THE LUNAR OBSERVER

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

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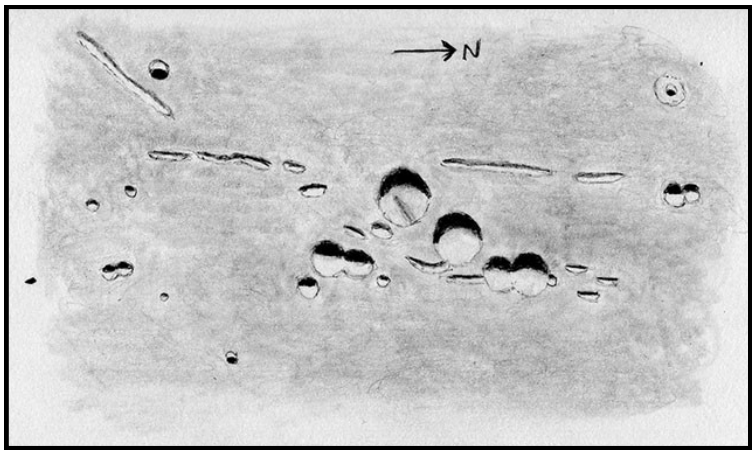
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – JANUARY 2018
MONTES SPITZBERGEN



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
November 10, 2005 23:25-23:39, 23:46-23:58 UT, 15 cm refl, 170x, seeing 7-8/10.

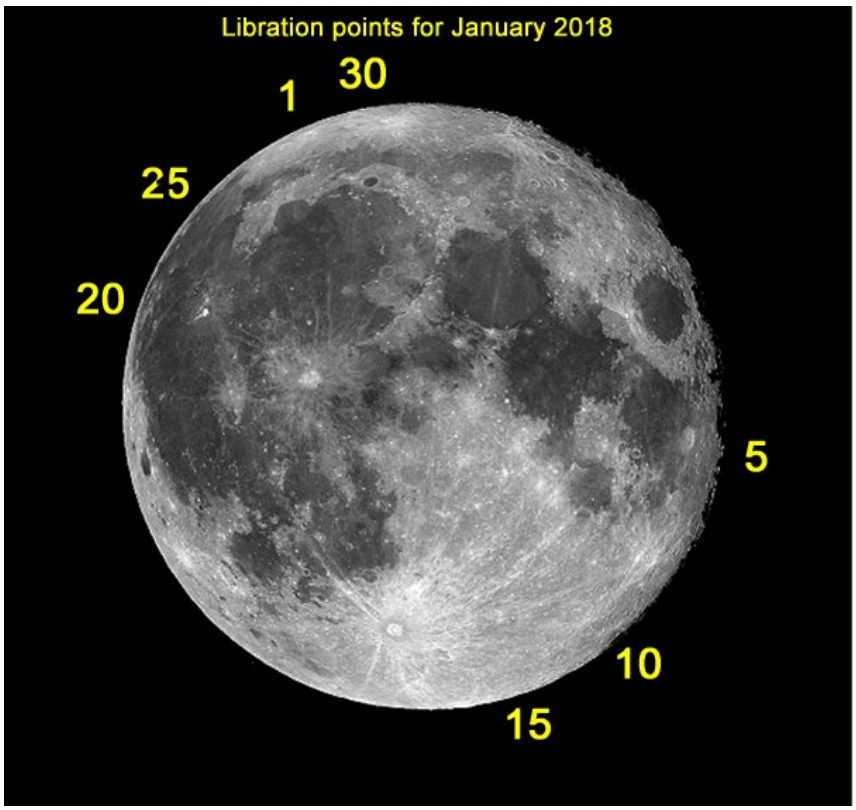
I drew this area on the evening of Nov. 10, 2005 while observing four occultations. This clump of peaks is in eastern Mare Imbrium north of Archimedes. It is one of several isolated mountain groups in Mare Imbrium. Many of the more conspicuous peaks are in pairs. Montes Spitzbergen (M.S) mu is a small pair of peaks north of the main group. The tiny pit to the west of M.S. mu is Kirch E, according to the L.Q. map. This crater had a modest halo. The large pair at the north end of the main group appears to be M.S. epsilon, and M.S. beta is at the west end. The latter feature had a strip of shadow within it, and also appeared less bright than nearby peaks. There is a large peak between epsilon and beta which is shown, but not labelled on the L.Q. map. The large double peak at the south end of the main group is M.S. gamma, with M.S. alpha just to its southeast. The moderate-sized pit to the southwest is M.S. A, and the small pit to the southeast is Archimedes V. Neither of theseÂ· craters had a halo. The double peak between these craters is Archimedes xi. This pair is as far south of the main group as M.S. mu is to the north. This area has a varied assortment of small peaks and ridges which I have tried to draw as well as possible.

LUNAR CALENDAR

2018	U.T.	EVENT
Jan. 01	16:54	Moon Perigee: 356600 km
01	19:01	Moon Extreme North Dec.: 20.1° N
01	21:24	Full Moon
04	02:48	Moon Ascending Node
08	17:25	Last Quarter
11	00:59	Moon-Jupiter: 4.7° S
14	21:09	Moon Apogee: 406500 km
14	21:13	Moon-Saturn: 2.9° S
15	11:28	Moon Extreme South Dec.: 20° S
16	21:17	New Moon
18	09:28	Moon Descending Node
24	17:20	First Quarter
29	06:32	Moon Extreme North Dec.: 20° N
30	04:54	Moon Perigee: 359000 km
31	08:27	Full Moon
31	08:30	Total Lunar Eclipse
31	13:46	Moon Ascending Node
Feb 07	10:54	Last Quarter
07	14:47	Moon-Jupiter: 4.7° S
09	00:12	Moon-Mars: 4.8° S
11	09:16	Moon Apogee: 405700 km
11	09:46	Moon-Saturn: 2.7° S
11	18:21	Moon Extreme South Dec.: 20° S
14	16:11	Moon Descending Node
15	15:52	Partial Solar Eclipse
15	16:05	New Moon
23	03:09	First Quarter
25	15:07	Moon Extreme North Dec.: 20.1° N
27	09:48	Moon Perigee: 363900 km
28	00:03	Moon Ascending Node

LUNAR LIBRATION

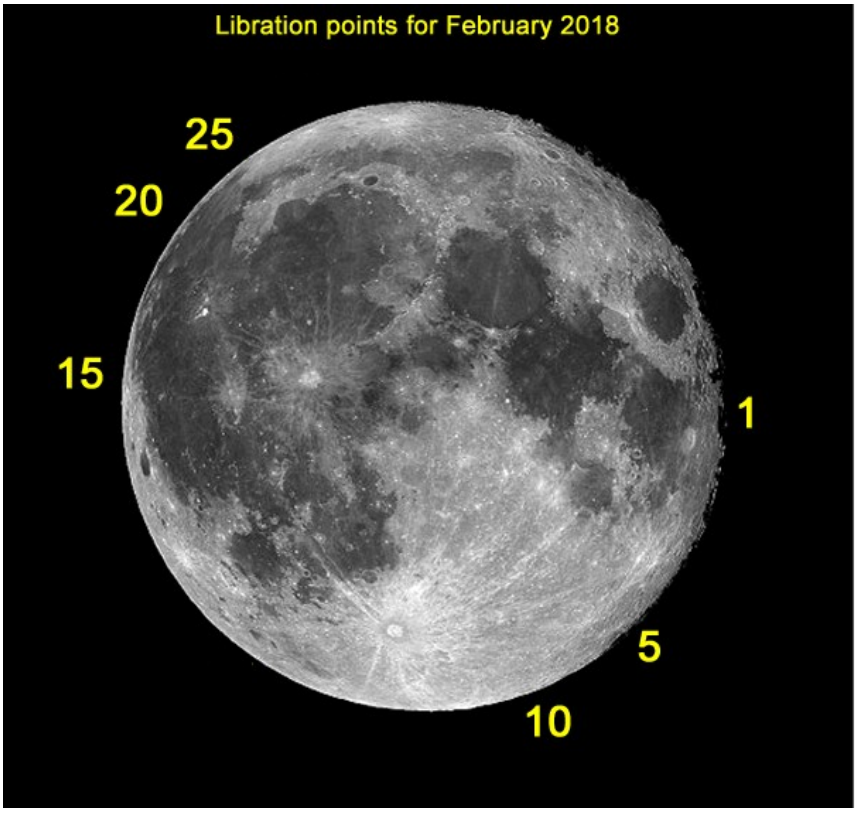
JANUARY-FEBRUARY 2018



Size of Libration

01/01	Lat	+05°14'	Long	-01°55'
01/05	Lat	-01°07'	Long	+05°33'
01/10	Lat	-06°36'	Long	+06°37'
01/15	Lat	-04°39'	Long	+00°56'
01/20	Lat	+01°57'	Long	-05°23'
01/25	Lat	+06°45'	Long	-07°14'
01/30	Lat	+03°06'	Long	-00°42'

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



Size of Libration

02/01	Lat	-00°22'	Long	+02°54'
02/05	Lat	-05°55'	Long	+06°45'
02/10	Lat	-05°48'	Long	+03°14'
02/15	Lat	+00°10'	Long	-03°19'
02/20	Lat	+06°09'	Long	-06°16'
02/25	Lat	+04°57'	Long	-03°16'

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.

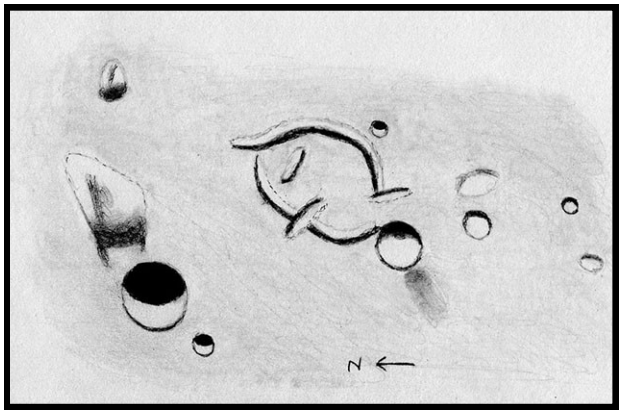
We have sections devoted to the observation of all types of bodies found in our solar system. Section coordinators collect and study members' observations, correspond with observers, encourage beginners, and contribute reports to our Journal at appropriate intervals.

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.

ERRATUM

Due to an editorial error, the wrong image was printed with the Feature of the Month article on Burnham in the December 2017 issue. The text and image caption were correct, and the link to the on-line original image was also correct. The on-line copy of the issue has been corrected, and the correct image is also included below.



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: Rima-Rilles

Focus on is a bi-monthly series of articles, which includes observations received for a specific feature or class of features. The subject for the **March 2018** edition will be **Rima-Rilles** 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 Rima-Rilles article is February 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
Craters – Latest and Greatest	**May 2018**	**Apr. 20, 2018**

Focus On: Montes & Mons
Mountains and Mountain Ranges

Jerry Hubbell

Assistant Coordinator, Lunar Topographical Studies

With this month's Focus On series, we continue our discussion of the different types of lunar features with Mons and Montes. I remember when I got my first telescope during the Apollo era of lunar exploration, the moon was the object of choice to observe. Two of my favorite objects were the isolated peaks Piton and Pico near the crater Plato. These two peaks reminded me of the drawings of Chesley Bonestell with the jagged lunar peaks and breathtaking vistas of the moon. Early lunar cartographers depicted the peaks as jagged also based on a misunderstanding of the topography that they thought the stark shadows were showing them (Figure 1.) This first impression set the stage for centuries of awesome views of the lunar landscape that until the 1960's was not fully understood.

Figure 1. *Mons Pico near Plato, Francisco Alsina Cardinalli, Oro Verde, Argentina, December 20, 2015 0206 UT, 250 mm. Schmidt-Cassegrain (Meade LX 200), Canon Eos Digital Rebel XS, north/up, east/right.*

Several members provided extensive descriptions and images of various mountains and mountain ranges that demonstrate the depth of knowledge and skill that our observers bring to the table. Most notably, David Teske and members of the Lunar Group of the Madrid Amateur Astronomical Society (AAM). I have provided here excerpts from their contributions which are greatly appreciated:

David Teske:

Montes Caucasus

These mountains mark the western boundary of Mare Serenitatis and the eastern boundary of Mare Imbrium. This heavily eroded, rugged mountain range is a direct continuation of the Apennines, separated from the later by an approximately 50 km wide, flat, lava covered strait. This mountain range is likely made of Imbrium ejecta. Stretching 520 km, the Montes Caucasus this old battered range is about 3 to 4 km tall, but also contains some of the highest peaks on the lunar nearside, towering 6 km above the lunar surface. If you could stand on this peak, you could see for 140 km. The Montes Caucasus is not arcuate toward either the center of Imbrium or Serenitatis.

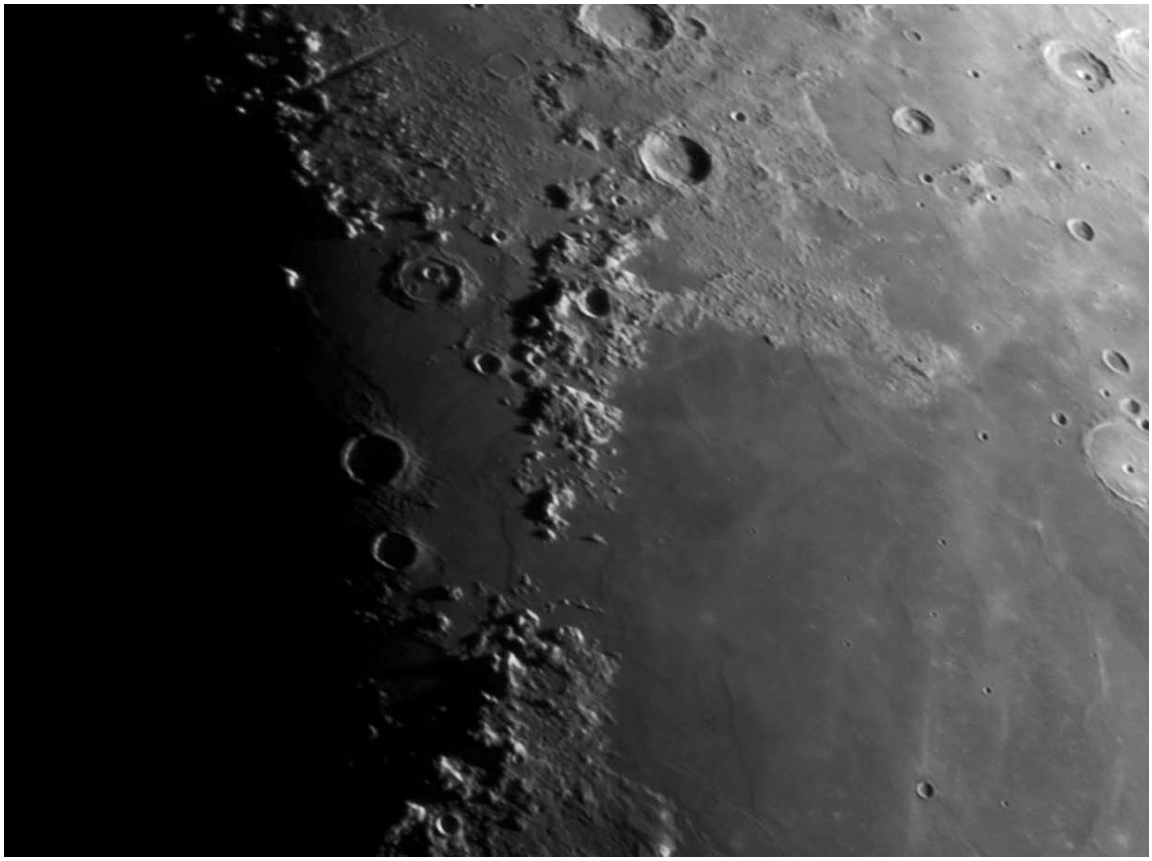


Figure 2. *Montes Caucasus, David Teske, Louisville, Mississippi, USA, 26 November 2017 at 0134 UT. Colongitude 356.6 degrees, Seeing 6/10, 4 inch APO refractor.*

Montes Apenninus

These are the greatest range of mountains on the lunar nearside. These mountains make the southeastern rim of the Imbrium basin. With a length of 600 km, it includes some 3,000 individual peaks, some, like Mons Huygens tower 5 km tall. The side facing Mare Imbrium is steep, with a slope of 30 degrees, whereas the other side towards Mare Vaporum is significantly less steep. The scarps are not continuous but are broken into a series of roughly parallel, but sometimes offset massifs that are 25 to 50 km long. The hilly terrain of the Apennine back slope is cut by lineations that radiate from the Imbrium basin. The Montes Apenninus originated 3.85

billion years ago when a giant impact forever changed the face of the moon. This impacting projectile caused the highland crust along its southeastern border to be violently uplifted forming this spectacular mountain range. Ejecta from this impact cover the Apennine highlands.

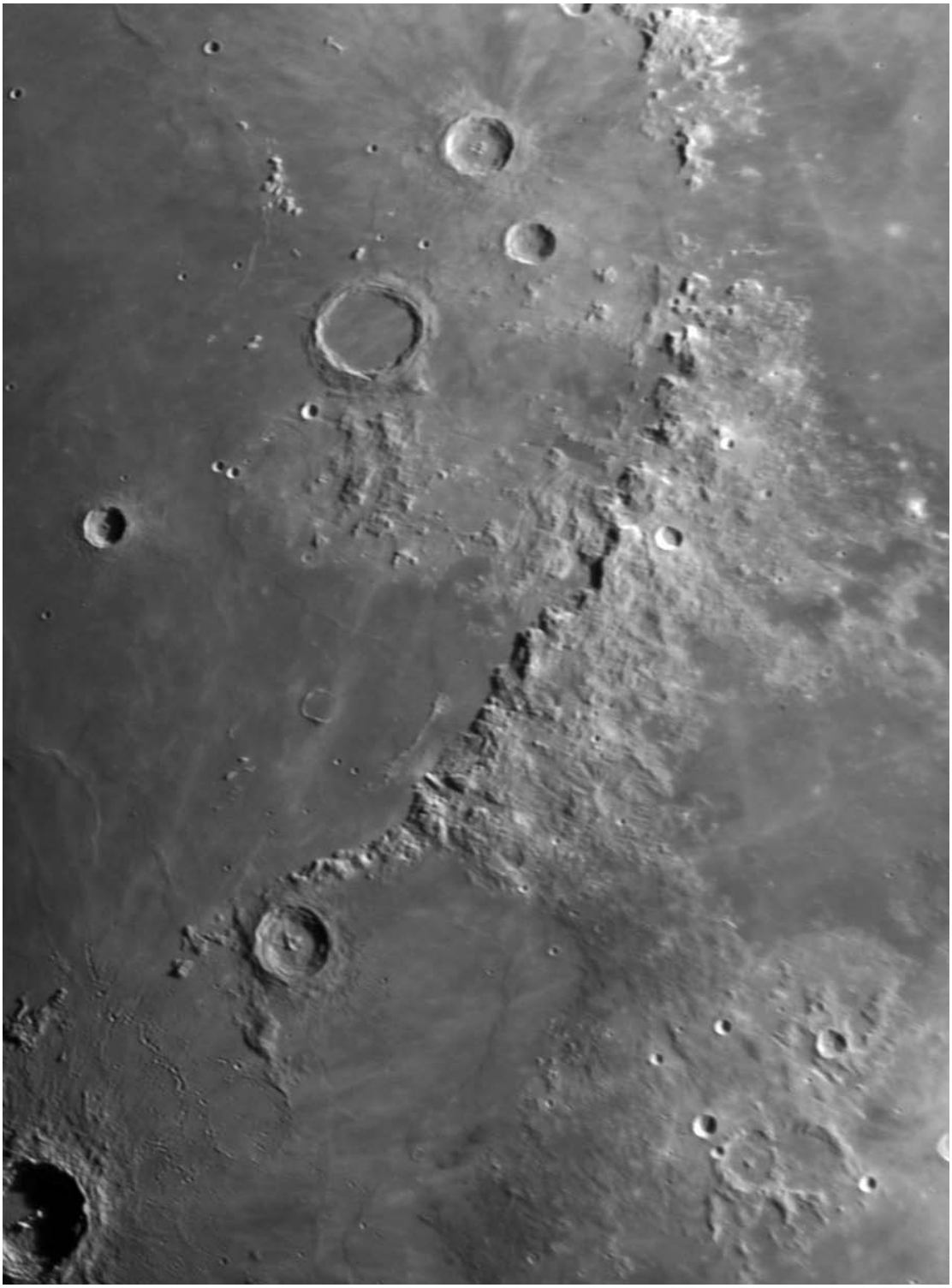


Figure 3*. Montes Apenninus, David Teske, Louisville, Mississippi, USA, 28 November 2017 at 0224 UT. Colongitude 21.3 degrees, Seeing 5/10, 4-inch APO refractor.*

Montes Agricola

This narrow, straight chain of mountains extends 160 km to the northwest of the Aristarchus Plateau, lying on the plains of Oceanus Procellarum. The moon's narrowest mountain range must somehow be associated with the nearby Aristarchus Plateau. The range parallels the northern boundary of the Plateau, and might also be associated with the formation of the Imbrium Basin. The northern portion of Montes Agricola runs, at a right angle into the moon's smallest named wrinkle ridge, Dorsum Niggli, which runs 50 km to its junction with the Aristarchus Plateau.

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

Lunar Group of the Madrid Amateur Astronomical Society (AAM)

We observed Montes Apenninus on Sunday, 26th November 2017, under clear skies (just some weak halo produced by very high cirrus), moderate turbulence and light pollution, not too far (40 km) from a large town (Madrid) and high drought, after a long period (50 days) of no rainfall. Visibility conditions for the relevant Moon zone, position angle -23.2 degrees and libration in longitude, -8 degrees (!), as can be seen in ephemeris list, conspired in our favor to take out of the shadow most of the features we planned to observe. Average Sun altitude over Montes Apenninus was 5.6 degrees.

We used two telescopes, one 102 mm ED refractor and one 20 cm SC. After a couple of unsuccessful attempts, two 200 frame videos were captured with a QHY-III camera, attached to the 102 mm refractor scope by a Barlow x2 lens, to be processed later on with Registax-6 program. Photo 1 and pseudo-anaglyph show the outcome image Nº 1.

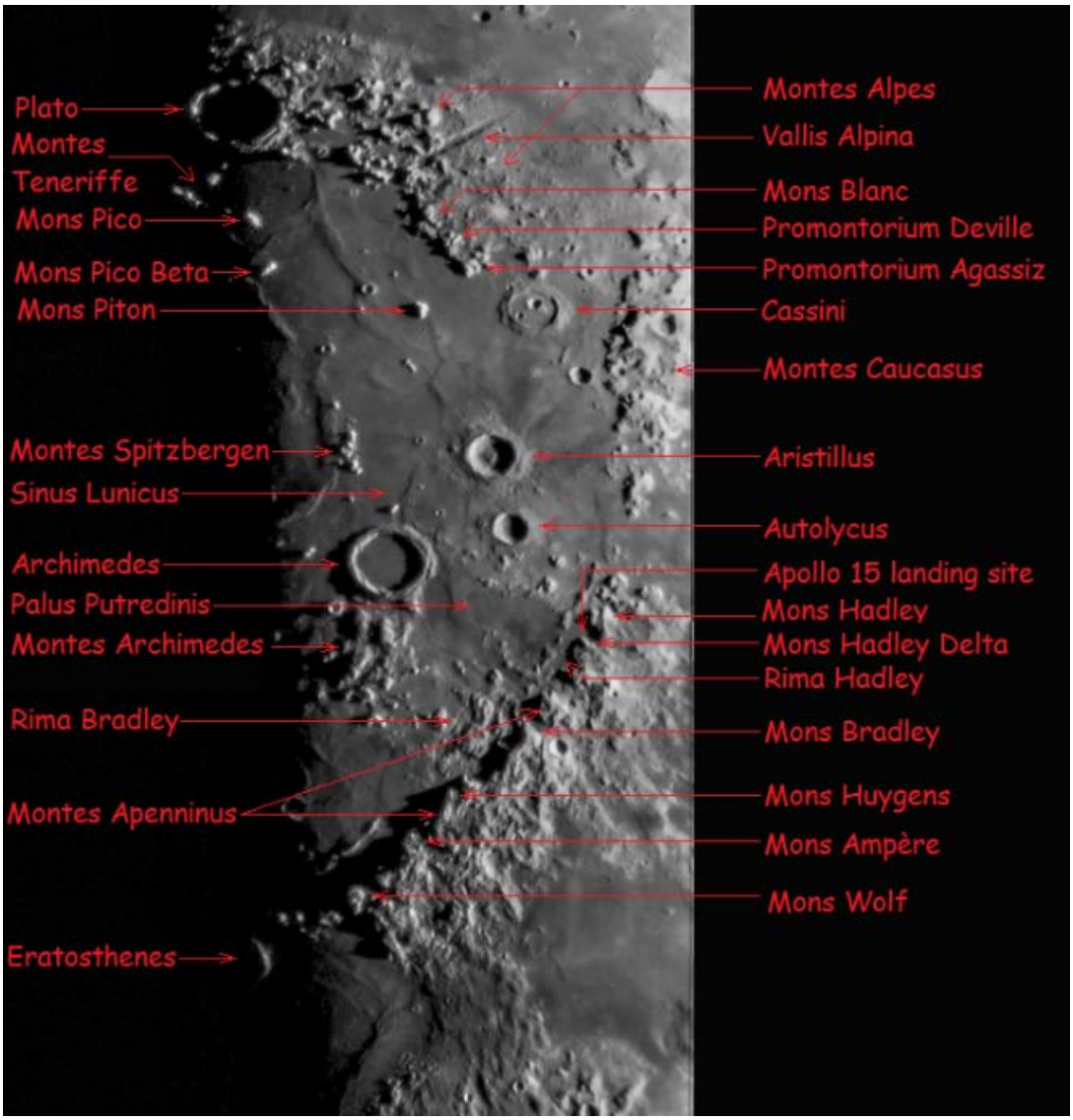


Figure 5. *Montes Apenninus, Montes Caucasus, Montes Alpes and Montes Spitzbergen, as well as Mons Pico and Mons Piton.*

A close visual inspection with the SC scope at moderate power (200x), showed five razor-sharp peaks, casting very delicate individual shadows onto the Mare Imbrium dark surface, so delicate that we could identify some smaller peaks by looking at the shadow they cast, a lot better than staring at themselves. Unfortunately, and it was a pity, our two first videos recorded at that time failed, so we couldn't catch this stirring and elusive scene. No matter how good was this viewing condition, the extent of the shadow prevented us from seeing the Mons Wolf and the Eratosthenes crater, both known to be located at the wester end of the range. Even Montes Archimedes were out of sight.

Then, meanwhile the shadow was retracting, we devoted our time to recognize the five lone peaks uncovered at that time. Mons Hadley, easily identified because of a shorter companion and because its nearness to the small crater Santos-Dumont, was somehow brighter (it recalled us a snowy mount) than the remaining peaks. Although it is known to be second in the height ranking (4800 m), the double curvature of range and of the lunar floor, as well as the double shadow because of its lesser brother, pose a strong difficulty to its awareness. north of Mons Hadley and just at the edge of the shadow, we saw some elongated rocky outcrop and beyond it, Rimae Fresnel, a very thin system of grooves, difficult to notice in our picture, which carried lavas during the basin lava fill epoch.

Mons Hadley Delta, located due SW of Mons Hadley, and separated from it by an arcuate nook, cast a dark shadow on the floor, which prevented us from observing Rima Hadley and the Apollo 15 landing site. Mons Hadley Delta is not so tall (3500 m) as Mons Hadley and looks a darker hue.

Mons Bradley is not next-in-the-row, but fourth. Mount number three is anonymous up to our knowledge. Nevertheless, Mons Bradley is number three in the height ranking, because of its 4200 m height, and it is best identified by crater Conon, located ramp-down from the peak (one must be cautious for not to confuse the 22 km crater Conon with the smaller 10.6 km crater Aratus). At the foot of Mons Bradley we could see the broad platform called the Apenninus bank, that runs along the mountain range. Mons Bradley summit is very steep and has a bright facies. In the particular case of our observation, the shadow extent was not long enough to cover Rima Bradley, the very broad and sinuous groove located beyond the Apenninus bank, that separates the whitish lava flood that runs all the way across to Montes Eratosthenes. Unluckily, the bright hue of this special non-magmatic lava, is only visible under high illumination conditions and we missed it.

Mons Huygens is not next-in-the-row after Mons Bradley, but it is separated from it by a very long and dark nook and by another anonymous peak. It is best localized by looking for the west end of the Apenninus bank, after the anonymous peak. So, Mons Huygens, regardless being the number one in the height ranking (it towers 5500 m), is number sixth along the range. Mons Huygens summit is not steep, but something chunky, and its west slope called our attention, because of its soft tilt. At the time of our first observation, the Mount Huygens shadow laid very close to the terminator, so we were unable to identify the tip.

Mons Ampère raises beyond the Mons Huygens soft tilt ramp-down slope, without continuity solution. Its 3000-meter height provides it the sixth (last) position in the height ranking and its west slope is also soft. Since it was rather close to the terminator, we couldn't realize a great deal of detail in it at this first observation.

About 50 Km north of Montes Apenninus lie Montes Caucasus, a mountain range of which loftiest ridge reaches a maximum height of 6000 m. No matter how tall is that neck breaking peak, the overall aspect of the range is quite different from that of Montes Apenninus. In our observation, everything looked old and worn, mainly because of the lack of shadows. Being the Sun altitude over the main range below 15 degrees, the lack of shadows reveals a soft slope, as is usual of old mountains. Even the distorted craters Alexander and Calippus contributed to spread that impression.

A much better option to observe at that time, was the one offered by Montes Alpes and the alone Mons Piton. Montes Alpes is a flat mountain range that closes the northern edge of the imbrium basin, isolated from Montes Caucasus by the Cassini crater. Being by average half as tall as Montes Apenninus, and therefore half as impressive, its most appealing feature is the beautiful fault, Vallis Alpina (better than Vallis Alpes, to our own criterion). Three peaks have deserved to bear particular names, one remembering the tallest peak of earthly Alps, Mons Blanc, which rises 3600 m, and two as *promontoria*, that is, as two rocky cliffs that lean over the imbrium lavas, Promontorium Agassiz, 2280 m and Promontorium Deville, 1300 m.

As the whole mountain range cast a dark shadow over the lava surface, and due to the Moon position angle, all the three elevations cast northward skewed shadows, too close to the darkened "shore", we could not discern their true tallness by means of their extent. Only Mons Blanc shadow could be distinguished easily as a double arrowhead bearing NE, long enough to guess its tall elevation. And let alone we could see the very narrow rille that runs along Vallis Alpina, no matter how hard we tried it.

In reference to Mons Pico, it is well known by all observers that under low Sun, the aspect of this mount is rather deceiving. Being 2250 m high, but 25 Km wide, its slope is nothing astounding (≈10 deg.). However, under the above said conditions, it casts a very long and pointy shadow that stretches a very long distance across the Mare Imbrium surface, amazing the beginning observers (and sometimes those already skilled). But what really called our attention was its high albedo and whitish aspect under grazing light (Sun altitude above Mons Piton was 7 deg.). These two features characterize Mons Piton as an anorthositic structure, rather than a volcanic one, as was thought long time ago. Nowadays it is very easy to follow part of the arc of the second inner ring of the basin: Mons Piton – Mons Pico – Montes Teneriffe – Montes Recti. All of them are protruding ridges aligned along the ring.

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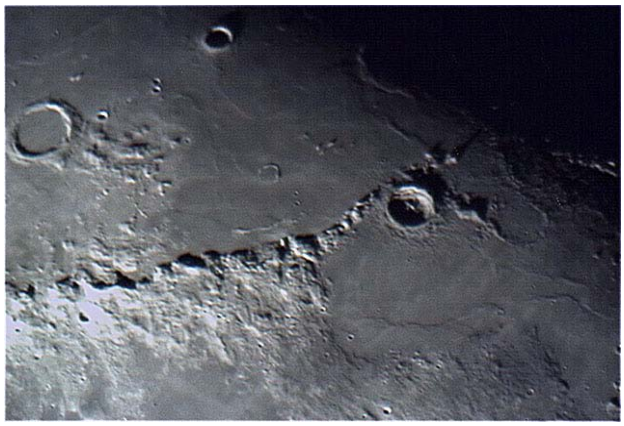
ADDITIONAL IMAGES

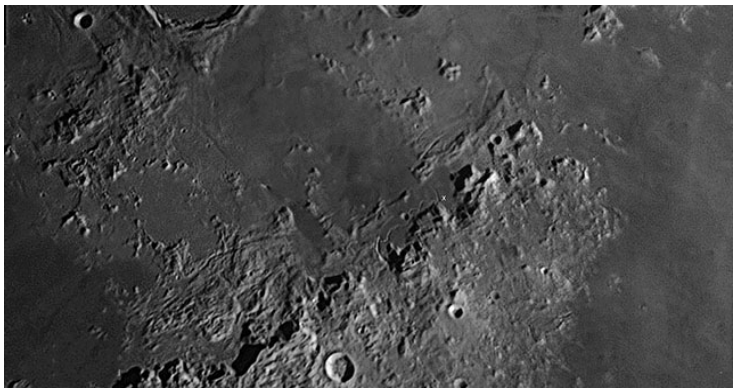


MONTES APENNINUS - Jay Albert, Lake Worth, Florida USA. June 14 2016 02:45 UT. C-11 SCT, Neximage 5.

ADDITIONAL IMAGES

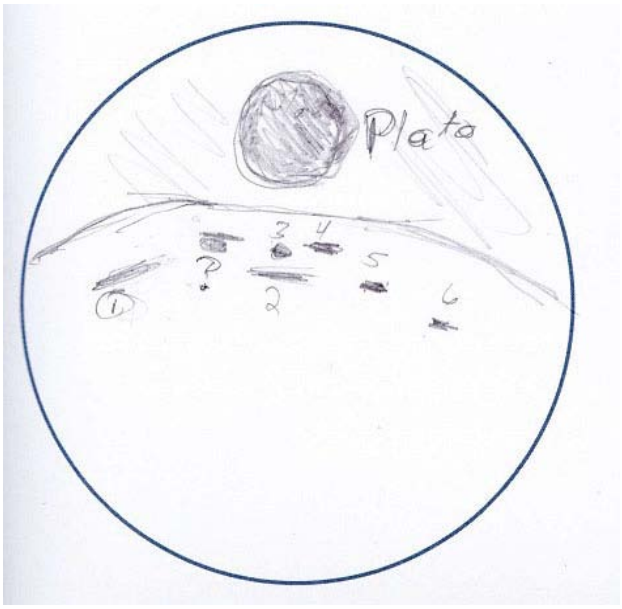
PROMONTORIUM AGASSIZ- Walter Elias, Oro Verde, Argentina. November 26, 2017 01:20 UT. 289mm Celestron, Canon EOS Digital Rebel XS.

MONTES APENNINUS - Richard Hill – Tucson, Arizona, USA November 30, 2014 01:31 UT. Seeing 8/10. 8" Mak-Cass, f20, SKYRIS 445M.

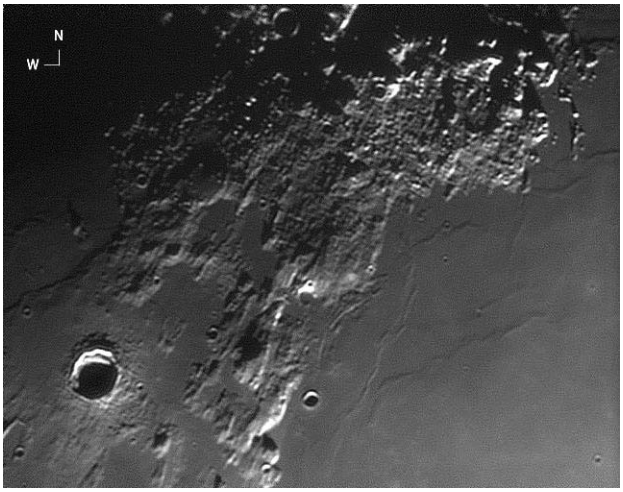


MONTES ARCHMEDES & APENNINUS - Richard Hill – Tucson, Arizona, USA January 7, 2017 01:27 UT. Seeing 8/10. 8" Mak-Cass, f20, 656.3nm filter, SKYRIS 445M.

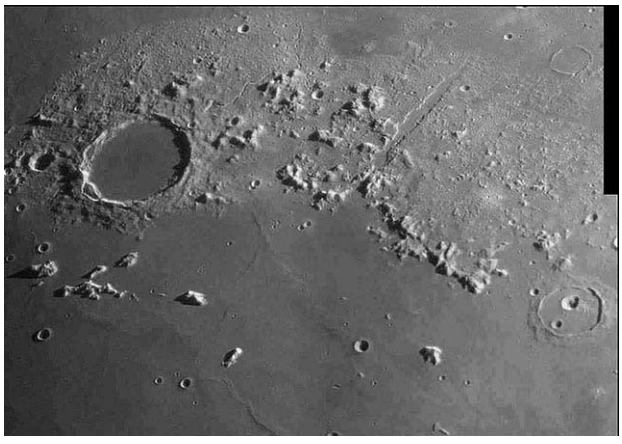
ADDITIONAL IMAGES



MOUNTAINS NEAR PLATO– David Jackson – Reynoldsburg, Ohio USA December 2, 2017 0:44 UT. 25-125 x80mm binoculars. 1. Montes Recti. 2,3,4 Montes Teneriffe. 5. Mons Pico. 6. Mons Piton



MONTES HAEMUS - Michael Sweetman - Tucson, Arizona, USA. December 18, 2015 03:35 UT. Seeing 6/10, transparency 3/6. 5" APO f/22.5 refractor. DMK21, Astronomik Pro IR 742nm filter.



MONTES ALPES - Richard Hill – Tucson, Arizona, USA. May 30, 2012 03:05 UT. Seeing 8/10. 8" Mak-Cass, f20, Wratten 23 filter, DMK21AU04.

ISOLATED PEAKS ON MARE IMBRIUM

Alberto Anunziato

One of my favorite lunar landscapes is the north shore of Mare Imbrium (figure 1), where the Montes Alpes draw the shape of the map of Mexico and Plato, a unique crater, appears as "the elephant in the living room" (in words of Richard Hill on the TLO issue of February 2016). What the first lunar observers believed oceans today is a stupendous metaphor, visually represented in the area covered by the image. A long series of isolated peaks, an arcuate alignment of remnants of the Imbrium basin's inner ring that could escape the lava flooding that formed Mare Imbrium. The catastrophic geological history of the first Moon is perceived in the height of these remnants, which seem to barely escape the lava but rise hundreds of meters above its level, marking the monstrous crater disappeared, the product of a monstrous impact during the Late Heavy Bombardment.

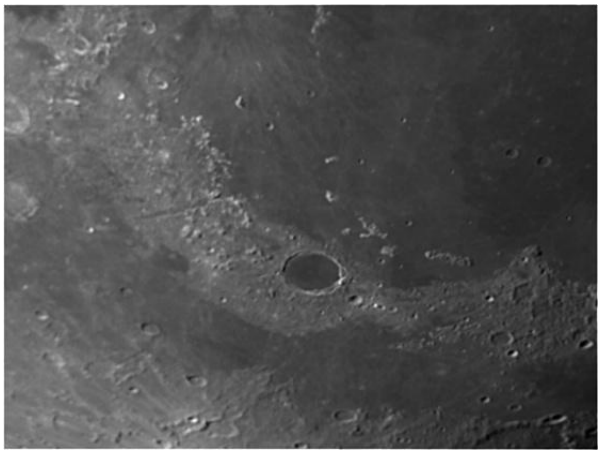


FIGURE 1. *Alberto Anunziato, Oro Verde, Argentina. December 11, 2016 02:13 UT. 250mm LX-200, Astronomik ProPlanet 742 nm IR-pass filter.*

From right to left we find first the rectangular shape of the Recti Mountains,1800 m height and a crater at each end. Following to the south, Montes Teneriffe, a group of mountains with similar height (between 1500 and 2500 meters) with a different morphology to the neighbors Recti, because they are more dispersed and with greater volume. Further south is Mons Pico, a solitary mountain with a wide base and a triangular shape that could perhaps be included in the Montes Teneriffe. The height of Mons Pico (2,400 meters), as the height of Mons Piton, seems much greater due to the shadow effect produced by its solitary location and increased by the global curvature of the Moon. To the southeast of Mons Pico appears another beautiful solitary mountain in the shape of a comet or a shooting star, known as Mons Pico β (a name not recognized by the IAU).

To the Southwest the 2,250 m high Mons Piton protrudes proudly over one of the many wrinkle ridges in this area of Mare Imbrium. Mons Piton is famous, as Mons Pico, by its fascinating shadowplay produced by a sharp elongated shadow, as we can see in figure 2, at a very different colongitude (177.6º) to figure 1 (51.5º)

FIGURE 2. *Alberto Anunziato, Oro Verde, Argentina. November 11, 2017 06:54UT. CPC-1100, Canon EOS Digital Rebel XS.*

It is interesting to note that with an illumination of 87%, we can observe how long are

the bright rays of Aristillus (out of image) and the differences in coloration on the surface of the Mare Imbrium.

Poetically, the lunar landscape on the north shore of the Mare Imbrium seems to strive to look like a maritime landscape. Montes Recti and Montes Teneriffe look like small islands near the continent. The terminology itself refers to an archipelago, the Canary Islands (Mons Pico, Mons Piton, Montes Teneriffe). To the east we find the lunar feature most similar to an authentic bay, Sinus Iridum. And Plato resembles a coastal lagoon, formed by waters that filter underground. But in reality, what we see is an image of the chaotic and tumultuous past of our satellite.

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IT'S NOT THE ALPS, BUT…

Richard Hill

Nestled in Mare Imbrium north of Archimedes is pretty little mountain range that makes for interesting shadowplay thanks to the mare as a smooth projection screen. These are the Montes Spitzbergen (figure 1) or the "sharp peaks" translated, named after the Spitsbergen archipelago in the Arctic Ocean between Norway and Greenland. Montes Spitzbergen is part of the inner ring of the mare with the tallest peaks just over 1400m. The wrinkle ridges hint that these mountains have some deep roots that were covered up in the lava flooding. The elephant-in-the-room is Archimedes the large 85km diameter crater at the bottom of this image with nice shadows on the floor. Autolycus (41km) to its right (east) and Aristillus (56km) above with the splendid splash pattern to the ejecta blanket and the elusive unnamed ghost crater to the north. The flat region between Archimedes and Aristillus is Sinus Lunicus with Archimedes C sitting right in the middle.

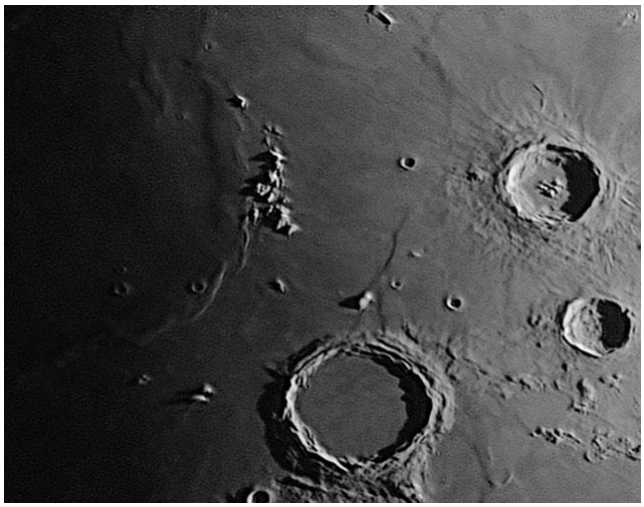

Figure 1. Richard Hill – Tucson, Arizona, USA November 27, 2017 00:36 UT. Colongitude 9.5º. Seeing 8/10. 8" Mak-Cass, f20, 610 nm filter, SKYRIS 445M.

LUNAR TOPOGRAPHICAL STUDIES

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

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

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OBSERVATIONS RECEIVED

JAY ALBERT - LAKE WORTH, FLORIDA, USA. Digital images of Motes Apenninus, Mons Piton-Cassini.

ALBERTO ANUNZIATO - ORO VERDE, ARGENTINA. Digital images of Mare Imbrium(2).

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 4, 5 & 10 day moon.

FRANCISCO CARDINALLI - ORO VERDE, ARGENTINA. Digital images of Mons Pico & Montes Apenninus(2).

WALTER ELIAS - ORO VERDE, ARGENTINA. Digital image of Promontorium Agassiz.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Eratosthenes, Montes Apenninus, Montes Spitzbergen, Posidonius-Plinius, Stoffler & Triesnecker.

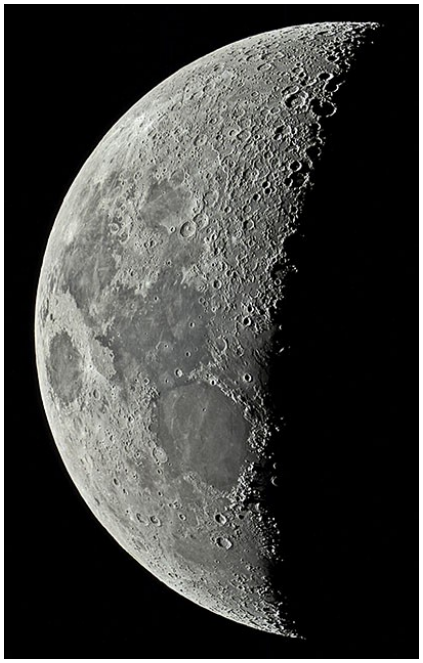
DAVID JACKSON - REYNOLDSBURG, OHIO, USA. Drawing of mountains near Plato.

ALBERTO MARTOS, CARLOS DE LUIS, NIEVES DEL RÍO, JOSÉ CASTILLO AND JESÚS MONTES – MADRID, SPAIN. Digital images of Montes Apenninus(2) & Montes Haemus.

MICHAEL SWEETMAN – TUCSON, ARIZONA USA. Digital image of Montes Haemus.

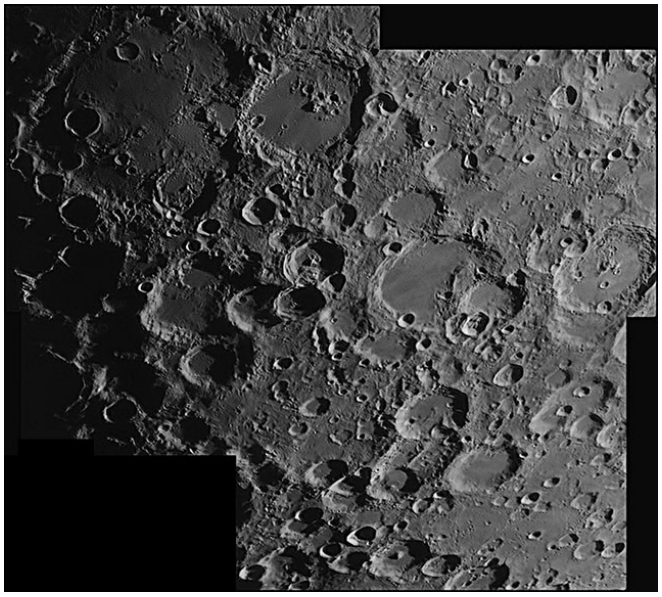
DAVID TESKE - LOUISVILLE, MISSISSIPPI, USA. Digital images of Montes Agricola, Montes Apenninus & Montes Caucasus.

RECENT TOPOGRAPHICAL OBSERVATIONS



7 DAY MOON- Maurice Collins,- Palmerston North, New Zealand. December 25, 2017 08:54-08:55 UT. FLT-110, ASI120M. North down.

STÖFLER - Richard Hill – Tucson, Arizona, USA November 27, 2017 01:35 UT. Colongitude 13.8º. Seeing 8-9/10. 8" Mak-Cass, f20, 610 nm filter, SKYRIS 445M.



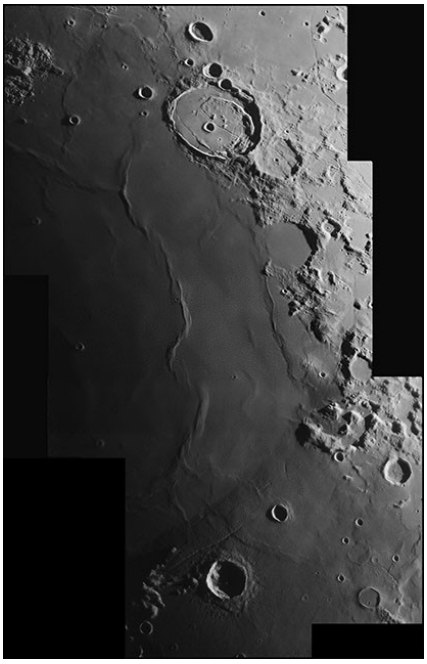
To most people the region to the lunar east of a line from Deslandres to Tycho appears to just be a chaos of craters and to some extent it is, known as part of the lunar highlands. This selenoscape cratering is called "saturated" meaning you cannot create a new crater without destroying an older one .

The large flat bottomed crater in the center, overlapped by some smaller ones to the southeast, is Stofler (129 km dia.). As the overlapping craters might indicate, it is an old crater possibly as old as 4.5 billion years. The larger of the overlapping craters is Faraday (71 km) and just south of it is a curious juxtaposition of at least two craters named Licetus A. To Stofler's left is a line of 3 craters the farthest and largest of which is Orontius (126 km). The next one in is Huggins (66 km) and the third and closest to Stofler is Nasireddin (54 km). Above this latter crater is a slightly larger crater Miller (77 km). Notethe central peak. Under the right lighting this is yet another lunar "X"!

The huge crater in the upper left corner is Deslandres (241 km), another ancient impact that is overlain by numerous other craters including a very intersting chain of craters in its upper right quadrant. To the right of this monster crater is Walther (134 km), mislabeled "Walter" on the Virtual Moon Atlas. Just below or south of this crater is a double crater one of which is named Nonius B (21 km) very reminiscent of Vogel and Vogel B near Albategnius. Below Stofler are a couple flat bottomed craters Licetus (77 km) and farther out Cuvier (also 77 km). These two flank an odd formation, Heraclitus, an elongated crater-like feature with the crater Heraclitus D on the southern end. This unusual and ancient feature is the product of as many as 3 merged craters. I find listed diameters from 85-97 km but I am at a loss to understand how a diameter can be assigned to such an odd shaped feature. It appears that the measured diameter extends from Cuvier H on the upper right corner to Heraclitus K on the opposite lower left corner.

To the east or right of Stofler is the crater Maurolycus (117 km) and in the upper right corner of the image is Gemma Frisius (90 km). Both of these deserve more discussion but not at this time.

RECENT TOPOGRAPHICAL OBSERVATIONS



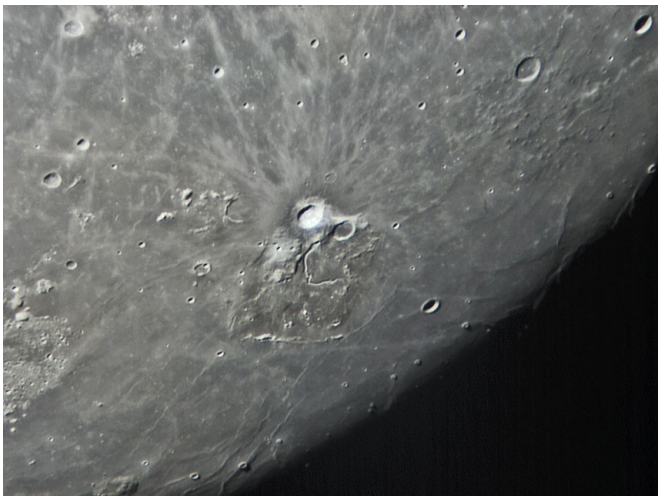
POSIDONIUS-PLINIUS - Richard Hill – Tucson, Arizona, USA April 9, 2014 00:45 UT. Seeing 8/10. 8" Mak-Cass, f20, 656.3 nm filter, SKYRIS 445M.

Here were see the eastern (lunar) shore of Mare Serenitatis. The first feature you probably notice is at the top of this image. the grand crater Posidonius (99 km diameter) with it's floor reticulated by rimae of several different origins. Adjacent to it, to the southeast or lower right, is the crater Chacornac (53 km), its walls softened by a blanket of eject laid on it from the younger Posidonius impact. Note that some of the rimae from Posidonius cross over this crater and go beyond. Below Chacornac is Le Monnier (63 km), an embayment that formed during Serenitatis impact when an ancient crater was flooded. At the bottom of this image is the shadow filled Plinius (44 km) with Dawes (19 km) to the upper right of it and near the right edge of the image the crater Vitrivius (31 km).

Out in the mare on the edge of shadow is the north-south "Serpentine Wrinkle Ridge" Dorsa Smirnov. I find lengths listed from 135 km (Virtual Moon Atlas) to 500 km (moon-Wikispaces) for this feature with 222 km being the value used by LROC. Another ridge can be seen running from Le Monnier south almost to prominence sticking out into the mare where the ghost crater Abetti (17 km) can be found.

Just above Vitruvius a row of four similar sized mountain peaks can be seen. 45 years ago this next week Apollo 17 landed just north of the second peak in from the left. This was the place where man, Gene Cernan in this case, left his last footprint on the moon and brought back 244 lbs of samples. As he boarded the Lunar Module he is reported to have said:

"I'm on the surface; and, as I take man's last step from the surface, back home for some time to come - but we believe not too long into the future - I'd like to just [say] what I believe history will record. That America's challenge of today has forged man's destiny of tomorrow. And, as we leave the Moon at Taurus-Littrow, we leave as we came and, God willing, as we shall return, with peace and hope for all mankind. "Godspeed the crew of Apollo 17."



ARISTARCHUS- Maurice Collins,- Palmerston North, New Zealand. December 1, 2017 08:53 UT. FLT-110, f/14 ASI120M. North down.

BRIGHT LUNAR RAYS PROJECT

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

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

RECENT RAY OBSERVATIONS

12 DAY MOON- Maurice Collins,- Palmerston North, New Zealand. November 30, 2017 08:41-08:43 UT. FLT-110, ASI120M. North down.

14 DAY MOON- Maurice Collins,- Palmerston North, New Zealand. December 2, 2017 08:57-09:00 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

A happy 2018 to all of our readers! Observations for November were received from the following observers: Jay Albert (Lake Worth, FL, USA – ALPO) observed Aristarchus, Licetus F, Mare Anguis, Mons Piton, Plato, and Ross D. Peter Anderson (Australia – BAA) imaged earthshine and the south pole area (discussed in last month's newsletter). Alberto Anunziato (Argentina – AEA) observed Copernicus. Jario Chavez (Columbia - LIADA) imaged Vallis Alpes and several other features. Maurice Collins (New Zealand – ALPO/BAA/RASNZ) imaged Mare Nectaris and took some whole Moon disk images. Anthony Cook (Newtown, UK – ALPO/BAA) imaged several features. Marie Cook (Mundesley, UK – BAA) observed Aristarchus, Gassendi, Proclus and Promontorium Agarum. Walter Elias (Argentina – AEA) imaged Bessel, Mons Piton, Promontorium Agassiz, and Theophilus. Rik Hill (Tucson, AZ, USA – ALPO/BAA) imaged Eratosthenes, Montes Apenninus, Montes Spitzbergen, Stofler, and Trienecker. Nigel Longshaw (Oldham, UK – BAA) observed Callipus, Conon, Eudoxus, and Plato. Franco Taccogna (Italy – UAI) imaged earthshine, Mare Imbrium, Montes Teneriffe, and Plato.

Figure 1. *Four 8" f/5 Skywatcher tubes bolted together, on independent platforms with each scope operating in the following wavebands: ZWO CCD Filters: Red, Green, Kodak Wratten 87C near IR filter, and a low resolution diffraction grating. Purpose: Multi-waveband impact flash observing.*

News: The campaign to encourage observers to video the lunar earthshine, in order to detect lunar impact flashes from the Geminids, had mixed success. From the UK we got hit by poor weather, so for myself, observations were only possible on December 12th and the 15th. I had even built a 4 channel Quadruple Dobsonian telescope for the task, but in the end, local trees, freezing (-6°C or 21°F) temperatures, and tiredness prevented use of all but one of the tubes (Fig 1). Instead I pinned my hopes on one of the

remotely operated robotic telescopes at Aberystwyth University to conduct white light observations. Alas no impact flashes have been found on either of the observing runs though I did capture some satellites passing across the Moon. Tim Haymes (BAA), Nick James (BAA), Tom Moran (BAA) all managed to observe on the 12th Dec, and Tom on the 11th, but so far no impact flashes have been discovered from these recordings, other than a faint candidate flash recorded by Tim. Stefano Sposetti (Switzerland, GLR) managed to observe on the 13th, closer to the maximum, but again did not detect any impact flashes. A report came through of four impact flashes recorded by an ESA funded professional 1.2m size telescope in the Corinth area of Greece. Although Stefano was observing on the 13th, he examined his recording, but could not confirm the Greek 04:27UT flash, maybe perhaps because it was too faint? Upon asking the four UK observers, who were videoing the Moon on the 12th, whether they had detected a 04:30UT flash seen from Greece on the 12th, only Tim Haymes had the necessary sensitivity, and even then the flash he suspected, which was in the right place, at the right time, was close to the noise limits of the system (See Fig 2). So if this was the same impact flash it shows what can be achieved by amateur astronomers with just 1/16th of the collecting area light grasp namely, from a 12-inch amateur sized mirror.

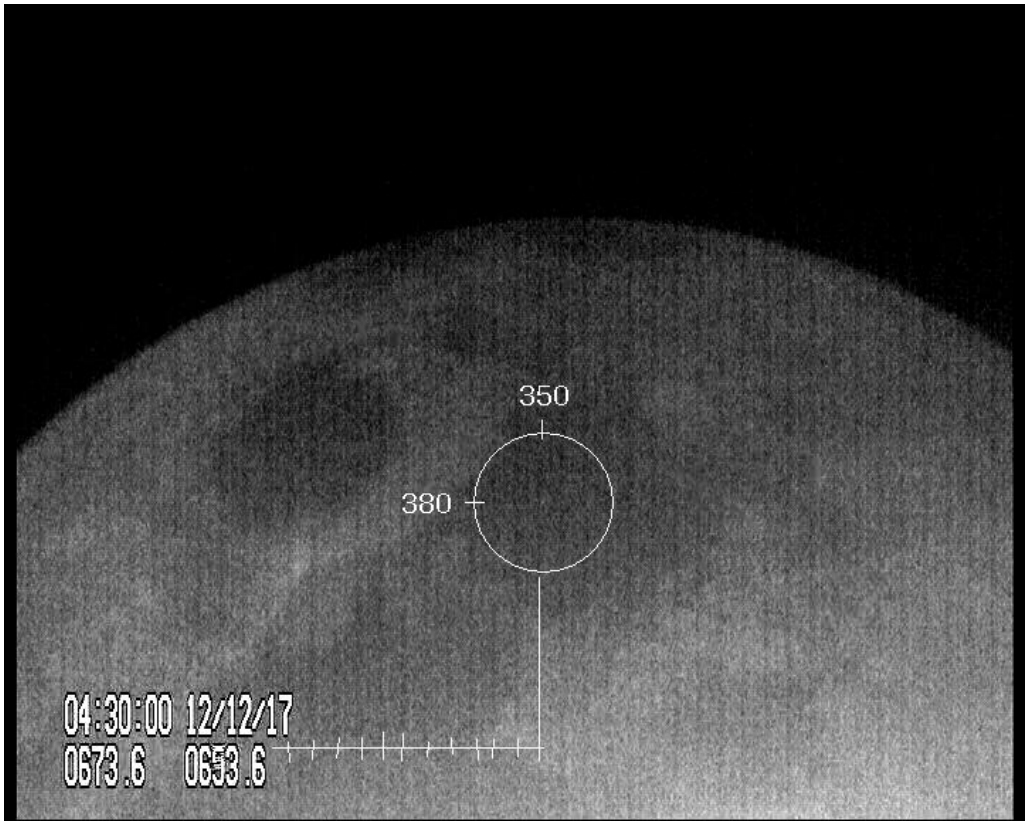

Figure 2. *Tim Haymes' (BAA) candidate impact flash for the 2017 Dec 12 UT 04:30:00 flash seen also by the Greek/ESA NEOLITA observing programme. North is towards the left.*

I then received some interesting news from Brazil, via REA's Alexandre Amorim, namely that Marcelo Zurita, and a joint team of David Duarte/Romualdo Calddas, independently videoed a bright impact flash north east of da Vinci crater on 2017 Dec 14 UT 07:13:46 UT (See Fig 3). Brain Cudnik and myself, have been in touch with the observers concerned, offering advice, and they have even put in a request to NASA's LROC web site for new images of the impact area, in order to compare with images taken prior to the impact at some point in the past. So hopefully they will be able to find the size of crater produced. David Duarte and Romualdo Calddas also reported another candidate flash, on the same night, just a short time later at 07:14:29 UT, located in/near the south east of Cleomedes, but as far as I am aware this has not been confirmed, though it does not look/act like a cosmic ray event.

I would like to thank the following observers, who planned to observe for Geminid impact flashes, but who were clouded out: Tony Barry (Australia – BAA), Kate Blackham (UK – BAA), Raffello Lena (Italy – BAA/GLR), and Charlie Throop (TX, USA)

Figure 3. *The 2017 Dec 14 UT 07:13:46 impact flash, located just north east of da Vinci crater, from a video frame by Marcelo Zurita. North is towards the left.*

LTP Reports: No LTP reports were received for November.

Routine Reports: Below is a selection of reports received for November that can help us to re-assess unusual past lunar observations.

Plato: On 2017 Nov 02 Franco Taccogna took three color images, composed of separate red, green, blue filter images, rather than a color one shot, and covered three past LTP reports under similar illumination to within ±0.5° for specific reports below:

Plato 1945 Oct 19 UT 23:24:30 Observed by Thornton (Northwich, England) described in the NASA catalog as: "Bright flashes on the floor near E.wall (meteor?) but others have seen flashes there too. time given is 1123, must be P.M., local time. MBMW gives date as Oct 19, which is wrong" Haas (more reliable account) in his 2003 article in Strolling Astronomer Vol 45, p28 states" 23cm x220 reflector used - "minute but brilliant flash of light seen just inside eastern border of walled plain Plato. Color was said to be orange side of yellow. NASA catalog weight=4& NASA catalog LTP ID No. #494. ALPO/BAA weight=3.

On 2013 Jan 25 UT 19:05-19:15 R.Braga (Milan, Italy, 115mm refractor, x267, seeing III, transparency average) observed that Plato in general was normal in appearance, but the east rim was showing a remarkable golden (yellow-golden) hue. This was a repeat illumination observation for a W.E. Fox LTP observation from 1938 Feb 14. The observer was wondering whether they were in some way biased after reading the original report description - so uncertain over this being a LTP. In view of uncertainty ALPO/BAA weight=1.

Plato 1938 Feb 14 UT 00:25 Observed by Fox (Newark, England, 6.5" reflector, x240) "Prominent gold-brown spot on E. wall with yellow glow without definite boundary, spreading over floor." NASA catalog weight=3. NASA catalog ID #431. ALPO/BAA weight=3.

Fig 4 (Left) shows the closest approximation to the F.H. Thornton report from 1945, Based upon Thornton's description of the flash, especially the color, many have speculated that this could have been an impact flash seen against the day side of the Moon. Though of course without an independent second observation, there is no way to know for sure. I shall keep the weight at 3.

Fig 4 (Right) matches the same illumination to the Braga and Fox reports; however despite being color enhanced, there is no sign of a "prominent gold-brown spot/yellow hue, on the east wall, nor any ill-defined yellow glow spreading across onto the floor. So whatever Braga and Fox saw remains a mystery. There is certainly no variation in color between Franco's images, so clearly what is shown is natural color (Plato's ejecta), albeit enhanced in Fig 4 - though the 2nd image is a factor of two higher in resolution. So for now I will leave the weight of the respective LTP observations at 1 and 3.

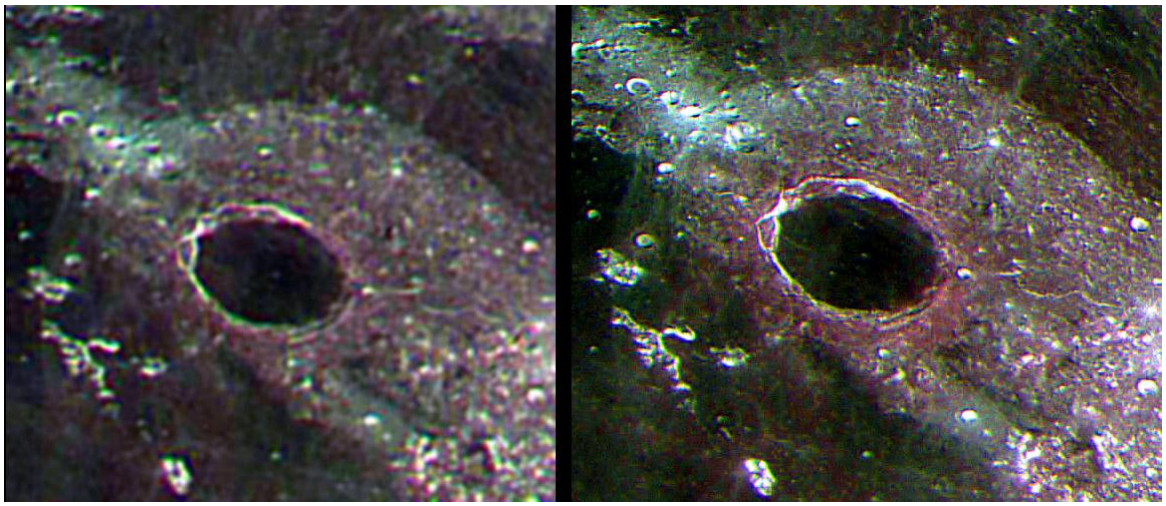

Figure 4. *A color image of Plato as imaged by Franco Taccogna, taken on 2017 Nov 02, with color saturation increased to 70 %. Image orientated with north towards the top.* ***(Left)*** *image captured at 18:22UT.* ***(Right)*** *image captured at 21:48 UT.*

Proclus: On 2017 Nov 05 UT 20:08-20:14 Marie Cook observed this crater under the same illumination conditions to a BAA observational report from 1975:

> *Proclus 1975 Feb 27/28 UT 22:00-01:00 Observers: (Fitton) at 2200h (moon low) at 200x saw vivid blue to N., vivid yellow & orange to S. in Aris., Proc., Menelaus, & many other bright craters til 2300h. Then Aris. less blue & mare obj. no colors. No blinks in these craters. No obscur. Polariz. normal till 2330h using many rotations. Only Proc. remained blue till 0020h (28th). Photo-electric scan at 2340h was normal for Aris. (600 microamps) compared with Tycho (900 microamps), total of 10 scans. all neg. with 15km resolution. Blink neg. but blue still vis. in N. in white light till 0030h. At 0100h (S=III at 200x) Proc. clear of blue, Aris. nearly clear, blink neg. Concluded due to optical effects. Fitton says due to atm. effects from high press. sys. W. of obs (blue on one rim & red on other due to chrom. aberr. ? If spurious, should get no blink &similar crater conditions should exhibit same phenomena all over Moon). NASA catalog weight=5. NASA catalog LTP ID No. #1400. ALPO/BAA weight=1.*

Marie was using a 90mm Questar telescope, x80, under Antoniadi III seeing and good transparency conditions. She found that the crater looked normal i.e. detail was sharp and clear, and there was no sign of any color. I will therefore keep the ALPO/BAA weight of Fitton's report as it is, at 1.

Plinius: On 2017 Nov 07 UT 23:50 Les Fry (Trawscoed, UK, NAS) imaged this crater under similar illumination to (to within ±0.5°) to the following report:

> *Plinius 1889 Sep 13 UT 23:00? Observed by Thury (Geneva, Switzerland) NASA Catalog Event #265, NASA Weight=3 Event described as: "Unusual black spot with intensely white 4" border over CP. Normal aspect is 2 craters. #260 says that Gaudibert saw same thing in Sep. - confirmed". References: Nature 41, 183, 1890 (April). The ALPO/BAA weight=1, this is probably perfectly normal.*

In the image that Les took (Fig 5) the central peak stands out well. There is a shadow of the eastern rim to its left and the peak's own shadow to the right, which seems to be bounded by a "V" shaped light area. I wonder if this is what Thury was referring to? Alas the resolution in the image would need to be a little high to be sure. We shall leave the weight at 1 for now.

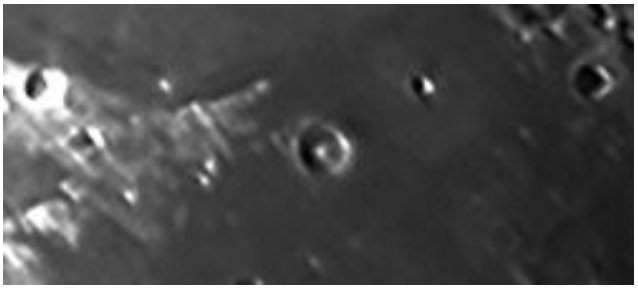

Figure 5. *Plinius as imaged by Les Fry (NAS) and orientated with north towards the top.*

Theophilus: On 2017 Nov 26 UT 00:05 and 01:06 Jario Chavez (LIADA) and Walter Elias (AEA) imaged this area to within ±0.5° to the following report:

Theophilus 1969 Jul 21 UT 19:30-21:45 and 21:00-22:00 Observed by Fox(Newark, England, 6.5" reflector,) and Baum (Chester, England, 4.5" refractor) (S=6, T=4) "At wall, adjacent to Cyrillus was a reddish glow, then obscur. (Fox). Baum saw intermittent white-blue shimmering as if glowing thru dust glowing & upsurge in brightness on c.p. Gradually faded to normal at 21:20. 1st time ever seen by him tho. obs. since 1947. Image sharp, no haziness. (indep. confirm. of activity, but details differ, but same time, Apollo 11 watch)." NASA catalog weight=5. NASA catalog ID #1180. ALPO/BAA weight=3.

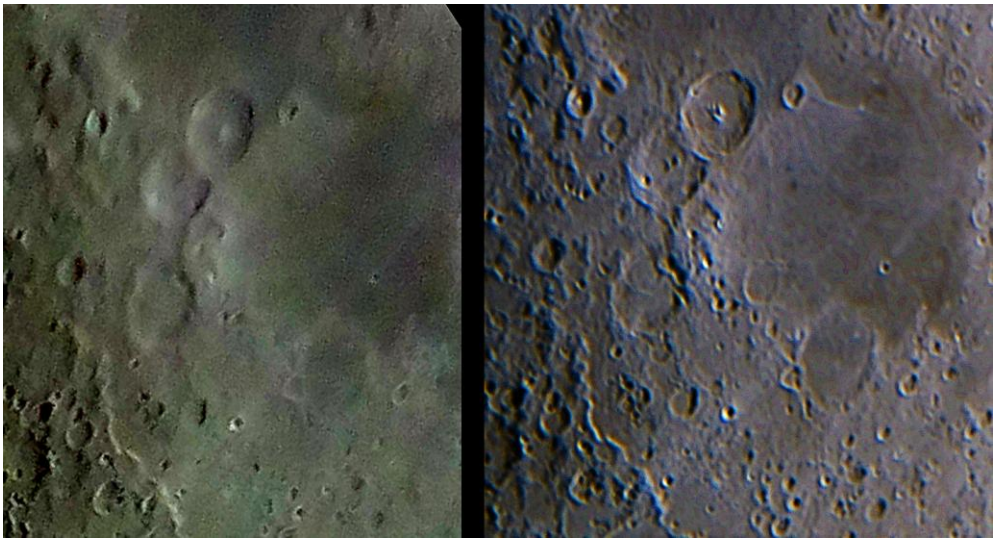

Figure 6. *Theophilus, as imaged on 2017 Nov 26, with color saturation increased to 60%, and orientated with north towards the top.* ***(Left)*** *An image by Jario Chavez (LIADA) taken at 00:05 UT.* ***(Right)*** *An image by Walter Elias (AEA) taken at 01:06 UT.*

Neither of the images in Fig 6 show either a reddish area between Theophilus and Cyrilus, nor any unusual appearance to the central peak. We shall therefore leave the ALPO/BAA weight at 3.

Licetus F: On 2017 Nov 27 UT 00:30-00:45 Jay Albert (ALPO) observed this crater under the same illumination to this report from 1953:

Licetus F On 1953 Mar 23 UT 18:30 A.P. Lenham (Swindon, UK, 3.25 inch refractor, x128) made a sketch of the area between Maginus and Stofler. Although the observer never commented on this, they draw Licetus F with a central peak - however this crater does not have a central peak! A very low weight will be applied here because there were some slight inaccuracies elsewhere in the drawing - possibly due to observing at the limits of the resolution of the telescope involved. The ALPO/BAA weight=1.

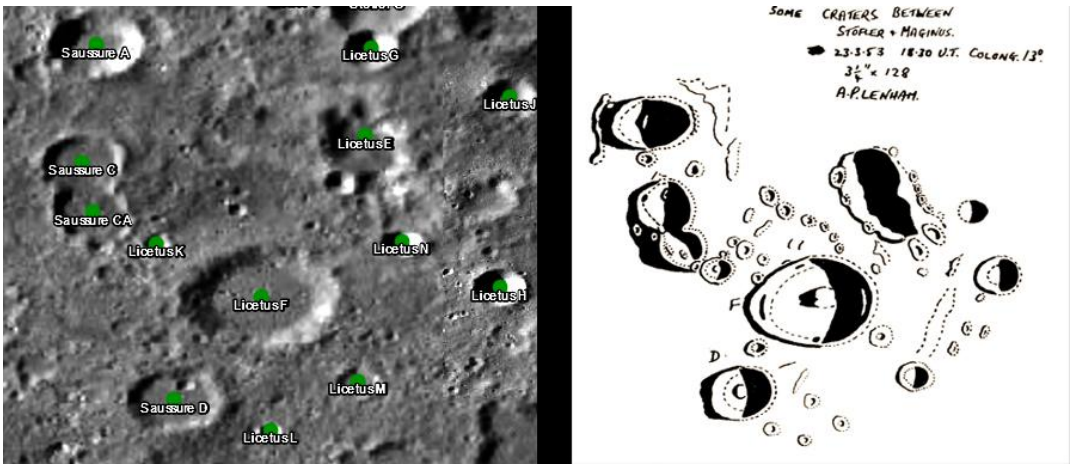

Figure 7. *The region around Licetus F, orientated with north towards the top.* ***(Left)*** *From NASA's LROC Quick Map web site.* ***(Right)*** *From A.P. Lenham's sketch book from 1953.*

Jay, using a Nexstar 6" (x136 & x214) with transparency ranging from 2nd to 3rd magnitude and seeing initially at 7/10, saw a deep black shadow from the east wall over much of the floor, but found no sign of a central peak. He also commented that there is no central peak shown for this crater in the Rukl atlas. I will therefore lower the ALPO/BAA weight to 0, especially as some central peaks were drawn in two other craters in the 1953 sketch (Fig 7 – Right) and they do not appear in Rukl, nor in the LROC Wide Angle mosaic in Fig 7 (Left).

Copernicus: On 2017 Nov 27 UT 01:00-01:15 Alberto Anunziato (AEA) observed this crater under the same illumination, to within ±0.5°, to a curious observational report from 2006:

2006 Jun 05 UT 21:00-22:00 G. Burt made a drawing over a period of 30 minutes. Upon examining drawing, and comparing with photos made under similar illumination was struck by the abnormality of a small white blob in the north east corner of the shadowed floor. There should be no raised topography between the wall and the central peaks that could give rise to this. The making of the sketch overlapped with an earlier drawing made by Rony de Laet (Belgium) which did not show this blob. Subsequent attempts to find sketches/images at very similar illumination angles have failed to show the blob in the north east corner of the shadowed floor. ALPO/BAA weight=3.

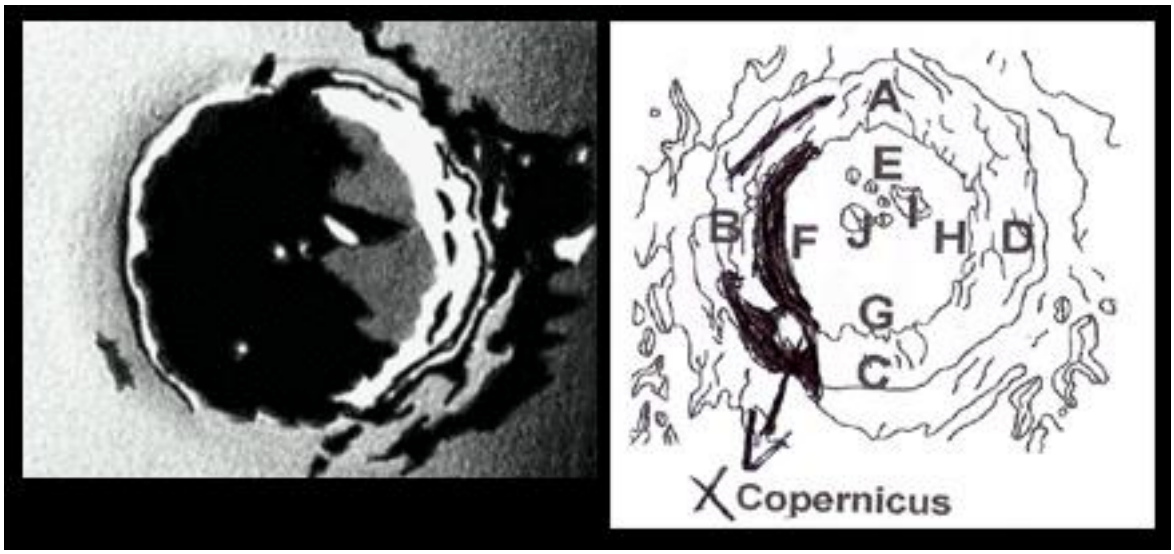

Figure 8 *Copernicus orientated with north towards the bottom.* ***(Left)*** *A sketch by Geoff Burt from 2006 Jun 05 UT 21:00-22:00.* ***(Right)*** *An ALPO chart with the shadow as indicated by Albert Anunziato (AEA) from 2017 Nov 27 UT 01:00-01:15. X is an indicator for a bright spot associated with the rim, indicated by the non-pointed end of the arrow.*

Alberto noted that the "interior shadow" appeared very thin (see ALPO marked chart in Fig 8 (Right)), and on the NE rim was a bright spot (a high spot?), arrowed with an X. However this was not between the central peaks and the NE rim but in the NE rim. Out of curiosity I included Geoff Burt's original drawing from 2006 in Fig 8 (Left). The shadows are quite different, however this is consistent with the ±0.5° tolerance in illumination. We shall therefore leave the 2006 report at an ALPO/BAA weight of 3.

Plato: On 2017 Nov 28 UT 09:29-09:35 Maurice Collins (ALPO/BAA/RASNZ) imaged the crater under similar illumination, to within ±0.5° to the following reports:

On 2009 Apr 04 at UT 20:30-20:45 C. Brook (Plymouth, UK) observed a slight pinkish mottling on the floor of Plato. The effect was no longer visible after 20:45UT. A telephone alert was put out to M. Cook and G. North. The former saw no color, but this was after the event finished. The latter observer reported cloudy conditions. A. Cook was probably observing at the same time as C. Brook, via a couple of remotely controlled telescopes in Aberystwyth. The results (time lapse imagery through narrow band filters) will be examined at a later date. ALPO/BAA weight=3.

Plato 1972 Mar 24/25 UT 20:38-00:00 Observed by M. Burton (UK, 13.5" reflector, seeing IV-V, Transparency Fair, x180) UT20:38-20:45 floor was darker in a red filter than in a blue. UT20:47-20:56 JS Burgess (seeing 2/5, x200, with and without filters) found everything normal (with and without filters).

UT20:00-20:07 and 21:30-21:35 A.J. Beddoes found everything normal (with and without filters). However at 23:10 L. Fitton suspected that the E (IAU?) floor of Plato had a red-brown cast, but could not be quite sure. UT23:54-00:00 M. Burton, detected the floor was darker in red than in blue light. Burton did not detect any color without the use of filters on either of the two occasions that he detected a blink. In view of the fact that two observers did not detect anything, albeit not concurrently with the LTP reports, this LTP is being given an ALPO/BAA weight of 1.

On 2009 Apr 04 at UT 21:40 M.C. Cook (Mundesley, UK) after receiving a telephone alert call, examined Plato crater. Although she did not report C. Brook's slight mottled pink on the floor of Plato, she did report through that the floor patches looked darker than normal, especially in blue light and in red they were not visible at all. In white light they were darker than normal. A.C. Cook was probably observing at the same time via a couple of remotely controlled telescopes in Aberystwyth. The results (time lapse imagery through narrow band filters) will be examined at a later date. Note that this observation was made after C. Brook said that he could no longer see his LTP. Therefore this constitutes a different LTP as there had been a gap of 1 hour since the last LTP report. ALPO/BAA weight=2.

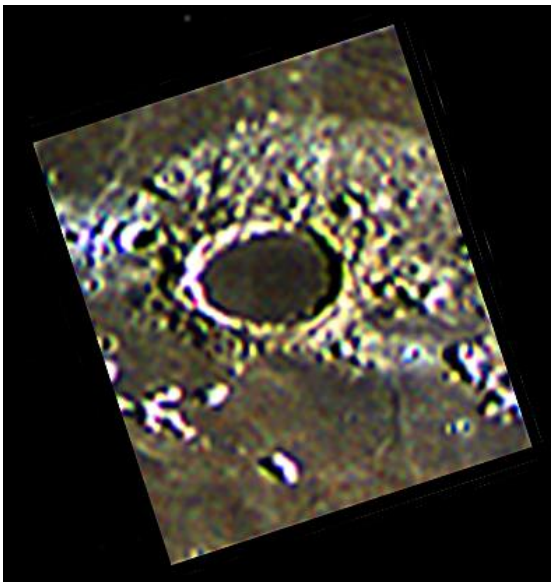

Figure 9. *A Plato composite by Maurice Collins, taken on 2017 Nov 28, from images captured 09:21-09:31 and 09:32-09:35 UT. The resultant composite has had its color saturation increased to 80%, has been non-linearly contrast stretched, and is orientated with north towards the top.*

The images taken by Maurice were with a one shot color camera. Although I have applied a color normalization, and then increased the color saturation, I fear that the color processing has not worked too well as we should be getting a nice pink ring around Plato (See Fig 4) instead of green. However in terms of color difference, the enhancement should be good enough though to distinguish natural colors differences, if not quite the right hues. Concerning the 2009 reports, there is no indication of any colored mottling on the floor in Maurice's image, and for the 1972 report no sign of overall color can be seen on the floor either. Concerning my own time lapse imaging taken in 2009, I have not had a chance to examine this is detail, apart from watching the video speeded up, and that showed nothing unusual. However my time lapse video was in only one waveband, and at low resolution, so it probably would not have picked out mottling on the floor of Plato, and therefore may not have been much use in proving/disproving Clive Brook's report. I shall therefore leave the weights for all these observations as they are, for now.

Conon: On 2017 Nov 28 UT 20:10 Nigel Longshaw (BAA) sketched this crater a about nine minutes before the repeat illumination window for an observational report from 1941:

Conon 1941 Feb 07 UT 03:00? Observed by Vaughan (Des Moines, Iowa, 3" reflector) "Faint bright spot on floor, no definite outline (??? reported 6th, but if local time 7th in UT)" NASA catalog weight=3. NASA catalog ID #484.ALPO/BAA weight=3.

Nigel used a 100mm Borg Achromatic refractor at x160, under Antoniadi III-IV seeing conditions. He suspected a brightening in the crater center, as you can see in Fig 10 (Top Left). He did a follow up observation, the next day (Fig 10 – Top Right) using a Takamasti FS 78mm APO telescope at x175 under Antoniadi III-IV seeing, and good transparency. He was able to confirm that that there was a slightly lighter rounded feature on the floor, with a light diffuse streak coming off the NE wall. For comparison I have included a map of the crater by E.J. Reese (Fig 10 – Bottom Left) and a repeat illumination image by Brendan Shaw (Fig 10 – Bottom Right). The latter shows up light spots on the floor which match the general location of where Nigel saw his light spot. So I think that the cause of the Vaughhan report is probably atmospheric seeing related, but to be sure we will lower the weight from 3 to 1 and keep it in the system for a few more repeat illumination observations, but taken under different resolutions and seeing conditions.

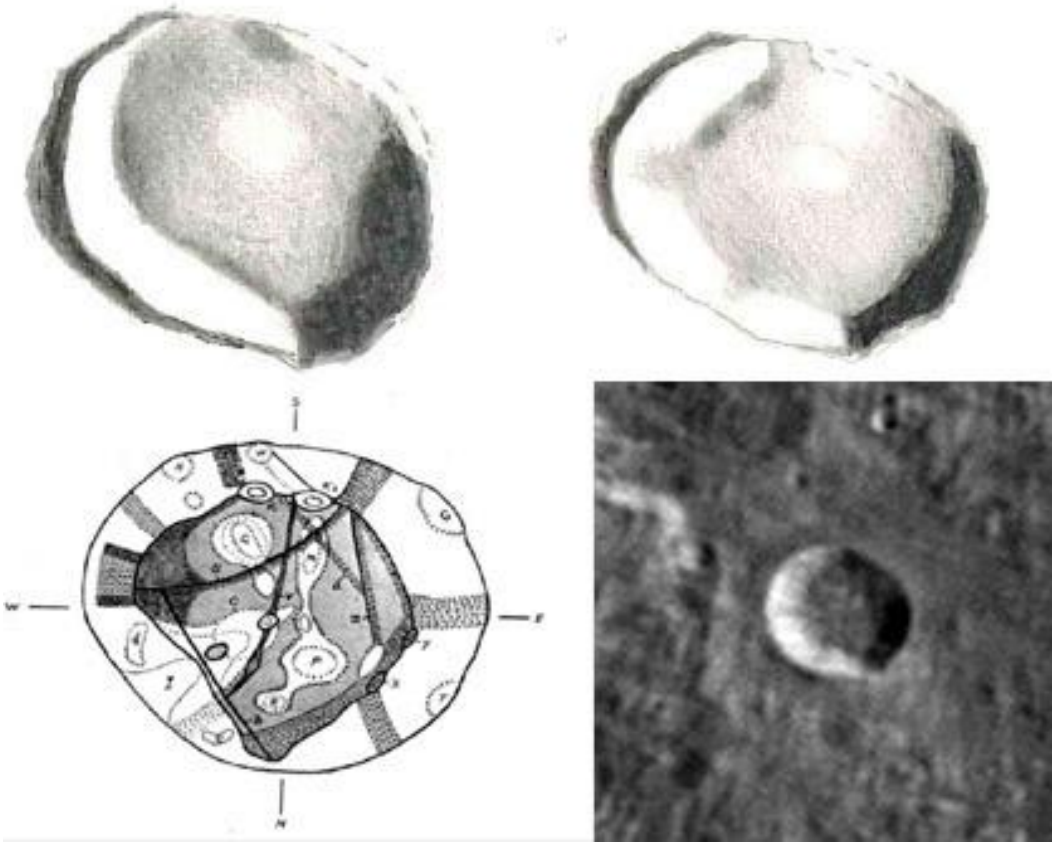

Figure 10. *Conon as sketched by Nigel Longshaw and orientated with north towards the top.* ***(Top Left)****. From 2017 Nov 28 UT 20:10.* ***(Top Right).*** *From 2017 Nov 29 UT 20:15.* ***(Bottom Left)*** *A sketch by E.J. Reese from observations made between March 1947 and Mar 1949 – from the 11th BAA Lunar Section Memoir, p15-16.* ***(Bottom Right)*** *An image by Brendan Shaw (BAA), taken on 2012 Feb 02 UT 20:16 under similar illumination conditions to the 1941 report.*

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. **Mare Imbrium**
2. **Mons Pico**
3. **Mons Piton**
4. **Montes Agricola**
5. **Montes Alpes**
6. **Montes Apenninus**
7. **Montes Archimedes**
8. **Montes Caucasus**
9. **Montes Haemus**
10. **Montes Recti**
11. **Montes Spitzbergen**
12. **Montes Teneriffe**
13. **Plinius**
14. **Posidonius**
15. **Prom Agassiz**
16. **Stöfler**