# The Lunar Observer

**A Publication of the Lunar Section of ALPO**

David Teske, editor

Coordinator, Lunar Topographic Studies Section Program


# July 2024

## In This Issue



Online readers, click on images for hyperlinks

# Lunar Reflections

A warm greeting to all readers. Hoping that this issue of *The Lunar Observer* finds you doing well. I think you are in possession of a great issue of *The Lunar Observer* thanks ti the many interesting articles, drawings and images included here. It has been interesting corresponding with observers from all over the world. Of note, most everyone has been complaining of their local weather with clouds, rain, dust from the Sahara, etc. For me, I have some clear nights but it is so muggy it feels like a steam room outside. But we all persevere! Thanks much to all who contributed!

As mentioned, we have a very nice issue here. On the pages ahead, you will find lunar topographic articles by Robert Reeves, Rik Hill, Paul Walker, Jon Bosley, Scott Smith and Alberto Anunziato. Alberto takes us on a very interesting tour of Mare Nectaris in this month's Focus-On article. Tony Cook leads us on a tour of both Lunar Geologic Change an Buried Basins and Craters. This issue would not be possible without all of these contributors.

Please try to "attend" the ALPO conference July 26-27, 2024 (see page 6). It will be virtual, so all can attend.

This past month, cloudynights.com has put the current edition of the ALPO *The Lunar Observer* on its home page! This has generated more views (899 views of the June TLO) of TLO and hopefully more interest in the newsletter and in ALPO.

Please remember to follow the future Focus-On topics and gather observations of these features. Next up is the very interesting Aristoteles and Eudoxus. Observations are due to Alberto and myself by August 20, 2024.

Clear skies,
-David Teske

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

# Lunar Topographic Studies

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**Website: http://www.alpo-astronomy.org/**

## Observations Received

| Name | Location and Organization | Image/Article |
|---|---|---|
| Esteban Andrada | Mar del Plata, Argentina | Image of Theophilus. |
| Alberto Anunziato | Paraná, Argentina | Drawing of Rupes Altai, images of Theophilus, articles and drawings *Dorsum Heim: A Wrinkle Ridge with Numerous Crests, Dorsum Higazy: A Wrinkle Ridge with a Broad Arch* and *Focus-On: Mare Nectaris: A Small Basin Full of Wonders.* |
| Sergio Babino | Montevideo, Uruguay | Images of Fracastorius, Theophilus, Bohnenberger, Santbech and Colombo. |
| Jon Bosley | White Dwarf Observatory, Central Texas, USA | Article and Image *INA, Irregular Mare Patch (IMP).* |
| Don Capone | Waxahachie, Texas, USA | Images of Aristarchus, Plato, Lacus Mortis, Posidonius, Fracastorius, Janssen and Straight Wall. |
| Ariel Cappelletti | Córdoba, Argentina, SLA | Image of Theophilus. |
| Francisco Alsina Cardinalli | Oro Verde, Argentina SLA-LIADA | Images of Rheita E, Theophilus (4), Mädler (3), Fracastorius and Maskelyne |
| Maurice Collins | Palmerston North, New Zealand | Images of the 6.7 day-old Moon (2), 8.8 day-old Moon, 11.7 day-old Moon, 13.8 day-old Moon, 14.8 day-old Moon, , Archimedes, Rupes Recta, Plato and Eratosthenes. |
| Massimo Dionisi | Sassari, Italy | Images of Kane, Eudoxus, Mare Serenitatis South, Aristoteles, Arago, Meton and Rima Hypatia. |
| Avril Elias | Oro Verde, Argentina | Images of Proclus and Eudoxus. |
| Walter Ricardo Elias | Oro Verde, Argentina | Images of Capella, Cyrillus G (3), Posidonius (2), Mare Crisium, Menelaus (3), Rheita E (2), Theophilus, Lindenau (2), Proclus and Eudoxus. |
| Diego Ferradans | Villa Maria, Argentina | Image of Theophilus. |
| Howard Fink | New York, New York, USA | Model of Mare Nectaris. |
| István Zoltán Földvári | Budapest, Hungary | Image of Rima Oppolzer, Rima Réaumur and Aristoteles. |
| Marina Grandolio | Oro Verde, Argentina | Images of Proclus and Eudoxus. |
| Jeff Grainger | Cumbria, United Kingdom | Image of Gruithuisen. |

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

# Lunar Topographic Studies

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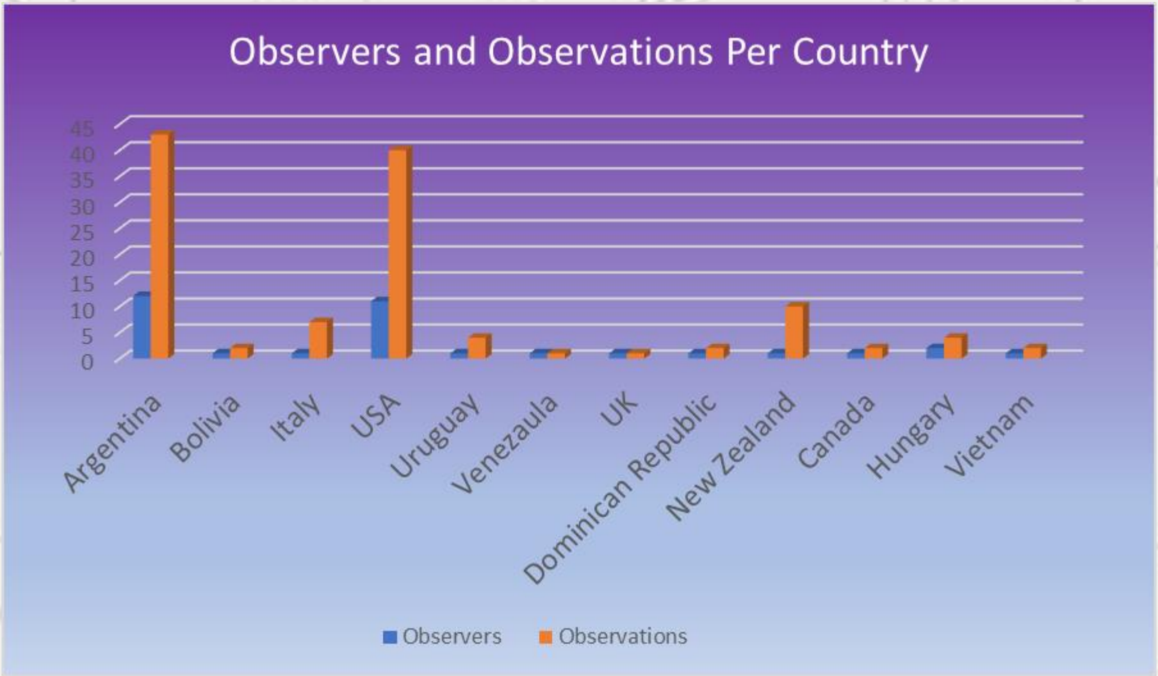
## Observations Received

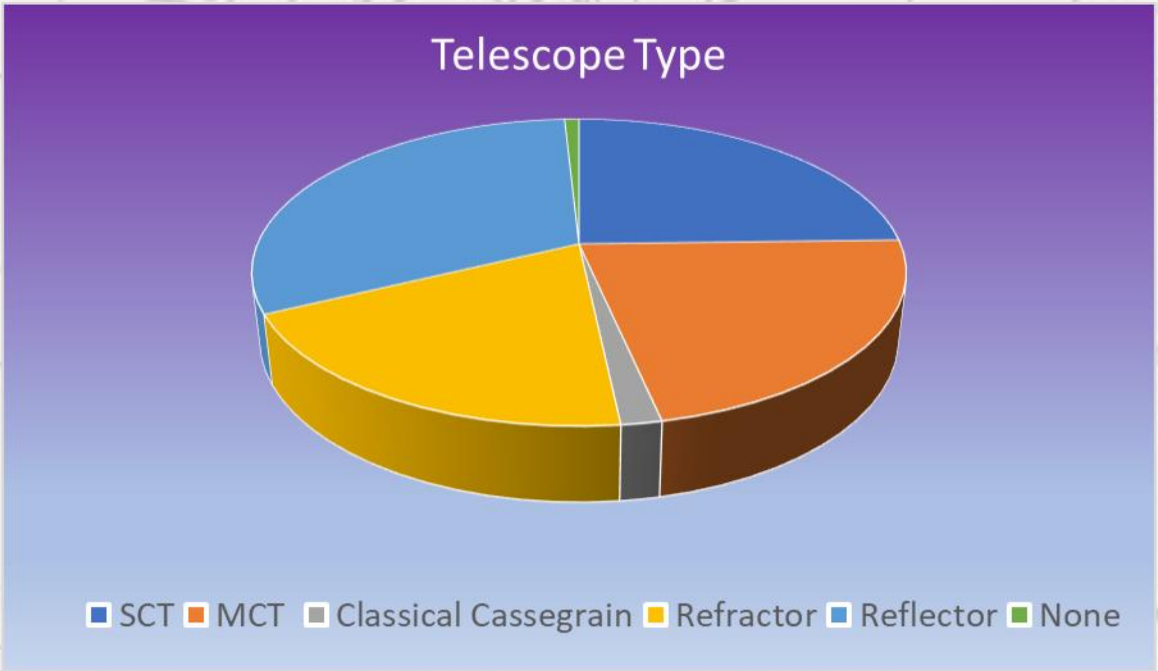
| Name | Location and Organization | Image/Article |
|---|---|---|
| Marcelo Mojica Gundlach | Cochabamba, Bolivia | Images of Mare Nectaris (2). |
| Rik Hill | Loudon Observatory, Tucson, Arizona, USA | Article and image *Taurus-Littrow*, images of Mare Nectaris (11). |
| Eduardo Horacek | Mar del Plata, Argentina | Image of Theophilus. |
| Mike Karakas | Winnipeg, Manitoba, Canada | Images of Mare Nectaris (2). |
| Felix León | Santo Domingo, República Dominicana | Images of Rupes Altai and Theophilus. |
| Attila Ete Molnar | Budapest, Hungary | Images of Janssen and Neander. |
| Micheal P. Owen | St. Augustine, Florida, USA | Image of Gruithuisen. |
| Jesús Piñeiro | San Antonio de los Altos, Venezuela | Image of Mare Nectaris. |
| Raúl Roberto Podestá | Formosa, Argentina | Image of Mare Nectaris and Theophilus. |
| Robert Reeves | San Antonia, Texas, USA | Articles and images *For Want of a Name*. |
| Greg Shanos | Sarasota, Florida, USA | Image of the 1-day old Moon, Luna X and Mare Nectaris. |
| Stan Sienkiewicz | Philadelphia, Pennsylvania, USA | Image of the Lunar X and the Waxing Gibbous Moon. |
| Steve E. Smith | Nashville, Tennessee, USA | Article *A Quick Study of Gruithuisen Region (South of Mons Delta).* |
| Fernando Surá | San Nicolás de los Arroyos, Argentina | Image of Mare Nectaris. |
| Michael E. Sweetman | Sky Crest Observatory, Tucson, Arizona, USA | Images of Hipparchus and Rima Hyginus. |
| David Teske | Louisville, Mississippi, USA | Images of Mare Nectaris (4) and Theophilus (2). |
| Ngô Trần Tiến | Ho Chi Mihn City, Vietnam | Image of Mare Nectaris and Fracastorius. |
| Randy Trank | Rockford, Illinois, USA | Image of Mare Nectaris. |
| Gonzalo Vega | Oro Verde, Argentina | Images of Aristarchus, Schickard and the Wax-ing Gibbous Moon. |
| Paul Walker | Middlebury, Vermont, USA | Article and image *The Chaotic Western Shore of Mare Nectaris as Revealed By Grazing Sun-light.* |

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

# July 2024 *The Lunar Observer*
# By the Numbers

**This month there were 116 observations by 34 contributors in 12 countries.**



# ALPO 2024 Conference: Call for Papers


## Tim Robertson & Ken Poshedly,
## ALPO Conference coordinators


***Overview***
Due to the success of attracting more and more viewers and participants to our online conferences, the 2024 Conference of the ALPO will once more be held online, this time on Friday and Saturday, July 26 and 27.
The ALPO conference times will be:

- Friday from 1 p.m. to 5 p.m. Eastern Time (10 a.m. to 2 p.m. Pacific Time)
- Saturday from 1 p.m. to 6 p.m. Eastern Time (10 a.m. to 3 p.m. Pacific Time).
- The ALPO Conference is free and open to all via two different streaming methods:
- The free online conferencing software application, Zoom.
- On the ALPO YouTube channel at *https://www.youtube.com/channel/UCEmixiL-d5k2Fx27Ijfk41A*

Those who plan to present papers or presentations must (1) be members of the ALPO, (2) use Zoom, and (3) have it already installed on their computer prior to the conference dates. Zoom is free and available at *https://zoom.us/*
Those who have not yet joined the ALPO may do so online. Digital ALPO memberships start at only $22 a year. To join online, go to *http://www.astroleague.org/store/index.phpmain_page=product_info&cPath=10&products_id=39*, then scroll to the bottom of that page, select your membership type, click on "Add to Cart" and proceed from there.
There will be different Zoom meeting hyperlinks to access the conference each of the two days of the conference. Both links will be posted on social media and e-mailed to those who wish to receive it that way on Thursday, July 27.
The Zoom virtual (online) "meeting room" will open 15 minutes prior to the beginning of each day's activities.
Those individuals wishing to attend via Zoom should contact Tim Robertson at *cometman@cometman.net* as soon as possible.

***Conference Agenda***
The conference will consist of initial welcoming remarks and general announcements at the beginning each day, followed by papers and research findings on astronomy-related topics presented by ALPO members.
Following a break after the last astronomy talk on Saturday will be presentation of the Walter Haas Observing Award. A Peggy Haas Service Award may also be awarded.
A keynote speaker will then follow the awards presentations on Saturday. The selection of a keynote speaker is in progress and the final decision will be announced in the summer issue of this Journal (JALPO66-3).

***Presentation Guidelines***
All presentations should be no more than 15 minutes in length; the preferred method is 12 minutes for the presentation itself plus 3 minutes for follow-up questions. The preferred format is Microsoft PowerPoint.
Send all PowerPoint files of the presentations to Tim Robertson at *cometman@cometman.net* .

***Suggested Topics***
Participants are encouraged to present research papers and experience reports concerning various aspects of Earth-based observational astronomy including the following.

- New or ongoing observing programs and studies, specifically, how those programs were designed, implemented and continue to function.
- Results of personal or group studies of solar system or extra-solar system bodies.
- New or ongoing activities involving astronomical instrumentation, construction or improvement.
- Challenges faced by Earth-based observers such as changing interest levels, deteriorating observing conditions brought about by possible global warming, etc.

Information about paper presentations, the keynote speaker and other conference data will be published in this Journal and online as details are learned.

# Lunar X Predictions for 2024

## 40°N-75°W, Eastern Time Zone

| Date, 2024 | 358° Colongitude | Altitude/Azimuth | Cloudy Nights |
|---|---|---|---|
| **January 18** | 5:15 am | –37° / 345° | 4:05 am |
| **February 16** | 7:40 pm | +66° / 236° | 6:49 pm |
| **March 17** | 10:22 am | –11° / 38° | 10:10 am |
| **April 15** | 11:08 pm | +43° / 268° | 11:41 pm |
| **May 15** | 11:01 am | –16° / 53° | 12:13 pm |
| **June 13** | 10:15 pm | +34° / 244° | 11:49 pm |
| **July 13** | 9:11 am | –43° / 58° | 10:48 am |
| **August 11** | 8:15 pm | +24° / 212° | 9:31 pm |
| **September 10** | 7:49 am | –65° / 65° | 8:29 am |
| **October 9** | 8:12 pm | +16° / 206° | 8:09 pm |
| **November 8** | 8:33 am | –49° / 79° | 7:49 am |
| **December 7** | 10:43 pm | +4° / 253° | 9:36 pm |

**Note**: The Lunar X is not an instantaneous phenomenon; rather, it appears and evolves over several hours, so the times above are fundamentally approximate and serve only as a guide. The ardent observer should look a little early to catch the initial visible illumination. A less-dramatic Lunar X against a fully illuminated background can still be seen at least several days later. Because of the Moon's nominal 29.5-day synodic period (phase-to-phase), favorable dates for a given location tend to occur on alternate months (unfavorable dates for 40°N-75°W are shaded gray in this table). The 358° colongitude value for the terminator reaching the Lunar X and making it visible (see this RASC paper) and the corresponding lunar altitude/azimuth for 40°N-75°W were determined with WinJUPOS, which is freeware linked from the WinJUPOS download page.

The Cloudy Nights comparative data, derived by a different method, was presented in this post.

Daylight Saving Time for 2024 begins on March 10 and ends on November 3. The listed times are EST/EDT as appropriate for the date.

Submitted by Greg Shanos.

# Lunar X Predictions for 2024-2028

5 Year Lunar "X" and "V" Schedule * **

| | 2024 | 2025 | 2026 | 2027 | 2028 |
|---|---|---|---|---|---|
| Jan | 18: 0830 | 6: 1645 | 25: 1630 | 15: 0015 | 4: 0830 |
| Feb | 16: 2345 | 5: 0800 | 24: 0730 | 13: 1530 | 3: 0015 |
| Mar | 17: 1400 | 6: 2300 | 25: 2145 | 15: 0600 | 3: 1500 |
| Apr | 16: 0300 | 5: 1300 | 24: 1100 | 13: 1930 | 2: 0430 |
| | | | | | 1: 1700 |
| May | 15: 1600 | 5: 0130 | 23: 2245 | 13: 0730 | 31: 0400 |
| Jun | 14: 0400 | 3: 1330 | 22: 0945 | 11: 1830 | 29: 1430 |
| Jul | 13: 1430 | 3: 0015 | 21: 2000 | 11: 0500 | 29: 0030 |
| | | 1: 1100 | | | |
| Aug | 12: 0130 | 30: 2130 | 20: 0630 | 9: 1530 | 27: 1100 |
| Sep | 10: 1230 | 29: 0900 | 18: 1730 | 8: 0200 | 25: 2245 |
| Oct | 10: 0015 | 28: 2115 | 18: 0530 | 7: 1400 | 25: 1130 |
| Nov | 8: 1245 | 27: 1045 | 16: 1900 | 6: 0300 | 24: 0145 |
| Dec | 8: 0230 | 27: 0115 | 16: 0930 | 5: 1730 | 23: 1645 |

* All times are listed as the day of the month and then the hour in **UT**

** All times are approximations based on LTVT calculations. They are accurate to ± 1 hour.

Submitted by Greg Shanos.

# Photographic Atlas of the Moon: A Comprehensive Guide for the Amateur Astronomer, Robert Reeves, Hardcover – September 1, 2024

Written by a dedicated selenophile (a person who loves the Moon), this guide to Earth's celestial companion is a non-technical narrative that quickly elevates the lunar novice to lunar authority.

Photographic Atlas of the Moon explains how the Earth and the Moon are locked together in a co-dependent embrace, each affecting the other in ways that impact our lives. The reader will learn in comprehensible, jargon-free language about the Moon we see, its orbit, its creation and the differing geologic details of the Moon, some of which can be seen with the naked eye. All the photographs in this lavishly illustrated book were taken by the author, an internationally recognized authority on celestial photography. Reeves has perfected image processing techniques that allow the amateur astronomer, using modest equipment, to exceed the quality of Earth-based professional lunar photographs taken during the Apollo era.

Although Reeves is an accomplished deep-sky photographer, his current passion is re-popularizing the Moon within the amateur astronomy community. Momentum is building for a manned return to the Moon to continue the exploration started over half a century ago. Photographic Atlas of the Moon will provide even the most novice reader with an understanding of the Moon and its allure so they can appreciate the upcoming explorations by NASA's Artemis lunar program.

*https://www.amazon.com/Photographic-Atlas-Moon-Comprehensive-Astronomer/dp/022810498X/ref=rvi_d_sccl_1/136-6077595-9611424?pd_rd_w=NTjEa&content-id=amzn1.sym.f5690a4d-f2bb-45d9-9d1b-736fee412437&pf_rd_p=f5690a4d-f2bb-45d9-9d1b-736fee412437&pf_rd_r=7XZ4992GTVJKS0K7P4F5&pd_rd_wg=WEmPb&pd_rd_r=310acd54-2b8b-4d1c-a84a-abe0a3d2034f&pd_rd_i=022810498X&psc=1*

I received this email recently that is of interest to all of us lunar observers.  Enjoy!

This is a field guide.  Spiral bound with pages that will stand up to dew so you can use use it at the eyepiece. Think of it as a compendium to the Exploring the Moon with Robert Reeves.

I am lucky enough to be able to proof read the 1st 75 pages or so.

Expected publication is September 1st and is 288 pages.  It is called a hard cover book and is $49.95 available exclusively on Amazon at this time.  I believe it is print on demand as a hard cover.

Photographic Atlas of the Moon: A Comprehensive Guide for the Amateur Astronomer https://a.co/d/4sUnjW3

I am not receiving any remuneration for reviewing the 1st 75 pages nor for personally recommending this publication to other ALPO members

Thank you,
John Sillasen
ALPO Member

# For Want of a Name

Robert Reeves

Experienced lunar observers note there are many significant craters and mare regions on the Moon that lack a name. After centuries of observation, such omissions seem strange, yet the lunar map does contain gaps. Most obvious, are some bay-like extensions from larger named maria. The face of the Moon has many named bays, known as sinus in the Latin naming convention common to the Moon. However, three substantial bays remain nameless. How did the Moon gain its names and why are these three bays still nameless?

Although Luna has been admired, revered, and even worshiped by civilizations over the past millennia, it is only in the past four centuries that names have been applied to lunar features. Before his death in 1603, William Gilbert, an English scientist and personal physician to Queen Elizabeth I, created the first naked eye chart of the Moon upon which he named large regions. After the telescope was applied to astronomy, the Dutchman Michael van Langren and the Polish brewmaster Johannes Hewelke produced detailed chats of the Moon with hundreds of named features. However, it was the lunar charts produced by the Italian Jesuits Giovanni Riccioli and Francesco Grimaldi in 1651 that has stood the test of time. All but a few of the features named by van Langren and Hewelke have been banished from the lunar map in favor of the 210 names designated by the Italian Jesuits.

One hundred and fifty years after Riccioli and Grimaldi, a revival in lunar cartography saw Johannes Schröter add 60 more names, followed by Beer and Madler adding another 145. Additional names continued to be added over the next century by observers such as Julius Schmidt, Johann Krieger, Edmond Nevill, (aka Neison), Julius Franz, and others. By the early 20$^{th}$ century, the lunar chart was a confused collection of names from various origins and lunar maps across the ages did not match. In 1913, Mary Blagg and Dr. Karl Muller undertook the talk of sorting out the confusing overlap from several centuries of independent lunar maps and created a consolidated list of 672 named features. In 1932, these were approved by the International Astronomical Union.

So, why are there map gaps with no names? The IAU emplaced a series of rules pertaining to the naming of celestial objects, and the rules continue to be modified to this day as we reach deeper into the cosmos and encounter new and different features on other worlds. Pertaining to the Moon, the rules are specific in that a crater cannot be named after a political, military, or religious figure unless they were from prior to the 19$^{th}$ century. Other people to be immortalized with a named lunar crater must be of high and enduring international standing and have been deceased for at least three years. Other regions on the Moon must have special scientific interest in where the naming of the feature is useful to the scientific and cartographic community.

Even within the scope of the IAU rules for naming lunar features, it is strange that after 350 years of telescopic scrutiny and over half a century of space age explorations of the entire lunar globe, there are still blank spots on the lunar map. My own lunar efforts center of popularizing and explaining the Moon to a lay audience. It falls to other academics to study the Moon and divine new knowledge of our natural satellite. Thus, I modestly propose three names for consideration if any of these regions on the Moon require a future name for scientific reasons.

Sinus Apollon: The Bay of Apollo, the 40,000 square kilometer bay extending south from Mare Fecunditatis, the bay entrance bordered on the north by Vendelinus and Columbo craters, so named to honor the monumental scientific and engineering effort of the Apollo lunar landings

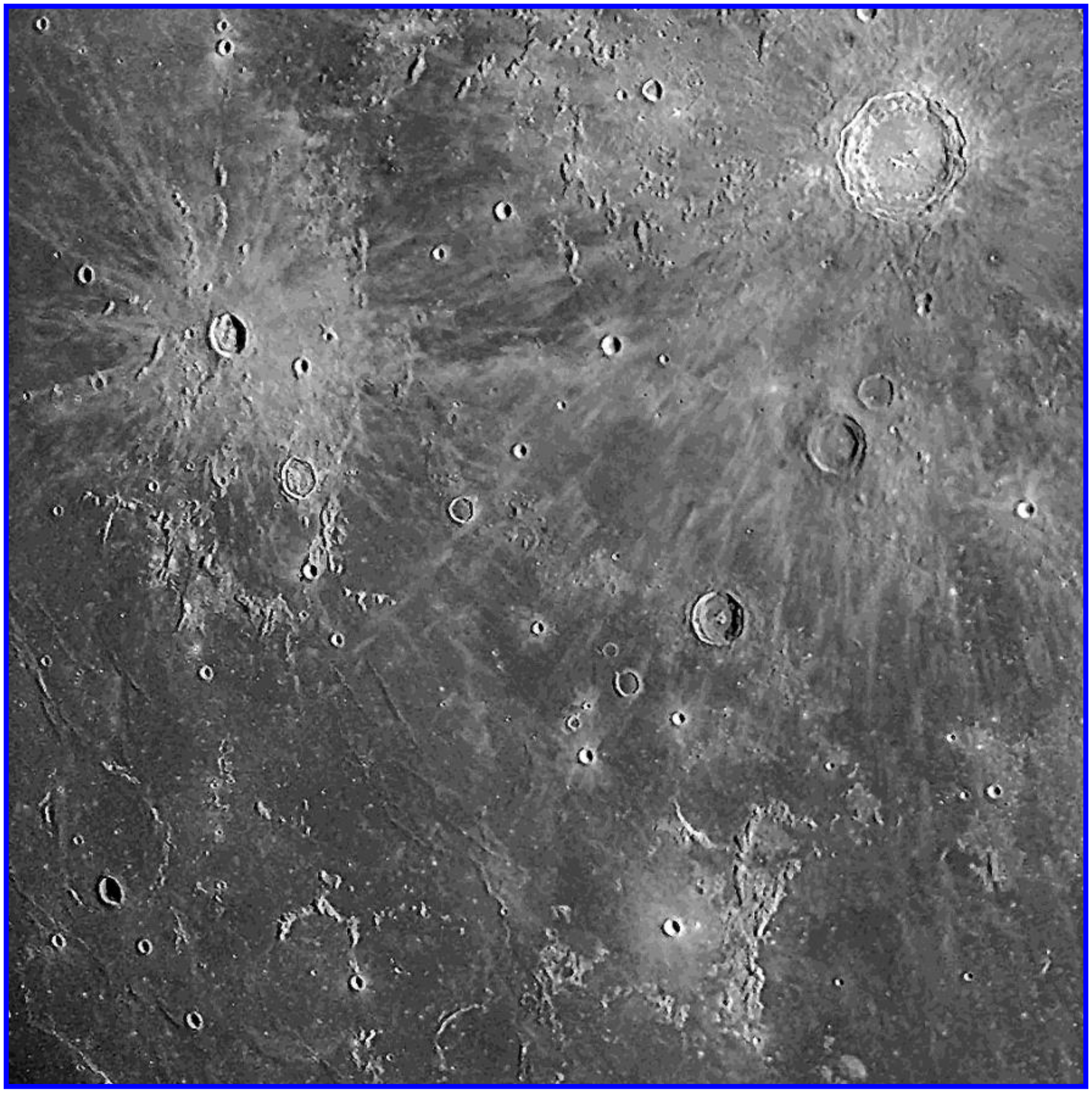
**Sinus Apollon**
The southern extension of Mare Fecunditatis between Langrenus crater and the butterfly ray structure of Petavius B presents a bay-like structure begging a separate name, perhaps Sinus Apollon, the Bay of Apollo, to honor the mid-1960s Apollo manned landings. *Robert Reeves.*

*Sinus Mysterium*: The Bay of Mystery, the 40,000 square kilometer tongue of basalt extending from northeast Mare Nubium, the bay entrance bordered by Davy and Guericke craters, so named because the Moon is a mysterious world.

**Sinus Mystrium**
The tongue of basalt flowing north between Davy and Guericke craters from northeastern Mare Nubium remains nameless. Sinus Mysterium, the Bay of Mystery, would carry on the theme of a mysterious and unknown world. *Robert Reeves.*

Lunar Topographic Studies
For Want of a Name

Sinus Refugium: The Bay of Refuge, another approximately 40,000 square kilometer region currently part of Oceanus Procellarum, but after the creation of Mare Cognitum in 1964 and Mare Insularum in 1976, this region becomes an isolated extension of Procellarum bordered by Encke and Lansberg craters as it pushes northeast toward Mare Insularum. So named because the bay provides refuge from the implied turmoil of the Ocean of Storms.

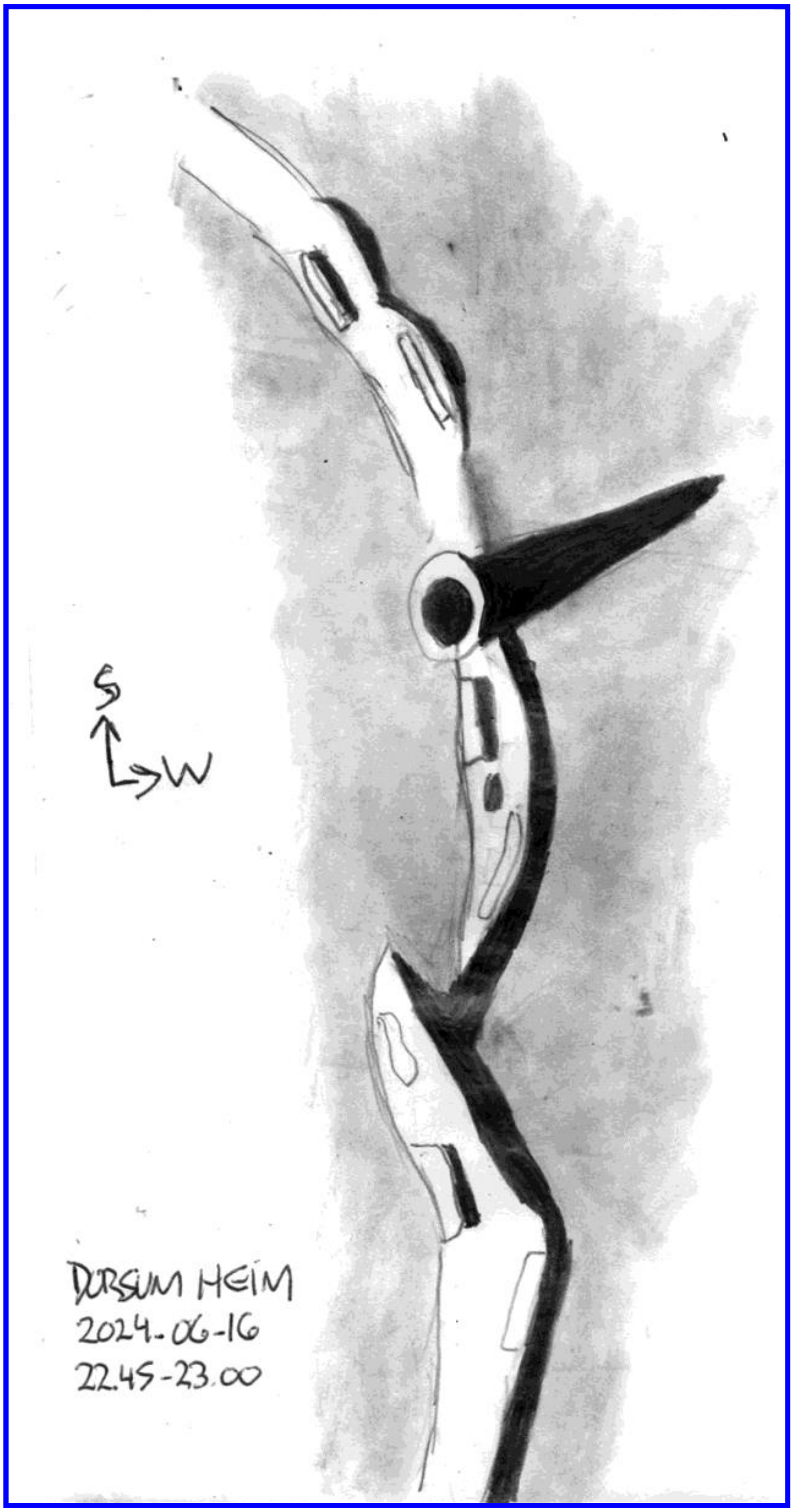


**Sinus Refugium**

After Mare Insularum and Mare Cognitum were partitioned from Oceanus Procellarum, the southeastern reach of Procellarum became an isolated field of basalt extending northeast from the ghost craters Flamsteed P and Wichmann R. The basalt patch between Encke and Lansberg craters can become Sinus Refugium, the Bay of Refuge, offering shelter from the turmoil of the Ocean of Storms. *Robert Reeves*

# Dorsum Heim: A Wrinkle Ridge with Numerous Crests

Alberto Anunziato




Dorsum Heim is located in Mare Imbrium, northwest of Sinus Iridum and is concentric to the center of this basin. It crosses the C. Herschel crater (13 km in diameter), although we should rather say that this crater was formed in the center of Dorsum Heim, since it would be an impact made after the formation of the dorsum.

What caught my attention on the night's observation was the incredibly sharp and complex topography of this not-so-known wrinkle ridge. As we can see in IMAGE 1, the steep and narrow upper structural components, called crests, were detectable, even with a small telescope (the lower, wide and low-elevated component, called the arch, is the most visible element of the wrinkle ridges).

***Image 1, Dorsum Heim,*** *Alberto Anunziato, 2026 June 16 22:45-23:00 UT. Meade EX105 Maksutov-Cassegrain telescope, 154 x.*

IMAGE 1 is a poor record of the image I witnessed behind the eyepiece, which is why I turned to Kwok Pau's Photographic Lunar Atlas for Moon Observers so that readers can enjoy a spectacle similar to the one I witnessed. IMAGE 2 is an image extracted from a larger photograph included on page 248 of Volume 2. From north to south, we could divide the dorsum that we see into 3 segments. The first segment in IMAGE 1 appears to run west and then east, but in IMAGE 2 it looks straighter (the dorsum segments always look telescopically more sinuous than they truly are).

Lunar Topographic Studies
Dorsum Heim: A Wrinkle Ridge with Numerous Crests

The crests in IMAGE 2 appear first on the east edge (arrow 1) and then on the west edge, approximately in the center of the arch two crests appear to touch (or to branch), for a short space there are crests, one on each edge (arrow 2), and then there are only crests on the eastern edge until the junction with the second segment, which rather appears to be a continuation of the western edge of the first segment (arrow 3). Of this series of crests, the most visible are those that appear in IMAGE 1 (which we mark with arrows 2, 3 and 4 in IMAGE 2), which in IMAGE 2 appear as areas of more intense brightness. The central crest of the first segment in IMAGE 1 casts an internal shadow on the arch (seen in IMAGE 2, arrow 3). In the second segment the drawing of the crests simpler, first on the west edge (arrow 5) and then on the east (arrow 6), in the center of both you can see a dark area (which was visually perceived as a shadow of deep relief), which corresponds to the transition zone between the crests that run along the west and east edge. The third segment, south of C. Herschel crater, begins with very low relief and then becomes more pronounced again, the crest migrates from west (arrow 7) to east (arrow 8), even casting shadow inward. As we have argued on other occasions, topographically the dorsa are more complex than their graphic representation is usually in studies, even those based on images from probes in lunar orbit, a new, more detailed topography is required for our observations.

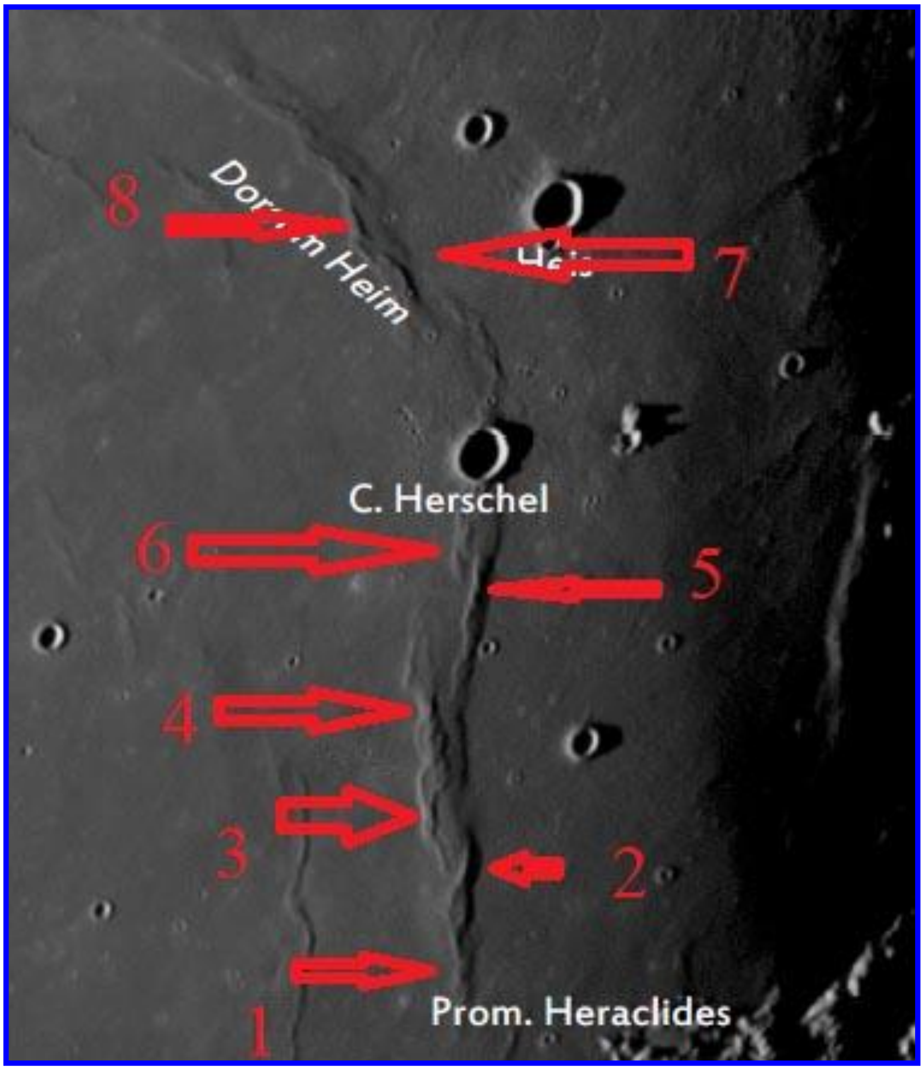


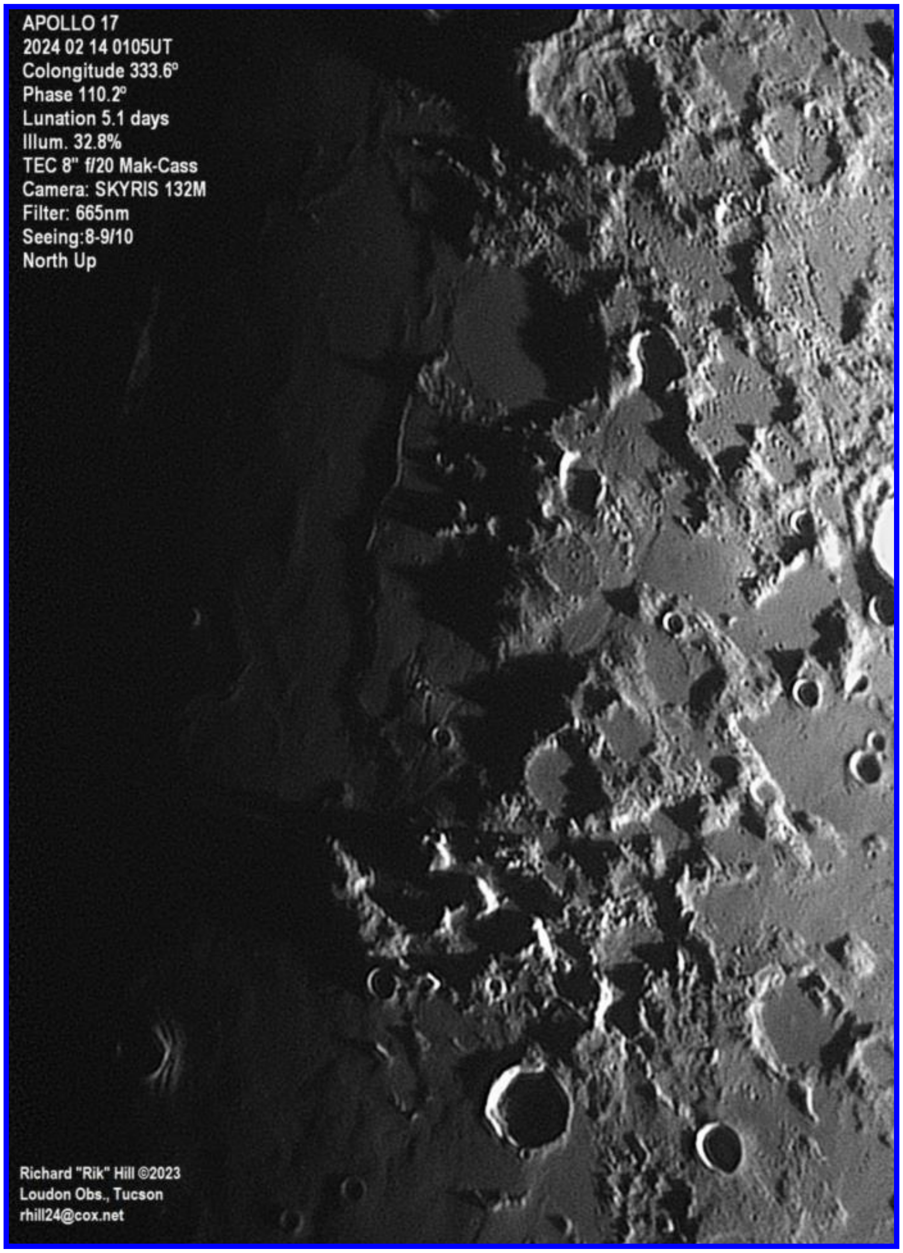

***Image 2 Dorsum Heim*** *from Kwok Pau's Photographic Lunar Atlas for Moon Observers , page 248 Volume 2. North is down, west is to the right.*

# Taurus-Littrow

Rik Hill

Apollo 17 and the Taurus-Littrow base, was the 11th and last Apollo mission, the last time man stepped on the moon. But it is one of the easiest bases to find on the Moon. It's south of Le Monnier (dia. 68 km), the Iridum-like cirque found on the east shore of Mare Serenitatis. You can see Le Monnier near the top of this image almost half in shadow. The low sun in this image allows you to see some of the great rimae east (right) of Le Monnier, with Rimae Chacornac, passing right through its namesake crater Chacornac above Le Monnier. This lighting also gives us a spectacular view of the dorsum running south from the southern cusp of Le Monnier leading all the way down to a patchwork of rimae and the small crater Clerke (6 km). The rimae are Rimae Littrow with the crater Littrow (28 km) seen just east of Clerke with beautiful shadows on its floor.

Just below Littrow and Clerke you can see a diagonal row of four brightly illuminated peaks. In the region just to the east (right) of the second peak down is the site of Apollo 17's Taurus-Littrow base. Even in an image like this one, taken with an 8" telescope, features named by the astronauts can be seen. The peak itself is called South Massif and just below it to the right you can see a small dot which is Bear Mountain on the south side of Taurus-Littrow valley. Across the valley from South Massif, you can see a bright double peak of Rondone Massif and above it a little fainter is North Massif. When the sun gets a little, just a little, higher you can see more features named by the astronauts. You can look these all up on the LROC QuickMap which is on line and should be bookmarked in the browser of every lunar observer.



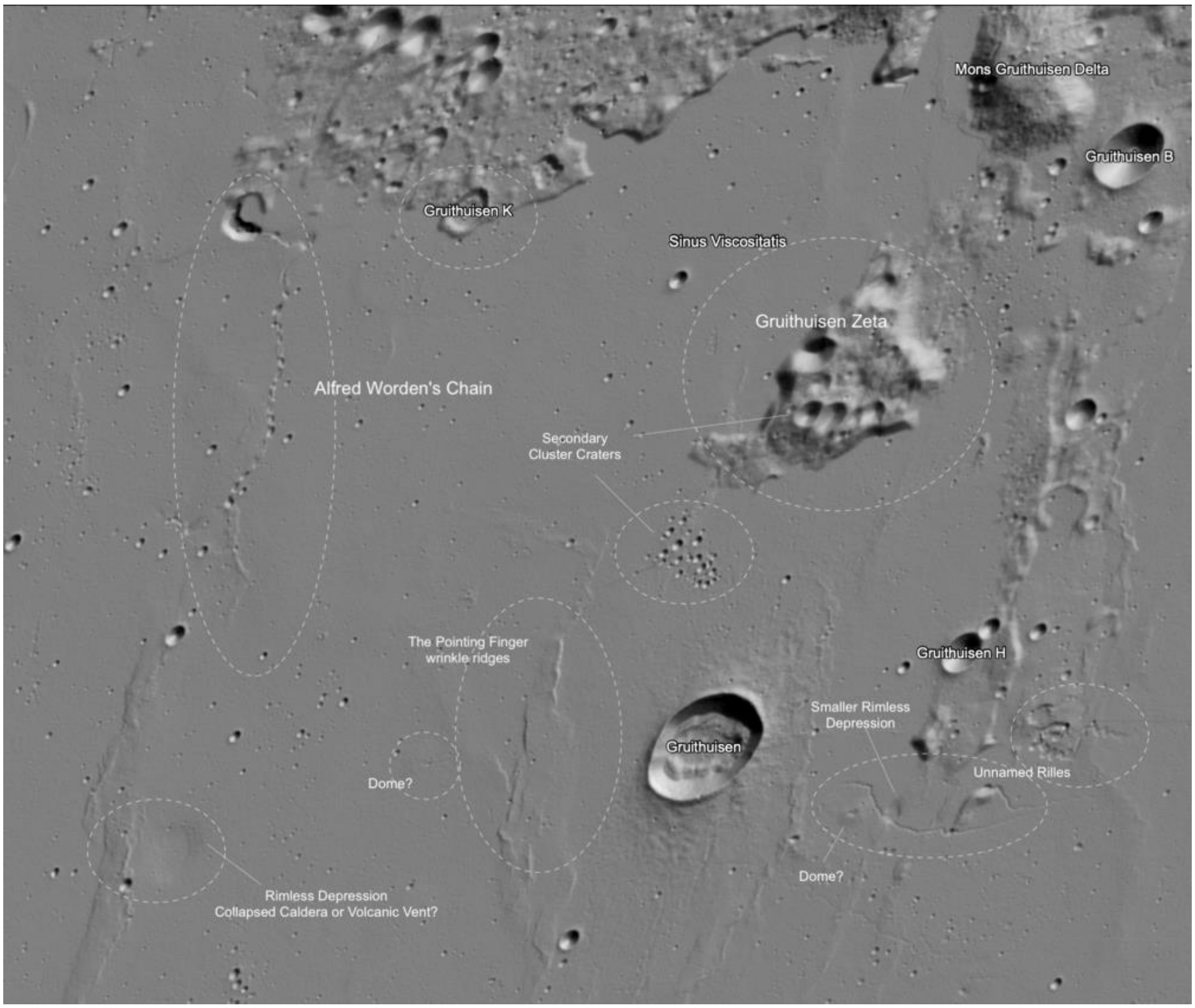

A couple last comments. South of Taurus-Littrow is a nice crater Vitruvius (30 km) in full shadow here, that has some interesting features on its floor (again seen under slightly higher sun). Then to the right is Maraldi (39 km). Between them, also filled with shadow, is Gardner (17 km). To the left of Vitruvius, on the edge of the terminator, is Dawes which has a weird rima on its east side seen here as a wide ditch. Between Dawes and Vitruvius is an area with what looks to be several very low domes. Certainly, worth another look in the future. All this and more in an area guaranteed to provide and evening's entertainment for any lunatic.

Lunar Topographic Studies
Taurus-Littrow

# Quick Study of Gruithuisen Region (South of Mons Delta)

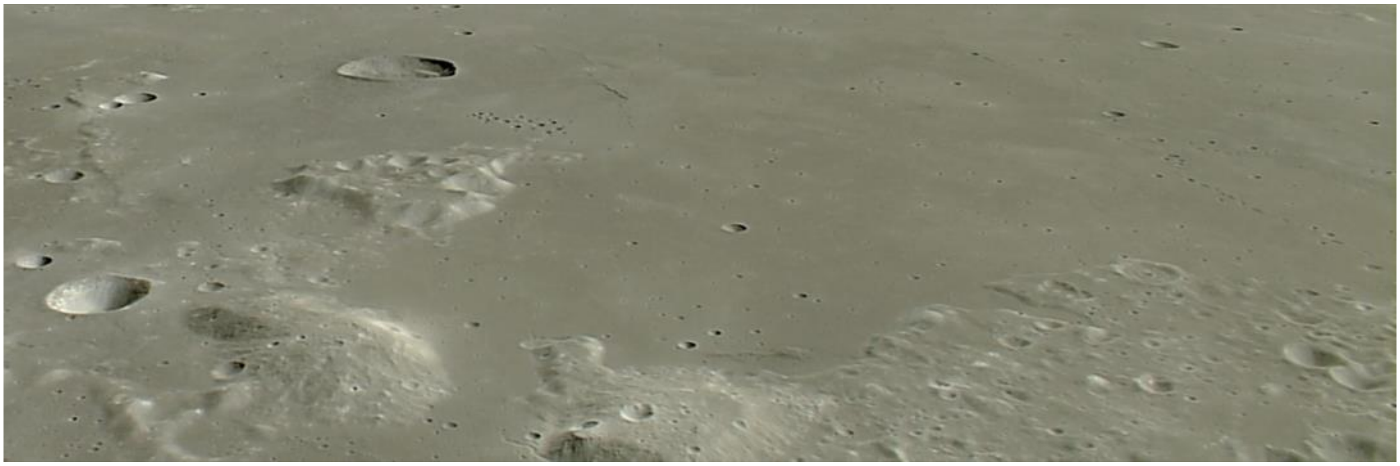
Scott E. Smith

I have recently been intrigued by the many unique features south of the famed Gruithuisen domes in Sinus Viscositatis (Bay of Stickiness). The boundary between Eastern Oceanus Procellarum and Western Mare Imbrium has many off-the-beaten-path features such as collapsed lava tubes, cluster craters, unnamed rilles, collapsed calderas/volcanic vents, silicic domes and newly detected underground magma chambers. Need I say more to draw your interest? While digging into this selected area, I was reminded of the Hubble Deep Field Image, where thousands of previously unknown galaxies were discovered in a seemingly dark and empty section of the sky.




*Credit: LROC Quickmap snapshot which I have highlighted several of the most interesting features of interest South of the famous Mons Gruithuisen Domes. (North is up).*
*32.88670, -39.77920 (coordinates for the Gruithuisen crater)*

Lunar Topographic Studies
A Quick Study of Gruithuisen Region (South of Mons Delta)

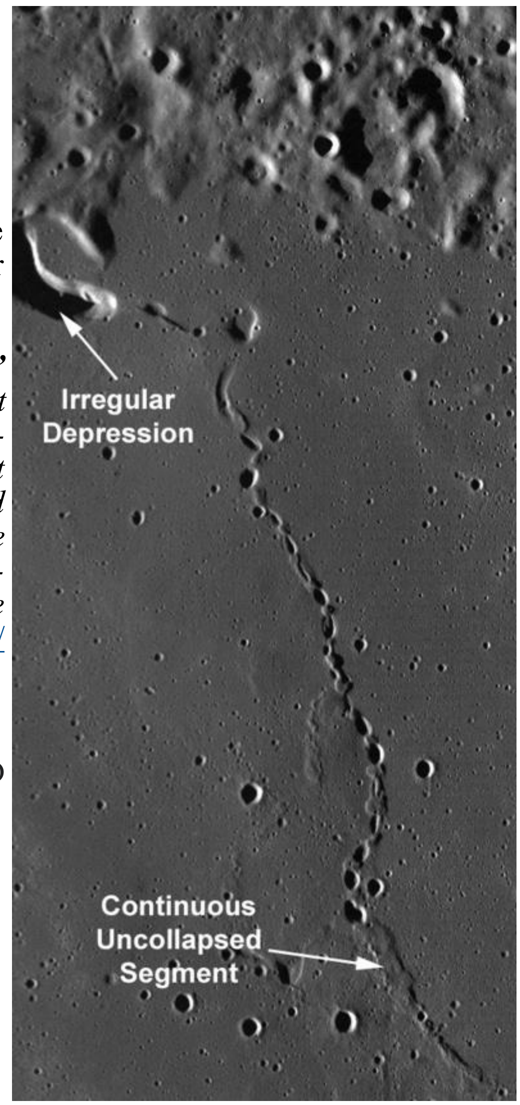


Credit: JAXA KAGUYA
https://data.darts.isas.jaxa.jp/pub/pds3/sln-l_e-hdtv-2-edr-v1.0/browse/large/200902/sh_20090216T234045_wm8.mp4

**Collapsed lava tube**

There is a great article on LROC site which suggests this chain to be a collapsed lava tube feature instead of long suspected impact crater chain. http://lroc.sese.asu.edu/posts/1189

This formation was unofficially named "***Alfred Worden's Chain"*** back in the 70's. Found the following on the-moon.us wiki – *"About one hundred km west-northwest of Gruithuisen is a chain of 30 tear-drop-shaped "craterlets", photographed by Command Module Pilot (CMP) Alfred **Worden** of Apollo 15's CSM Endeavour. One of Alfred Worden's orbital color Hasselblad-photographs appeared on page 252 of the article To the Mountains of the Moon by Kenneth F. Weaver, National Geographic Magazine, February 1972. Reference: See AS15-93-12724 through 12729 (Magazine P/93)"* https://www.lpi.usra.edu/resources/apollo/frame/?AS15-93-12725




Credit: LRO

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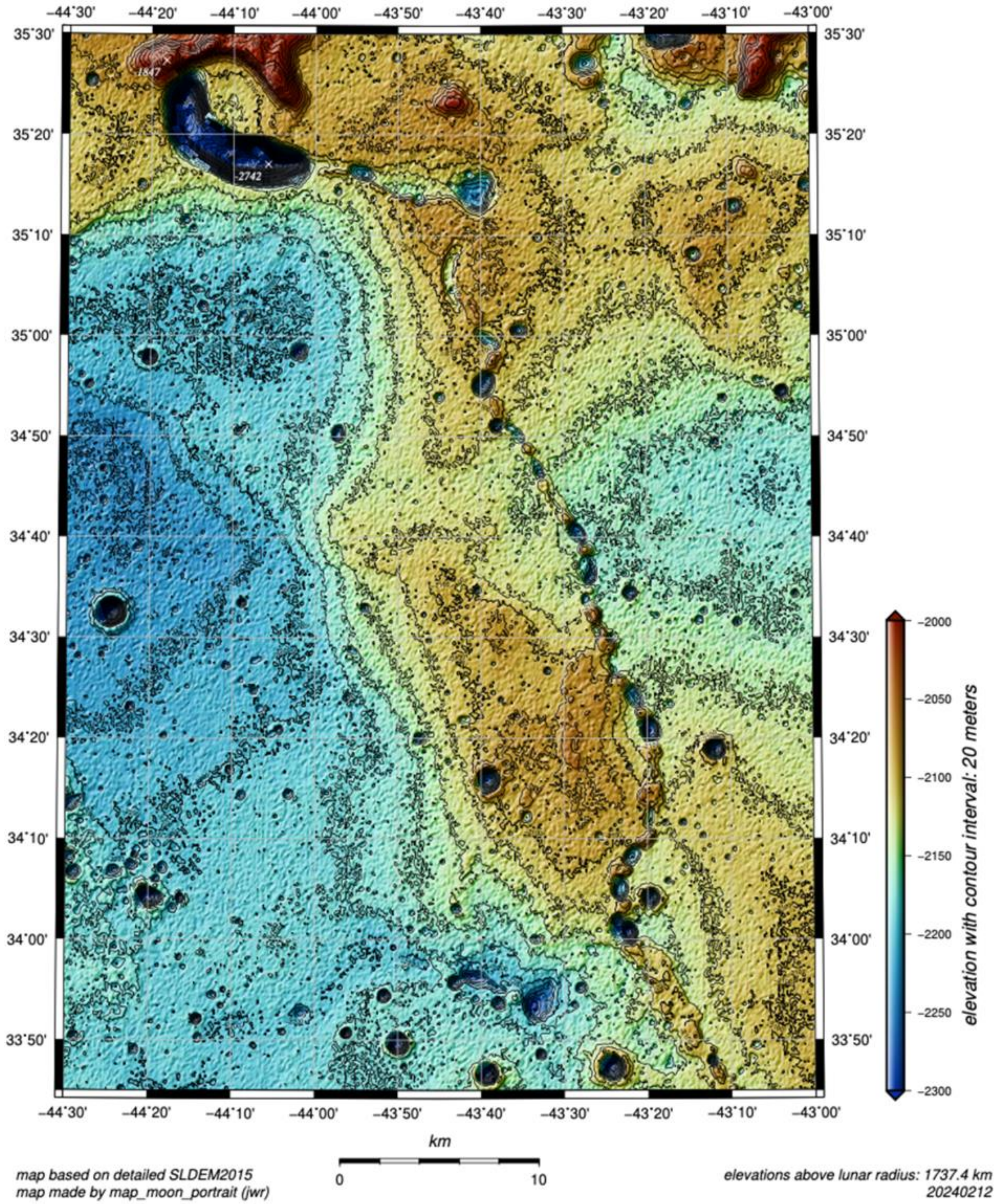
A Quick Study of Gruithuisen Region (South of Mons Delta)

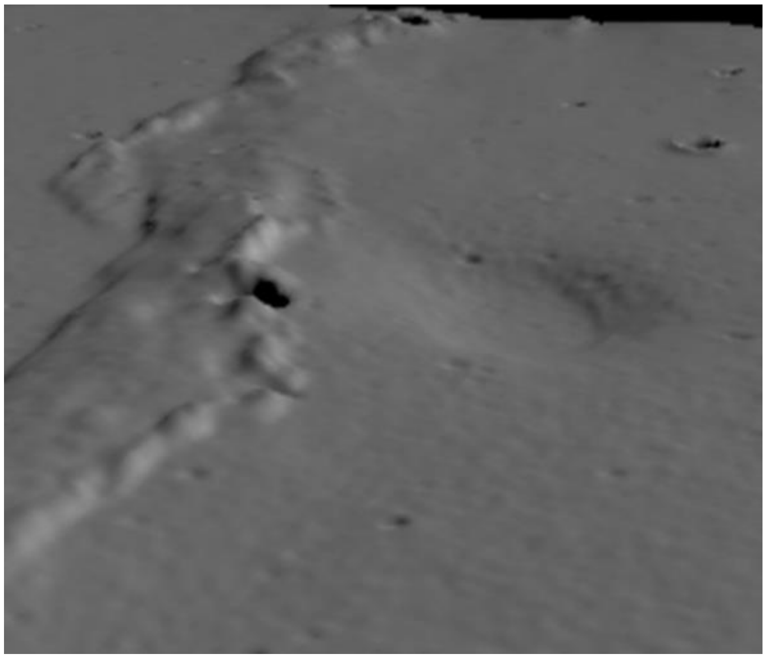


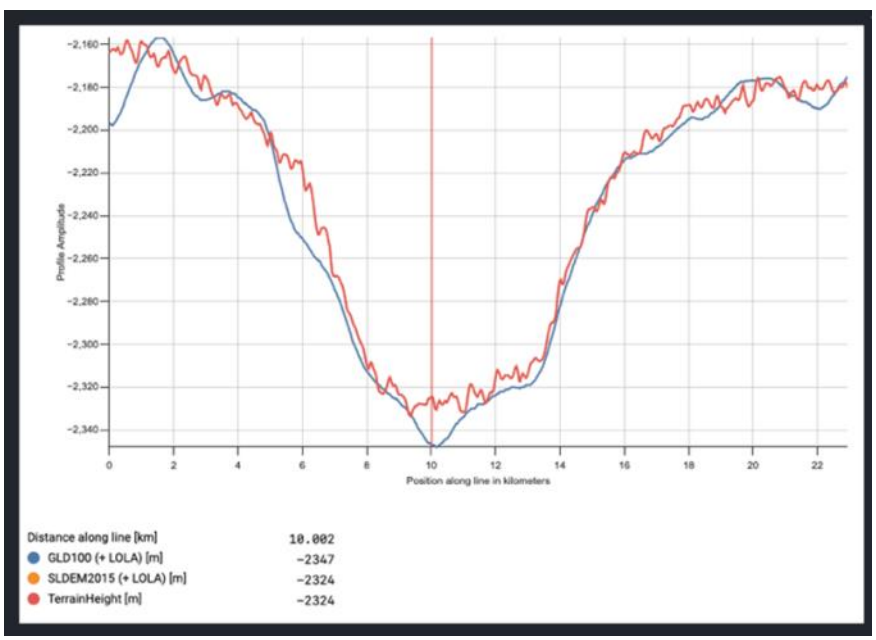

Credit to John Robbins for the Detailed Topographical Mapping

## Lunar Topographic Studies
## A Quick Study of Gruithuisen Region (South of Mons Delta)

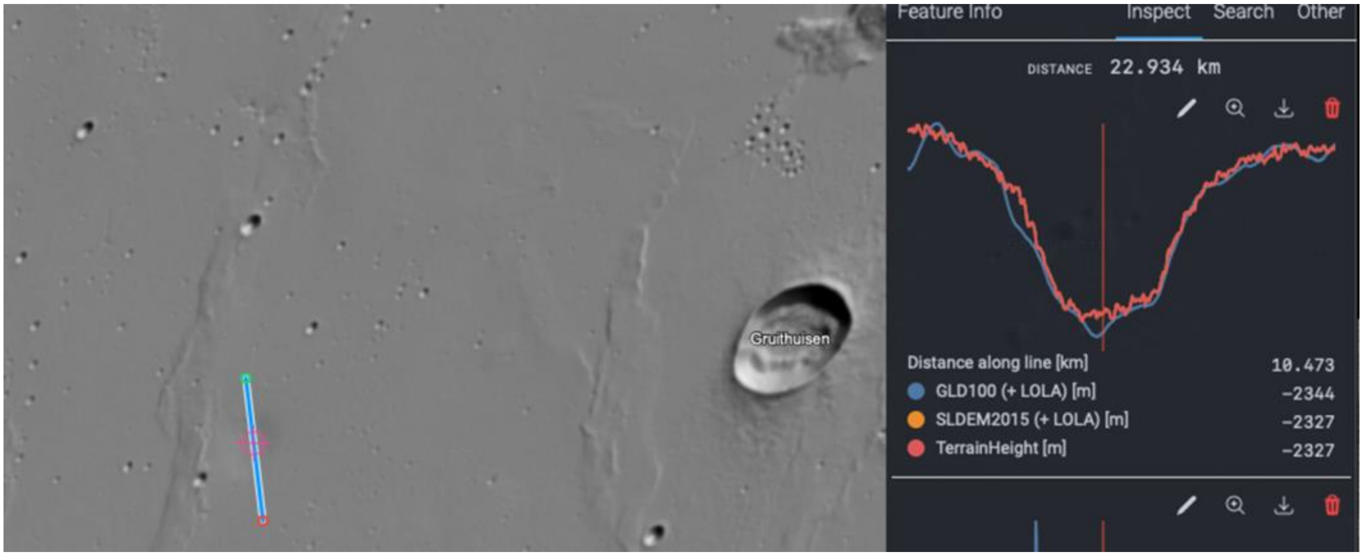
**The Depression**

(32.40925, -42.75160) South of the collapsed lava tube chain is a depression which I considered, at first sight, to be a ghost crater; however, there are no signs of a rim. I first noticed this via a topographical map shared by John Robbins and then via LROC Quickmap (Terrain Hillshade option). After investigating on-line, I found an older USGS map which supports this being a collapsed caldera or volcanic vent. I was able to observe this depression visually under very low angle lighting at appx 400x with my 13” reflector but not as apparent as with the LROC imagery and would have missed it if not specifically seeking it out. Also, see the smaller depression which I marked on near the northwestern most sinuous rille later in the article.

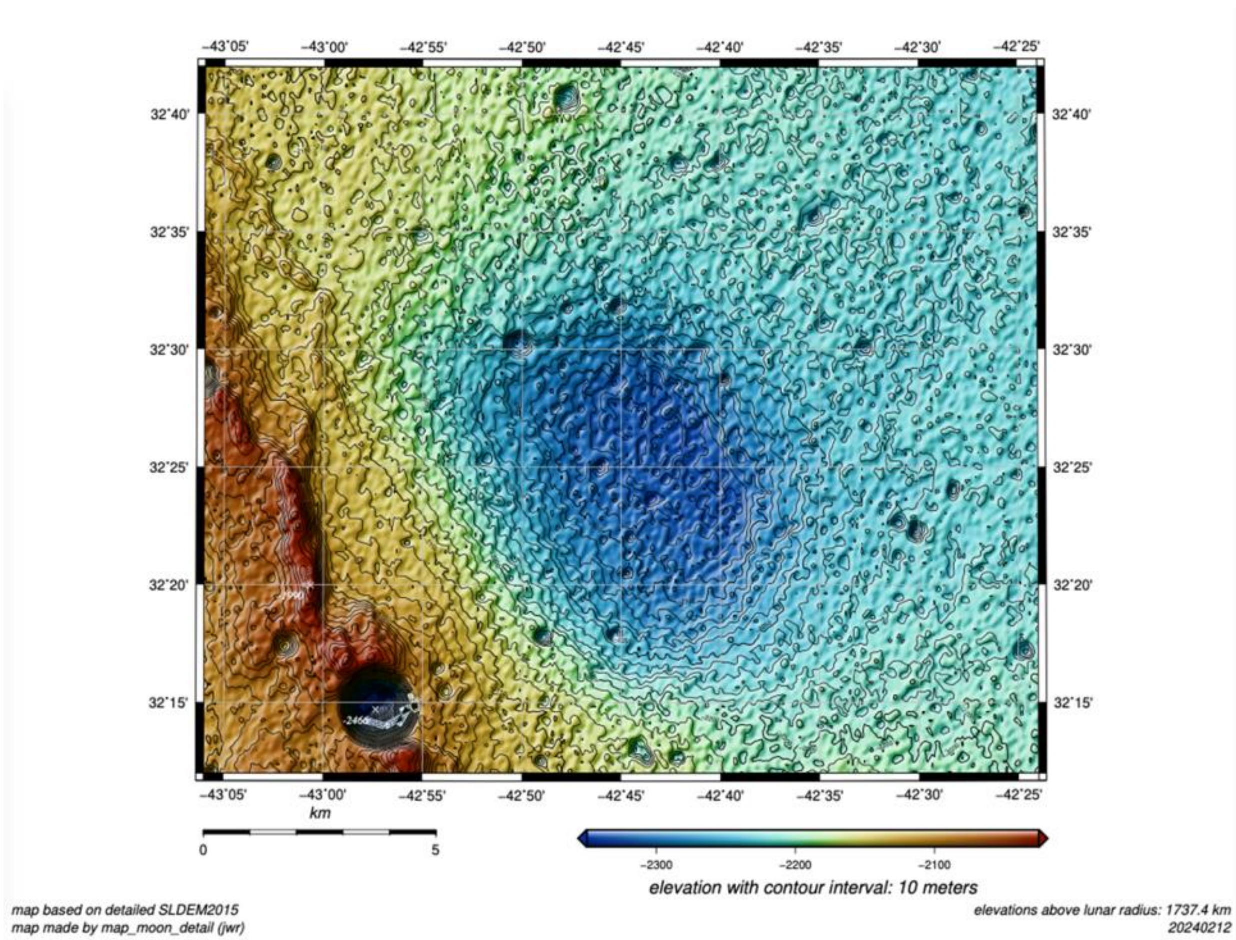





Credit: LROC Quickmap 3D render http://target.lroc.asu.edu/qm3d/o2w_3d_058771027_10_0_100_101_0/




Credit: Lunar LROC Quickmap




Credit to John Robbins for the Detailed Topographical Mapping

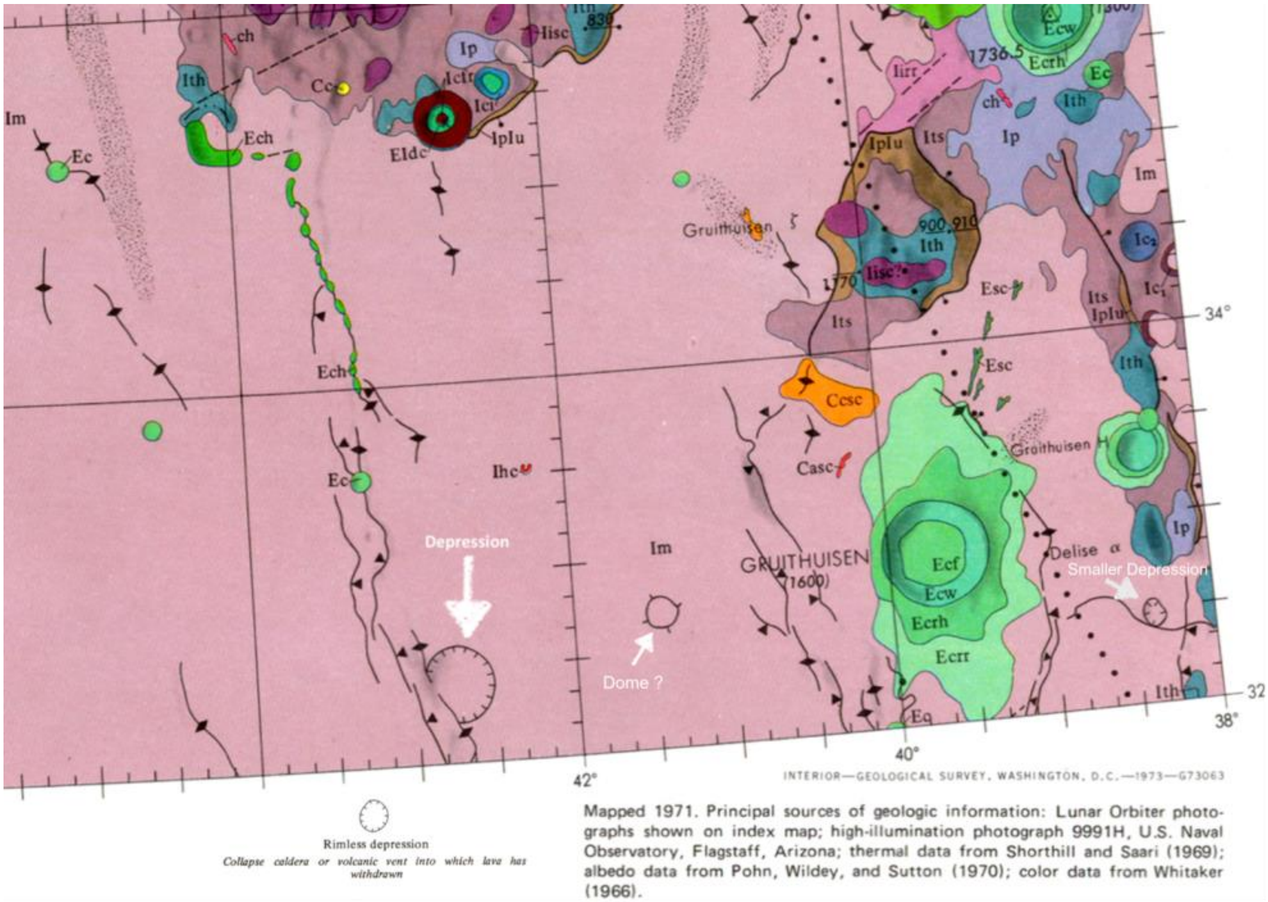
## Lunar Topographic Studies
## A Quick Study of Gruithuisen Region (South of Mons Delta)

Credit: Image by Michael P. Owen (May 20,2024 Phase 87.89% with 11” Edge SCT)

## Lunar Topographic Studies
## A Quick Study of Gruithuisen Region (South of Mons Delta)

Credit: Image by Jeff Grainger (April 2,2023 Phase 83.75% 11” Edge SCT)

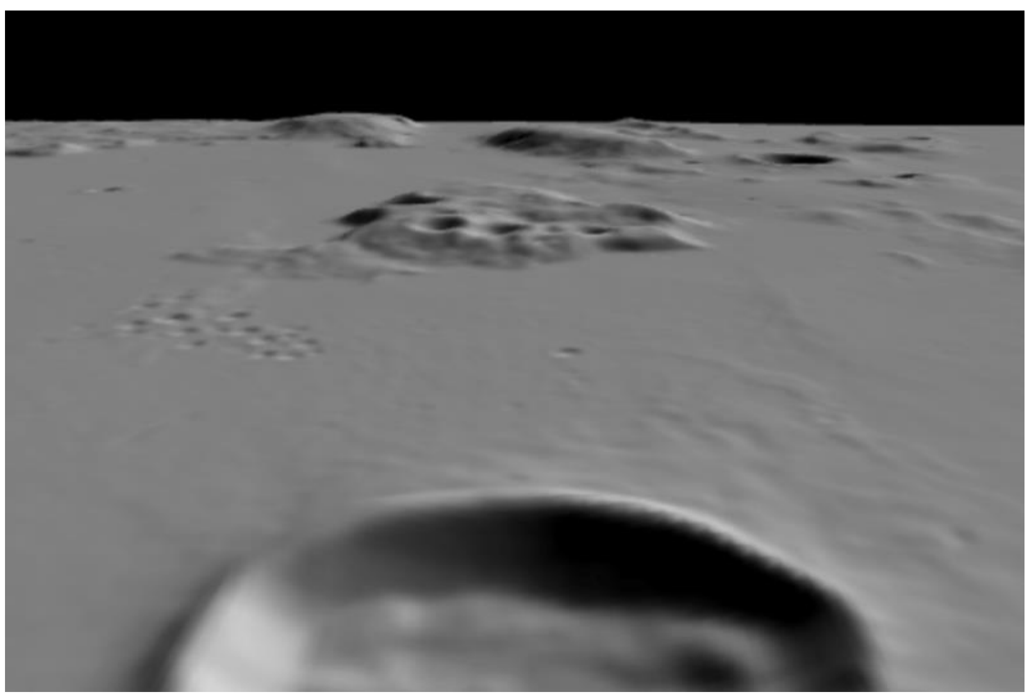
The USGS Geological Atlas of the Moon from Map #1805 Rumker (circa 1971) indicates that this feature is a “Rimless Depression – Collapsed caldera or volcanic vent in which lava has withdrawn” https://www.lpi.usra.edu/resources/mapcatalog/usgs/I805/




**Gruithuisen Zeta**

This feature does not have an official name currently after the IUA decommissioned the Gruithuisen Zeta nomenclature. There is something about this fantastic "hill" with it's secondary impact crater knocks which makes me identity with it as a mini-Mons Rümker impersonator.

Credit: LROC Quickmap render http://target.lroc.asu.edu/qm3d/



Lunar Topographic Studies
A Quick Study of Gruithuisen Region (South of Mons Delta)

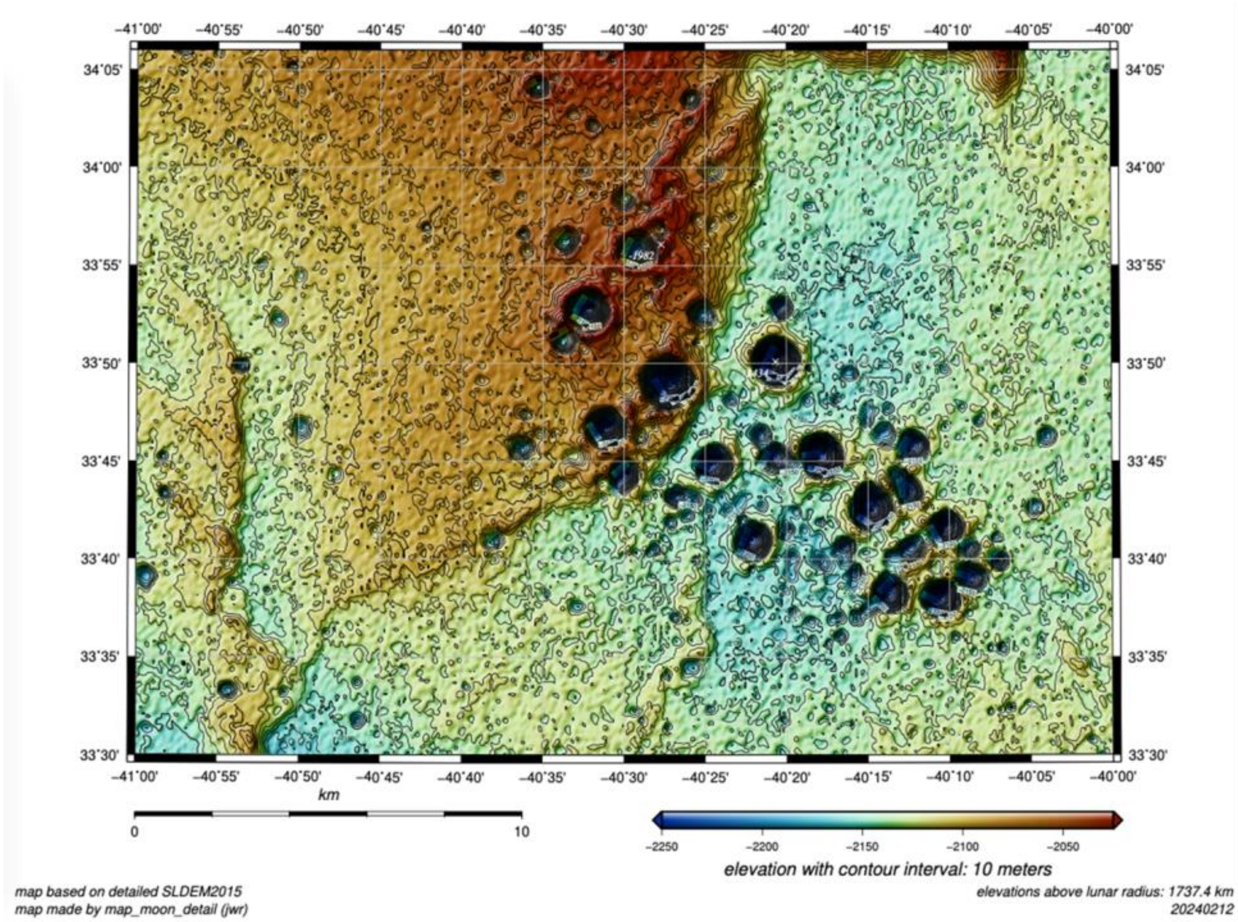
I recommend that you check out the very interesting paper on newly detected magma chambers in addition to the previously identified silicic domes in Gruithuisen Region. https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2023GL103336

**Cluster Craters**

Charles Wood identifies these as a tight cluster of "**secondary craters**" likely formed from a slightly dis-aggregated clump of debris. https://www.lpod.org/wiki/March_10,_2013

I also found a 2018 reference, where lunar observer Danny Caes gave this tight cluster of bowl-shaped craters the unofficial name of "**Gruithuisen's Mob**".

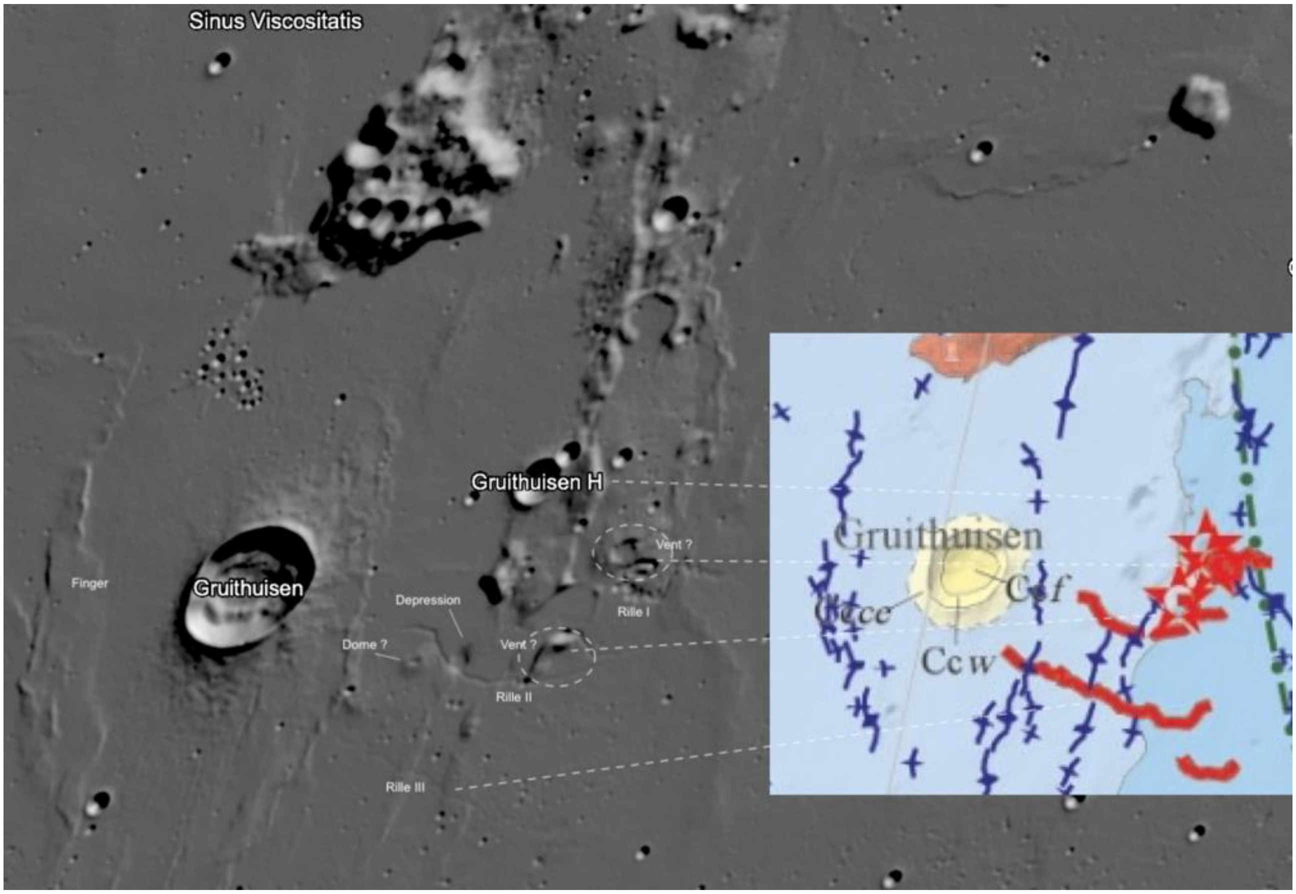
Credit: KAGUYA (Cluster craters in lower left)



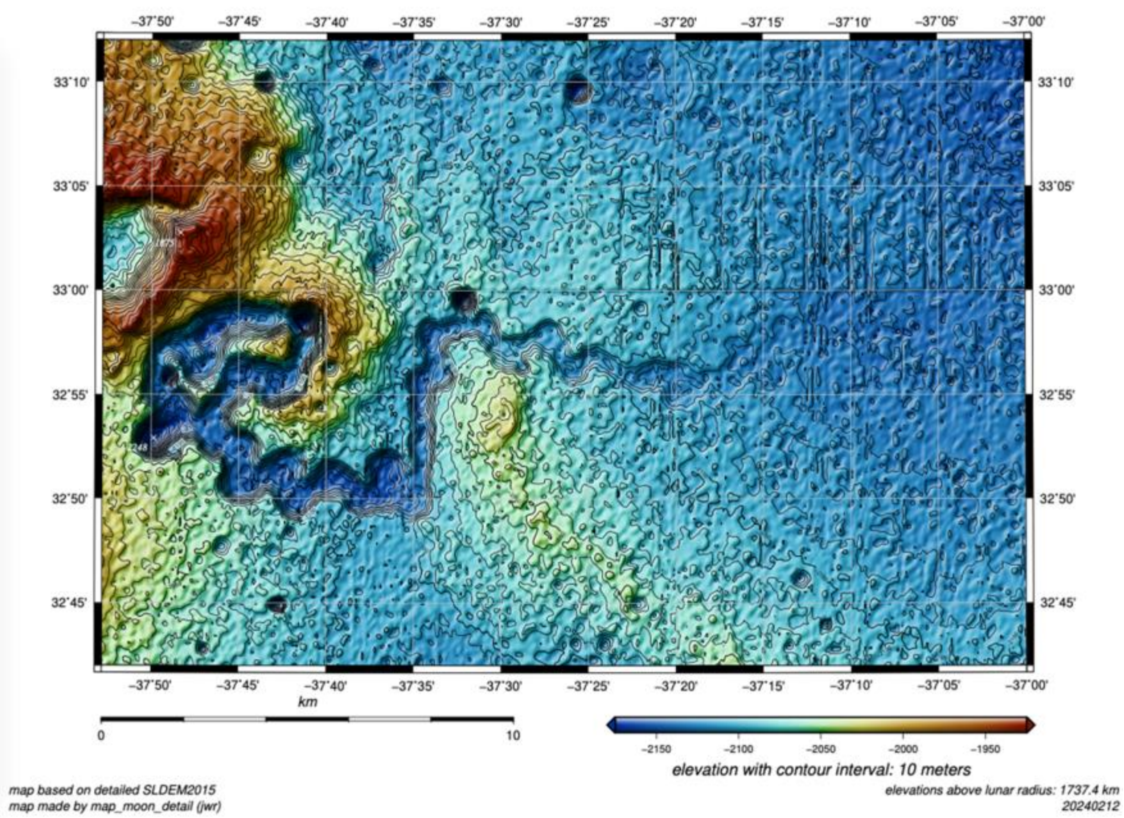

Credit to John Robbins for the Detailed Topographical Mapping (North is up)

**Rilles**

The Sinuous rille system to the Southeast of Gruithuisen H is worthy to study! There are no official or unofficial names that I can find for these two rilles. In addition to the rilles, take notice of the rimless depression and the dome-like feature to the west of the depression. The Chinese Geologic Map of the Moon suggests there are two volcanic vents in the midst of rille I and II.




Main Image Credit: Lunar LROC Quickmap Insert Credit: Chinese Academy of Sciences Geologic Map of the Moon (Volcanic vents designated by red stars)




**Rille I** Credit to John Robbins for the Detailed Topographical Mapping

## Lunar Topographic Studies
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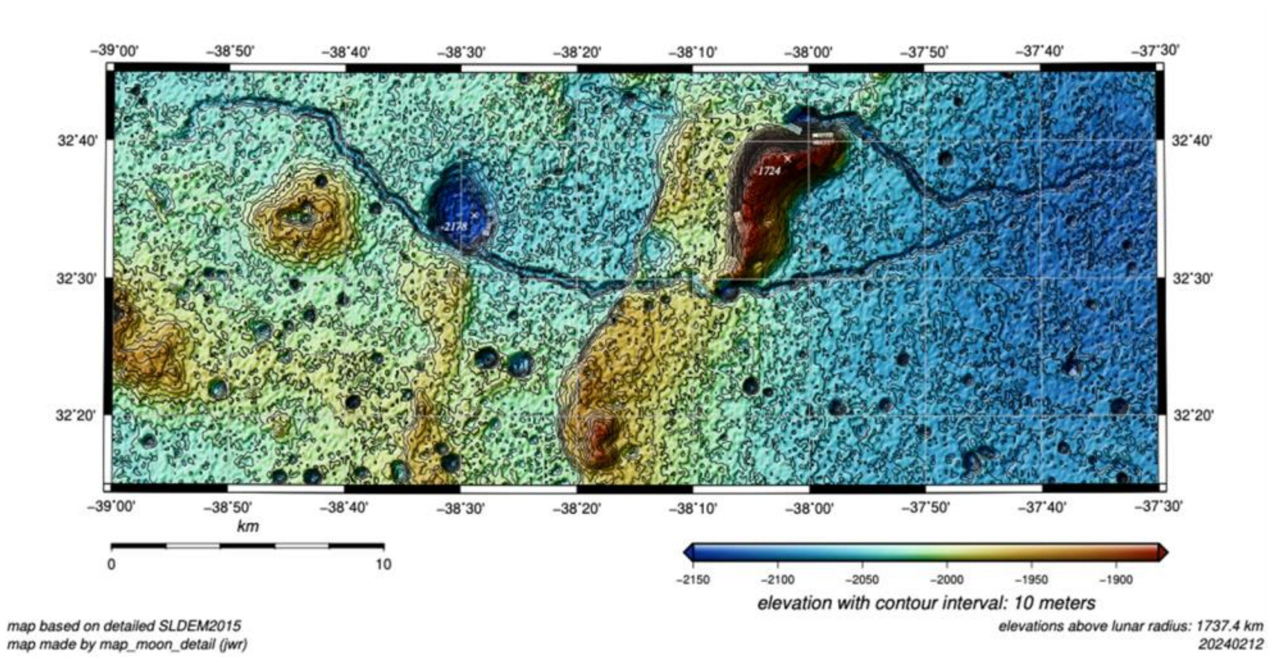
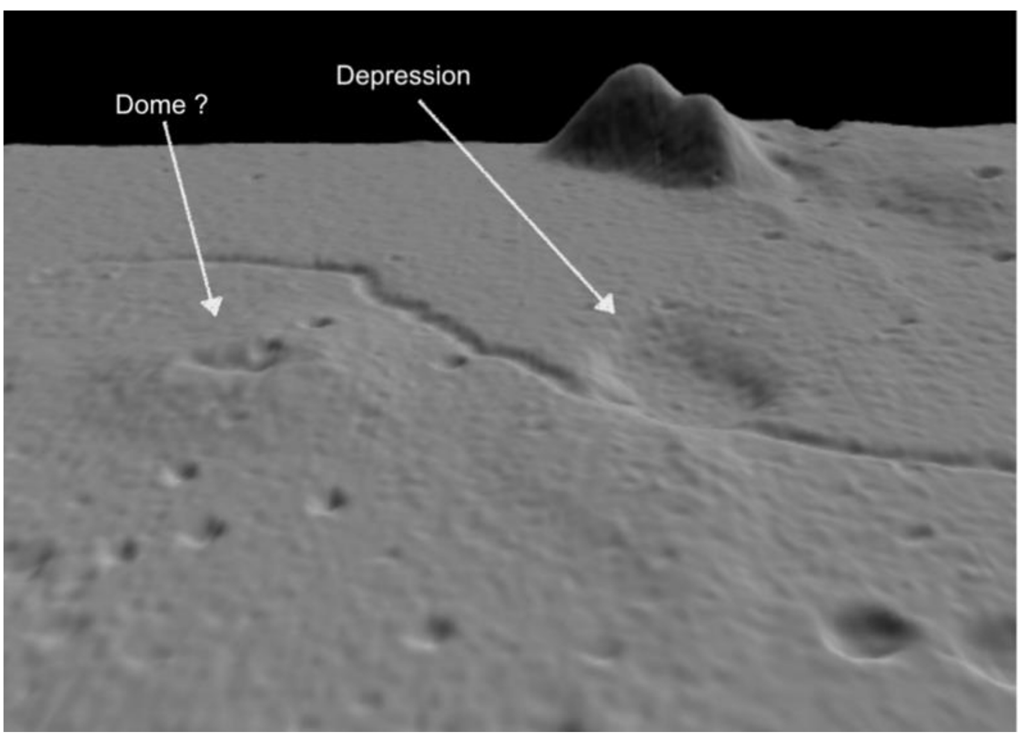
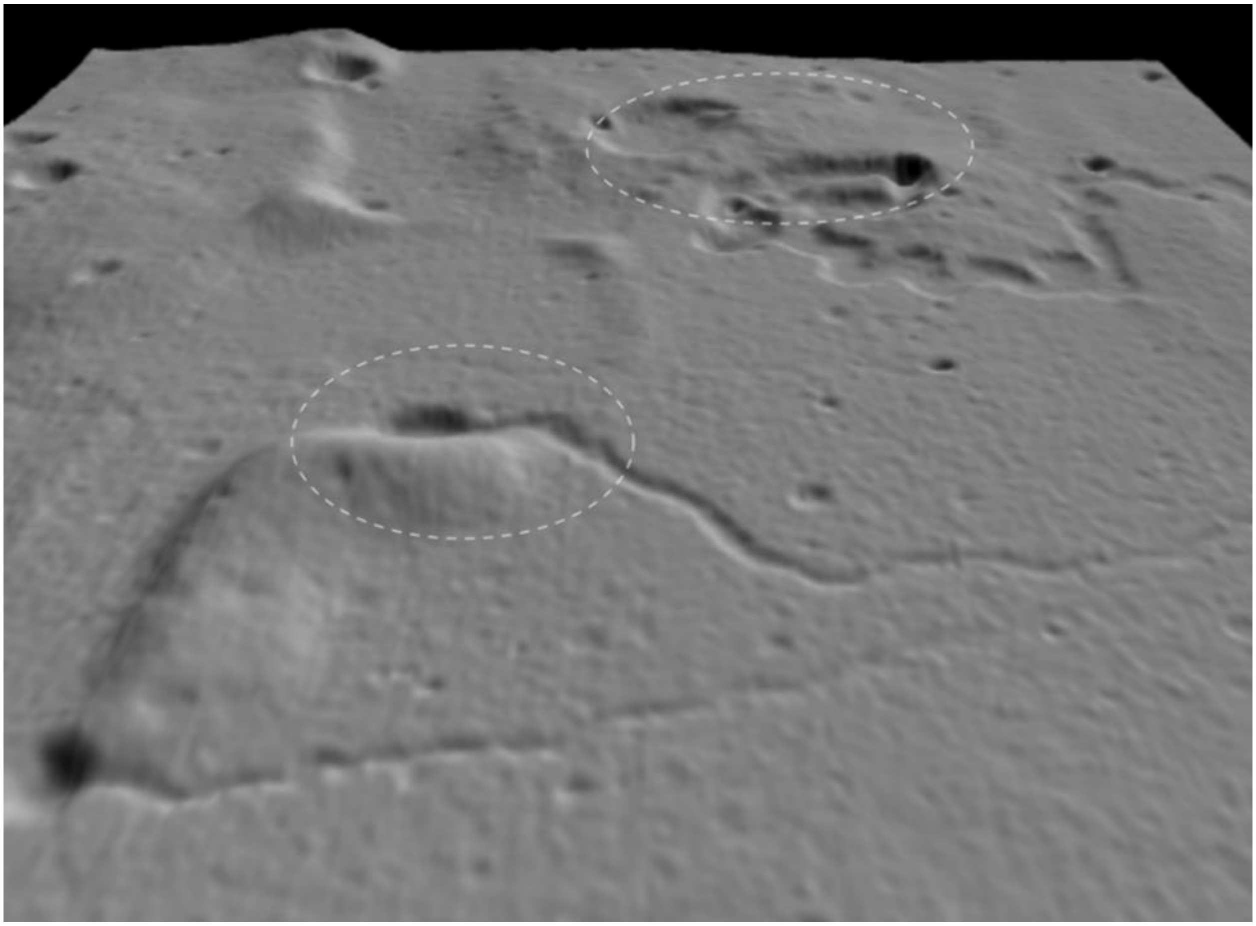



**Rille II** Credit to John Robbins for the Detailed Topographical Mapping

In addition to the rille, take notice of the rimless depression (darker blue) and the dome-like feature to the West of the depression.

Credit: LROC Quickmap 3D render of Western section of **Rille II** to examine the depression and possible dome
http://target.lroc.asu.edu/qm3d/o2w_3d_829447885_10_0_100_101_0/

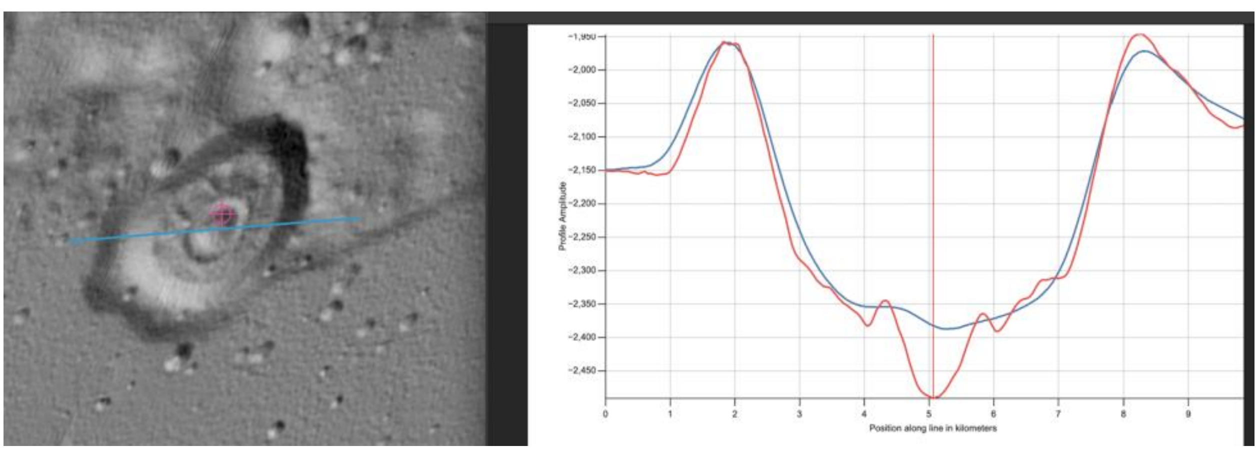




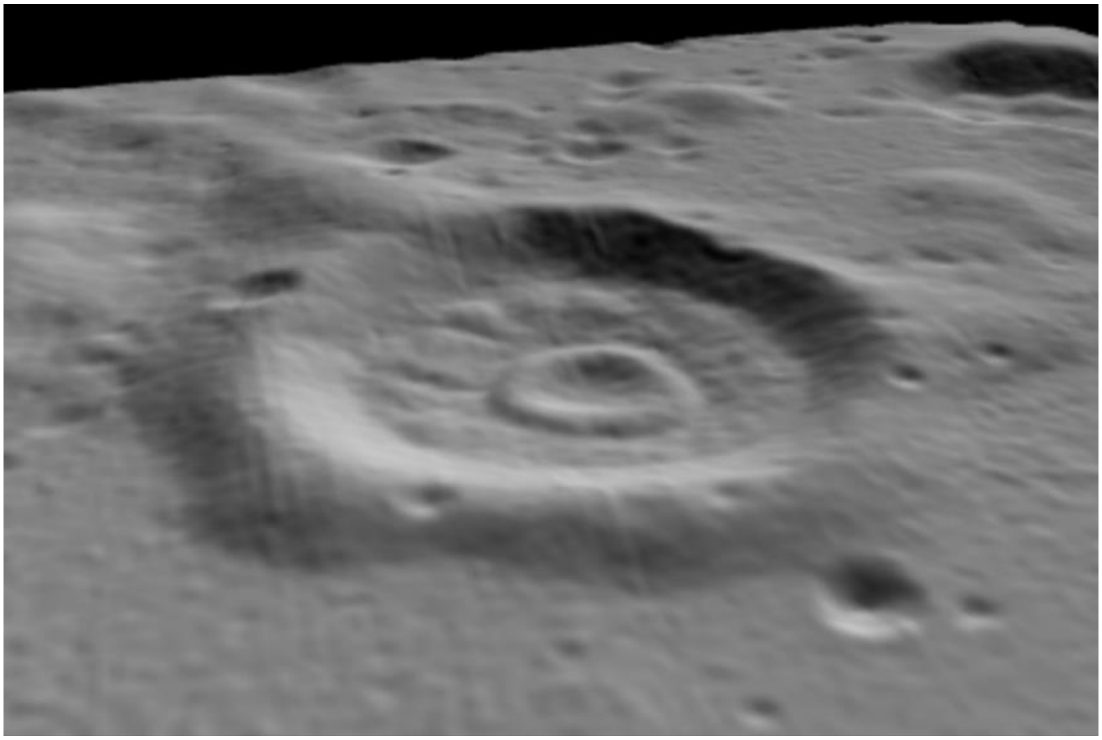
Credit: LROC Quickmap 3D render of **Rille I and eastern Rille II** to examine possible vents
http://target.lroc.asu.edu/qm3d/o2w_3d_091461269_10_0_100_101_0/

**Concentric Crater - Gruithuisen K**

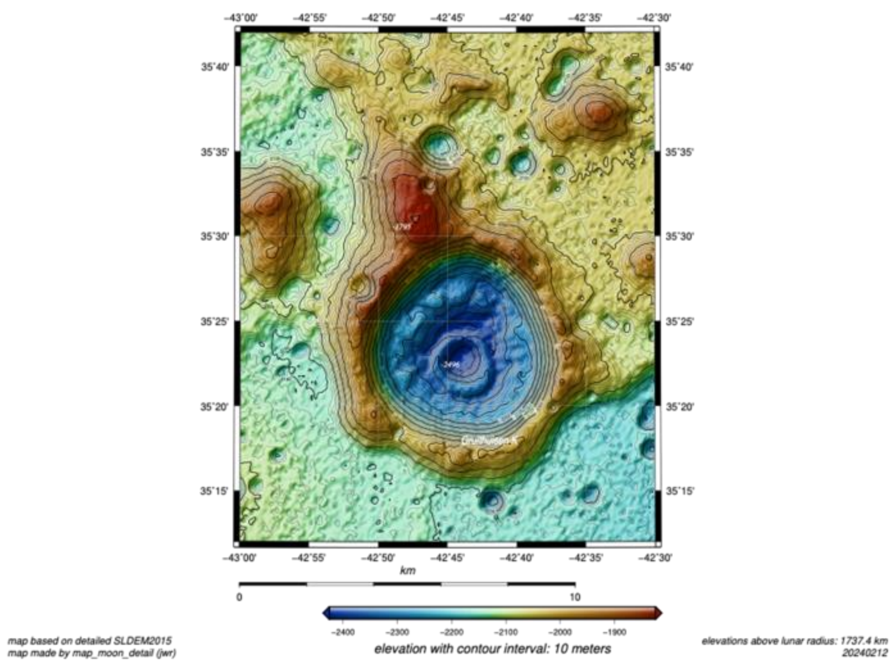
A very nice concentric crater residing on the western side of Sinus Viscositatis.




Credit: LROC Quickmap



Credit: LROC Quickmap 3D render http://target.lroc.asu.edu/qm3d/o2w_3d_098979680_10_0_100_101_0/




Credit to John Robbins for the Detailed Topographical Mapping

Lunar Topographic Studies
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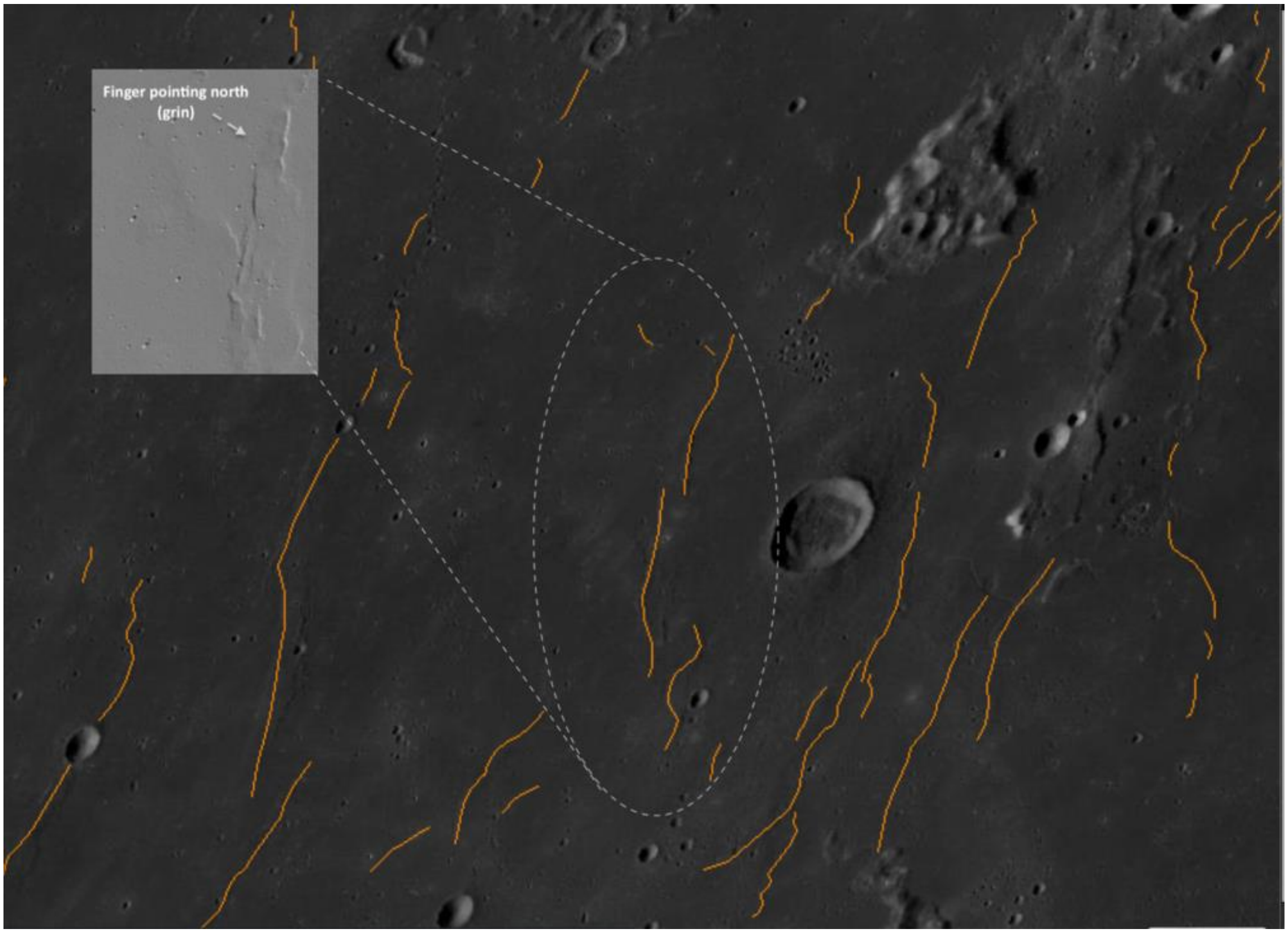
**The Pointing Finger**
*(honorable mention of an unofficial pareidolia)*

There are many lovely wrinkle ridges in this region, best seen in low angle lighting (see image below with overlay). I was amused to find "the finger" pointing up to the delta as indicated on the opening image




Credit: Lunar LROC Quickmap

**References/credits:**
A special thanks to John W Robbins for the wonderful Topographical Maps! Also, Michael P Owen and Jeff Granger for their excellent earth-based images of the Gruithuisen area.
https://data.darts.isas.jaxa.jp/pub/pds3/sln-l_e-hdtv-2-edr-v1.0/browse/large/200902/sh_20090216T234045_wm8.mp4
http://lroc.sese.asu.edu/posts/1189
https://www.lpi.usra.edu/resources/apollo/frame/?AS15-93-12725
https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2023GL103336
https://www.lpi.usra.edu/resources/mapcatalog/usgs/I805/
https://the-moon.us/wiki/Curious_crater_clusters
https://www.lpod.org/wiki/March_10,_2013

Lunar Topographic Studies
A Quick Study of Gruithuisen Region (South of Mons Delta)

# INA, Irregular Mare Patch (IMP)

## Jon Bosley

Ina is somewhat of an enigma that is located within the relatively small, at 98 km, Lacus Felicitatis ("Lake of Happiness"). It is classed, informally, as an Irregular Mare Patch (IMP) of which 70 have now been identified. The D shaped Ina was first discovered and imaged in 1971 by Apollo 15 when it was believed to be a collapsed caldera on the summit of a low lunar volcano.

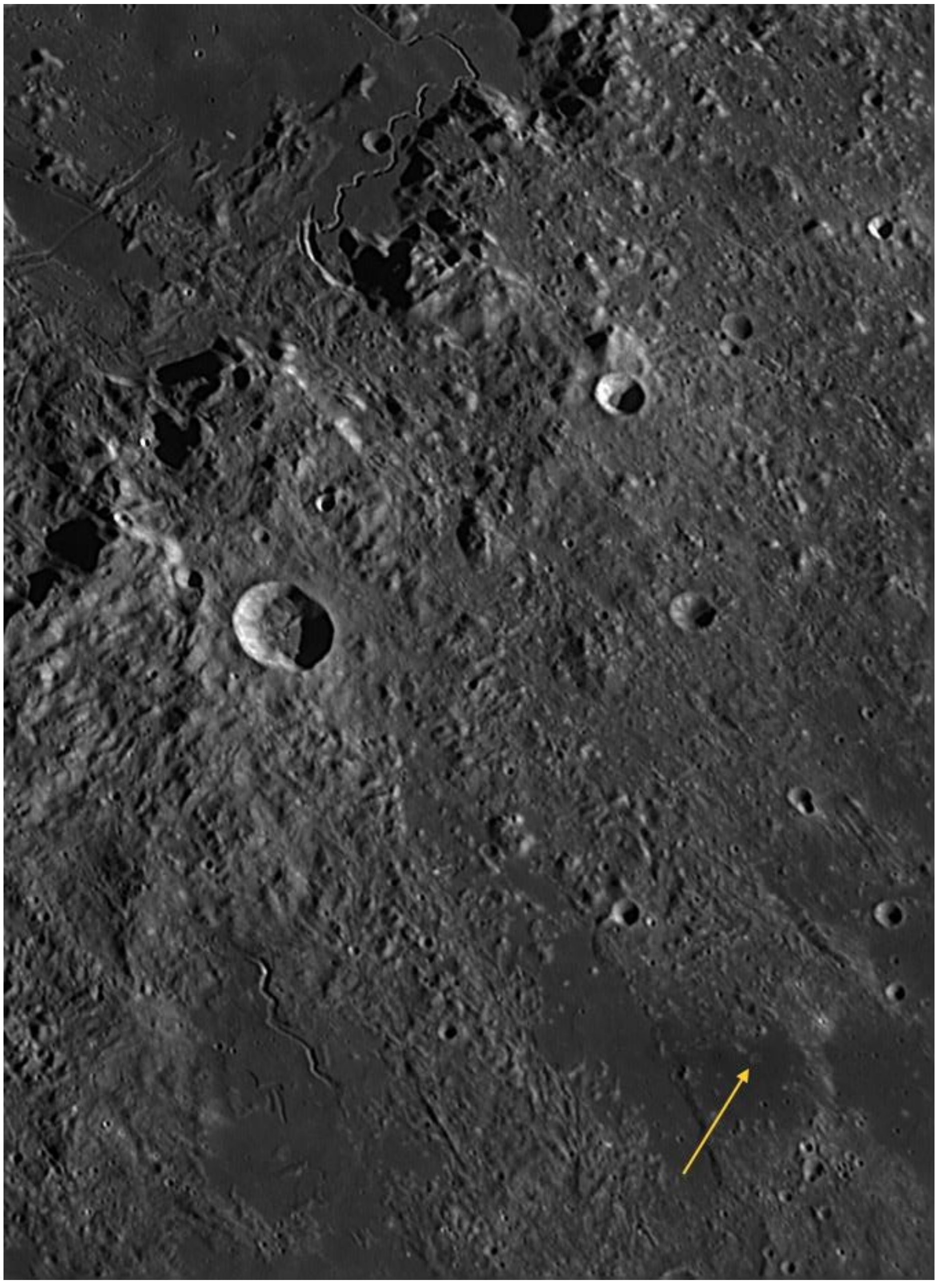


Image 1. Ina Location Area., White Dwarf Observatory, Central Texas 457mm Reflector (north is up).

For the amateur it is a very challenging feature to image in any detail let alone visually observe, predominantly because it is a small low-lying feature. However, with larger telescopes and favorable conditions, both imaging and visual observation are possible.

Topography

A 33 km central section of Lacus Felicitatis is raised up to 600 m above the relatively flat east and west sections of the surrounding topography. It is within this elevated central section that Ina is located at 18.66°N 5.30°E. Image 1 identifies the location (yellow arrow).

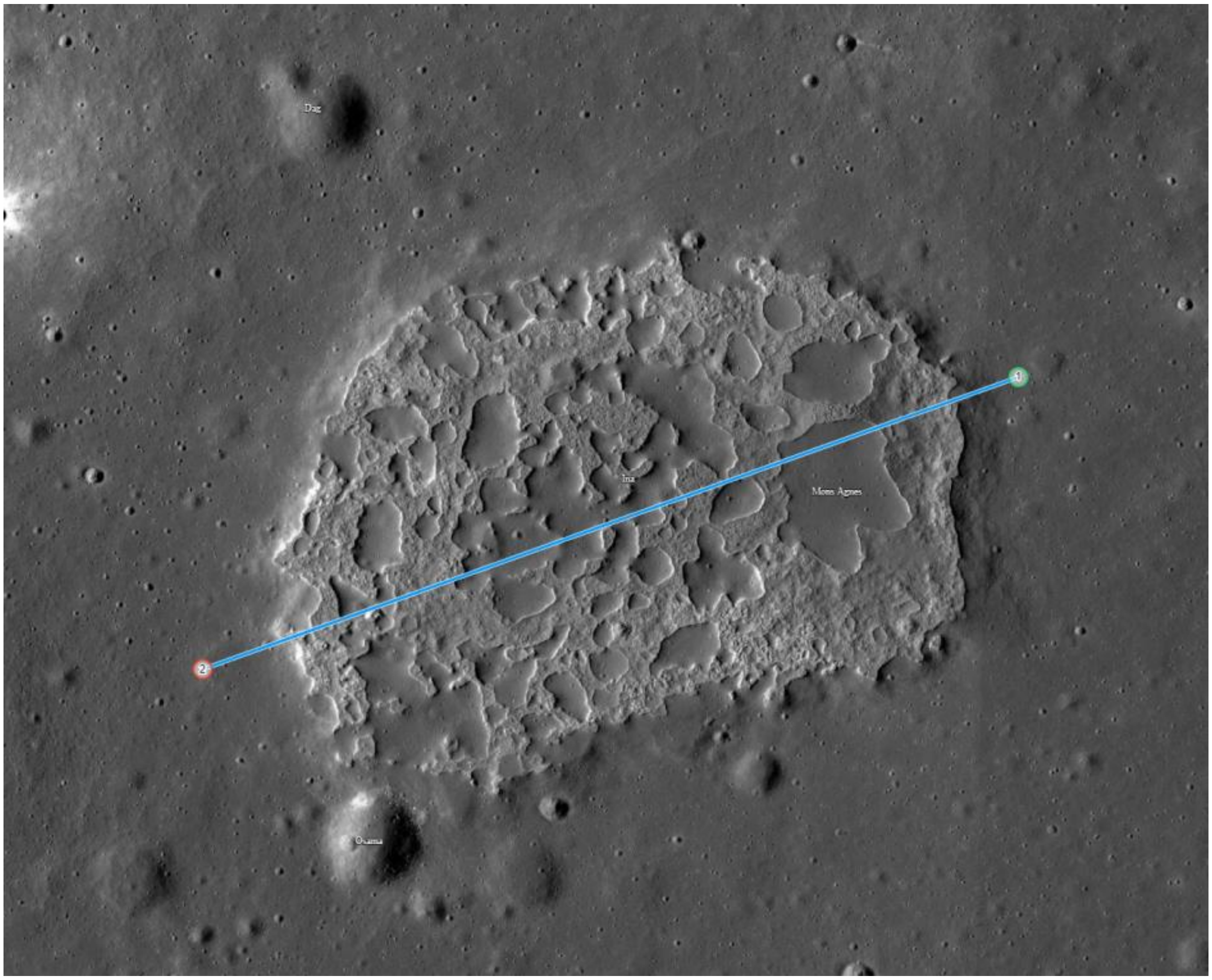



Image 3. LROC image.

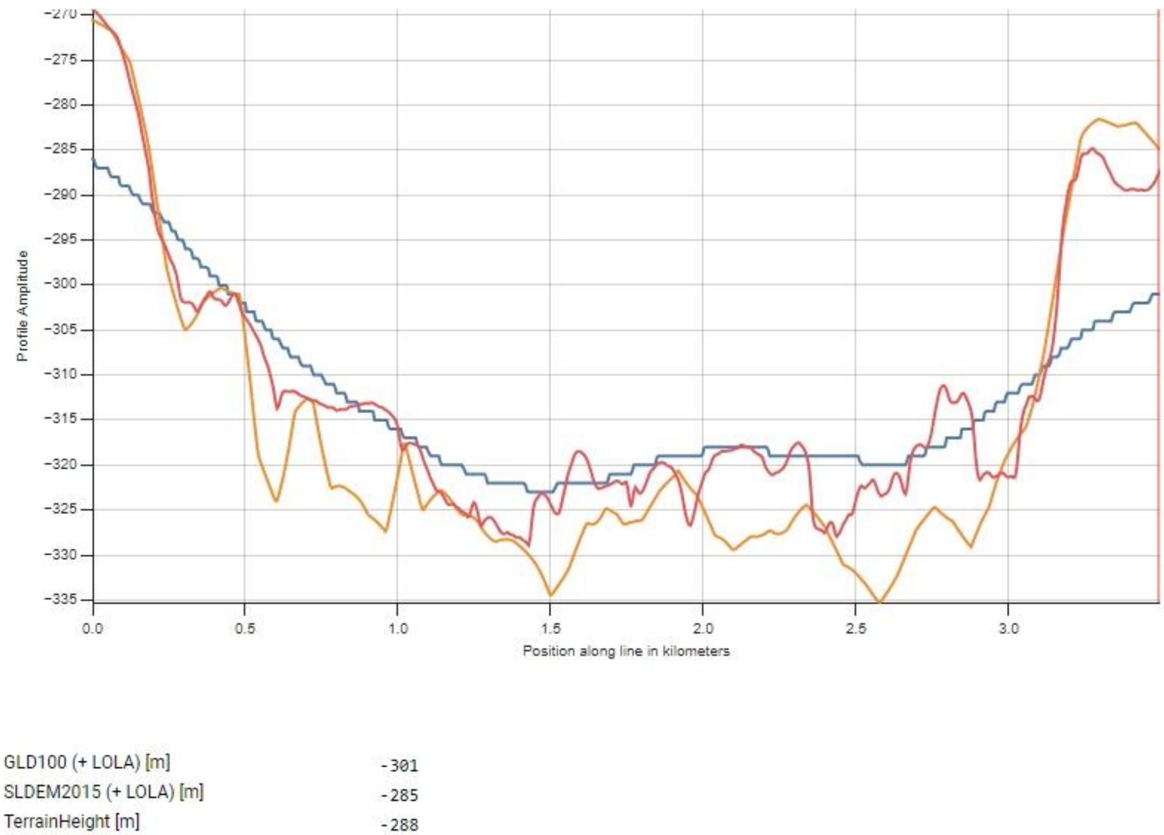



Image 3. Measured Diameter Lunar/LROC (Reference image 2).

Utilizing the LROC inspector tools the feature is a depression of approximately 50 m from the surrounding maria upon its eastern side and 40 m upon the western side. It is approximately 3 km wide east to west and a little over 2 km north to south. It forms a D shape in its appearance when looking from directly overhead (images 2 & 3).

Ina is composed of smoother in appearance raised darker areas and rough brighter albedo low areas (see image 2). The largest section of raised material is called Mons Agnes which is located within Ina on the far east-side. Mons Agnes is an elevated area of just 10-30 m and has a width of 600 m north to south at its widest.

Osama is a small 422 m named crater located on the southeast corner of Ina. Osama maybe responsible for giving Ina an extended southwest side when illuminated under high sun and imaged at high resolution in image 4. To the north is Dag an even smaller crater at 357 m.

Origin & Future

The origin of Ina and the other IMPs generally is believed to be volcanic but remains inconclusive, however it is believed that they may offer information on the thermal evolution of the Moon.

An interesting 2014 study suggested that IMPs are the result of small basaltic eruptions that maybe younger than 100 million years and Ina maybe be as young as just 33 million years. The evidence is based upon few local impact craters greater than 10 meters and relatively steep angles that demonstrate little erosion. This challenges most theories that propose that the majority of lunar volcanism transpired between 3.8 and 3 billion years ago and concluded approximately 1 billion years ago.

Many of the questions regarding Ina and other IMPs could soon be answered as NASA has selected a scientific payload mission called DIMPLE (Dating an Irregular Mare Patch with a Lunar Explorer). The mission will, it is hoped, determine the volcanic age of IMP's by collecting and analyzing numerous samples and is expected to launch sometime in 2027.

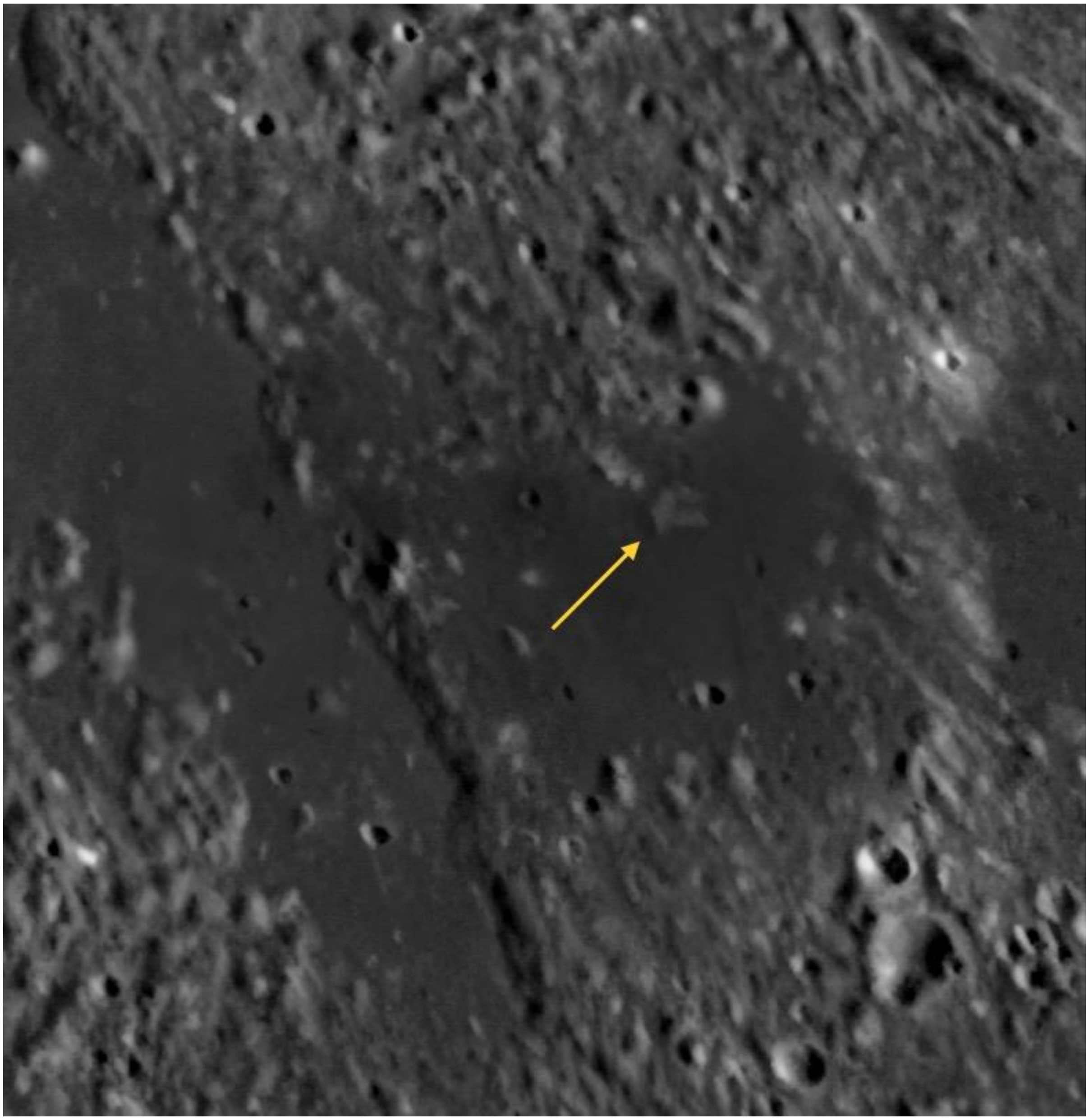


Image 4. Ina, White Dwarf Observatory, Central Texas 457mm Reflector, enlarged 4x (north is up).

Observation Report
Location White Dwarf Observatory, Central Texas.
UTC 2024-06-14 0400AM
Lunation Day 7.3, Alt 33°
Seeing 1.7 arc-seconds
457mm Reflector 354x-495x

While locating Lacus Felicitatis is relatively easy confirming the location of Ina can be more challenging. The central section of Lacus Felicitatis had a distinct shadow on its west-side while its east-side was illuminated. Ina itself is located just south of a small bright illuminated hilllock in the north central part of Felicitatis. Directly to the west is a small dark crater pit of procrustic material.

At 354x Ina could be identified as a bright patch, while increasing the magnification to 495x showed the feature that resembles an oval looking pancake. The observation was relatively close to the terminator displaying the west side in bright illumination while the center was of lower albedo. The extreme east side was in part shadow. Little else could be directly discerned however a confirmed observation on such an obscure object was a reward in itself.

Imaging
See Images 1 & 4
Location White Dwarf Observatory, Central Texas
UTC 2022-5.10 0401AM
Lunation 8.4
Seeing 1.5 arc-seconds
457mm Reflector 2.5x barlow
Player One Apollo-Mini IMX 429, 610nm filter
Image 4 is a 4x enlargement from the original full resolution image 1.

References:
http://lroc.sese.asu.edu/images/818

Braden, S., Stopar, J., Robinson, M. et al. Evidence for basaltic volcanism on the Moon within the past 100 million years. Nature Geosci 7, 787–791 (2014). https://doi.org/10.1038/ngeo2252

https://www.nasa.gov/news-release/new-nasa-artemis-instruments-to-study-volcanic-terrain-on-the-moon/

# Dorsum Higazy: A Wrinkle Ridge with a Broad Arch

Alberto Anunziato

Dorsum Higazy is located in the center of Mare Imbrium and forms part of the incredibly complicated wrinkle ridges system of this enormous basin. Higazy forms part of the radial ridges of Imbrium, which I believe are the most conspicuous radial ridges of the near side of the Moon. The segments we see in IMAGE 1 pass between two very well-known craters: Timocharis on the east and Lambert on the west.

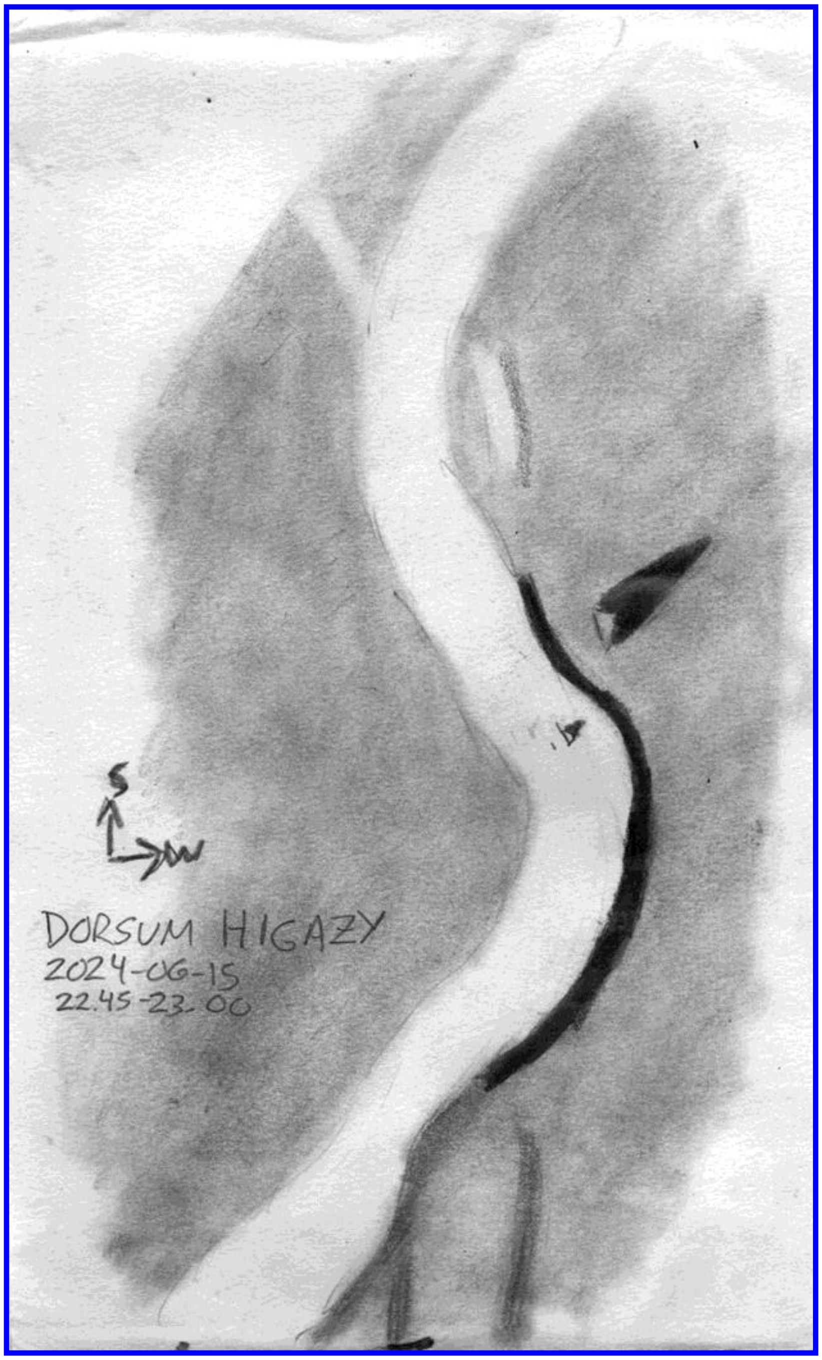



***Image 1, Dorsum Higazy,*** *Alberto Anunziato, 2026 June 15 22:45-23:00 UT. Meade EX105 Maksutov-Cassegrain telescope, 154 x.*

What called to my attention on the night of observation was the very definite shadow in a specific sector of the eastern border. Dorsum Higazy is, at least when observed, a fairly dull dorsum: there are no crests visible, there are no shadows inside the arch that indicate a topographic detail, there are no parallel segments. A picturesque detail caught my attention, some rocky outcrops that cast a very long shadow, also shining intensely (characteristics that all observers know, but which always fascinate during observation). The larger one, on the west, is outside the dorsum, and the smaller one, on the east, is located inside the arch of the dorsum. The arch appears as a continuity, without internal details. It is interesting, because many wrinkle ridges are observed with small telescopes like mine only as a bright area, without shadows, which would imply an arch with one of its two slopes, the less steep, with very smooth edges that descend very gradually, which small telescopes can't resolve and can be seen as moderate bright areas.

Dorsa, or wrinkle ridges, have structurally two different slopes, one steep and the other smooth. Dorsa as the one we see have their smooth slope extended and broad and their steep slope not very high, so that it does not project telescopically discernible shadows. In the case of Dorsum Higazy this seems to be the case, see IMAGE 2, which is the outline of the relief obtained from the Lunar Reconnaissance Orbiter Quickmap. In the catalog of the wrinkle ridges of this map it is recorded the extension of the orange lines, which pass through the highest areas (crests, which we do not see in IMAGE 1), but in the relieve line we see that the dorsum is broader what we see as the brightest areas is the arch (the lower part of the entire ridge, the higher and more narrow upper part is called the crest). We also see that the east slope is the most abrupt in IMAGE 2 and that the west slope appears irregular in IMAGE 1, as only one section of it projects shadows.

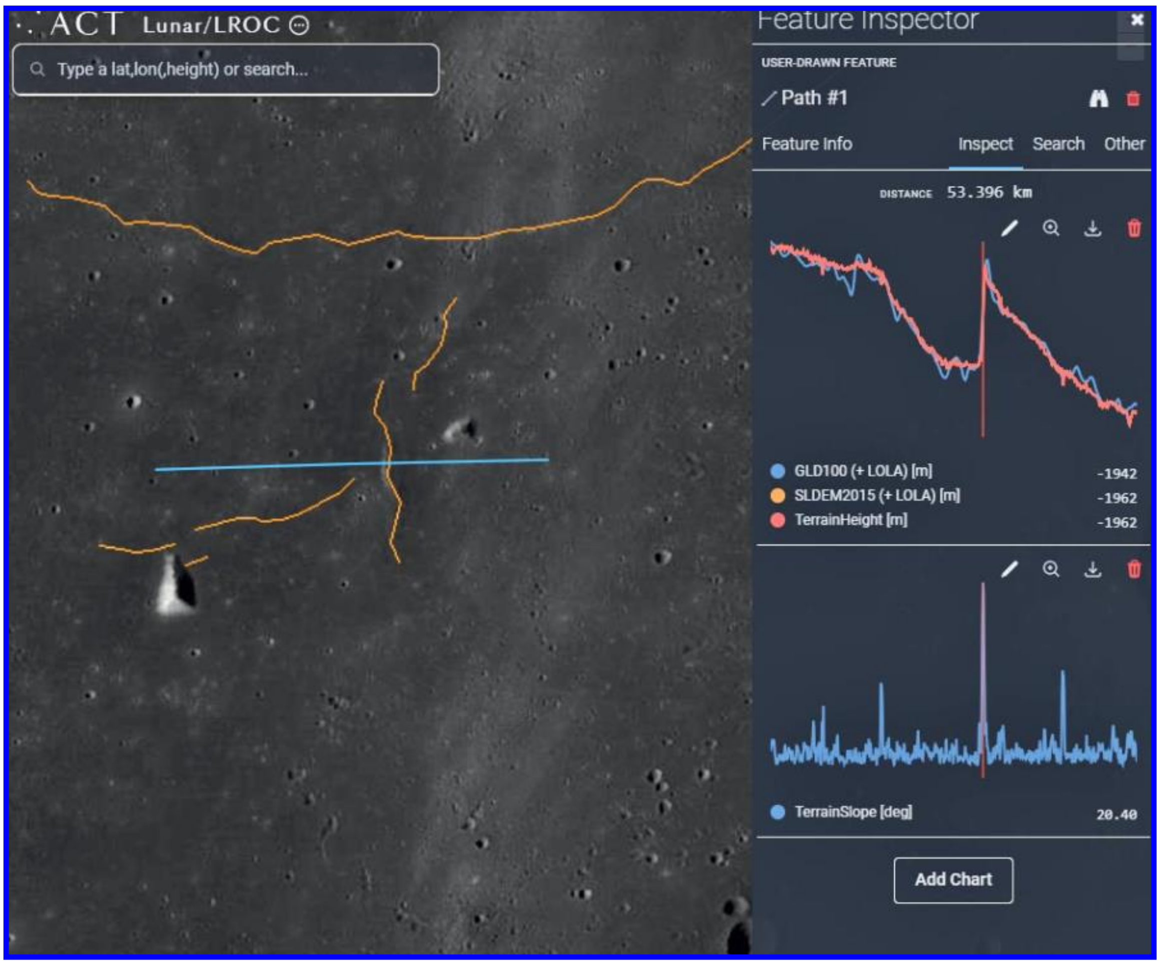



***Image 2, Dorsum Higazy,*** *LROC.*

# Focus On: Mare Nectaris:
# A Small Basin Full of Wonders

## Alberto Anunziato

The words of Charles Wood in his "The Modern Moon. A Personal View" at the beginning of chapter 12 to describe the area we are going to visit are unsurpassed: "The Nectaris basin is one of the undervaluated gems of the Moon. Some of the more dramatic and instructive landforms on the lunar surface are located within its fairly compact area (…) the lack of a thick mare fill leaves the basin`s scarps and rings better exposed than any other place on the lunar near side". Let's start then with the Nectaris Basin and then we will go to the Mare itself.

The Nectaris Basin is one of the oldest, but it is still one of the most discernible for the amateur. This is the description of Paul D. Spudis (The Geology of Multi-Ring Impact Basins): "The Nectaris basin displays five rings in various states of preservation. A questionable innermost ring (240 km in diameter) is buried and represented only by a concentric system of ridges located within the confines of Mare Nectaris. Circumscribing this ring is a shelf-like massif ring (400 km in diameter), made up by the Montes Pyrenaeus in the eastern half of the basin. Most of the mare basalts are concentrated within this ring, which also marks the outer boundary of the positive gravity anomaly (mascon) of the basin (Sjogren *et al,* 1974). The next larger Nectaris ring (620 km in diameter) is less well defined and passes through the craters Catharina in the west and Colombo in the east. This basin ring is composed of isolated massifs that lie on a circle crudely concentric to the main basin rim. This ring may be analogous to the outer Rook ring of Orientale because the knobby deposits of Nectaris described by Wilhelms (1972, 1980a) appear to be concentrated near it. The main rim of Nectaris (860 km in diameter) is well preserved in the south but appears to be discontinuous to absent in the northern half of the basin area".

Let's see if we can recognize the different rings in the images that make up our dossier, starting with the outer ring, that is, the very limit of the basin: "This ring is best exposed along the Altai scarp southwest of the Nectaris basin and is here named the Altai ring. The Altai ring displays simple scarp-like morphology and appears to be analogous to the Cordillera scarp of Orientale. Outside of the Altai scarp, textured exterior ejecta are poorly preserved and in some cases; obliterated, yet the basin ring is very sharply defined. One explanation for this relation is that this scarp has been rejuvenated during extended periods of crustal adjustment after the modification stage of basin formation (Hartmann and Wood, 1971; Schultz, 1976a). In this view, Nectaris would be analogous to those lunar craters displaying evidence for internal modification in the form of floor fractures" (Spudis).

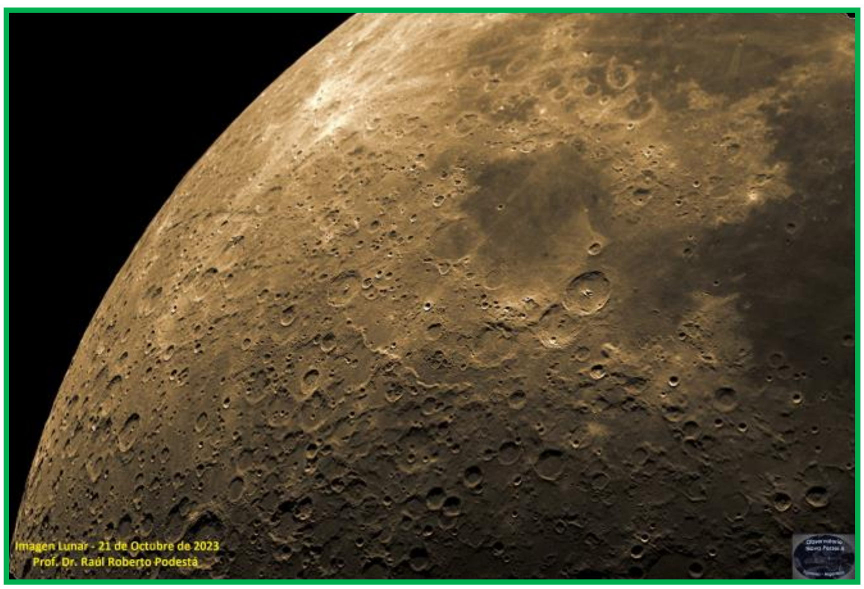



***Image 1, Mare Nectaris,*** *Raúl Roberto Podestá, Formosa, Argentina. 2023 October 21 23:16 UT. 127 mm Maksutov-Cassegrain telescope, UV/IR cut filter and #80 blue filter, ZWO ASI178MC camera. North is to the right, west is down.*

Rupes Altai is, I think without a doubt, the basin's rim best preserved: "The Nectaris basin is beautifully defined by the spectacular Altai Scarp, which forms the southwestern rim of the basin. The Scarp is dramatic 3.5-to 4-km-high cliff that continues as a weaker and more broken scarp" (Wood, page 111). Although there would be an outermost ring, about 1300 kilometers in diameter, which would be the fifth, the ring of which Rupes Altai is the most visible part and which is about 860 kilometers in diameter, we can consider in terms of observations that Rupes Altai is the edge of the basin. IMAGE 1 is a very wide field image that allows us to observe, in part and imagine the rest, the potential rings of the basin that we have mentioned. In IMAGE 2, and with a more limited field, it is easier to complete the rings that appear visible in Rupes Altai, Santbech/Colombo/Catharina, Monte Pyrenaeus (from exterior to interior).


***Image 2, Nectaris,*** *David Teske, Louisville, Mississippi, USA. 2024 May 15 02:48 UT, colongitude 349.4°. Stellarvue 127D refractor telescope, 1.5x barlow, IR block filter, ZWO ASI120 MM camera. Seeing 6/10.*

***Image 3, Mare Nectaris,*** *David Teske, Louisville, Mississippi, USA. 2023 January 28 01:34 UT, colongitude 346.7°. 3.5 inch Questar telescope, IR block filter, ZWO ASI 120MM cmera, seeing 9/10.*


In IMAGE 3 Rupes Altai is most conspicuous, shining at lunar morning. According to Peter Grego in "The Moon and How To Observe It": "Rupes Altai (Altai Scarp) presents a curving, scalloped cliff of staggering proportions – almost 500 km long, running from west of the crater Catharina to Piccolomini. The origin of the scarp is linked to the stresses set up in the lunar crust by the asteroidal impact that carved the Nectaris impact basin. The inner part of the basin has dropped by up to 1,000 m, exposing a scarp face along the line of a deep-seated fault. The young crescent Moon shows the Altai Mountains as a bright, winding line, in places up to 15 km wide. At sunset the scarp casts an irregular shadow onto the landscape beneath it".

IMAGES 4 and 5 show Rupes Altai illuminated by the brightness of the Sun, IMAGE 6 illustrates the dramatic shadow that it casts with the opposite lighting, in which the highest parts are indirectly distinguishable by the shape of the shadow. The craters that appear in IMAGE 6 are from south to north Pons (which seems to have dark bands, although the effect seems to be due to its topography), Rothman C, H and G.

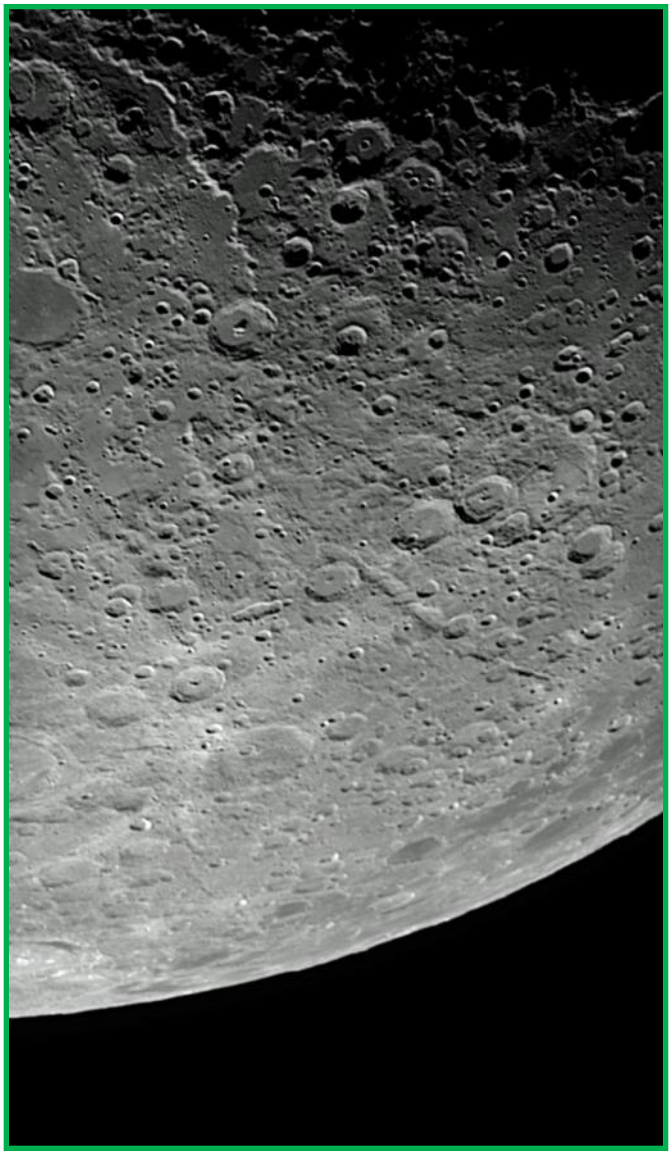


***Image 4, Rheita H,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2019 August 06 23:21 UT. 200 mm refractor telescope, IR-pass 742 nm filter, QHY5-I camera.*

***Image 5, Theophilus,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2019 August 06 23:34 UT. 200 mm refractor telescope, IR-pass 742 nm filter, QHY5-I camera.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

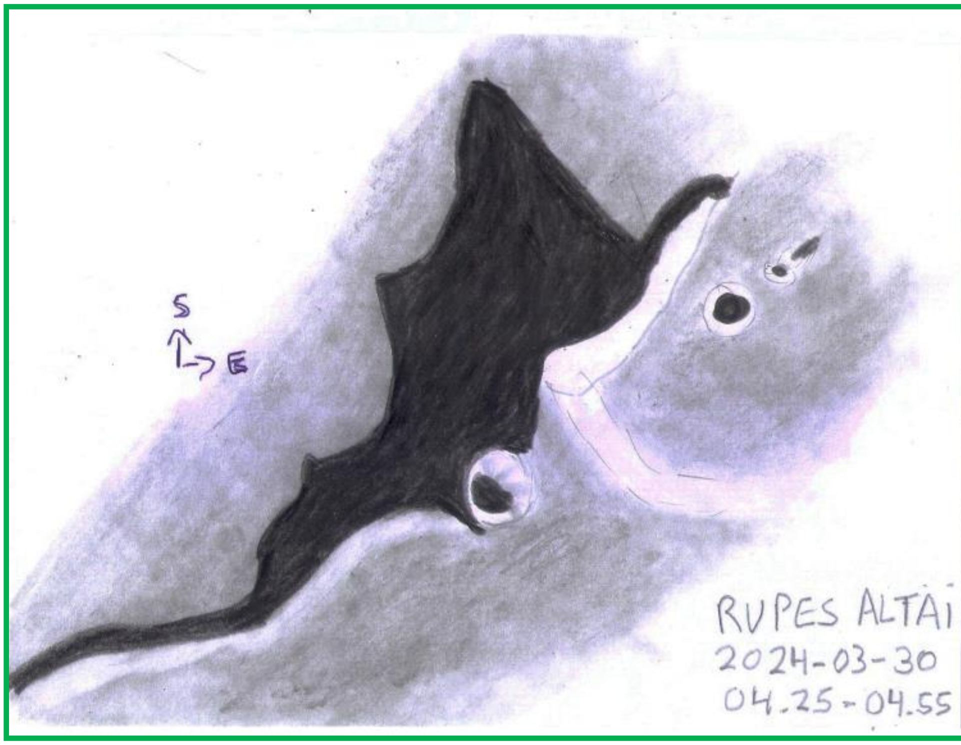



***Image 6, Rupes Altai,*** *Alberto Anunziato, 2024 March 30 04:25-04:55 UT. Meade EX105 Maksutov-Cassegrain telescope, 154 x*

Another of the quite obvious rings of the basin is more complete, the western edge is formed by a very noticeable trio of craters from different geological eras: Theophilus, Cyrillus and Catharina, and the eastern edge is formed by a line that goes from Santbech to Colombo.

We are already on the edge of Mare Nectaris. The third ring, in its western part, passes through the two oldest craters of a famous lunar trio, "a magnificent chain" Wood calls it (IMAGE 7): Catharina and Cyrillus (Theophilus is found inside the third ring), that belong to the Nectaric period: "Catharina (lat. 17.98°S, long 23.55°E; R, 1651): This Upper-Nectarian-age crater is about 98.77 km (61.37 miles) in diameter and 3130 m (10,270 feet) deep (…) All of the crater's walls are battered and rounded by numerous impacts. On the northern floor of the crater is the heavily pockmarked and degraded Imbrian-age satellite crater Catharina P" (Garfinkle). Catharina is the oldest crater of the 3: "five craters (including the 45-km-wide Catharina P) are superposed on it. Elongated craters on its northeast rim are aligned toward Imbrium, so Catherina is probably older than that basin. Cyrillus, on the other hand, is sufficiently young that traces of its terraced walls and a 2.1 km high central peak are preserved. Although its northeastern rim has been encroached on by the formation of Theophilus, Cyrillus doesn't look as battered as might be expected" (Wood).

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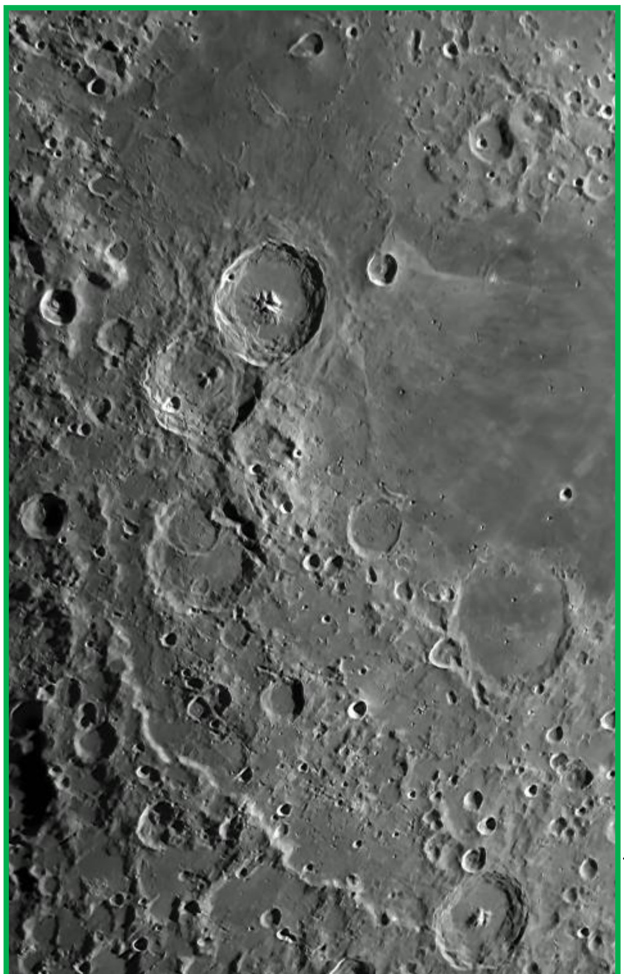


***Image 7, Mare Nectaris,*** *Mike Karakas, Winnipeg, Manitoba, Canada. 2018 June 19 02:50 UT. Intes 809 Maksutov-Cassegrain telescope, f/10, 2x Tele Vue Barlow, 642 nm IR pass filter, ZWO ASI174 MM camera. Seeing 6/10.*

Focus On: Mare Nectaris: A Small Basin Full of Wonders

Cyrillus is also about 98 kilometers in diameter, so the comparison with Catharina, of the same diameter, and the much younger Theophilus (101 kilometers) is very interesting, as we see in IMAGE 8 and 9. In the latter we can see details of the Cyrillus floor to which Wood refers: "Cyrillus doesn't look as battered as might be expected. The eastern side of its floor is dominated by a large arcuate ridge that seems to turn into a valley. Southwest of the central peak, a much narrower rille squiggles across the floor for a distance of about 10 km. Are these unusual floor fractures the result of a southward shove from the formation of Theophilus? Is Cyrillus a floor-fractured crater, with cracks due to underlying magma that warped the crater floor up and fractured it as well?".

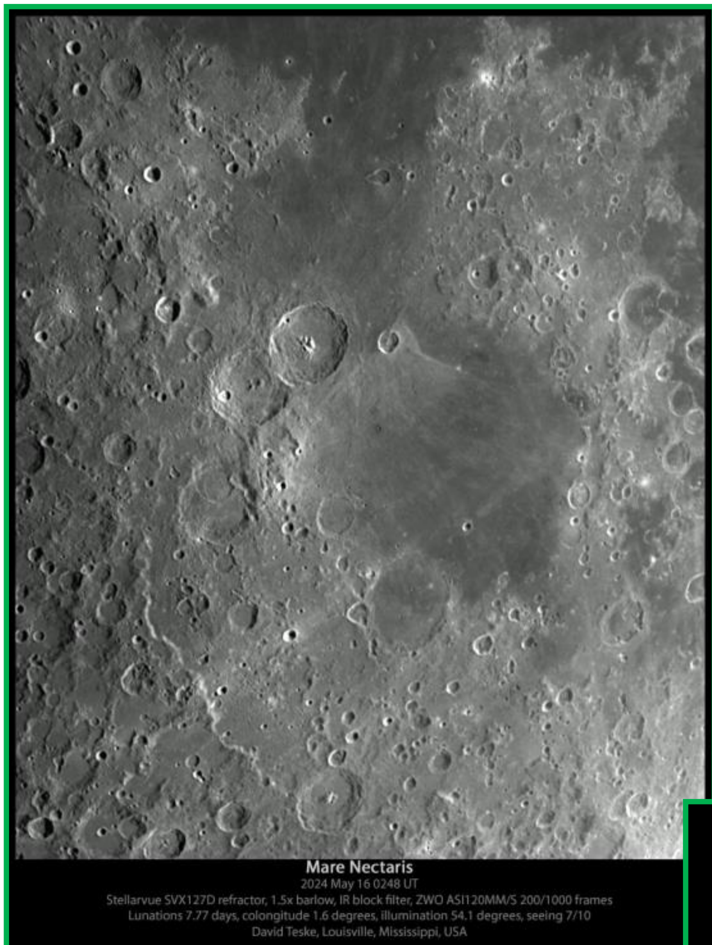



***Image 8, Mare Nectaris,*** *David Teske, Louisville, Mississippi, USA. 2024 May 16 02:48 UT, colongitude 1.6$^o$. Stellarvue 127D refractor telescope, 1.5x barlow, IR block filter, ZWO ASI120 MM camera. Seeing 7/10.*

***Image 9, Mädler,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2016 January 16 00:39 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

Focus On: Mare Nectaris: A Small Basin Full of Wonders

Thomas Elger had already noticed the unusual configuration of the floor of Cyrillus, his description is an example of how incredibly precise his observations were, just compare them with IMAGE 10: “The N.E. wall is very remarkable. It appears to be partially wrecked. If observed at an early stage of sunrise, a great number of undulating ridges and rows of hillocks will be seen crossing the region E. of Theophilus. They resemble a consolidated stream of "ropy" lava which has flowed through and over the wall and down the glacis. The arrangement of the ridges within Cyrillus is very noteworthy, as is also the triple mountain near the center of the floor. The fine curved cleft thereon traverses the W. side, sweeping round the central mountains and then turning to the south. I have only occasionally seen it in its entirety. There are also two oblong dark patches on the S. side of the interior. The S. wall of Cyrillus is broken by a narrow pass opening out into a valley situated on the plateau which bounds the W. side of the oblong formation lying between it and Catherina, and overlooking a curious shallow square-shaped enclosure abutting on the S.W. side of Cyrillus”. We have a different look at Catharina and Cyrillus in IMAGES 11 and 12, with more oblique lighting (as can be seen in the text by Paul Walker that is included in this same issue with the title of “The Chaotic Western Shore of Mare Nectaris as Reveled by Grazing Sunlight”). In these images the reader will surely have laid his eyes on the most spectacular crater in the area, because it is the youngest: “Along with Tycho and Copernicus, Theophilus is one of the most spectaculars craters visible from Earth, it is an excellent example of the Tycho class of complex-crater morphology, having the three characteristic components: terraced walls, a flat floor and broad central peaks. Standing on the rim crest of Theophilus would be frightening, for there is a steep scarp that drops 1.5 kms over a horizontal distance of just 2 kms! At the bottom of this plunge is the first of the flat-topped or rubbly terraces that step down to the floor- a mostly smooth expanse, with hills that extends from the massive central peaks toward the east and the west walls” (Wood).

***Image 10, Theophilus,*** *Raúl Roberto Podestá, Formosa, Argentina. 2023 October 22 00:24 UT. 127 mm Maksutov-Cassegrain telescope, UV/IR cut filter and #80 blue filter, ZWO ASI178MC camera. North is to the right, west is down.*

*Image 11,* ***Theophilus,*** *Eduardo Horacek-Esteban Andrada, Mar del Plata, Argentina. 2021 August 13 22:57 UT. 150 mm Maksutov-Cassegrain telescope, Canon EOS Rebel T5i camera.*

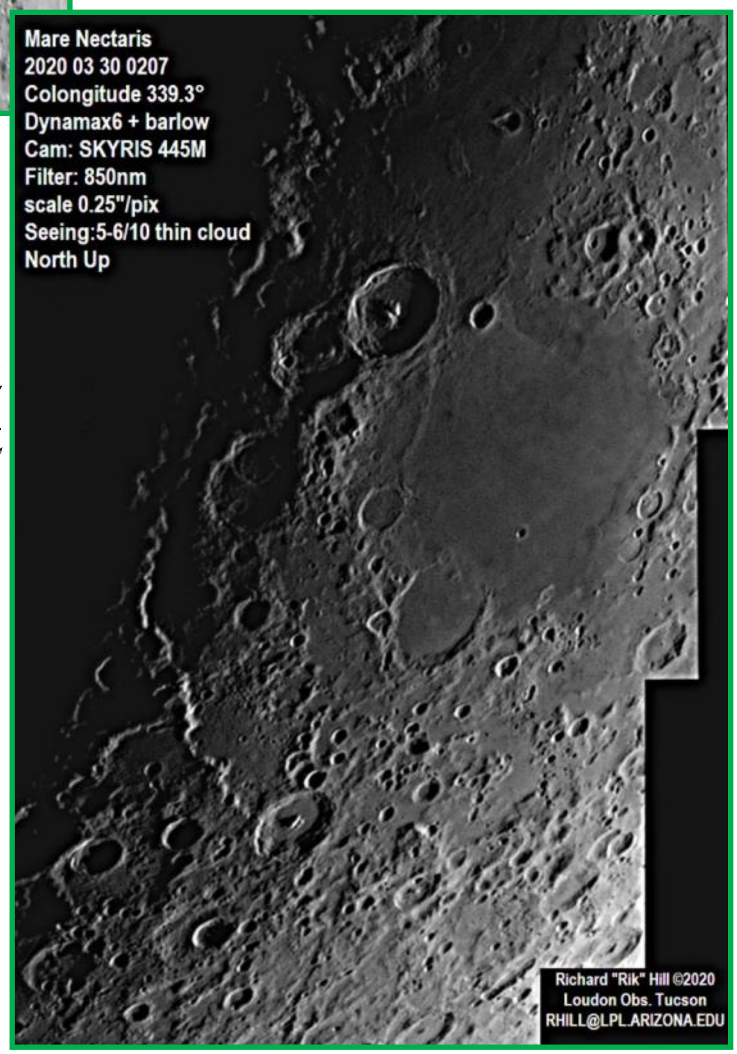



***Image 12, Mare Nectaris,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2020 March 30, 02:07 UT, colongitude 339,3º. Dynamax 6 inch Schmidt-Cassegrain telescope, barlow, 850 nm filter, SKYRIS 445M camera. Seeing 5-6/10.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

# The Chaotic Western Shore of Mare Nectaris as Reveled by Grazing Sunlight

Paul Walker

The western part of Mare Nectaris is the large, relatively smooth semi-circular area on right-hand side, a little above center. Some small, low wrinkle ridges are visible on the floor or Nectaris. One wide wrinkle ridge starts a little above Beaumont (crater just left of center). It is labeled Rima Beaumont on the LAC chart but it looks more like a wrinkle ridge to me, especially at the south end. Using the Draw/Search Tool on LROC QuickMap, the profile at the south end shows as a modest ridge rising about 200 m (650 ft) from west to east over ~3 km (1.9 mi) than descending about 500 m (1600 ft) over ~12 km (7.5 mi). As you follow it north (up) it narrows and appears to peter out. It actually becomes a modest slope for a short bit before changing into a 200-400 m (650-1300 ft) scarp with maximum slopes ranging from about 10-25 degrees. The scarp is a little longer than the section that lays between the ridge and scarp. In the image it looks like the ridge may continue but it's hard to tell. Using the LROC QuickMap I get the impression that it doesn't or if it does its buried under Theophilus' ejecta blanket. The ejecta blanket and secondary craters gives this area its chaotic appearance. Along the terminator are several bumps. Volcanic domes? Alas, apparently not, all the ones I checked out on LROC QuickMap turn out to be just small craters with the grazing sunshine accentuating their otherwise invisible shallow mantles.

Theophilus is in the upper left corner. It is the northern crater of the well-known Theophilus, Cyrillus, Catharina grouping. To the lower left of Theophilus a small bit of Cyrillus is visible and Cyrillus F below that. Theophilus is slightly oval, ~95x100 km (60x62 mi), with the long dimension going more or less north/south. It is a relatively fresh-looking crater with terraced walls, multiple central peaks (4-6 depending on what you count as peaks). The floor is flat to the north with another small flat area to the south. On the northern floor there are several small hills that look like they could be volcanic domes, however, based on what I have been reading in "Luna Cognita" their 5-10+ degree slopes would indicate that they are not. Theophilus made quite the splash blanketing the edge of Nectaris with its debris and many strings of secondary craters. Theophilus is about 4200 m (13,700 ft) deep. The 2 highest central peaks rise 2800 m (9200 ft) and 2400 m (7900 ft) above the floor and cast nice sharp pointy shadows in this image. Extensive terracing is visible on the east (right) slope of the rim with a more jumbled look on the north and south slopes. Spacecraft images show that there is a difference in the character of the north and south slopes. This images also show that width of the slumping in south is greater than rest of the crater. In shadow here, the west wall is terraced but looks more complex than the east wall. There is a 7 km crater (hidden in shadow) on the western slope providing additional interest even for small telescopes.

The large crater the lower right that is completely in shadow is Fracastorius. It does have a very narrow rille south of the crater's center, stretching all the way across east/west. The rille is only about 1 km (0.6 mi) wide and so, would need a large telescope under ideal conditions to see. It is however bisected by the 3.88 km (2.4 mi) crater, Fracastorius M, making it easier to identify the rille's location.

Focus On: Mare Nectaris: A Small Basin Full of Wonders

*Mare Nectaris (Western), Theophilus*
*Paul Walker, Middlebury, VT, USA, (44° 01’55”N, 73°09’20”W), 2023-10-04, 0806 UT*
*Lunation: 19.27 Colongitude: 146.8 deg Sub -solar Lat: 0.4 deg*
*10” f/5.6 Newt, 2x Barlow (3.39x), efl=4765mm, no filter, 0.155”/px org. image, Canon T7i (DSLR), HD video @ 3x digital zoom, 1/200 sec @ ISO 3200*


## Focus On: Mare Nectaris: A Small Basin Full of Wonders

In IMAGE 13 we can see the characteristics that Wood points out in Theophilus, as well as its wonderfully complex terraced walls: “The walls of Theophilus are terraced with multiple levels and valleys between them. The walls have darkened compared to other Copernican-age features” (Garfinkle). Another characteristic of Theophilus is its complex system of central peaks: “The central peak complex is offset to the west from the center of the crater’s rough floor. Three of the peaks have received Greek-letter designations. The northern peak is Theophilus ψ (lat. 11.20°S, long 26.40°E), which rises to a summit of about 660 m (2165 feet) above the floor. To the east of Theophilus ψ is Theophilus ϕ (lat. 11.30°S, long 26.50°E). This peak rises steeply to a summit elevation of about 1810 m (5938 feet). The southern peak is Theophilus α (lat. 11.40° S, long 26.45°E), which rises to a summit elevation of about 1660 m” (Garfinkle). Its ejecta mantle is also very peculiar: “The smooth parts of the floor are thought to be covered by rocks that were ejected and then rained back down into the crater while still molten from the energy of the impact that formed Theophilus. Look closely around the northern outer wall of the crater, where you can see more impact melt that splashed outside the rim and collected in small smooth surfaced ponds. This is one of the few places on the Moon where impact melt on the outside of the crater exterior is readily visible to telescopic observers” (Wood). The ejecta mantle has an irregular form: “the so-called “discontinuous ejecta” deposits from Theophilus are wonderfully displayed in the mare surfaces to the east and north of the crater. Low lighting reveals radiating ridges and grooves that give way to a myriad of tiny secondary craters at about one Theophilus diameter beyond the rim” (Wood), which can be seen in IMAGES 14 and 15.


***Image 13, Mare Nectaris and Theophilus,*** *Jesús Piñeiro, San Antonio de los Altos, Venezuela. 2016 January 28 22:27 UT. 250 mm Schmidt-Cassegrain telescope, Canon EOS 50D camera. North is to the right, west is up.*

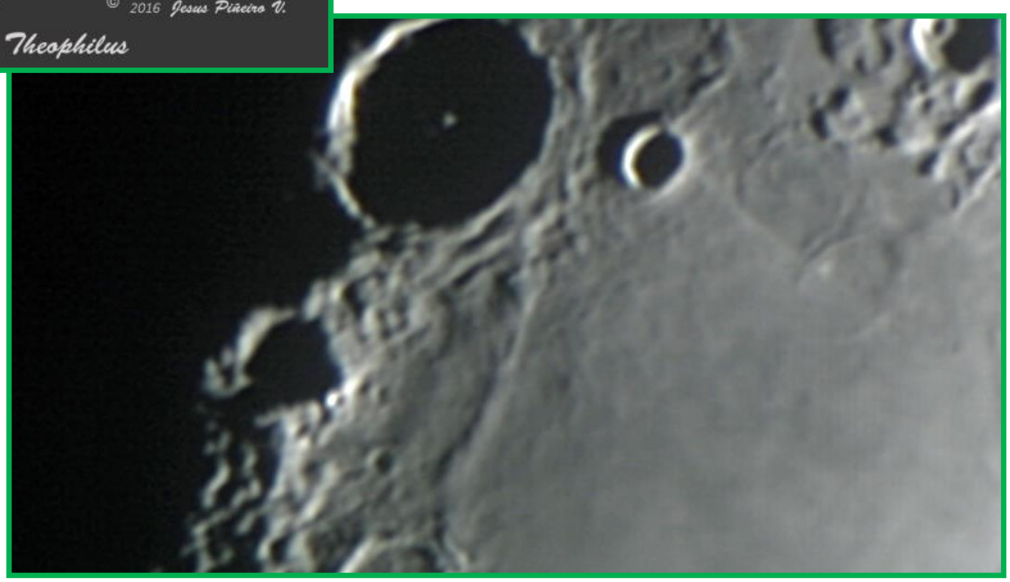


***Image 14, Theophilus,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2016 January 15 00:10 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

Focus On: Mare Nectaris: A Small Basin Full of Wonders

***Image 15, Nectaris,*** *Ariel Cappelletti, Córdoba, Argentina, SLA. 2019 April 20 00:50 UT. 102 mm Maksutov-Cassegrain telescope, IR filter, ZWO ASI178MC camera.*

Theophilus has all the characteristics of the craters geologically young, as we have seen, has also bright rays? Its doubtfull bright rays has an older origin, in the Erastothenian era: “Is Theophilus a rayed crater like Tycho and Copernicus? The answer is yes but just barely-Theophilus doesn’t have conspicuous Moon-girdling rays like Tycho, nor the more spider web-ray of Copernicus. Under the ideal lightning conditions of full Moon, the only definite rays are just visible over Sinus Asperitatis and in southern Mare Tranquillitatis near the Apollo 11 landing site (…) East of Theophilus is an enigmatic, bright region that could be rays too. This roughly square patch corresponds mostly to the area of discontinuous ejecta from Theophilus but has abrupt straight boundaries on the north and east. Why?” (Wood). This interesting description is illustrated by IMAGES 16, 17 and the photometric analysis of IMAGE 18. Before closing this description of Theophilus (a crater that deserves to be the target of its own Focus On dossier), we follow Charles Wood once again. Its central peaks are very bright, which can be seen in IMAGE 19, which led the great astronomer and lunar observer, and owner of a great fantasy William Pickering to conclude that... let's see: “Its massive peak is quite bright and, according to observations made early in the last century by Pickering, it seems to change as the Sun rises and sets on it. Pickering believed that these changes were due to the falling and melting of snow each month. It makes me wonder which of the ideas or contemporary lunar scientists may prove to be just as nutty?”


***Image 16, Mare Nectaris,*** *David Teske, Louisville, Mississippi, USA. 2024 May 20 03:07 UT, colongitude 50.7°. Stellarvue 127D refractor telescope, IR block filter, ZWO ASI120 MM camera. Seeing 8/10.*

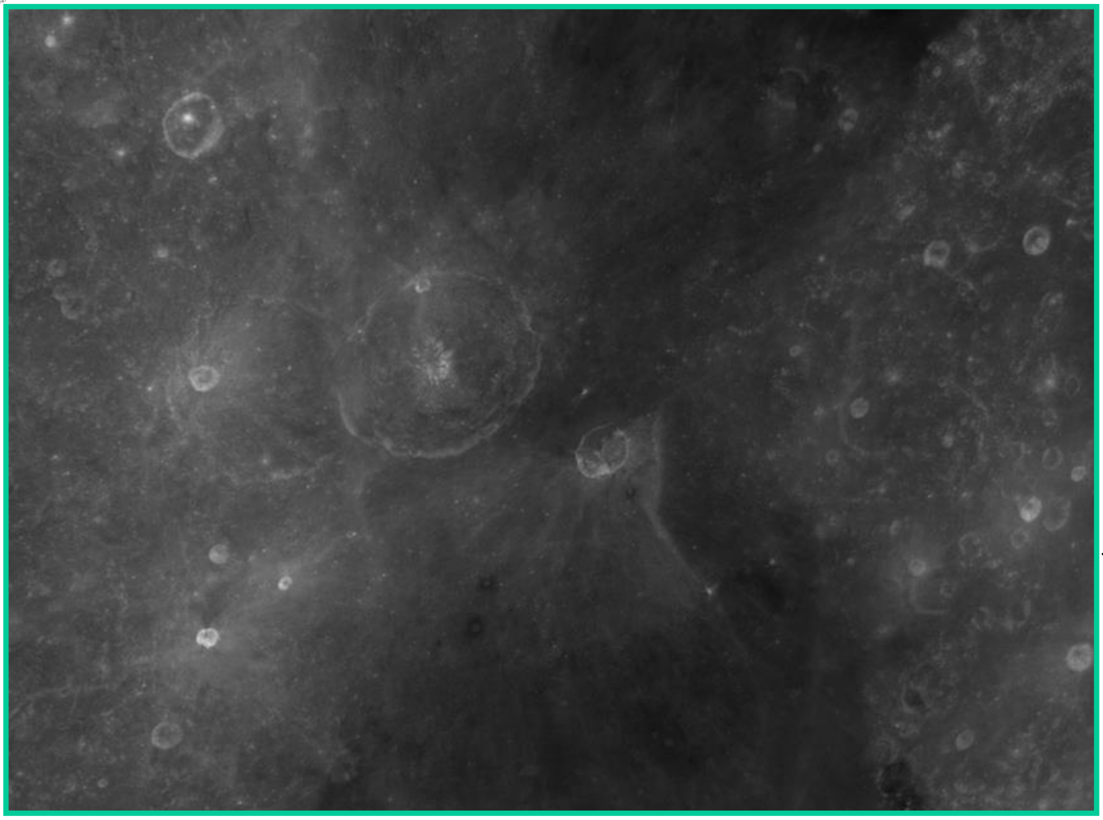


***Image 17, Mädler,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2016 June 19 03:23 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Astronomik Pro-Planet 742 nm IR-pass filter, QHY5-II camera.*

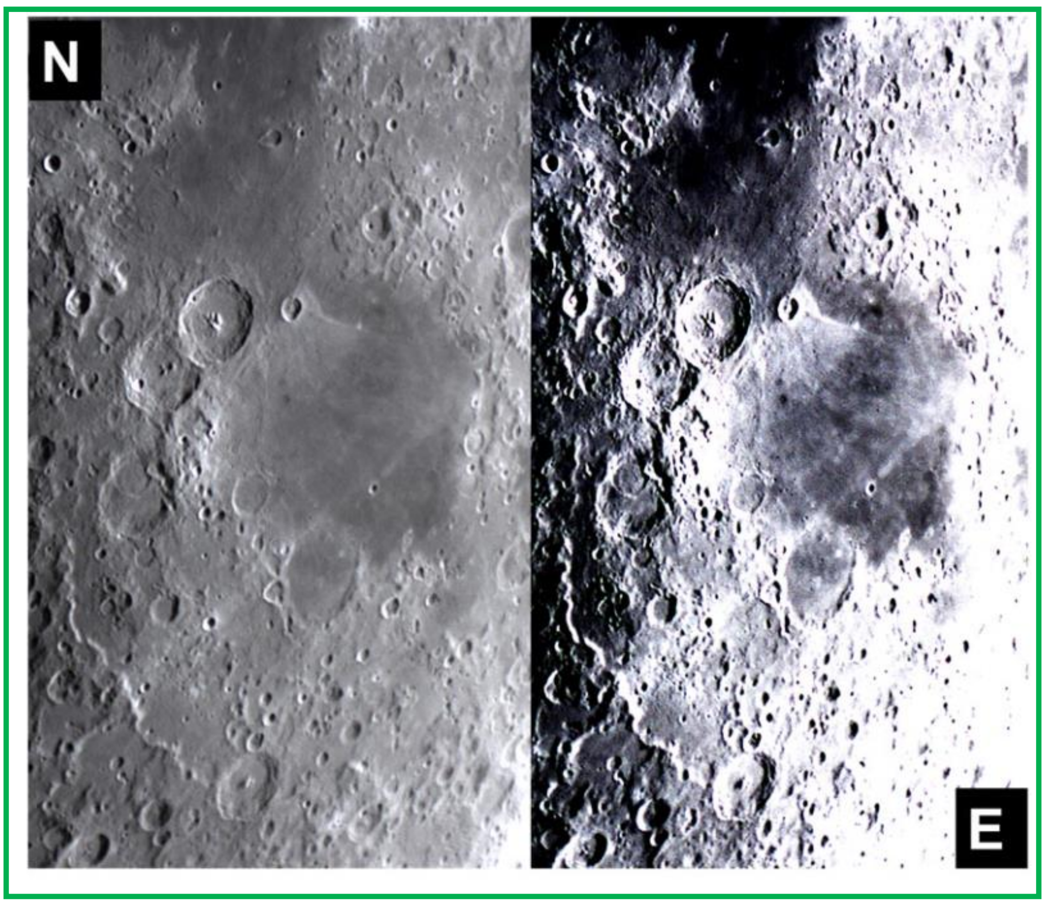



***Image 18, Mare Nectaris,*** *Marcelo Mojica Gundlach, Cochabamba, Bolivia. 2023 July 24 23:15 UT. 90 mm Maksutov-Cassegrain telescope, 1,250 mm fl, ZWO ASI178 B/W camera. Seeing 5/10, transparency 3/6. Same image with more contrast in the right to better contrast the rays, the light and dark areas of the base.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

*Image 19, Theophilus, Alberto Anunziato, Oro Verde, Argentina. 2017 November 26 01:06 UT. Celestron 11 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

Theophilus would be at the northern end of the edge of the third ring of Nectaris Basin, the southern end is occupied by two similar craters but of different sizes: Beaumont and further to the south Fracastorius. Beaumont is "the Nectarian-age crater is on the western shoreline of Mare Nectaris. The crater is about 50.69 km in diameter and 550 m deep, with highly degraded walls and pockmarked floor. Two small craters mark a gap in the southern wall. The western interior wall is very bright under morning sunrise illumination. The arc for a ghost crater can be seen close to the northeastern wall. There are three separate mountain complexes and a bright cone crater on the floor of Beaumont. To the east, on the mare is a clustering of named secondary craters" (Garfinkle) IMAGE 20.

***Image 20, Theophilus,** Diego Ferradans, Villa María, Argentina. 2020 March 29 22:18 UT. 200 mm Newtonian reflector telescope, Xiaomi Redmi Note 7 camera.*

Fracastorius is also a Nectarian-age crater, about 120 kms in diameter. According to Garfinkle: "The northern wall is partly missing and the crater is flooded with lava from Mare Nectaris. The remaining rim crests are generally rounded and highly degraded. The crater's floor is highly cratered and rough, with numerous hillocks, uneven patchy lava flows, and a sinuous rille that runs east to west across the floor". Usually, the walls of Fracastorius seem crumbling and low and its floor smooth and flooded with lava. But near the terminator, with oblique illumination, it is evident that its walls are quite steep. The almost completely destroyed wall is the northern one, but in IMAGES 21, 22 and 23 we can see a motley set of hills and ridges. Even with more frontal lighting, Fracastorius shows that it must have been a majestic crater (IMAGE 24), which has also suffered numerous impacts, even after being flooded with the lava that formed Mare Nectaris (IMAGE 25).

***Image 21, Fracastorius,*** *Sergio Babino, Montevideo, Uruguay. 2020 March 14 04:59 UT. 203 mm catadrioptic telescope, ZWO ASI174MM camera.*


***Image 22, Fracastorius,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2012 October 19, 23:43 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, DMK21AU04 camera. Seeing 7/10.*

Focus On: Mare Nectaris: A Small Basin Full of Wonders

***Image 23, Fracastorius,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2018 September 29, 07:29 UT, colongitude 144,6º. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, SKYRIS 445M camera. Seeing 8/10.*

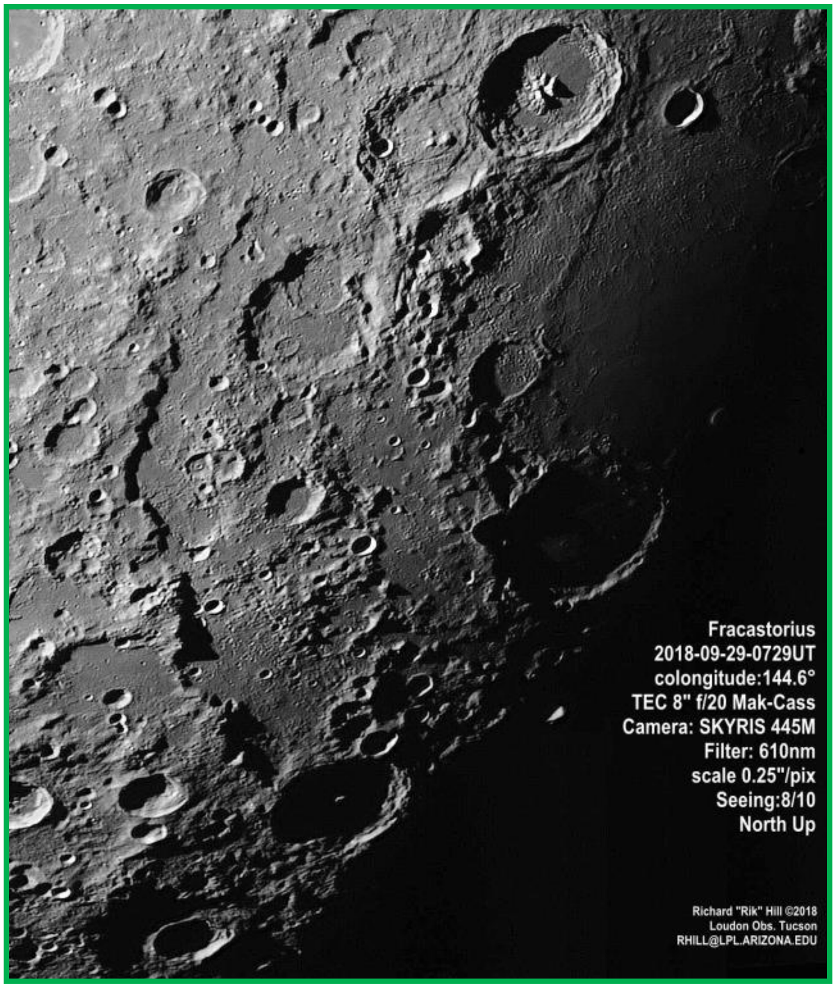



***Image 24, Fracastorius,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2016 January 14 23:20 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

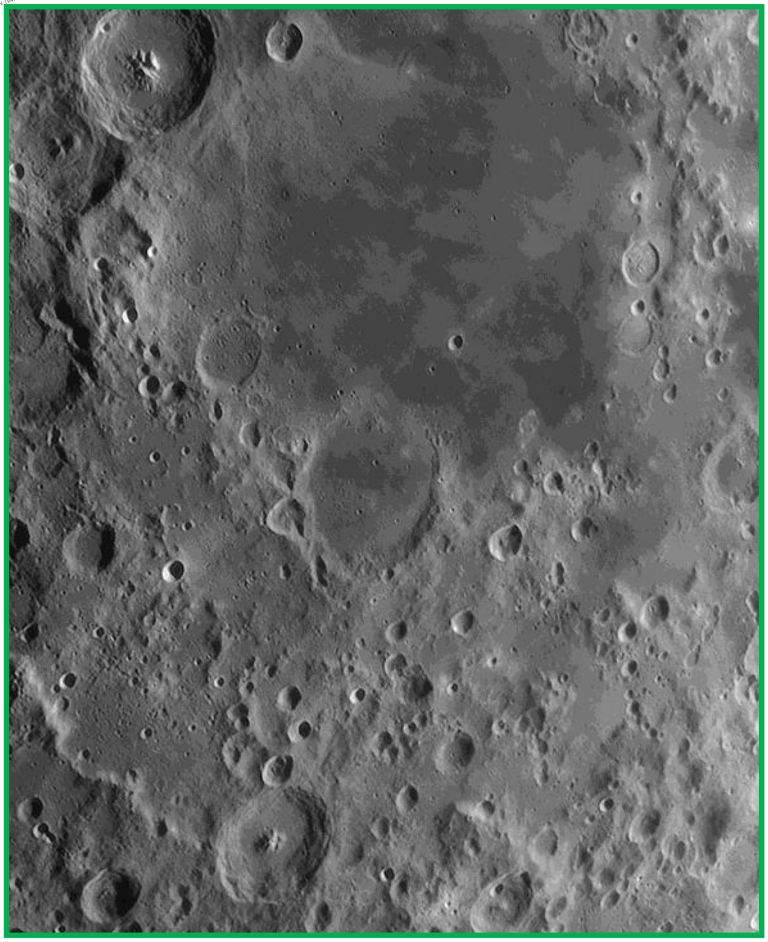


*Image 25,* ***Fracastorius,*** *Ngô Trần Tiến, Ho Chi Minh City, Vietnam. 2024 June 13 00:05 UT. 6.3 inch f/8 reflector telescope, on a manual Dobsonian mount, 1,280 mm focal length, IMC-3616UC camera. Seeing 8/10 on Pickering scale, transparency 3/6.*

If we pay attention to the upper part of IMAGE 25, as well as IMAGES 26, 27 and 28, we see that the southeastern edge of Mare Nectaris practically does not exist, as well as on the northern edge, as we will see, and that the craters of the eastern rim are much less spectacular than the magnificent craters we reviewed on the western rim. At first glance, Bohnenberger stands out, which we see in IMAGE 29 ("The Upper-Imbrian-age crater is about 31.74 km (19.72 miles) in diameter, 2400 m (7875 feet) deep, and is located to the west of Montes Pyrenaeus, near the eastern shore of Mare Nectaris. Bohnenberger is a type IV floor-fractured crater. A ring of rilles encircles the convex floor of the crater near the base of its steep and bright interior walls. A wide rille meanders across the floor from northeast to southwest. A mound of slump materials is piled up at the base of the northern interior wall. Light-gray bands are observable where landslides have grooved the interior walls. The rim crests are still sharp" (Garfinkle).

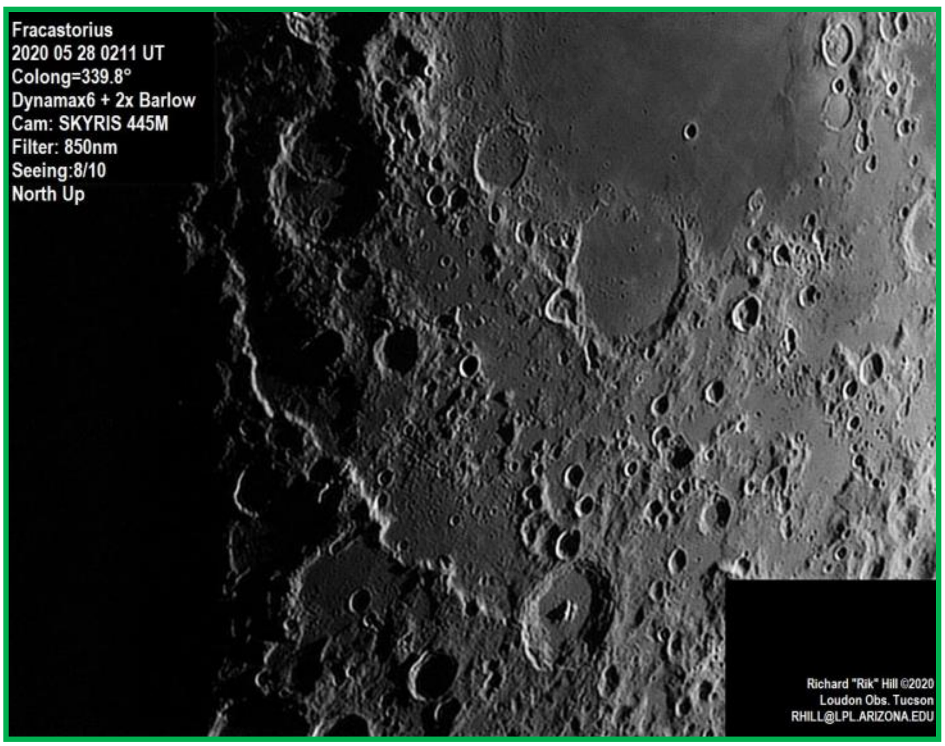



***Image 26, Fracastorius,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2020 May 28, 02:11 UT, colongitude 339,8°. Dynamax 6 inch Schmidt-Cassegrain telescope, 2x barlow, 850 nm filter, SKYRIS 445M camera. Seeing 8/10.*

*Image 27, Theophilus, Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2017 July 01 23:20 UT. 200 mm refractor telescope, QHY5-II camera.*

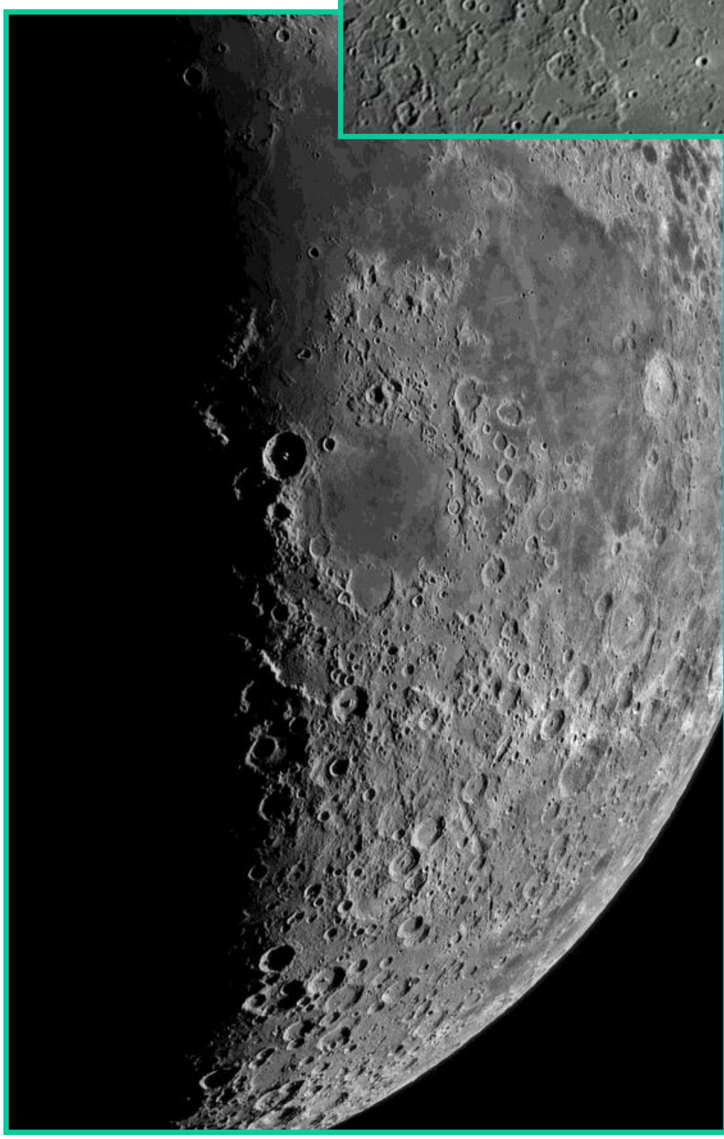


*Image 28, Theophilus, Sergio Babino, Montevideo, Uruguay. 2018 October 14 23:21 UT. 81 mm refractor telescope, ZWO ASI174MM camera.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

***Image 29, Bohnenberger,*** *Sergio Babino, Montevideo, Uruguay. 2018 October 13 22:24 UT. 81 mm refractor telescope, ZWO ASI174MM camera.*

In IMAGE 30 we see a panorama of the edge of Mare Nectaris to the next ring of the Nectaris Basin, marked by the largest craters, from the top we see in IMAGE 30 Gutenberg, Goclenius, Magelhaens, Colombo ("A fine ring-plain, about 50 miles in diameter, situated in the highlands separating the Mare Fecunditatis and the Mare Nectaris. The wall, rising at one place to a height of 8000 feet above the floor, is very complicated and irregular, being traversed within by many terraces, and almost everywhere by cross-valleys", Garfinkle), Cook and in the inferior border Monge and Biot B. The crater Santbech is also a part of the third ring of Nectaris Basin (IMAGE 31): "A very prominent ring-plain, 46 miles in diameter, on the S.E. side of the Mare Fecunditatis, W. of Fracastorius. The continuity of its fine lofty rampart is broken on the W., where it rises nearly 10,000 feet above the floor, by a brilliant little crater just below the crest, and by a narrow gap on the S. The wall on the E. towers to a height of 15,000 feet above the interior. On its broad outer slope, near the summit, there is a fine crater, and S. of this running obliquely down the slope a distinct valley" (Garfinkle).

***Image 30, Colombo,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2015 November 29 05:37 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

Focus On: Mare Nectaris: A Small Basin Full of Wonders

***Image 31, Santbech,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2015 November 29 05:39 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

***Image 32, Mare Nectaris,*** *Fernando Surá, San Nicolás de los Arroyos, Argentina. 2023 February 09 03:40 UT. 127 mm Maksutov-Cassegrain telescope. Samsung A22 cell phone camera.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

IMAGE 32 is very interesting, since we see a panorama of the Pyrenaeus Mountains, not very detailed, but which allows us to see its height (illuminated by the oblique rays of the Sun) and to represent the eastern edge of the third ring of the Nectaris Basin quite well. Wood calls Montes Pyreaneus "pronounced ridge" and in IMAGE 32 the cause is quite clear.

***Image 32, Mare Nectaris**, Fernando Surá, San Nicolás de los Arroyos, Argentina. 2023 February 09 03:40 UT. 127 mm Maksutov-Cassegrain telescope, Samsung A22 cell phone camera.*

The northern edge of Mare Nectaris is as vague as the southern edge, but much more interesting. East of Theophilus lies Mädler (28 km in diameter), a crater very attractive because of the fan-shaped bright area that extends to the south, (IMAGE 33 to 35) and also because of its peculiar interior, crossed by what appears to be a ridge that ends in what appears to be a central peak (IMAGES 36 and 37) , as described by Thomas Elger "there is a narrow gap (flanked on the W. by a somewhat obscure little crater) through which a curious bent ridge coming up from the N. passes, and, extending on to the floor, expands into something resembling a central mountain". Mädler is a crater from the Eratosthenian period, so when the folding occurred, related to the last period of geological activity on the Moon, it was still a young crater. Mädler is best-known for its strange and lonely ray: "a bright, single ray that stretches for 130 km eastwards across northern Mare Nectaris, covering the southern floors of two ghost craters, an unnamed one (54 km) and Daguerre (46 km), both of whose southern rims have been completely submerged" (Peter Grego). Is it really a bright ray? It's an interesting question, which we address in the May 2021 issue of "The Lunar Observer" ("Madler's bright streak: ray or elevation?"). It would be a peculiar bright ray, since it is observed with very oblique illumination (IMAGE 38). This is obviously a very bright area, because it appears on the LROC Quickmap as bright (unlike other craters with bright rays). Observing that area, bright near the terminator, it was clearly perceived that the area to the north of the "bright ray" was lower than the bright area by the shadows, whose depth we can deduce from the slightly bright areas inside (craters too?) that start to light up as the terminator line progresses. If we consult the data from the LOLA altimeter of the Lunar Reconnaissance Orbiter, we notice that the bright area coincides with a narrow elevation, while to the north and south the terrain is lower (especially inside the Mare Nectaris).

*Image 33, Theophilus, Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2016 January 14 23:53 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*

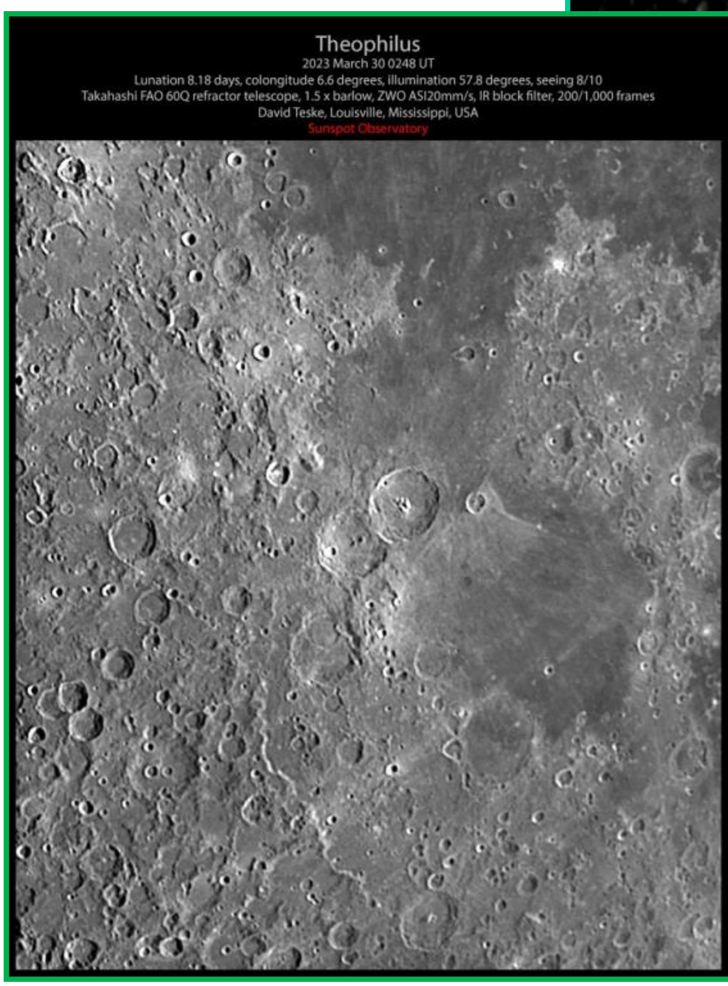



***Image 34, Theophilus,*** *David Teske, Louisville, Mississippi, USA. 2023 March 30 02:48 UT, colongitude 6.6$^o$. Takahashi FOA60Q refractor telescope, 1.5x barlow, IR block filter, ZWO ASI120 MM camera. Seeing 8/10.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

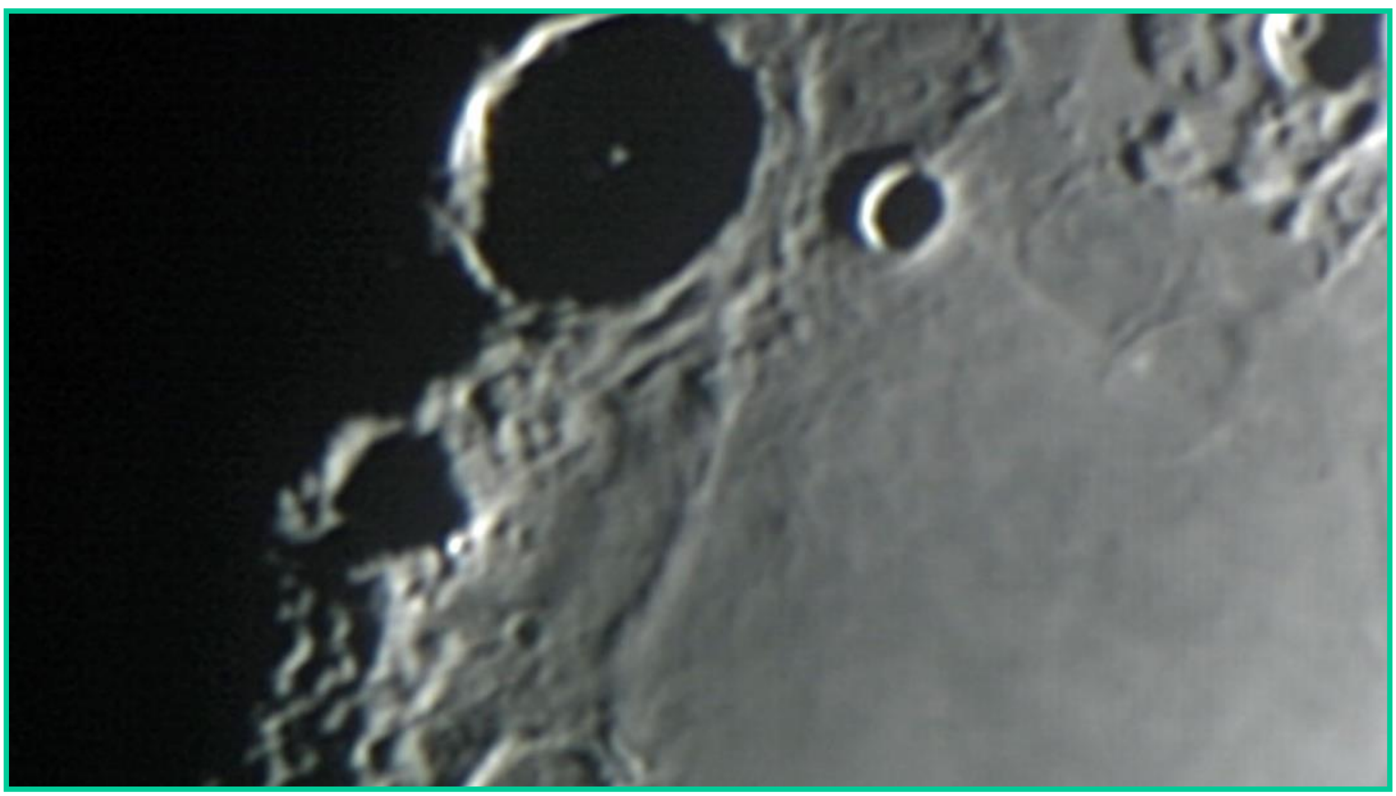

***Image 35, Theophilus,*** *David Teske, Louisville, Mississippi, USA. 2023 December 19 00:20 UT, colongitude 345.2º. Takahashi FOA60Q refractor telescope, 1.5x barlow, IR block filter, ZWO ASI120 MM camera. Seeing 6/10.*


***Image 36, Catharina to Torricelli,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2007 May 23, 03:37 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 1.6x barlow, UV/IR blocking filter,SPC900NC camera.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders


***Image 37, Rupes Altai,*** *Felix León, Santo Domingo, República Dominicana. 2021 March 27 00:25 UT. 127 mm Maksutov-Cassegrain telescope, DMK 21 618 AU camera. North is to the left, west is up.*

***Image 38, Theophilus,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2016 January 15 00:10 UT. Meade LX200 10 inch Schmidt-Cassegrain telescope, Canon EOS Digital Rebel XS camera.*



## Focus On: Mare Nectaris: A Small Basin Full of Wonders

Further east we find other of the attractive rarities of our area, the elevated region that includes the Isidorus and Capella craters. Isidorus is about 40 kilometers in diameter and despite being very old (Pre-Imbrian). Elger's description can be analyzed with IMAGE 39: "The rampart of this fine ring-plain, which is of about the same size as Capella, rises at a peak on the W. to a height of more than 13,000 feet above the interior, which, except a small bright crater at the foot of the E. wall and a smaller one adjoining it on the N., contains no detail". Capella is the crater attached to Isidorus to the east, it belongs to the same geological era and is barely larger (50 kilometers in diameter), we see it in IMAGES 40 and 41: "with finely terraced walls, broken on the S.W. by broad intrusive rill-valleys. The rampart on the N.E. is also cut through by a magnificent valley, which extends for many miles beyond the limits of the formation. There is a fine central mountain, on which M. Gaudibert discovered a crater, the existence of which has been subsequently verified by Professor Weinek on a Lick observatory negative" (Elger). Both overlapped craters form, in the words of Elger, "a very noteworthy object", it also draws the attention of Charles Wood (IMAGE 42): "The squarish patch of highlands-like material north of Nectaris, is a distinctive piece of lunar real estate, but like most bright regions of the Moon, it doesn't have an official name. I'm tired of this dark-material chauvinism -well defined bright regions need names too! So, I'm resurrecting Hevelius's 1647 designation, Colchis, for it (…) Within Colchis lie Capella and Isidorus-two craters of nearly equal size, but they are not twins (…) Capella is similar in morphology to the crater Alpetragius, located near the center of the visible hemisphere of the Moon. Each has broad inner walls and a domical central mountain but no floor. Capella has been a favorite of volcanophiles (people who think everything on the Moon is of internal original) because a line of elongated crateriform depressions passes through it".

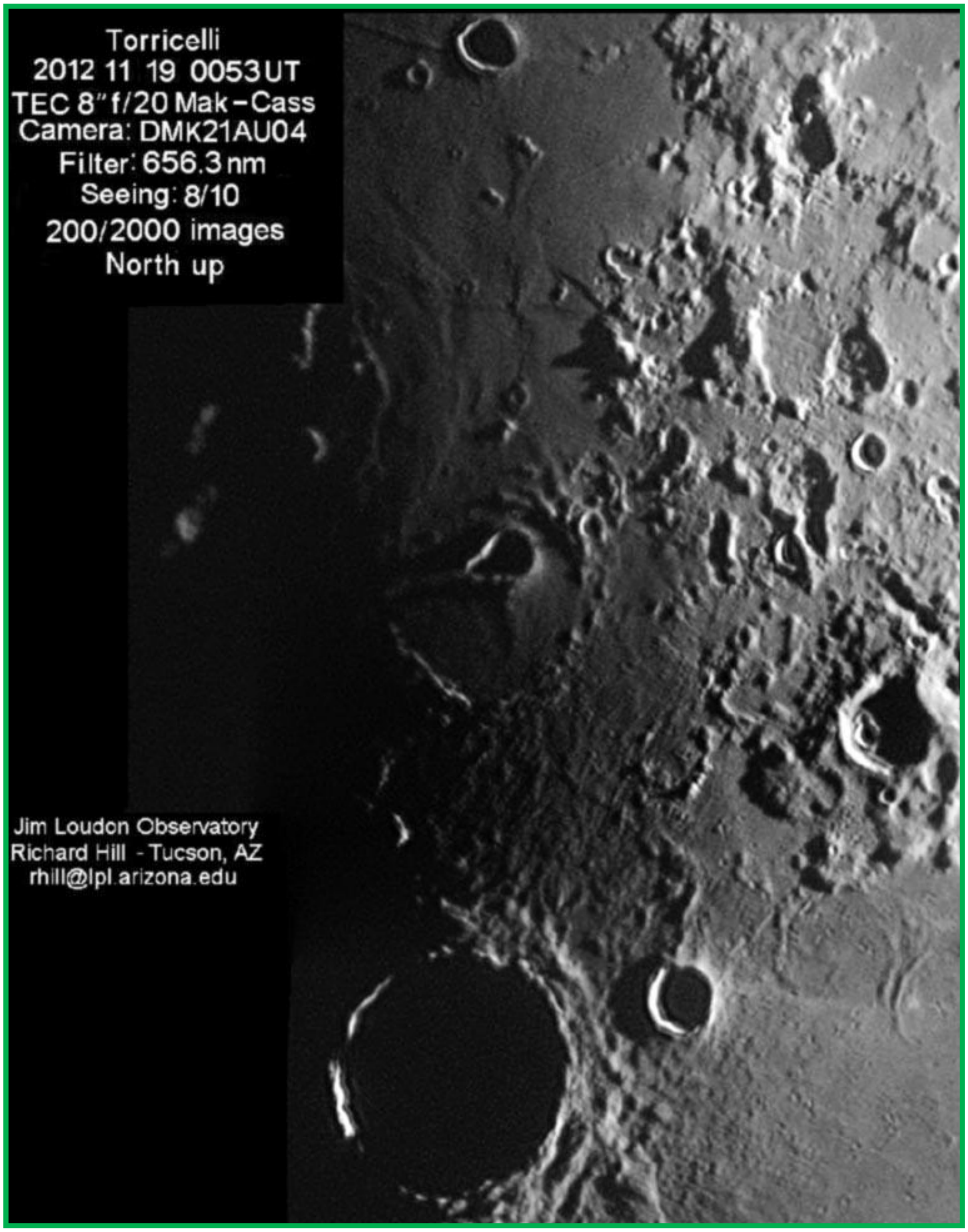



***Image 39, Torricelli,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2012 November 19, 00:53 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, DMK21AU04 camera. Seeing 8/10.*

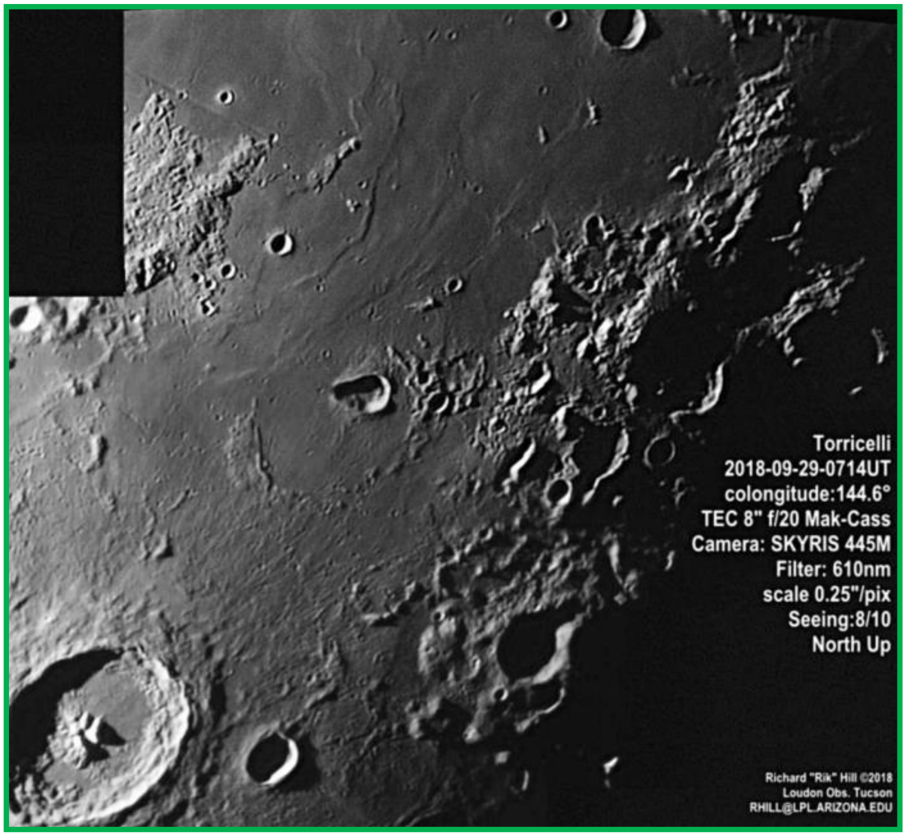



***Image 40, Torricelli,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2018 September 29, 07:14 UT, colongitude 144.6º. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, SKYRIS 445M camera. Seeing 8/10.*


***Image 41, Capella,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2012 October 20, 01:21 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, DMK21AU04 camera. Seeing 8/10.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

***Image 42, Maskelyne,*** *Francisco Alsina, Cardinalli, Oro Verde, Argentina, SLA-LIADA. 2018 October 16 01:10 UT. 200 mm refractor telescope, QHY5-II camera.*

The interior of Mare Nectaris seems a bit bland when the front lighting allows you to enjoy the bright rays (IMAGE 43, accompanied by a text by Greg Shanos that appears in this same section), of rather indeterminate origin (Theophilus, Mädler?) In In IMAGE 44 we can see that the small Rosse crater (12 km in diameter), which despite being from the Eratosthenian period, has bright rays that project towards the northeast, with a shape similar to the rays of Messier A (IMAGES 45 and 46). In these latest images you can see two interesting details of the interior of Mare Nectaris. The first is the asymmetry of the craterlets between the west side having many more impacts than the east side. The second is the dark halo craters in the Theophilus ejecta zone: "When the shadows are mostly gone from Theophilus, keen-sighted observers may detect three or more dark-haloed spots in northwestern Nectaris. The largest is the 4.4-km-wide craterlet Beaumont L, which is about 100 km due east of Cyrillus. Another dark-haloed crater lies just north of Beaumont L" (Wood).

**Image 43, Mare Nectaris,** Gregory T. Shanos, Mare Nectaris on June 13, 2024 at 10:55 pm or June 14, 2024 02h 55m UT. The moon was at 49% phase and only 39° above the horizon. The sky was perfectly clear down to the horizon however the seeing was below average without a jet stream. Image was acquired using a Meade LX200GPS ACF 8-inch 2000mm fl f/10 alt-azimuth mounted with a ZWO ASI 178MM monochrome camera and an Optec 0.62X focal reducer. Firecapture v2.7.14 acquired the AVI video which was processed using Autostakkert 4.0.11 beta and Registax 6.1. Further sharpening and processing in Photoshop CS4. Image by Gregory T. Shanos, Sarasota, Florida.

Mare Nectaris is a basin located south of the Mare Tranquillitatis and west of the Mare Fecunditatis. The diameter of Mare Nectaris is 360 km or 223.7 miles. Most of the floor of Mare Nectaris is flat and pockmarked with craterlets. The age of Mare Nectaris is between 3.85 and 3.92 billion years. Three prominent craters that surround Mare Nectaris are to the left (west) are Theophilus, Cyrillus and Catharina. The crater to the (bottom) south is Fracastorius, east (right) are Bohnenberger and Gaudibert and north (top) are Madler and Daguerre.

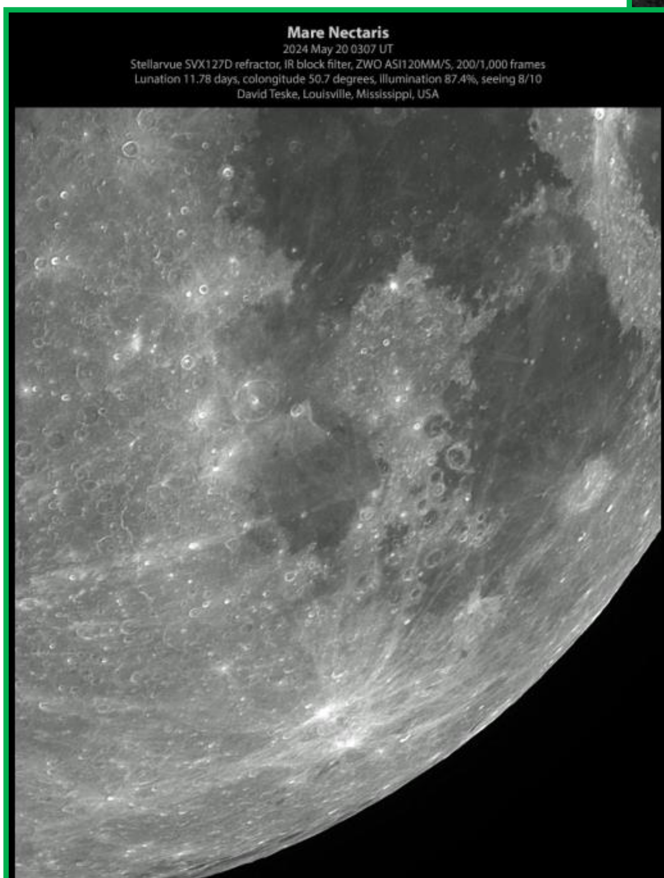



***Image 44, Mare Nectaris,*** *David Teske, Louisville, Mississippi, USA. 2024 May 20 03:07 UT, colongitude 50.7°. Stellarvue 127D refractor telescope, IR block filter, ZWO ASI120 MM camera. Seeing 8/10.*

Focus On: Mare Nectaris: A Small Basin Full of Wonders

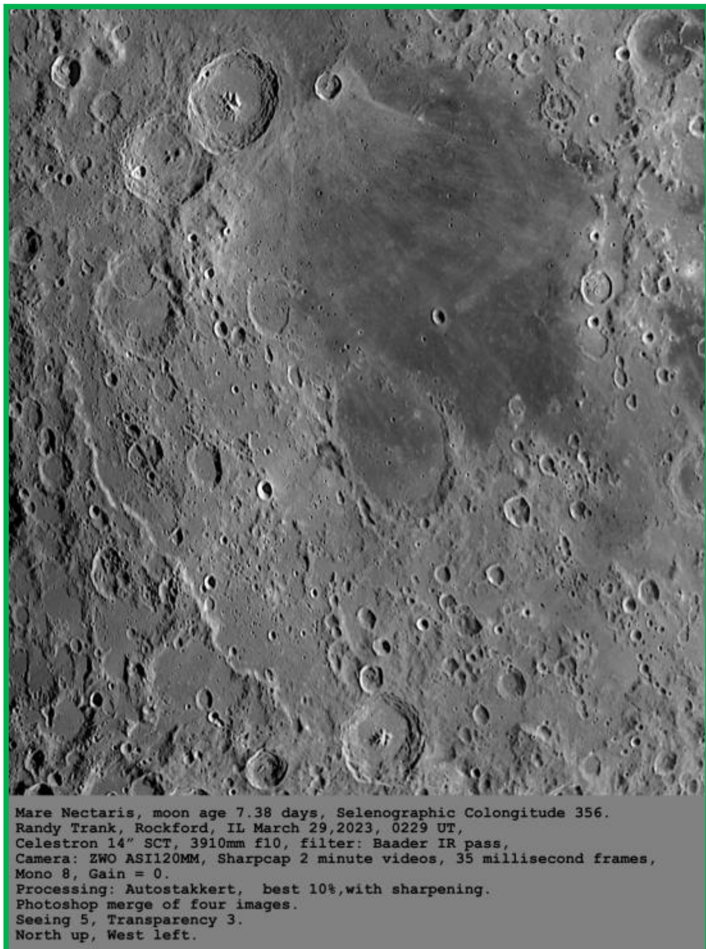



***Image 45, Mare Nectaris****, Randy Trank, Rockford, Illinois, USA. 2023 March 29 02:29 UT, colongitude 356º. Celestron 14 inch Schmidt-Cassegrain telescope, Baader IR pass filter, ZWO ASI 120MM camera. Seeing 5/10, transparency 3/6.*

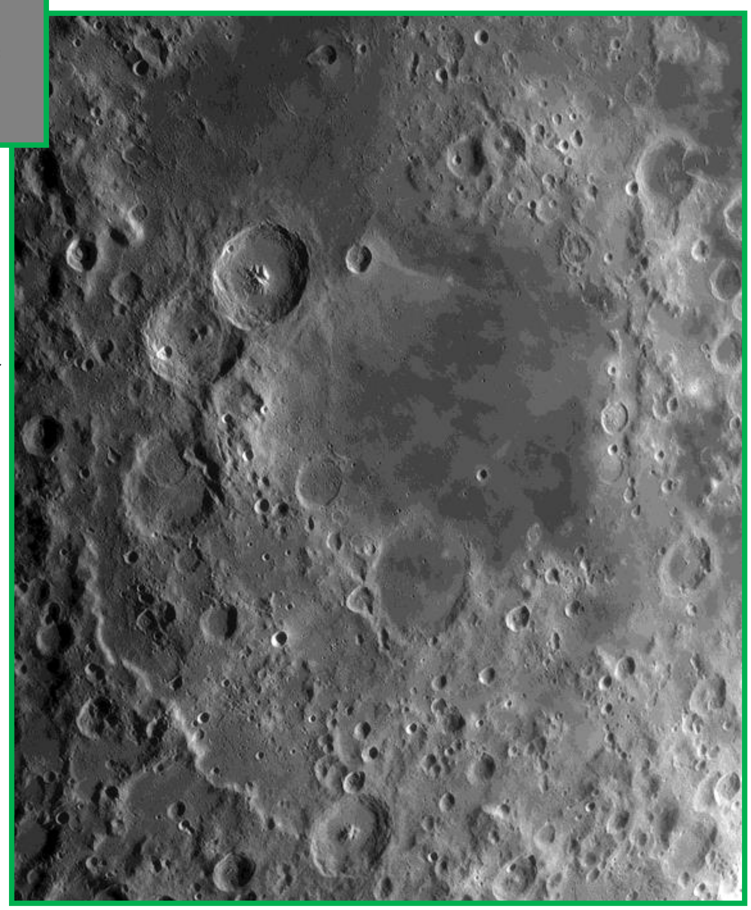
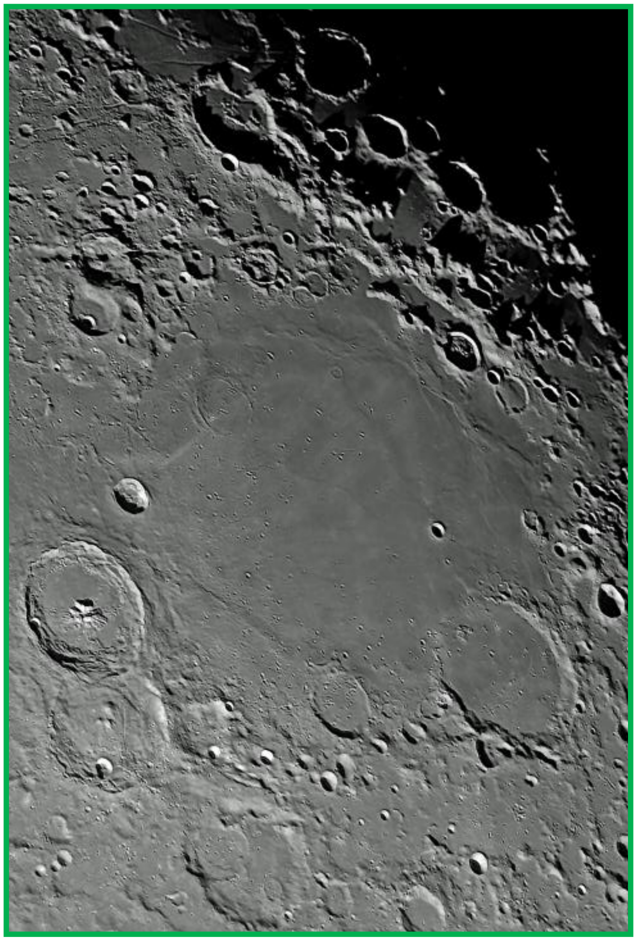


***Image 46, Mare Nectaris,** Ngô Trần Tiến, Ho Chi Minh City, Vietnam. 2024 June 13 00:05 UT. 6.3 inch f/8 reflector telescope, on a manual Dobsonian mount, 1,280 mm focal length, IMC-3616UC camera. Seeing 8/10 on Pickering scale, transparency 3/6.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders



The last ring of the Nectaris Basin would be the wrinkle ridges concentric to the center of the Mare, which can be seen in IMAGE 46, as a dark area on the eastern edge and as a more defined, and quite wide, dorsum on the western edge. IMAGE 47 shows, in addition to the asymmetry of small craters, the topography of the wrinkle ridges of both rims and even the very elusive central wrinkle ridges. In this image we can also see in extraordinary detail the 45 km diameter Nectaric crater Daguerre, almost completely disappeared under the shallow lavas of Mare Nectaris.

***Image 47, Mare Nectaris,*** *Mike Karakas, Winnipeg, Manitoba, Canada. 2020 November 04 05:38 UT. Celestron 11 inch Schmidt-Cassegrain telescope, f/10, 2x Tele Vue Barlow, 642 nm IR pass filter, ZWO ASI174 MM camera. Seeing 7/10.*

Dark areas can be seen, which would be, according to Charles Wood, dark mantling deposits and, therefore, of volcanic origin. Both the concentric dorsa and the radial dorsa of the center, as well as the peculiar topography of the dorsum that goes from the Theophilus ejecta mantle to Beaumont can be seen in IMAGES 48. We can see the latter in great detail in IMAGES 49 and 50. In the issue June 2023 we commented on the peculiar topography of this wrinkle ridge (“The topography or fan irregular wrinkle ridge in Mare Nectaris”). In IMAGE 51 its highest part is the only Illuminated part in the terminator area and in IMAGE 52 the Sun is a little higher over the area.

***Image 48, Mare Nectaris,*** *Marcelo Mojica Gundlach, Cochabamba, Bolivia. 2019 July 07 23:31 UT. 90 mm Maksutov-Cassegrain telescope, 1,250 mm fl, ZWO ASI120 color camera. Seeing 6/10, transparency 4/6. West is to the right.*

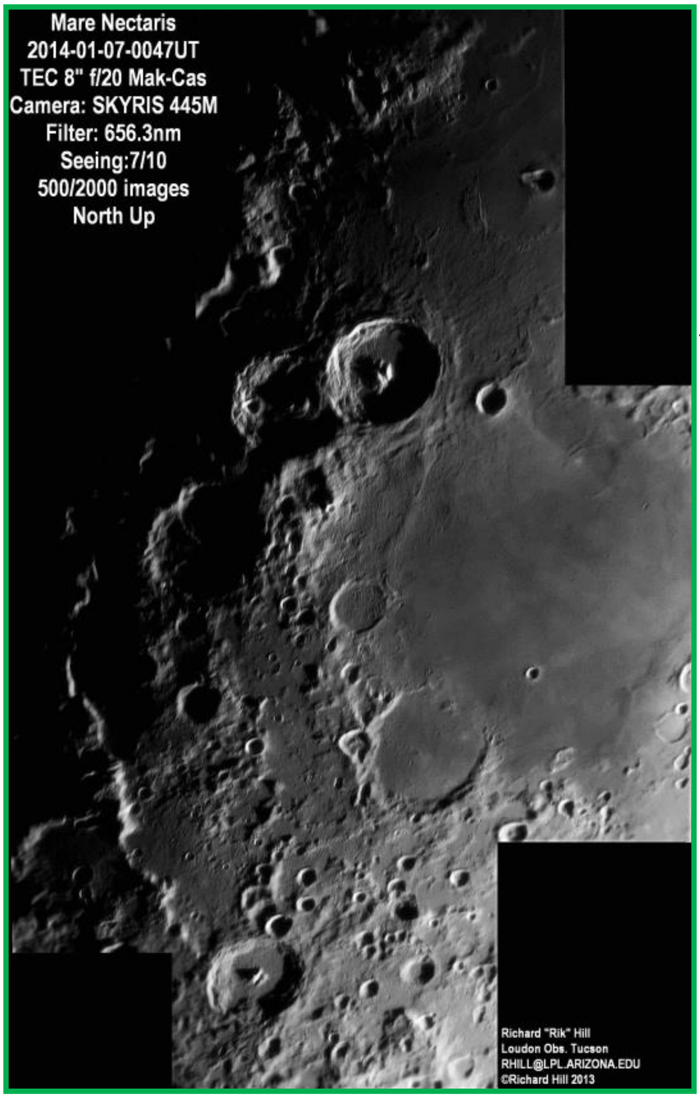



***Image 49, Mare Nectaris,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2014 January 07, 00:47 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, SKYRIS 445M camera. Seeing 7/10.*

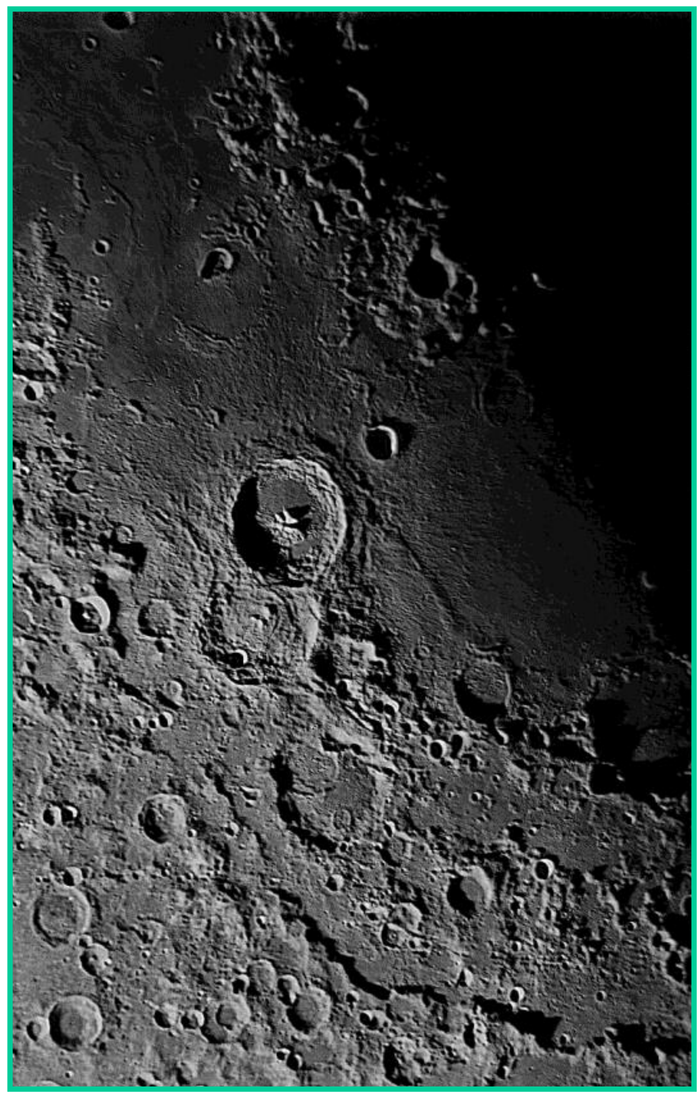


***Image 50, Theophilus,*** *Sergio Babino, Montevideo, Uruguay. 2020 March 14 04:49 UT. 203 mm catadrioptic telescope, ZWO ASI174MM camera.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

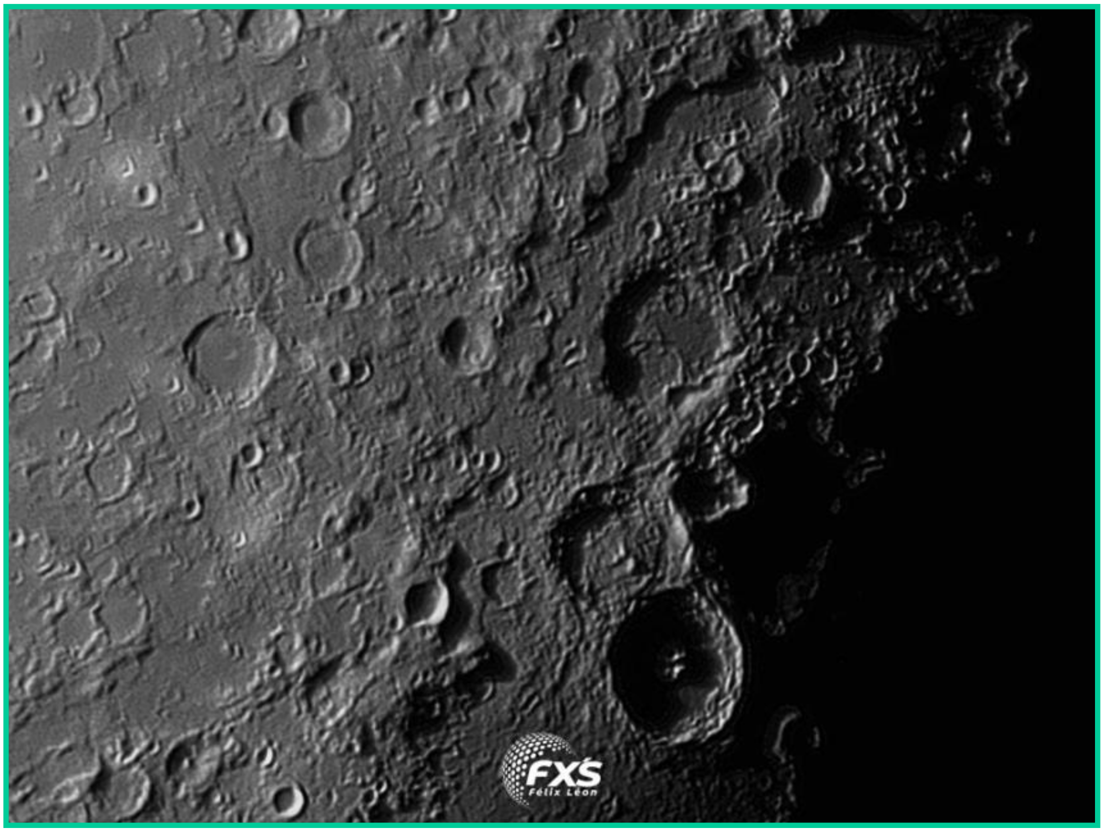


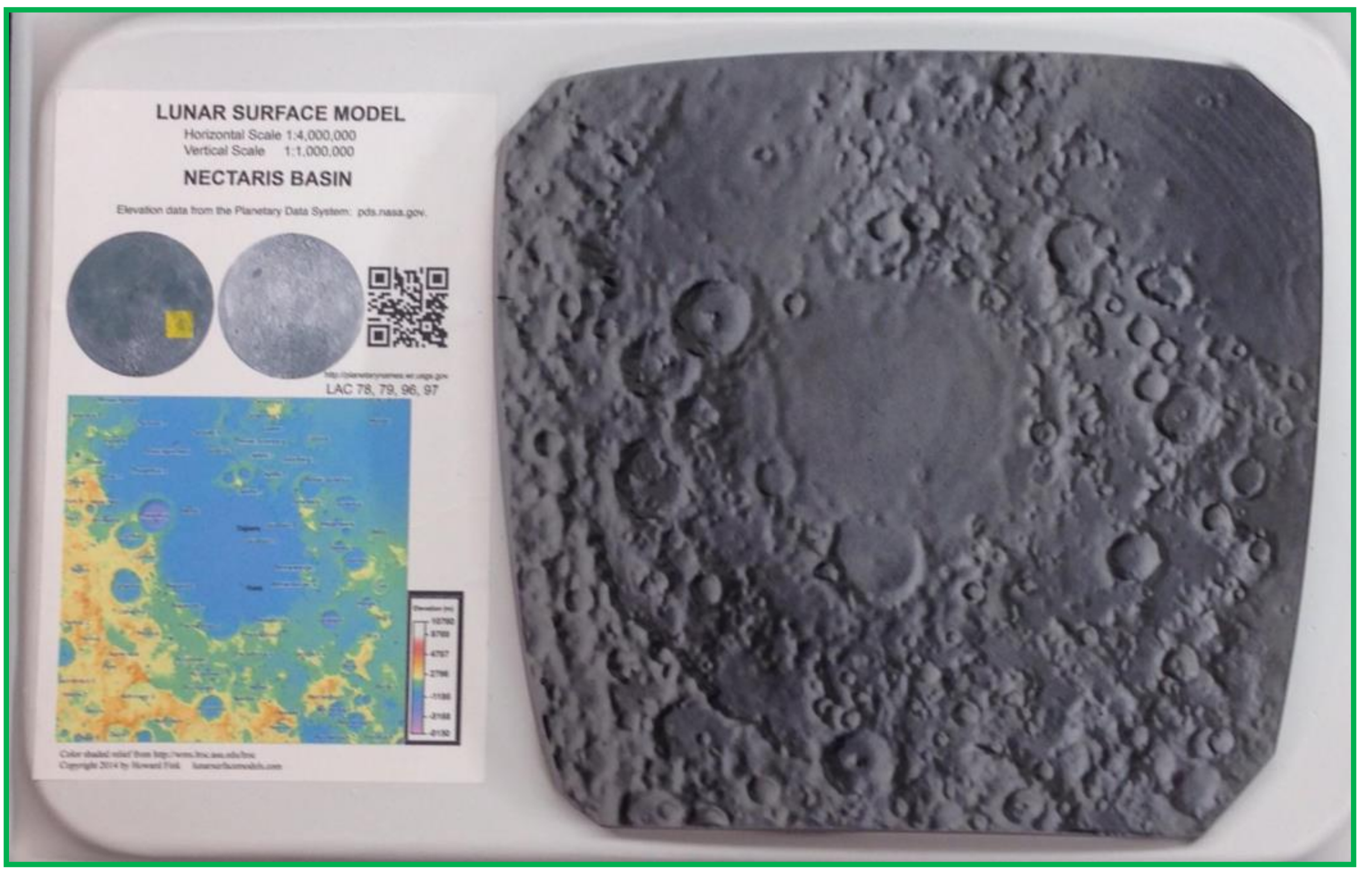

***Image 51, Theophilus,*** *Felix León, Santo Domingo, República Dominicana. 2022 October 12 05:12 UT. 8 inch Schmidt-Cassegrain telescope, DMK 21 618 AU camera. North is to the down, west is left.*

***Image 52, Fracastorius,*** *Fernando Surá, San Nicolás de los Arroyos, Argentina. 2021 January 19 00:19 UT. 127 mm Maksutov-Cassegrain telescope. Blue cell phone camera.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

To say goodbye to Mare Nectaris, but not before thanking the experts who have guided us on this journey (whose quotes we have use maybe too much) and who we will find in the bibliography; we share IMAGE 53, which illustrates Charles Wood's description: “Mare Nectaris is the smallest of the circular maria on the Moon; lavas extend only 350 km from shore to shore, and their estimated maximum thickness is just 1.5 km (…) apparently the small pool of mare lava did not cause enough subsidence for bending at the basin margins to form concentric troughs. Maybe that’s why Nectaris is one of the few basins not surrounded by arcuate grabens”. It is, according to its author Howard Fink, “a model of Mare Nectaris from 2014. The mold was 3D printed, and copies were made in polystyrene using a thermoformer.  The model was given a base coat of flat grey paint, and the shadow relief was added with an airbrush.  The frame is 12” x 18”.

***Image 53, Mare Nectaris Model,*** *Howard Fink, New York, New York, USA.  The mold was 3D printed, and copies were made in polystyrene using a thermoformer.  The model was given a base coat of flat grey paint, and the shadow relief was added with an airbrush.  The frame is 12” x 18”.*




Focus On: Mare Nectaris: A Small Basin Full of Wonders

BIBLIOGRAPHY

Elger, Thomas G. (1895), The Moon, George Philip & son, London.

Garfinkle, Robert (2020), Luna Cognita, Springer, New York.

Grego, Peter (2005), The Moon and How To Observe It, Springer.

Spudis, Paul D. (1993), The Geology of Multi-Ring Impact Basins, Cambridge University Press, Cambridge.

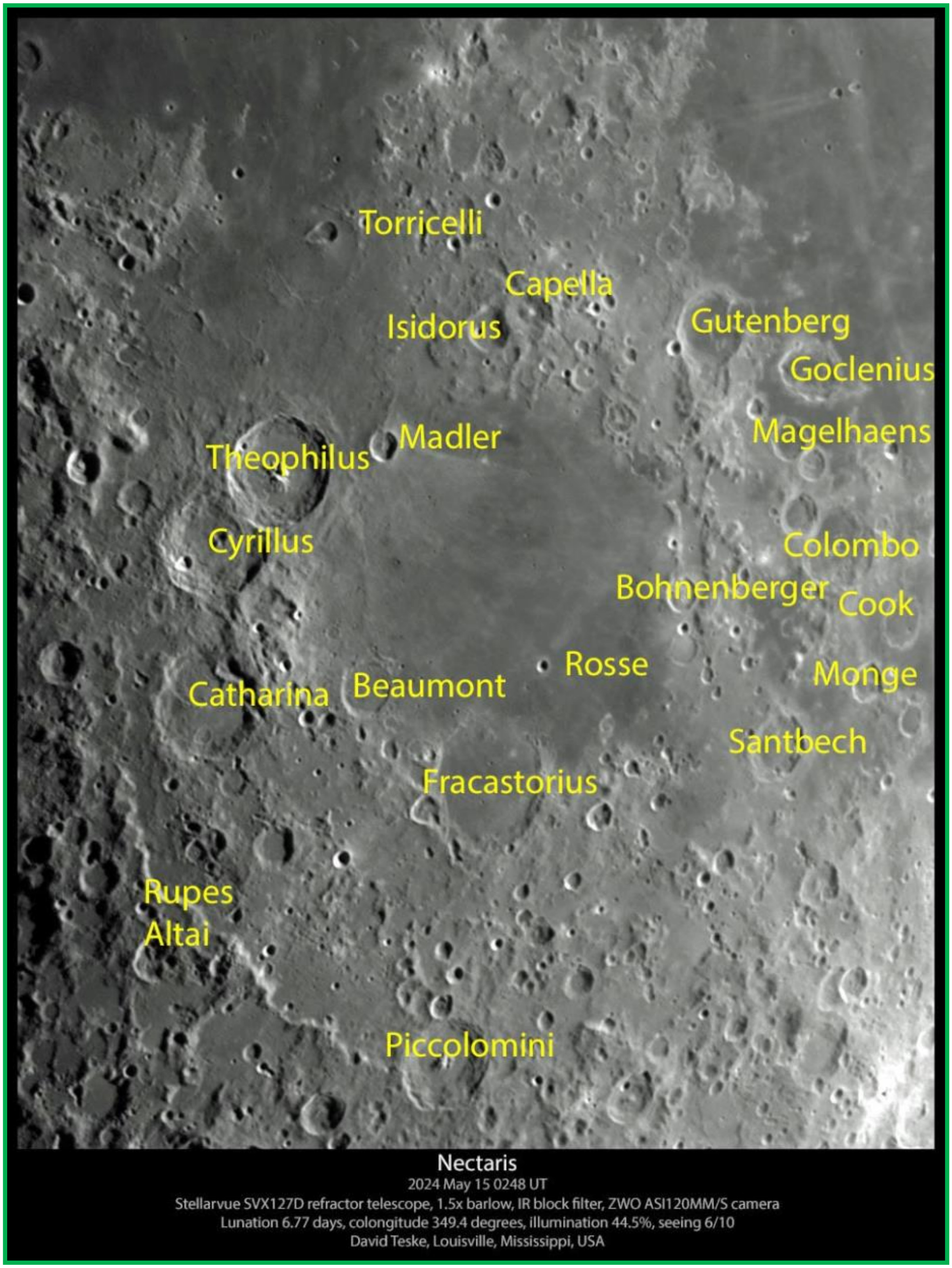
Wood, Charles A. (2003), The Modern Moon. A Personal View, Sky and Telescope, Cambridge.


***Piccolomini Region,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2016 April 13, 02:54 UT. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 656.3 nm filter, SKYRIS 445M camera. Seeing 7/10.*

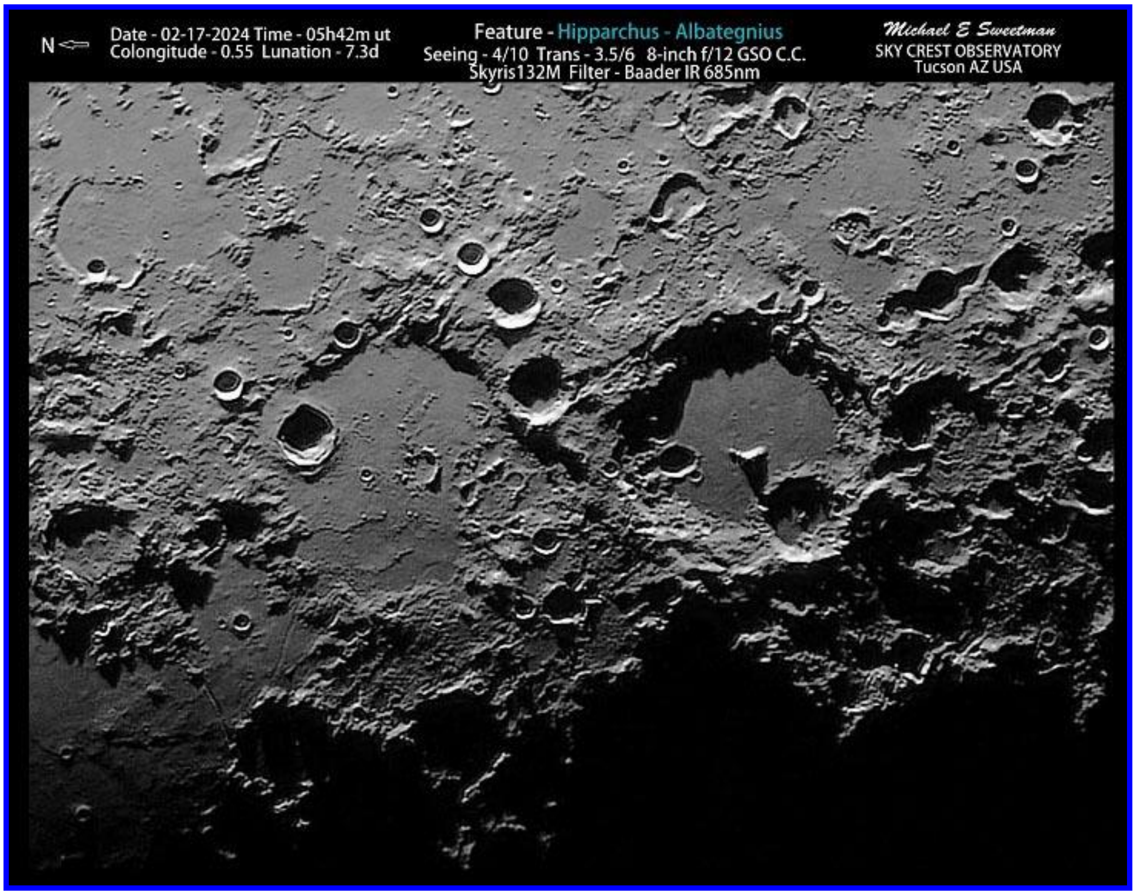

***Image X, Torricelli,*** *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2008 August 20, 06:48 UT. Celestron 14 inch Schmidt-Cassegrain telescope, 2x barlow, UV/IR blocking filter,SPC900NC camera, seeing 8/10.*

## Focus On: Mare Nectaris: A Small Basin Full of Wonders

## *Features in the Mare Nectaris Focus-On article*




Focus On: Mare Nectaris: A Small Basin Full of Wonders




***Hipparchus and Albategnius,*** *Michael E. Sweetman, Sky Crest Observatory, Tucson, Arizona, USA. 2027 February 17 05:42 UT, colongitude 0.55º. 8 inch f/12 Classical Cassegrain telescope, Baader IR 685 nm filter, Skyris 132M camera. Seeing 4/10, transparency 3.5/6. North is left, west is down.*

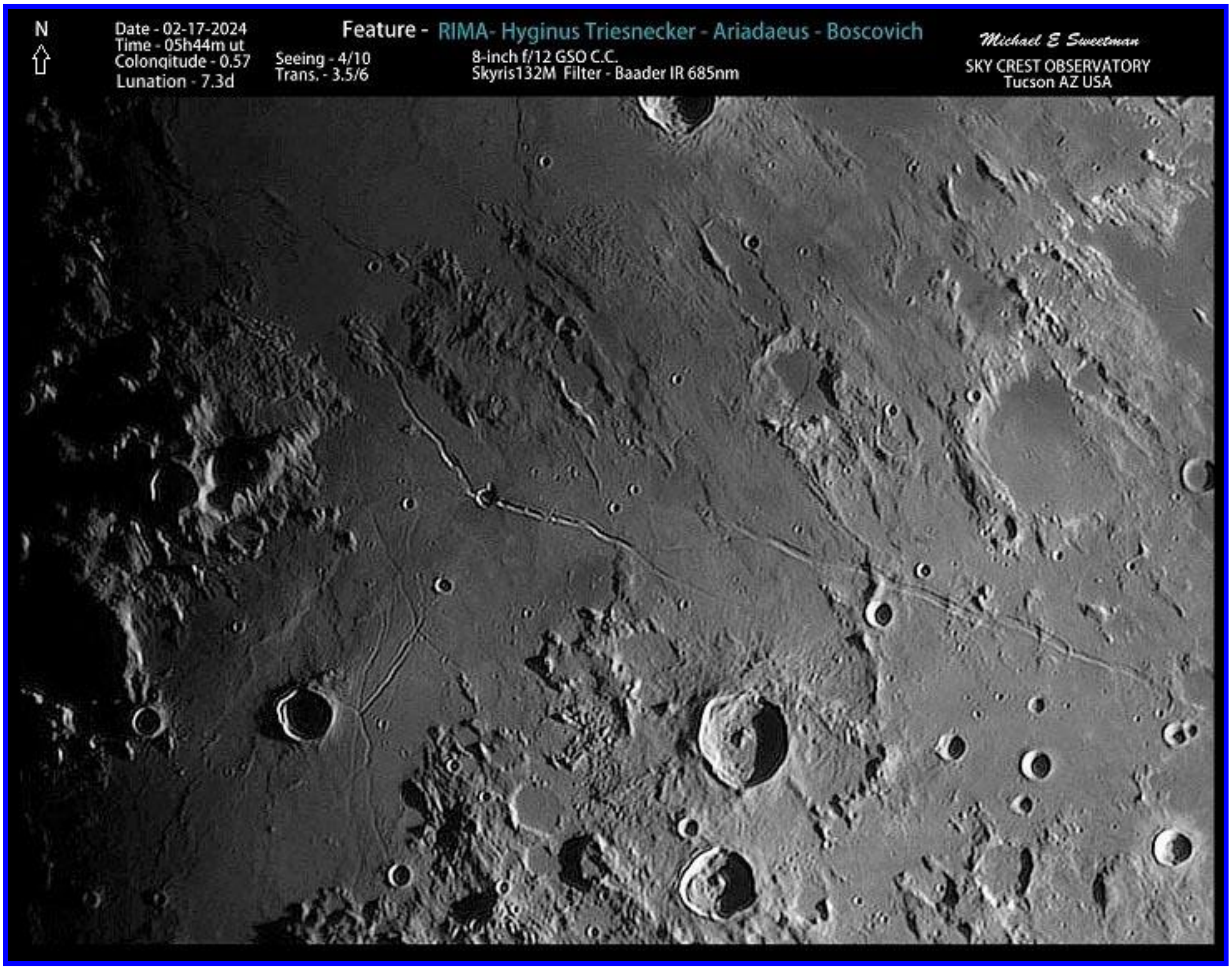
***Lunar X,*** *Stan Sienkiewicz, Philadelphia, Pennsylvania, USA. 2024 June 14 04:39 UT. SVBONY 90 mm refractor telescope, Canon M50 camera.*


## *Recent Topographic Studies*

Day old moon imaged with the ZWO Seestar S50 smart scope on June 7, 2024 at 9:21 pm local time or 01h 21m UT on June 8, 2024. A 3% phase moon was only 6.5 degrees above the horizon at the time of imaging. This image was attained by using the Seestar's internal software for aligning and stacking AVI images of the moon. Further editing in Photoshop CS4. The earthshine stands out in high relief however, the thin crescent is overexposed. Image by Gregory T. Shanos, Sarasota, Florida, USA.

***Rupes Recta,*** *Maurice Collins, Palmerston North, New Zealand. 2024 June 15 07:38 UT. Williams Optics FLT 110 mm APO refractor telescope, 2x barlow, QHY5III462C camera.*

## Recent Topographic Studies




***Rima Hyginus,*** *Michael E. Sweetman, Sky Crest Observatory, Tucson, Arizona, USA. 2027 February 17 05:44 UT, colongitude 0.57º. 8 inch f/12 Classical Cassegrain telescope, Baader IR 685 nm filter, Skyris 132M camera. Seeing 4/10, transparency 3.5/6.*

***Capella,*** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 11 22:57 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*

*Recent Topographic Studies*

***Cyrillus G,** Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 11 22:52 UT. Sky-Watcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*

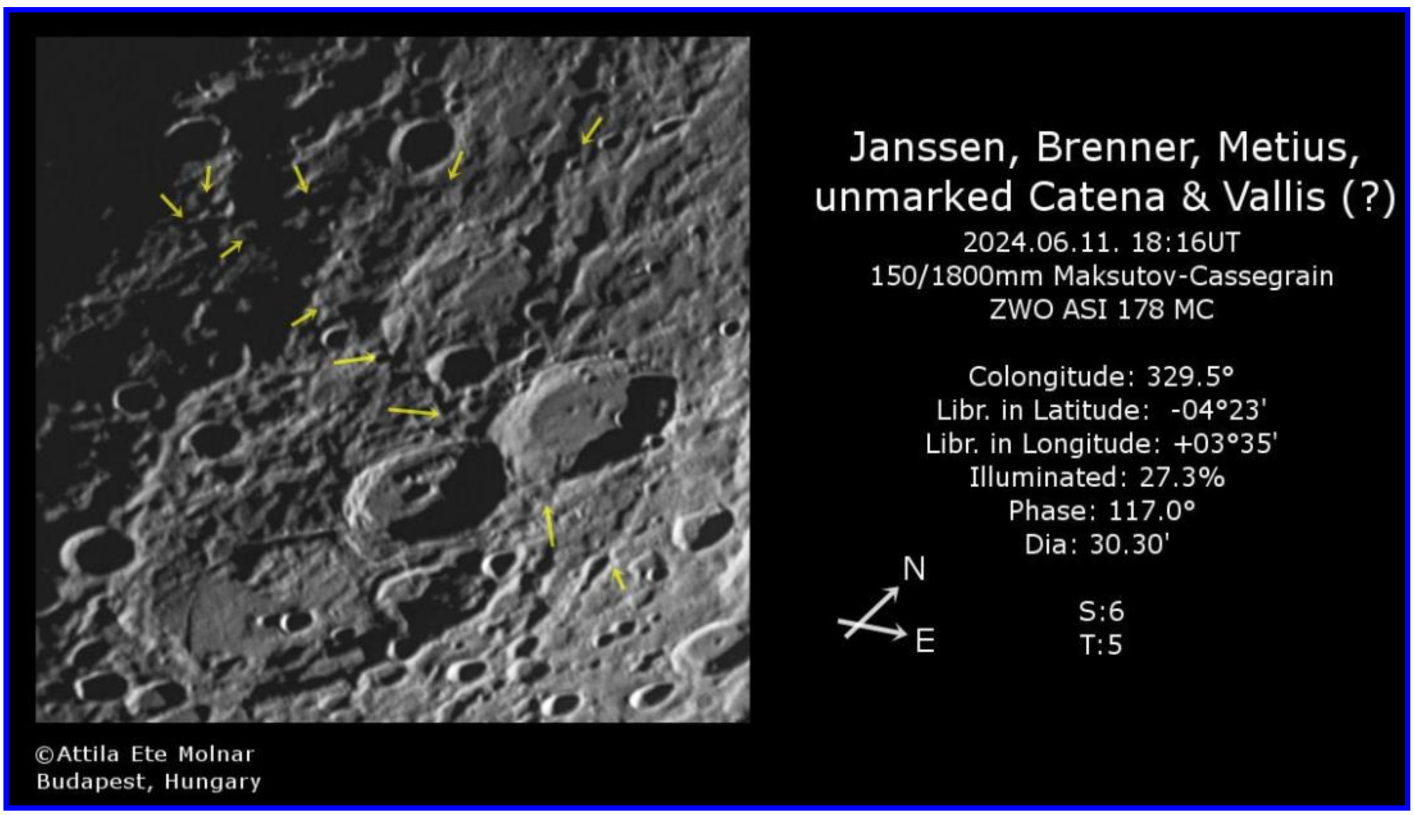
The Lunar X & V were visible June 13, 2024 at 11:43 pm local time or June 14, 2024 3h 43m Universal Time. The moon was at 49% phase and only 29° above the horizon. The sky was perfectly clear down to the horizon however, the seeing was below average without a jet stream. Image was acquired using a Meade LX200GPS ACF 8-inch 2000mm fl f/10 alt-azimuth mounted with a ZWO ASI 178MM monochrome camera and an Optec 0.62X focal reducer. Firecapture v2.7.14 acquired the AVI video which was processed using Autostakkert 4.0.11 beta and Registax 6.1. Further sharpening and processing in Photoshop CS4. Image by Gregory T. Shanos, Sarasota, Florida.

The Lunar X (also known as the Werner X) is a claire-obscure effect in which light and shadow creates the appearance of the letter 'X' and 'V'. The Lunar X forms from the rim of the craters Blanchinus, La Caille and Purbach. The X is visible beside the terminator about one-third of the way up from the southern pole of the moon. The Lunar V forms along the northern part of the terminator near the crater Ukert. The V was visible first then the X slowly appeared approximately an hour later. The X and V are visible for only a few hours and then disappear.

## Recent Topographic Studies

***Cyrillus G,*** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 11 22:45 UT. SkyWatcher 150/750 mm reflector telescope, QHY5-II-C camera.*

***Janssen, Brenner, Metius, unmarked Catena and Vallis(?),*** *Attila Ete Molnar, Budapest, Hungary. 2024 June 11 18:16 UT, colongitude 329.5º. 150/1800 mm Maksutov-Cassegrain telescope, ZWO ASI 178MC camera. Seeing 6/10, transparency 5/6.*




*Recent Topographic Studies*

**Archimedes,** *Maurice Collins, Palmerston North, New Zealand. 2024 June 15 07:37 UT. Williams Optics FLT 110 mm APO refractor telescope, 2x barlow, QHY5III462C camera.*

**Posidonius,** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 11 22:48 UT. Sky-Watcher 150/750 mm reflector telescope, QHY5-II-C camera.*

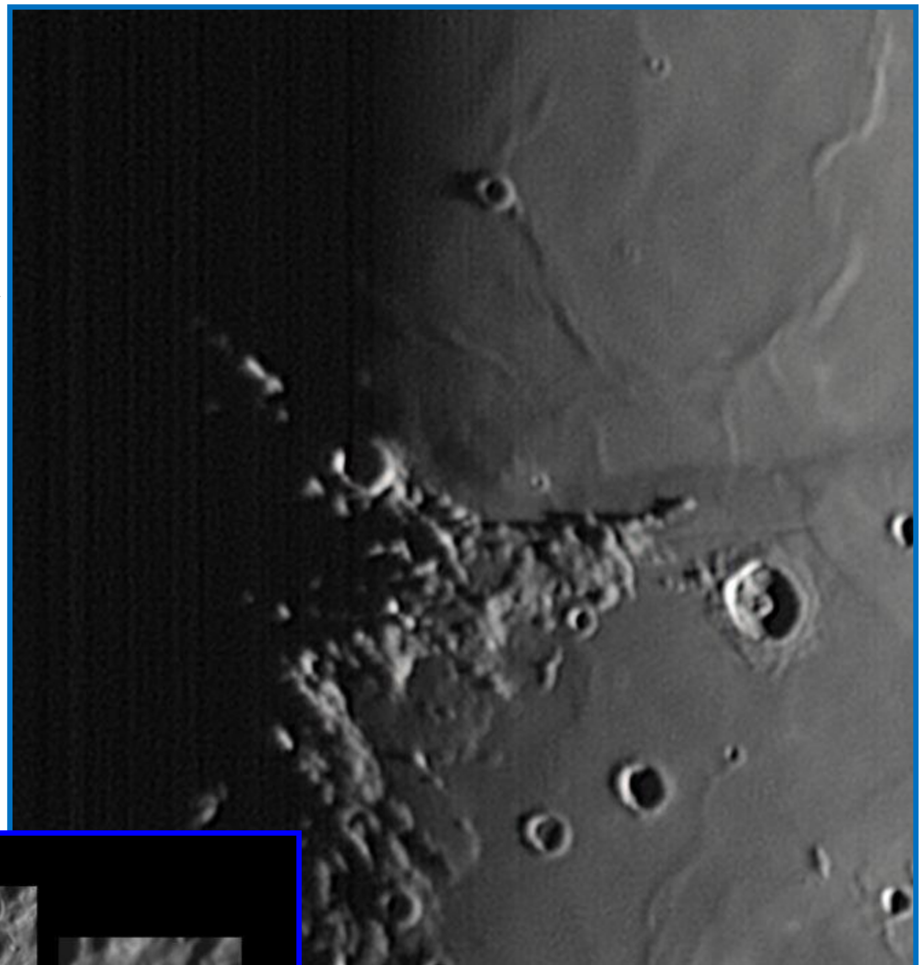
## Recent Topographic Studies

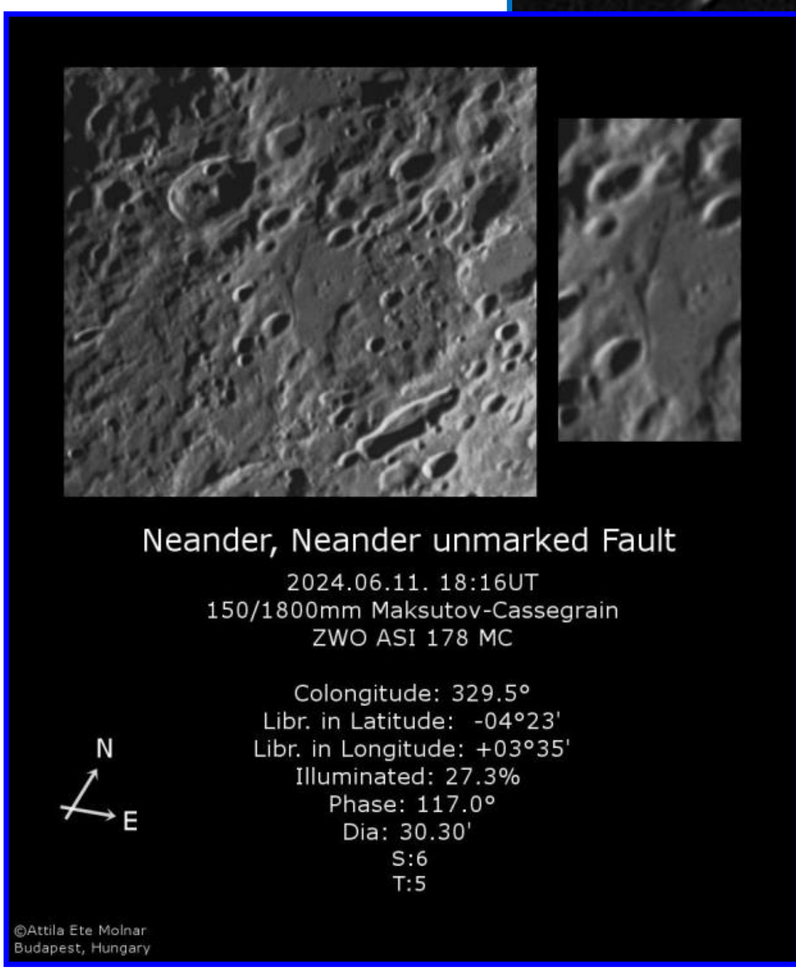
***Mare Crisium,*** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 12 22:09 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*


***8.8 Day-Old Moon,*** *Maurice Collins, Palmerston North, New Zealand. 2024 June 15 07:31-07:36 UT. Williams Optics FLT 110 mm APO refractor telescope, 2x barlow, QHY5III462C camera. North is down, west is right.*

## Recent Topographic Studies

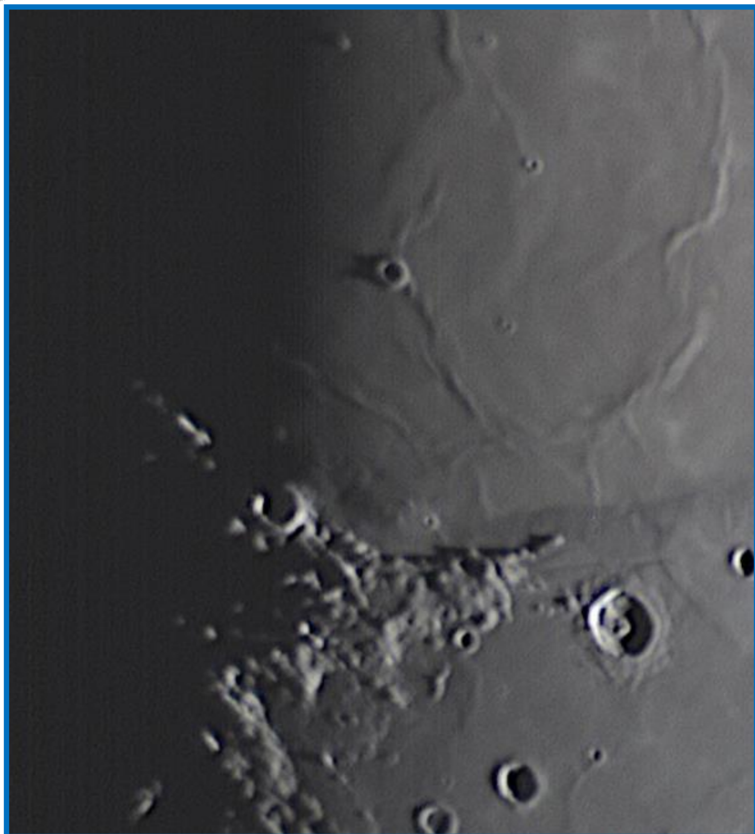
***Menelaus,*** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 12 21:57 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*






***Neander and Neander Unmarked Fault,*** *Attila Ete Molnar, Budapest, Hungary. 2024 June 11 18:16 UT, colongitude 329.5°. 150/1800 mm Maksutov-Cassegrain telescope, ZWO ASI 178MC camera. Seeing 6/10, transparency 5/6.*

## Recent Topographic Studies



***Menelaus,*** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 12 21:58 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*

***Waxing Gibbous Moon,*** *Stan Sienkiewicz, Philadelphia, Pennsylvania, USA. 2024 June 18 03:11 UT. SVBONY 90 mm refractor telescope, 1.6x barlow, Canon M50 camera. Seeing 5/10, transparency 3/6.*


## *Recent Topographic Studies*

***Posidonius,*** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 11 22:51 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*

***Plato,*** *Maurice Collins, Palmerston North, New Zealand. 2024 June 15 07:37 UT. Williams Optics FLT 110 mm APO refractor telescope, 2x barlow, QHY5III462C camera. NOTE: Look at the hook shadow!*

## Recent Topographic Studies

**Cyrillus G,** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 11 22:46 UT. SkyWatcher 150/750 mm reflector telescope, QHY5-II-C camera.*


***13.8 Day-Old Moon,*** *Maurice Collins, Palmerston North, New Zealand. 2024 June 20 07:20-07:22 UT. Williams Optics FLT 110 mm APO refractor telescope, QHY5III462C camera. North is down, west is right.*

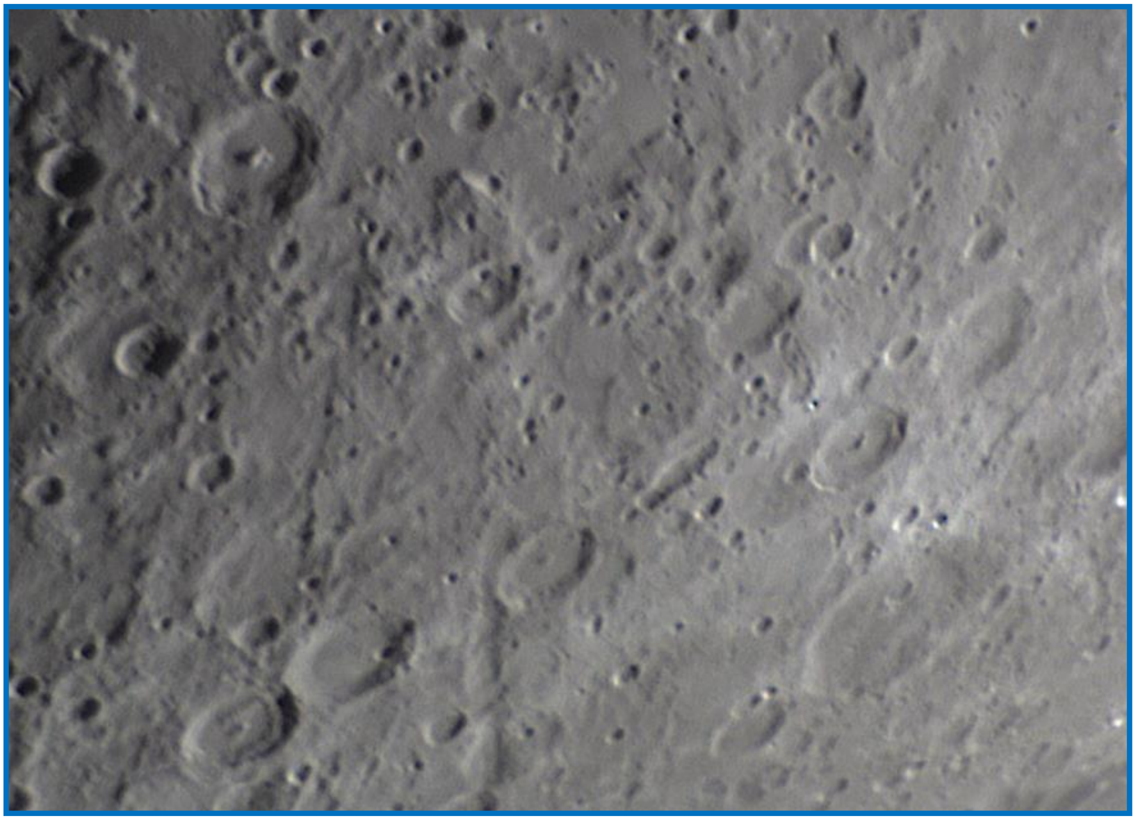
## Recent Topographic Studies

**Menelaus,** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 12 21:59 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*

**Eratosthenes,** *Maurice Collins, Palmerston North, New Zealand. 2024 June 15 07:37 UT. Williams Optics FLT 110 mm APO refractor telescope, 2x barlow, QHY5III462C camera.*

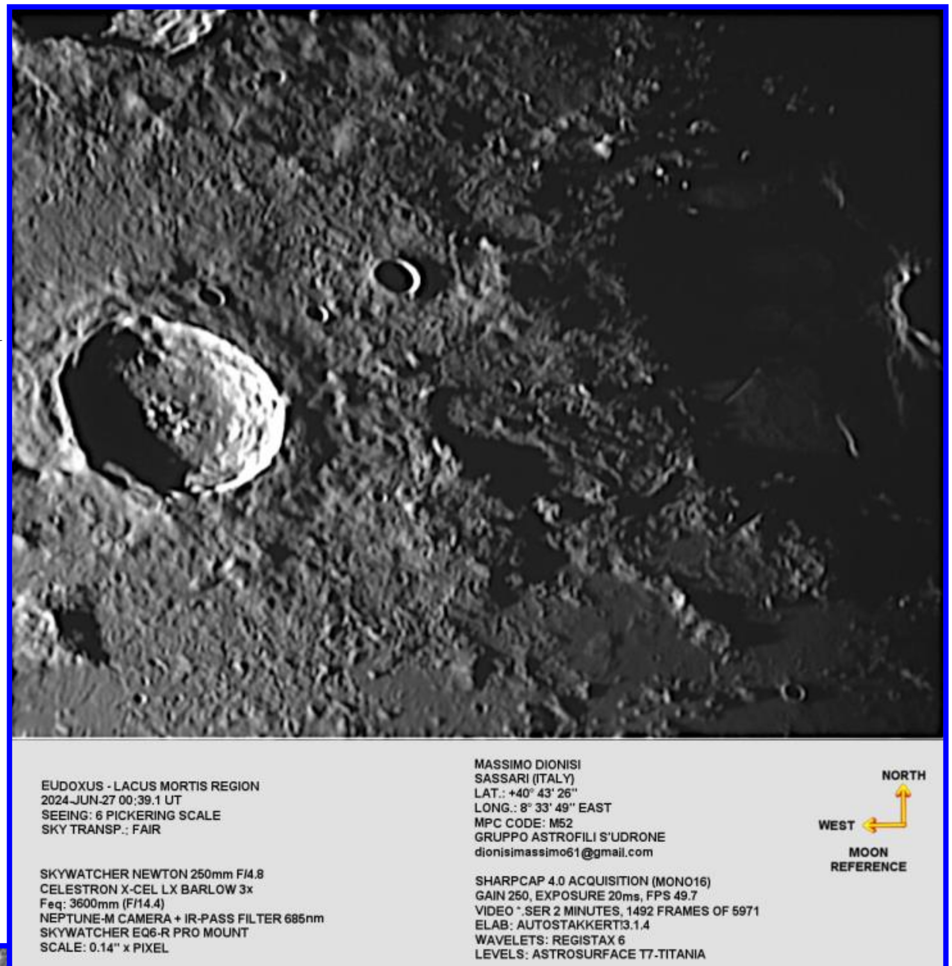
## Recent Topographic Studies

***Rheita E,*** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 12 21:05 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*




***Kane****, Massimo Dionisi, Sassari, Italy. 2024 June 27 00:32 UT. SkyWatcher 10 inch f/4.8 Newtonian reflector telescope, 3x barlow, efl 3600 mm , IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency fair.*

## *Recent Topographic Studies*




***Eudoxus**, Massimo Dionisi, Sassari, Italy. 2024 June 27 00:39 UT. Sky-Watcher 10 inch f/4.8 Newtonian reflector telescope, 3x barlow, efl 3600 mm , IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency fair.*

***Plato and the Alpine Valley**, Don Capone, Waxahachie , Texas, USA, 2024 June 25 10:03 UT. Orion xx16g Dobsonian f/4.4 Newtonian reflector telescope, 2x barlow, ZWO ADC, ASI678MC camera.*

## Recent Topographic Studies

**6.7 Day-Old Moon,** *Maurice Collins, Palmerston North, New Zealand. 2024 June 13 06:17-06:20 UT. Williams Optics FLT 110 mm APO refractor telescope, 2x barlow, QHY5III462C camera. North is down, west is right.*


**Lindenau,** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 12 22:03 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*

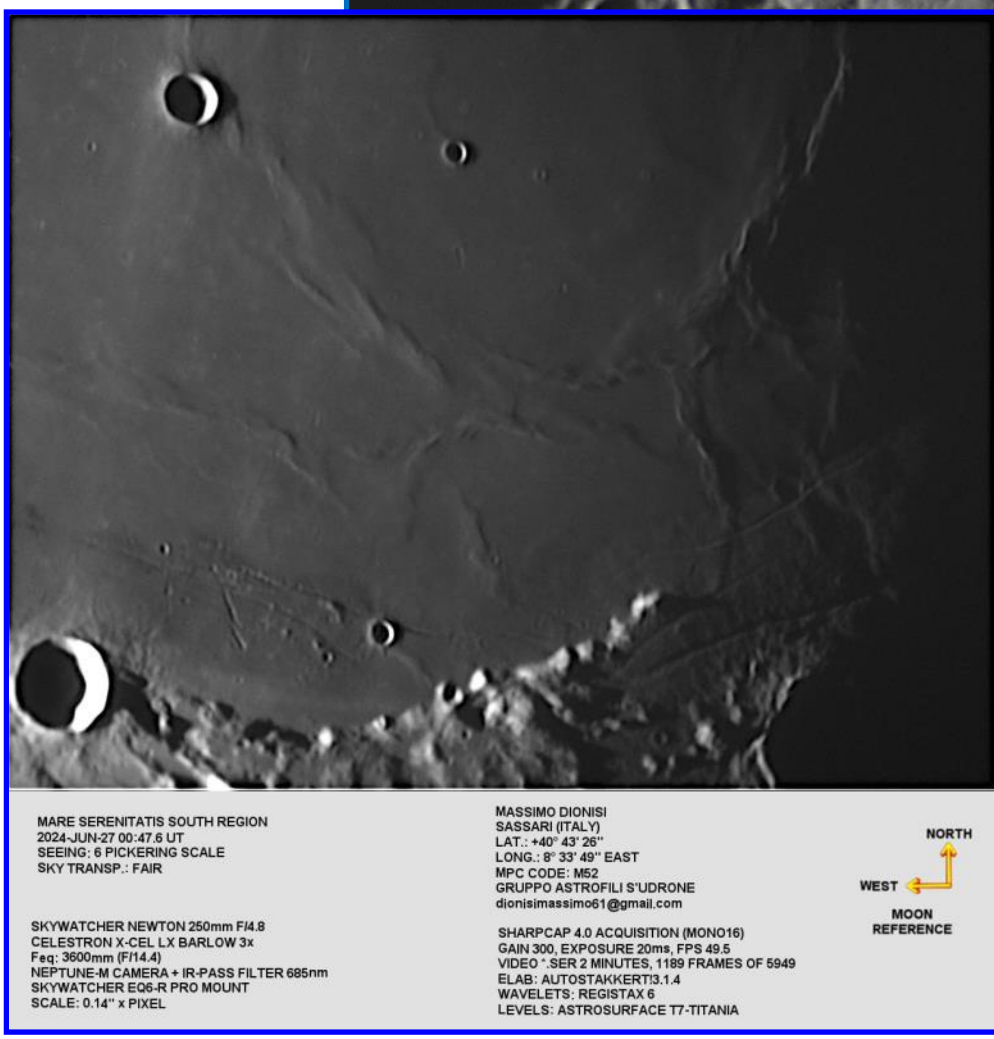
## *Recent Topographic Studies*


***6.7 Day-Old Moon,*** *Maurice Collins, Palmerston North, New Zealand. 2024 June 13 06:06-06:08 UT. Williams Optics FLT 110 mm APO refractor telescope, QHY5III462C camera. North is down, west is right. Compare with Maurice's other image of the 6.7 day-old Moon with same telescope and camera, but with a 2x barlow.*

***Lindenau,*** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 12 22:02 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*

## Recent Topographic Studies

***Theophilus,*** *Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 12 21:00 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*




***Mare Serenitatis South****, Massimo Dionisi, Sassari, Italy. 2024 June 27 00:47 UT. SkyWatcher 10 inch f/4.8 Newtonian reflector telescope, 3x barlow, efl 3600 mm , IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency fair.*

***Aristoteles***, *Massimo Dionisi, Sassari, Italy. 2024 June 27 00:21 UT. Sky-Watcher 10 inch f/4.8 Newtonian reflector telescope, 3x barlow, efl 3600 mm , IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency fair.*



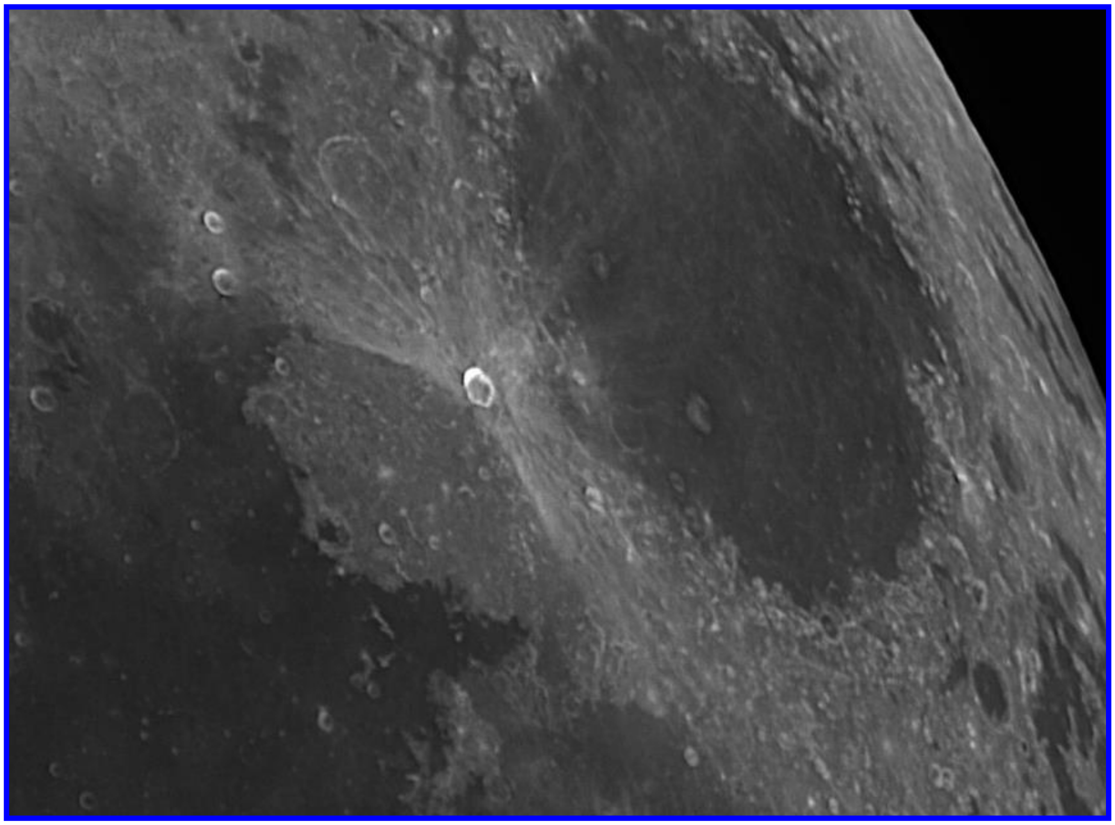
***Aristarchus,*** *Gonzalo Vega, Oro Verde, Argentina. 2024 June 19 00:10 UT. Celestron 130 mm reflector telescope, 650 mm fl, EQ CG3 mount. Player One cc camera. North is down, west is right.*

## Recent Topographic Studies

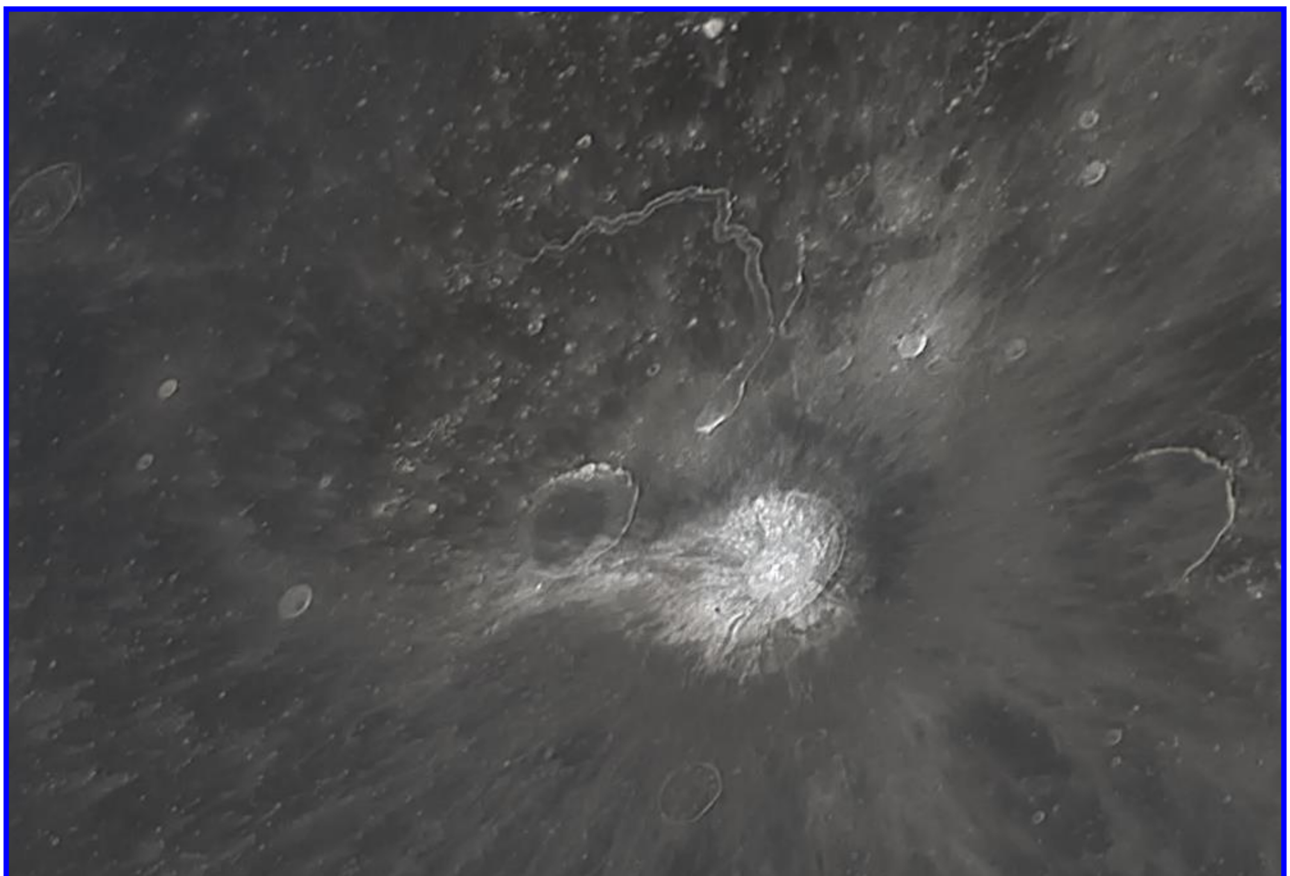
***Rheita E,** Walter Ricardo Elias, Oro Verde, Argentina. 2024 June 12 21:06 UT. SkyWatcher 150/750 mm reflector telescope, 3x barlow, QHY5-II-C camera.*

***Schickard,** Gonzalo Vega, Oro Verde, Argentina. 2024 June 19 00:10 UT. Celestron 130 mm reflector telescope, 650 mm fl, EQ CG3 mount. Player One cc camera.*

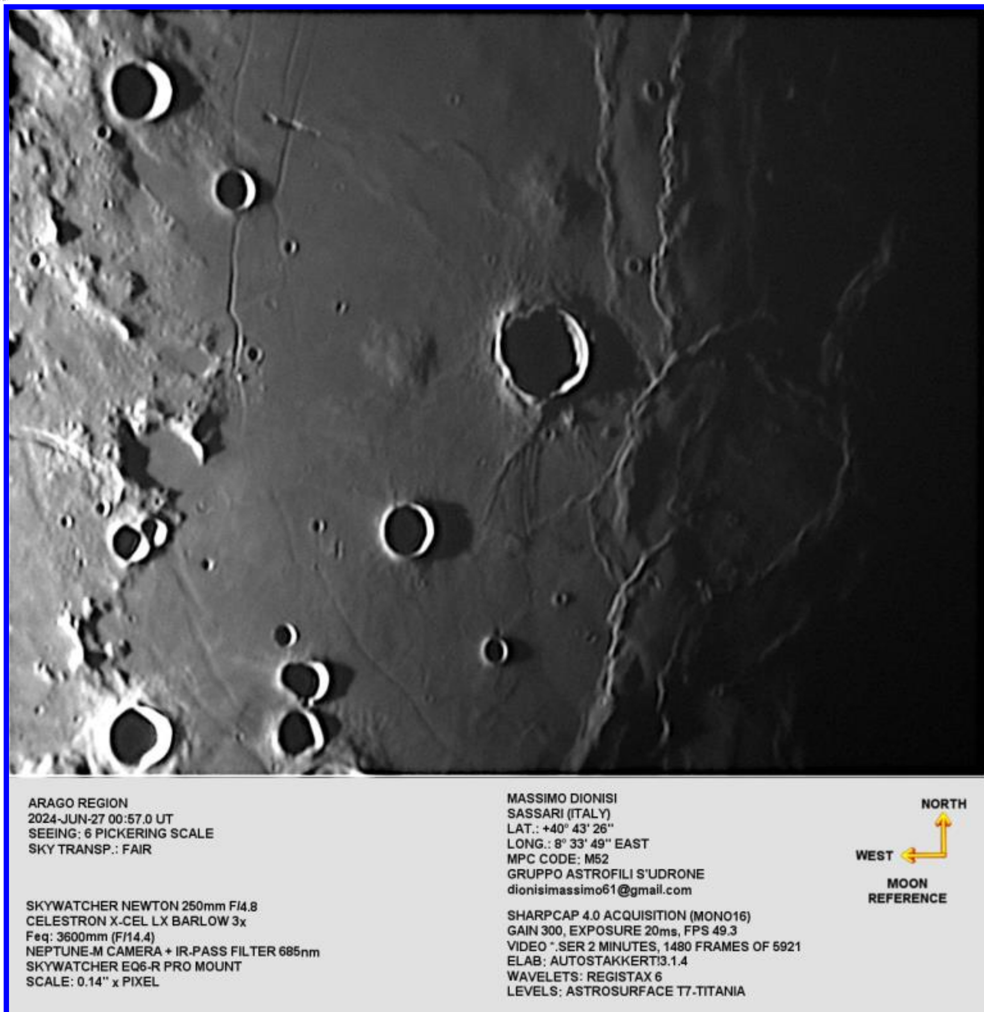
***Proclus,*** *Walter Ricardo Elias, Avril Elias and Marina Grandolio Oro Verde, Argentina, AEA observatory. 2024 June 17 01:29 UT. Celestron 11 inch Schmidt-Cassegrain telescope, ZWO ASI120MM camera.*



***Aristarchus In High Sun****, Don Capone, Waxahachie , Texas, USA, 2024 June 25 10:02 UT. Orion xx16g Dobsonian f/4.4 Newtonian reflector telescope, 2x barlow, ZWO ADC, ASI678MC camera.*



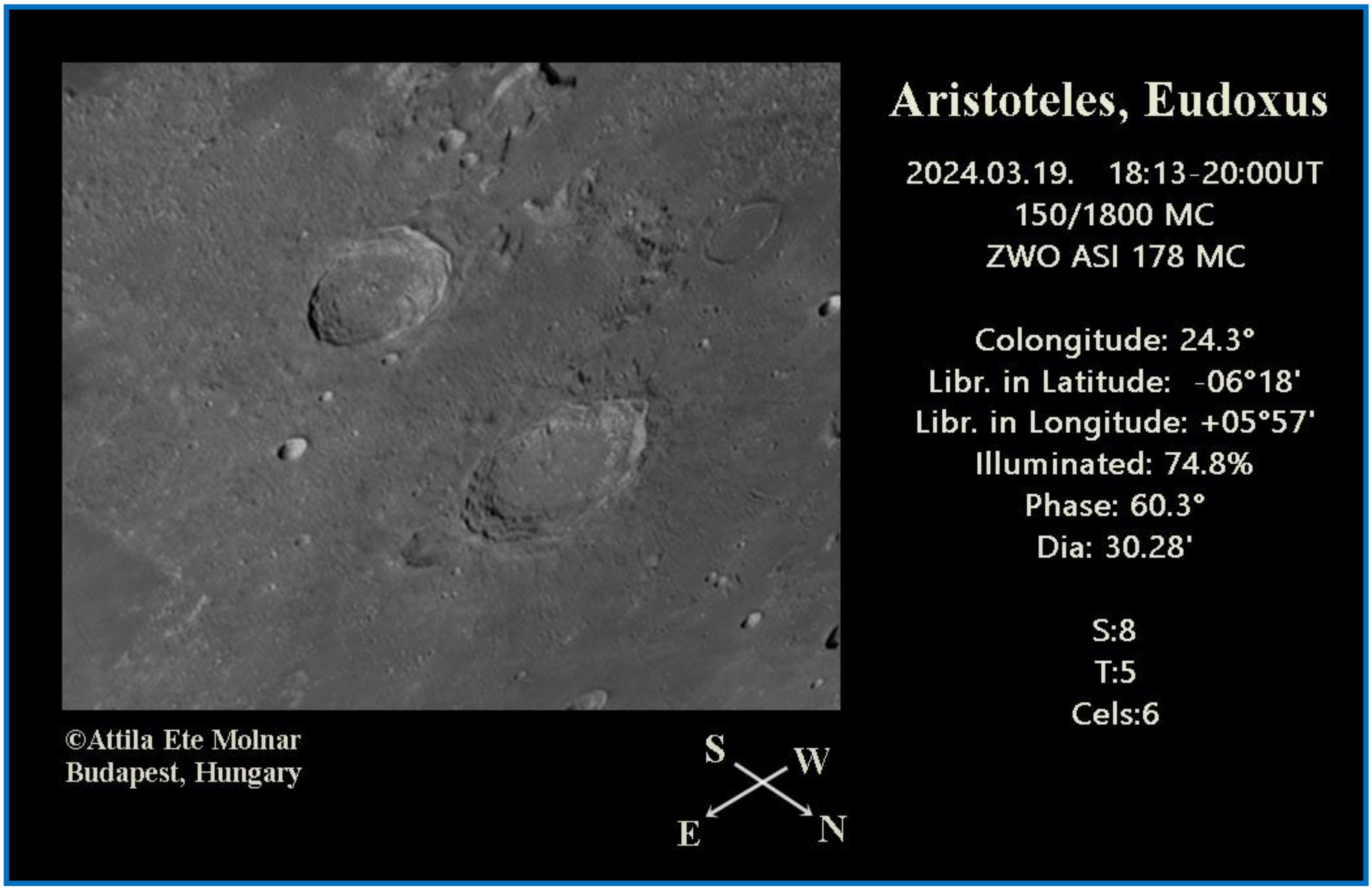
## *Recent Topographic Studies*

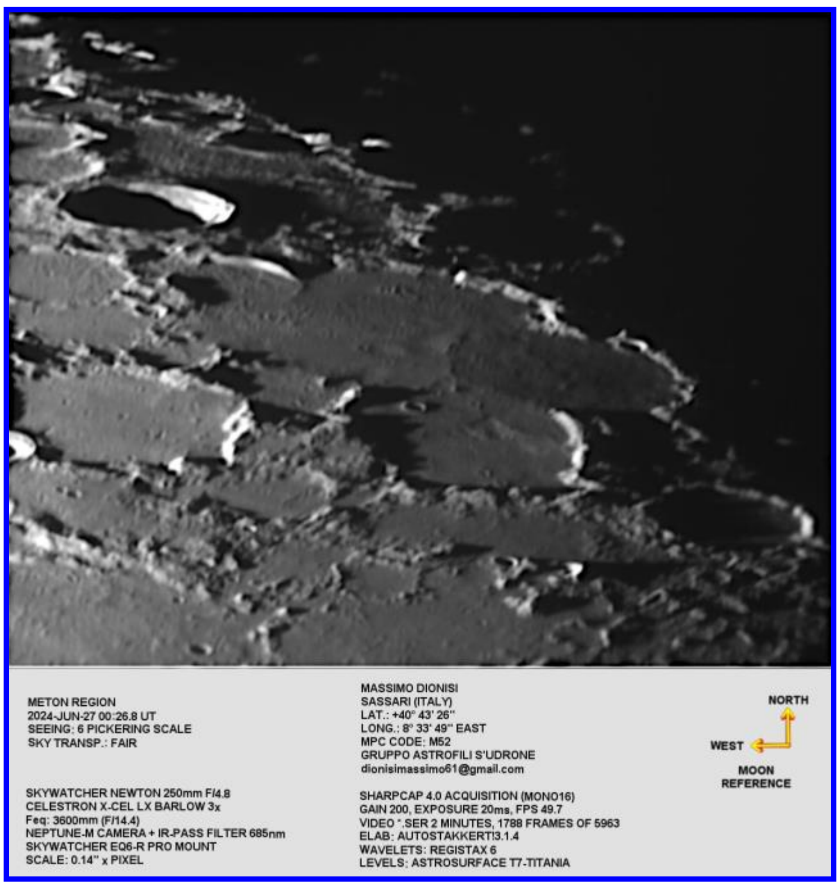



***Arago**, Massimo Dionisi, Sassari, Italy. 2024 June 27 00:57 UT. SkyWatcher 10 inch f/4.8 Newtonian reflector telescope, 3x barlow, efl 3600 mm , IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency fair.*

***Eudoxus,** Walter Ricardo Elias, Avril Elias and Marina Grandolio Oro Verde, Argentina, AEA observatory. 2024 June 17 01:21 UT. Celestron 11 inch Schmidt-Cassegrain telescope, ZWO ASI120MM camera.*

## Recent Topographic Studies




***Aristoteles, Eudoxus and Egede,*** *István Zoltán Földvári, Budapest, Hungary. 2024 March 19 18:13-20:00 UT, colongitude 24.3º. 150 mm Maksutov-Cassegrain telescope, 1800 mm focal length, ZWO ASI178MC camera. Seeing 8/10, transparency 5/6.*

***Meton****, Massimo Dionisi, Sassari, Italy. 2024 June 27 00:26 UT. SkyWatcher 10 inch f/4.8 Newtonian reflector telescope, 3x barlow, efl 3600 mm , IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency fair.*

## Recent Topographic Studies

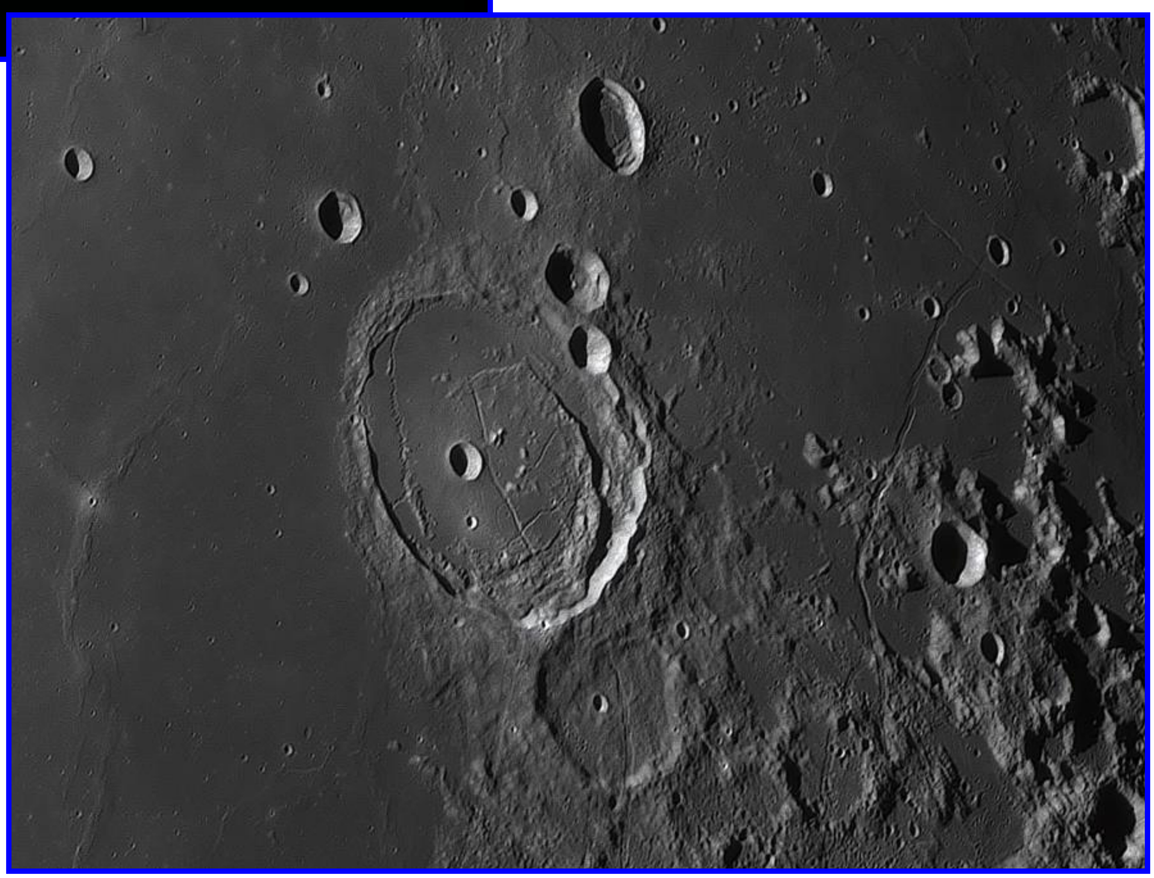
**11.7 Day-Old Moon,** *Maurice Collins, Palmerston North, New Zealand. 2024 June 18 05:42-05:46 UT. Williams Optics FLT 110 mm APO refractor telescope, QHY5III462C camera. North is down, west is right.*


**Lacus Mortis**, *Don Capone, Waxahachie , Texas, USA, 2024 June 25 10:05 UT. Orion xx16g Dobsonian f/4.4 Newtonian reflector telescope, 2x barlow, ZWO ADC, ASI678MC camera*

## Recent Topographic Studies

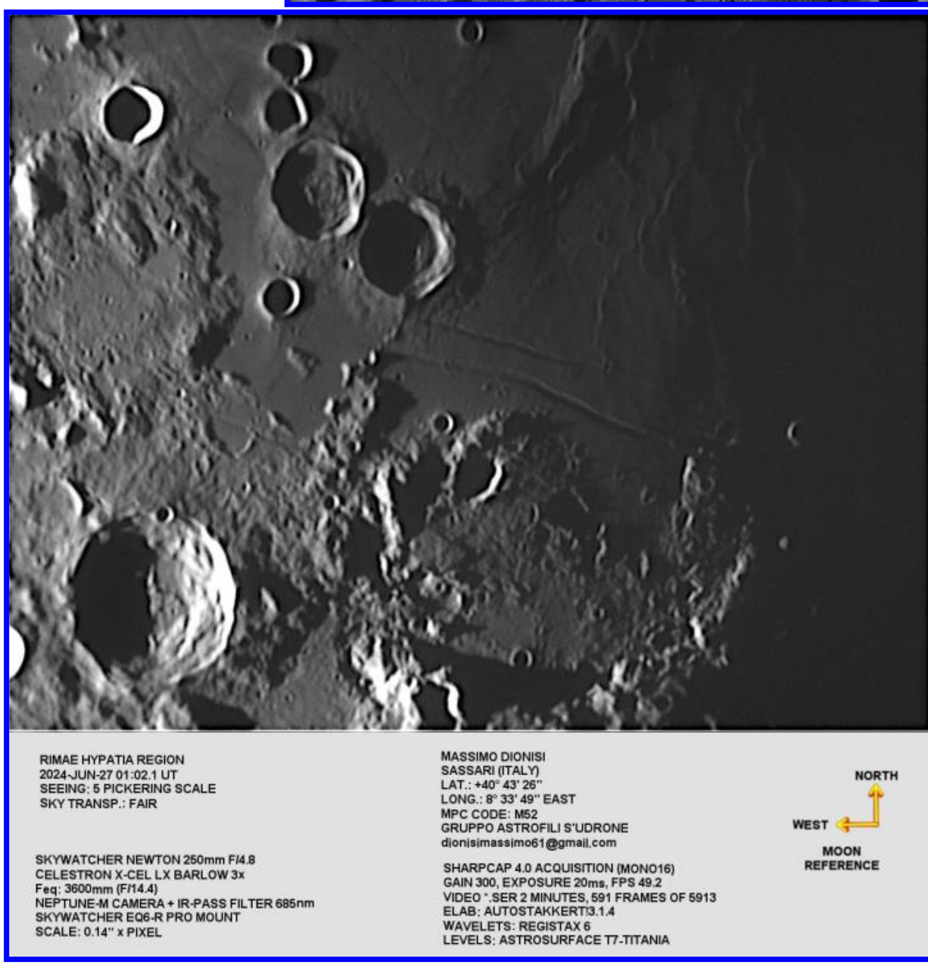
***Waxing Gibbous Moon,*** *Gonzalo Vega, Oro Verde, Argentina. 2024 June 19 00:15 UT. Celestron 130 mm reflector telescope, 650 mm fl, EQ CG3 mount. Nikon D5100 camera.*

***Posidonius****, Don Capone, Waxahachie , Texas, USA, 2024 June 25 10:06 UT. Orion xx16g Dobsonian f/4.4 Newtonian reflector telescope, 2x barlow, ZWO ADC, ASI678MC camera.*



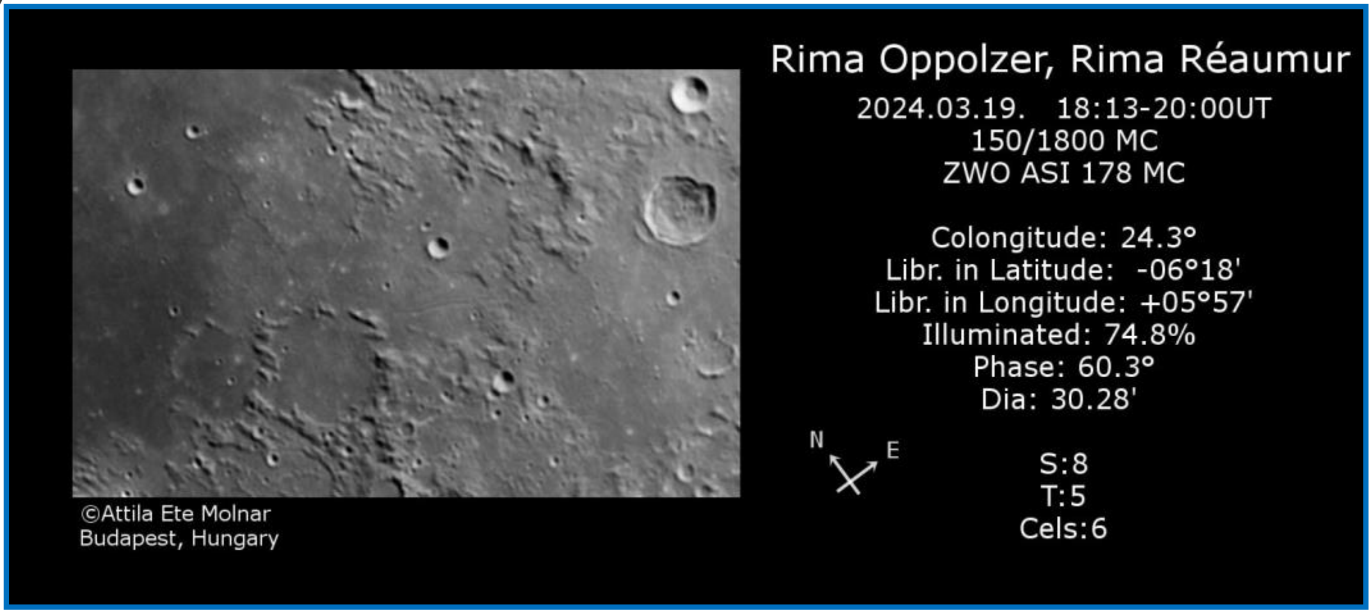
## Recent Topographic Studies

***Fracastorius**, Don Capone, Waxahachie , Texas, USA, 2024 June 25 10:08 UT. Orion xx16g Dobsonian f/4.4 Newtonian reflector telescope, 2x barlow, ZWO ADC, ASI678MC camera.*




***Rima Hypatia**, Massimo Dionisi, Sassari, Italy. 2024 June 27 01:02 UT. SkyWatcher 10 inch f/4.8 Newtonian reflector telescope, 3x barlow, efl 3600 mm , IR pass filter 685 nm, Neptune M camera. Seeing 5 on Pickering scale, transparency fair.*

## Recent Topographic Studies




***Rima Oppolzer and Rima Réaumur,*** *István Zoltán Földvári, Budapest, Hungary. 2024 March 19 18:13-20:00 UT, colongitude 24.3°. 150 mm Maksutov-Cassegrain telescope, 1800 mm focal length, ZWO ASI178MC camera. Seeing 8/10, transparency 5/6.*

***Janssen on the Terminator,*** *Don Capone, Waxahachie , Texas, USA, 2024 June 25 10:09 UT. Orion xx16g Dobsonian f/4.4 Newtonian reflector telescope, 2x barlow, ZWO ADC, ASI678MC camera.*

## Recent Topographic Studies


***Straight Wall and Rima Birt,*** *Don Capone, Waxahachie , Texas, USA, 2024 June 25 10:11 UT. Orion xx16g Dobsonian f/4.4 Newtonian reflector telescope, 2x barlow, ZWO ADC, ASI678MC camera.*

***14.8 Day-Old Moon,*** *Maurice Collins, Palmerston North, New Zealand. 2024 June 21 07:12-07:13 UT. Sky Watcher Espirt 80 mm ED refractor telescope, 2.5 x barlow, QHY5III462C camera. North is down, west is right.*

## Recent Topographic Studies

# Lunar Geologic Change Detection Program

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

## 2024 July


***Figure 1.*** *Images provided by Peter Anderson (BAA).* ***(Left)*** *A very bright spot seen close to the lunar south pole. The date is given in the image and north is towards the bottom.* ***(Center)*** *Very bright spot seen close to the lunar south pole at the date and UT mentioned in the image. North is towards the right.* ***(Left)*** *A very bright spot seen on the NW shore of Mare Crisium. This image was taken on 1980 Jun 17. North is towards the top.*

**LTP Reports Received**

No new LTP or impact flash reports have been received for the months of May-June. Concerning the very bright rim of Barrow crater seen on 2024 May 15 by Trevor Smith, Peter Anderson has emailed in some images (See Fig 1) which illustrate similar very bright sunward facing slopes that grab an observer's attention. His text is below:

"I also throw in a pretty useless image from 18th June 2018, and one more from many years ago showing a feature that got me really excited at the time - a very bright peak on the wall of the Mare Crisium. Again, clearly a bright mountain face in the morning sunlight- Quoting from something I later wrote: *"On 20th March 1980 using my then new 16" reflector, I felt that I had observed a likely LTP in the form of an anomalously bright headland on the Mare Crisium - the same headland referenced in your December 2021 Lunar Section circular at page 27."* The attached image from 17th June 1980 shows this feature at a subsequent lunation not quite as bright but still prominent."

The Mare Crisium bright spot effect is definitely well known about and most have been removed from the LTP database. It is highly prominent at low magnifications where it looks very much star like. The actual surface feature is a small ray crater on the inner slope of Mare Crisium. The brightness is dependent upon illumination and viewing (topocentric libration) directions. The south pole bright spot also shows up in past LTP reports, and again we learn to ignore these unless it exhibits short time scale changes in brightness.

**Routine reports received for April included**: Mário Rui Abade (Portugal – BAA) imaged: earthshine. Paul Abel (Waxahachie, TX, USA – BAA) observed the total solar eclipse. Alberto Anunziato (Argentina – SLA) observed: Alphonsus, Archimedes, Copernicus, Mons Hadley, Plato and Promontorium Laplace. Bob Bowen (Scarborough and Newtown, UK – NAS) imaged: several features. Maurice Collins (New Zealand - ALPO/BAA/RASNZ) imaged: Copernicus, eastern Mare Orientale, and several features. Anthomy Cook (Newtown and Mundesley, UK – ALPO/BAA) imaged: earthshine in the SWIR and several features in color. Walter Elias (Argentina – AEA) imaged: Albategnius, Copernicus and Mare Crisium. Dave Finnigan (Halesowen, UK – BAA) imaged: Balmer, Humboldt, Langrenus and Oken. Marcus Hall (Idabel, OK, USA - Aberystwyth University) imaged the solar eclipse. Rik Hill (Tucson, AZ, USA – ALPO/BAA) imaged: Lamont. Phil Mading (Manchester, UK – BAA) imaged: Ptolemaeus, Rimma Ariadaeus, Rima Hadley and several features. Luigi Morrone (Italy – BAA) imaged: Atlas, Gutenberg and Janssen. Trevor Smith (Codnor, UK – BAA) observed: Aristarchus, Atlas, Censorinus, Grimaldi, Macrobius, Proclus and Theophilus. Franco Taccogna (Italy – UAI) imaged: Herodotus.

Note that we I have included some BAA pooled observations in with this report. I have also included May observations received below. During academic term time, I fell behind by one month in reporting observations. The quitter Summer enables us to catch up.

**Routine reports received for May included**: Mário Rui Abade (Portugal – BAA) imaged: several features. Bob Bowen (Ynyslas, UK – NAS) imaged: several features. Maurice Collins (New Zealand - ALPO/BAA/RASNZ) imaged: Clavius, Copernicus, Gassendi, Plato, Schiller and several features. Walter Elias (Argentina – AEA) imaged: Aristarchus and Copernicus. Dave Finnigan (Halesowen, UK – BAA) imaged: several features. Les Fry (West Wales, UK – NAS) imaged: the eastern limb, earthshine, and several features. Bill Leatherbarrow (Sheffield, UK – BAA) imaged: Diophantus, Mare Humorum, Ramsden, Sinus Iridum and Tycho. Jean Marc Lechopier (Tenerife – UAI) observed: Stofler. Lars Lindhard (Denmark – BAA) imaged: Hypatia. Bob and Sophie Stuart (Rhayader, UK – NAS/BAA) imaged: Aristarchus, Bessarion, Copernicus, Finsch, Gassendi, Hainzel, Kepler, Longomontanus, Prinz, Proclus, Ramsden, Schiller and Sinus Iridum. Franco Taccogna (Italy – IAI) imaged: Promontorium Agarum, and several features. Aldo Tonon (Italy – UAI) imaged: earthshine. Alexander Vandenbohede (Belgium – BAA) imaged: Fracatorius, Mare Australe, Mare Undarum and Theophilus. Luigi Zanatta (Italy – UAI) imaged: earthshine, and several features.

Note that we I have included some BAA pooled observations in with this report.

**Analysis of Routine Reports Received (April)**

**Earthshine:** On 2024 Apr 10 UT 20:02 Mário Rui Abade imaged earthshine during the following lunar schedule request to monitor the Moon's night side for impact flashes.

`Look out for sporadic impact flashes in earthshine. Any observations should be reported to: a t c @ a b e r . a c . uk`

***Figure 2.*** *The earth lit Moon orientated with north towards the top as imaged by Mário Rui Abade (BAA) on 2024 Apr 10 UT 20:02.* ***(Left)*** *a truncated and rotated view of the original image that also included Jupiter nearby (not shown here).* ***(Right)*** *A contrast enhanced version.*

Although Mário was not taking video to detect impact flashes, his image (Fig 2) does illustrate how straight forward it is to go about hunting for impact flashes in the earthshine. If you have the capability to capture views of earthshine, at video frame rates of at least 10 frames per sec, and can detect the limb of the earth lit Moon and see at least some of the brighter features on the night side of the Moon, then you have the capability to monitor the Moon for impact flashes. One basically just takes video, at the times given in the predictions, then feeds the AVI video into either Lunarscan or ALFI (email me and I'll send you the software for Lunarscan) or even look for flashes directly at the telescope in real time using FDS. Then if you send me (or if you are in the Americas, send to Brian Cudnik) copies of possible detected impact flashes then these can be compared against other people's observations to make sure that the flashes are not stand-alone cosmic ray events mimicking real impact flashes. Although an Italian Moon Mission, LUMIO, will look for flashes, it won't be launched for at least another three years. It is therefore very important that we set up a ground network of dedicated amateur impact flash observers so as to get a team in place before the mission starts monitoring impacts on the far side. Nearside Earth based observation and far side LUMIO observations will be useful in determining the near and far side impact flux ratio. Anybody interested in taking part in this space based: amateur program should contact me, or if you are in the USA, Canada the please contact ALPO's Brian Cudnik, see: https://alpo-astronomy.org/lunarupload/lunimpacts.htm

**Atlas:** On 2024 Apr 14 UT 21:40-21:50 Trevor Smith observed visually this crater under similar illumination to the following report:

*On 1965 Oct 30 at 23:30-23:50UT Fehring and Garris (Parasmus, NJ, USA, using a 2.4" refractor x88, seeing very good) saw a fuzzy area -- variations in shape and distinctness, seen in an area east of Atlas crater. A drawing was made. It was noted that no other area had a similar effect. Cameron 1978 catalog ID=909 and weight=3. ALPO/BAA weight=3.*

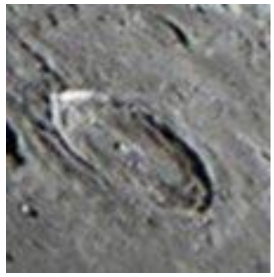


***Figure. 3.*** *Atlas from a small section of a larger image of the Moon taken by Maurice Collins on 2020 Jul 26 UT 07:15-07:24, orientated with north towards the top.*

Trevor, using a 9” Newtonian under Antoniadi III-IV seeing conditions observed but could not see a fuzzy area. Indeed, everywhere he looked in and around Atlas and its vicinity looked sharp and normal. Observing ceased at 21:50UT due to cloud. A similar illumination image can be seen in Fig 3 and again this has no fuzzy area either. So, we shall keep the ALPO/BAA weight at 3 for now.

**Alphonsus:** On 2024 Apr 16 UT 19:09 Phil Masding (BAA) imaged the Ptolemaeus region and this included Alphonsus within just a few minutes of the similar illumination (±0.5˚) to the following LTP report:

*Alphonsus 1966 May 27 UT 21:10 Observed by Sartory, Moore, Mosely (England and Northern Ireland, 8.5" reflector, 10" refractor) "Red color on central peak area" NASA catalog ID 937. NASA catalog weight=5. ALPO/BAA weight=4.*

***Figure 4.*** *Alphonsus as imaged by Phil Masding (BAA) on 2024 Apr 16 UT 19:09 and orientated with north towards the top.*

Although the topocentric libration was not the same, in terms of illumination, Fig 4 is not far off what Sartory, Moore and Mosely would have seen back in 1966 if the appearance had been normal. We shall keep the weight at 4 for now as three independent observations were made back in 1966, but at least we have a good context image that Phil has supplied. We have discussed this LTP report before, with a similar illumination observation, back in the 2013 Jan newsletter.

**Copernicus:** On 2024 Apr 17 UT 22:58 Walter Elias (AEA) imaged this crater a matter of a few min outside the repeat illumination window for the following report:

*Copernicus 1939 Mar 29 UT 19:00-19:15 Observed by Wilkins (Kent, England, 6" reflector) "C.P. diffuse light spot, faint glow s as tho in a luminous mist (3h before SR) Some indication of E.terraces, then vanished." NASA catalog weight=4. NASA catalog ID #447. ALPO/BAA weight=3.*

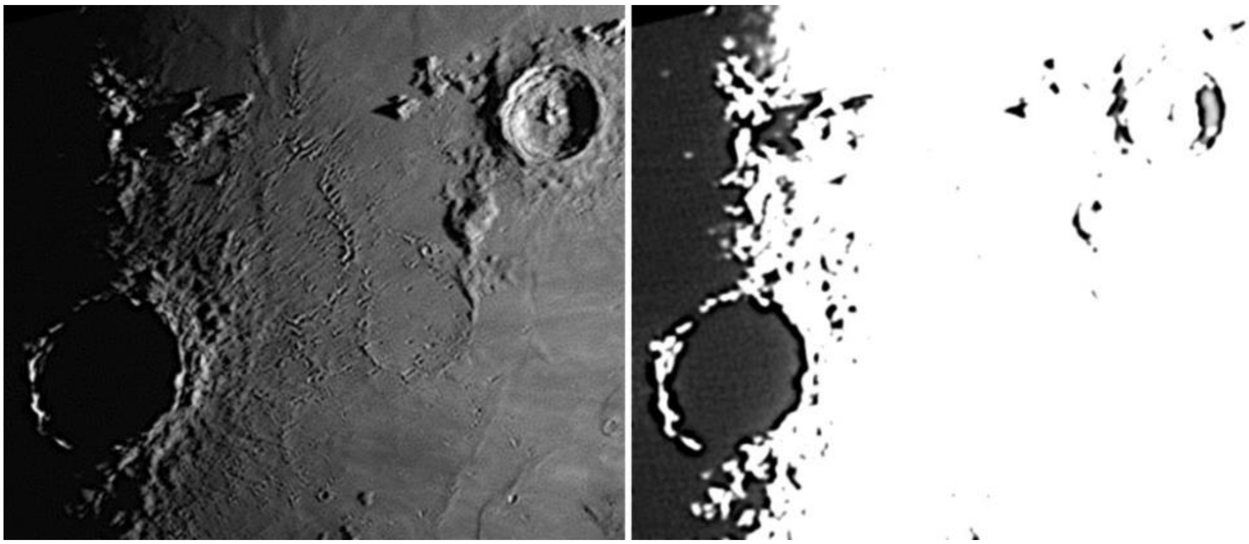


***Figure 5.*** *Copernicus as imaged by Walter Elias (AEA) on 2024 Apr 17 UT 22:58 and orientated with north towards the top.* ***(Left)*** *Walter's Original image.* ***(Right)*** *Contrast stretched to bring out any interior detail in the shadow.*

Walter's image (Fig 5 – Left) was taken when the solar altitude at the center of Copernicus was +0.3˚ and you can just about see in the enhanced version (Fig 5 – Right) a faint hint of possible inner slopes detail maybe lit up by scattered light off the illuminated rim – though it could also be an artefact of processing. But there is clearly no sign of the central peak. Wilkins' observation was made when the solar altitude lay in the range +0.4 to +0.5˚ (i.e. slightly higher than in Fig 5) and what was unusual was that the effect appeared and then disappeared? We have covered this LTP before in the 2014 Feb newsletter. For now, we shall leave the weight as it is at 3.

**Archimedes, Censorinus, Mons La Hire and Langrenus, Proclus:** On 2024 Apr 18 UT 06:55-07:01 Maurice Collins (ALPO/BAA/RASNZ) imaged the whole Moon under similar illumination the following 7 past LTP reports:

*Archimedes 1973 Jan 13 UT 19:06-19:40 Observed by Theiss (51N, 9.67E, 75mm refractor) "Yellow to green colors at wall of Archimedes, became stronger until 19:09UT, constant brightness until 19:10UT and disappeared at 19:16UT" Ref: Hilbrecht & Kuveler (1984) Moon & Planets 30, pp53-61. ALPO/BAA weight=1.*

*Censorinus 1973 Jan 13 UT 20:02-20:14 Observed by Leitzinger (48.25N, 11.5E, 60mm refractor) "Censorinus Extraordinarily bright, pure white" Ref: Hilbrecht & Kuveler (1984) Moon & Planets 30, pp53-61. ALP:O/BAA weight=1.*

*Langrenus. On 1993 Jan 02 at UT 17:42 A. Dollfus (Meudon, France, 1m aperture telescope used) detected evidence for a dust cloud in Langrenus crater using CCD polarimetry. The ALPO/BAA weight=5.*

*Messier and Messier A. On 1968 May 07 at UT 03:00-03:40 Kelsey (Riverside, CA, USA, 8" reflector) observed Messier and Messier A and noted the following: "The ray-tail halo (in N. ray) showed a possible enhancement in blue filter at 1st obs. per. but not seen at 0330. Later enhancement was indicated in red filter but not apparent at 0600h. The red enhancement is very unusual; but has been suspected on a few previous occasions. Not seen vis. (confirm. of Jean?)" The Cameron 1978 catalog ID= and weight=5. The ALPO/BAA weight=3.*

*Mons La Hire 1887 Feb 02 UT 20:00? Observed by Klein (Cologne, Germany, 6" refractor) "Intense yellow streak that cast shadows around neighbouring features". NASA catalog weight=4. NASA catalog ID #255. ALPO/BAA weight=3.*

*Proclus 1973 Jan 13 UT 19:30-19:35 Observed by Krojer (48.25N, 11.5E, 60mm refractor) "North East wall of Proclus extraordinarily bright, observation interrupted by fog." Ref: Hilbrecht & Kuveler (1984) Moon & Planets 30, pp53-61. ALPO/BAA weight=1.*

*Proclus 1973 Jan 13 UT 20:50 Observed by Schnuchel (13.25E, 52.5N, 7x50 binoculars?) "Proclus Brighter than Langrenus". Ref: Hilbrecht & Kuveler Moon & Planets (1984) Vol 30, pp53-61. ALPO/BAA weight=1.*

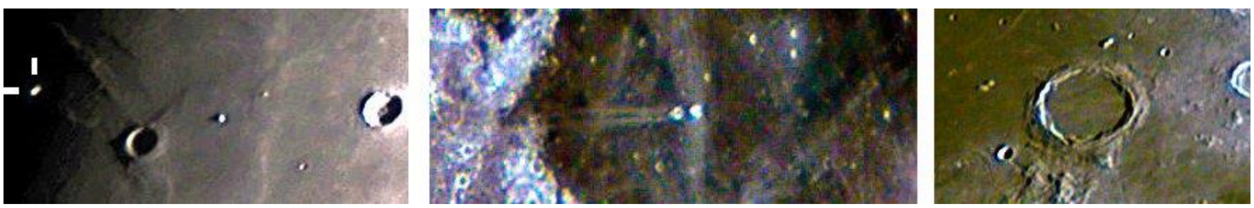


**Figure 6.** *Sub-sections of a whole Moon image obtained by Maurice Collins (ALPO/BAA/RASNZ) obtained on 2024 Apr 18 UT 06:55-07:01 and orientated with north towards the top.* ***(Left)*** *Mons La Hire as indicated by the tick marks. The image has been color normalized and had its color saturation increased to 3.0 on GIMP.* ***(Center)*** *Messier and Messier A – the image has been color normalized and had its color saturation increased to 5.0.* ***(Right)*** *Archimedes crater – this has been color normalized and had its color saturation increased to 5.0 using GIMP.*

It is somewhat unusual to find so many repeat illumination events occurring during the same observing session, though four are from the same day: 1973 Jan 13.

For the Mon La Hire report from 1887, Klein was using a refractor and found a yellow streak that cast shadows apparently around neighbouring features. This description is very different to most LTP reports. I suppose that it could be due to chromatic aberration, but there is no mention of the effect elsewhere on the terminator. The only issue with this report is that Cameron has estimated it for 20:00 UT, being a typical time that she considers that Klein would have been observing at. The repeat illumination image, Fig 6 (Left) does not cast any light on a possible explanation, so we shall leave the weight at 3.

For the Messier report from 1968, the observer at least appears to have been using a Moon Blink device, which is relatively sensitive to true red/blue colors, and theoretically immune to atmospheric spectral dispersion effects. Fig 6 (Center), which has been enhanced to bring out color, shows no obvious sign or red or blue in the comet like tail of Messier. We shall therefore leave the weight at 3. However at least we have a good color image of what the surface should have looked like at this stage of illumination.

The Archimedes report from 1973 is the first of four from the Hilbrecht and Kuveler paper from the Earth, Moon and Planets journal. However, don't assume that everything appearing in a refereed journal is always scientifically accurate. Winnie Cameron was always sceptical of the LTP reports listed in that paper as nearly all were made with small sized instruments, and the observers concerned were not experienced lunar observers (according to her). However, giving them the benefit of the doubt and investigating each one on an individual bases seems a good strategy. Interestingly the color enhanced version of the repeat illumination image, Fig 6 (Right) does show some yellow, maybe even green, but also orange on the rim, however we are into the noise levels of the camera being used in this enhancement and colors show up on other features too, which probably are not all natural surface colors. It is very unlikely that Theiss would have been able to see colors other than just maybe the blue tinge of some crater slopes which are due to non-geologically recent surface disturbances from e.g. landslides, dust removal on steep gradients etc. We have covered repeat illumination events of this LTP before in the 2017 Jan newsletter. I will leave the ALPO/BAA weight at 1 for now.

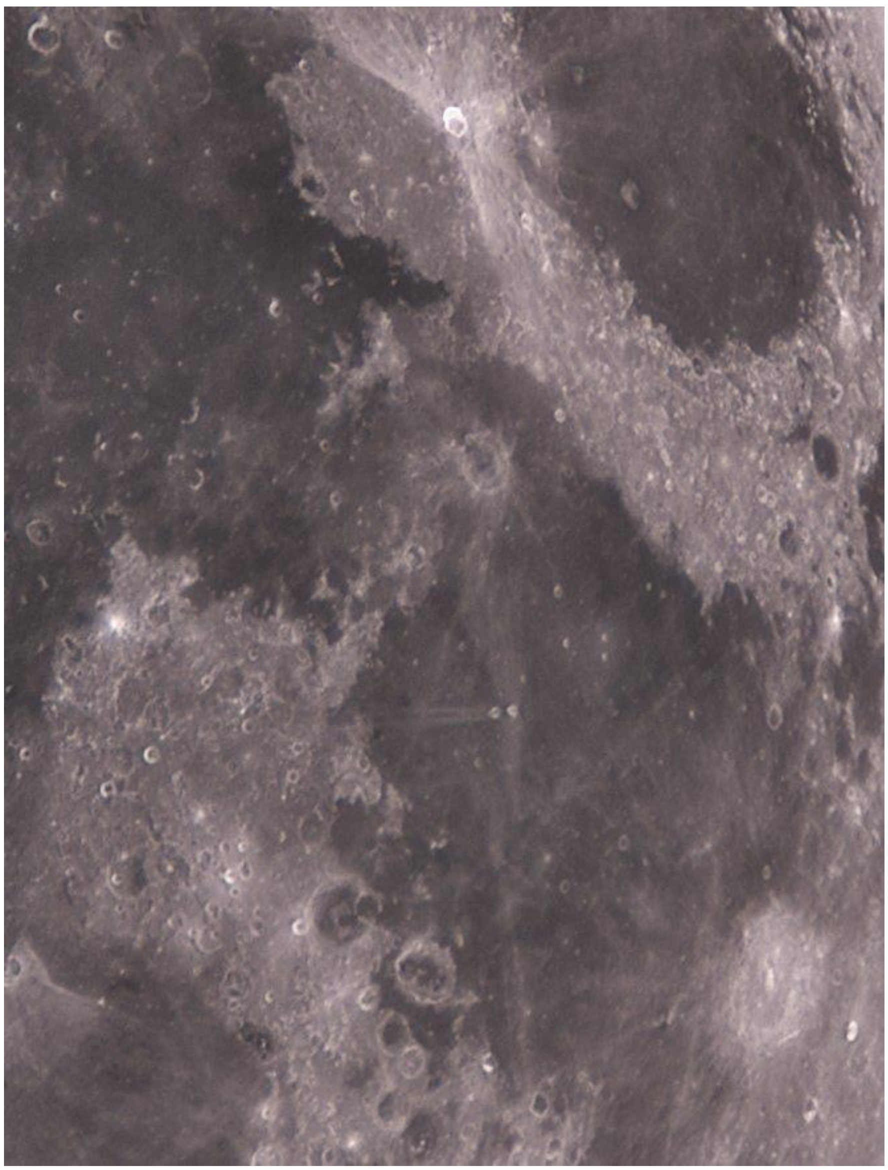


***Figure 7.*** *Section of a whole Moon image obtained by Maurice Collins (ALPO/BAA/RASNZ) on 2024 Apr 18 UT 06:55-07:01 and orientated with north towards the top.*

Three of the Hilbrecht and Kuveler LTP reports from 1973 Jan 13 refer to the brightness of Censorinus and Proclus and by way of comparison Langrenus. Fig 7 neatly covers all three craters in the same image, and it has been possible to measure their peak digital number DN values and determine which is actually the brightest. Proclus has a peak brightness of DN=246, followed by Censorinus with a DN=240, followed by the central peak of Langrenus with DN=211.So whether Proclus or Censorinus can be regarded as extra -ordinarily bright in this 2024 apparition I doubt, as they are often quite bright and sometimes equal, depending upon which parts you measure. So, we will keep the weights of these two 1973 LTP as they are, but for the 1973 Langrenus one, yes, I would not be surprised if Proclus is definitely a lot brighter than Langrenus at this lunar phase – therefore we shall lower the weight of the Schnuchel LTP to 0 and effectively remove it from the ALPO/BAA database, after all the observation was made originally with mere binoculars!

Lastly concerning the Langrenus LTP, which is often regarded as a gold standard as a paper because it was published in the highly rated refereed planetary science journal: Icarus, by renowned astronomer Dolfus and involved polarimetry. Well as you can see the white light image that Dolfus used, for one of the three Langrenus LTP (1993 Jan 02), it is extremely poor quality (Fig 8 – Right) compared to modern amateur images (Fig 8 – Left). This begs the question on the reliability of the polarimetry data if seeing conditions can affect the white light image so much. I shall therefore lower the weight from 5 to 4. We have discussed this report before under similar illumination in the 2017 Jan newsletter.

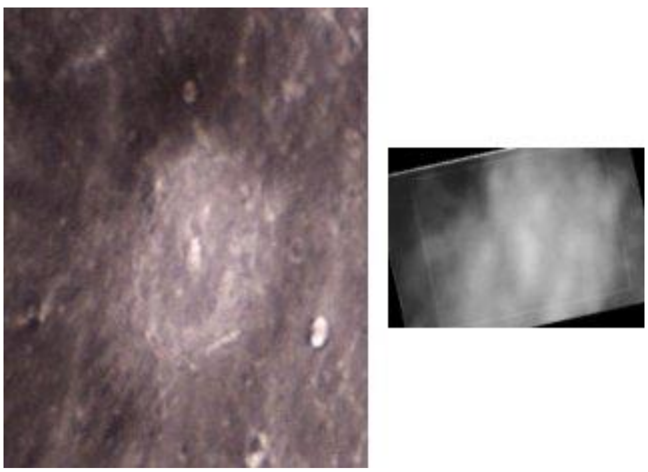


***Figure 8.*** *Langrenus crater with north towards the top.* ***(Left)*** *Image by Maurice Collins taken on 2024 Apr 18 UT 06:55-07:01.* ***(Right)*** *Image from Fig 3 of the paper: Audouin Dolfus (2000) Langrenus: Transient Illuminations on the Moon, Icarus, 146, p430-443 (Academic Press), taken with a 1m aperture telescope at Meudon observatory on 1993 Jan 03 UT 17.7.*

**Archimedes:** On 2024 Apr 19 UT 02:05-02:20 Alberto Anunziato (SLA) observed/sketched (Fig 9) this crater under similar illumination to the following report:

*Archimedes 1971 Aug 01 UT 22:00(?) (19:00 originally given probably local time) Miranda (Plaui, Brazil, 4" refractor, x80) observed two grooves going from east to west, broadening towards the west, across Archimedes. A drawing was supplied. Apparently this was the first time that this was ever seen. Cameron suggests rays? and also says that in fact a similar phenomenon reported before in nearly the same position (Apollo 15 watch?). The Cameron 1978 catalog ID=1303 and weight=2. The ALPO/BAA weight=1.*

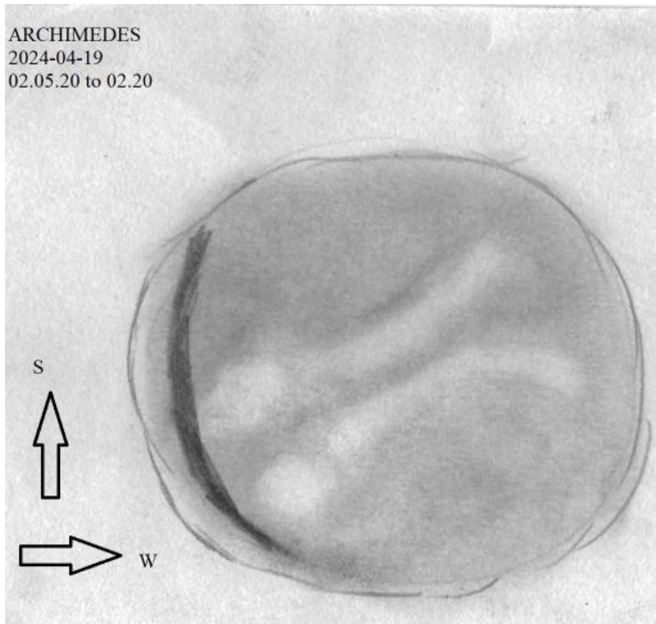



***Figure 9.*** *Archimedes as sketched by Alberto Anunziato (SLA). Date, UT and sketch orientation are given above.*

Alberto comments that there appears to be two light bands that run from west to east and seem to end near the thin shadow of the east wall. These bands are not seen very clearly, being of little contrast, except for the southern most part. Comparing Alberto's description with the Miranda description, they seem fairly similar. Therefore, I will remove this from the ALPO/BAA database by assigning a weight of 0.

**Herodotus:** On 2024 Apr 20 UT 21:41 Franco Taccogna (UAI) imaged this crater for the following Lunar Schedule request:

*BAA Request: Some astronomers have occasionally reported seeing a pseudo peak on the floor of this crater. However there is no central peak! Please therefore image or sketch the floor, looking for anything near the center of the crater resembling a light spot, or some highland emerging from the shadow. All reports should be emailed to: a t c @ a b e r . a c . u k*

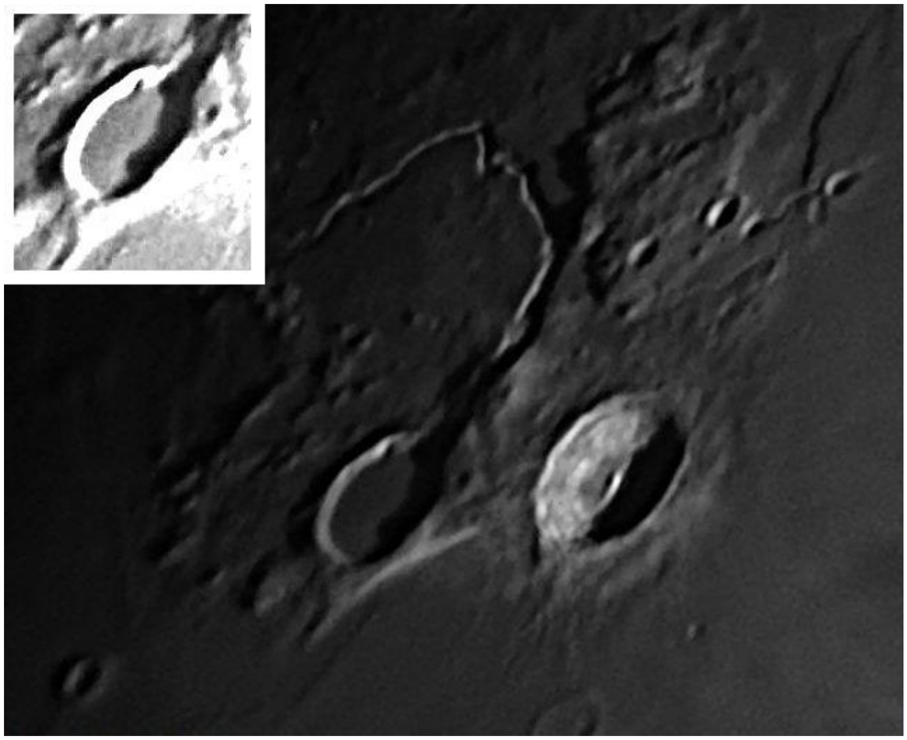


***Figure 10.*** *Aristarchus and Herodotus as imaged by Franco Taccogna (UAI) on 2024 Apr 20 UT 21:4. North is towards the top. The insert on the top left is a contrast stretched view intended to bring out detail on the floor of Herodotus.*

As you can see from Franco's excellent image (Fig 10), which shows a wealth of detail in Aristarchus and its surrounds, the floor of Herodotus fails to show any sign of a central light spot or pseudo peak. We shall keep on looking as it has certainly appeared visually around similar colongitudes, but its appearance is quite rare and we do not fully understand why this is so.

**Full Moon:** On 2024 Apr 23 UT 22:26 Bob Bowen imaged the during Full Moon, when we are interested in the brightnesses of different features on the Moon.

***Figure 11.*** *The Full Moon as imaged by Bob Bowen on 2024 Apr 23 UT 22:26 and orientated with north towards the top.*

Although the Moon was a bit on the low side, it is still possible to take some brightness measurements from Fig 11, and these have been ordered from faintest to brightest according to their digital number (DN) value:

Plato floor (DN=96), Kepler (DN=136), Copernicus (DN=151), Tycho (DN=166), Censorinus (DN=173), Bright spot near Hell (DN=174), Aristarchus (DN=182), Proclus (DN=192)

So here Proclus appears to be the brightest feature on the Moon, out of all of these craters. Aristarchus may look the brightest in the relative sense with respect to the dark surrounding mare, but in an absolute sense, Proclus was the most reflective.

## Analysis of Routine Reports Received (May)

**Earthshine:** On 2024 May 09 UAI members Aldo Tonon and Luigi Zanatta took up the following Lunar Schedule request:

*BAA Request: Please try to image the Moon as a very thin crescent, trying to detect Earthshine. A good telephoto lens will do on a DSLR, or a camera on a small scope. We are attempting to monitor the brightness of the edge of the earthshine limb in order to follow up a project suggested by Dr Martin Hoffmann at the 2017 EPSC Conference in Riga, Latvia. This is quite a challenging project due to the sky brightness and the low altitude of the Moon. Please do not attempt if the Sun is still above the horizon. Do not bother observing if the sky conditions are hazy. Any images should be emailed to: a t c@ a b e r . a c . u k*

***Figure 12.*** *UAI images of lunar earthshine, taken on 2024 May 09, with north approximately off to the right.* ***(Left)*** *Image by Luigi Zanatta taken at 19:37UT.* ***(Center)*** *Image taken by Aldo Tonon at 19:48UT.* ***(Right)*** *Image by Luigi Zanatta taken at 19:51UT.*

There is no sign of any bright or light arcs on the SW, W, NW earth lit limb, in Fig 12, as one would expect from any forward scattering of sunlight from the lunar far side via dust particles. There is a faint hazy arc on the northern earth lit limb but this is simply lighter highland north or Sinus Frigoris. We shall keep on looking as Prof Hoffmann sounded pretty convinced that this could happen, when I spoke to him at Riga in 2017. But in order for this to happen you probably need a fairly big impact just over the limb on the lunar far side.

**Promontorium Agarum:** On 2024 May 12 UT 20:42 Franco Taccogna (UAI) imaged this area for the following Lunar Schedule request:

*BAA Request: Images and sketches needed of this feature. Use a telescope of at least 6" aperture and a magnification of 300-350x. Any sketches, visual descriptions, or images taken, should be emailed to: a t c @ a b e r . a c. u k .*

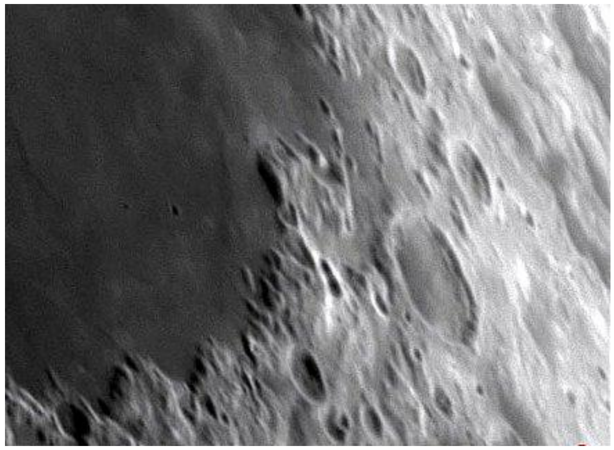


***Figure 13.*** *Mare Agarum as imaged by Franco Tacogna (UAI) on 2024 May 12 UT 20:42. North is towards the top.*

This lunar schedule request is at a similar colongitude to a Patrick Moore LTP report from 1995 Feb 05, when using his 15" Newtonian, under Antoniadi II seeing (good), he noted an obscuration, lack of detail, despite the Moon being high up in the sky from his observing site. We have covered a repeat illumination observation of this LTP in the 2019 Nov newsletter. Franco's image (Fig 13) does not show any lack of detail, therefore we shall keep the weight of Patrick Moore's observation at 3 for now.

**Theophilus:** On 2024 May 13 UT 21:27 Lars Lindhard (BAA) imaged the Moon through a camera phone, held up to the eyepiece, under both similar illumination and similar topocentric libration (both to within ±1.0˚) to the following report:

*Theophilus 1970 Apr 12 UT 00:25 Observed by Collier (Montreal, Canada, 6" reflector?, x180) "Sharp E. inside wall flashes; c.p. lighter than floor. Pink on peak & illum. wall. Drawing. (Apollo 13 watch)." NASA catalog weight=2. NASA catalog ID #1240. ALPO/BAA weight=2.*

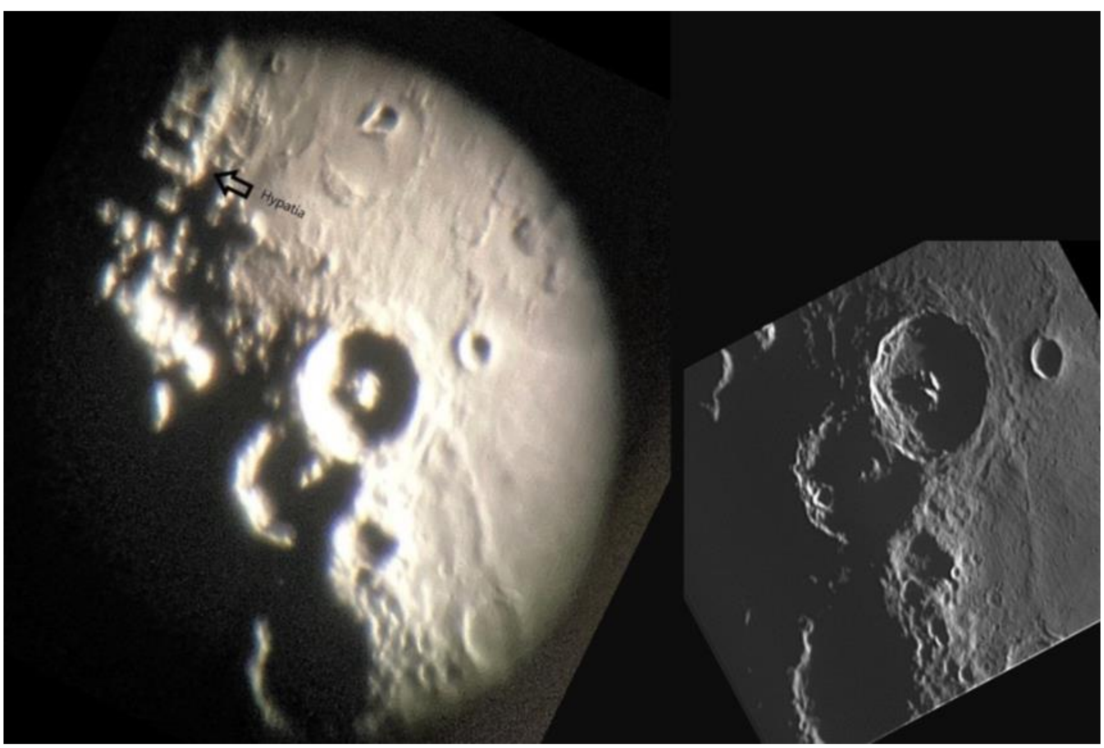



*Figure 14. The Theophilus area with north towards the top. (Left) as imaged in color by Lars Lindhard (BAA) on 2024 May 13 UT 21:27 using a camera phone. An arrow points to Hypatia with a pearl necklace type of effect of sunlit peaks. North is towards the top left. (Right) As imaged by Brendan Shaw (BAA) on 2004 May 24 UT 21:14.*

Although Lars imaged the area because they saw visually an interesting pearl-neckless type of effect around the rim of Hypatia (See Fig 14 - Left), and had not seen this before, I am guessing that this is probably normal as other images of the rim of Hypatia, at different illuminations, show it to have rounded hummocky hills in its rim. Of greater interest is that the view of Theophilus was pretty much identical, to within ±1.0˚, in terms of illumination and viewing angle to what Collier saw back in 1970. Basically, this means that if an explanation to what Collier saw was due to specular reflection from natural mineral facets, internal refractive effects from volcanic/impact melt glass beads on the surface, then the effect would show up again. It clearly does not, so this cannot be the cause of what Collier saw. A couple of things we can agree on from Fig 14 (left). Firstly, the inside east wall is nice and sharp, and the central peak is definitely brighter than the floor – much of which is in shadow anyway. There is no sign of pink in the central peak area or the illuminated wall on the west, but I suppose that chromatic aberration or atmospheric spectral dispersion could explain that for the 1970 observation – alas the observer does not state whether they checked other nearby features. Just for comparison I have included a similar illumination monochrome image by Brendan Shaw, taken back in 2004 – see Fig 14 (Right). Looking at the original Cameron catalog data cards, it seems that the location of the flashes is ambiguous – cannot easily tell from the description? We shall leave the weight of this LTP report at 2 for now.

**Poisson:** On 2024 May 15 UT 21:39 Les Fry imaged the whole Moon at a time when the illumination for the following report was similar:

*On 1982 Aug 26 at UT 21:00 Arsyukhin (Moscow, Russia, 3" reflector) found that Poisson appeared hazy. The Cameron 2006 catalog ID=181 and weight=3. The ALPO/BAA weight=1.*

***Figure 15.*** *Poisson, highlighted by tick marks from a whole Moon image obtained by Les Fry on 2024 May 15 UT 21:39.*

As you can see in Fig 15, Poisson is not a particularly well defined crater, so maybe it is not surprising that Arsyukhin found it hazy as the telescope used was quite a small aperture. We have covered similar illumination images before in the 2013 Apr newsletter. We shall leave the weight at 1 for now.

**Stöfler:** On 2024 May 16 UT 22:30-23:00 Jean Marc Lechopier observed this crater visually with a 15cm Skywatcher, about a day after the following Lunar Observation Request:

*BAA Request: Images or sketches of this crater needed. We are trying to see if a curious grey band is visible across the crater floor as seen by T. Smith on 2020 Nov 22. Any sized scope can be used from 5" or upwards. All images should be sent to: a t c @ a b e r . a c . u k*

Jean-Luc comments*: "Although an observation was requested on 15/05/2004, I transcribe my observation made on 16/05/2024. At magnifications of 200x and 300x, at the best times of seeing, numerous craters are visible in the Stöfler floor; in particular a trio placed to the north. In the south-east area of the Stöfler slab you can see a beautiful mountain massif on the north-west side of which a crater is easily visible. Three dark grey regions immediately jump out at you. The first, certainly the object of the requested observation, cuts diametrically through Stöfler for almost its entire diameter in an east-west direction to stop against the massif previously indicated. It contrasts very well with Stöfler's brightness. It is several kilometers wide and is much darker in the central part of Stöfler, which is almost interrupted. It has irregularities in shape and in the intensity of grey but on a large scale it is homogeneous. To the north-west of the bottom of Stöfler, against the wall, you can see another grey area a little less contrasted than the previous one, semi-circular in shape, rather small but similar in width to the large central grey band. In the opposite direction you can see another dark grey band of long shape, shorter than the central band and stopping against the mountain massif. It is the least contrasted of the three grey areas. The three grey bands/ areas are very easily visible."* I think therefore that we can remove this from the Lunar Observation request web site.

**Messier:** On 2024 May 17 UT 21:22 Mário Rui Abade (BAA) imaged a large section of the Moon in color under similar illumination to the following report:

*Messier and Messier A. On 1968 May 07 at UT 03:00-03:40 Kelsey (Riverside, CA, USA, 8" reflector) observed Messier and Messier A and noted the following: "The ray-tail halo (in N. ray) showed a possible enhancement in blue filter at 1st obs. per. but not seen at 0330. Later enhancement was indicated in red filter but not apparent at 0600h. The red enhancement is very unusual; but has been suspected on a few previous occasions. Not seen vis. (confirm. of Jean?)" The Cameron 1978 catalog ID= and weight=5. The ALPO/BAA weight=3.*

***Figure 16.*** *Messier, from a larger color enhanced image by Mário Rui Abade (BAA) , taken on 2024 May 17 UT 21:22. The image has been truncated from the original and rotated so that north is towards the top.*

Although right on the edge of Mário's image (Fig 16), we can just make out Messier, Messier A and the comet-like tail. Like in the 2024 Apr 18 image above (Fig 6 – Center), there is no obvious color to the tail area. We shall therefore leave the weight as it is for now.

**Proclus:** On 2024 May 19 UT 07:26-07:31 Maurice Collins (ALPO/BAA/RASNZ) imaged the whole Moon and part of this included Proclus under similar illumination to the following report:

*On 1988 Jul 25 at UT03:15 H. Davis (Madison, WI, USA) stated that Proclus was normal apart from a "slightly darker area in SW (Ast) SE (IUE) corner." The Cameron 2006 catalog ID=334 and the weight=0. The ALPO/BAA weight=1.*

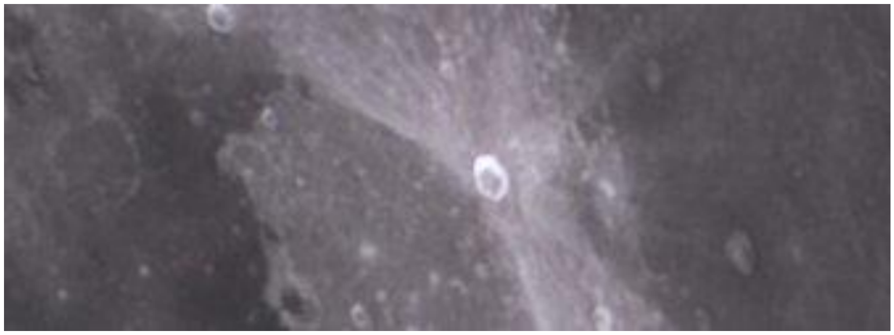


***Figure 17.*** *Proclus, from a larger image mosaic of the Moon taken by Maurice Collins (ALPO/BAA/RASNZ)*

Although Proclus appears quite small in Maurice's image (Fig 17), the resolution is just good enough to confirm that there is a dark area on the south east IAU floor (SW Astronomical directions used in the 1960's and early 1970's). We will therefore lower the weight to 0 and effectively remove it from the ALPO/BAA LTP catalog.

**Aristarchus:** On 2024 May 19 at UT 21:17 and 21:20 Bob and Sophie Stuart imaged this crater under similar illumination to two past LTP reports:

*Aristarchus 1989 Jul 15 UT 02:00-04:20 Observed by Manske, Weier, Curtis, Keyes, Yanna, Norman, Knutson, Sullivan, Eichman and Radi (Carl Fosmark Jr. Memorial Observatory, Madison, WI, USA, SCT C11) "Manske initially observed a reddish tinge on the SE rim of Aristarchus. The color was present in different eyepieces. Two other pinkish tinge areas were seen on the SE and NE rims. 4 of the observers did not see color. Independent confirmation was made by Don Spain (KY) and Smith in LA. Full details can be found on the following web site: http://www.ltpresearch.org/ltpreports/LTP19890715.htm " An ALPO report. ALPO/BAA weight=1.*

*On 1969 May 28 at UT 02:18 Delano (Taunton? MA, USA, 12.5" reflector, x300, seeing=fair and transparency=good) through the red filter at 02:18UT saw a bright area on the west wall of Aristarchus crater become 2x brighter than normal then faded back to normal in < 1 min duration. The spot was 8km centerd on sigma=0.682 and eta=0.397. No events seen at Kepler (Apollo 10 watch). The Cameron 1978 catalog ID=1149 and weight=4. ALPO/BAA weight=3.*

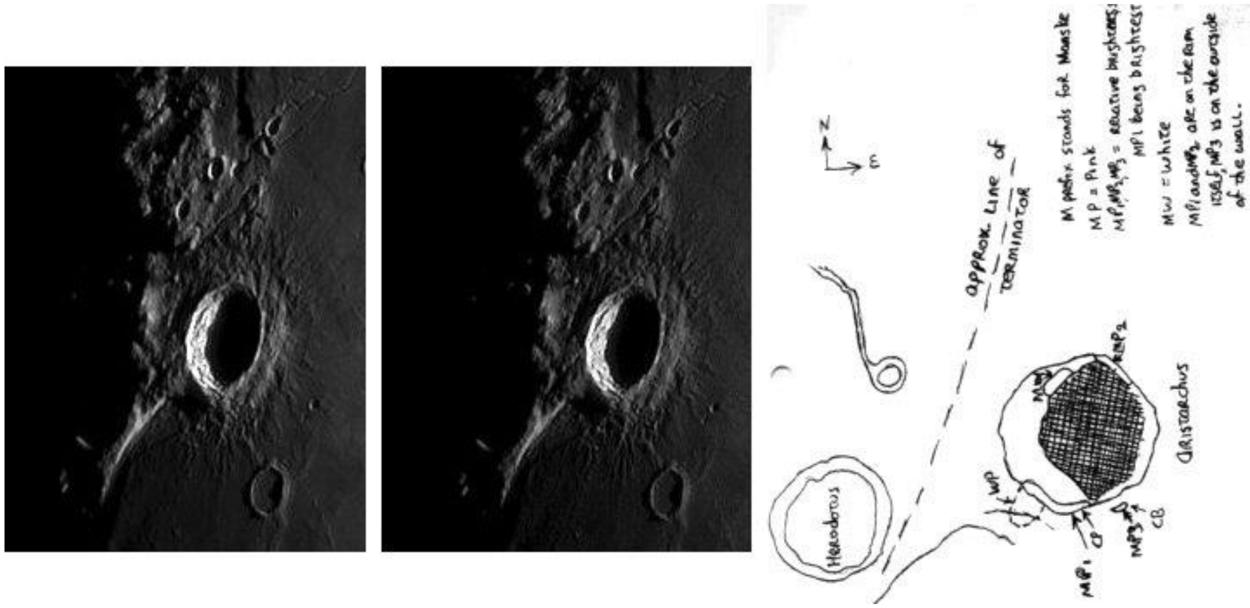



*Figure 18. Aristarchus orientated with north towards the top.* ***(Left)*** *As imaged by Bob and Sophie Stuart (BAA/NAS) on 2024 May 19 UT 21:17.* ***(Center)*** *As imaged by Bob and Sophie Stuart (BAA/NAS) on 2024 May 19 UT 21:20.* ***(Right)*** *A sketch made by Bob Manske (ALS) from 1989 Jul 14 UT*

Bob and Sophie's imaging efforts (Fig 18 – Left and Center) reveal highly detailed views of what Aristarchus should have looked like in 1969 and 1989 under similar illumination – ignoring libration viewing angle effects. For comparison with the 1989 report, I have included Robert Manske's sketch (Fig 18 – Right). He observed a pinkish tinge in the area labelled MP1. This is actually on the SW, so the LTP description on-line is wrong and will be corrected. Other pinkish spots, albeit sequentially less bright were spotted at MP2, MP3, MP4. MP2 is an oddity as I cannot see this in the Fig 18 (Left and Center) modern day images. A white spot was seen on the NW inner rim at MW and a green-blue tinge was seen at location designated CB. Using Fig 18 (Left and Center) images, although not in color, we can deduce that since the areas where MP2, MP3 and CB lie do not have especially contrasty edges, they should not be likely to produce much color from atmospheric spectral dispersion or chromatic aberration. In view of this, and the fact that color was seen by several observers, I shall raise the ALPO/BAA weight from 1 to 2.

For the 1969 report, there maybe is a slightly bright spot on the inner NW rim slopes, just next to the shadow (it is possibly designated MW in Fig 18 – Right) – I wonder if this is what Delano saw? Bob and Sofie's imaging (Fig 18 (Left and Center) do not show any variations in brightness during the 3 min time interval. We shall lower the weight of the 1969 report from 3 to 2 as the spot exists, and potentially seeing conditions could cause the variations in brightness.

**Aristarchus:** On 2024 May 20 UT 21:01 Bob Bowen (NAS) imaged the whole Moon and captured Aristarchus under similar illumination to the following report:

*On 1975 Feb 23 at UT 18:00-00:24 P.W. Foley (Kent, UK, 12-inch reflector, seeing Good), noticed that Aristarchus was a slate-grey tinged with blue, and abnormally bright, fading at UT 18:47, and decreased activity at UT20:45 after a cloudy period. Blue was seen on the northern wall at UT19:00, but at 19:10 no color, but instead an obscuration. All normal from UT 21:04-21:46 according to Foley. At UT19:00 G. Amery (Reading, UK, 10-inch reflector) noted shadowy grey near the shadow under the south wall, indistinct small area, no color. At UT 20:00 activity increased. Color negative fr. 150-300x till 21:10 (Hunt, Cambridge, UK, 2.5" refractor, seeing Poor-Very good). Negative fr. 20:20-21:00 in bad seeing, and very good seeing at 200x all negative (color blink filters). From 23:45-00:20UT (Fitton, Lancashire, UK, 8" reflector). Turner of Sussex, UK with an 8" reflector, observed as well. (confirm. of activity earlier & neg. later). Cameron 1978 catalog ID=1397 and weight=5. ALPO/BAA weight=3.*

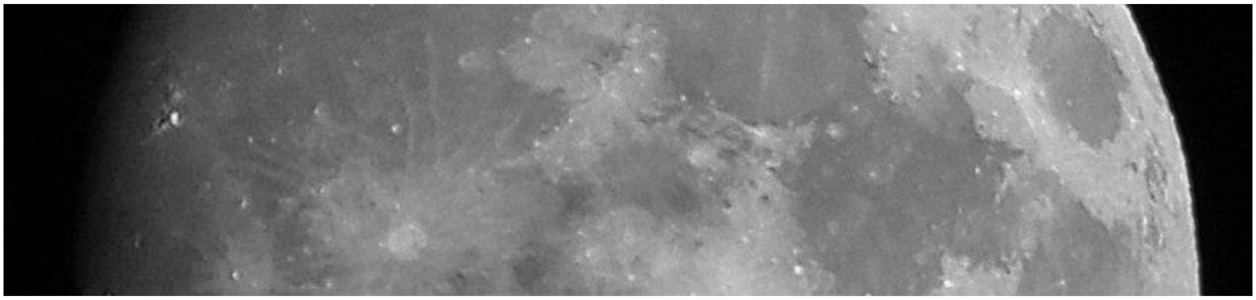


***Figure 19.*** *Part of the image of the Moon by Bob Bowen (NAS), taken on 2024 May 20 UT 21:01 from Ynyslas, Wales, using a Canon EOS 7D Mk2, Canon EOS 75 - 200 f2.8 L-Series lens, Canon EOS 2x Magnifier. ISO 200, 1/250 sec, f6.3, 400mm. North is towards the top.*

Dr Anthony Cook, Department of Physics, Aberystwyth University, Penglais, Aberystwyth, Ceredigion, SY23 3BZ, Bob's image (Fig 19) shows a relatively very bright Aristarchus, seemingly in good agreement with the Foley LTP report. However, it appears like this because it has sunward facing slope and is seen against a dark mare background that in not far from the dark terminator. In terms of absolute brightness, represented by digital number (DN) values, Aristarchus comes out at DN=238 and Proclus on the eastern side of the Moon is DN=245 - not that much difference. So there was nothing unusual when Peter Foley claimed Aristarchus was abnormally bright, as he was referring to its contrasty appearance. Alas, Bob's image does not have the resolution to investigate the other characteristics of the 1975 LTP. We shall therefore leave the weight at 3.

**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. 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 .

WALES, UNITED KINGDOM. Email: atc @ aber.ac.uk

# Basin and Buried Crater Project

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

This month I thought that I would pick another suspected buried crater at random from the buried crater database and see what we can learn about it. QCMA 101 is located at 63.8˚W, 3.4˚S and has an estimated diameter of 76 km according to: Evans, A. J., J. M. Soderblom, J. C. Andrews-Hanna, S. C. Solomon, and M. T. Zuber (2016), Identification of buried lunar impact craters from GRAIL data and implications for the nearside maria, Geophys. Res. Lett., 43, 2445–2455, doi:10.1002/2015GL067394. QMCA stands for Quasi-Circular Mass Anomaly – in other words there is some sort of circular feature in gravity data but nothing so obvious in terrain maps or imagery of the area.

So our task is to check out the gravity data, take a very careful look at other remotely sensed data in order to see if there is any physical evidence for partial remains of say a crater rim or central peak, to check the coordinates and diameter, and hopefully if we have observations sent I, to be able to determine the best morning and evening selenographic colongitudes to see the buried crater or basin at.

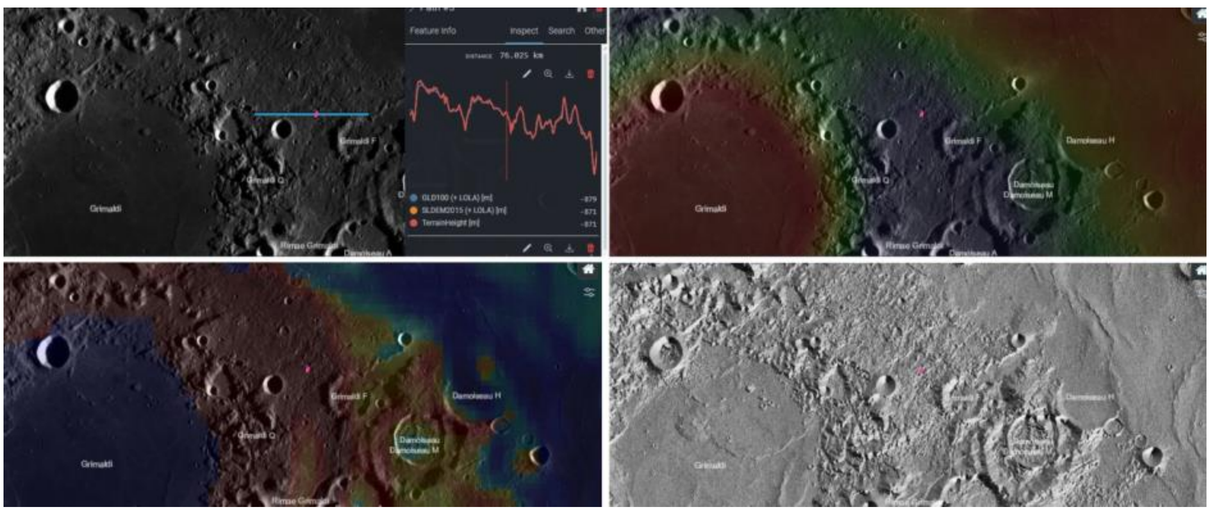
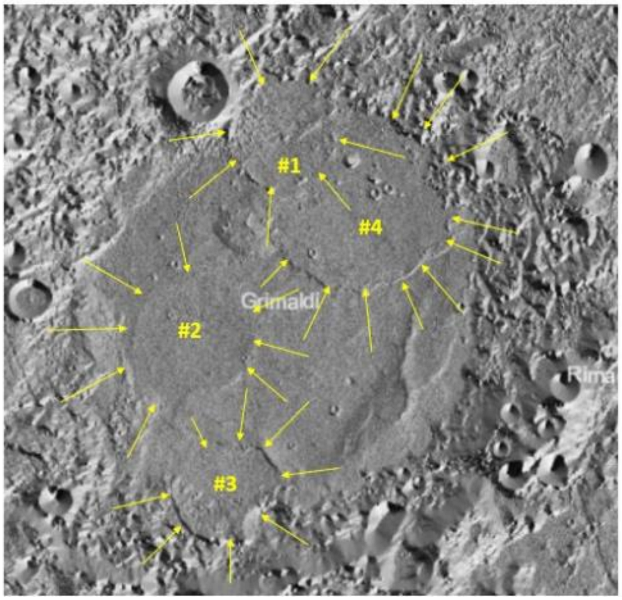


***Figure 1*** *The location of QCMA 101 as indicated by the pink spot near each NASA ACT Quickmap screenshot centre. arrows.* ***(Top Left)*** *An image mosaic with a lot of shadow with a light blue bar showing the effective extent of the hypothetical 76 km diameter buried c rater.* ***(Top Right)*** *GRAIL Bouguer Gravity map 6-600 degree.* ***(Bottom Left)*** *GRAIL gravity gradient map.* ***(Bottom Right)*** *Slope azimuth map.*

Now QCMA 101 is incredibly difficult to find evidence for if you examine the usual remote sensing datasets. Firstly one might expect to find some arcs of the rim, or the remains of a central peak, in image mosaics of the surface with a lot of shadow (Fig 1 – Left) but there is no sign of anything of the order of the size of the scale bar in diameter. The gravity data and gravity gradient data do not help either (Fig 1 – top right and bottom left). The usual trustworthy slope azimuth map, does not show any evidence of the remains of a 76 km diameter crater here. Although not shown here, a simple digital elevation model topography map or a hill shaded relief map (neither shown here) do not reveal evidence of a buried crater. Therefore I shall assign a weight of 0 to QCMA 101, meaning I do not think this is a buried crater.

Interestingly if you look off to one side in the azimuth slope map, at the floor of Grimaldi (Fig 2) , then there are hints of up to four buried craters . These will be added to the buried crater catalog.




| No. | Lon (deg) | Lat (deg) | Diameter (km) | Weight |
|---|---|---|---|---|
| #1 | 68.3W | 3.4S | 39 | 4 |
| #2 | 69.4W | 5.8S | 41 | 2 |
| #3 | 69.0W | 7.6S | 38 | 3 |
| #4 | 67.4W | 4.1S | 65 | 4 |

***Figure 2. (Left)*** *LROC Quickmap Slope Azimuth map with buried craters #1 to #4 indicated.* ***(Right)*** *table of buried crater parameters.*

So if you wish to go and take a look at buried craters #1 to #4 on the floor of Grimaldi, whilst observing, then please try at local sunrise or set on the Moon. However you may find this a challenge as Grimaldi is fairly foreshortened by the limb area of the Moon especially due to libration.

If you think that you have discovered a new impact basin, or unknown buried crater, please check whether it has been found previously on the following web site, and if not email me its location and diameter so that I can update the list.

https://users.aber.ac.uk/atc/basin_and_buried_crater_project.htm.

Alternatively, if you want an observational challenge, try to see if you can image one of more of the basins or buried craters at sunrise/set and establish what colongitude range they are best depicted at. Or you can even do this "virtually" with LTVT software. As you can see from the tables on the web sites there are lot of blank cells to fill in on the sunrise and sunset colongitude columns – so a good opportunity for you to get busy!

# Lunar Calendar July 2024

| Date | UT | Event |
|---|---|---|
| **1** | 1800 | Mars 4° south of Moon |
| **2** | 1000 | Uranus 4° south of Moon |
| **3** | 0800 | Jupiter 5° south of Moon |
| **5** | 2257 | New Moon (lunation 1256) |
| **5** | | Greatest northern declination +28.4° |
| **6** | | East limb most exposed +5.0° |
| **6** | | South limb most exposed -6.5° |
| **7** | 1900 | Mercury 3° south of Moon |
| **12** | 0800 | Moon at apogee 404,076 km |
| **12** | 2227 | Moon at descending node |
| **13** | 2249 | First Quarter Moon |
| **14** | 0300 | Spica 0.9° south of Moon, occultation Russia, North America, Caribbean |
| **17** | 2000 | Antares 0.2° south of Moon, occultation Africa |
| **18** | | West limb most exposed -6.1° |
| **19** | | Greatest southern declination -28.2° |
| **20** | | North limb most exposed +6.6° |
| **21** | 1017 | Full Moon |
| **24** | 0600 | Moon at perigee 364,917 km |
| **24** | 21 | Saturn 0.4° south of Moon, occultation Africa to Japan |
| **25** | 1500 | Neptune 0.6° north of Moon, occultation Pacific |
| **26** | 0533 | Moon at ascending node |
| **28** | 0252 | Last Quarter Moon |
| **29** | 2200 | Moon 0.1° south of Pleiades |
| **30** | 1100 | Mars 5° south of Moon |
| **31** | 0000 | Jupiter 5° south of Moon |

## AN INVITATION TO JOIN THE A.L.P.O.

*The Lunar Observer* is a publication of the Association of Lunar and Planetary Observers that is available for access and participation by non- members free of charge, but there is more to the A.L.P.O. than a monthly lunar newsletter. If you are a non-member you are invited to join our organization for its many other advantages.

We have sections devoted to the observation of all types of bodies found in our solar system. Section coordinators collect and study members' observations, correspond with observers, encourage beginners, and contribute reports to our Journal at appropriate intervals.

Our quarterly journal, *The Journal of the Association of Lunar and Planetary Observers-The Strolling Astronomer*, contains the results of the many observing programs which we sponsor including the drawings and images produced by individual amateurs. Additional information about the A.L.P.O. and its Journal is on-line at: **http://www.alpo-astronomy.org.** I invite you to spend a few minutes browsing the Section Pages to learn more about the fine work being done by your fellow amateur astronomers.
To learn more about membership in the A.L.P.O. go to: **http://www.alpo- astronomy.org/main/member.html** which now also provides links so that you can enroll and pay your membership dues online.

# SUBMISSION THROUGH THE ALPO IMAGE ARCHIVE

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

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

It is helpful if the filenames follow the naming convention :

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.**

# ATTENTION ALL CONTRIBUTORS

## Effective Immediately (March 1, 2024)

While it is a great honor to put together The Lunar Observer, we are now overwhelmed by our success with some issues in excess of 200 pages.

**The increased time it requires for me to perform this job (as a volunteer) pulls me away from my own family and other obligations. Thus, the following rules are being implemented to improve content flow on my end and provide you with the criteria needed to make the "TLO" even more professional in appearance and subject matter.**

1. **Review your image(s) at your location before submitting it/them, then brighten or darken it/them as needed and if required, using whatever tools you have at hand. Images deemed unsuitable (including blurry, out-of-focus or "clouded-out" images) will either be returned for your attention or simply not used.**
2. **Images in jpeg format are preferred but others are also acceptable.**
3. **Crop your images to avoid jagged edges.**
4. **Orient the image so it makes the most sense. North at the top (with Mare Crisium at the upper right) is preferred but not required. To our many wonderful southern hemisphere contributors, please orient as you wish (probably south at top).**
5. **Be very limited on end-of-the-month submissions.**
6. **CHOOSE ONLY YOUR BEST IMAGES and limit the number to no more than eight (8) per each issue of the TLO. (obviously, if there is an article you are writing or contributing to this does not apply).**
7. **The image filename should be submitted with the object name spelled correctly, then the year-month-day-hour-minutes-Your Name or initials So, my image of Copernicus should have a file name of:**

**Copernicus_2023-08-31-2134-DTe**
**means**
**Copernicus, 2023 August 31, 21:34 UT by David Teske**

**If we all do this going forward, it should make putting this all together faster and easier. Many of you already do this. Thank you for your contributions and your help. We have a premier lunar resource for the planet.**

**Please send images/drawings/text to drteske@yahoo.com**

# ATTENTION ALL CONTRIBUTORS
## Effective Immediately (March 1, 2024)

In his efforts to make our organization as professional as possible, the late Walter Haas, the founder of the ALPO, urged that all image and sketch CAPTIONS be as complete as possible. This could enable others to perform their own observations using as much of the original caption data as possible to obtain the same or at least similar results. And while not everyone can provide every detail, we request the following in your captions:

1. Name of feature or object followed by name of imager and their specific location (including geographical coordinates if readily available).
2. Date and Universal Time when image was captured (or sketch was completed) using either the three-letter abbreviation or full spelling of the month to avoid possible month-and-date or date-and-month confusion.
3. Sky seeing (steadiness) conditions (0 = Worst and 10 = Perfect).
4. Sky transparency (opacity of the atmosphere) conditions (poor to good)
5. Intensity conditions (Standard ALPO Scale of Intensity: 0.0 = Completely black and 10.0 = Very brightest features, Intermediate values are assigned along the scale to account for observed intensity of features).
6. Equipment details (including instrument type, brand is optional) and aperture size (inches or mm/cm); telescope mount data (if applicable), camera brand and type, filter data (if applicable), as much exposure data as available (sketchers should provide other pertinent data).
7. Capturing, exposure and processing software data.
8. Personal comments about specific features including north (or south) in the image (sketch), markings and all other items pertinent to the subject being presented.
9. Any other pertinent comments.
10. Email or other contact information.

Below are two sample captions. Both at least attempt to follow the above-stated guidelines

Meton Region as imaged by Massimo Dionisi of Sassari, Italy (10°43’26” N, 8° 33’9” E), on 2024 January 30, at 00:03 UT. Equipment details: Sky Watcher 250 mm, f/4.8 reflector telescope, Tecnosky ADC, Celestron X-cel LX 3x Barlow lens, effective focal length = 4,750 mm, 685 nm IR pass filter, Neptune-M camera, Skywatcher EQ6-R Pro mount. Seeing conditions = III-to-IV (Antoniadi scale). Software details: SharpCap 4.0 acquisition (mono), AutoStakkert! 3.1.4 ELAB, Registax Wavelets.

Lunar craters Hausen and Bailly D as imaged by István Zoltán Földvári of Budapest, Hungary on 2020 April 07, at 21:03-21:17 UT. Colongitude 86.5°. Equipment details: 70 mm refractor telescope, f/l = 500 mm, Vixen Lanthanum LV 4mm eyepiece, 125x, Baader Contrast Booster Filter. Sky seeing = 7 out of 10, sky transparency = 6 out of 6.

## 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
Alberto Anunziato–albertoanunziato@yahoo.com.ar
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: Aristoteles and Eudoxus

***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 September 2024, will be Aristoteles and Eudoxus. 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):

**Alberto Anunziato** – albertoanziato@yahoo.com-ar
**David Teske** – david.teske@alpo-astronomy.org

**Deadline for inclusion in the Aristoteles and Eudoxus Focus-On article is August 20, 2024**

## FUTURE FOCUS ON ARTICLES:

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

| **Subject** | **TLO Issue** | **Deadline** |
|---|---|---|
| **Aristoteles and Eudoxus** | **September 2024** | **August 20, 2024** |
| **Archimedes Region** | **November 2024** | **October 20, 2024** |
| **Anaxagoras** | **January 2025** | **December 20, 2024** |
| **Clavius** | **March 2025** | **February 2025** |
| **Volcanic Features** | **May 2025** | **April 20, 2025** |

# Focus-On Announcement
## Aristoteles and Eudoxus: Similar and Different

The Moon offers us many areas of contrasts, one of them is very close to two areas that we have recently visited in the Focus Section, near Mare Frigoris and Lacus Mortis, two very close giants: the Aristoteles and Eudoxus craters. These two craters, so magnificent and so close, allow an interesting comparison between two geological eras in the same image: the Eratosthenian Aristoteles and the Copernican Eudoxus.

FOCUS ON JULY 2024: Due June 20, 2024: MARE NECTARIS

FOCUS ON SEPTEMBER 2024: Due August 20, 2024: ARISTOTELES AND EUDOXUS

FOCUS ON NOVEMBER 2024: Due: October 20, 2024: ARCHIMEDES, AUTOLYCUS AND ARISTILLUS

FOCUS ON JANUARY 2025: Due December 20, 2024: ANAXAGORAS

FOCUS ON MARCH 2025: Due February 20, 2025: CLAVIUS

FOCUS ON: MAY 2025: Due April 20, 2025: VOLCANIC FEATURES

*Germán Savor*

# Key to Lunar Images In This Issue


1. Arago
2. Archimedes
3. Aristarchus
4. Aristoteles
5. Capella
6. Crisium, Mare
7. Cyrillus
8. Eratosthenes
9. Eudoxus
10. Fracastorius
11. Gruithuisen
12. Heim, Dorsum
13. Higazy, Dorsum
14. Hipparchus
15. Hyginus, Rima
16. Hypatia, Rima
17. Ina
18. Janssen
19. Kant
20. Lindenau
21. Menelaus
22. Meton
23. Mortis, Lacus
24. Neander
25. Nectaris, Mare
26. Oppolzer, Rima
27. Plato
28. Posidonius
29. Proclus
30. Recta, Rupes
31. Rheita
32. Schickard
33. Serenitatis, Mare
34. Taurus-Littrow
35. Theophilus