



THE LUNAR OBSERVER

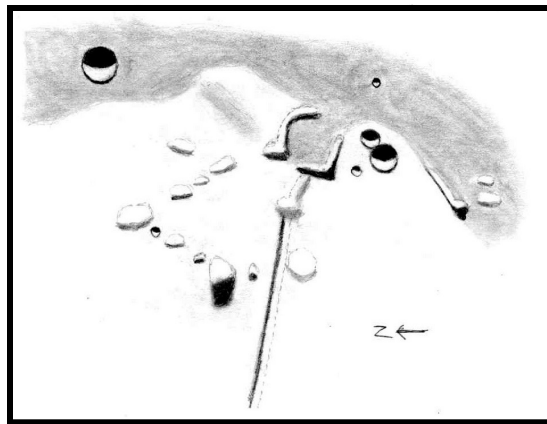
A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.

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

FEATURE OF THE MONTH – MARCH 2018 ARIADAEUS & SOSIGENES A



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

**Nov. 25, 2017 23:38-00:08, 00:26-00:48 UT, 15 cm refl, 170x,
seeing 7-8/10, transparency 6//6.**

I observed these craters and vicinity on the evening of Nov. 25/26, 2017. Ariadaeus is a very bright crater near the western edge of Mare Tranquillitatis. It makes a tight pair with Ariadaeus A to its northeast. They appear to abut each other, but I could not determine if one actually overlapped the other. Ariadaeus A does not have its neighbor's bright appearance, but is otherwise a smaller version of it. Ariadaeus D is the small pit just northwest of Ariadaeus, and Ariadaeus F is the pit to the east out onto the mare. A ridge with a knobby west end is along the mare boundary south of Ariadaeus, and two mounds are farther to the south. Ariadaeus E is the large broken ring north of the tight pair. It has clearly been flooded by Mare Tranquillitatis, though the Lunar Quadrant map does not show it as such. This feature opens onto the mare to the southeast, and there is a gap in its northwest side near a large peak. A low ridge and hill west of Ariadaeus E morph into the Rima Ariadaeus. This is a wide, easy rille that extends well west of the sketched area. Sosigenes A is the largest intact crater on this sketch. It is a larger version of Ariadaeus except that it is not as bright.

A cluster of peaks are between Sosigenes A and Rima Ariadaeus, and the pit Julius Caesar D is tucked among them. One triangular peak is quite large, and a low mound is just across the rille from it. The peaks are not shown as such on the map, but it does show some unlabeled ghost rings in that area.

The brightness of Ariadaeus became more evident in succeeding nights as the moon neared full.

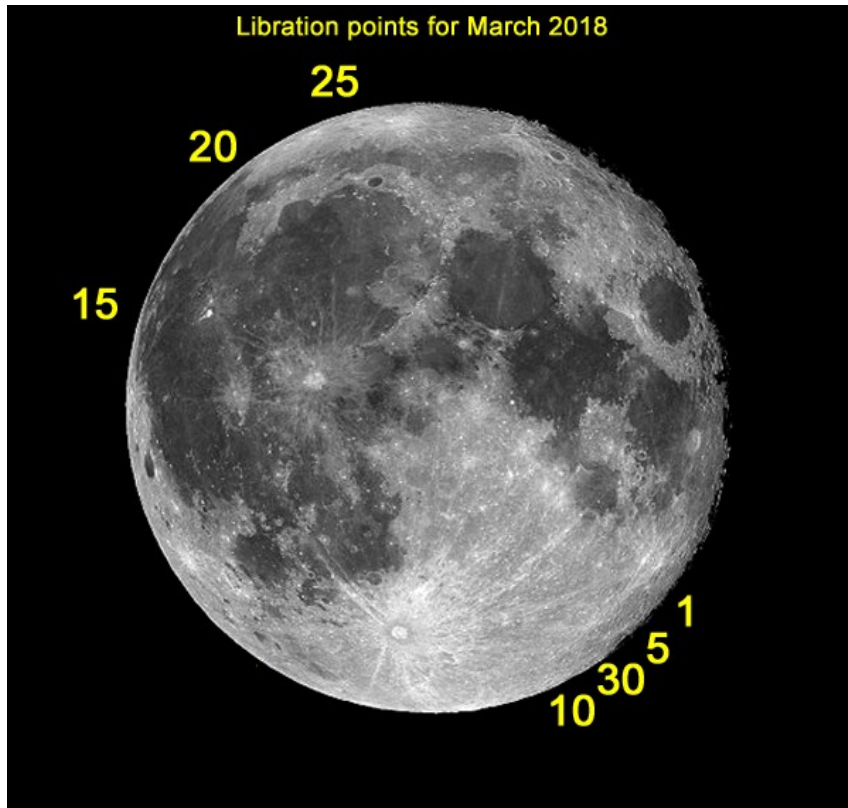
LUNAR CALENDAR

2018	U.T.	EVENT
Mar 02	00:51	Full Moon
07	06:57	Moon-Jupiter: 4.4° S
09	11:20	Last Quarter
10	00:37	Moon-Mars: 4.2° S
11	02:37	Moon-Saturn: 2.5° S
11	06:39	Moon Extreme South Dec.: 20.1° S
11	09:13	Moon Apogee: 404700 km
14	03:48	Moon Descending Node
17	13:12	New Moon
18	19:07	Moon-Venus: 3.9° N
24	15:35	First Quarter
25	02:04	Moon Extreme North Dec.: 20.2° N
26	17:17	Moon Perigee: 369100 km
27	10:56	Moon Ascending Node
31	08:37	Full Moon

2018	U.T.	EVENT
Apr 03	14:14	Moon-Jupiter: 4.2° S
07	12:50	Moon-Saturn: 2.1° S
07	14:37	Moon Extreme South Dec.: 20.3° S
07	18:15	Moon-Mars: 3.5° S
08	05:32	Moon Apogee: 404100 km
08	07:18	Last Quarter
10	08:09	Moon Descending Node
16	01:57	New Moon
17	19:29	Moon-Venus: 5.5° N
20	14:44	Moon Perigee: 368700 km
21	07:38	Moon Extreme North Dec.: 20.4° N
22	21:46	First Quarter
23	12:19	Moon Ascending Node
30	00:58	Full Moon
30	17:16	Moon-Jupiter: 4.1° S

LUNAR LIBRATION

MARCH-APRIL 2018

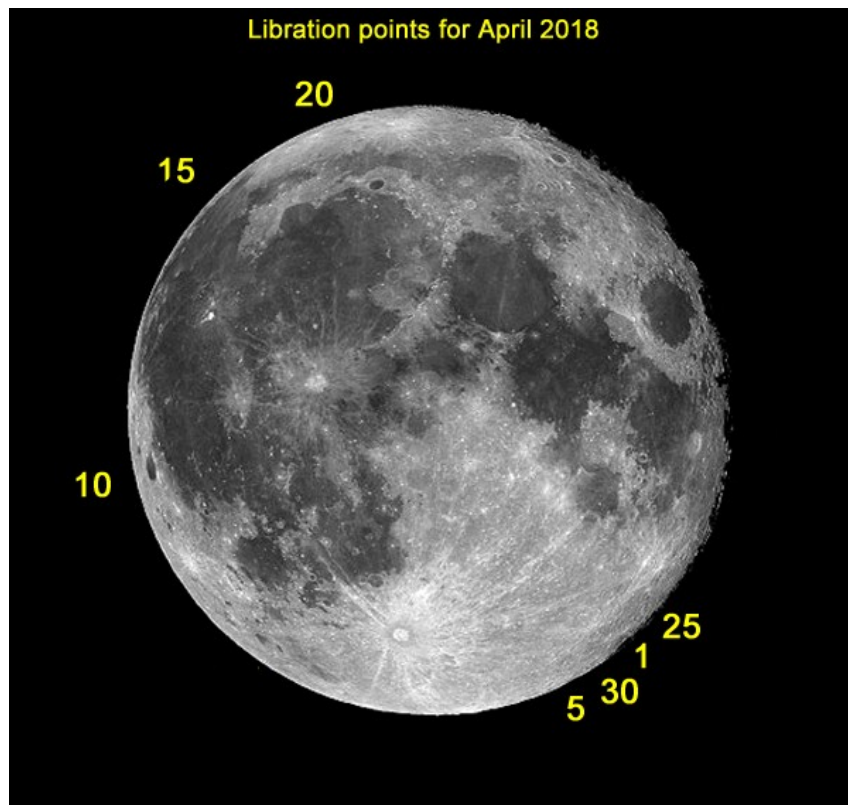


Size of Libration

03/01	Lat -01°23'	Long +02°09'
03/05	Lat -06°17'	Long +05°39'
03/10	Lat -05°07'	Long +02°25'
03/15	Lat +01°14'	Long -03°56'
03/20	Lat +06°28'	Long -05°13'
03/25	Lat +03°48'	Long -01°28'
03/30	Lat -03°56'	Long +03°15'

NOTE:

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



Size of Libration

04/01	Lat -05°58'	Long +04°27'
04/05	Lat -05°57'	Long +03°30'
04/10	Lat -00°27'	Long -02°45'
04/15	Lat +05°39'	Long -05°51'
04/20	Lat +05°02'	Long -01°32'
04/25	Lat -02°20'	Long +02°58'
04/30	Lat -06°33'	Long +04°20'

NOTE:

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

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

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

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

Our quarterly journal, **The Journal of the Association of Lunar and Planetary Observers-The Strolling Astronomer**, contains the results of the many observing programs which we sponsor including the drawings and images produced by individual amateurs. Additional information about the A.L.P.O. and its Journal is on-line at: <http://www.alpo-astronomy.org>. I invite you to spend a few minutes browsing the Section Pages to learn more about the fine work being done by your fellow amateur astronomers.

To learn more about membership in the A.L.P.O. go to: <http://www.alpo-astronomy.org/main/member.html> which now also provides links so that you can enroll and pay your membership dues online.

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, dd/mm/yyyy)

Size and type of telescope used Magnification (for sketches)

Filter (if used)

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

Full resolution images are preferred-it is not necessary to compress, or reduce the size of images. *Additional commentary accompanying images is always welcome.* **Items in bold are required. Submissions lacking this basic information will be discarded.**

Digitally submitted images should be sent to both

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

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

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

CALL FOR OBSERVATIONS:

FOCUS ON: Craters-Latest and Greatest

Focus on is a bi-monthly series of articles, which includes observations received for a specific feature or class of features. The subject for the **May 2018** edition will be **Craters-Latest and Greatest**. Observations at all phases and of all kinds (electronic or film based images, drawings, etc.) are welcomed and invited. Keep in mind that observations do not have to be recent ones, so search your files and/or add these features to your observing list and send your favorites to (both):

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

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

Deadline for inclusion in the Craters article is April 20, 2018

FUTURE FOCUS ON ARTICLES:

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

Subject

TLO Issue

Deadline

LUNAR DOMES PROGRAM

Following a long period of inactivity, the Lunar Domes program is being revived, thanks to Raffaello Lena and Jim Phillips. The official announcement from Executive Director Richard Schmude follows. Raffaello and Jim will be announcing the details of the program in the near future. Welcome to you both.

From Richard Schmude, executive director, the ALPO

It is my pleasure to announce the appointments of two individuals to resurrect our ALPO Lunar Domes Program, Raffaello Lena as acting coordinator and Jim Phillips as acting assistant coordinator. (The "acting" status will drop off by action of the board in the near future, as is the usual practice.)

Raffaello Lena (in his own words) -- I have been interested in the Moon since I was 10 years old (during the Apollo era) and have progressed from a small Newtonian telescope to high-quality scopes (6-inch Maksutov Cassegrain and a 5-inch refractor). Twenty years ago, I used my Polarex Unitron 100 mm, f/15 refractor. My old telescope is now a vintage object in my house. My first interest in lunar studies is represented by the lunar domes analysis and their classifications. Moreover, I was the first Italian to document a lunar impact because it was simultaneously recorded also in Switzerland from other two observing sites (independent and simultaneous observation with a distance between the observatories > 500 km).

I am interested in volcanism and thus in lunar domes. Thus, I worked intensively in this area of study and was impressed by lunar expert Charles Wood when we met in Rome. Among our discussions were different methods for determining the morphometric properties of lunar domes (diameter, height, flank slope, edifice volume) from image data or orbital topographic data, and for determining multispectral image data providing insights into the composition of the dome material

In addition, I was interested with some my friends in the GLR (Geological Lunar Research Group) to study geophysical models of lunar domes, which yield information about the properties of the lava from which they formed and the depth of the magma source regions below the lunar surface.

Lunar domes represent a clear testimony of the volcanic processes that occurred in our Moon. In fact, the differences in dome shapes and rheologic parameters raise broad questions concerning the source regions of the various dome types, allowing the knowledge of which differences in the lunar interior are responsible for the different lunar dome properties observed on the surface. The book "Lunar Domes: Properties and Formation Processes", which I co-authored, is a reference work on these elusive features, providing the methods used to study quantitatively these volcanic constructs (Springer <http://www.springer.com/it/book/9788847026360>)

Besides the work cited above, I have published lunar articles in Icarus, Planetary Space Science, LPSC conferences, the Journal of the ALPO, Selenology, the Journal of the BAA and other American and Italian magazines. My outside interests include listening to jazz whenever possible and exploring Italy's volcanoes and mountainous geology. I hold a doctorate in pharmaceutical sciences from the University of Rome and currently work on food safety (Ministry of Health).

Jim Phillips (in his own words) -- I became interested in astronomy and space as soon as Sputnik went up and I remember standing outside with my parents looking for satellites in the 1950s. Following the manned space program and never missing a launch, I became very interested in the Moon. Reading Patrick Moore's "Guide to the Moon" solidified my interest in lunar observation.

I donated a collection of rare lunar maps and atlases to the College of Charleston with a six-figure value several years ago.

Although I started observing in September 1965 and have kept journals ever since, my first big telescope was an R.E. Brandt refractor of 8-inch aperture, homemade with a tube made from irrigation pipe.

Somewhere along the way I had learned about lunar domes and knew that the ALPO had had a lunar dome section at one point. I contacted the ALPO executive director at the time, John Westfall, to see if he had a finished catalog of domes which had been discovered and/or cataloged. I wanted to begin to search for new lunar domes at that point. John contacted me and said that the project had never been completed and suggested that I begin work on a new lunar dome survey, which I did.

Due to circumstances beyond my control, I ran into some problems and decided to work instead with Raffaello Lena and the GLR. My job was to image the Moon, looking for new domes while Raf and others in the GLR wrote up the articles. While others contributed to imaging the Moon, I discovered multiple new domes which had never been cataloged before.

My interest in assisting Raf at this time is to continue the work we were able to do together with others at the GLR to describe and catalog lunar domes.

I am an M.D. with boards in clinical pathology, surgical pathology and dermatopathology. I am married with three children. My wife is a dermatologist.

Focus On: Rima & Rimae **Volcanic Rilles and Tectonic Trenches**

Jerry Hubbell

Assistant Coordinator, Lunar Topographical Studies

The topic of this month's Focus On article, Rilles, are very interesting and well documented features on the lunar surface. There are literally thousands of these trenches and there are over 330 of these documented on The Moon Wikispaces (ref.) These features are classified based on their structure and formation. There are straight, sinuous, and concentric type rimae. They are formed via volcanic activity and in tectonic and lava cooling processes. These features are excellent targets to train the eye in observing the lunar surface, and in gauging the quality of your high-resolution imaging.



Figure 1. Rimae Sirsalis-LAC74 Grimaldi, Jerry Hubbell, Locust Grove, Virginia, January 7, 2012 0118 UT, 5-inch. APO Refractor (Explore Scientific 127 ED) + TeleView 4x Power Mate, Imaging Source DMK21AU04.AS CCD video camera, north/up, east/right. Seeing 7/10, Transparency 5/6. LAC74 April 1962, Aeronautical Chart and Information Center, US Air Force, Lunar & Planetary Institute.

The typical linear type of rille, such as Rimae Sirsalis (Figure 1). The LAC 74 chart shows the rille in the lower center of the frame to the east of craters Sirsalis and Sirsalis A 25-miles (42 km) each. This rille runs for about 182-miles (300 km) and is about 2-miles (3 km) in width according to the Virtual Lunar Atlas. Located at Selenographic coordinates 14°S and 60°W, this

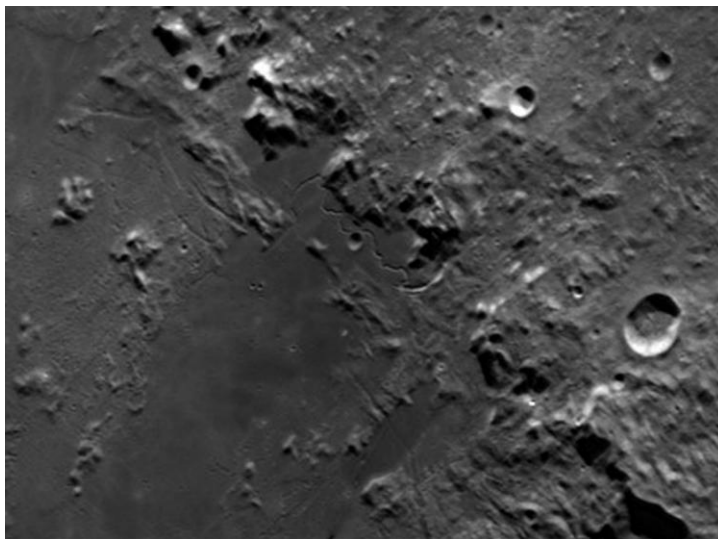
feature is best observed 5 days after first quarter, or 4 days after last quarter. Close observation of this rille and its surrounding area will reveal the specifics of its formation.

The primary characteristic of its surrounding area is that it is in the lunar highlands, not in an area of lava flow or smooth maria. This indicates that the rimae was more than likely formed via tectonic activity in the crust around that location. If you look at the area several hundred miles to the southeast of Sirsalis, you will find Mare Humorum and Rimae Mersenius, 139-miles (230 km) and 2-miles (3 km) wide, another linear rille system. The formation of these 2 rille systems, Sirsalis, and Mersenius could have been caused by the impact that created Mare Humorum. Other's speculate that Rimae Sirsalis was formed from the tectonic stress when Oceanus Procellarum was formed.

If you look to the southeast on the outskirts of Mare Humorum, you will find concentric rilles Hippalus 145-miles (240 km) long, and 2-miles (3 km) wide, and Campanus. These rilles are of the concentric type in that they curve parallel to the shore of Mare Humorum and are tectonic in nature also related to the formation of Mare Humorum.

The other type of rille is of the sinuous type and is formed through the volcanic process from lunar volcanoes or through the piercing of the lunar crust and resulting lava flow forming large maria and other smaller lava lakes or lacus. There are myriad examples of this type of rille, Hadley Rille being one of the most famous due to being a landing site for Apollo 15 (Figure 2).

Figure 2. Rima Hadley (crop, 3x enlargement, ed.), Francisco Alsina Cardinalli, Oro Verde, Argentina, September 10, 2256 UT, 0.28-m. SCT (Celestron 11" Edge HD), QHYCCD QHY5-II CCD video camera, north/up, east/right.



Named for 18th century inventor, John Hadley, Hadley Rille 60-miles (100 km) long and 1-mile (1.5 km) wide, is a sinuous rille runs through a valley by crater Hadley C 4-miles (6 km) and Mons Hadley. Located at approximately 3° E and 26° N Selenographic coordinates, the rille winds through the valley and is the result of volcanic lava flow. Adjacent to the southeastern edge of the lava-filled Mare Imbrium impact feature, the steep-walled rille, which is about 1,300 feet (400-m) deep, winds across Palus Putredinis at the foot of the Montes Apenninus (Apennine mountain range).

Another very well-observed rille system is Rimae Hyginus 133-miles (220 km) long and 2-miles (3 km) wide (Figure 3.) located in the southern part of Mare Vaporum. This rille is very distinct in that it passes directly through and bisects the crater Hyginus 6-miles (10 km), and then to the east, forks into 2 separate rilles. Immediately to the west of crater Hyginus, there is a series

of very small craters, 2 to 3-miles in diameter that follow the path of the rille. It almost appears that these series of 10-12 craters are sections of the lava tube that originally created the rille and caved-in along the path of the rille.



Figure 3. Rima Hyginus, David Teske, Louisville, Mississippi, USA, 26 November 2017 at 0141 UT. Colongitude 356.5 degrees, Seeing 6/10, 4-inch APO refractor + 2.5x Powermate.

These features are some of the most interesting features to observe, not only in terms of there variety of shapes and character, but also in their origins in the formation of the lunar crust. Rilles can almost be considered the fingerprint of the formation of the moon that resulted from the early bombardment of the surface from the thousands of large asteroids and other space debris billions of years ago. The rich variety of volcanic and tectonic trenches provide endless opportunities to spy some of the smallest, yet most distinctive features of the moon. Here (Figures 4-6) are a few other examples:



Figure 4. Rimae Gassendi, Jerry Hubbell, Locust Grove, Virginia, January 7, 2012 0128 UT, 5-inch. APO Refractor (Explore Scientific 127 ED) + TeleView 4x Power Mate, Imaging Source DMK21AU04.AS CCD video camera, north/up, east/right. Seeing 7/10, Transparency 5/6



Figure 5. Aristarchus and Vallis Schroteri, Jerry Hubbell, Locust Grove, Virginia, January 7, 2012 0057 UT, 5-inch. APO Refractor (Explore Scientific 127 ED) + TeleView 4x Power Mate, Imaging Source DMK21AU04.AS CCD video camera, north/up, east/right. Seeing 7/10, Transparency 5/6



Figure 6. Aristarchus, Vallis Schroteri, and Montes Agricola, David Teske, Louisville, Mississippi, USA, 01 December 2017 at 0302 UT. Colongitude 58 degrees, Seeing 5/10, 4 inch APO refractor

There were several observations received also from members of the Lunar Section. Here (Figure 7) is one such example from Alberto Anunziato from Paraná, Argentina.

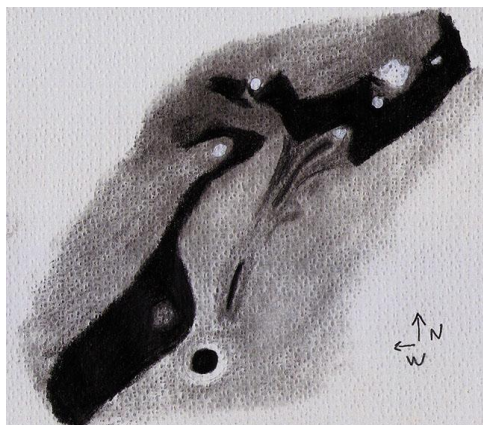


Figure 7. Rima Sulpicius Gallus. Alberto Anunziato, Paraná, Argentina. 08 January 2018 06:20-06:55 UT. Meade EX 105. 154X, seeing 7/10.

Rimae Sulpicius Gallus is an Imbrium network of three rilles on the southwest shore of Mare Serenitatis. It is located parallel to Montes Haemus, in the words of Peter Grego "one of the Moon's less grand-looking named mountain ranges, a narrow, knobby plateau some 400 km in length that marks the southwestern boundary of Mare Serenitatis. Made up of rounded elevations, its highest summits reach around 2,000 m "(The moon and how to observe it). Well, Montes Haemus are not very tall but at 163.3° Colongitude it is their turn to shine, rather, their turn to cast shadows around. The shadows penetrate, rather moderately, in Mare Serenitatis.

In the extreme south they extend towards Sulpicius Gallus, in front of which a diffusely bright patch is observed, surely one of the high peaks of the mountain range. Then the darker shadows delineate the edges of a gulf-like feature, on one of whose promontories (south) shines Sulpicius Gallus M, the bright spot on the northern promontory shines is a craterlet whose name I do not know but which appears bright in the images of the Lunar Reconnaissance Orbiter.

To the east, the bright spots are, from south to north, 1) what appears to be Sulpicius Gallus A or a high point of the central Rima - the shadows of Montes Haemus do not allow us to distinguish clearly-, 2) what seems to be the highest summit in the area-a bright spot and a diffusely bright area that we also observed in the LRO photographs, 3) and finally what appears to be another craterlet. It is the right moment of the lunation to observe shadows inside the central rille, the west and east rilles barely distinguish themselves as diffuse shadows. The three rimae extend further to the north but the shadows of Montes Haemus hide a considerable part.

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Rima Ariadaeus, Rima Hyginus, and Rimae Triesnecker

David Teske

One of the best places on the moon to see rilles is just west of Mare Tranquillitatis (fig. 1). Here, rilles Rima Ariadaeus and Rima Hyginus are easily located near the center of the lunar nearside. The two rilles are oriented more-less east and west, and together span 1/12th of the lunar disk. The first of these rilles to see during the lunation is Rima Ariadaeus. The name of this rille is derived from the crater Ariadaeus, which lies on the eastern end of the rille. Here, the rille is forked and bends slightly south then crosses onto the lavas of Mare Tranquillitatis and ends near the Rimae Ritter rille system. Rima Ariadaeus is a linear rille up to 7 km across, 250 km long and around 500 m deep. The Ariadaeus Rille runs almost radially to the direction of the center of the Imbrium basin. This is an excellent example of a graben. Grabens form when opposing horizontal forces pull apart with enough strength that parallel faults form, and the terrain between them drops. One possible explanation for the expansion around these rilles is that underneath may be a volcanic dike, which is a vertical sheet of magma that slightly raised the ground over it, cracking the surface above.

Figure 1. Rille-land, David Teske, Louisville, Mississippi, USA, 26 November 2017 at 0141 UT. Colongitude 356.5 degrees, Seeing 6/10, 4 inch APO refractor, 2.5 x Powermate.

At one spot, the Ariadaeus Rille is offset by its own width, which appears to be the clearest example of a strike-slip fault found on the moon, showing that the terrain shifted after

the rille's formation.



Just west of Rima Ariadaeus lies Rima Hyginus, perhaps the best known of all rilles (fig. 2). It consists of two linear sections, each about 11 km in length, interrupted by the crater Hyginus. Both sections of the rille are about 400 m deep and

Figure 2. Ariadaeus Rille, David Teske, Louisville, Mississippi, USA, 11 September 2017 at 1005 UT. Colongitude 155 degrees, Seeing 4/10, 4 inch APO refractor, 2.5x Powermate.

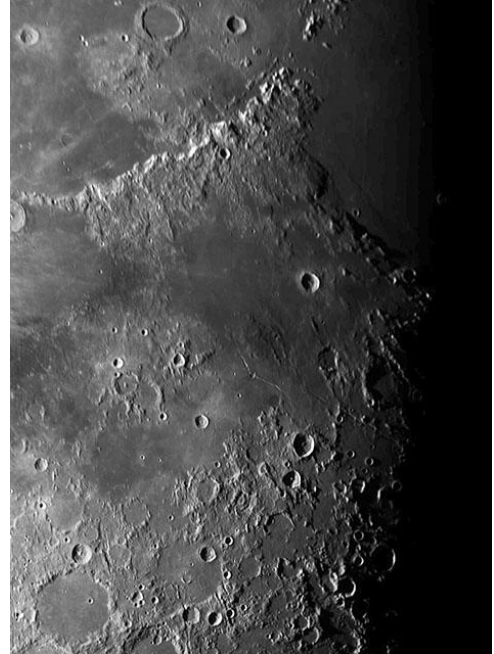
4 km wide. The eastern section runs parallel to Rima Ariadaeus and the western section bends about 35 degrees to the north at crater Hyginus. There is no apparent reason why Rima Hyginus should have been diverted from its straight path. At the west end of the Ariadaeus rille there is a narrow diagonal shunt that connects Rima Ariadaeus to Rima Hyginus. The western section of Rima Hyginus is interrupted by nine craterlets which lie directly on the rille. Rima Hyginus is probably an old lava

channel whose surface collapsed into the lunar subsurface and hardened and the craterlets may

have been responsible for repeated eruptions of lava ash. There are many nearby areas that are coated with dark volcanic ash, as near full moon, areas around the rille take on a dark appearance. The crater pit Hyginus lies directly on Rima Hyginus with a diameter of 9.7 km and a depth of 780 m. Its rim does not protrude visibly above the outside surface. Hyginus has a flat floor that contains small domes that may be volcanic in origin. Hyginus is in the center of a 100 km wide saucer-like depression about 1.5 km in depth. Some volcanoes on Earth are also centered on broad sags that result when subterranean magma reservoirs empty during volcanic eruptions.

West of Rima Hyginus lies the Rima Triesnecker (fig. 3), a greatly branching and very complex system of rilles, many of which are long and thin. The system lies almost at right angles to Rima Hyginus and Rima Ariadaeus. These rilles which stretch 200 km north to south are former lava channels, which probably

Figure 3. Rille-land, David Teske, Louisville, Mississippi, USA, 15 June 2017 at 0955 UT. Colongitude 159.7 degrees, Seeing 6/10, 4 inch APO refractor, 2 x barlow.



transported the lava that formed Sinus Medii. These rilles are named after the 26 km diameter crater Triesnecker. The Triesnecker crater is younger than the nearby rille. Thus it is likely that the crater is an impact one that formed on the edge of a preexisting rille complex. These rilles consist of at least nine crisscrossing rilles that look rather like a railway switchyard or a “K” shape. There are different generations of rilles demonstrated by the observation that the straight leg of the “K” has softer edges and thus is older than other parts of the rille system.

Enjoy the views of the many rilles near the lunar center. Many fascinating observations can be made in this vicinity.

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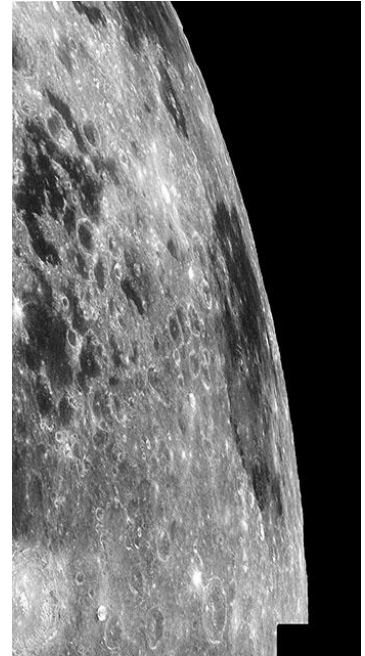
LESSER KNOWN MARIA

Rik Hill

With a colongitude between 5 and 6 deg. and the maximum libration point on the eastern point of the lunar limb you have perfect conditions to observe some lesser known maria. The big one nearest the limb is Mare Smythii (fig. 1). There are two round dark craters on the southern end. The one on the left is Kastner (109km dia.) and the one on the right is Kiess (56km). There is another dark oval to the north of Smythii. This is the large crater Neper (141km) leading to Mare Marginis which is only partially seen here.

Figure 1. Maria Undarum & Smythii - Richard Hill – Tucson, Arizona, USA
May 4, 2017 02:19 UT. Seeing 8-9/10. Colongitude 5.4°. TEC 8" f/20 Mak-Cass, 610 nm filter, SKYRIS 445M.

There are two more dark regions on the left edge of the image. The quasi-circular one just below the left center is Mare Spumans (206km dia.) with the nice crater Maclaurin (51km) to the lower right. Above it is the irregularly shaped Mare Undarum with the very dark crater Dubiago to its lower right and Condorcet (77km) on the northern edge. There is a dark crater with a bright central peak between Spumans and Smythii, Nobili (43km). In the lower left corner is Langrenus (136km) and to the right of it (in the middle) is La Perouse.



FIELDS OF DOMES

Rik Hill



We are looking at an area northwest of Copernicus here (fig. 1). The larger crater on the terminator about halfway up is Kepler (32km dia.). This poor crater is lost in the rays of its monster neighbor Copernicus and often overlooked. South of Kepler is Encke (31km) also deep in shadow in this image. Due east (right) of Encke is Kunowsky (19km).

Figure 1. Kepler - Richard Hill – Tucson, Arizona, USA
Feb. 26, 2018 01:21 UT. Seeing 8/10. Colongitude 38.3°. TEC 8" f/20 Mak-Cass, 610 nm filter, SKYRIS 445M.

Following this arc of craters further we come to Hortensius (15km). This is where we can start to enjoy the gems of this region on the Moon. North of Hortensius you notice some swellings on the surface of Mare Insularum like little lunar blisters. These are the most easily observed dome field on the Moon called Hortensius Omega. There are six of them

(H1-6) with little 1-2km pits in the top of 5 of them. Through the mountain pass north of these and a little west is the crater Milichius (14km) and to the west (left) of it is the grand Dome Milichius also called M12. Northwest of this you'll see another swelling which is M6, with a 2km pit in its summit. visible at full resolution of this image. There are others in the Milichius dome field but they don't show well at this lighting. Dome visibility is very sensitive to sun angle.

There are two parallel mountains north and a little east of this last dome and the pass between them leads you to the crater Tobias Mayer. From the front of this pass right up to the crater is a field of another 8 domes some of which you can see here. These all attest to volcanism on the moon.

CASSINI TO EUDOXUS

Rik Hill

What a wonderful region on the moon with rilles, mountains fantastic craters with great ejecta blankets and at this colongitude, some great shadows thrown in to boot! (fig. 1) The large crater just left of center is Cassini (60km dia.) with the distinctive sub-craters A and B on its floor, the nice rima to the right of A and the obvious tight ejecta blanket. Notice how the blanket tapers off to the upper left with what looks to be flow marks and how the peaks to the north cast such long shadows. Above and to the left (west) is Promontorium Agassiz and above it is Promontorium DeVille though still largely in shadow here.

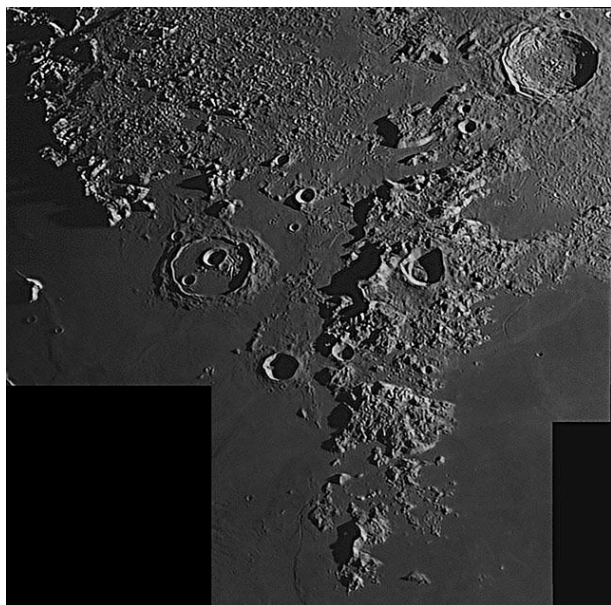


Figure 1. *Cassini-Eudoxus - Richard Hill – Tucson, Arizona, USA May 4, 2017 02:10 UT. Seeing 8-9/10. Colongitude 5.3°. TEC 8" f/20 Mak-Cass, 610 nm filter, SKYRIS 445M.*

To the left of Cassini is the majestic Mons Piton standing like a sentinel in eastern Imbrium. To the east (right) of Cassini is the spectacular downward pointing triangle of Montes Caucasus, my favorite isolated range on the Moon with peaks jutting up out of the surrounding mare, Imbrium to the left and Serenitatis to the right. The pear shaped crater in the center of this range is Calippus (34km). Notice the mountains to the west of Calippus that cast shadows towards Cassini. Between these and Cassini are some nice rilles and south of them the crater Thaetetus (26km). I also like the peak in the lower tip of this mountain range also casting dramatic shadows westward and to the left of these shadows is Rima Thaetetus.

At the north end of the mountain range is a plain known as Alexander listed with an 85km "diameter" though it is not very round and above this, in the corner of this image is the grand crater Eudoxus with nicely terraced walls surrounded by the hummocky terrain of its ejecta.

LUNAR TOPOGRAPHICAL STUDIES

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OBSERVATIONS RECEIVED

ALBERTO ANUNZIATO - ORO VERDE, ARGENTINA. Digital images of Atlas, Cleomedes, Mutus & Rima Furnerius. Drawing of Rima Sulpicius Gallus.

FRANCISCO CARDINALI - ORO VERDE, ARGENTINA. Digital images of Rima Hadley(2).

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 12 day moon. Aristarchus, Copernicus, Mons Rumker & Tycho.

WALTER ELIAS - ORO VERDE, ARGENTINA. Digital image of Aristarchus(2), Censorinus, Dionysius-Rima Ariadaeus, Gassendi, Macrobius, Mare Crisium, Messier-Langrenus, Peirce, Petavius, Picard, Rima Goclenius, Rima Janssen & Sharp.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Agatharchides, Aristarchus, Bode, Conon, Full Moon, Motes Alpes, North Pole, Pytheas & Theaetetus.

ROBERT HAYS - WORTH, ILLINOIS, USA. Drawings of Ariadaeus-Solsigenes A, Harpalus E,G,H & Naumann.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Cassini-Eudoxus, Kepler, Torricelli, Maria Underum-Smythii.

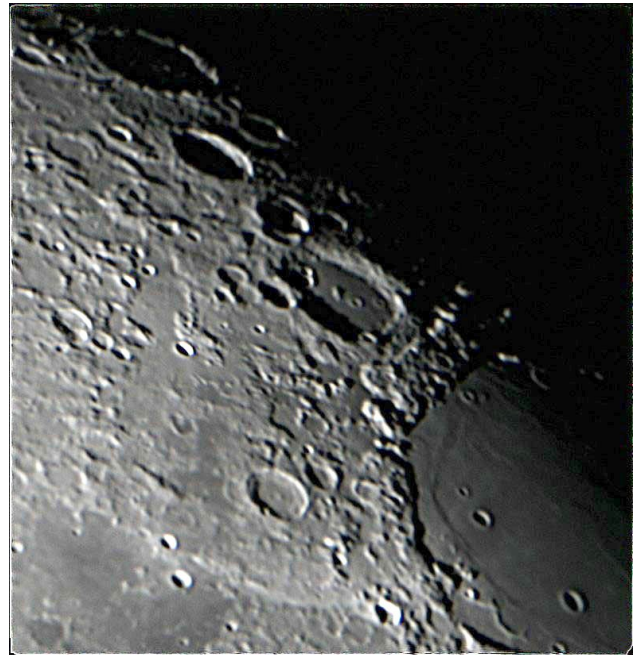
JERRY HUBBELL – LOCUST GROVE, VIRGINIA, USA. Digital image of 17 day Moon.

WALTER LATRONICO - ORO VERDE, ARGENTINA. Digital images of Littrow, Gassendi, Proclus & Full Moon.

DAVID TESKE - LOUISVILLE, MISSISSIPPI, USA. Digital images of Rima Ariadaeus, Rima Hyginus, & Rima Triesnecker.

RECENT TOPOGRAPHICAL OBSERVATIONS

CLEOMEDES– Alberto Anunziato, Paraná, Argentina. February 3, 2018 04:32 UT. CPC-1100, Canon EOS digital rebel XS.

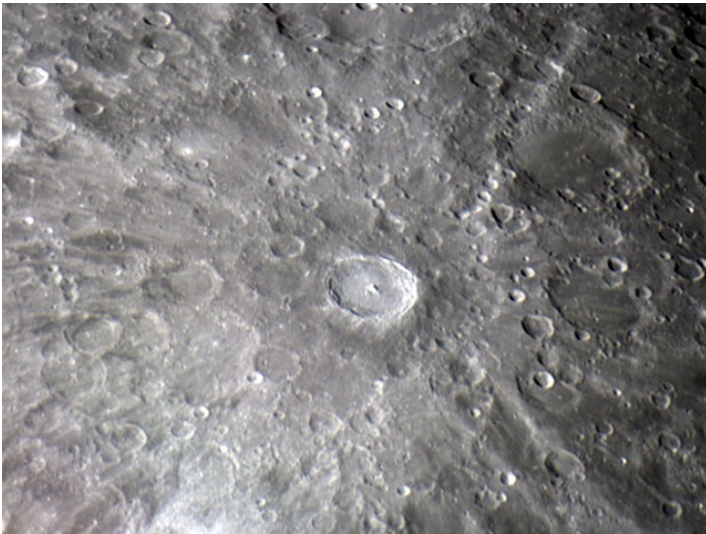


MUTUS– Alberto Anunziato, Paraná, Argentina. February 3, 2018 04:06 UT. CPC-1100, Canon EOS digital rebel XS.

MONS RUMKER- Maurice Collins,- Palmerston North, New Zealand. January 29, 2018 09:22 UT. FLT-110, f/21. ASI120M. North down.

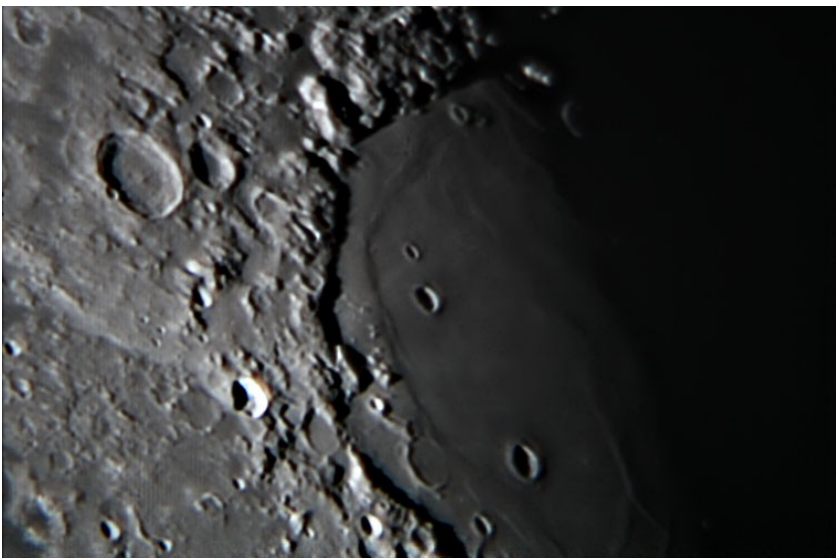


RECENT TOPOGRAPHICAL OBSERVATIONS



TYCHO- Maurice Collins,- Palmerston North, New Zealand. January 29, 2018 09:26 UT. FLT-110, f/21. ASI120M. North down.

GASSENDI- Walter Elias, Oro Verde, Argentina. February 3, 2018 05:25 UT. CPC-1100, Canon EOS Digital Rebel XS.

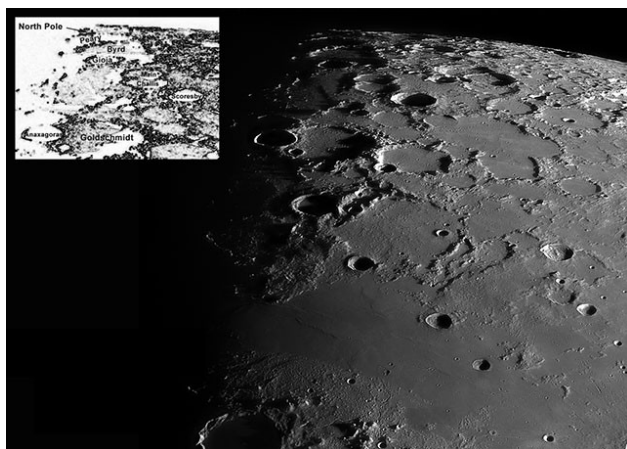
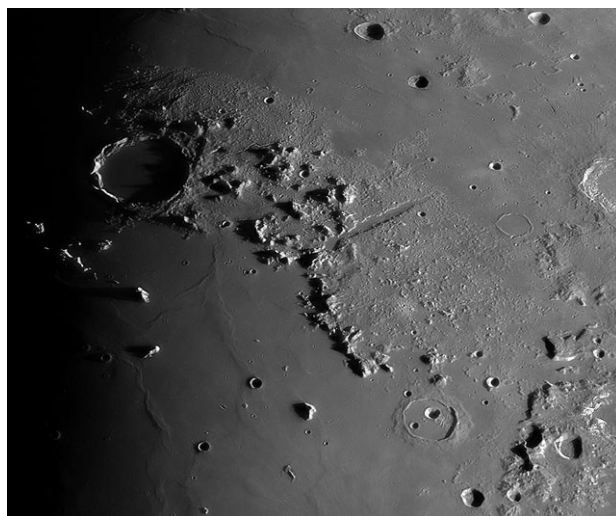


PEIRCE- Walter Elias, Oro Verde, Argentina. February 3, 2018 05:48 UT. CPC-1100, Canon EOS Digital Rebel XS.

RECENT TOPOGRAPHICAL OBSERVATIONS

MONTES ALPES - Howard Eskildsen, Ocala, Florida, USA. February 24, 2018 00:52, UT. Seeing 10/10, transparency 5/6. 6" Refractor, f/8, 2x barlow, W-8 Yellow filter, DMK41AU02.AS.

The 10/10 on seeing is not a typo. I have never put that on an image before, nor have I gotten this much detail out of a 6" aperture. This is probably my best lunar image ever. It shows the Montes Alpes with its famous valley, Plato with hints of two craterlets emerging from the shadows, and mounds on the floor of the crater Callipus on the lower right. It also shows the pressure ridges like wings between Plato K and Plato KA, reminds me of a snowman. What a night!



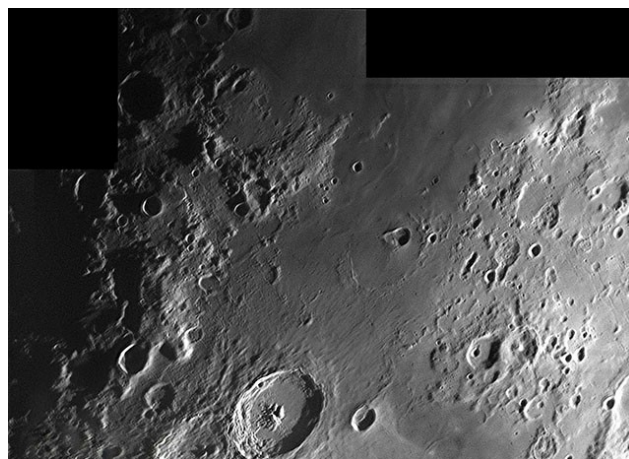
NORTH POLE - Howard Eskildsen, Ocala, Florida, USA. February 24, 2018 00:53, UT. Seeing 10/10, transparency 5/6. 6" Refractor, f/8, 2x barlow, W-8 Yellow filter, DMK41AU02.AS.

Due to favorable libration, it is possible to see over the north pole and beyond. I think of the craters Scoresby, Challis, Main, Byrd and Peary as stepping stones to the pole, which resides on the rim of Peary. Continue beyond that to the top of the photo and we are headed south again.

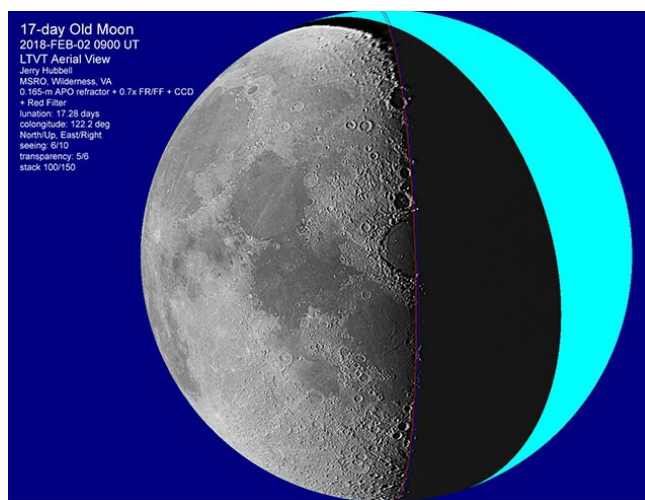
TORRICELLI - Richard Hill – Tucson, Arizona, USA January 23, 2018 00:50 UT. Colongitude 357.9°. Seeing 8-9/10. TEC 8" f/20 Mak-Cass, 610 nm filter, SKYRIS 445M.

Every lunar observer has a handful of favorite features. One of mine is the pear-shaped crater Torricelli. It is on the north side of Torricelli R, an 87km diameter ghost crater. The long dimension of Torricelli is 24 km but the main crater is about 18km in diameter. There are many pear-shaped craters on the moon but this one, sitting out in the open is quite distinctive and immediately identifiable. Torricelli sits in the middle of Sinus Asperitatis (Bay of Roughness) and embayment off of Mare Tranquillitatis, just south of the Apollo 11 landing site, that extends down to the spectacular crater Theophilus (104 km dia.) to the south certainly helps! Just to the right of Theophilus is Madler (29km). Note the unusual structure to the ejecta blanket. There is a short dorsum heading out of the crater to the northeast and then a bright ray pointing southeast out of the crater. During higher sun this is a very curious structure.

Above and right from Madler are two similar diameter craters of very different morphology. The one closer to Madler with a small crater on its floor is Isidorus (43km) and the one with the rounded central peak is Capella (51km). Though they look very different, and one would be tempted to say Capella is the older, they are both assigned ages of "Pre-Imbrian" between 4.5 and 3.9 billion years ago. Due left (west) from Torricelli is an odd teardrop shaped crater Hypatia (43km) that points south. Note the smaller crater to the upper left of it that points the same way. The big shadow filled crater beyond it is Delambre (54km) and to the south of it is a smaller crater Alfraganus (22km). To its left is the shadow filled Taylor (43km) and way south is Kant (32km).



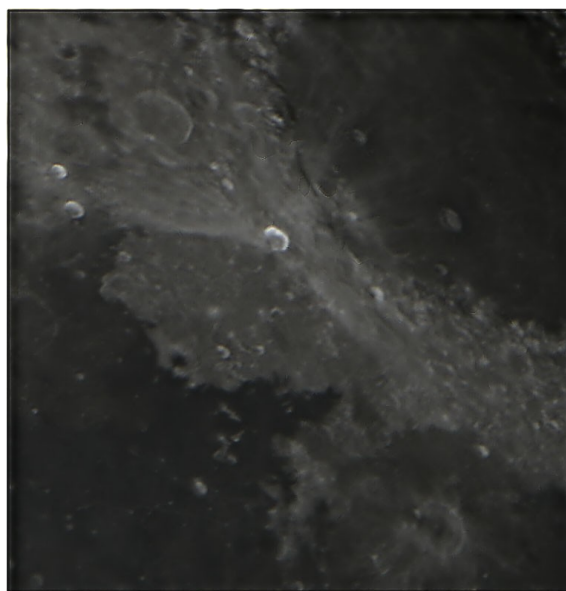
RECENT TOPOGRAPHICAL OBSERVATIONS



17 day MOON - Jerry Hubbell · Wilderness, Virginia USA.. February 2, 2018 09:00 UT. 0.165m APO refractor, f/4.9, 0.7x FR/FF. Seeing 6/10, transparency 5/6. Colongitude 122.2°. ST200XM, .Red filter.

Although not the best image scale for high-resolution imaging (f/4.9) and not the best camera (a deep sky SBIG ST2000XM CCD), I think being able to capture the whole disk of the moon is very nice. You can detect features < 3 km on this image if you zoom up on it. I though it would be interesting to use LTVT to rotate the image around so that we are directly over Mare Crisium with the craters Picard and Peirce very prominent on the smooth surface of the maria.

PROCLUS - Walter Latronico, Oro Verde, Argentina. February 1, 2018 05:04 UT. CPC-1100, Canon EOS Digital Rebel XS.



FULL MOON - Walter Latronico & Walter Elias, Oro Verde, Argentina. February 1, 2018 02:03 UT. CPC-1100, Canon EOS Digital Rebel XS.

BANDED CRATERS PROGRAM

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

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

Assistant Coordinator – Jerry Hubbell jerryhubbell@alpo-astronomy.org

Banded Craters Program Website: <http://moon.scopesandscapes.com/alpo-bcp.html>

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

Crater Observed: Agatharchides A 28.4° W, 23.3° S
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: P.O. Box 830415, Ocala, Florida, 34483
Telescope: Mewlon 250
Imaging: DMK 41AU02.AS, 1.5X Barlow, Filter: W-25 Red
Seeing: 9/10 Transparency: 3/6
Date (UT): 2015/04/11 Time (UT): 11:22
Colongitude: 178°

Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

Image (north up):

Comments:



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

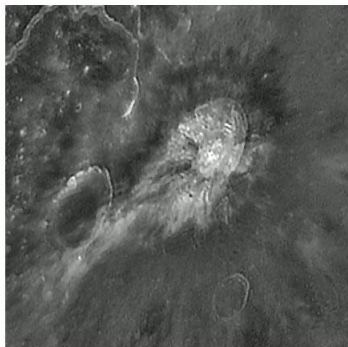
Crater Observed: Aristarchus
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: P.O. Box 830415, Ocala, Florida, 34483
Telescope: Mewlon 250
Imaging: DMK 41AU02.AS, 1.5X Barlow, Filter: W-25 Red
Seeing: 8/10 Transparency: 4/6
Date (UT): 2015/06/07 Time (UT): 10:30
Colongitude: 153°

Position of crater: Selen. Long. Selen. Lat.
47.4° West 23.7° North

Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

Image (north up):

Comments:



Crater Observed: Conon
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: P.O. Box 830415, Ocala, Florida, 34483
Telescope: Meade Refractor 15.2 cm f/8
Imaging: DMK AU4102.AS, 2X Barlow, Filters: None
Seeing: 9/10 Transparency: 5/6
Date (UT): 2017/02/07 Time (UT): 00:45
Colongitude: 37°
Position of crater: Selen. Long. Selen. Lat.
 2.0° East 21.6° North
Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

Comments:



Crater Observed: Theaetetus
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: P.O. Box 830415, Ocala, Florida, 34483
Telescope: Meade Refractor 152 cm f/8
Imaging: DMK 41AU02.AS, 2X Barlow Filters: None
Seeing: 9/10 Transparency: 5/6
Date (UT): 2017/02/07 Time (UT): 00:45
Colongitude: 37°
Position of crater: Selen. Long. Selen. Lat.
6.0° East 37.0° North
Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1

Comments:



BRIGHT LUNAR RAYS PROJECT

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

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

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

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

RECENT RAY OBSERVATIONS

TYCHO – Alberto Anunziato, Paraná, Argentina.
February 3, 2018 04:22 UT. CPC-1100, Canon
EOS digital rebel XS.



12 DAY MOON- Maurice Collins,- Palmerston
North, New Zealand. January 29, 2018 09:00-
09:04 UT. FLT-110, ASI120M. North down.

LUNAR GEOLOGICAL CHANGE

DETECTION PROGRAM

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

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

Reports have been received from the following observers: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Alphonsus, earthshine, Mons Hadley, Picard, and Plato. Alberto Anunziato (Argentina - AEA) observed: Alphonsus, Aristarchus, Beaumont, Cassini, Gassendi, Herodotus, Lambert Gamma, McClure, Plato, Proclus, Tycho, and Vallis Schroteri. Anthony Cook (Newtown, UK – ALPO/BAA) observed: several features. Thomas Bianchi (Italy – UAI) imaged several features. Bruno Cantatella (Italy – UAI) imaged Herodotus. Marc Charron (Reading, UK – Reading AS) imaged several features. Jario Chavez (Columbia - LIADA) imaged several features. Maurice Collins (New Zealand – ALPO/BAA/RASNZ) imaged Aristarchus, Mons Rumker, Tycho and several features. Marie Cook (Mundesley, UK – BAA) observed Aristarchus, Herodotus, and Plato. Rob Davies (UK, Newtown AS) imaged Sinus Roris and several features. Walter Elias (Argentina – AEA) imaged Proclus. Valerio Fontano (Italy – UAI) imaged Herodotus. Camilo Satler (Argentina – AEA) imaged the whole Moon. Franco Taccogna (Italy – UAI) imaged Herodotus, Picard and Sirsalis. Aldo Tonon (Italy – UAI) imaged Herodotus, Picard, Siralis and Theophilus. Ivor Walton (UK – CADSAS) imaged several features. Luigi Zanatta (Italy – UAI) imaged Theophilus.

LTP Reports: No LTP reports were received for January.

Routine Reports: Below is a selection of reports received for January that can help us to re-assess unusual past lunar observations. During January several of these have helped us lower the weights of, or eliminate some past LTP reports, – so it was quite a productive month. Getting rid of LTPs or reducing their weights in the ALPO/BAA catalog, helps us to focus on studying the more reliable ones, and removes unnecessary noise from LTP statistics.

Aristarchus: On 2018 Jan 02 UT 21:50 Thomas Bianchi (UAI) obtained a whole Moon image around Full Moon time, which we can use to examine the brightness of Aristarchus crater and compare it to other times of Full Moon, in order to see how the crater's brightness varies with topocentric libration. Remember that at Full Moon, the brightness of any area, once normalized to the rest of the lunar disk, is effectively proportional to the albedo of that part of the surface, though moderated by visibility of areas of different reflectivity presented by the librated topography. So the following measurements are being pooled with others to see if we can detect a relationship to topocentric libration and perhaps come up with a theory which explains, why in the past some observers measured Aristarchus as being very bright and at other times less so? We did something similar in the [November 2017](#) newsletter, though in that case we were comparing the brightness of different features in different colors. Based upon Thomas' image in Fig 1, it is possible to find the order of brightness of seven lunar features, and to compare these with the order discussed in the Nov newsletter. In order of brightness from dark to light we find: Plato (71), Kepler (115), Tycho and Aristarchus (150), Censorinus (167), Proclus (171) and Hell (179). This is very similar to the earlier results, though I have not normalized these to each other yet.

Maurolycus: On 2018 Jan 23 UT 17:50 Marc Charron (Reading Astronomical Society) imaged the Moon and captured this crater under similar illumination (to within $\pm 0.5^\circ$) to the following report from Bolivia:

*Maurolycus 2000 Aug 06 UT 23:45 observed by Gundlach (Bolivia, telescope with Sony Camcorder)
"Observer reported capturing an abnormality near the rim. Darling, suspects that this is a normal appearance based upon a later observation under similar illumination." ALPO observation. ALPO/BAA weight=1*

All I can imagine is that maybe the LTP from 2000 refers to the fuzzy area on the SW rim, adjacent to Barocius (See Fig 2). In the [Hatfield Lunar Atlas](#) plates 14A and 14D, this appears to be the location of a small

bright ray crater. So it seems that the most likely explanation was that this was the normal appearance, as David Darling suggested, however I will keep the ALPO/BAA weight at 1 for now until I can find more details about the original observation, which is currently not in our archives.



Figure 1. The Full Moon as imaged by Thomas Bianchi (UAI) on 2018 Jan 02 UT 21:50 by Thomas Bianchi (UAI).



Figure 2. Maurolycus as imaged by Marc Charron (Reading Astronomical Society) – extracted from a larger image of the Moon, and orientated with north towards the top.

Theophilus: On 2018 Jan 23, between 18:33-20:31 UT, an observing run was [scheduled](#) to check out if the N and SW floor if this crater looked bland and featureless, a fact noted by John Duchek (ALPO) on 2017 Mar 07 UT 01:23 (See Fig 3 – Top Left). Three UAI observers participated: Luigi Zanatta, Franco Taccogna, and Aldo Tonon.

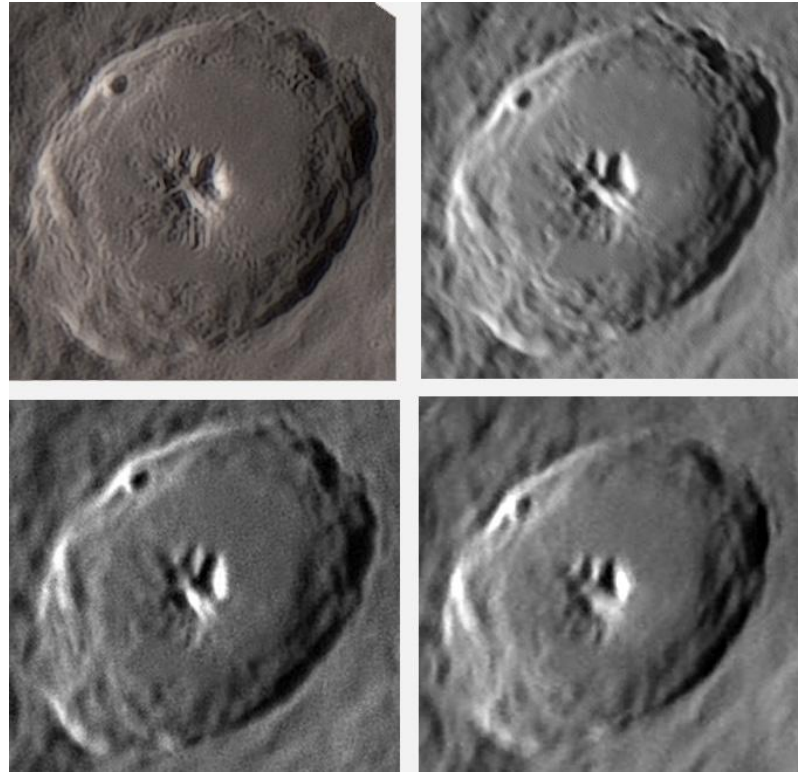


Figure 3 Images of Theophilus, taken under similar illumination conditions, and orientated with north towards the top. **(Top Left)** An image by John Duchek (ALPO) from 2017 Mar 07 UT 01:23. **(Top Right)** An image by Luigi Zanatta (UAI) from 2018 Jan 23 UT 18:01. **(Bottom Left)** An image by Franco Taccogna (UAI) from 2018 Jan 23 UT 18:01. **(Bottom Right)** An image by Aldo Tonon (UAI) from 2018 Jan 23 UT 19:58.

In the past there have been a number of occasions when visual lunar observers have reported obscuration, i.e. lack of details, of the surface of the Moon – usually transient in nature. Whilst the 2017 Theophilus observation mystery was soon cleared up after further studies in the [2017 April newsletter](#) (p12-13), and showed it was the normal appearance, within a $\pm 1^\circ$ colongitude window, we kept it on our radar screens for batch of images, with a narrower similar illumination constraint. I can safely say now that thanks to the contribution by the UAI observer images from Fig 3, that the N and SW floor areas of Theophilus can be regarded as featureless in appearance, depending upon image resolution. LROC WAC images do show craters on these bland areas of the floor, but at a resolution beyond what most amateur sized Earth-based telescopes can capture. No further studies are required and we do not need further repeat illumination of this crater for the observation in question- so it will be removed from the Lunar Schedule program.

Proclus: On 2018 Jan 23 UT 23:38 Walter Elias (AEA) imaged this crater under similar illumination to the following Victorian era report:

Proclus 1877 May 27 UT 20:00? Observed by Barrett (England?) described in NASA catalog as: "Brilliant illum. - not from sun". NASA catalog weight=2. NASA catalog event ID=#188. ALPO/BAA weight=2.

Clearly the NW rim of Proclus is nicely illuminated in Fig 4. Perhaps Barrett was considering this to be unusual? Anyway I checked in the Cameron Catalog and note that the date in the ALPO/BAA database (in the “description” only) should have read 1877 Mar 21, not 1877 May 27. I apologize over this error and have corrected this. Fortunately the description is separate to the entry for the date in the ALPO/BAA database, and the latter is correct, so the above figure should be what Barrett saw in 1877, assuming that the UT of 20:00, from Cameron’s catalog, was reliable. I think I will lower the weight to 1, at least until we can find better reference material than what is in the Cameron catalog.

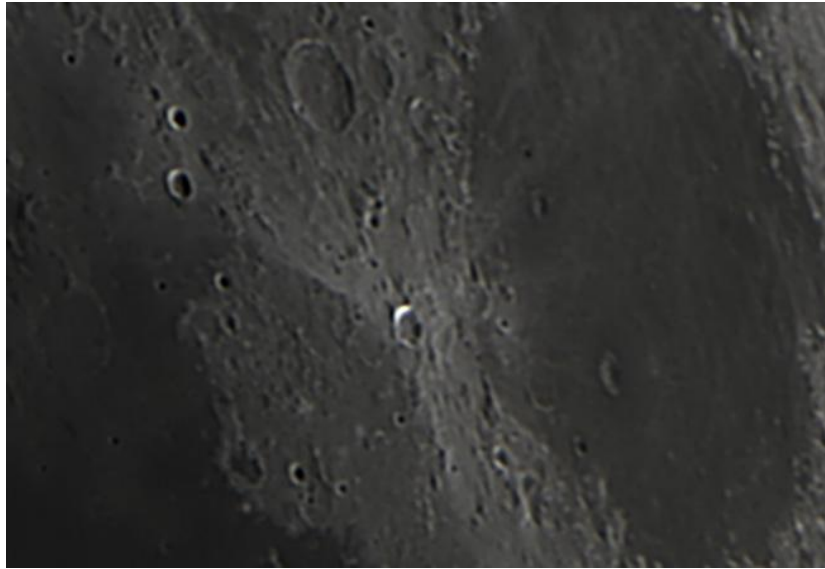


Figure 4. *Proclus* by Walter Elias (AEA), taken on 2018 Jan 23 UT 23:38.

Mons Pico: On 2018 Jan 25 UT 00:04 Jario Chavez (LIADA) imaged this region just outside the $\pm 1^\circ$ repeat illumination/topocentric libration window for a Johann Friedrich Julius Schmidt observation from 1844:

SW of Pico 1844 Apr 25 UT 20:00? Observed by Schmidt (Athens, Greece, ? refractor) "A bluish glimmering patch of light not quite within the dark side" NASA catalog weight=4. NASA catalog ID #123. ALPO/BAA weight=3.



Figure 5 *Mons Pico* as imaged by Jario Chavez (LIADA) on 2018 Jan 25 UT 00:04, orientated with north towards the top.

Clearly there is nothing SW of Mons Pico in Jario's image (Fig 5), and I cannot see anything obvious in lunar atlases, or on the LROC web site either. It is possible that our $\pm 1^\circ$ observing window, is too relaxed. So we had best keep the weight of this report at 3 for now and see what future observations show us.

Plato: On 2018 Jan 26 UT 01:20-01:35 Jay Albert (ALPO) observed this crater under similar illumination to the following report 1952:

On 1952 Jul 31 at UT 03:45-05:30 J.Carle (USA) and J. Supinger (USA, 6" reflector) observed the floor of Plato was almost blank, only two spots could be seen, despite other areas having plenty of detail. The ALPO/BAA weight=1.

A more detailed description of the 1952 report can be found in Fig 6 below

During the repeat illumination observing window, Jay was using a Celestron Nexstar Evolution 8" SCT (x185) under partly to mostly cloudy sky, i.e. through the gaps. Transparency was magnitude 2. He comments that due to the wind and the highly variable seeing, that he saw almost no detail on the floor of Plato. The E wall shadow was prominent on the crater floor, but he saw only the central craterlet, and only when the wind momentarily died down. Because of the poor seeing, therefore, his observation was similar to the LTP description. I checked through the BAA/ALPO database to find similar illumination reports. There is one LTP reports within $\pm 0.5^\circ$ illumination to Carle's observation, but it is somewhat different in description: "*Plato 1932 Apr 15 UT 06:57 Observed by A.V. Goddard & friend (Portland, Oregon, USA, 16" telescope, S=G steady) "Sudden*

appearance of a white spot like a cloud of steam (in appearance only), and in less than a minute it had spread in a NW direction, until it almost reached the rim of the crater" NASA catalog weight=4. NASA catalog ID #403. ALPO/BAA weight=4." Then there are several routine written description reports, for similar illumination, for example on:

- 1972 Feb 23 UT 18:30-18:30 & 18:51-19:10 BAA member Eric Watkins (4.5" Newtonian, x150) stated that the crater had a crisp and well defined floor and surrounding wall and nothing unusual was seen.
- 1972 Feb 23 UT 18:50-19:50 BAA member, Ernest Hulme (8.5" reflector), found nothing unusual in Plato.
- 1980 Jan 26 UT 16:40 ALPO/BAA member Patrick Moore – nothing unusual to report about Plato.
- 1992 Jun 09 UT up to 23:26 BAA member Marie Cook (Questar 3.5", seeing III, transparency very poor) commented that probably due to poor local conditions that she could not see Plato's central craterlet, Archimedes Y or the unnamed crater NW of Mons Pico.
- 2001 Nov 24 UT 20:02-20:30 UAI member, Raffaello Braga (10.2cm refractor, x144, Seeing IV, Transparency Very Good), found that the floor was dark and uniform as usual.
- 2008 Feb 15 Sometime between 20:05 and 2125 UT Plato looked normal the Marie Cook (Questar 3.5", Seeing III, Transparency very poor)

On July 31, 1952 from 3^h 45^m to 5^h 30^m, U.T., colongitude near 21°, Mr. Carle was amazed to find Plato almost blank of detail. Fine detail in other lunar regions, for example the chain of craterlets west of Copernicus, was seen quite as well as in past views which had shown much detail on the floor of Plato. On July 31, however, the most careful study revealed only one or two faint spots in the locations of known craterlets and a hint of the rolling depression of June 2 described above. Observing with Carle, Mr. J. Supinger with a 6-inch reflector also found a remarkable lack of detail in Plato. Actually, their experience is very far from unique; and many famous lunarians have reported an occasional remarkable lack of detail in Plato when observing-conditions and solar lighting were favorable to seeing markings. A recent example is T. A. Cragg's experience on April 4, 1952, as reported on pp. 86-87 of the June, 1952 Strolling Astronomer. It is certainly tempting to invoke obscuring lunar mists to explain such well-supported observations in spite of the great theoretical difficulties which their existence poses.

Figure 6. Extract from the *Strolling Astronomer* Vol. 6, p120.

We can also examine some images and sketches in our archives (See Fig 7), again all within $\pm 0.5^\circ$ in terms of similar illumination to the Carle report. As you can see none of the sketches reveal anything but dusky faint shadings on the floor. As for the images, they hint at the shadings depicted in the three Robinson sketches, but what is quite clear is that unless the image resolution and definition, is very good at this stage in illumination, as in the two Shaw and one Brown images (you can see at least 3 small craterlets in these), then you will not see any fine floor detail as illustrated by the lower resolution Speth and Munoz images. Therefore we can be fairly certain that the 1952 Carle report of a LTP on the floor of Plato, attributed to some sort of obscuration, was merely a resolution issue at this stage in illumination. Therefore we will lower the weight of this report to 0 and effectively remove it from the ALPO/BAA LTP catalog.

Herodotus: On 2018 Jan 28 several observers attempted observation of this crater as the illumination matched (to within $\pm 0.5^\circ$) the following three historic reports concerning a central pseudo-peak/light spot on the floor of the crater:

On 2003 May 13 at UT06:40-07:26 W. Haas (Las Cruces, NM, USA, 12.5" reflector, x321 and x202, S=2, T=3.5) suspected (06:40-06:55UT) that he saw an oval bright feature (intensity 5.5) near the center of the floor of Herodotus crater indenting into the shadow - however the seeing was none too good, so it is more of a suspicion than a definite sighting. At 07:14-07:26UT he re-examined the region (x202 and x321, S=1-2 and T=3.5) and had better glimpses that conformed his initial suspicions of there being an oval indentation bright spot (now intensity 6) into the shadow in the center of the floor. Of course Herodotus does not have a central peak! There was also a very bright spot on the NW sunlit rim of Herodotus crater. The ALPO/BAA weight=2.

Herodotus 1950 Mar 30 UT 19:00? Observed by Wilkins (Kent, UK, 15" reflector) "Transient c.p. (similar phen. to Bartlett's in later yrs.? see #532). NASA catalog weight=4. NASA catalog ID #523. ALPO/BAA weight=3.

Herodotus 1956 Nov 15 UT 01:05-01:30 Observed by Bartlett (Baltimore, MD, USA, 3.5" reflector x100) "Pseudo c.p. clearly seen est. I=5.5, wratten filters showed it neutral to green, red, & yellow, but duller in blue. Floor est. 2deg, distinctly olive-green. Precise time at 0117 at col. 55.27deg" NASA catalog weight=4. NASA catalog ID #655. ALPO/BAA weight=3.

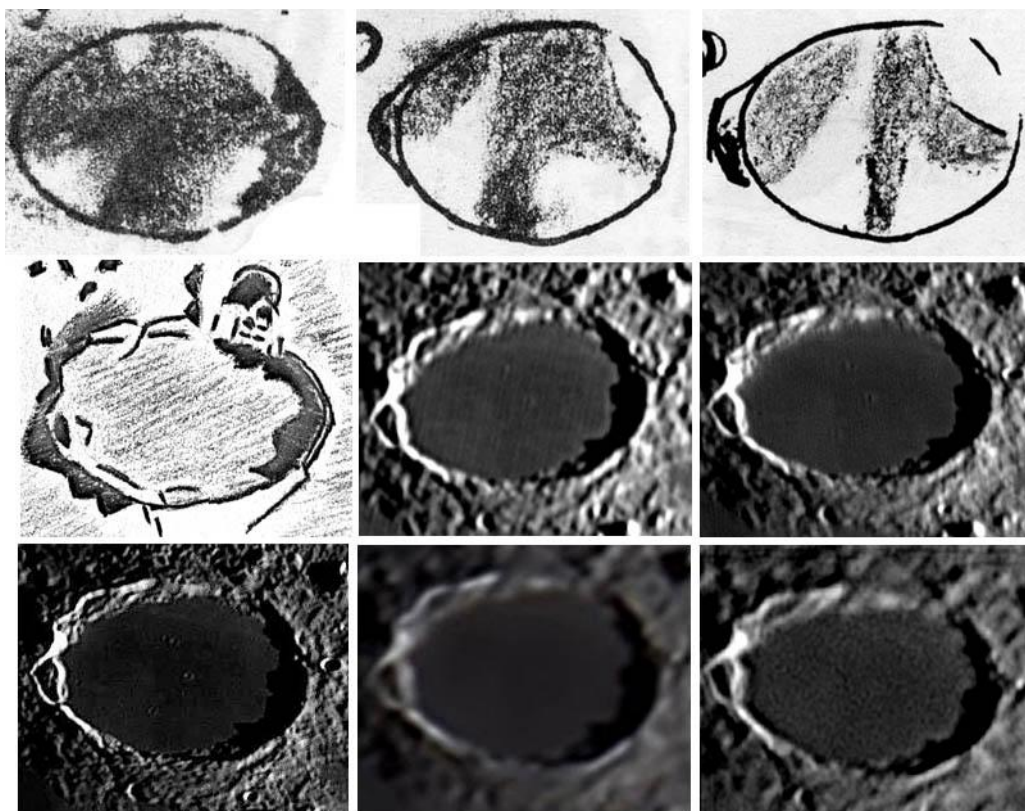


Figure 7. Sketches and images of Plato, orientated with north towards the top. **(Top Left)** 1935 Feb 12 UT 1835 by Headley-J Robinson (BAA). **(Top Center)** 1955 May 30 UT 20:45 by Headley-J Robinson (BAA). **(Top Right)** 1955 May 30 UT 21:10 by Headley-J Robinson (BAA). **(Center Left)** 1979 Mar 07 UT 23:00-00:14 by Marie Cook (BAA). **(Center)** 2005 May 17 UT 21:01 by Brendan Shaw (BAA). **(Center Right)** 2005 May 17 UT 21:34 by Brendan Shaw (BAA). **(Bottom Left)** 2013 Apr 19 UT 2002 by Mike Brown (BAA). **(Bottom Center)** 2013 Apr 19 UT 2005 by Andre Munoz (Aberystwyth University), **(Bottom Right)** 2014 Nov 01 UT 18:03 by Thierry Speth (ALPO).

Marie Cook observed from 21:10-21:28UT, catching the Bartlett and the Wilkins repeat illumination, using a 3.5" Questar telescope under Antoniadi III seeing, and poor transparency conditions. She found that the shadow was well defined, but no sign of a central pseudo peak. A thin band was seen on the illuminated wall. The repeat illumination for the Walter Haas central white spot spanned the first two images in Fig 8, however as you can see the 18:31 and 19:21 UT images do not entirely resemble what Walter observed, as there is no spot at the center. The Wilkins sketch spans images from 20:00 to 21:21 UT, but again nothing resembling the central pseudo peak can be seen. Likewise for the Bartlett report, the 21:21UT modern day image in Fig 8 is the nearest, but again no sign of the central pseudo peak. None of these explain the central pseudo peak/white spot effect, so we shall leave the ALPO/BAA weights as they are and keep on looking. If you are interested in further reading on this topic, see: "The Pseudo-Peak in Herodotus", by Cook and Dobbins, in: "The Moon: Notes and Records of the Lunar Section of the British Astronomical Association" 2:22–35.

Vallis Schroteri and Plato: On 2018 Jan 28 Alberto Anunziato (AEA) observed the former (23:50-23:55UT) and the latter (23:55-00:03UT) under similar illumination ($\pm 0.5^\circ$) to the following two observational reports:

On 1993 Jun 02 at UT 04:30-05:45 S. Beaumont (Cambridge, UK) saw that the shadow of the Cobra's Head in Schroter's Valley was lighter and more diffuse seen at user defined locations of C or B rim (these were black versus medium gray for Cobra's Head). The LTP had vanished by 05:45UT. The Cameron 2006 catalog ID=462 and weight=3. The ALPO/BAA weight=1 because the date or time is wrong.

On 1984 Nov 05 at UT18:00 Marshall (England) noted that there was no normal brightening on the floor just next to the southern most craterlet. The Cameron 2006 catalog ID=251 and the weight=2. The ALPO/BAA weight=1.

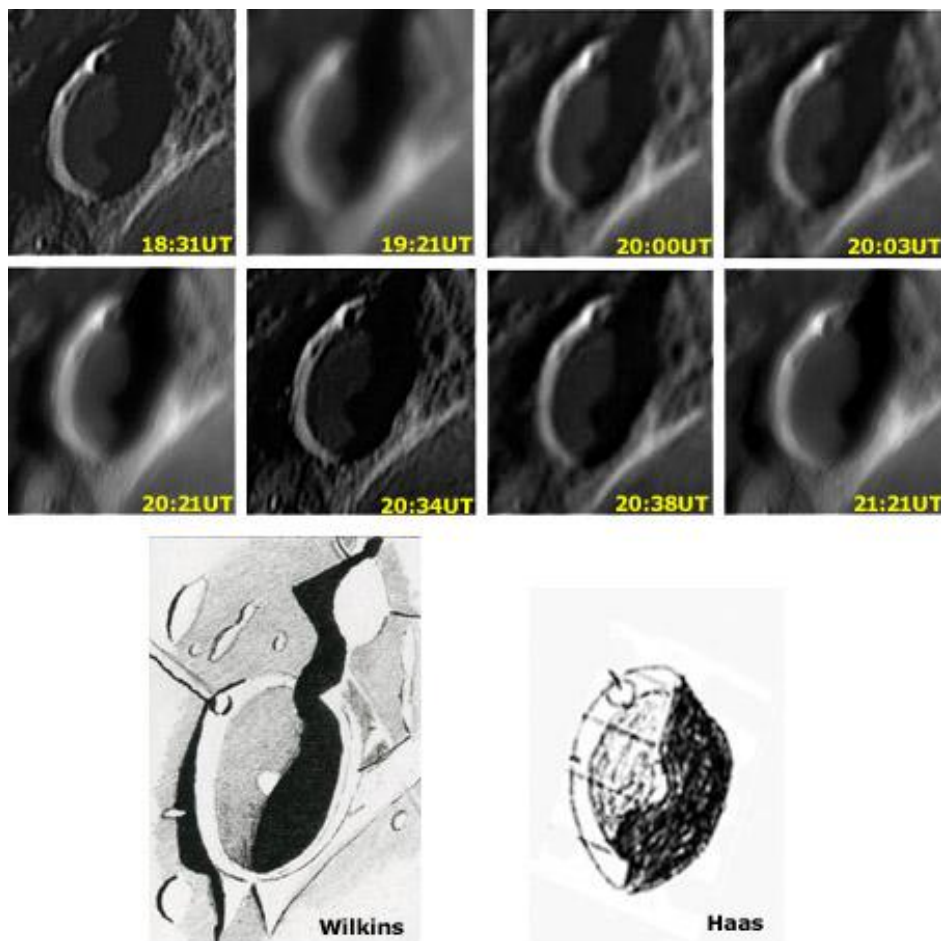


Figure 8. Herodotus orientated with north towards the top. **Top Row** contains images by UAI observers taken at the following times on 2018 Jan 28: **18:31 UT** by Bruno Cantatella. **19:21 UT** by Valerio Fontani. **20:00 UT** by Franco Taccogna. **20:03UT** by Franco Taccogna. **Center Row** contains images by UAI observers taken on 2018 Jan 28: **20:21 UT** by Valerio Fontani. **20:34 UT** by Aldo Tonon. **20:38 UT** by Franco Taccogna. **21:21 UT** by Valerio Fontani. **Bottom Row** contains **(Left)** the sketch of the central pseudo peak by Wilkins from 1950 Mar 30 **(Right)** A sketch of a central white patch by Walter Haas from 2003 May 13.



Figure 9. Part of a whole Moon image by Camilo Satler (AEA) taken on 2018 Jan 28 UT 23:49.

Camilo Satler (AEA) took a wide area image of the Moon at 23:49UT and you can see this in Fig 9. Around this time Alberto Anunziato (AEA), using a Meade EX 105, (Seeing 7/10 and magnification x154) noted

that visually the shadows on the Cobra Head, were dark, and with regards to Plato, this crater appeared normal. Unfortunately I do not have any information on the Sally Beaumont observation, other than what is in the Cameron catalog, and her reference to #237 does not show up in the [catalog](#) reference section. The Kevin Marshall report from 1984 Nov 05 I can also find no further information on other than what was in Cameron catalog description, and appears word for word on p2 of the BAA Lunar Section Circular from 1985 January, p2. I will therefore leave the weights of these two observations as they are, at least until we can find better descriptions, or sketches.

Mare Frigoris: On 2018 Jan 29 UT 09:00 Maurice Collins imaged the Moon and this area under similar illumination, to within $\pm 0.5^\circ$ to the following report from 1982:

On 1982 Jul 03/04 at UT 20:45-01:08 J.D. Cook (Frimley, Surrey, UK) found the Mare Frigoris area, north of Plato was pink at 20:45UT. Saxton found flashes in Mare Frigoris and near the Alps. The Cameron 2006 catalog ID=174 and the weight=5. The ALPO/BAA weight=3.



Figure 10. Mare Frigoris to the north of Plato, orientated with north towards the top. **(Left)** As imaged by Maurice Collins on 2018 Jan 29 UT 09:00. Color saturation increased to 75%. **(Right)** A sketch by Jeremy Cook (Past BAA Lunar Section Director) from 1982 Jul 02 UT 21:45-22:00.

Maurice's image in Fig 10 (Left) has had its color saturation increased considerably to try to bring out surface color. No obvious natural surface pink color can be seen in Mare Frigoris, indeed it is the same color as the Northern Mare Imbrium, just beneath Plato, and this is backed up by examining color information on the LROC [Quickmap](#) web site. The original observation from 1982 gives a color of orange, rather than pink, so we will correct that in the descriptions. Also you can see that it is not all of Mare Frigoris, but a patch NE of Plato – which happens to coincide with a slightly darker area of the Mare on Maurice's image. I checked the Moon's altitude for the 1982 report and this was between 16° and 9° above the horizon, so maybe this had some effect, though it is surprising that it did not affect other mare areas too other than the inner north floor of Plato. I think that I will lower the ALPO/BAA weight from 3 to 2, despite the additional observations of flashes seen in the area by Saxton later.

Promontorium Laplace: On 2018 Jan 29 UT 21:31 Tony Cook (ALPO/BAA) was trying out a tracking platform for his 8" Dobsonian telescope for the first time and captured this image of Promontorium Laplace at some 3.6 hours after the ± 0.5 similar illumination window for the following event:

Promontory Laplace 1968 Oct 04 UT 19:45 Observed by Peters (England, 3" refractor, x80) "Dark spot (or shadow?) seen nr. the cape slightly W. of the promontory. Has not seen it since. (If shadow, slope has to be > 40 deg)." NASA catalog weight=1. NASA catalog ID #1094. ALPO/BAA weight=1.

I managed to dig out the original BAA Lunar Section Circular report (Fig 11 – Top). However as you can see from Fig 11 (Bottom) there is indeed a small dark spot here, and Cameron is almost right as the steepest slope I could find is 35° , so in fact this is just the last remnants of shadow and it is perfectly normal. Back in 1968 of course, without the benefit of Laser Altimetry, such slope angles seemed unusually steep. We shall therefore reduce the weight to 0 and remove this from the ALPO/LTP database. Even without this 1968 observation the whole Sinus Iridum area still has 10 reports of LTP remaining on this Promontorium, and only one of these was shadow related.

CONFIRMATION OF OBSERVATION IN LAST ISSUE OF CIRCULAR. M.Duckworth.

One of my night school students, Mr.R.E.Smith, observed a dark black spot near the Prom.Laplace on Sunday 13 September at 21.30 UT with a 6" spec. at x100.

David Berauds report on page 92 of the October Circular, prompted me to turn up my own observatory log and I see that on 1968 . 4. 10 I made the following note.

"1945hrs.U.T. 3" O.G. x80. Dark spot (or shadow) seen near Cape Laplace slightly to East (classical) of the promontory". I have not seen it since but I shall make a point of looking for it in future.

J.W.Peters.

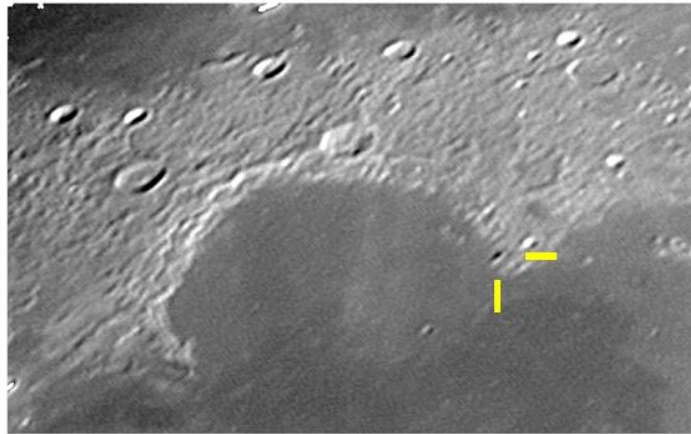


Figure 11. (Top) a report from a 1968 editions of the BAA Lunar Section Circular, p107. **(Bottom)** An image from 2018 Jan 29 UT 21:31 by Tony Cook (ALPO/BAA) showing the same small dark spot (indicated by the yellow markers), and orientated with north towards the top. Image created using 400 frames.

Aristarchus: On 2018 Jan 29 UT 22:28 Ivor Walton (CADSAS) imaged the crater under similar illumination, to within $\pm 0.5^\circ$ to the following report from Peter Foley from 1975:

Aristarchus 1975 May 23 P.W. Foley (Wilmington, UK, 12" reflector, x200, x360, x624, atmospheric clarity good, seeing III from 20:15-22:30, but the clouded out at 22:30, and from 23:15-01:15 seeing was IV-V with poor transparency) observed (22:20-20:45 UT) variation in the SE corner of the Aristarchus, namely the usual dark bands were alternating light to dark, not in keeping with other crater features. This effect was not linked to atmospheric turbulence. Also projected image of bands beyond the crater W. wall were repeatedly noted. The observer broke away from observing at 20:45UT to make a telephone alert call. At 20:55UT they noted that the area between Vallis Schroteri and Herodotus seemed very light/bright, also the E. exterior of the crater wall of Herodotus. From 21:01-21:11 A slight blueness was seen to extend from the NE corner of Aristarchus, along the exterior rim, across and beyond Herodotus to the SW. A thorough search was made of many bright areas, both near the terminator and to the E., but no blueness could be detected elsewhere. A slight orange hue was noted along the E. limb of the Moon (Spurious color). From 21:18;22:30 Aristarchus seemed normal again, and likewise the head of Vallis Schroteri too. The observer was clouded out from 22:30-23:15 and from 23:15-01:30 the seeing was so appalling that no color or projection of the bands could be seen. A Moon Blink was used during the session, but no color was detected in this? Another observer, R.W. Rose (Devon, UK) observed 21:20-21:30 but had IV seeing, and saw nothing unusual, but commented that if LTP activity had been taking place, then they would probably not have seen it. The ALPO/BAA weight=1.

Ivor's image in Fig 12 is over exposed in the interior, but you can see some shading beyond the SW rim, which might be related to what Peter Foley describes as "projected image of bands beyond the crater W. wall"? also "the area between Vallis Schroteri and Herodotus seemed very light/bright, also the E. exterior of the crater wall of Herodotus." certainly has a ring of truth about it in Fig 12, so is probably the normal appearance. So in essence the main features of the 1975 LTP report seems to be the bands alternating inside the crater and changes in color. However these could easily be related to atmospheric conditions as the Moon was between 14° and 17° in

elevation above the horizon at the time of the observation. Therefore a weight of 1 seems fitting for this, though I would like to see a repeat illumination image showing the interior of this crater in more detail.



Figure 12. Aristarchus imaged by Ivor Clarke (CADSAS) on 2018 Jan 29 UT 22:29, orientated with north towards the top.

General Information: For repeat illumination (and a few repeat libration) observations for the coming month - these can be found on the following web site: http://users.aber.ac.uk/atc/lunar_schedule.htm . By re-observing and submitting your observations, only this way can we fully resolve past observational puzzles. To keep yourself busy on cloudy nights, why not try “Spot the Difference” between spacecraft imagery taken on different dates? This can be found on: http://users.aber.ac.uk/atc/tlp/spot_the_difference.htm . If in the unlikely event you do ever see a LTP, firstly read the LTP checklist on <http://users.aber.ac.uk/atc/alpo/ltp.htm> , and if this does not explain what you are seeing, please give me a call on my cell phone: +44 (0)798 505 5681 and I will alert other observers. Note when telephoning from outside the UK you must not use the (0). When phoning from within the UK please do not use the +44! Twitter LTP alerts can be accessed on <https://twitter.com/lunarnaut> .

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KEY TO IMAGES IN THIS ISSUE

1. **Agatharchides A**
2. **Ariadaeus**
3. **Aristarchus**
4. **Cassini**
5. **Cleomedes**
6. **Conon**
7. **Eudoxus**
8. **Gassendi**
9. **Herodotus**
10. **Kepler**
11. **Mare Frigoris**
12. **Mare Smythii**
13. **Mare Undarum**
14. **Maurolycus**
15. **Mons Pico**
16. **Mons Rumker**
17. **Montes Alpes**
18. **Mutus**
19. **Peirce**
20. **Plato**
21. **Proclus**
22. **Promontorium
Laplace**
23. **Rimae Hadley**
24. **Rimae Hyginus**
25. **Rimae Sirsalis**
26. **Rimae Sulpicius Gallus**
27. **Rimae Triesnecker**
28. **Theaetetus**
29. **Theophilus**
30. **Torricelli**
31. **Tycho**

