THE LUNAR OBSERVER

A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.
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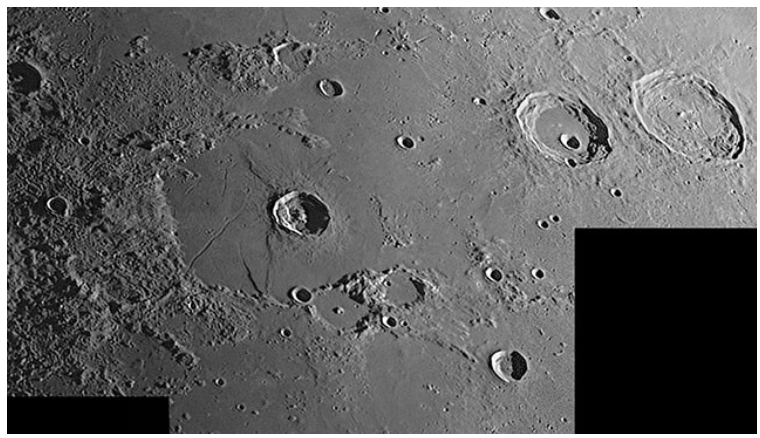
17 Autumn Lane, Sewell, NJ 08080
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – MAY 2017
LACUS MORTIS



Richard Hill – Tucson, Arizona, USA
April 3, 2017 01:31 UT. Seeing 8/10.
8" Mak-Cass, f20, 656.3 nm filter,
SKYRIS 445M.

About 5 to 6 days into a lunation when Atlas and Hercules are clearly visible, look between them and the terminator for a flat, roughly hexagonal area with a 41km diameter crater in the center. The crater is Burg and it sits in the middle of the ominous sounding Lacus Mortis, the Lake of Death. The lake is approximately 155km in "diameter" even though it is quite polygonal. It is a very old feature, possibly the remains of an impact crater over 4 billion years old. Burg is relatively recent, less than 1 billion years. There are numerous faults in this lake of different types. North of the lake is another polygonal crater like a miniature of the lake itself. This is Baily (27km), a little younger than the lake. Below or south of Burg are two interesting craters Plana (46km) on the left and Mason (44km) on the right. Plana appears to have a central crater instead of a central peak. Using LROC images (http://target.lroc.asu.edu/q3/) I could see that it is a crater on the southern flank of the remnants of a mostly buried central peak. Further south is what looks to be a young crater comparable to Burg in age. This is Grove (29km) and is listed as being the same age as the lake! On the right side of this image can be seen Hercules (71km) with Hercules G (13km) on its floor. Further right is Atlas (90km) with the beautiful system of rimae on its floor. Notice these nice rilles snaking all over the floor of Atlas.

Astrobiotic Technology announced two years ago that Lacus Mortis would be the target landing site for the Google Lunar X Prize.

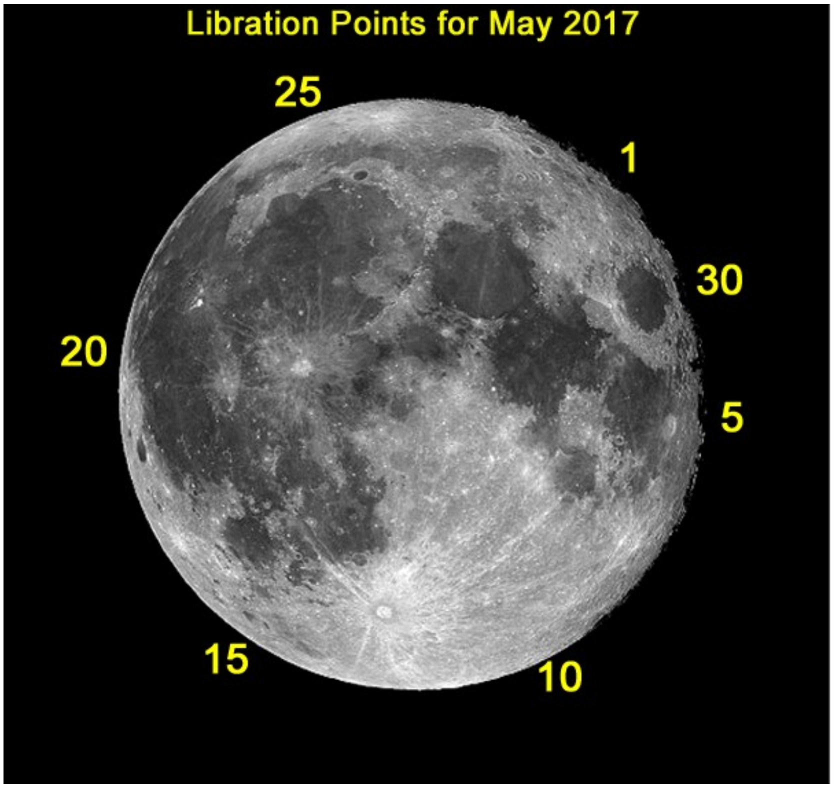
LUNAR CALENDAR

MAY-JUNE 2017 (UT)

2017		UT	EVENT
May	03	02:47	First Quarter
	04	09:49	Moon-Regulus: 0.6° N
	07	21:24	Moon-Jupiter: 2.3° S
	10	21:43	Full Moon
	12	19:51	Moon Apogee: 406200 km
	13	23:07	Moon-Saturn: 3.4° S
	14	20:29	Moon Extreme South Dec.: 19.3° S
	19	00:33	Last Quarter
	22	12:32	Moon-Venus: 2.4° N
	24	01:20	Moon-Mercury: 1.6° N
	25	19:44	New Moon
	26	01:23	Moon Perigee: 357200 km
	27	23:36	Moon Extreme North Dec.: 19.4° N
	31	16:08	Moon-Regulus: 0.3° N
Jun	01	12:42	First Quarter
	03	23:57	Moon-Jupiter: 2.5° S
	08	22:21	Moon Apogee: 406400 km
	09	13:10	Full Moon
	10	01:25	Moon-Saturn: 3.4° S
	11	03:36	Moon Extreme South Dec.: 19.4° S
	17	11:33	Last Quarter
	20	21:13	Moon-Venus: 2.4° N
	22	14:23	Moon-Aldebaran: 0.5° S
	23	10:49	Moon Perigee: 357900 km
	24	02:31	New Moon
	24	11:12	Moon Extreme North Dec.: 19.4° N
	28	00:26	Moon-Regulus: 0.1° N

LUNAR LIBRATION

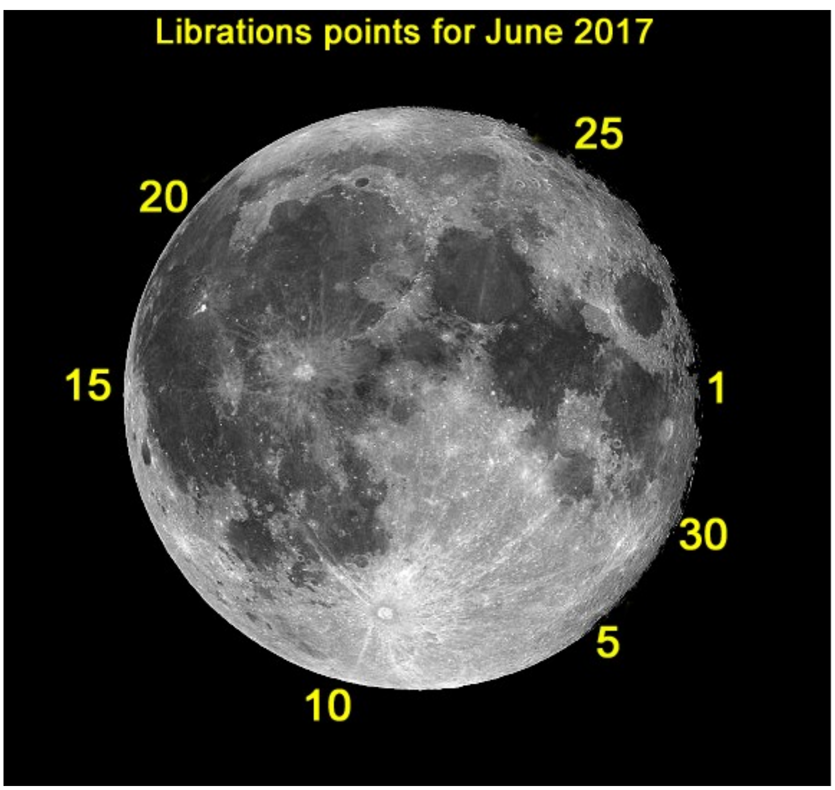
MAY-JUNE 2017



Size of Libration

05/01	Lat +04°50'	Long +04°57'
05/05	Lat -00°50'	Long +06°23'
05/10	Lat -06°08'	Long +02°21'
05/15	Lat -05°02'	Long -03°52'
05/20	Lat +01°22'	Long -08°06'
05/25	Lat +06°31'	Long -02°37'
05/30	Lat +02°21'	Long +06°22'

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



Size of Libration

06/01	Lat -00°45'	Long +07°13'
06/05	Lat -05°31'	Long +04°45'
06/10	Lat -05°51'	Long -01°19'
06/15	Lat -00°12'	Long -06°52'
06/20	Lat +06°01'	Long -06°11'
06/25	Lat +04°14'	Long +03°08'
06/30	Lat -03°25'	Long +07°01'

NOTE:
Librations are based on a geocentric position and 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: Messier & Messier A-Oblique Craters

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 **July 2017** edition will be **Messier & Messier A-Oblique Craters.** 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 craters in Mare Fecunditatis 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 Messier & Messier A-Oblique Craters article is June 20, 2017

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	**September 2017**	**August 20, 2017**

<u>FOCUS ON: Concentric Lunar Craters</u>

Jerry Hubbell

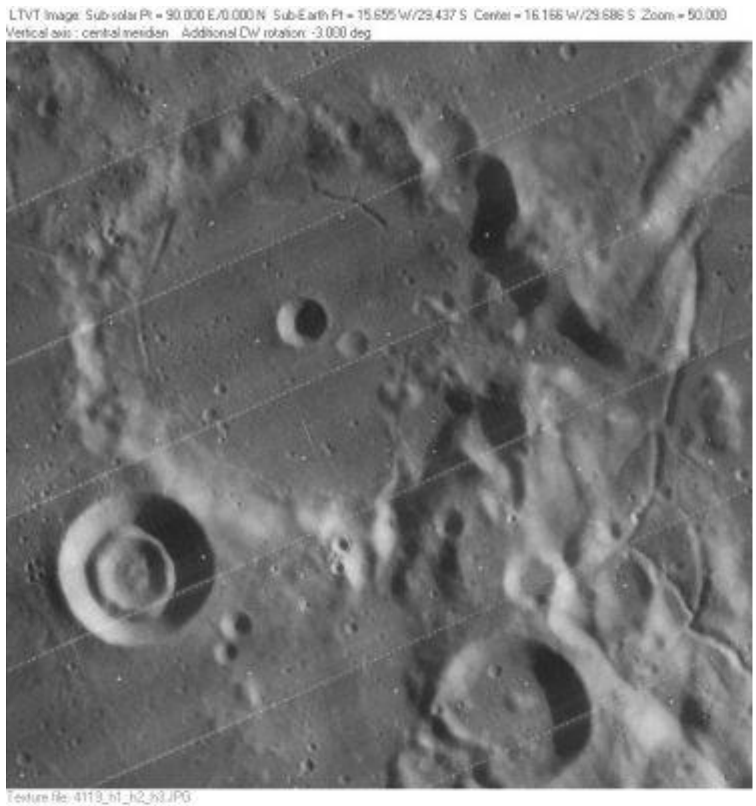
Assistant Coordinator, Lunar Topographical Studies

Some of the most interesting and odd formations on the lunar surface are concentric lunar craters. These features are, at first glance, a larger crater with a smaller crater placed in the exact center of the larger crater. These craters illicit a series of questions: how was it that a meteor strike (a large meteor at that) could hit the exact center of a large crater and hitting a bulls-eye? Is there something special about the material underneath these craters that may cause this feature to emerge from an impact?

These concentric craters, typically 9 miles (15 km) and smaller, are strewn throughout the lunar surface, but have been found to be within 37 miles (60 km) of a mare boundary on the border between the highlands and the maria. Hesiodus, 9 miles (15 km) in diameter, is a typical and well-known example (Fig. 1). Charles Wood published a list of 51 concentric craters in 1978. There has been a total of 114 concentric craters identified on the lunar surface based on a study of images provided by the Lunar Reconnaissance Orbiter (LRO) Wide Angle Camera (WAC).

***<u>Figure 1.</u>* CRATER HESIODUS** *(left), Locust Grove, VA, December 5, 2011 – Jerry Hubbell, 01:09 UT. 0.2-m Ritchey-Chretien, DMK 21AU04.AS CCD, Seeing 4/10, Transparency 5/6, Colongitude 26.4 degrees. Crop of LRO Image (right)processed by Maurice Collins.*

Given that these concentric craters are < 9 miles (15 km), the age of all the craters of this size can be anywhere from 10s of millions of years to 4.5 billion years old. It was found when studying the 114 identified concentric craters, that most the clear majority of these were older than 3 billion years. Since impact craters of this size have been formed throughout the history of the moon, we should see concentric craters of various ages, not just older than 3 billion years. For that reason, I think we can rule out coincident impacts as cause of these types of craters. (Fig. 2)



<u>Figure 2.</u> ***CRATER HESIODUS, HESIODUS A,*** *Lunar Orbiter IV, Image LO-IV-119H3, Lunar and Planetary Institute. Accessed via* http://the-moon.wikispaces.com/Hesiodus *(April 30, 2017)*

That leaves surface formation and characteristics as the most likely cause of this type of formation. As a comparison, large impact craters typically form a characteristic peak mountain in the center of the impact. The rebound of lunar crust after a large impact causes these mountain peaks to "bounce back" from the surface like the way liquid will bounce back and ripple when an object is dropped into it. Similarly, the formation of this "ripple" within the larger crater could be rebound of the material within the crust pushing up a circular "ridge" that looks like a smaller crater. Studies have also shown that the depth of concentric craters of size 15 km or less are shallower than the typical normal crater of this size. This lends credence to the idea that the material from beneath has rebounded and has formed the circular ridge within the crater.

There must have been something different about the surface crust material >3 billion years ago that facilitated the formation of these concentric craters. I would suggest that the internal temperatures in the moon's crust were much higher and the crust was more malleable than it is today providing an environment for the formation of these most interesting features.

Be sure to check out the references below for more about these most interesting features. Chuck Wood provides an excellent list of the concentric craters in The Moon Wikispaces page.

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Trang, D. (August, 2016) What Made the Doughnuts Inside Lunar Concentric Craters? http://www.psrd.hawaii.edu/Aug16/Lunar-concentric-craters.html (April 30, 2017).

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Wood, Charles, The Moon Wikispaces – Concentric Crater, http://the-moon.wikispaces.com/Concentric+Crater (April 30, 2017).

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

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ADDITIONAL OBSERVATIONS

ARCHIMEDES F - Francisco Alsina Cardinali-Oro Verde, Argentina. December 20, 2015 02:09 UT, 250mm LX-200 SCT, Canon EOS Digital Rebel. 168x with telextender.

HESIODIUS A - Francisco Alsina Cardinali-Oro Verde, Argentina. October 24, 2015 04:11 UT, Seeing 7/10. 250mm LX-200 SCT, SP900NC webcam O III narrow-band filter.

GROVE, A FALSE BRIGHT RAY CRATER

Alberto Anunziato

An ancient image of the crater Grove, in which it seemed to have the appearance of a bright ray crater (colongitude 133.2º, 88.5% illuminated) motivated a brief investigation in the lunar literature within the reach of the enthusiast amateur. It was an unsuccessful search, very little is said about Grove.

Grove lies in the northern part of the Lacus Somniorum, in an area easily recognizable by the silhouettes of Atlas and Hércules in the shadows of the terminator to the left and the distinct profile of Posidonius to the right (and Posidonius B, Posidonious J and Daniell in a row). Its form is slightly oval and it has a 28 kilometre diameter. It’s 2400 m deep interior is almost completely filled by shadows, we could only discern the northern part of its sharp-edged rim lightened by the sun.

Observing visually seconds before obtaining the video from which later were extracted the frames for the stack (fig. 1), Grove displayed the typical aspect of a bright ray crater (BRC). In the image you can see what looks like a ray coming from the north to Plana B, and more markedly from the northwest to Mare Serenitatis (or arriving from there?)

But Grove does not appear on ALPO list of BRCs, nor does it appear to be so young as to retain rays (in fact, it is one of the oldest craters, it belongs to the Nectarian period). It was generally accepted that BRC belong to the Copernican period. Recently (Martel, Linda M., Lunar Crater Rays Point to a New Lunar Time Scale. Planeatry Science Research Discoveries, 2004, p.4) the rays have been related not only to immature surface but also with the presence of low FeO (ferrous oxide) materials. Anyway, though they have been cataloged BRC older than 1.1 billion years (the Eratosthenian-Copernican boundary), these are not older than 2 billion years (as Lichtenberg), while Grove is much older and therefore space weather should have erased its possible rays.

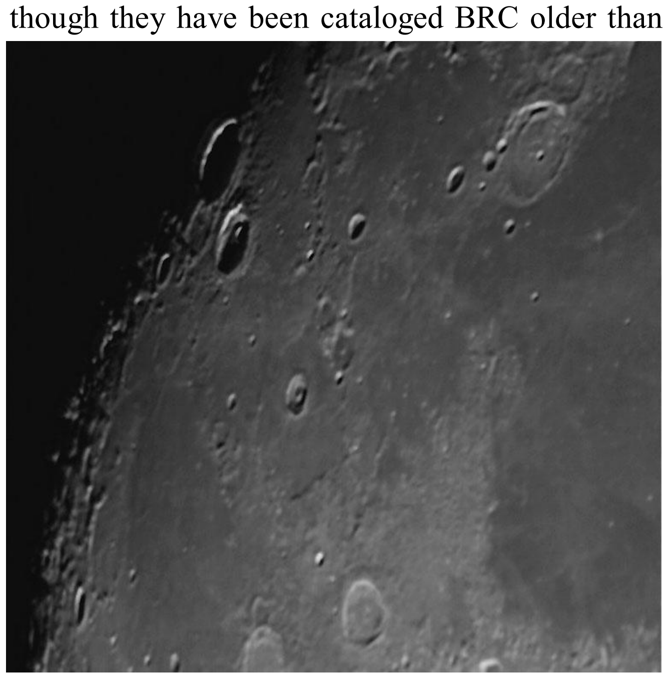

FIGURE 1. ***Grove****– Alberto Anunziato, Paraná, Argentina. March 27, 2016 03:56 UT. C-11 Edge HD, Canon EOS digital Rebel XS.*

These pseudo-rays may be explained by differences in coloration of the lava patches, as in the neighboring Mare Serenitatis. What is more intriguing is what appears to be an extended ejecta blanket finished on uneven ends. Could the impactor that formed Grove have impacted the center of a preexisting geological feature? Perhaps it is not an ejecta blanket but the last ridges of the Taurus Mountains. We know from the formation dynamics of an impact crater that at least half the volume of ejecta falls within 1 crater radius of the rim, and this supposed ejecta blanket seems quite broader.

Sometimes visual observation is less misleading. I recently visually observed Grove with a 105 mm. Maksutov-Cassegrain (Meade EX 105) at 154X (Colongitude 111.1º, 96% illuminated) and I could not see any ray, and the configuration of the terrain that in our image resembles an ejecta blanket seemed to be a continuation of the rugged terrain of the Taurus Mountains.

The mere fact that Grove is not on ALPO's BRC list may have closed the case, but a brief reflection on the formation mechanisms and characteristics of this type of crater helps the amateur to become more familiar with the Lunar surface

MACROBIUS AND TISSERAND

David Teske

I made this sketch on 13 February 2017 between 3:36 AM and 4:22 AM using the 60 mm Moonraker f/16.7 refractor telescope. An 8 mm Baader Hyperion eyepiece was used for 125 x. Skies were clear with seeing of 6/10 with 10 being perfect.

This drawing (fig. 1) depicts a chance alignment of two craters. Although these two craters are unrelated, their closeness to each other makes for an interesting pairing. Macrobius is the larger crater in this drawing with a diameter of 63 km. Macrobius and Tisserand are located just west of Mare Crisium in highlands. Macrobius is a large, flat bottomed crater that was rather oval due to some foreshortening. Its walls were rather low. On the eastern side, the wall is bright in the evening sunlight. The western wall is interrupted by a small crater on the wall. The northwestern wall showed strong terracing and some shadow. The walls of Macrobius are deeply terraced. The floor was flat with a tiny central peak visible, though it is listed as a compound central mountain of moderate height. These off center peaks on the floor may be part of a ring of peaks. Macrobius lies on the outer edge of one of Mare Crisium's ring/rim system of 750 km in diameter. Macrobius is of Lower Imbrium Period, 3.85 to 3.75 billion years old.

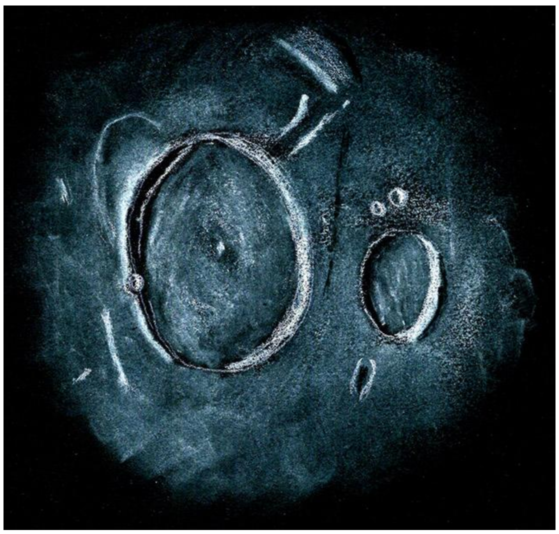

***Figure 1*. RUPES RECTA**, *Starkville, MS, February 13, 2017 – David Teske, 09:36-10:22UT. 60mm f/16.7 refractor, 125x . Clear Sky, Seeing 6/10.*

Within one diameter to the east of Macrobius towards Mare Crisium was the smaller flat floored crater Tisserand. This crater, 35 km in diameter is older than Macrobius. Tisserand is Nectarian in age, 3.92 to 3.85 billion years old. It seemed to be a smaller version of Macrobius in ways. The eastern wall was bright in the evening sun. The western wall was low with some shadowing. The floor was flat with no evidence of a central peak. Ejecta from Macrobius overlie most of Tisserand's western rim and floor. The eastern part of the floor appears to have undergone some internal flooding.

North of Tisserand were two small craters, similar in size to the crater on the wall of Macrobius. South of Tisserand was a shallow depression oriented southwest to northeast. Between Tisserand and Macrobius was a long ridge that extended north to south. The eastern side towards Tisserand was lower than the western side towards Macrobius based on the shadow. Extending northeast of Macrobius was a shallow valley that turned a right angle as it verged to the northwest. Northeast of this was a hill as indicated by the shadow. Northwest of Macrobius was an arched light feature. Its northwest end extended into the mare region surrounding Mare Crisium, thus was a darker surface. A light region was west of this. To the southwest of Macrobius was a hill that was relatively long aligned north-south and a smaller light area to its west.

Macrobius named after Ambrosius T. Macrobius, a Greek grammarian of the fourth century AD. Tisserand named after Francois F. Tisserand, a French Astronomer who lived from 1845-1896.

References

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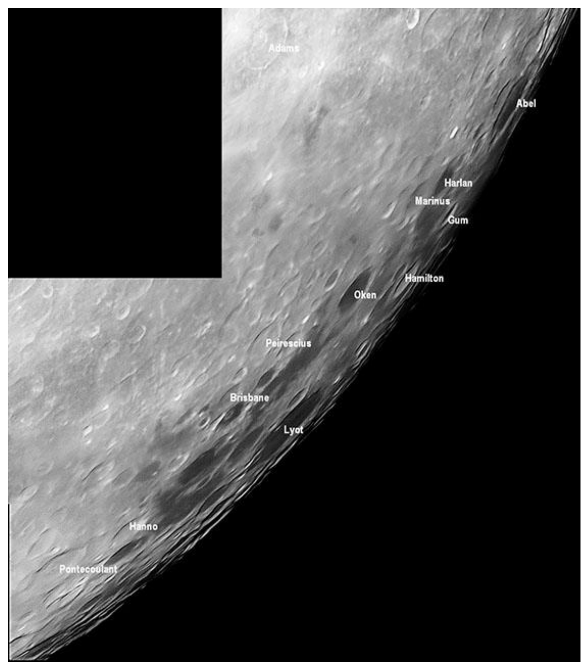
TAKING A DIP IN THE SOUTHERN SEA

Richard Hill

What we have here is a more complicated situation than the usual image. This image (fig. 1) shows many features not seen or poorly seen under average libration conditions. But in this case, due to a favorable libration, we get a good look at these details. Because of the complicated nature of the view, i created a second annotated image under the principle that "a picture is worth a thousand words". This is the lunar southeast limb that was imaged, as I made and effort to see the elusive Mare Australe. I was using Virtual Moon Atlas, which is usually a good reference but in this case (as in a couple others) there was an error in identification that nearly resulted in me missing the mare altogether!



<u>HAINZEL</u> – Richard Hill *– Tucson, Arizona, USA April 11, 2017 06:08UT. Seeing 6/10.   8" Mak-Cass, f20, 656.3 nm filter, SKYRIS 445M.*

Major craters are identified with Lyot, Oken and Abel being the most easily found. I thought I had found Mare Australe between Lyot and Hamilton where VMA had noted it, but it didn't look much like a mare. I wondered if it could be the area just above Lyot, between it and Peirescius? So now it was time to go to the IAU/USGS Gazetteer of Planetary Nomenclature on the web. This is a very official atlas using imagery from a number of lunar missions all annotated. I was surprised by what I found. Mare Australe is the flat area on either side of the crater Gum, between Gum - Abel and Gum - Hamilton! It would have been better imaged the night before. The area between Lyot and Peirescius is unnamed though much more noticeable. Next I wondered what the area above and to the right of Hanno was, perhaps another sea? No! That area too is unnamed for the most part.

So the moral of the story is that it pays to use a couple sources when identifying tricky and more elusive lunar features!

LUNAR TOPOGRAPHICAL STUDIES

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

ALBERTO ANUNZIATO—PARANÁ,, ARGENTINA. Digital image of Grove.

FRANCISCO ALSINA CARDINALI - ORO VERDE, ARGENTINA. Digital images of Archimedes F & Hesiodius A.

JOHN DUCHEK – St. LOUIS, MISSOURI, USA. Digital image of Aristarchus Plateau.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital image of waning crescent moon.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Aristoteles, Fracastorius, Lacus Mortis, Mare Australe & Plato.

DAVID JACKSON - REYNOLDSBURG, OHIO, USA. Drawing of Full Moon.

DAVID TESKE - STARKVILLE, MISSISSIPPI, USA. Drawing of Neper.

STEVE TZIKAS - RESTON, VIRGINIA, USA. Drawing of Macrobius-Tiesserand.

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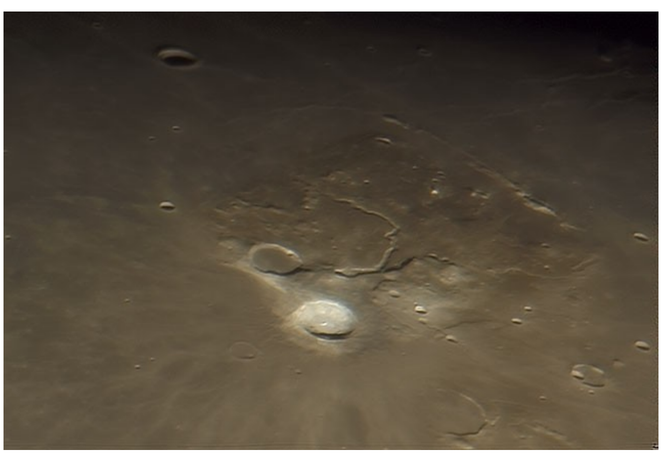
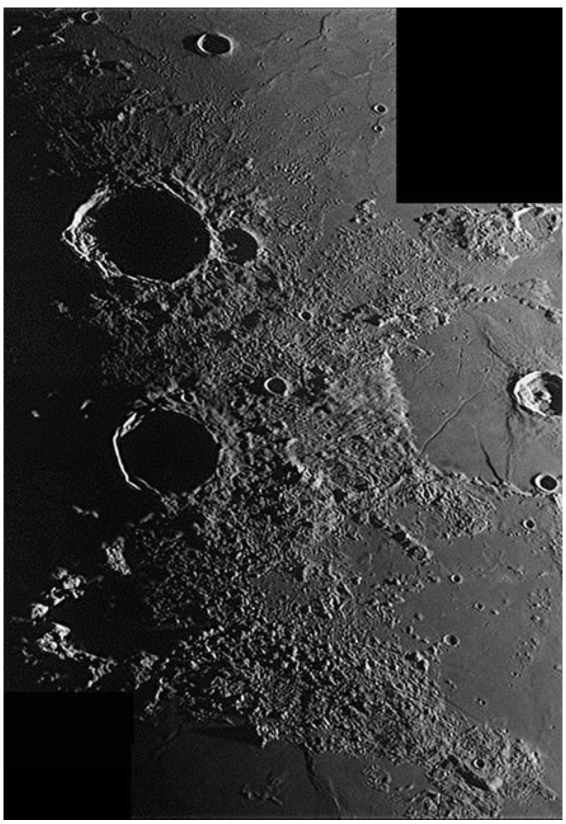
RECENT TOPOGRAPHICAL OBSERVATIONS



ARISTARCHUS PLATEAU - John Duchek—Carrizozo, NM, September 20, 2010 22:00 UT. 10" Orion Newtonian, Canon 500D, Seeing 6/10, Transparency 6/6. West up.

RECENT TOPOGRAPHICAL OBSERVATIONS

WANING CRESCENT - Howard Eskildsen, Ocala, Florida, USA. April 22, 2017 10:53 UT. 6” Refractor, f/8,. Canon 40D SLR.

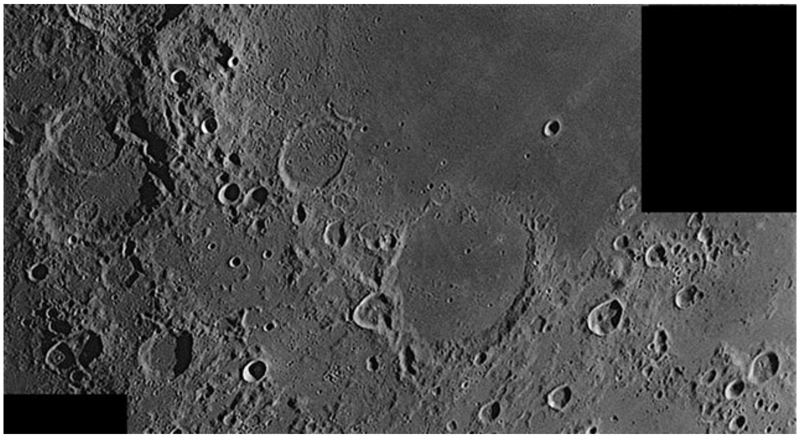


ARISTOTELES & EUDOXUS – Richard Hill – Tucson, Arizona, USA April 3, 2017 01:24 UT. Seeing 8/10. 8” Mak-Cass, f20, 656.3 nm filter, SKYRIS 445M.

The lunar terminator always provides breathtaking views of topography that can be enjoyed on no other body in the solar system with the amateur telescope. This image is a good example of just such selenoscape almost exactly 6 days into a unation. The large, shadow filled crater above center is Aristoteles (diameter 90km) with the small 31km diameter Mitchell on its right edge. Note the detail in the sunlit wall of Aristoteles and the Rimae Aristoteles above Mitchell. Above that is the crater Galle (22km). Because of the lighting the two craters look more dissimilar in size. Below these two is Eudoxus (70km) also filled with shadow and the youngest large crater in this image. Below Eudoxus is another irregularly shaped pool of darkness. This is Alexander (85km) that is not usually so prominent.

On the right edge of the image is the crater Burg (41km) sitting in the middle of Lacus Mortis surrounded by Rimae Burg. It's a study all by itself

RECENT TOPOGRAPHICAL OBSERVATIONS



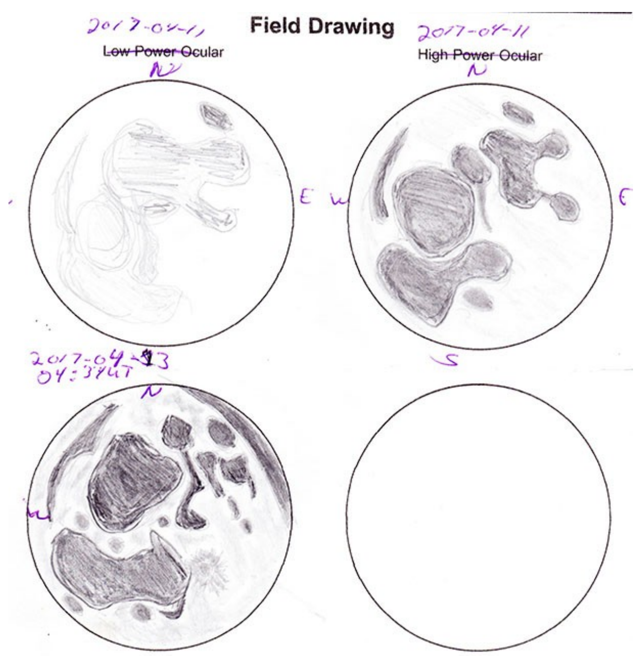
FRACASTORIUS – Richard Hill – Tucson, Arizona, USA April 3, 2017 01:53 UT. Seeing 8/10. 8" Mak-Cass, f20, 656.3 nm filter, SKYRIS 445M.

Nestled on the southern shore of the Sea of Nectar is the 128km diameter ruined crater Fracastorius that is the "U" shaped feature in the middle of this image. It is a marvelous and very obvious sight as soon as 6 days into each lunation. Besides the nice peppering of secondary craters on its floor, probably caused by ejecta from the great Theophilus impact just to the north of this image, there's a nice little unnamed east-west running rille that passes right very near the 4km crater Fracastorius M on the floor of the larger crater. This rille is hard to catch more than a day away from the terminator. On the south shore of Fracastorius is an odd feature that looks like the outline of a fish. This is Fracastorius Y about 20km long and 12km wide, probably the overlap of a few secondary craters. There was a D.W.G. Arthur article about this feature in Sky & Telescope back in the 1960s.

Up the shore of the mare from Fracastorius, is a smaller but almost identical crater, Beaumont (54km). It is a very old crater, possibly as old as 4.5 billion years! Immediately to the left of this is the large crater Catharina (104km) with all the younger craters overlapping it. Above Fracastorius is the isolated 12km crater Rosse sitting like a lone sentinel in Mare Nectaris. Take a moment and enjoy the morphology of the impacts between Fracastorius and Catharina. There is a myriad of shapes and sizes down to about 1.5km in this image.

FULL MOON – David Jackson – Reynoldsburg, Ohio USA Top: April 11, 2017 23:03 UT. Bottom: April 13, 2017 04:34 UT. Seeing 7/10. Transparency 4/6, 7x35 binoculars.

This series of sketches were inspired by the article, "Analysis of a 1609 Galileo Sketch." by Stephen Tzikas which appeared in the April 2017 edition of "The Lunar Observer"(ALPO) . All the sketches were made using a pair of (vintage) Sears 7x35 binoculars.



LUNAR GEOLOGICAL CHANGE DETECTION PROGRAM

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Observations for February were received from the following observers: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Albategnius, Aristarchus, Julius Caesar, Langrenus, the Lunar Eclipse, Mare Crisium, Messier, Peirce, Picard, and Pitiscus. Alberto Anunziato (Argentina – AEA) observed: Mons Hadley. Kevin Berwick (Ireland – ALPO) observed Aristarchus. Maurice Collins (New Zealand – ALPO) observed Aristotles, Montes Caucasus and took some whole Moon images. Anthony Cook (Aberystwyth University, UK) imaged the lunar eclipse. Marie Cook (Mundesley, UK - BAA) observed Aristarchus. Phil Deyner (Hornchurch, UK – BAA) imaged the Cichus area. Marcelo Gundlach (Bolivia IACCB) imaged Eudxus. Colin Henshaw (Saudi Arabia – BAA) imaged the lunar eclipse. Rik Hill (Tucson, AZ – ALPO/BAA) imaged Janssen. Franco Taccogna (Italy – UAI) imaged the lunar eclipse and several features. Gary Varney (Prembroke Pines, FL – ALPO) imaged the lunar eclipse and several features.

Observations for March were received from the following observers: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Plato, Proclus, Ross D and Torricelli B. Alberto Anunziato (Argentina – AEA) observed: Aristarchus and Curtius. Marie Cook (BAA – Mundesley, UK) observed Aristarchus, Bullialdus, Darney, Gassendi, and Vallis Schroteri. Les Fry (Elan Valley, UK – NAS) imaged several features. John Duchek (Carrizozo, NM, USA – ALPO) imaged Theophilus. Rik Hill imaged Mare Humboldtianum, Plato, and Vitello. Franco Taccogna (Italy – UAI) imaged Aristarchus, Earthshine, Theaetetus, and several features. Paul Zeller (Indianapolis, IN, USA, - ALPO) imaged several features.

News: This month we have more pages than normal as we are catching up on observations received in February and March, and one mislaid observation from January. I have received communication from Ken Sato (Japan, ALPO), concerning buried saucer-like craters on the Moon, and how we can spot these from low relief angle images. I hope to do a write up on this sometime soon. I have also received communication from Jill Scambler (UK, BAA) about her continued statistical analysis of LTP reports.

LTP Reports: Three have been no LTP reports received so in April.

Routine Reports: Below is a selection of reports received for January-March, that can help us to re-assess unusual past lunar observations. Note that due to page limitations I cannot include observations that are outside the predicted observation times, but keep such observations on record for future comparative use.

Plato: On 2017 Jan 13 Desiré Godoy (Argentina – AEA) imaged the crater under the same illumination conditions to the following report from 1975:

On 1975 Mar 27 at UT22:30-01:45 P.W. Foley (Wilmington, Dartford, Kent, UK, 30cm Newtonian) observed blueness along the inner southern wall of Plato, though the center of the activity was offset on one side. This is a BAA report. The ALPO/BAA weight=1.

Although Desiré G's image was monochrome, (Fig 1 Left), I have added artificial spectral dispersion (Fig 1 Right), and we can see that it is indeed possible to have blue on the inner southern rim as depicted in Peter Foley's sketch (Fig 1 Center). Whether this was the cause of what was reported back in 1975 is uncertain as we do not know if Peter Foley used red and blue filters to check for such effects, and also you can see corresponding colors elsewhere on other contrasty edges, which presumably he would have noticed and commented about? The Moon's altitude above the horizon at the time of the 1975 LTP was 24˚ to 26˚. For now I will leave the weight of this report at 1 for now.

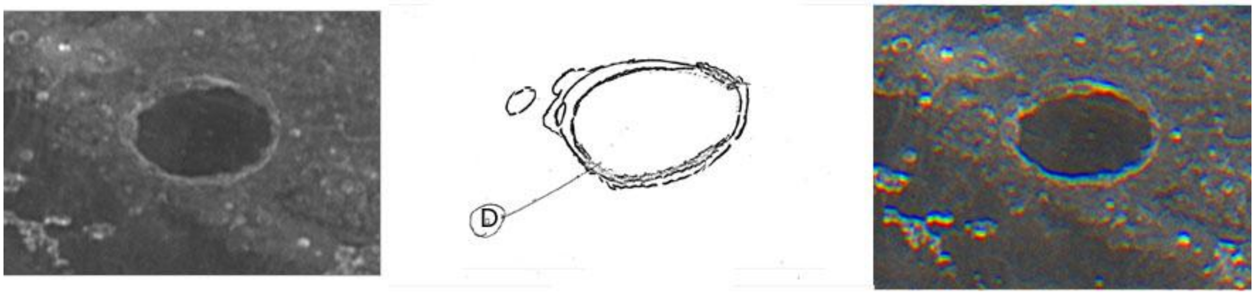


Figure 1. Plato, orientated with north towards the top**. (Left)** Image taken on 2017 Jan 13 UT 03:02 by Desiré Godoy (Argentina – AEA). **(Center)** A sketch by Peter Foley (BAA) from 1975 Mar 27 UT 22:50-01:45 – where "D" denotes where some blue color was seen. **(Right)** Simulation of atmospheric spectral dispersion using Desiré's image.

Pictisus: On 2017 Feb 02 UT 01:49 Rik Hill (ALPO-BAA) imaged the southern part of the Moon aiming at Janssen, but serendipitously managed to capture Pictiscus in his field of view. Jay Albert (ALPO) also observed the crater visually 00:55-01:25UT. Both of these observations just happened to coincide with the repeat illumination of the following report that we have been trying to solve for the last 16 years:

On 2001 Jul 26 at UT 00:17-00:45 Daniel del Valle Hernandez (Puerto Rico, USA) made an unusual sketch of Pitiscus crater that showed 3 small patches of light coming out of the "just over half filled" interior shadow. The central patch seems to be part of a central peak, although most atlases do not show this (although LO photos and Clementine images show a peaked ridge coming off the central craterlet). The two other patches are on opposite sides, near the shallow edge of the shadow on the floor. These might be slightly raised topography from material that has slumped off the wall, just catching sunlight. The ALPO/BAA weight of this report=1.

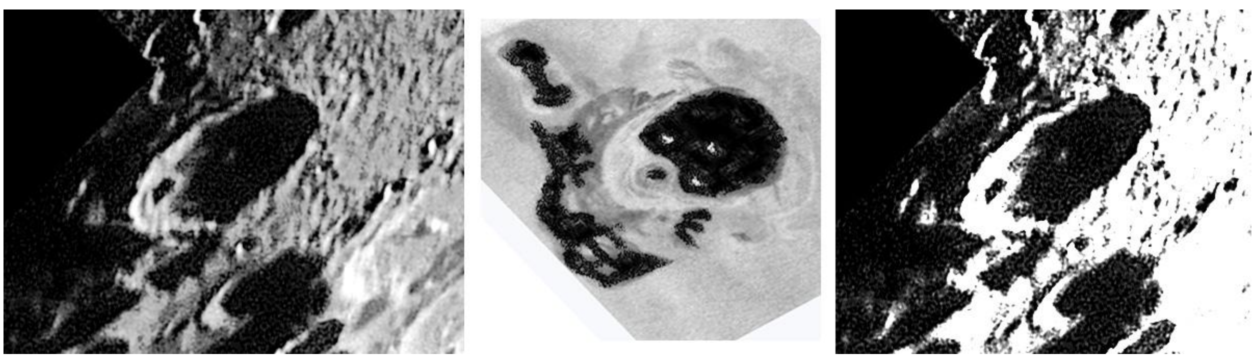


Figure 2 Pictisus crater, orientated with north towards the top. **(Left)** Image by Rik Hill (ALPO-BAA) taken on 2017 Feb 02 UT 01:49. **(Center)** A sketch by Daniel del Valle Hernendez (ALPO) from 2001 Jul 26 UT 00:17-0045. **(Right)** Rik Hill's image, but heavily contrast and non-linearly stretched to enhance further detail inside the shadow of the crater.

Concerning Jay's visual report he states: "*The walls of Pitiscus E were lit, but its floor was in shadow. A bright point sticking out of the shadow in the central part of the Pitiscus may likely be the central peak. Most of the floor of Pitiscus was in shadow and Pitiscus A was not seen. A thin bright line within the shadow on the floor of Pitiscus was seen near the SE wall. I did not see a third point rising out of the shadow. I used 214x from 00:55 to 01:25UT.*" Jay was using a Celestron 6" Nexstar SCT scope, under 7-5 (out of 10) seeing conditions and 3rd magnitude transparency. However with a bit of an image contrast boost, in Rik's image, you can not only see the central peak, but also the two other emerging spots, close to the inner edge of the floor shadow. I think that we can safely say, looking at Fig 3 (Right), that there definitely are 3 points of light on the shadowed floor of this crater at this colongitude, and this is the natural appearance due to highland poking up out of the shadow, though these maybe just on the limit of visibility and their visibility affected by observing conditions. I can therefore assign a weight of 0 to this LTP report and take it out of the LTP database.

Godin, Agrippa, and Mare Crisium: On 2017 Feb 03 UT 08:18-08:24 Maurice Collins (ALPO) imaged these features under the same illumination conditions (to within ±0.5˚) to the following report by Ridd:

Godin, Agrippa, Mare Crisium, and Webb's spot.... 1882 Apr 24 UT 21:30-22:00 Observed by Ridd (England?) "Shadow anomalies-strange appearance. (he often noticed appear. that could only be haze. Shadows blurred and oscillated. Shadows in Aristotles were steady. E. of Agrippa shadows were misty as the foggy which lifted & then became obscur. again. Intervals being 10 min. (not terr. atmos.). Shadows never became clear whole time of obs. Also saw a white spot NW *of 5 on Nelson's map (Webb's spot). " NASA catalog weight=2. NASA catalog ID #231. ALPO/BAA weight=2.*

Figure 3. Images taken by Maurice Collins (ALPO) on 2017 Feb 03, orientated with north towards the top. **(Top Left)** Aristotles from 08:22 UT. **(Bottom Left)** Agrippa with Godin below from 08:18UT. **(Right)** Mare Crisium from 08:24UT.

Although I am not sure where Webb's spot is, on Fig 3 – it could perhaps be somewhere in Mare Crisium, as no further mention of this mare, by name, is made in the Cameron catalog description above The images that Maurice supplied do though show the shadows in Aristotles looking "steady" (perhaps he meant sharp?). I am not sure from the description by Ridd, what was supposed to be unusual about Godin, but it looks perfectly normal to me in the image that Maurice has supplied. As for Agrippa, I see nothing misty in the shadows east of this crater. There is not a lot else we can learn, and I have always been very skeptical about simultaneous LTPs sighted over vast distance across the lunar surface. So it is about time we reduced the weight of this report to 1.

Cichus: On 2015 Feb 05 UT 23:00-23:13 Philip Denyer (BAA) imaged this crater, and associated region beyond the terminator to the NW, to see if he could capture some thread-like effects in shadow. However as you can see from his image in Fig 4, there is no sign of these, despite being in the designated colongitude range. We will come back to this crater again when we discuss our April observations, and see where the images that Philip took lie on our sub-solar latitude Vs Selenographic Colongitude plot from the February newsletter (p18).

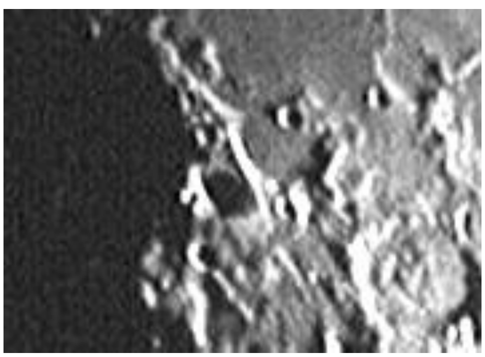


Figure 4. Cichus crater (near the center) as imaged at 23:12UT on 2017 Feb 5 by Philip Deyner (BAA), orientated with north towards the top.

Aristarchus: On 2017 Feb 07 UT 21:30-22:54 Kevin Berwick observed the crater under the same illumination conditions to the following three reports:

> *On 1991 Jan 26 at UT 23:38-23:50 D. Darling (Sun Prairie, WI, USA, 12.5" reflector, x159 and 3" refractor x90, seeing 5/10, transparency 3/6) found that Aristarchus was brighter through a red filter than through a blue filter on its western wall. He checked Aristarchus in two telescopes and obtained the same result. The Cameron 2006 catalog ID=419 and the weight=4. The ALPO/BAA weight=3.*

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

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

Kevin, using a C90 scope at x78, under Antoniadi II seeing conditions, commented: "*Lovely clear night for observing once the hail cleared early in the evening. Beautiful sunrise over Aristarchus. I concentrated on the West wall looking for any change in the sharpness of the wall. In addition, I checked the NW wall for color, red in particular. I saw nothing out of the ordinary…* ". I will therefore leave the weights of all these reports as they are. though it's good to have the normal appearances now, well described.

Lunar Eclipse: On 2017 Feb 11/12 several of you attempted to observe the penumbral eclipse of the Moon. In the past there have been many reports of LTP associated with lunar eclipses in general (though mostly umbral). There are at least 20 past LTP reports which lie within ±0.5˚ in illumination, or ±1˚ in both illumination and topocentric libration to February's eclipse; however all appear to be umbral too, so will skip describing these there. Suffice to say effects seen during past eclipses have included examples of unexpected brightening, darkening, flashes, changes of color, luminescence, and some small ray craters changing in diameter? I suspect the majority are associated with observer misinterpretations. For example a blue crater such as Aristarchus, when illuminated by red light in the umbra, will look darker than normal, however on the edge of the umbra, where one can sometimes find a blue band, the crater may look slightly brighter. Anyway the observations below were just of the penumbral shadow, and you can quite clearly see from Fig 5, how broad and diffuse this area actually. ALPO's Gary Varney (Fig 5 – Top-Center) captured the color nicely, perhaps a hint of smudgy brown can be seen - though I had to enhance the saturation in order to bring out the color. Franco Taccogna's (UAI) Full Moon image in Fig 5 (Top-Left) is a good comparison image to compare the rest of the other images against to see the extent of the penumbral shadow. Nothing unusual seems to have happened in the images that I received, i.e. they are all LTP free! However on the Space Weather web site it was reported that Luis G. Verdiales, from Puerto Rico, videoed a strange dark round object moving across the lunar disk. After a bit of investigating, this turned out to be a "Google Loon", a stratospheric Internet Balloon – perhaps something we will be seeing more of in our sky in the future?

Aristarchus: On 2017 Feb 13 UT 00:30-00:45 Marie Cook (BAA) observed this crater under the same illumination conditions (to within ±0.5˚) to the following report:

> *On 1986 Apr 26 at UT 21:00? H. Miles (Cornwall?, UK) found that Aristarchus was "still brighter in moments of better seeing". The rim could be seen as a complete circle. The Cameron catalog ID=283 and the weight=3. The ALPO/BAA weight=2.*

Marie was using a 90mm Questar telescope under Antoniadi III seeing conditions, and moderate to poor transparency. She found the crater to have normal brightness; it had a normal shape, and exhibited no obvious color. Although Marie's report does not address the complete circle nature of the rim, everything else seemed normal. The 1986 report mentions the crater looking brighter during better moments of seeing conditions – but of course this is perfectly normal behavior. I will therefore lower the weight from 2 to 1. So the only outstanding issue is whether the crater, having a complete circle for the rim, is abnormal?

Figure 5. The penumbral lunar eclipse sequence of 2017 Feb 10/11, orientated with north towards the top – mid eclipse was at 00:45UT. **(Top Left)** Image by Franco Taccogna (UAI) taken at 21:38 UT under a Full Moon, about an hour before penumbral first contact at 21:34. **(Top Center)** A color image taken by Gary Varney (ALPO) at 23:53 UT – note this image has had its color saturation enhanced to 70%, to bring out some of the subtle colors present in the penumbral shadow. **(Top Right)** Image taken by Colin Henshaw (BAA) at 00:32 UT. **(Bottom Left)** Image taken by Jay Albert (ALPO) at 00:50 UT. **(Bottom Center)** Image by Colin Henshaw (BAA) taken at 01:05 UT. **(Bottom Right)** Image by Franco Taccogna (UAI) taken at 01:30 UT.

Proclus: On 2017 Mar 05 UT 02:50-03:06 Jay Albert (ALPO), observed this crater under the same illumination conditions, to within ±0.5˚, to a report by David Darling, from 1989:

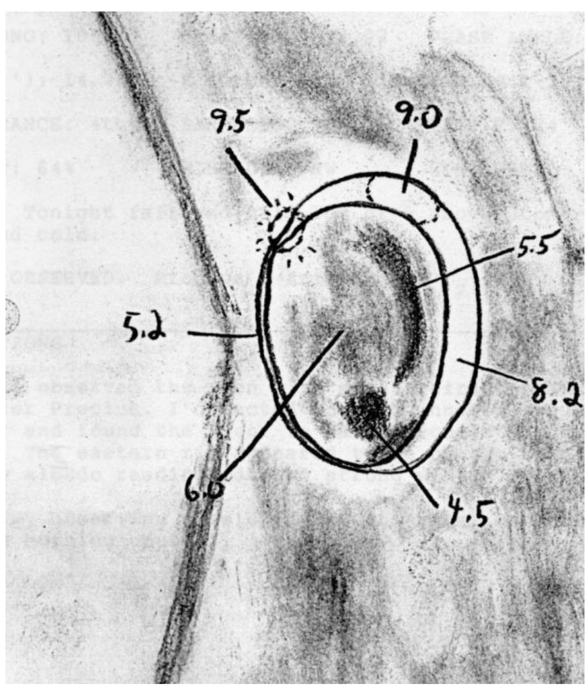


Figure 6. A sketch by David Darling from 1989 Feb 17 UT 00:55 orientated with north towards the top.

On 1989 Feb 17 at UT00:55 D. Darling (Sun Prairie, WI, USA, 12.5" reflector, x248) found that the brightness of the rim of Proclus was 9.0, the north west wall to be 9.5, the west wall to be 5.2, and the east wall 8.2 (normal?). The Cameron 2006 catalog ID=355 and the weight=1. The ALPO/BAA weight=1.

Jay, using a Celestron NexStar 6", at x214 (Seeing 7-8 out of 10, and transparency, magnitude 3), found that the crater appeared as a brilliant, glowing ring all the way round. The NW wall was the brightest section as usual at this solar angle. The SW wall was the thinnest and least bright section, but not significantly dimmer than the average brightness of the Proclus walls. The reported brightness difference of 9 and 5.2 seemed too extreme for what Jay saw. In view of the difference in appearance, I will increase the weight of the 1989 David Darling's observation to 2, though it is possible the cause might be libration related?

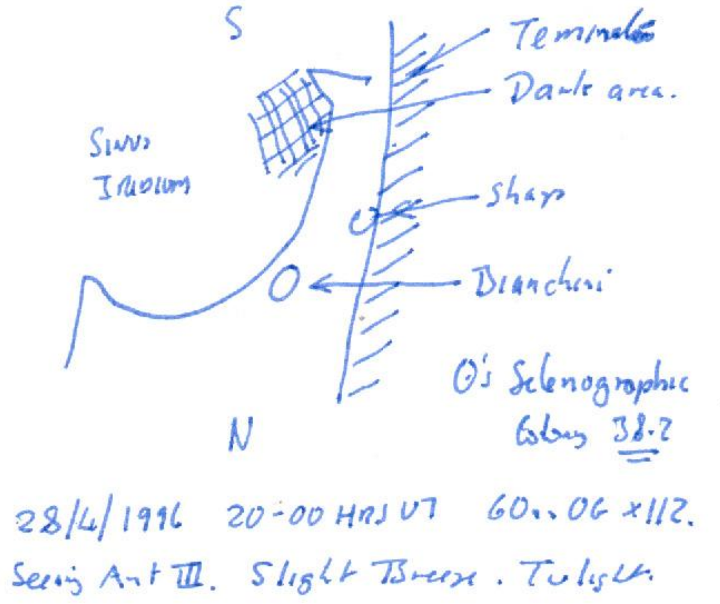
Theophilus: On 2017 Mar 05 UT 04:27 Paul Zeller imaged this crater about five hours after John Duchek imaged the crater and suspected the floor was lacking in detail. As discussed last month, this turned out to be the normal appearance of the floor of Theophilus crater. Anyway Paul's image, shown in Fig 7, is a useful context image, covering a wider area.

Figure 7. The area surrounding Theophilus, orientated with north towards the top, as imaged by Paul Zeller (ALPO) on 2017 Mar 05 UT 04:27.

Sinus Iridum: On 2017 Mar 08 UT 18:39 Les Fry (NAS) imaged the Moon under similar illumination conditions to an observation from 1995:

Sinus Iridum 1996 Apr 28 UT 21:00 Observed by Brook (Plymouth, UK, 60mm refractor, x112, seeing III, slight breeze, twilight) "dark shaded area on floor ~1/4 diameter of Sinus Iridum on western interior by rim" BAA Lunar Section Observation. ALPO/BAA weight=1.

The image that Les took (Fig 8 – Right) shows some major differences with the sketch that Clive made (Fig 8- Left). For example the shaded area on the SW floor of Clive's sketch is almost trapezoid in shape, where as in Les' image the whole of the inner western floor, close to the rim, is shaded. In Clive's sketch, the crater Sharp is visible, where as in Les' image it is not yet illuminated. This leads me to the conclusion that the UT on Clive's image is off, perhaps by an hour. It is not uncommon for numerical errors to occur during, or not long after, Day Light Saving time starts, so I would suggest that Clive's sketch was made about 21:00 UT? Also, in the past I have found that sometimes numerical errors can occur in converting 12 hour times to the 24 hour clock. We will make some temporary alterations to the repeat timings, and see if future repeat illumination observations can explain what was seen back in 1996?



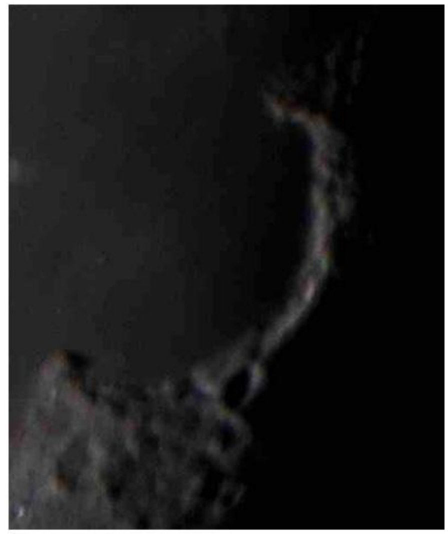


Figure 8. Sinus Iridum orientated with north towards the bottom. **(Left)** A sketch by Clive brook from 1994 – UT and observation details on the sketch. **(Right)** Image by Les Fry (NAS) taken on 2017 Mar 8 UT 18:39.

Aristarchus: On 2017 Mar 11 UT 05:15-05:56 Alberto Anunziato (AEA) sketched (Fig 9) this crater under similar illumination, to within ±0.5˚ to the following six past historical past observational reports:

Aristarchus-Herodotus 1967 Apr 22 UT 20:20 Observed by Schobel (Hirschfelde, Germany, 5"? refractor) "Interference filter. (indep. confirm. of Darnella?)" NASA catalog weight=5. NASA catalog ID #1032. ALPO/BAA weight=2.

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 22:30-23:15and 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.

Aristarchus, 1979 Aug 06, observed by Louderback, to be normal in red and blue filters however the Cobra Head part of Schroter's Valley was brighter in blue. Indeed it was very dull in red - Louderback says that this was not surprising as the whole areas around Aristarchus is brighter in blue. Louderback is an experienced observer of the Aristarchus area of more than 10 years. Cameron 2006 extended catalog ID=63 and weight=1. ALPO/BAA weight=1.

Aristarchus 1967 Apr 22 UT 21:00? Observed by Classen (Pulsnitz Obs., E. Germany) & by Corralitos Observatory (Organ Pass, New Mexico, 24" reflector+Moonblink). "Crater was so bright it could be seen with the naked eye (indep. confirm. of Darnella & Schobel of activity here?). Corralitos M.B. did not confirm." NASA catalog weight=3. NASA catalog ID #1034. ALPO/BAA weight=3.

On 1964 Jun 23 at UT 04:45-05:05 Bartlett (Baltimore, MD, USA, 5" reflector, x180, S=4-1 and T=3) observed a blue-violet glare on the north east rim and a strong violet tinge in the nimbus. The effect was absent 1 hour earlier. The Cameron 1978 catalog ID=821 and weight=4. The ALPO/BAA weight=2.

Aristarchus, Schroter's Valley, Herodotus 1967 Apr 22 UT 21:45 Observed by Darnella (Copenhagen, Denmark, 3.5" refractor) & Coralitos Observatory (Organ Pass, New Mexico, USA< 24" reflector + Moonblink). "Red pts. suspected in same areas as in #1030, but seeing was bad. (confirm by Schobel?). Corralitos MB did not confirm" NASA catalog weight=5. NASA catalog ID #1033. ALPO/BAA weight=2.

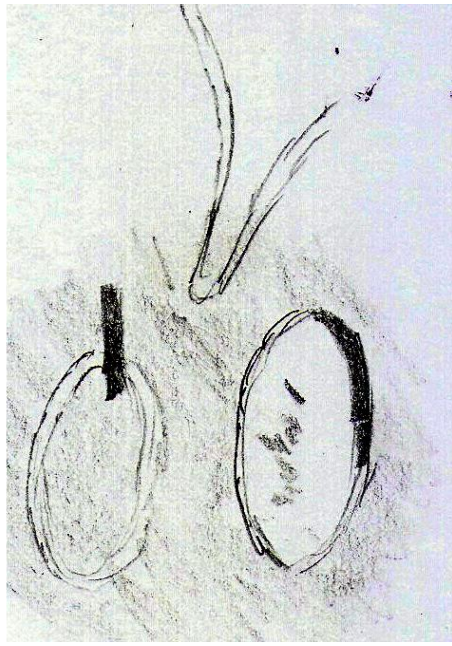


Figure 9. Aristarchus and Herodotus, as sketched by Alberto Anunziato on 2017 Mar 11 UT 05:15-05:56. Orientated with north towards the top.

Alberto (using a Meade EX 105, x154) commented that to his eyes, Aristarchus was extremely bright, and it was very difficult to note the radial bands. He sketched the areas in shadows in Aristarchus and Herodotus. However he could not discern the alternation dark/light as reported by Foley. Aristarchus was not visible with the naked eye (Claussen) either. We will leave all the weights as thy are.

Aristarchus Area: On 2017 Mar 11 UT 21:55-22:09 Marie Cook (BAA) observed this region under the same illumination conditions (to within ±0.5˚) to the following two reports:

1955 Jul 03 Schroter's Valley 1955 Jul 03 Observed by Firsoff (Somerset, England, 6.5" reflector x200) "Drawing contains a star-like pt. at N. part of valley." NASA catalog weight=4. NASA catalog ID #597.ALPO/BAA weight=2.

On 1985 May 03 at UT 1959-2330 M.C. Cook (Mill Hill, UK) and M. Mobberley (Suffolk, UK) both detected a large very bright region on the eastern exterior. The Cameron 2006 catalog ID=269 and the weight=5. The ALPO/BAA weight=1.

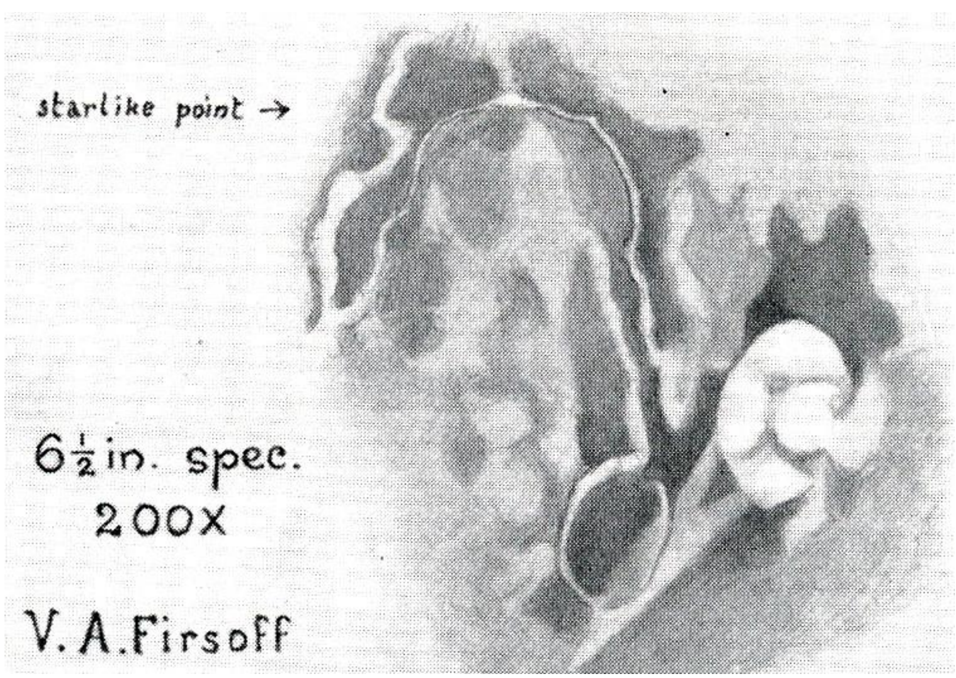


Figure 10. A sketch of the Aristarchus region by V. A. Firsoff (BAA) made on 1955 Jul 03 UT 22:00, with text and the sketch re-orientated with north towards the top.

Marie, using a 90mm aperture Questar telescope, x80 under Antoniadi III-IV seeing, but poor transparency, found no sign of a star-like point on the northern part of Vallis Schroteri 21:55-22:05 UT). She also saw no sign of a large bright region on the eastern exterior of Aristarchus. Interestingly I came across a sketch by Firsoff showing the location of the 1955 star-like point (See Fig 10), I also came across copies of the original 1985 reports. Marie Cook was actually on a local astronomy tour of the University of London's Observatory at Mill Hill, UK, and caught a glimpse of the crater in white light at 19:59UT using a 6" f/14 refractor, seeing=III. She comments that major bands were seen to the western half of the crater, but had no time to depict the exact location. She did note a big bright blob beyond the eastern rim, due to ejecta material, directly due east – two southern tips of ejecta material seemed sharp and clear. In Martin Mobberley's report write up from 1985 May 03 UT 20:05-22:35 he comments on a distinctive brightening to the NE, which he had previously seen in Earthshine and explains away as just a light coloration on the Aristarchus Plateau. So in my view this does not sound like he regarded this as a LTP. So the evidence for the 1985 report being a LTP just rests on Marie Cook's notes, based upon a brief look through a refractor. I will therefore leave the weights of these two LTP at weights at 2 and 1 respectively, though it is interesting that Marie did not notice a bright blow on the eastern rim in 2017.

Theaetetus: On 2017 Mar 12 UT 20:32 Franco Taccogna (UAI) imaged this crater under the same illumination conditions (to within ±0.5˚) to those for the given date and UT of the report from 1902 below.

Thaetetus 1902 Oct 16 UT 18:10? Observed by Cherbonneaux (Meudon, France, 33" refractor) "Unmistakable white cloud formed close to it." NASA catalogue weight=3. NASA catalogue ID #313.ALPO/BAA weight=3.

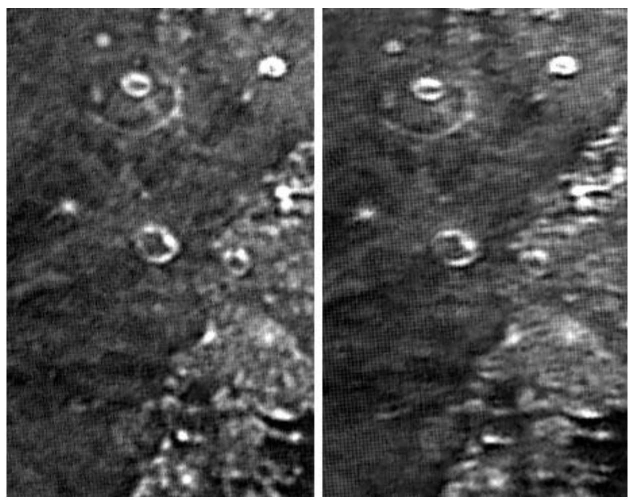


Figure 11. Theaetetus as imaged by Franco Taccogna on 2017 Mar 12 UT 20:32 **(Left)** and 21:32 **(Right)**. Images orientated with north towards the top and Theaetetus in the center of each image.

Franco imaged this crater according to the predicted times (Fig 11 Left), and as you can see from his image, there is clearly no evidence of a transient white cloud, not any fuzzy nearby diffuse tiny white ray craters which could resemble a white cloud during brief moments of good seeing conditions when they pop into visibility. A comparison image, taken an hour later (Fig 11 – Right) shows the same appearance. There is a bright ray crater on the eastern rim, but this does not change between images.

Having failed to find anything resembling a cloud effect, I was prompted to see what further information I could find out about the original observation. For example Cameron puts a "?" next to the UT given, meaning it was estimated. It transpires that there was a lunar eclipse on 1902 Oct 16, so there is a good chance that the effect was seen during the eclipse, though from the information I have I cannot be a100% sure. So instead we can at least compute the Moon rise and set times for the observing site at Meudon, and these come out to be from: Moon above the horizon from 00:00 U.T. till 04:59 U.T. in the early hours of the morning on 1902 Oct 16. Then the Moon rises again at 16:43 UT, with the Moon attaining a maximum altitude above the horizon of 49˚ at 23:25 UT, and setting on the 17th at 06:13UT UT. The lunar eclipse timings were as follows: The lunar eclipse was actually on 1902 Oct 17 with these stages: penumbral phase started (03:18 UT), first contact of umbra (04:17 UT), start of totality (05:19 UT), mid eclipse (06:03 UT), end of totality (06:48 UT), last umbral contact (07:50 UT), penumbral phase ended (08:49 UT). The reference given by Cameron to the report is not complete: Bulletin de la Société

Astonomique de France, 14, 1902. However the volume No. for 1902 appears to be different – so I have notbeen able to locate the original report!

In view of the uncertainty of the observing times, and whether it was seen on the morning of the 16th Oct 1902, or in the evening, or during the total lunar eclipse which was on the 17th Oct 1902, I will therefore lower the weight from 3 to 2 to reflect this timing uncertainty - at least until we can locate the original reference. I will make changes to the descriptions of the LTP to warn users about the wide range in colongitudes that might be needed to replicate a repeat illumination, however my hunch is that it was during the lunar eclipse itself?

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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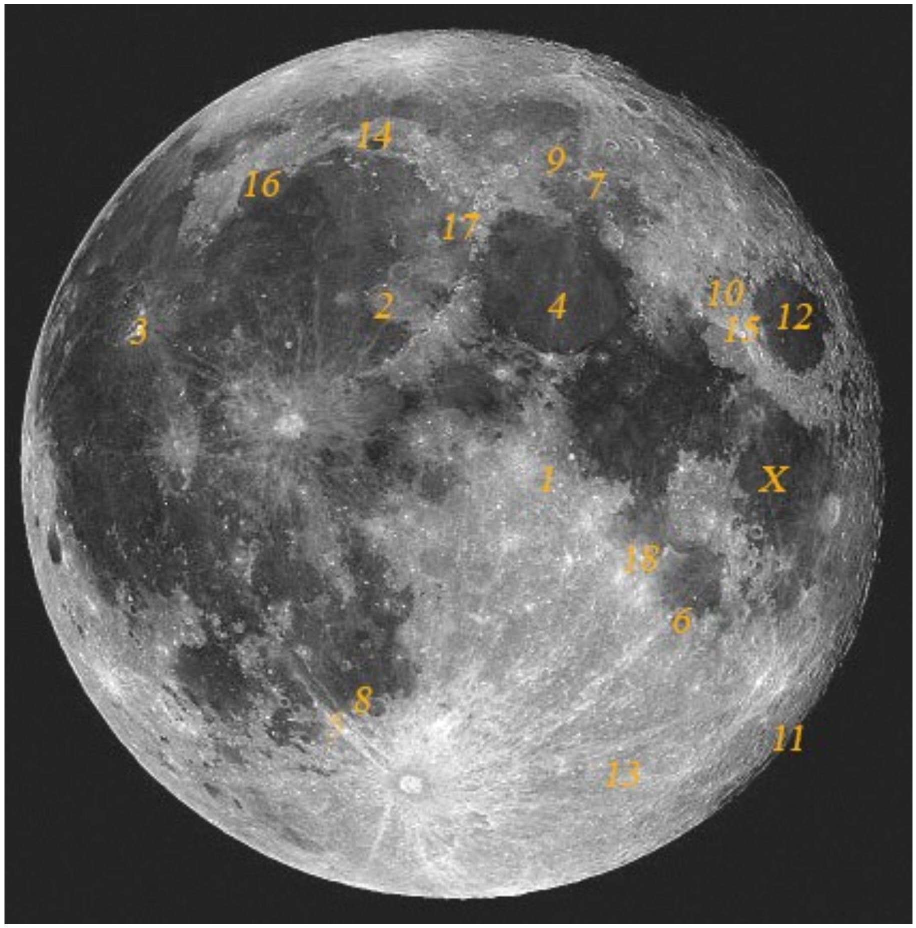
KEY TO IMAGES IN THIS ISSUE

1. **Agrippa**
2. **Archimedes**
3. **Aristarchus**
4. **Aristoteles**
5. **Cichus**
6. **Fracastorius**
7. **Grove**
8. **Hesiodius**
9. **Lacus Mortis**
10. **Macrobius**
11. **Mare Australe**
12. **Mare Crisiusm**
13. **Pitiscus**
14. **Plato**
15. **Proclus**
16. **Sinus Iridum**
17. **Theaetetus**
18. **Theophilus**



FOCUS ON targets

X = Messier-Messier A