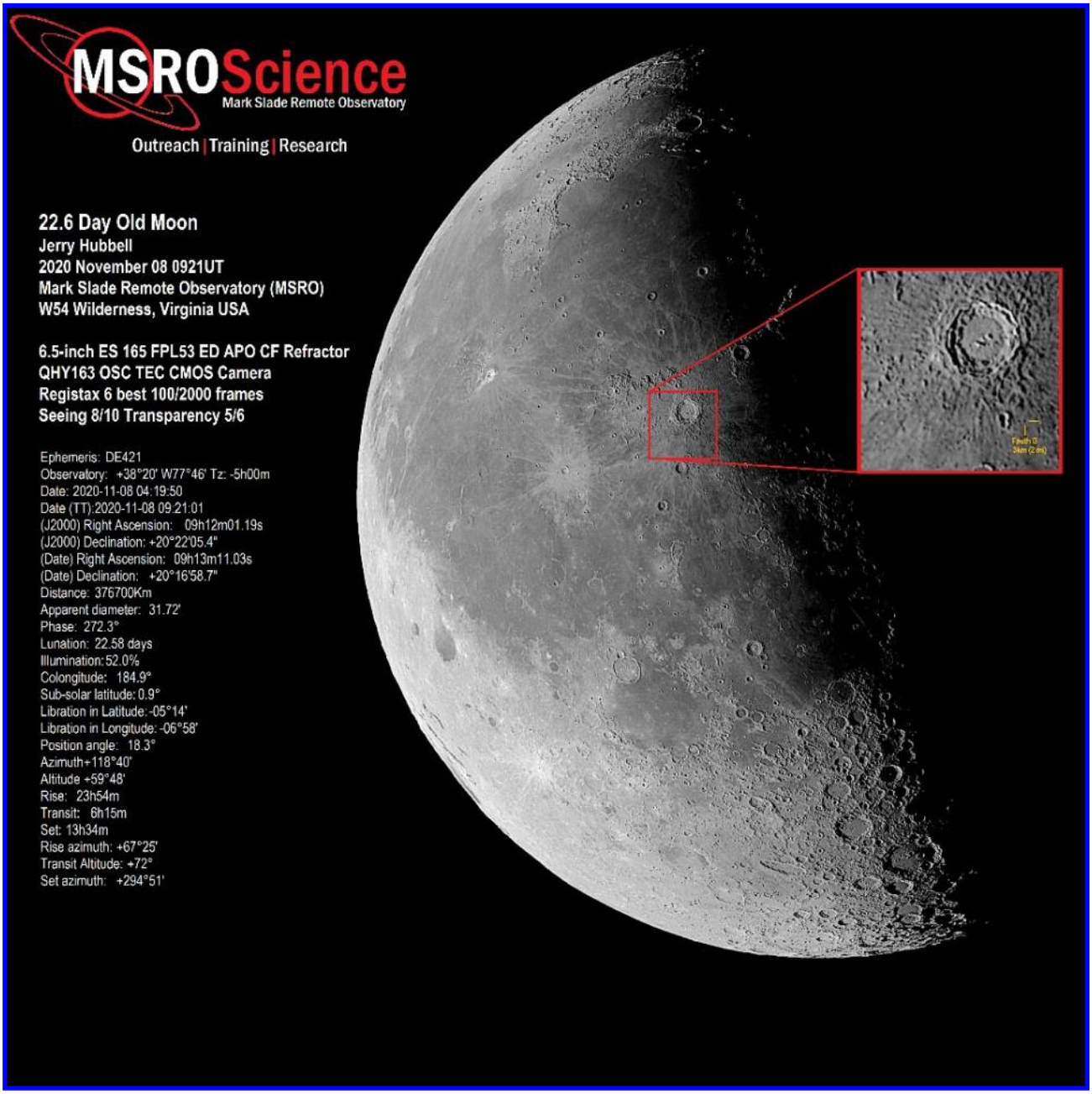


Briggs, *Fabio Verza, SNdR Luna, Milan, Italy. 06 April 2020 20:08 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

***Moon, Jupiter and Saturn**, Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 16 December, 2020. 75 mm lens.*



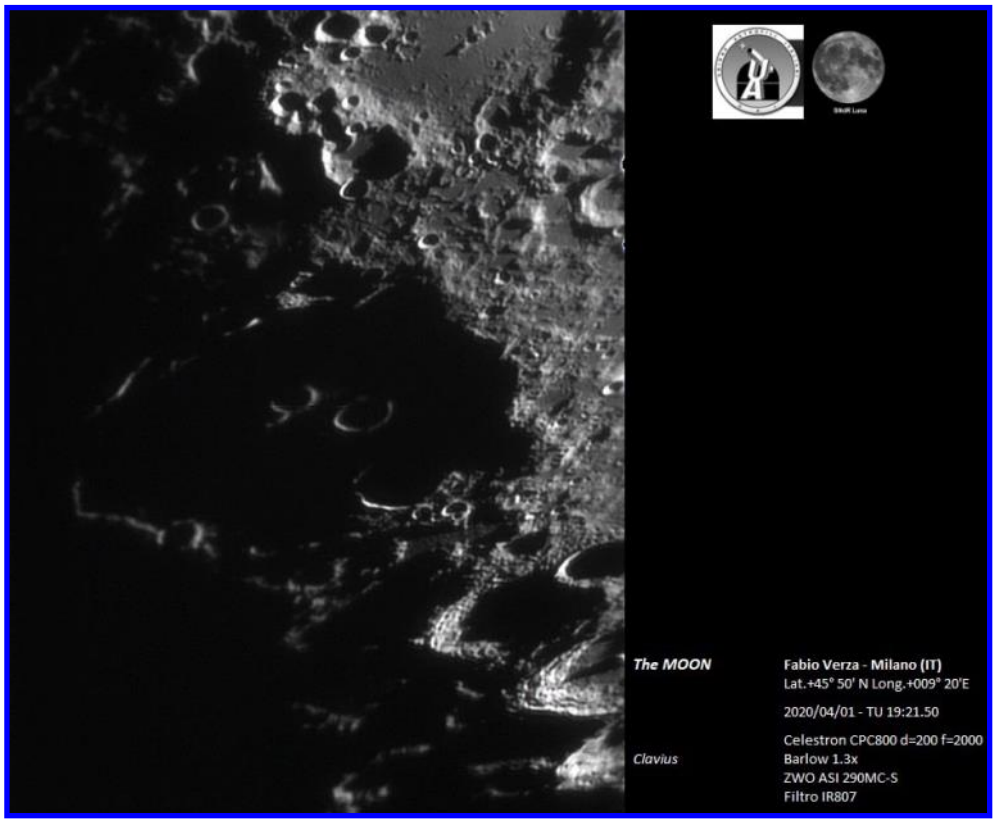
***Cardanus,** Fabio Verza, SNdR Luna, Milan, Italy. 06 April 2020 20:00 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*



22.6-Day-Old-Moon, *Jerry Hubbell, Wilderness, Virginia, USA. 08 November 2020 09:21 UT colongitude 184.9o. 6.5 inch Explore Scientific 165 FPL53 ED APO CF refractor telescope, QHY163 OSC TEC COMOS camera. Seeing 8/10, transparency 5/6.*

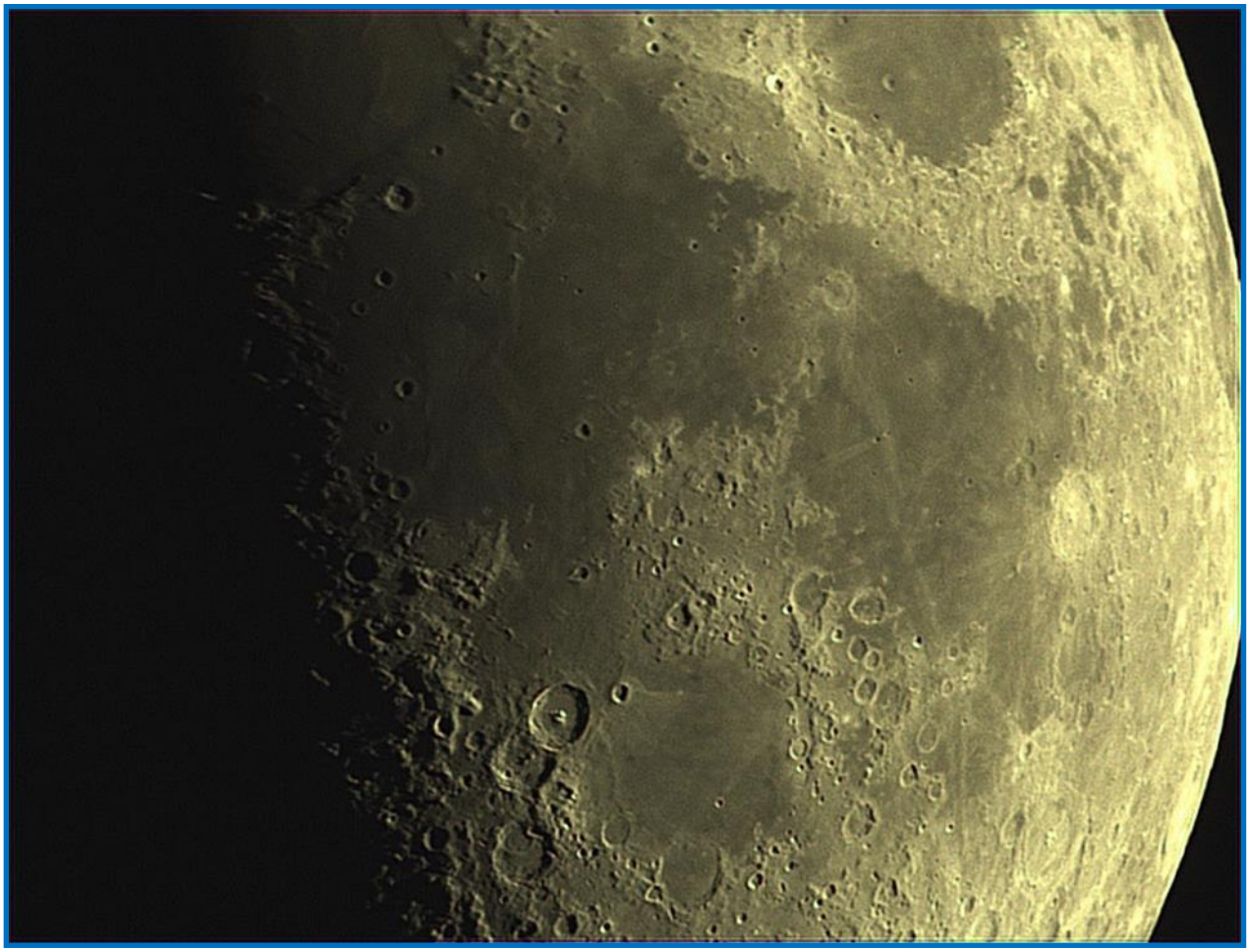
Copernicus, *Jesús Piñeiro (San Antonio de los Altos, Venezuela. 24 November 2020 22:48 UT. Meade ETX-90 Maksutov-Cassegrain telescope, Astronomik 807 filter, ZWO ASI 462 MC camera.*

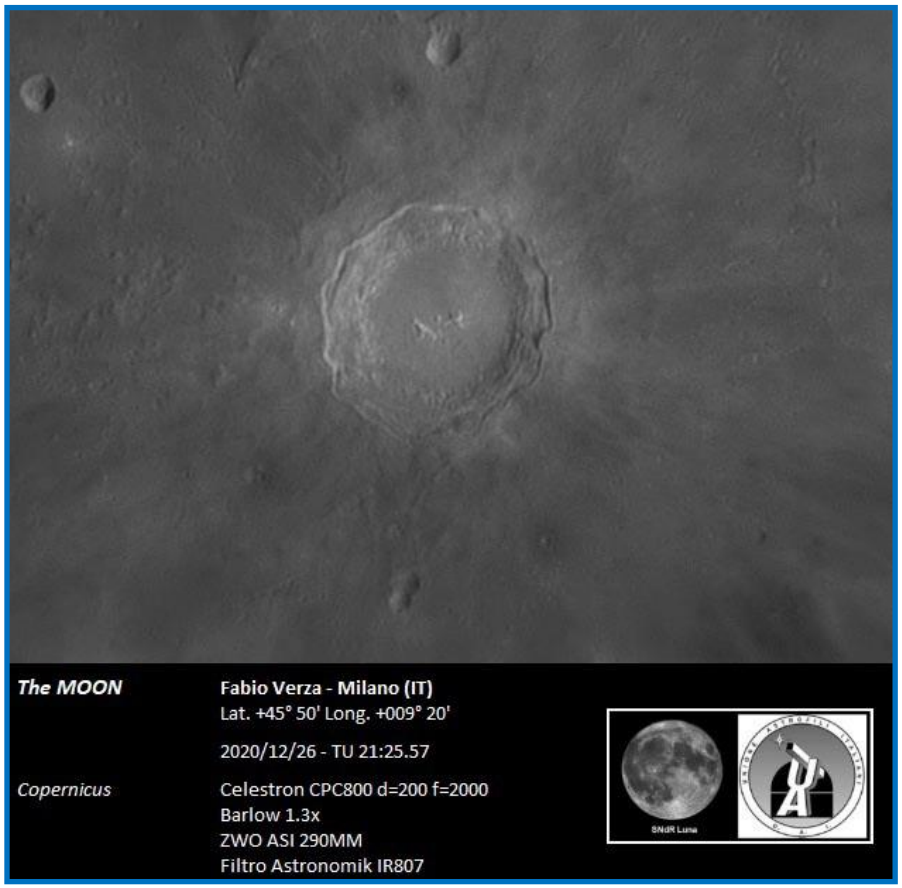
Moon, *Jairo Chavez, Popayán, Colombia. 01 December 2020 02:36 UT. 114 mm Konus refractor telescope, MOTO ES PLAY camera.*



Clavius, *Fabio Verza, SNdR Luna, Milan, Italy. 01 April 2020 19:21 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

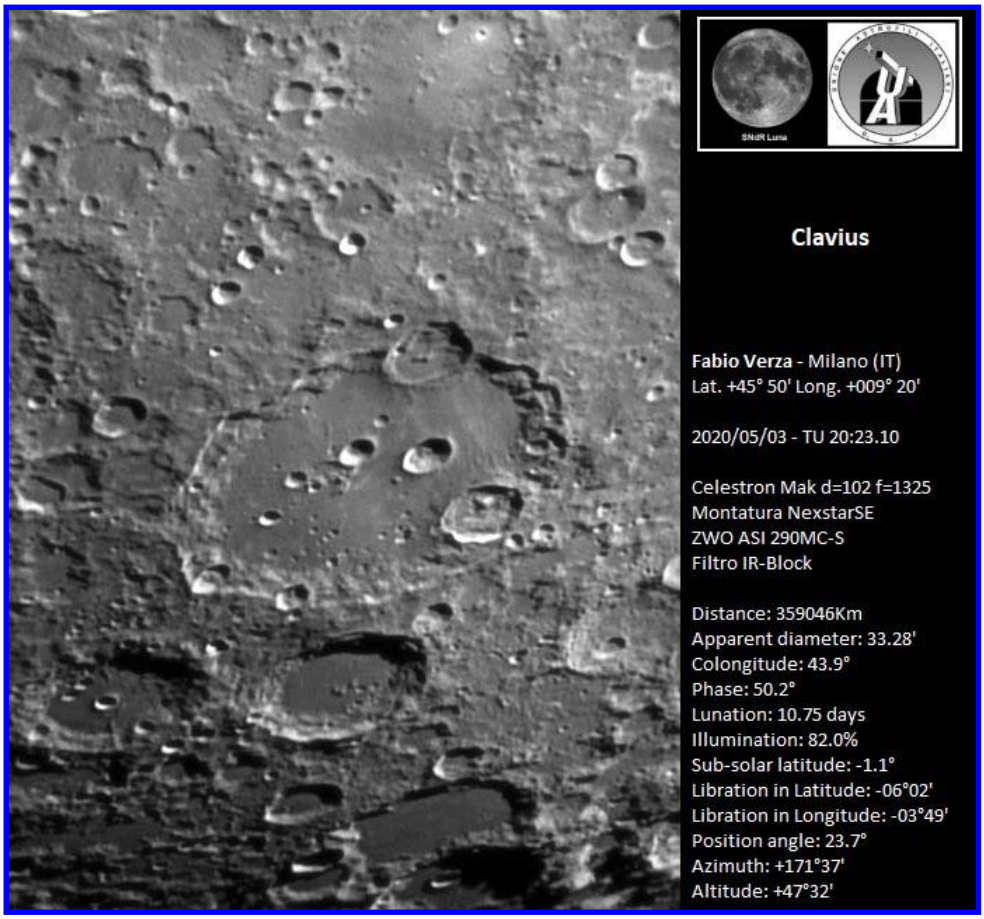
Capella, *Walter Riccardo Elias, Oro Verde, Argentina. 21 December 2020 01:19 UT. Helios 114 telescope, QHY5-ll C camera.*

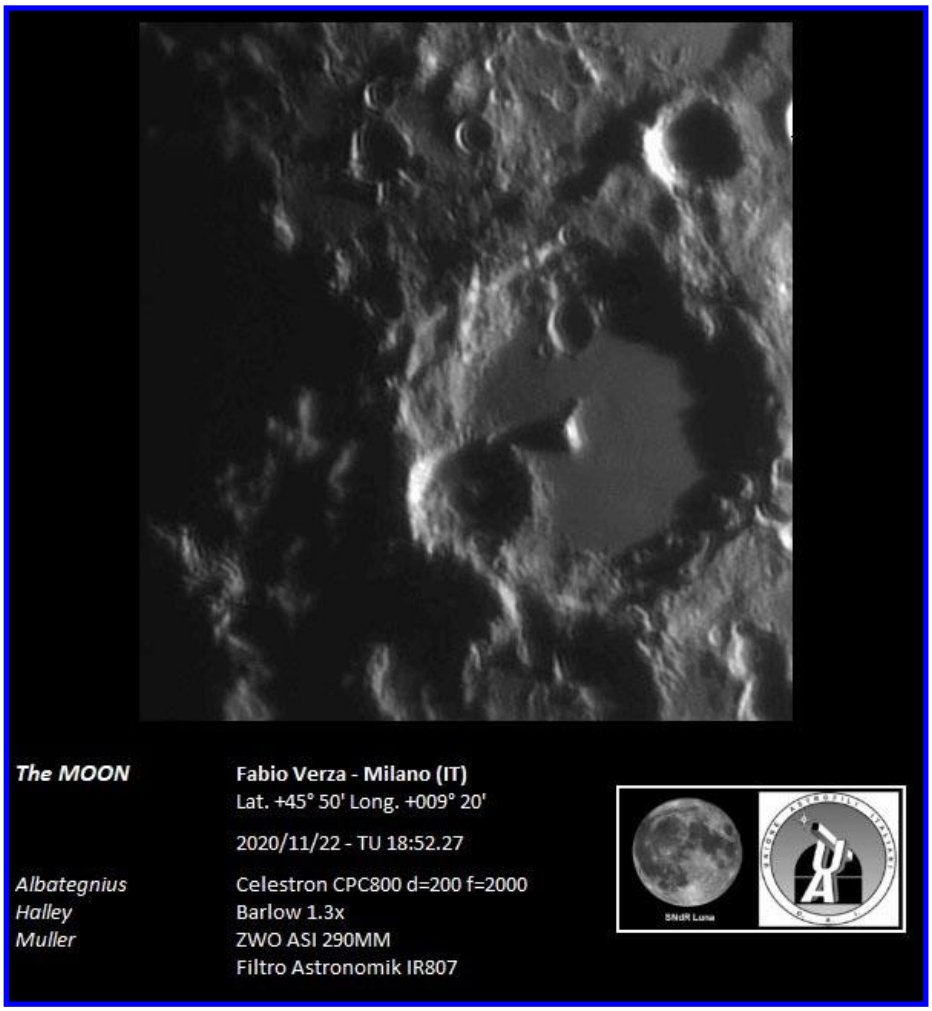




Copernicus, *Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 21:25 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

Clavius, *Fabio Verza, SNdR Luna, Milan, Italy. 03 May 2020 20:23 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR Block filter, ZWO ASI 290 MC-S camera.*

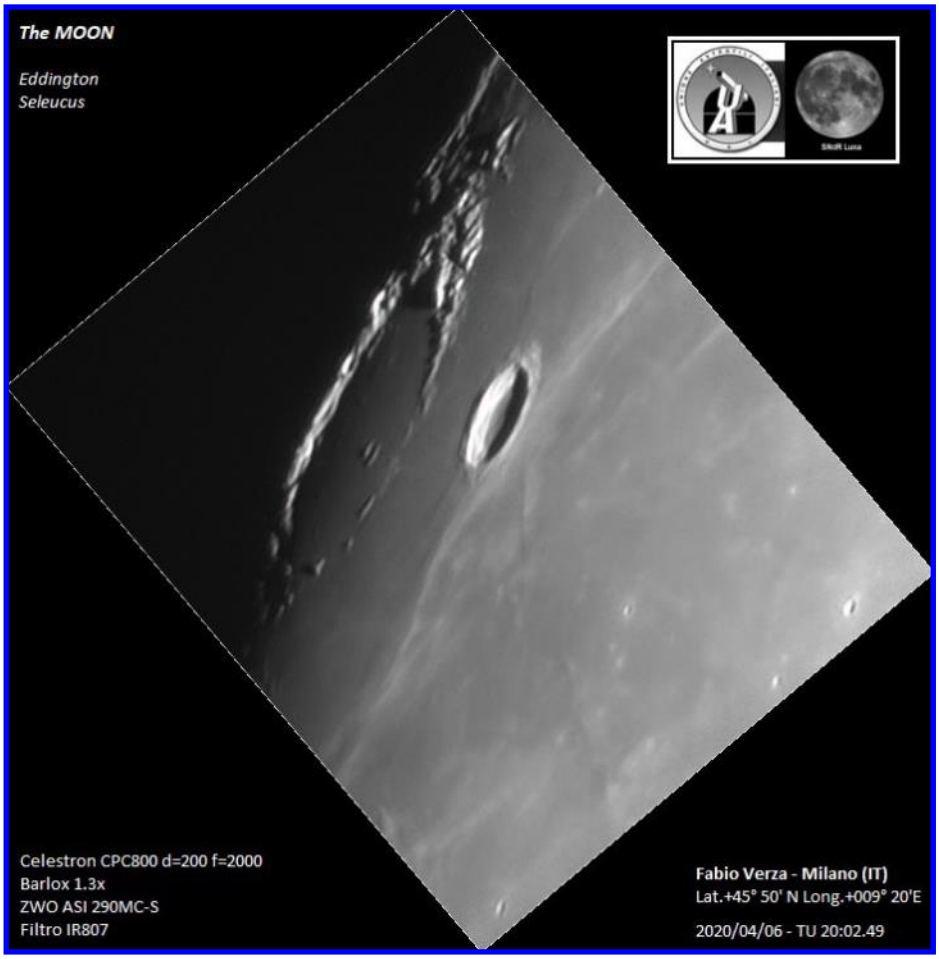




Albategnius, *Fabio Verza, SNdR Luna, Milan, Italy. 22 November 2020 18:52 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik IR 807 filter, ZWO ASI 290 MM camera.*

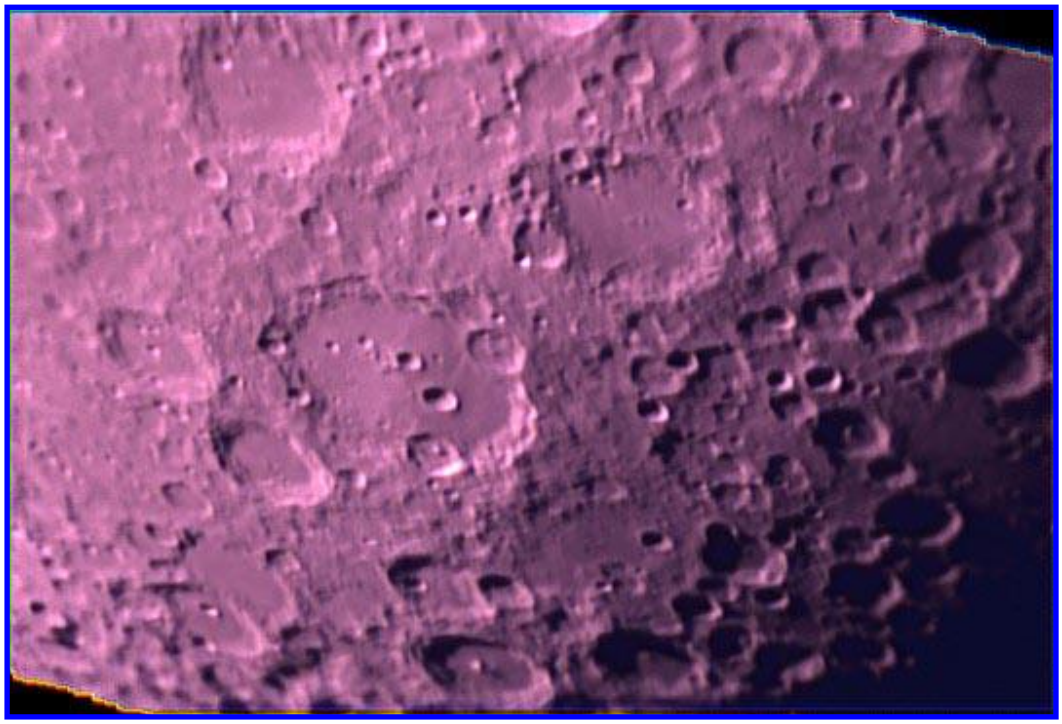
Copernicus, *Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 21:16 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

Mare Nectaris, *Walter Riccardo Elias, Oro Verde, Argentina. 22 December 2020 01:39 UT. Helios 114 telescope, QHY5-ll C camera.*



Eddington, *Fabio Verza, SNdR Luna, Milan, Italy. 06 April 2020 20:02 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik IR 807 filter, ZWO ASI 290 MM camera.*

Waning Gibbous Moon, *Leonardo Alberto Colombo, Molinari, Argentina. 03 December 2020 03:30 UT. 67 mm refractor telescope, yellow-green filter, QHY Lll-M camera.*



Clavius*, Fernando Surà, San Nicolás de los Arroyos, Argentina. 03 December 2020 06:05 UT. 127 mm Maksutov-Cassegrain telescope, CPL Sbony filter, Neximage 5 camera.*

***Mare Crisium**, Luis Francisco Alsina Cardinalli, Oro Verde, Argentina. 15 April 2016 00:23 UT. 10 inch Meade LX200 Schmidt-Cassegrain telescope, QHY5-ll camera.*

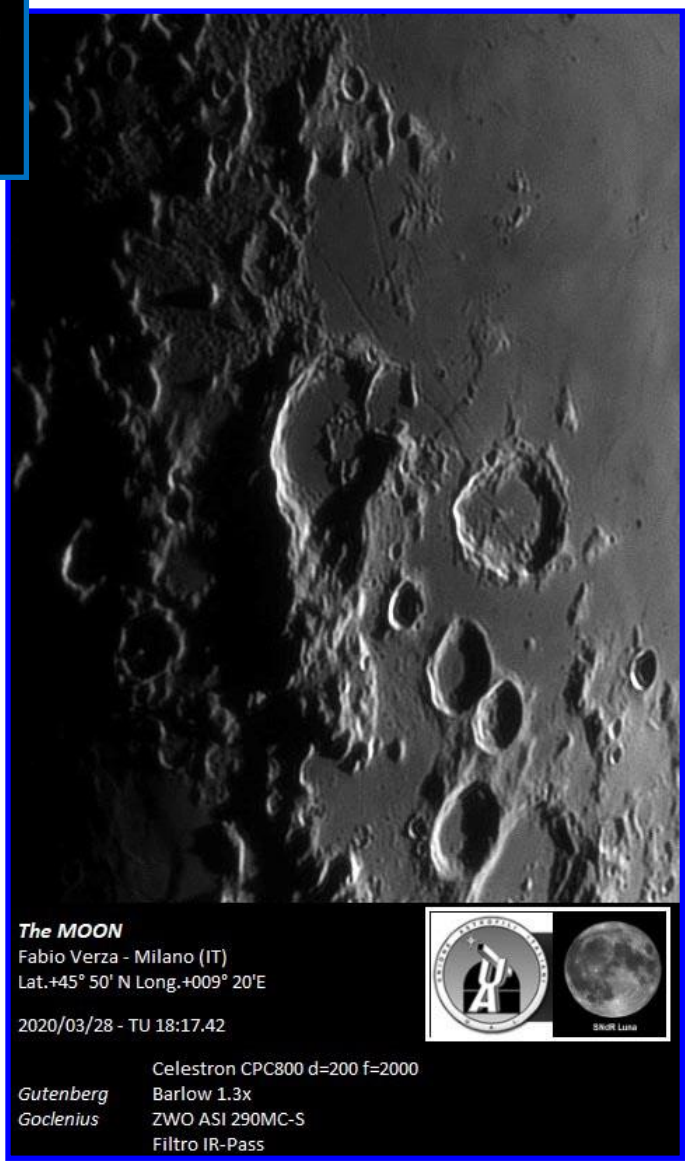
***Copernicus,** Fabio Verza, SNdR Luna, Milan, Italy. 03 May 2020 20:35 UT. Celestron 4 inch Maksutov-Cassegrain Nexstar telescope, IR Block filter, ZWO ASI 290 MC-S camera.*

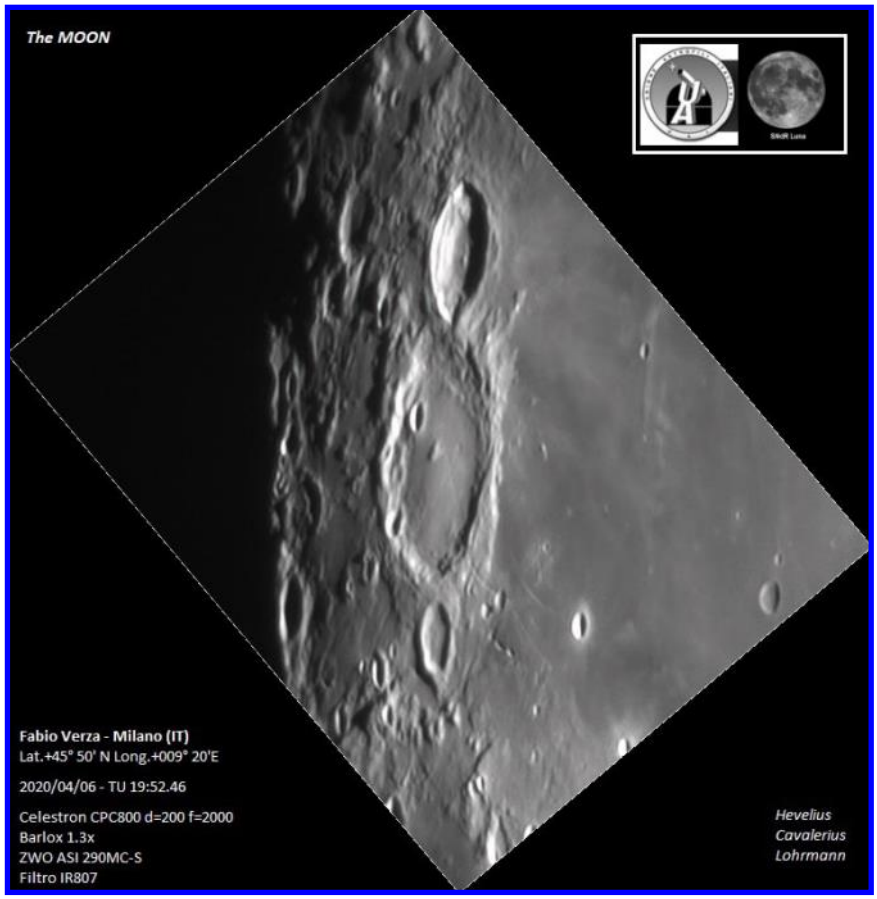
Eudoxus, *Fabio Verza, SNdR Luna, Milan, Italy. 31 March 2020 18:15 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR block filter, ZWO ASI 290 MM camera.*

Piccolomini, *Walter Riccardo Elias, Oro Verde, Argentina. 22 December 2020 01:26 UT. Helios 114 telescope, QHY5-ll C camera.*

Fontenelle, *Fabio Verza, SNdR Luna, Milan, Italy. 03 May 2020 20:44 UT. Celestron 4 inch Maksutov-Cassegrain Nexstar telescope, IR Block filter, ZWO ASI 290 MC-S camera.*

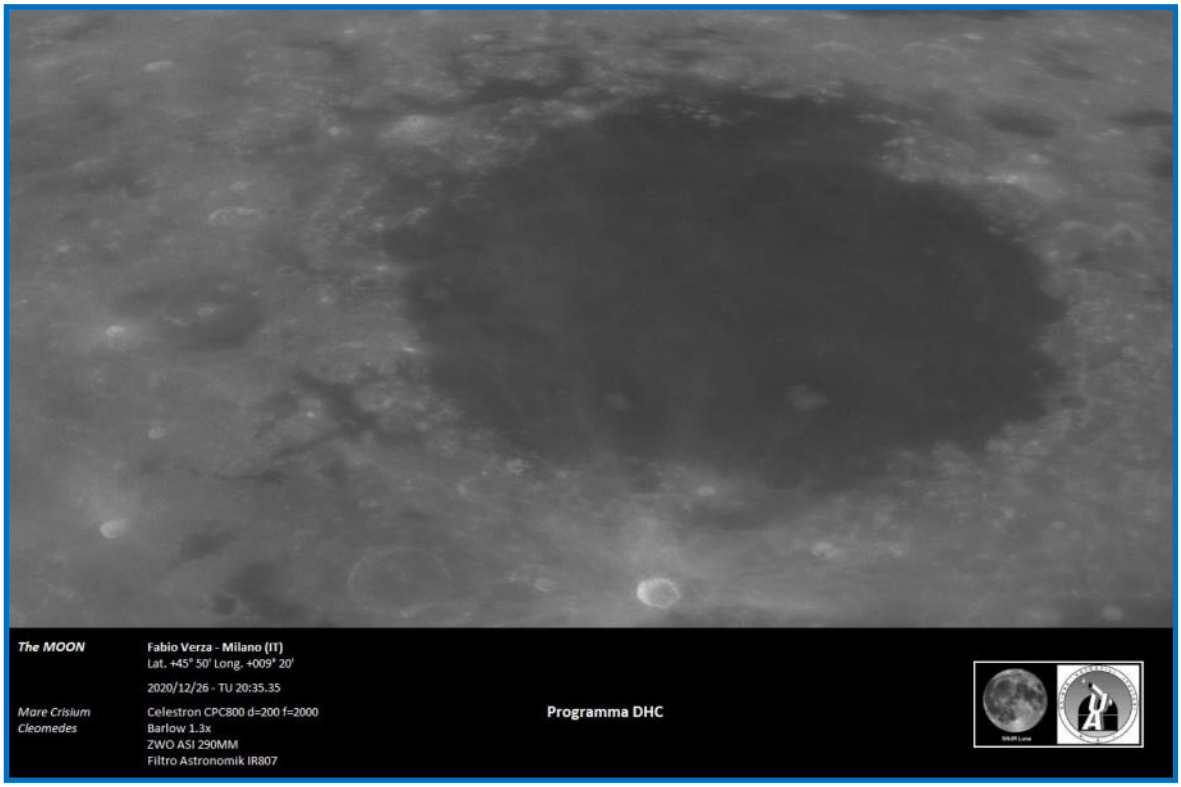
Gutenberg, *Fabio Verza, SNdR Luna, Milan, Italy. 28 March 2020 18:15 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR block filter, ZWO ASI 290 MM camera.*





Hevelius, *Fabio Verza, SNdR Luna, Milan, Italy. 06 April 2020 19:52 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

Posidonius, *Walter Riccardo Elias, Oro Verde, Argentina. 22 December 2020 01:27 UT. Helios 114 telescope, QHY5-ll C camera.*



Dark Halo Crater Mare Crisium, *Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 20:35 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

J. Herschel, *Fabio Verza, SNdR Luna, Milan, Italy. 04 April 2020 23:07 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, ZWO ASI 290 MM camera.*

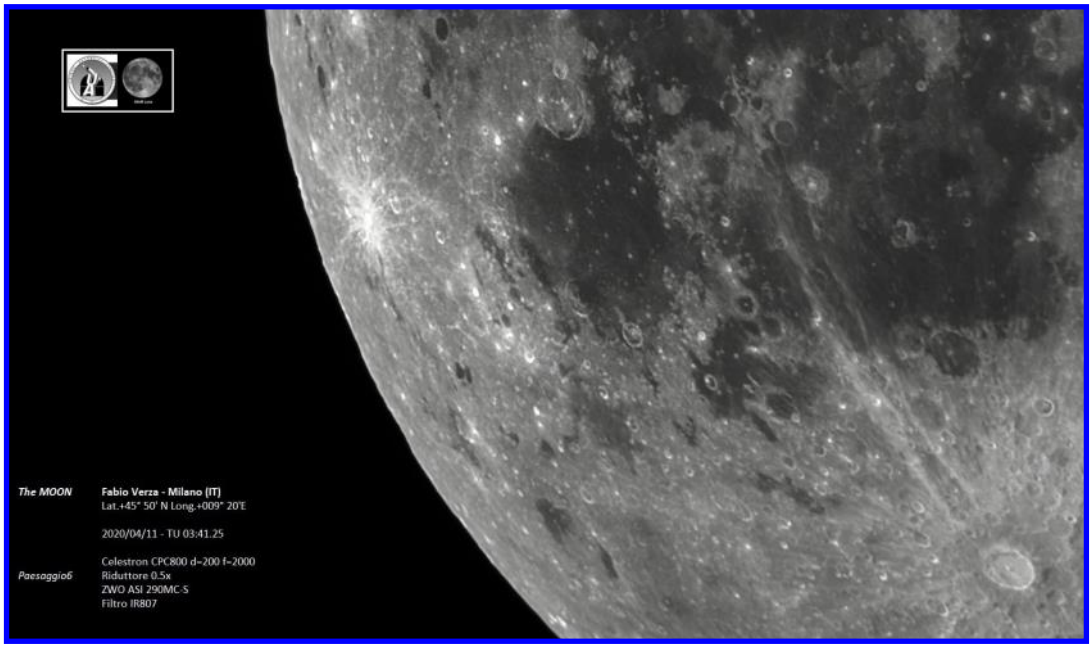
Lunar Landscape, *Fabio Verza, SNdR Luna, Milan, Italy. 11 April 2020 03:36 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 0.5 x reducer, Astronomik 807 nm filter, ZWO ASI 290 MC -S camera.*

Lunar Landscape, *Fabio Verza, SNdR Luna, Milan, Italy. 11 April 2020 03:37 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 0.5 x reducer, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

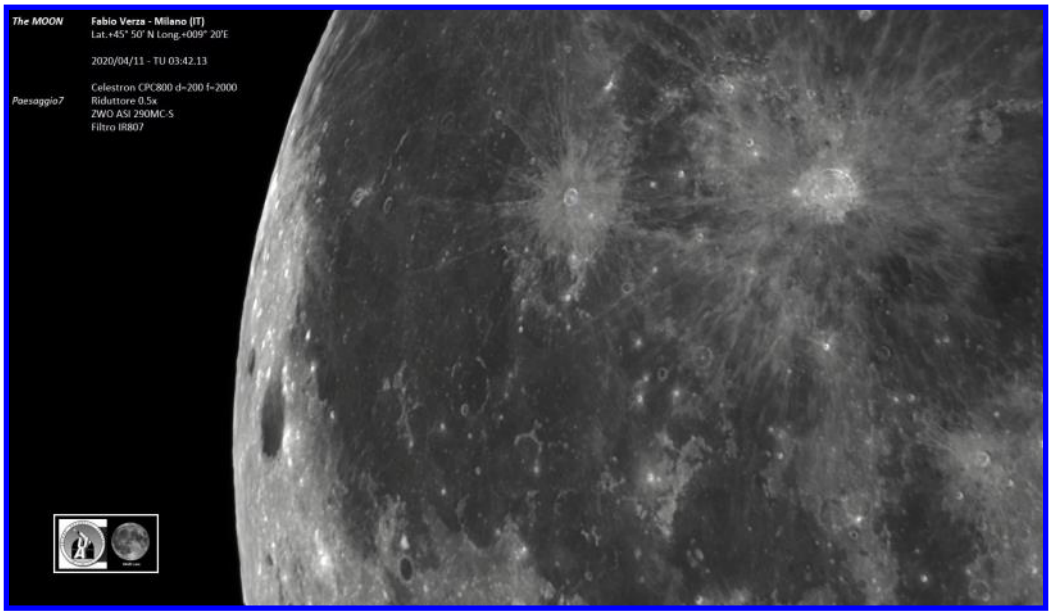
Lunar Landscape, *Fabio Verza, SNdR Luna, Milan, Italy. 11 April 2020 03:39 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 0.5 x reducer, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

Lunar Landscape, *Fabio Verza, SNdR Luna, Milan, Italy. 11 April 2020 03:38 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 0.5 x reducer, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

Lunar Landscape, *Fabio Verza, SNdR Luna, Milan, Italy. 11 April 2020 03:40 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 0.5 x reducer, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*



Lunar Landscape, *Fabio Verza, SNdR Luna, Milan, Italy. 11 April 2020 03:41 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 0.5 x reducer, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

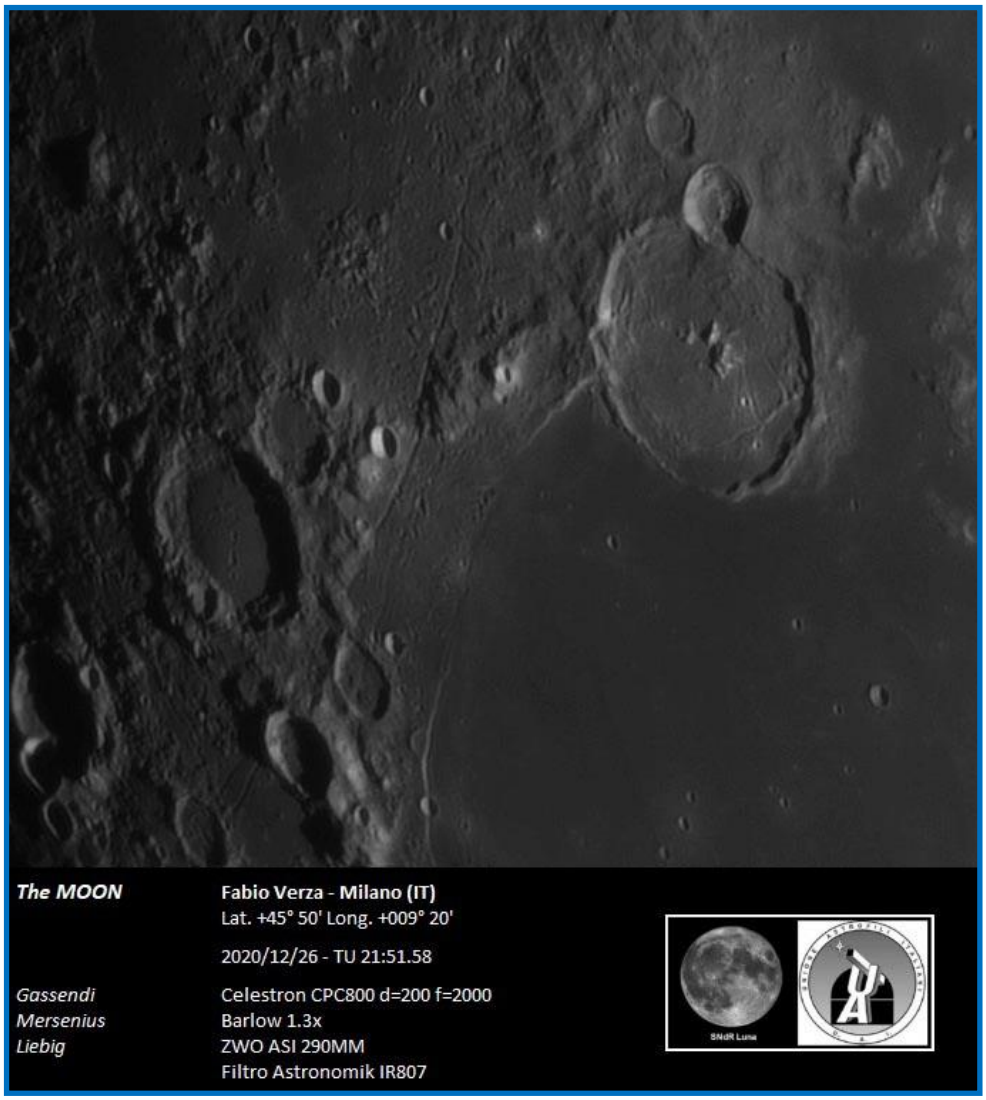


Lunar Landscape, *Fabio Verza, SNdR Luna, Milan, Italy. 11 April 2020 03:42 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 0.5 x reducer, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

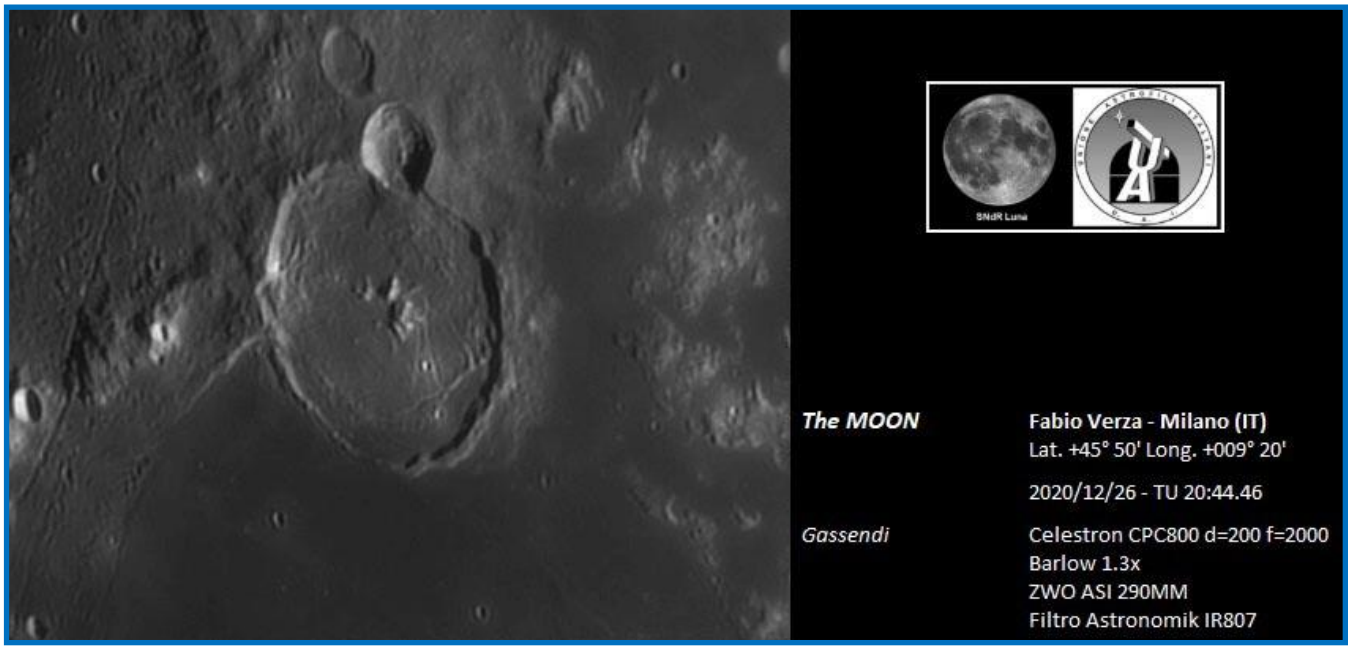
Lunar Landscape, *Fabio Verza, SNdR Luna, Milan, Italy. 11 April 2020 03:44 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 0.5 x reducer, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

Lunar Landscape, *Fabio Verza, SNdR Luna, Milan, Italy. 11 April 2020 03:43 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 0.5 x reducer, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

Mare Nectaris, *Fabio Verza, SNdR Luna, Milan, Italy. 12 April 2020 04:00 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

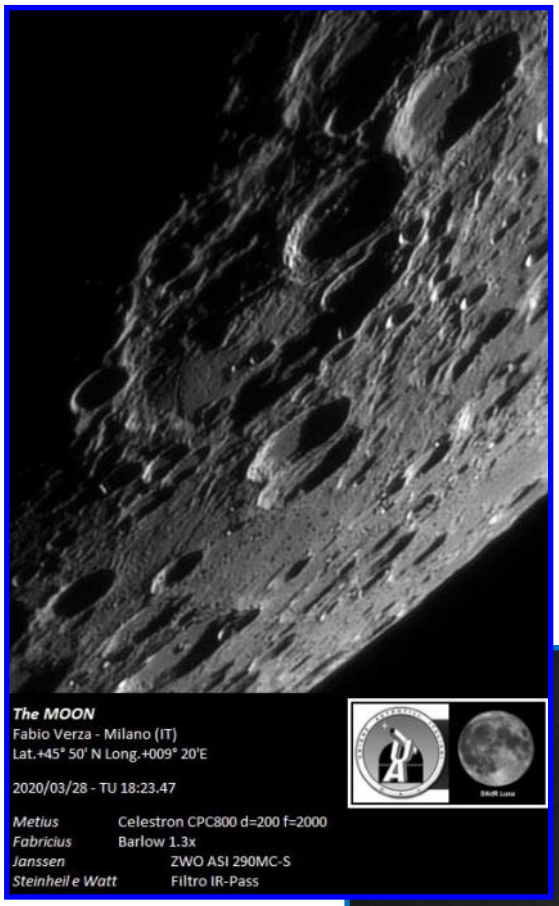


Gassendi, *Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 21:51 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*



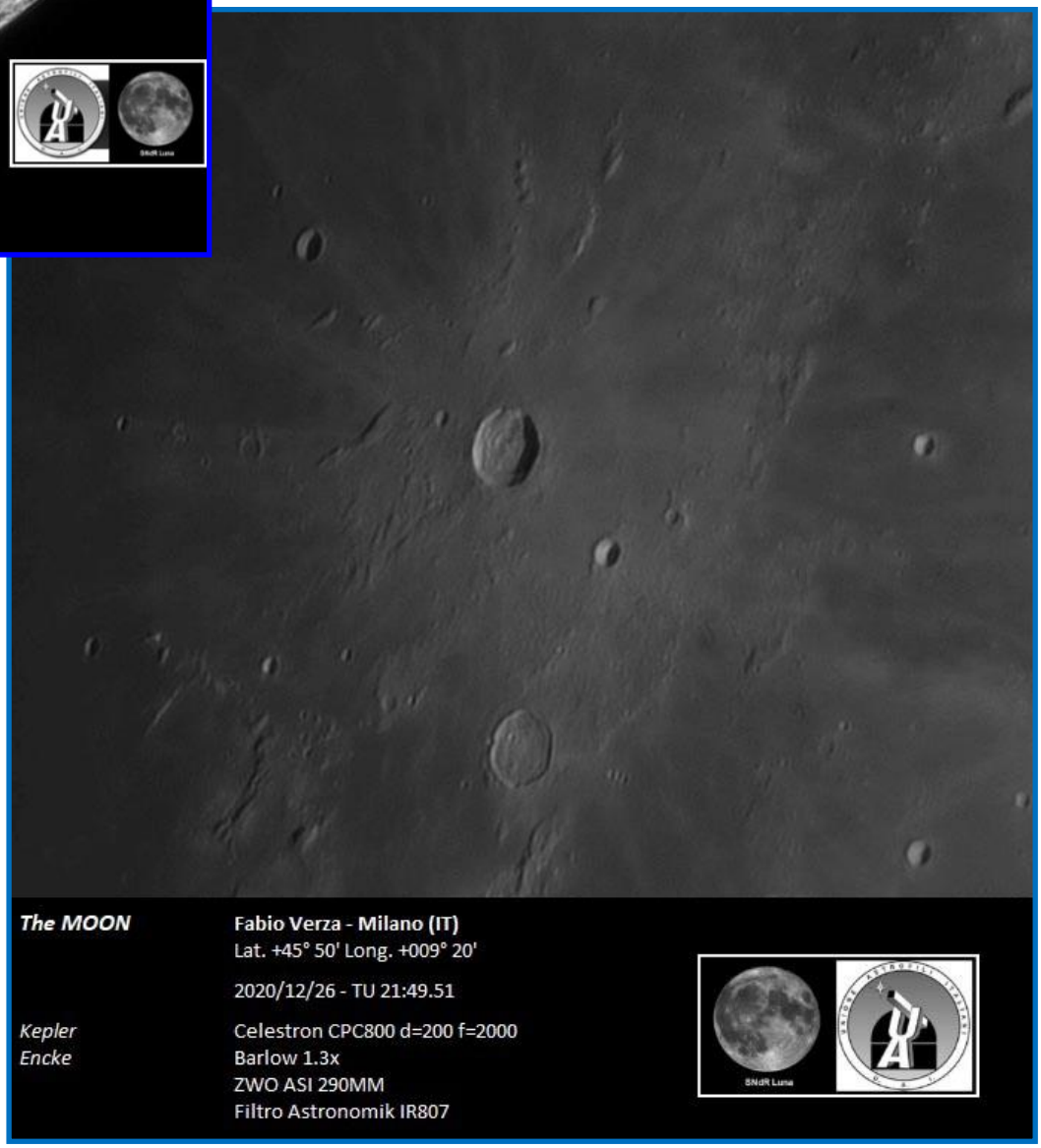
Gassendi, *Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 20:44 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

Mare Serenitatis, *Fabio Verza, SNdR Luna, Milan, Italy. 31 March 2020 18:18 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR pass filter, ZWO ASI 290 MM camera.*



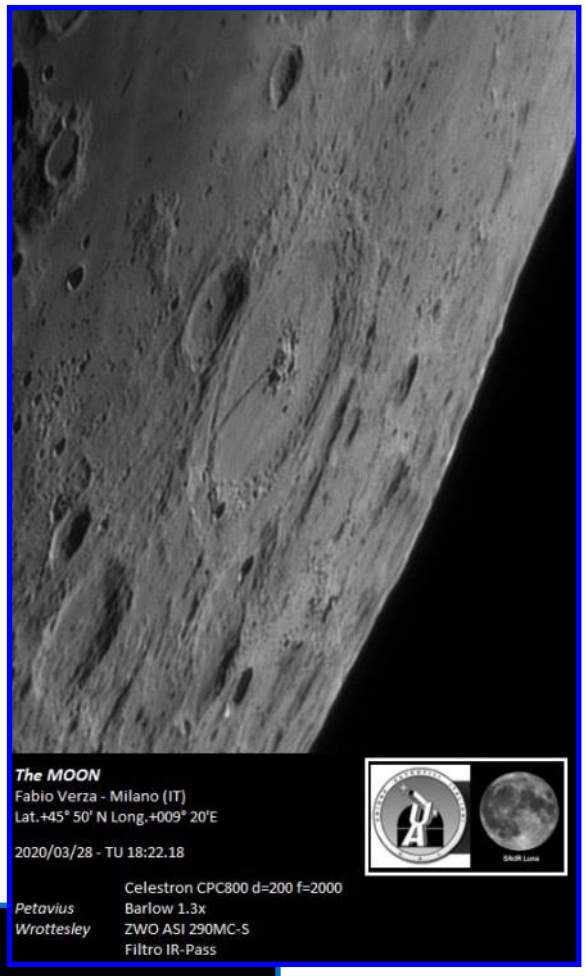
Janssen, *Fabio Verza, SNdR Luna, Milan, Italy. 28 March 2020 18:23 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR pass filter, ZWO ASI 290 MM camera.*

Kepler, *Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 21:49 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*



Theophilus, *Walter Riccardo Elias, Oro Verde, Argentina. 22 December 2020 01:28 UT. Helios 114 telescope, QHY5-ll C camera.*

Moretus, *Fabio Verza, SNdR Luna, Milan, Italy. 01 April 2020 19:24 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*



Petavius, *Fabio Verza, SNdR Luna, Milan, Italy. 28 March 2020 18:22 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR pass filter, ZWO ASI 290 MC-S camera.*

Mare Humorum, *Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 20:41 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

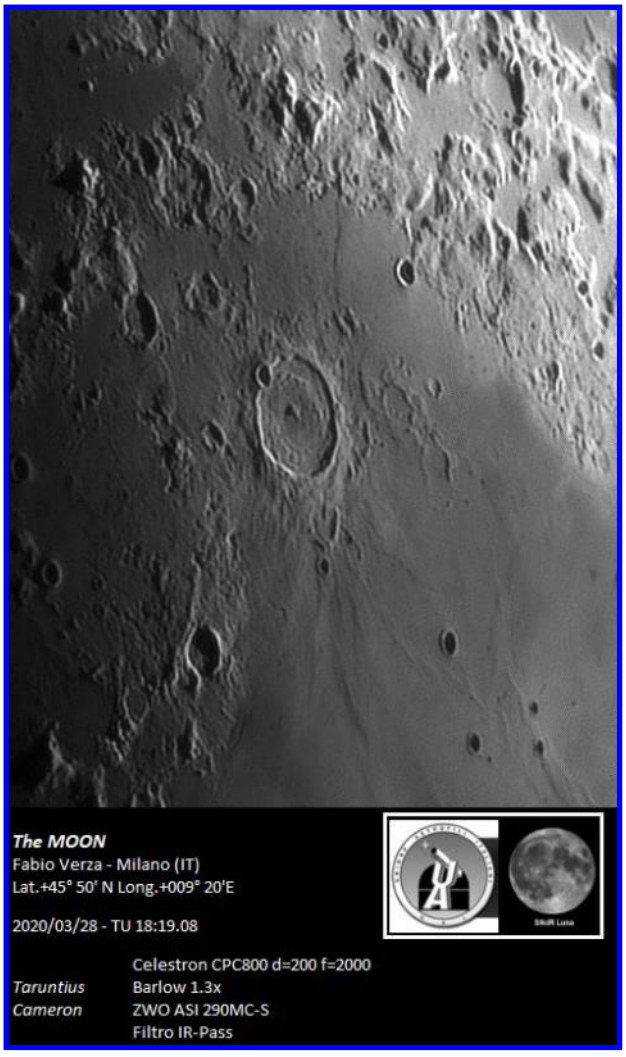
Herodotus, *Leandro Sid, 27 December 2020 02:06 UT. Meade Star-Navigator NG 90MAK 90 mm Maksutov-Cassegrain telescope, Sony Motorola One Fusion camera.*

Schickard, *Fabio Verza, SNdR Luna, Milan, Italy. 06 April 2020 19:58 UT. Celestron CPC800 8 inch Schmidt -Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

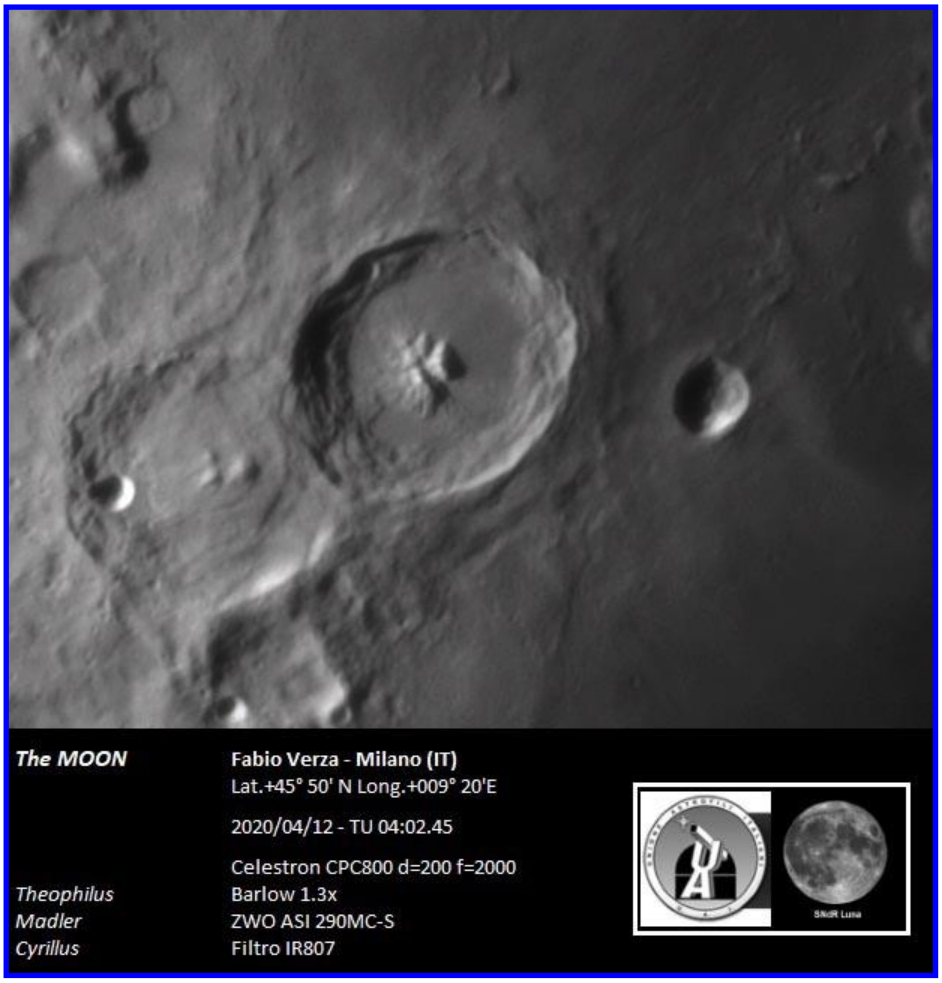
Sinus Iridum, *Fabio Verza, SNdR Luna, Milan, Italy. 04 April 2020 22:56 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, ZWO ASI 290 MC-S camera.*

Sinus Iridum, *Fabio Verza, SNdR Luna, Milan, Italy. 03 May 2020 20:25 UT. Celestron 4 inch Maksutov-Cassegrain Nexstar telescope, IR Block filter, ZWO ASI 290 MC-S camera.*

South Pole, *Fabio Verza, SNdR Luna, Milan, Italy. 04 May 2020 20:41 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

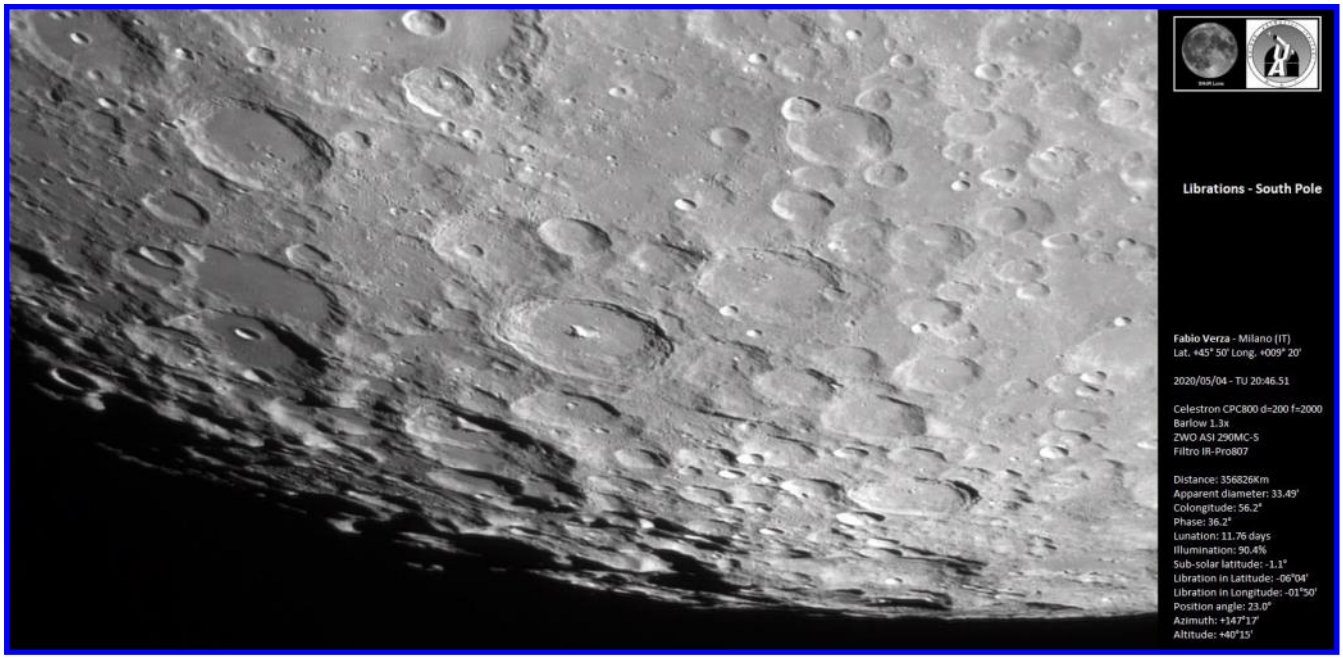


Taruntius, *Fabio Verza, SNdR Luna, Milan, Italy. 28 March 2020 18:19 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR pass filter, ZWO ASI 290 MC-S camera.*



Theophilus, *Fabio Verza, SNdR Luna, Milan, Italy. 12 April 2020 04:02 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

Walter, *Fabio Verza, SNdR Luna, Milan, Italy. 31 March 2020 18:12 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, IR pass filter, ZWO ASI 290 MC-S camera.*

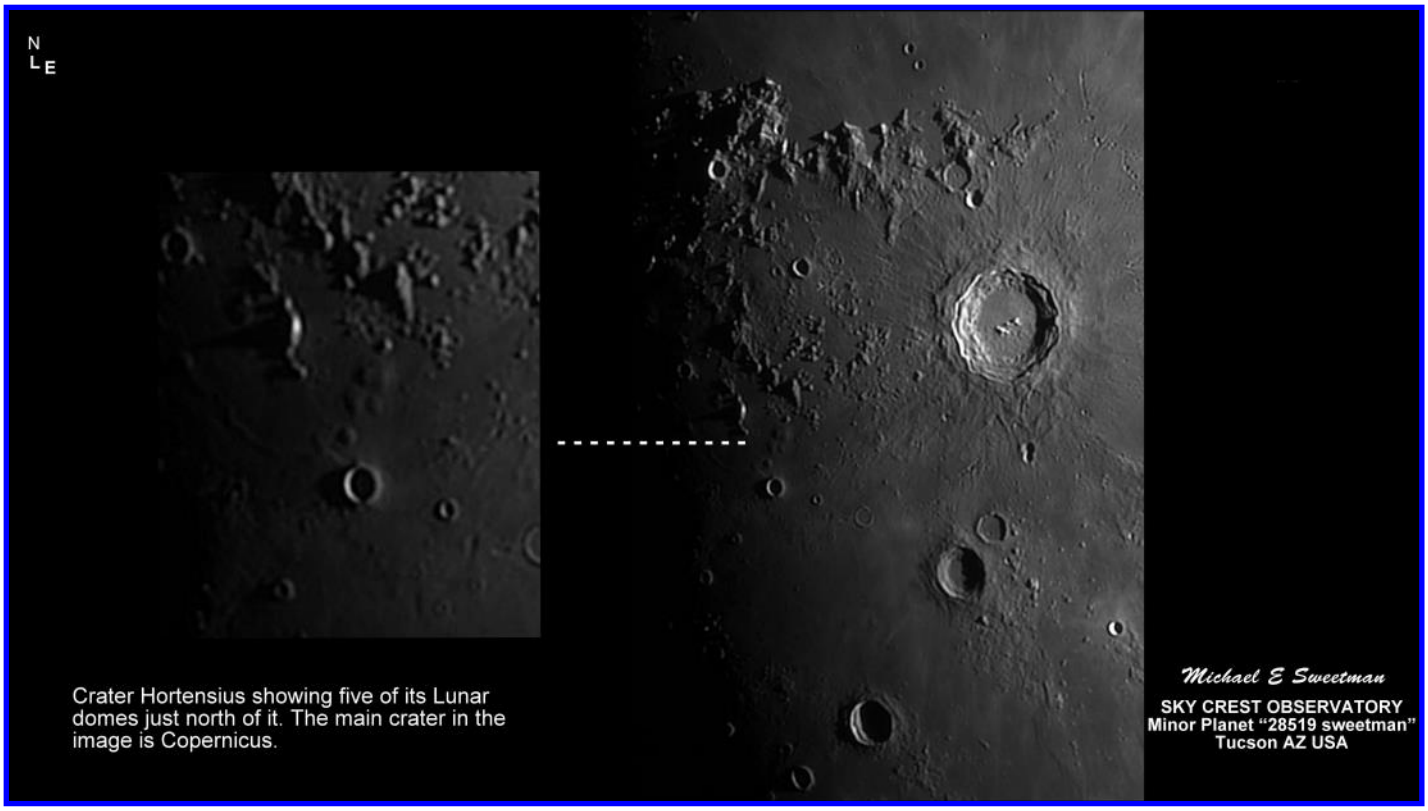


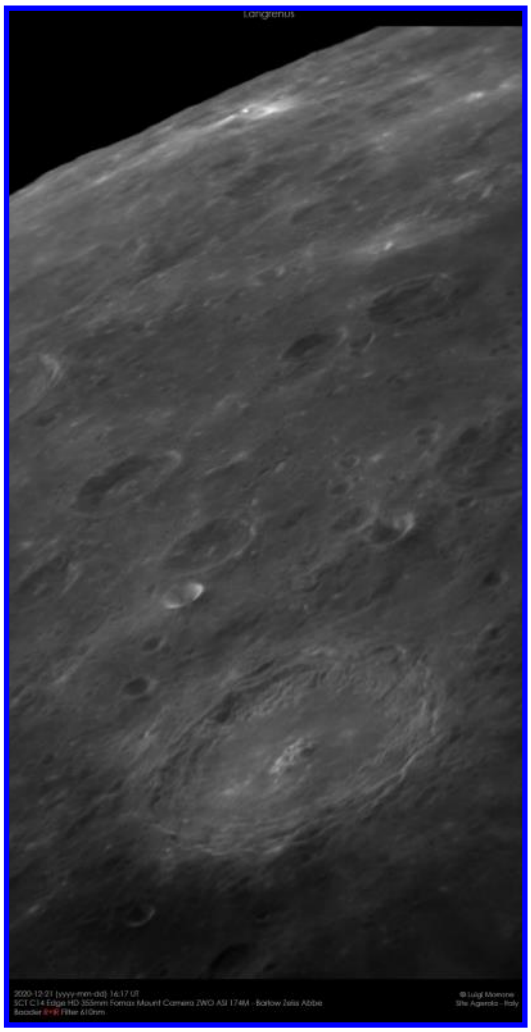
South Pole, *Fabio Verza, SNdR Luna, Milan, Italy. 04 May 2020 20:46 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

Walter, *Fabio Verza, SNdR Luna, Milan, Italy. 01 April 2020 19:15 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MC-S camera.*

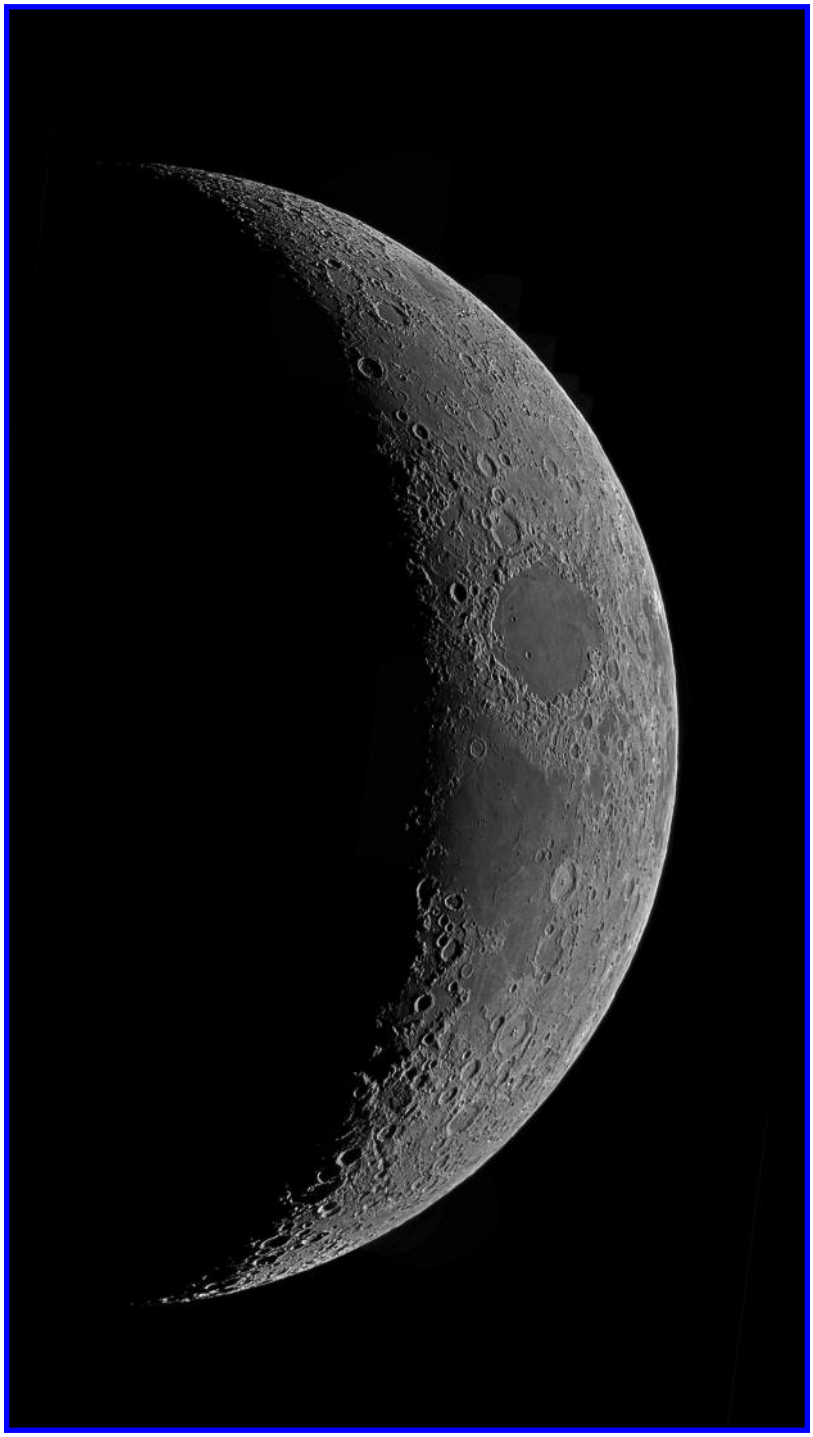
***Meton**, Luigi Morrone, Agerola, Italy. 21 December 2020 16:40 UT. Celestron 14 inch Edge HD Schmidt -Cassegrain telescope, Fornax Mount, Zeiss Abbe barlow, Baader 610 nm filter, ZWO ASI 174M camera.*

***Hortensius Domes,** Michael E. Sweetman, Sky Crest Observatory, Tucson, Arizona, USA. 25 November 2020 07:09 UT. Celestron/Vixen 4 inch achromatic refractor telescope f/10 @ f/20, Baader fringe killer filter, Skyris 132 M camera. Seeing 5/10, transparency 3/6.*

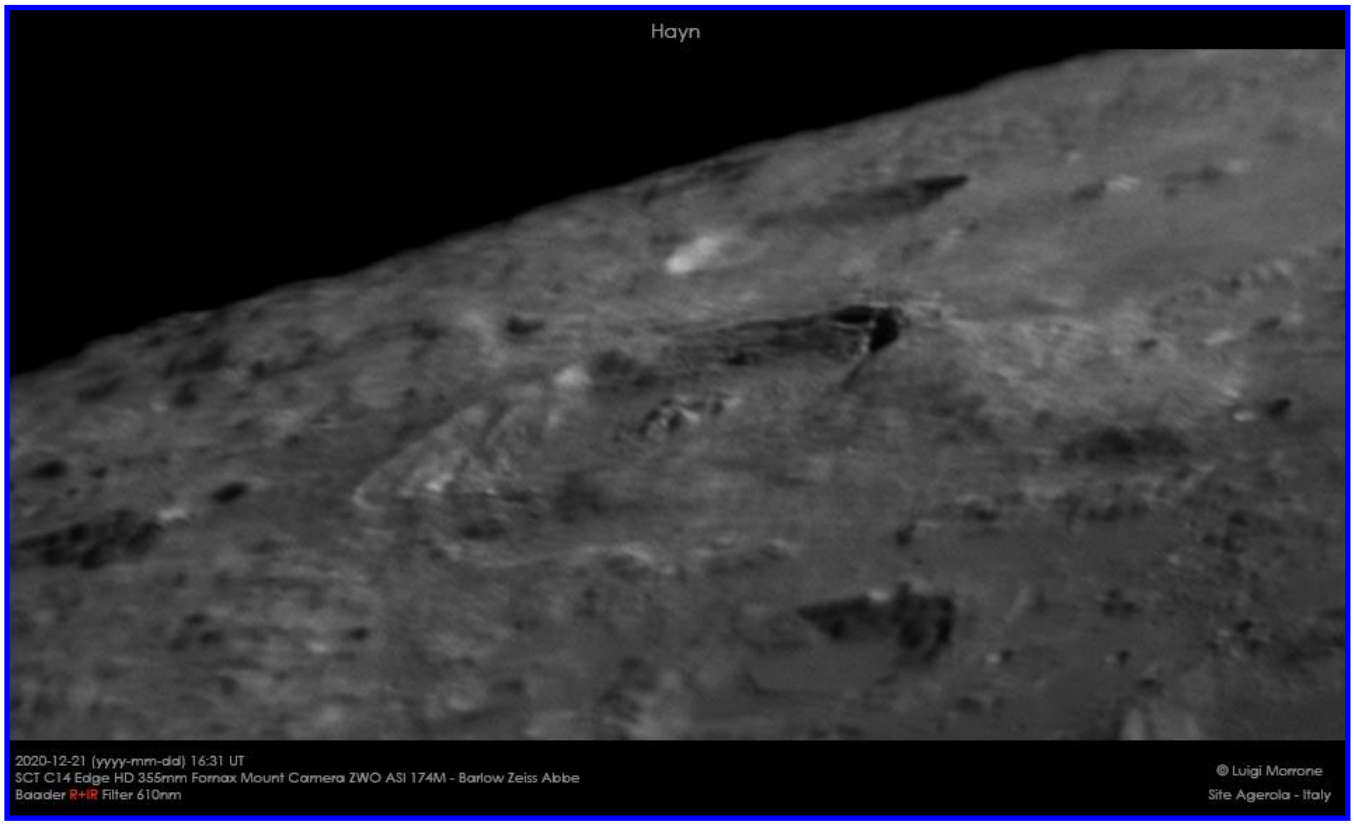




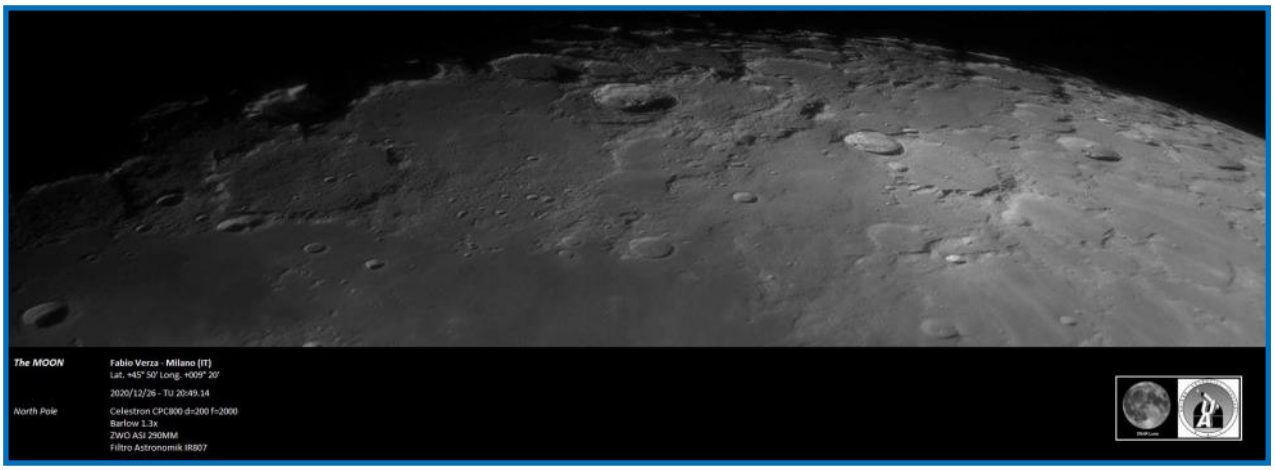
***Langrenus**, Luigi Morrone, Agerola, Italy. 21 December 2020 16:17 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Fornax Mount, Zeiss Abbe barlow, Baader 610 nm filter, ZWO ASI 174M camera.*



***Waxing Crescent Moon,** Michael E. Sweetman, Sky Crest Observatory, Tucson, Arizona, USA. 19 December 2020 01:16 UT. Celestron/Vixen 4 inch achromatic refractor telescope f/10, Baader fringe killer filter, Skyris 132 M camera. Seeing 4-5/10, transparency 3/6.*



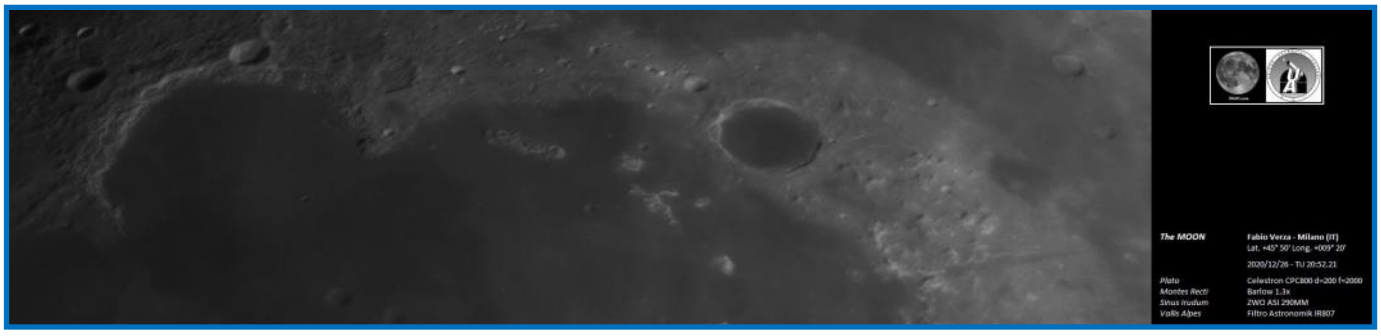
Hayn, *Luigi Morrone, Agerola, Italy. 21 December 2020 16:31 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Fornax Mount, Zeiss Abbe barlow, Baader 610 nm filter, ZWO ASI 174M camera.*



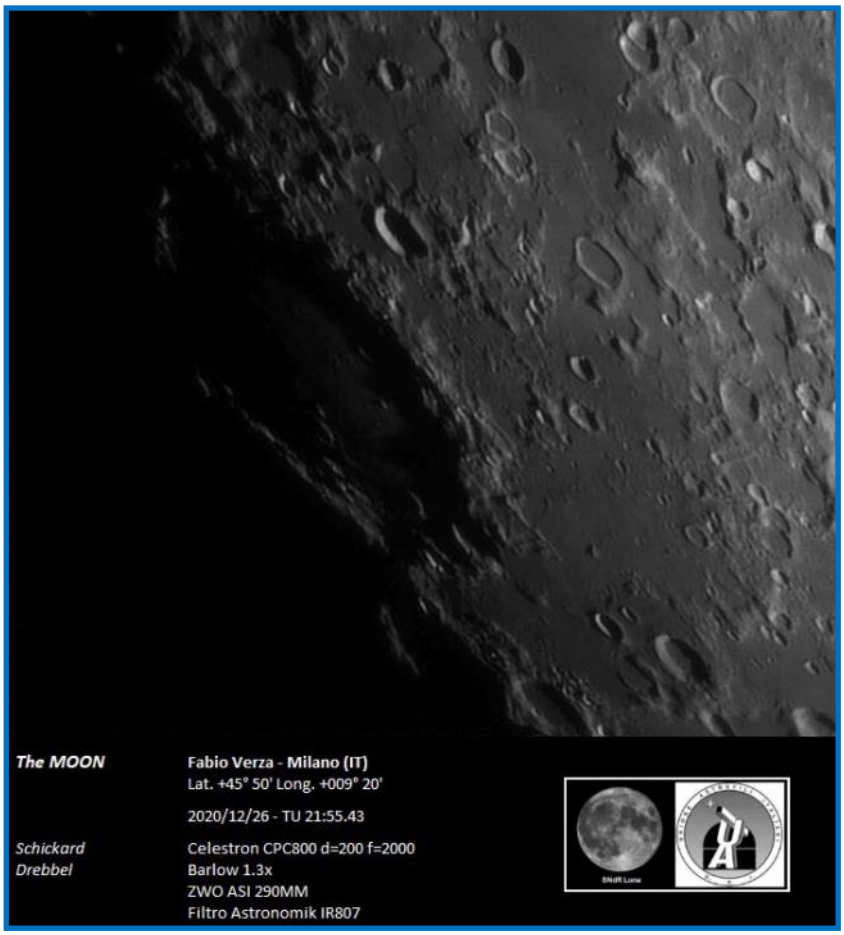
North Pole, *Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 20:49 UT. Celestron CPC800 8 inch Schmidt -Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

***Endymion**, Luigi Morrone, Agerola, Italy. 21 December 2020 16:27 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Fornax Mount, Zeiss Abbe barlow, Baader 610 nm filter, ZWO ASI 174M camera.*

***Plato,** Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 20:52 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

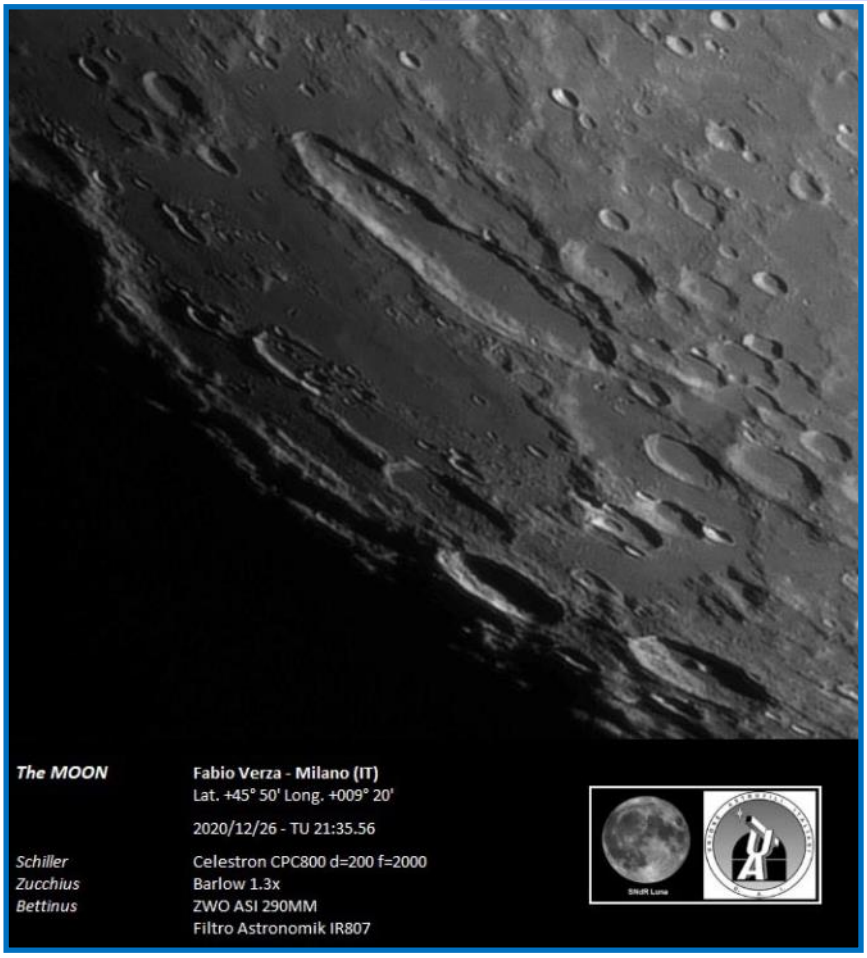


***Atlas and Hercules**, Luigi Morrone, Agerola, Italy. 21 December 2020 16:24 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Fornax Mount, Zeiss Abbe barlow, Baader 610 nm filter, ZWO ASI 174M camera.*



***Schickard,** Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 21:55 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

***Aristoteles and Eudoxus**, Luigi Morrone, Agerola, Italy. 21 December 2020 16:35 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Fornax Mount, Zeiss Abbe barlow, Baader 610 nm filter, ZWO ASI 174M camera.*

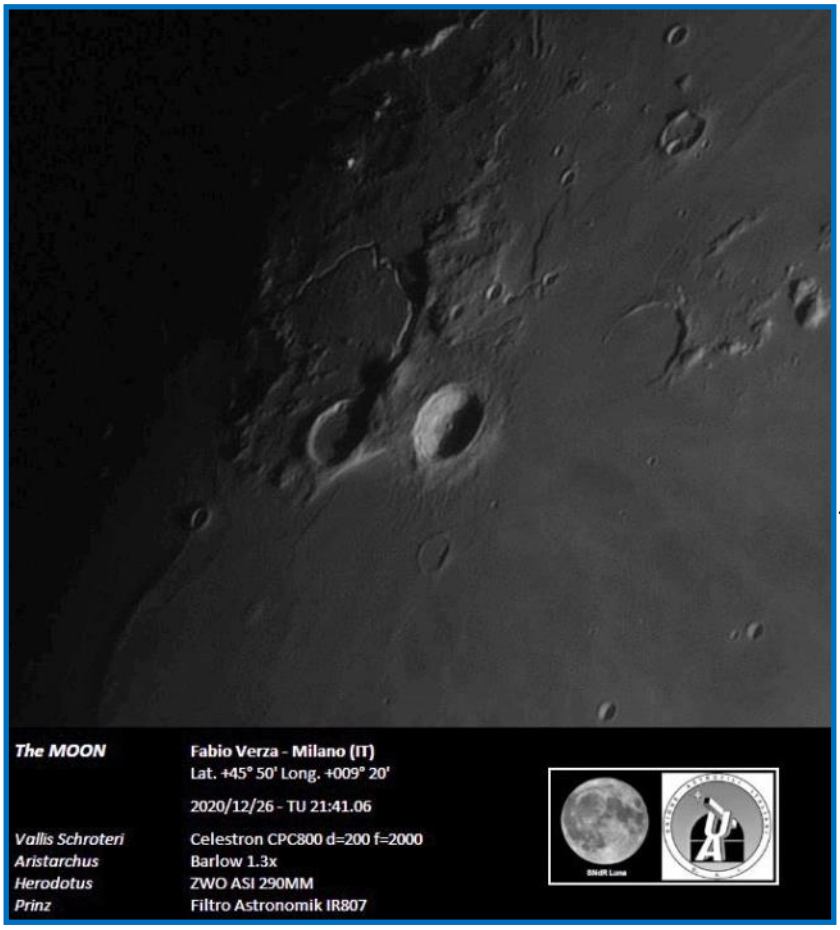


***Schiller,** Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 21:35 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

***Abulfeda**, Luigi Morrone, Agerola, Italy. 21 December 2020 16:42 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Fornax Mount, Zeiss Abbe barlow, Baader 610 nm filter, ZWO ASI 174M camera.*

***Sinus Iridum,** Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 21:47 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

***Theophilus**, Luigi Morrone, Agerola, Italy. 21 December 2020 16:12 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, Fornax Mount, Zeiss Abbe barlow, Baader 610 nm filter, ZWO ASI 174M camera.*



***Vallis Schröteri,** Fabio Verza, SNdR Luna, Milan, Italy. 26 December 2020 21:41 UT. Celestron CPC800 8 inch Schmidt-Cassegrain telescope, 1.3 x barlow, Astronomik 807 nm filter, ZWO ASI 290 MM camera.*

Lunar Geologic Change Detection Program

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

2021 January

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 further reports were received for November, but I will have some reports from Trevor Smith, for December, to describe in the next newsletter.

News: I'd like to wish our readers a rather better 2021 than the preceding year. I also would like to congratulate the Chinese Space Agency for a successful sample and return mission to the Mons Rumker area of the Moon with their Chang'e 5 lander.

Level 1 – All Reports received for November: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Agrippa, Alphonsus, Censorinus, Manilius, Plato, Proclus and Swift. Alberto Anunziato (Argentina - SLA) observed: Alphonsus and Mons Piton. Juan Manuel Biagi (Argentina – SLA) imaged: several features. Massimo Alessandro Bianchi (Italy – UAI) observed/imaged: Aristarchus, Copernicus and Montes Teneriffe. Maurice Collins (New Zealand – ALPO/BAA/RASNZ) imaged: the Full Moon. Anthony Cook (Newtown, UK – ALPO/BAA/NAS) observed: Proclus and videoed several features. Daryl Dobbs (Risca, UK - BAA) observed: Aristarchus and Gassendi. Fernando Ferri (Italy - UAI) imaged: the Full Moon. Valerio Fontani (Italy – UAI) imaged: Montes Teneriffe and the Full Moon. Marco Di Francesco (Italy – UAI) imaged: Aristarchus and Montes Teneriffe. Les Fry (UK – NAS) imaged: Aristarchus, Hansteen, J Herschel, Kepler, Mersenius, and Schickard. Rik Hill (Tucson, AZ, USA – ALPO/BAA) imaged: the Kies area. Jean Marc Lechopier (France – UAI) imaged Montes Teneriffe. Davide Pistritto (Italy – UAI) imaged: Aristarchus. Trevor Smith (UK – BAA) observed: Aristarchus, and Atlas. Bob Stuart (Rhayader, UK – BAA/NAS) imaged: Birt, Copernicus, Eratosthenes, Rupes Recta and Stadius. Franco Taccogna (Italy – UAI) imaged: Aristarchus, Montes Teneriffe and Prinz. Aldo Tonon (Italy – UAI) imaged: Copernicus, Mare Frigoris, and Montes Teneriffe. Gary Varney (Pembroke Pines, FL, USA – ALPO) imaged: Clavius, Plato, and Sinus Iridum. Román García Verdier (Argentina – SLA) imaged: several features. Ivor Walton (Cranbrook, UK – CADSAS) imaged: the Moon from a robotic telescope in Chile. Luigi Zanatta (Italy – UAI) imaged Mare Frigoris.

Level 2 – Example Observations Received:

Mare Crisium: On 2020 Nov 01 UT 04:31 Román García Verdier (Argentina – SLA) took an image of the Moon (See Fig 1) that included this crater – under similar illumination to the following report:

Mare Crisium 1948 Jul 21/22 UT 22:00?-01:00? Observed by Moore (England, 12" reflector) "Almost featureless except for Peirce & Picard" NASA catalog weight=3. NASA catalog ID #506. ALPO/BAA weight=2.

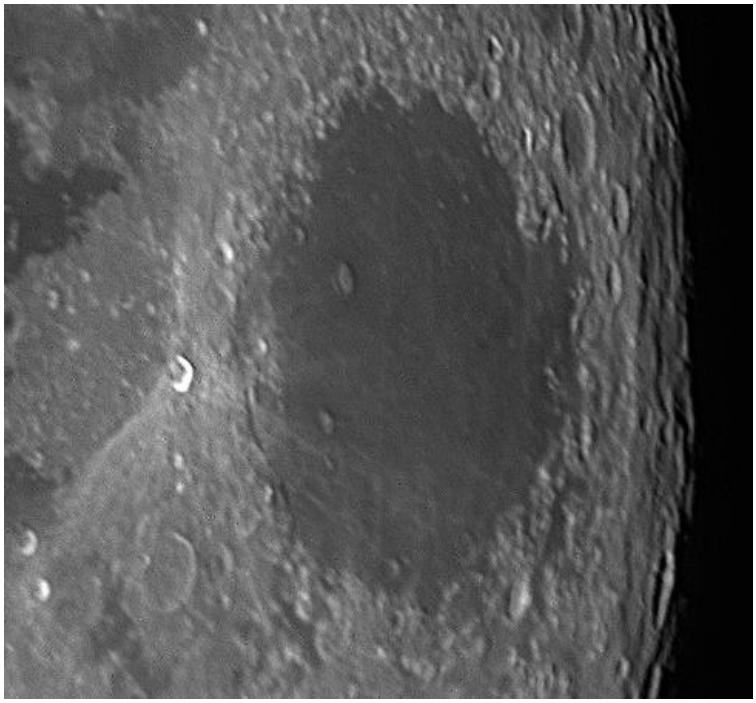


Figure 1. *Mare Crisium as imaged by Román García Verdier (Argentina – SLA) imaged) on 2020Nov 01 UT 04:31 and orientated with north towards the top.*

Fig 1 shows clearly that contrary to the Patrick Moore description, Mare Crisium does have plenty of detail in it. Whether this would still be the case under an identical topocentric libration still needs to be tested.

Plato: On 2020 Nov 01 UT 04:42 Juan Manuel Biagi (SLA) took a monochrome image (See Fig 2) of the Moon that included this crater – under similar illumination to the following report:

On 1938 Jan 17 Barker (Chestnut, England, UK, 12.5" reflector) noticed that Plato crater had a brownish-gold veined surface, color irregular - laid on a smooth floor. It had extended further E than on the previous night. The ALPO/BAA weight=2.

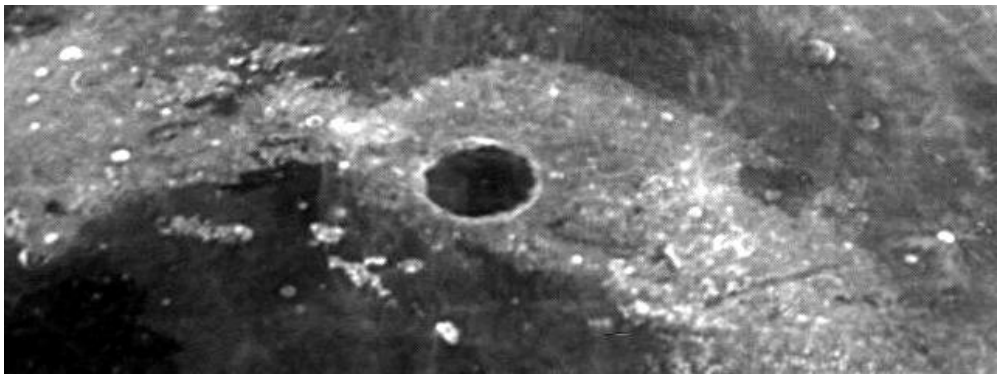


Figure 2. *Plato as imaged by Juan Manuel Biagi (SLA) on 2020 Nov 01 UT 04:42 and orientated with north towards the top.*

You can see some veins-like features on the floor of Plato in Fig 2, but alas the image is monochrome – so is useful at least as a context image.

Aristarchus: On 2020 Nov 03 UT 22:50-23:00 and 23:25-23:40 Trevor Smith observed the crater under similar illumination to the following two reports respectively:

On 1992 May 20 at UT 11:15 D. Weier (Sun Prairie, WI, USA, naked eye and 7x50 binoculars, sky conditions excellent) noted that Aristarchus and, an area, were very bright to the eye. In binoculars the feature was quire sharp and distinct, "> anything else on the Moon". The Cameron 2006 catalog ID=447 and the weight=2. The ALPO/BAA weight=1.

Aristarchus 1979 Nov 07/08 UT 23:10-00:00 Observed by R.H. Ricketts (Lewis, Sussex, UK, 10" reflector, x300, Seeing Antoniadi II) - obscuration and coloration seen. ALPO/BAA weight=2.

For the first report Trevor notes that the crater did indeed look bright but was not excessively so. No colors were seen and the crater looked normal. For the second report Trevor saw no coloring or obscurations either.

Alphonsus: On 2020 Nov 23 UT 03:30-03:35 Alberto Anunziato (SLA) observed visually this crater under similar illumination to the following two reports:

1958 Nov 19 Poppendiek observed a *large plume-like diffuse cloud over central peak, very large compared to central peak (@ approx 30km diameter) with intensity much different from other parts. Brightness between walls and shadowed floor. Would take 3 minutes to collapse, so continuously fed. 13-14 days later, at SS, central peak was normal. Kuiper took photos after Kozyrev's observations, but saw nothing abnormal. Drawing. Haas saw nothing in 12inch reflector at the time. Cameron 1978 catalog LTP ID=705 and weight=4. ALPO/BAA weight=2.*

Alphonsus 1966 Jun 26 UT 04:30-04:40 Observed visually by D.Harris and E.Arriola (Whittier, CA, USA, 19" reflector x146, and spectrum, S=4, T=1-0) "Absorp. spectrum (visual) of c.p. band at 475+/-5nm (1st est.); 2nd est. at 485+/-5nm. Band degraded towards the viol. Band nr.Hydrogen Beta. as if abnormally broadened. No sign of anything unusual visually in central peak in white light. Absorption appeared only on C.P., not over walls. Calibration corrections put band at 491+/-4nm" NASA catalog weight=5. NASA catalog ID #948. ALPO/BAA weight=5.

Alberto, using a Meade EX 105 at x154, comments that he could not see the features reported in

Alberto, using a Meade EX 105 at x154, comments that he could not see the features reported in 1958 and 1966. We have covered the Poppendiek report before in the 2017 Jan and Nov newsletters and the Harris report in the 2017 Jan newsletter.

Mare Frigoris: On 2020 Nov 24 UT 22:14-22:41 UAI observers: Aldo Tonon (17:10-17:17UT) and Luigi Zanatta (22:14-22:41UT) imaged (See Fig 3) the following lunar schedule request:

UAI Request: Mare Frigoris between Plato and Fontenelle (colongitude from 23-27deg or from 185-190deg), a study of the area by Maurizio Cecchini (member of the PNdR Luna UAI) for the confirmation of a probable volcanic dome in the area. The highest possible resolution achievable, with telescopes at least of 8" aperture or larger, is needed. All images, sketches and visual reports should be e-mailed to: u a i . l u n a . l g c @ g m a i l . c o m

Figure 3. *Mare Frigoris as imaged by UAI on 2020 Nov 24 by UAI observers and orientated with north towards the top.* ***(Left)*** *image by Aldo Tonon at 17:13 UT.* ***(Right)*** *image by Luigi Zanatta taken at 22:34 UT.*

Swift: On 2020 Nov 25 UT 02:36-02:44 Jay Albert (ALPO) observed this crater visually under similar illumination to the following report:

Peirce A 1927 Dec 03 UT 22:00 Observed by Wilkins (England, 15" reflector) "Invisible (date in MBM) is wrong, would be only 6h before NM. Sunrise on crater is at 3d & ? h. No interposition of dates works e.g., 13th or 1926 or Dec 26 1923. Only Dec 3 1927 is feasible as it would be just after 1st Q. & more similar to the May obs.)" NASA catalog weight=4?. NASA catalog ID #396. ALPO/BAA weight=2.

Jay was using a the Celestron NexStar Evolution 8" SCT. The sky was partly cloudy with fast moving cumulus and moderate to stiff breezes. Transparency was second magnitude where clear and seeing was initially 5-6/10 but deteriorated to 3-4/10. Clouds covered the Moon from 02:21 as he arrived at Crisium till 02:36. Once the clouds cleared, he could see Picard, Peirce and, with difficulty, Swift. Seeing had deteriorated to 3-4/10 due to passing clouds in the lunar vicinity and increased wind. When seeing permitted, Swift could be seen as a dim crater in one of Proclus' ejecta rays. He first saw Swift at 185x, then at 226x. He viewed Swift from 02:36 to 02:44UT.

Plato: On 2020 Nov 26 UT 01:50 Gary Varney imaged (See Fig 4) this crater under similar illumination to the following two reports:

Plato 1967 May 20 UT 01:13 K.Simmons (Jacksonville, FL, USA, 10" reflector) observed a large bright (intensity 6.5) oval area on near the central floor. According to Ricker and Kelsey (ALPO selected area coordinators) this is unusual. ALPO/BAA weight=1.

Plato and Plato A 1972 Jan 26 UT 18:25-18:55 Observed by Watkins and Hunt (England, 4.5" reflector x150, x225, and a 2.75" refractor) "Misty patch over A, & a misty brightness over SW wall of Plato. Hunt saw nothing unusual." NASA catalog weight=2. NASA catalog ID #1321. ALPO/BAA weight=2.

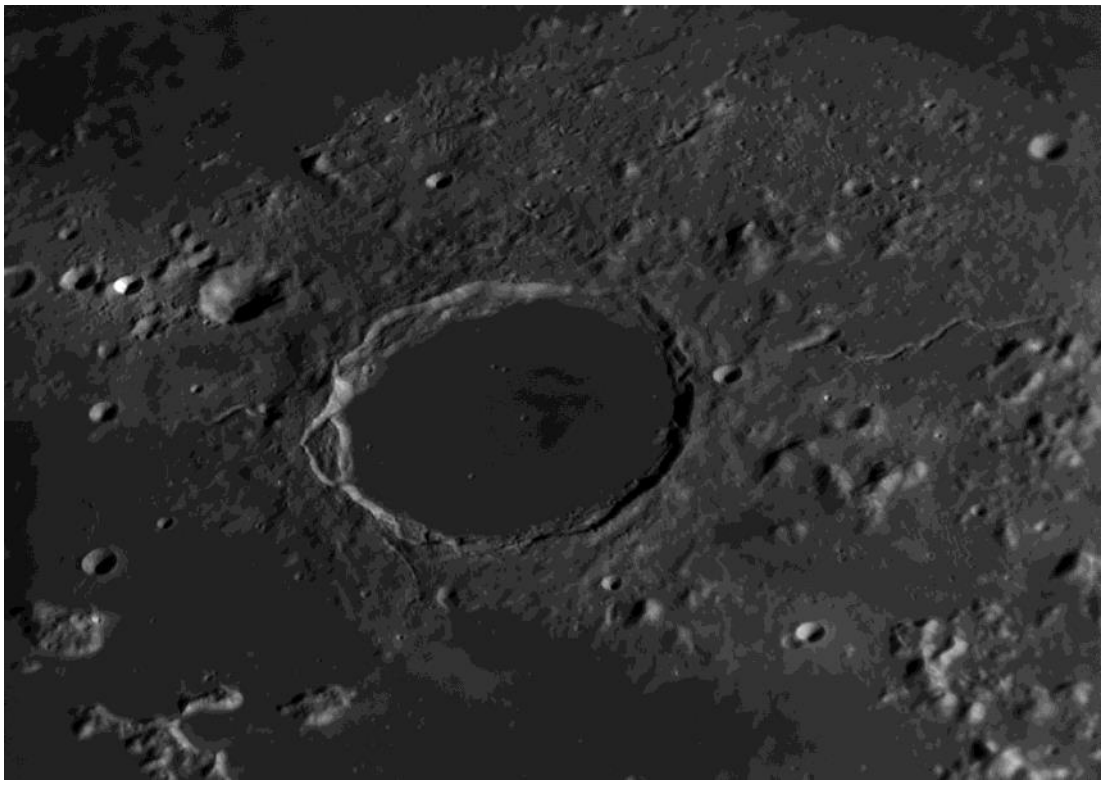


Figure 4. *Plato as imaged by Gary Varney (ALPO) on 2020 Nov 26 UT 01:50 and orientated with north towards the top.*

Aristarchus: On 2020 Nov 26 UAI observers: Alessandro Bianchi (17:34-17:46 UT), Marco Di Francesco (16:47-17:50UT), Davide Pistritto (17:38-17:56 UT), and Franco Taccogna (16:48-17:31 UT) imaged (Fig 5) this crater under similar illumination to the following reports:

On 2013 Apr 22 UT 01:39-02:37 P. Zeller (Indianapollis, USA, 10" f/4 reflector, x200, seeing 6, Transparency 3 - scattered cirrus) observed visually (depicted in sketch) the two closely spaced NW wall dark bands) to have a rusty-red hue. The color of these bands did not change over the period of the observing session. Images were taken, but resolution and image S/N is not sufficient to resolve separate bands here, or to detect color. The ALPO/BAA weight=2.

The earlier coverage of Marco Di Francesco and Franco Taccogna (Fig 5) also covered similar illumination to this report: during 15:56-16:56 UT:

Aristarchus 1975 Dec 14/15 UT 17:05-00:30 Observed by Foley (Dartford, England, 12" reflector, S=II) and Moore (Sussex, UK, 15" reflector x250 S=IV) and Argent and Brumder (Sussex, UK). In early sunrise conditions, W. wall was less brilliant than usual -- matched only by Sharp, Bianchini, & Marian. Extraordinary detail could be seen on this wall. Also noted intense & distinctly blue color entire length of W. wall. 3 others corroborated detail, but not color. Moore found things normal & saw Aris. brightest at 2030-2125h tho Argent & Brumder made it < Proclus" NASA catalog weight=4. NASA catlog ID #1422. ALPO/BAA weight=1.

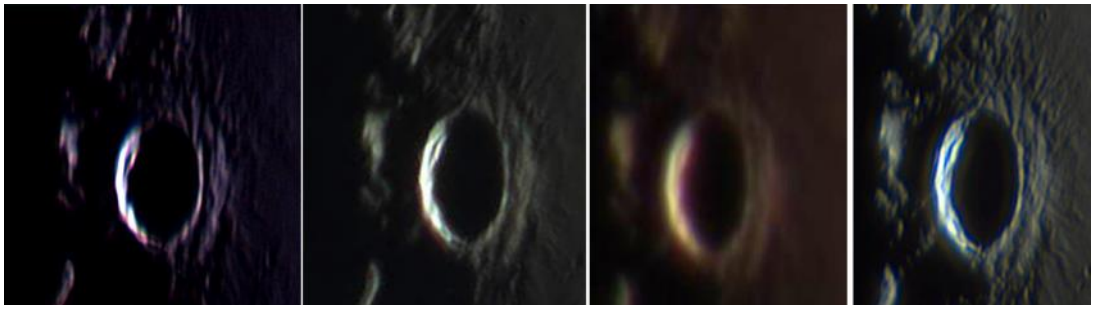


Figure 5. *Color images of Aristarchus crater orientated with north towards the top taken on 2020 Nov 26 by UAI observers. Color saturation has been increased to 40%.* ***(Far Left)*** *Marco Di Francesco took this image at 16:46 UT.* ***(Left)*** *Franco Taccogna took this image at 17:02 UT.* ***(Right)*** *Alessandro Bianchi took this image at 16:34 UT.* ***(Far Right)*** *Davide Pistritto took this image at 17:38UT.*

We have covered the Zeller report before in the 2018 Oct newsletter and the Foley observation in the 2015 Jan, 2016 Mar and 2020 Dec newsletters.

Aristarchus: On 2020 Nov 27 UT 18:35 Les Fry (NAS) imaged (Fig 6) this crater under similar illumination to the following two reports:

Herodotus 1965 Jun 11 UT 21:35-21:40 Observed by Porta, Garau (Mallorca, Baleares, 4" refractor x250) "Red glow in crater at 2140, then clouds stopped obs. After clouds, floor was abnormal rose color" NASA catalog weight=5. NASA catalog ID #879. ALPO/BAA weight=4.

On 1978 Mar 21 at UT 20:57 an Unknown observer observed a LTP in Aristarchus crater. The details for this report are still being looked up in the archives. In view of the uncertain details this LTP has been given an ALPO/BAA weight of 1.

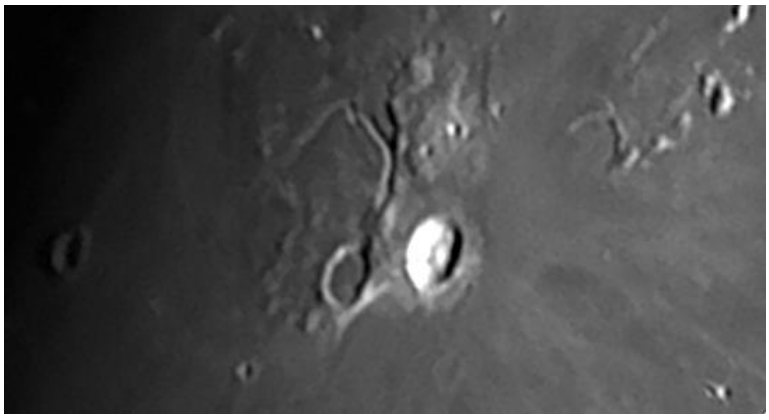


Figure 6. *Aristarchus as imaged by Les Fry (NAS) on 2020 Nov 27 UT 18:35 and orientated with north towards the top.*

The 1965 report was covered in the 2015 Jun newsletter and the 1978 report in the 2020 Mar newsletter. We are still none the wiser who made the original TLP observation in 1978. If anybody knows more about this, please let me know.

Riccioli: On 2020 Nov 29 UT 10:03-10:06 Maurice Collins (ALPO/BAA/RASNZ) imaged the whole lunar disk, part of which (Fig 7) contained this crater under similar illumination and topocentric libration (viewing angle) to the following report:

Riccioli 1974 Jan 07 UT 16:30-17:00 Observed by McKay (South Downs, England, 3" refractor, x135, S=IV boiling) "Bright spot and dark patch changing in size (atmos. aberr. ?)" NASA catalog weight=1. NASA catalog ID #1385.

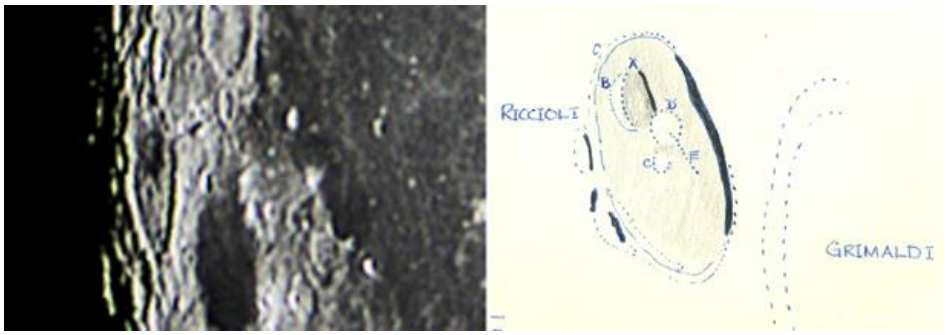


Figure 7. *Riccioloi orientated with north towards the top.* ***(Left)*** *As imaged by Maurice Collins on 2020 Nov 29 UT 10:03-10:06 in color.* ***(Right)*** *The sketch by McKay from 1974 Jan 07 UT 16:30-17:00.*

Full Moon: On 2020 Nov 29 UT UAI observers Valerio Fontani and Fernando Ferri submitted images (Fig 8) of the Full Moon, from which relative brightness of some craters were measured (see table 1 - to compare with past measurements – covered in earlier newsletters) for the following Lunar Schedule 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 8. *The Full Moon as imaged on 2020 Nov 29.* ***(Left)*** *Taken by Fernando Ferri at 23:35 UT with a Canon 400mm f5.6 telephoto + Kenko 1.4x convertor + Canon 70D camera.* ***(Right)*** *Taken by Valerio Fontani at 23:56 UT with a 1000mm f/10 telephoto on a Canon EOS 80D camera.*

	Aristarchus	Censorinus	Copernicus	Kepler	Plato	Proclus	Tycho
Fontani	177	189	159	97	67	195	170
Ferri	186	180	152	142	99	200	168

Relative brightness measurements from the images in Figure 7.

The relative brightness of craters from Table 7 were found to be (from dark to bright): Plato, Kepler, Copernicus, Tycho, Aristarchus, Proclus. As we have found in the past this varies with illumination, libration, image scale, and even color. However, we still need a large dataset of measurements in this 6-parameter space to do this study properly.

Level 3 - In Depth Analysis:

Proclus: On 2020 Nov 05 UT 00:34 Anthony Cook (ALPO/BAA/NAS) observed the crater visually under similar illumination to the following report:

On 1980 Aug 30? at UT 08:00? D. Louderback (South bend, WA, USA, 8" reflector x140) found the north wall to be very bright in red light (this is not normal as it is usually bright in blue - according to Cameron). The brightness was 9.7 (red) and 9 (blue no filter) compared to Eimmart's 8.7. Louderback thought that they observed an orange-yellow tinge. Cameron 2006 catalog ID=108 and weight=3. ALPO/BAA weight=2.

Quite clearly the day is wrong so the report will be shifted by one day to 1980 Aug 31. The weight shall remain at 2 for now.

Montes Teneriffe: On 2020 Nov 23 UAI observers: Massimo Alessandro Bianchi observed visually, and Marco Di Francesco, Valerio Fontani, Jean Marc Lechopier, Franco Taccogna, and Aldo Tonon imaged this area under the following repeat illumination request which had a selenographic colongitude range of 10.2°-12.4°:

BAA Request: please image this area as we want to compare against a sketch made in 1854 under similar illumination. However, if you want to check this area visually (or with a color camera) we would be very interested to see if you can detect some color on the illuminated peaks of this mountain range, or elsewhere in Mare Imbrium. Features to capture in any image (mosaic), apart from Montes Teneriffe, should include: Plato, Vallis Alpes, Mons Pico and Mons Piton. Any visual descriptions, sketches or images of Earthshine should be emailed to: a t c @ a b e r . a c . u k

This actually refers to the following report from Cameron's catalog:

"nr. Plato in Teneriffe Mountains 1854 Dec 27 UT 18:00-23:00 Observed by Hart & others (Glasgow, Scotland, 10" reflector) "2 luminous fiery spots on bright side on either side of a ridge, contrasting color. Seemed to be 2 active volcanoes. Ridge was normal color. Spots were yellow or flame color. Never seen before in 40 yrs. of observing." NASA catalog weight=4. NASA catalog ID #129. ALPO/BAA weight=3."

We have discussed this before in past newsletters e.g.: 2018 Jun, 2019 Feb, 2020 Aug and 2020 Dec. The problem has always been to try to match the sketches (Fig 9) from the report with modern imagery:

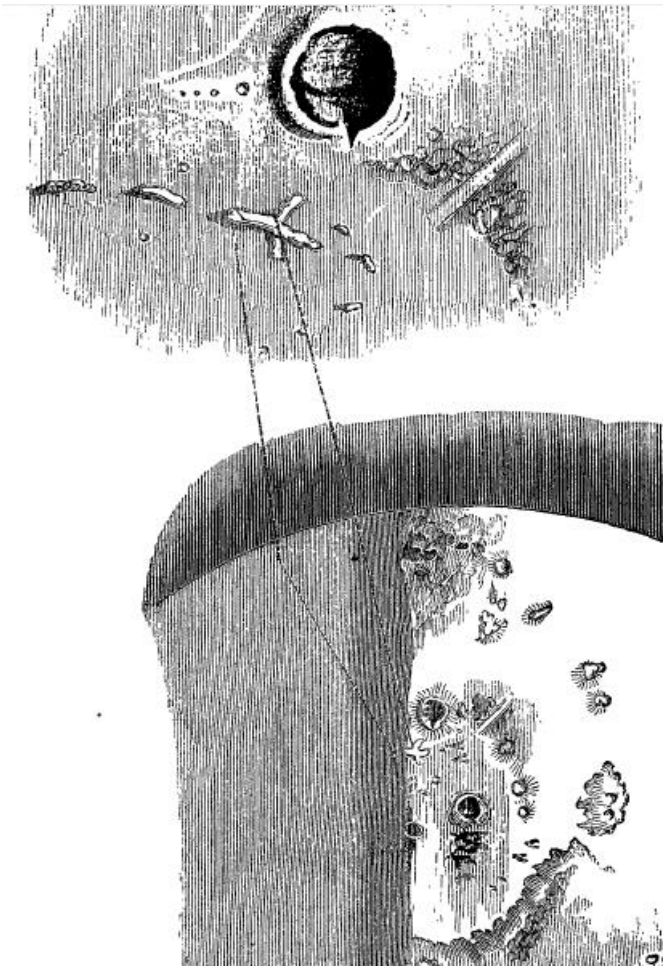


Figure 9. *A LTP report for Montes Teneriffe from the Royal Astronomical Society's Monthly Notices from 1854, Vol 15, p163. The sketch has been rotated to put north at the top,*

Three narrow camera view images were taken by UAI members and seem to show similar shadow patterns on the floor of Plato in Fig 10. Two of these images are color but show nothing unusual on the Montes Teneriffe in terms of the color described in 1854.

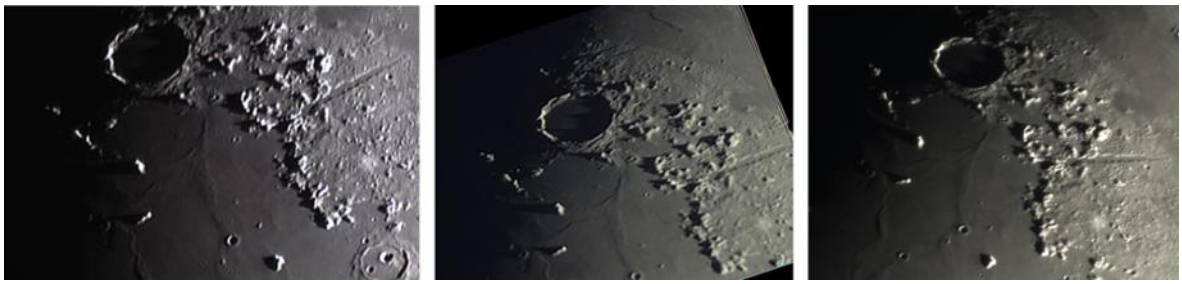


Figure 10. *Montes Teneriffe and Plato, on 2020 Nov 23 orientated approximately with north towards the top by UAI astronomers:* ***(Left)*** *A monochrome image by Marco Di Francesco taken at 16:08 UT.* ***(Center)*** *A color image taken by Aldo Tonon at 16:57 UT.* ***(Right)*** *A color image taken by Franco Taccogna at 17:27 UT.*

A wider-angle perspective by another couple of UAI astronomers, in Fig 11, lets us check the accuracy of the sketch a little further to the south. Marco's image (Fig 11 – Right) is a little outside the lunar schedule window, but is important as it confirms the shadows on the floor of Plato are too short at this time, so sets an important upper limit on the colongitude range.

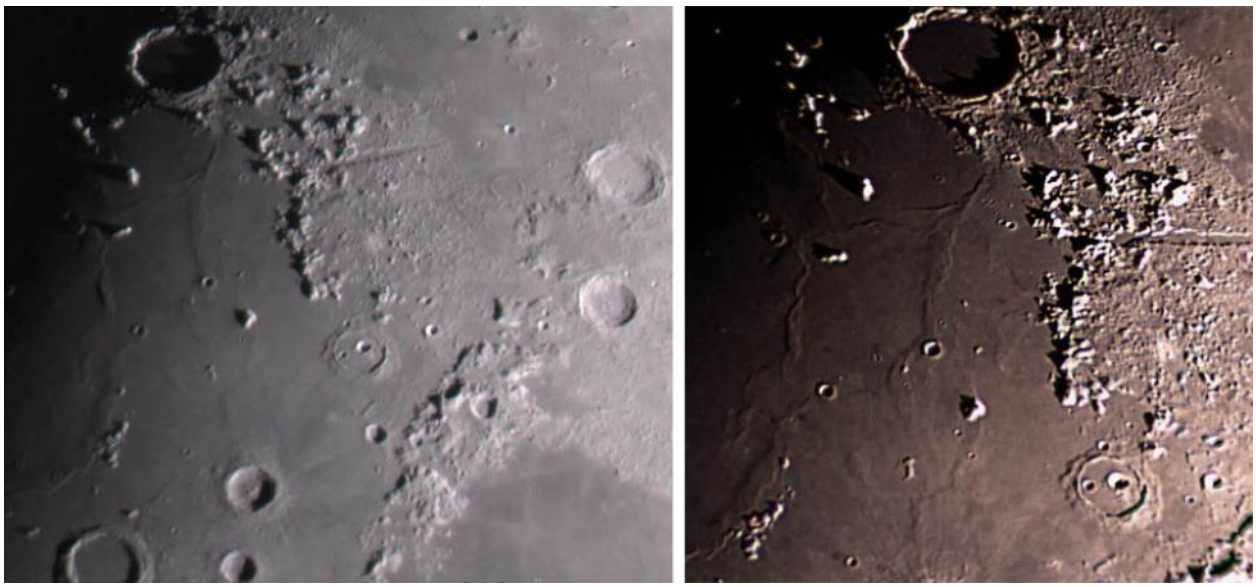


Figure 11. *Images of NE Mare Imbrium, by UAI astronomers, orientated with north towards the top, taken on 2020 Nov 23.* ***(Left)*** *A monochrome image taken by Valerio Fontani at 16:35 UT.* ***(Right)*** *A color image taken by Marco Di Francesco at 21:08.*

Massimo Alessandro Bianchi made a visual observation and was very keen to look out for chromatic aberration and colored scintillation effects on the sunlit peaks of Montes Teneriffe. He reports: *"Cloudy skies, high turbulence. On the peaks highlighted I found, with decreasing intensity indicated by the numbering (See Fig 12), a surge in the halos caused by the chromatic aberration of my instrument, more visible in its red component on the peaks 1 and 2, more balanced and diagonally along the ridge for the peak 3. The phenomenon, much more pronounced than the other features visible in the eyepiece field, was more noticeable during moments with higher turbulence, for instance after the passage of a cloud."* This is a very important observation, something that is filtered out by stacking software used on the images in Fig 10 and 11. It seems that point "3" and "2" in Fig 12 seem at least to correspond the arrowed peaks in the 1854 top sketch in Fig 9. I think I will lower the ALPO/BAA weight from 3 to 2. Quite clearly it would be very beneficial if we had more visual reports at these colongitudes to double check the appearance.

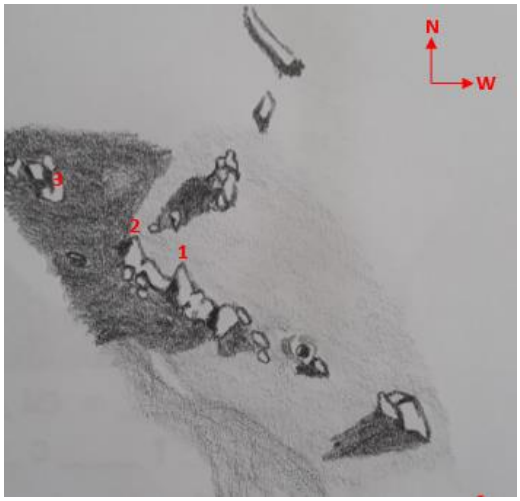


Figure 12 *A sketch made of the Montes Teneriffe by Massimo Alessandro Bianchi (UAI) on 2020 Nov 23 UT 16:36-17:40.*

Gassendi: On 2020 Nov 26 UT 19:23-20:25 Daryl Dobbs (BAA) observed this area under similar illumination to the following report:

On 1977 Oct 23 observing period: UT22:00-22:40 A.C. Cook (Frimley, Surrey, UK, 6" reflector, x144, 6mm Ortho eyepiece, seeing IV, red and blue filters used) saw at 22:10 a sector on the western floor to be mainly bright in the red. The surface was bumpy here. The observer at the time commented that this was probably not a LTP, but no precise explanation given. ALPO/BAA weight=1.

Daryl had an Antoniadi seeing of II, transparency very clear, and was using a 10" Skywatcher Dobsonian, 5mm Altair Astro eyepiece with a magnification of 240, filters #12 yellow #23a red #58 green and #80a blue. He noticed a heart shaped area on the floor of Gassendi slightly darker in tone to the rest of the floor as indicated by the shading on the sketch (Fig 13 Left). This was not very obvious without filters, but very noticeable in a red filter more so than in a blue or green or yellow. Using a blue filter, it was hardly noticeable with a view similar to the unfiltered view. The heart shaped area reached from a shadow protruding from Gassendi A to the central peaks in one direction and to the broken terrain under the western rim. Very noticeable on the western rim was a small crater with a teardrop shaped floor deep in shadow. If the heart shaped area is the one reported then Daryl thought that "it's just normal floor tone enhanced by using a red filter". Re-reading my own report 1977 I was pretty sure that the effect was not a LTP, so not sure why it made it into the LTP list, though the altitude was quite respectable at 37° above the local horizon. I think I will lower the weight to 0 but put it into the Lunar Schedule web site as I am curious to see if the color can be imaged or seen visually again.

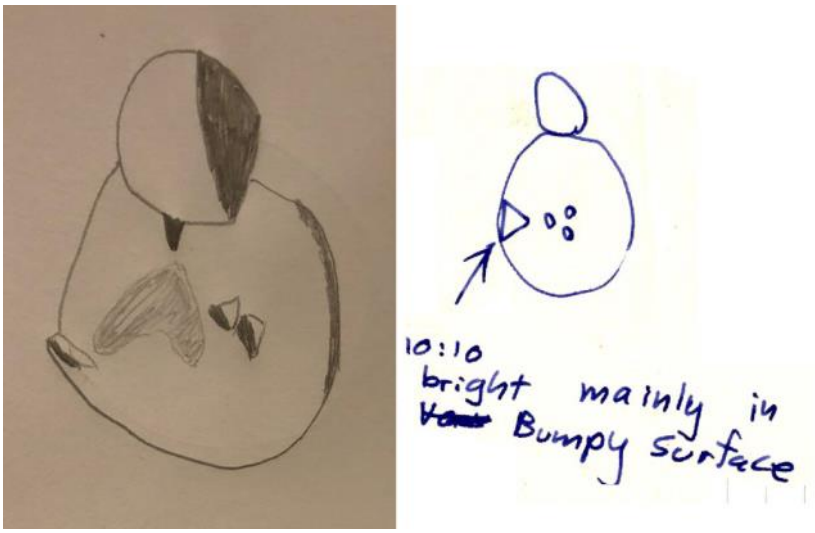
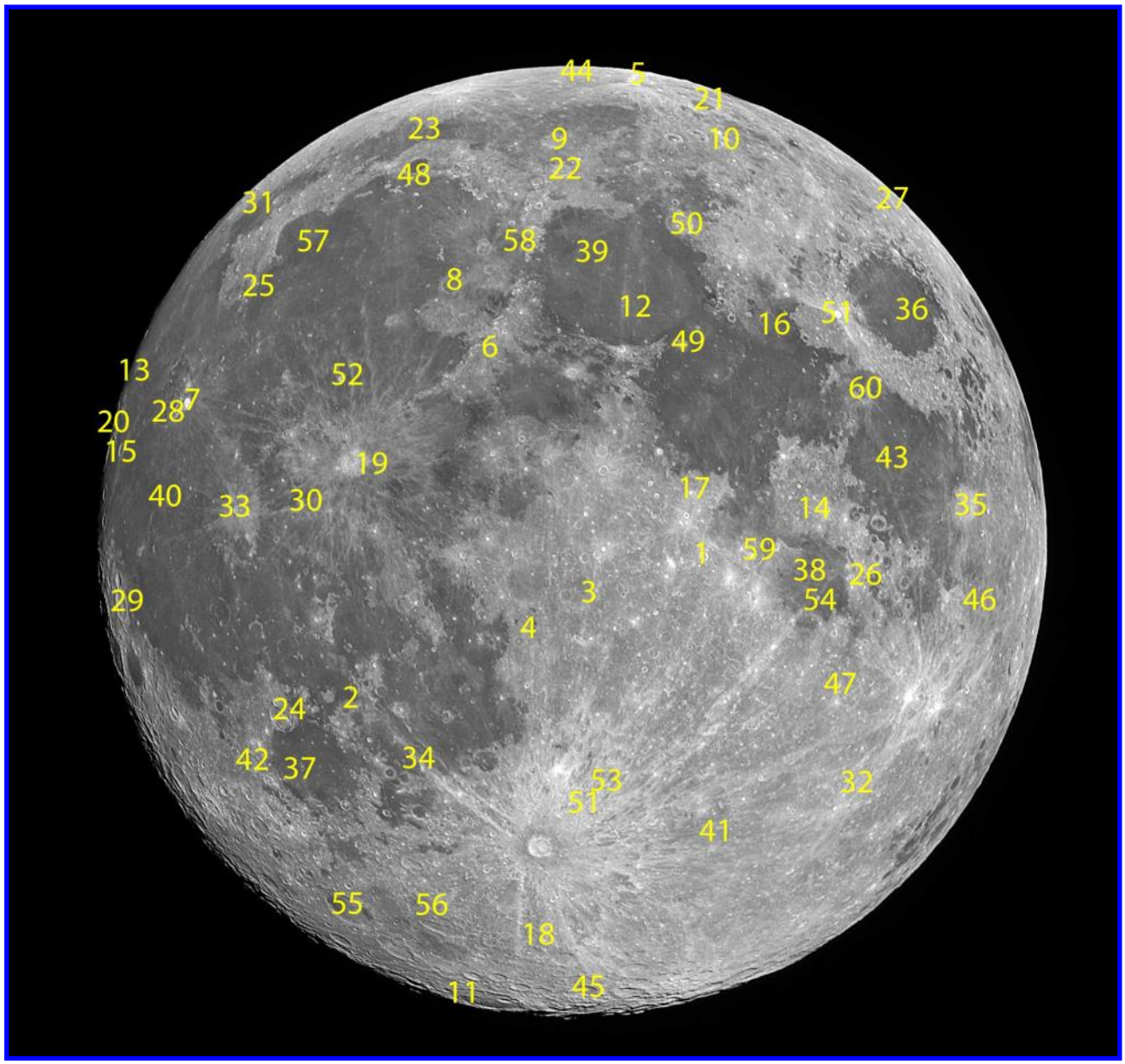


Figure 13. *Gassendi orientated with north towards the top.* ***(Left)*** *A sketch by Daryl Dobbs from 2020 Nov 26 UT 19:23-20:25.* ***(Right)*** *A sketch by Anthony Cook from 1977 Oct 23 UT 22:10.*

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 .

Dr Anthony Cook, Department of Physics, Aberystwyth University, Penglais, Aberystwyth, Ceredigion, SY23 3BZ, WALES, UNITED KINGDOM. Email: atc @ aber.ac.uk

Key to Images In This Issue



1. Abulfeda
2. Agatharchides
3. Albategnius
4. Alphonsus
5. Anaxagoras
6. Apenninus
7. Aristarchus
8. Aristillus
9. Aristoteles
10. Atlas
11. Bailly
12. Bessel
13. Briggs
14. Capella
15. Cardanus
16. Cauchy
17. Cayley
18. Clavius
19. Copernicus
20. Eddington
21. Endymion
22. Eudoxus
23. Fontenelle
24. Gassendi
25. Gruithuisen
26. Gutenberg
27. Hayn
28. Herodotus
29. Hevelius
30. Hortensius
31. J. Herschel
32. Janssen
33. Kepler
34. Kies
35. Langrenus
36. Mare Crisium
37. Mare Humorum
38. Mare Nectaris
39. Mare Serenitatis
40. Marius
41. Maurolycus
42. Mersenius
43. Messier
44. Meton
45. Moretus
46. Petavius
47. Piccolomini
48. Plato
49. Plinius
50. Posidonius
51. Proclus
52. Pytheas
53. Regiomontanus
54. Rosse
55. Schickard
56. Schiller
57. Sinus Iridum
58. Theaetetus
59. Theophilus
60. Taruntius
61. Walter