THE LUNAR OBSERVER

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

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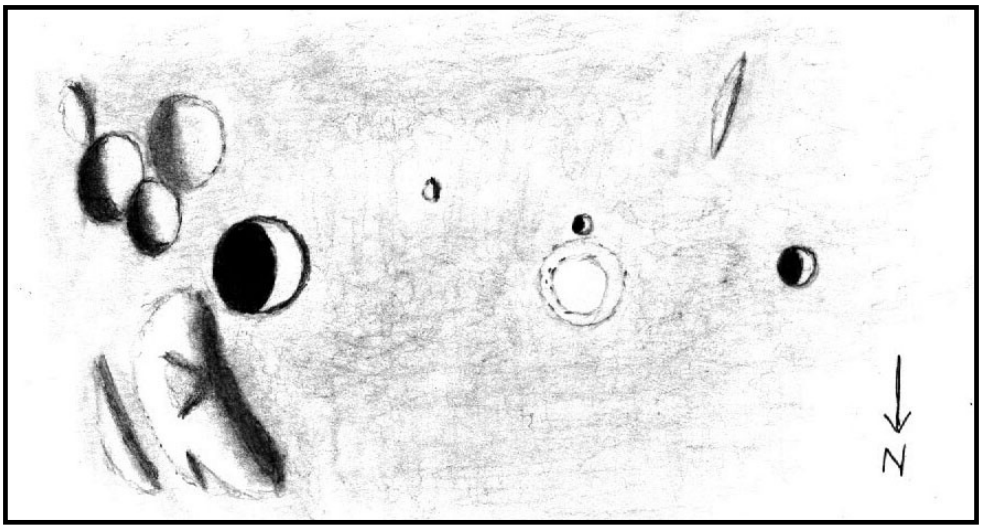
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – OCTOBER 2016

Lassell C



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
April 16, 2016 02:12-02:38 UT, 15 cm refl, 170x, seeing 7-8/10, transparency 6/6

I sketched this crater and vicinity on the evening of April 15/16, 2016. This area is in northeast Mare Nubium, west of Alphonsus. Lassell C is a crisp, round crater with deep shadowing at this time. A large mountain mass (not labelled on the LQ map) is just to the northeast. A low ridge is northeast of this feature. A trio of craters, all elongated north-south, are southeast of Lassell C. Two showed modest shadowing, lighter than that in Lassell C. The third one, farthest to the southwest, is less elongated than its neighbors, and has a grayish interior. Its interior shadowing was guite pale at this time. One of these three craters may be Lassell G, according to the Lunar Quadrant map. I saw this crater trio differently than how the map plots them. A short ridge protrudes from the easternmost crater. The small pit Lassell J is well to the west of Lassell C, and the larger crater Lassell H is west of J. A conspicuous round bright spot is just north of Lassell J. The LQ map labels it as Lassell D, indicating a crater, but I saw no shadow in it. Lassell J and H are miniature versions of Lassell C. A straight, low ridge is south of J and H.

LUNAR CALENDAR

OCTOBER-NOVEMBER 2016 (UT)

2016		UT	EVENT
Oct	01	00:12	New Moon
	03	17:30	Moon-Venus: 5.6° S
	04	11:02	Moon Apogee: 406100 km
	06	08:04	Moon-Saturn: 4.2° S
	08	06:03	Moon Extreme South Dec.: 18.5° S
	09	04:33	First Quarter
	13	09:43	Moon Descending Node
	16	04:23	Full Moon
	16	23:36	Moon Perigee: 357900 km
	19	06:18	Moon-Aldebaran: 0.3° S
	20	23:38	Moon Extreme North Dec.: 18.6° N
	22	19:14	Last Quarter
	25	04:01	Moon-Regulus: 1.7° N
	26	01:45	Moon Ascending Node
	28	09:33	Moon-Jupiter: 1.6° S
	30	17:38	New Moon
	31	19:29	Moon Apogee: 406700 km
Nov	02	19:38	Moon-Saturn: 4.1° S
	04	13:04	Moon Extreme South Dec.: 18.7° S
	07	19:51	First Quarter
	09	15:57	Moon Descending Node
	14	11:23	Moon Perigee: 356500 km
	14	13:52	Full Moon
	15	16:50	Moon-Aldebaran: 0.4° S
	17	09:32	Moon Extreme North Dec.: 18.8° N
	21	08:33	Last Quarter
	21	10:08	Moon-Regulus: 1.4° N
	22	02:48	Moon Ascending Node
	25	01:47	Moon-Jupiter: 2.1° S
	27	20:08	Moon Apogee: 406600 km
	29	12:18	New Moon

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

The Lunar Observer is a publication of the Association of Lunar and Planetary Observers that is available for access and participation by non-members free of charge, but there is more to the A.L.P.O. than a monthly lunar newsletter. If you are a 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: Schiller-Zuchius Basin

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 **November 2016** edition will be **the Schiller-Zuchius Basin** located to the west of Schiller at selenographic coordinates 45.0 W, 56.0 S. 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 this 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 Schiller-Zuchius Basin article is October 20, 2016

FUTURE FOCUS ON ARTICLES:

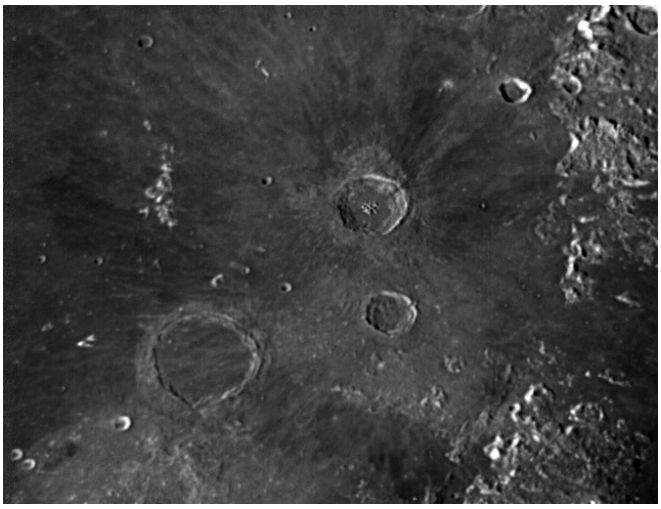
In order to provide more lead time for potential contributors the following targets have been selected:

Subject	TLO Issue	Deadline
Montes Taurus & Taurus-Littrow Valley	**January 2017**	**December 20, 2016**

THE MAGNIFICENT THREE

Alberto Anunziato

These beautiful features in the western part of the Mare Imbrium are well known but always deserves another look. Archimedes, Autolycus and Aristillus are very different from each other. Archimedes is a large crater (83 km.) with a floor completely flooded by the lava that formed Mare Imbrium, wich also flooded partially it's ejecta blanket. Autolycus (39 km.) is the smaller one, it's main characteristic is a rough and disintegrated floor. Aristillus (55 km.) is a tipical and splendid impact crater with terraced inner walls, wide and bright ejecta blanket and a constellation of central peaks.



ARCHIMEDES< AUTOLYCUS and ARISTILLUS—Alberto Anunziato Oro Verde, Argentina. August 21,, 2016 05:28 UT. 250 mm LX-200 SCT, QHY5-II, 742nm IR pass filter.

This area is very special because the soviet probe Luna 2-the first man-made object to reach the Moon surface-lies somewhere near Autolycus.

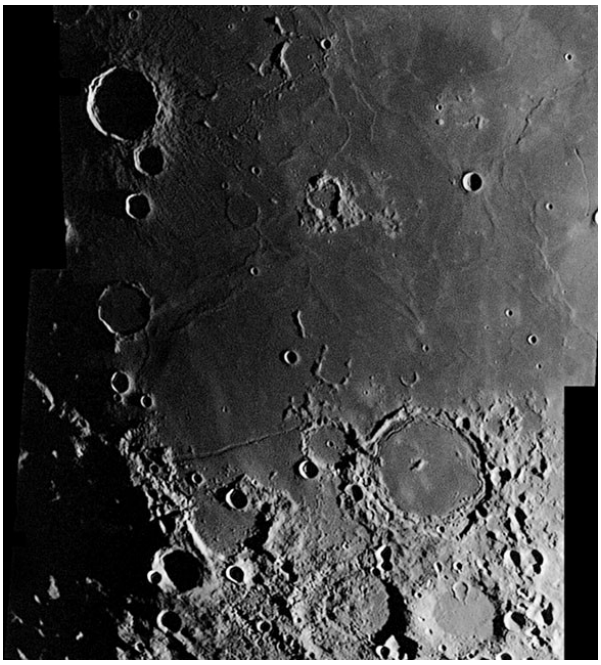
In the 18th day of the lunation (129.8 colongitude), we could see the the rays emanating from Aristillus and Autolycus. The rays from Autolycus (or from Copernicus?) supply a rare view of Archimedes, with it's floor, usually completely dark, now veined with bright streaks.

What caught my attention in this image was a dark band in Aristillus, an oddity that made me think on a lunar transient phenomena. In Peter Grego's "The moon and how to observe it" was the answer, as always: "The northeastern inner wall is marked by aprominent dark band that extends from the crater's floor to its rim. This feature,one of the most noteworthy dark albedo bands to be found in any lunar crater,doesnot appear to be associated with any topographic formation"(p.140). Peter will be with us every time we have the need and the pleasure of review his works. And the dark band of Aristillus remains a mystery.

WOLF-ANOTHER ODD CRATER

Richard Hill

One day after you get through enjoying Rupes Recta you can slide over to the west (lunar) into the center of Mare Nubium for some lesser known treats. In this image, the big crater near the bottom with the flat floor and central peak is the 100km diameter Pitatus with Rima Pitatus just inside its northern wall. Just to the left of it is Hesiodus (44km) with the central craterlet Hesiodus D (only 5km) and beyond that a nice graben, Rima Hesiodus where the land between two parallel faults has dropped down. Below Pitatus are two more large craters, Gauricus (82km) to the right and Wurzelbauer (90km) on the left. These two ancient craters may be as old as 4.5 billion years!



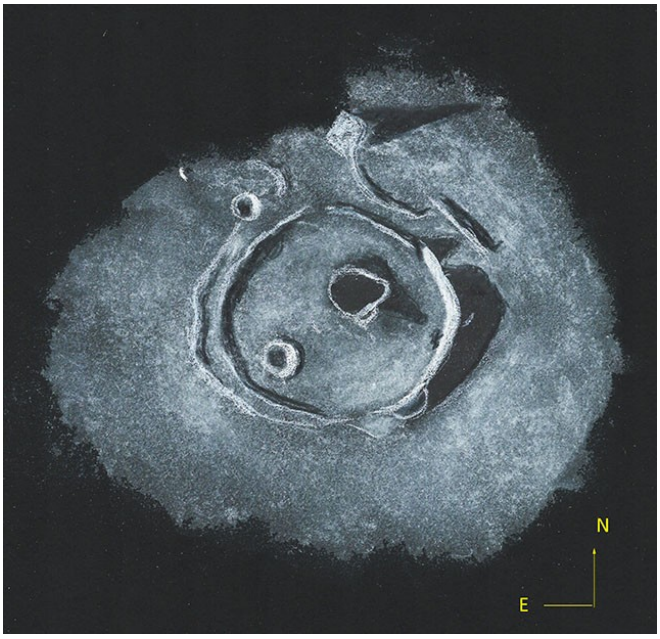
SOUTHWEST MARE NUBIUM-*Richard Hill – Tucson, Arizona, USA July 14, 2016 03:07 UT. Seeing 8/10. TEC 8" f/20 MakCass, SKYRIS 445M, 656.3 nm filter.*

Another feature of such great age is seen in the middle of the mare above Pitatus. This is two overlapping craters Wolf and below it Wolf B that form the horseshoe shaped feature with the curious hummocky apron to the south where it opens to the mare. This feature goes through some remarkable changes in appearance with change in sun angle throughout the lunation and is worth following.

At the top of this image, just coming into view is the 63km crater, Bullialdus with A and B below. To the right of Bullialdus is a ghost crater Gould (36km). Notice the line of secondary craters in the bottom of Gould that point back to Bullialdus. This unnamed cantena ends at the 3km crater Gould B. At that crater it appears to make a 60deg. turn to the south and goes on about 15-20km and then turns back to nearly its original course for another 20km. This portion after Gould B is just a chance line up of other craters and has no real physical significance as shown in LROC imagery (http://target.lroc.asu.edu/q3/).

CASSINI

David Teske



I sketched this crater on the northern shores on Mare Imbrium on the morning of 24 August 2016. For the sketch I used a Moonraker 60 mm f/16.7 refractor telescope with a 5 mm Baader Hyperion eyepiece for 200 x. The observation was made between 3:54 and 4:58 UT. The skies were clear with excellent seeing, 9/10 with 10 being perfect.

> ***CASSINI* –David Teske** - *Starkville, Mississippi, August 24, 2016 03:54-04:58 UT, Seeing 9/10, North/Up, East/Right, 60mm f/16.7 refractor, 200x..*

On the sketch, Cassini is a shallow crater with low walls. The walls seem highest on the eastern side as judging from the shadows. The southern wall is very thin. The western wall was low and thin. As the wall reached its northern apex, there was a small gap. The northeastern wall was thin and straight and disconnected from the northern and western walls. The floor of Cassini seemed flat. There was a large pear-shaped crater, Cassini A with a diameter of 15 km east of the center of the floor. The interior of Cassini A was in shadow. On the south rim of Cassini A was the rim of an older crater or hill. This caused the shadow of Cassini A to have an odd shape. On the southwestern floor of Cassini was Cassini B, a regular shaped, crisp crater with a diameter of 9 km. Most of its interior was in shadow, and a shadow of the crater was to the east of Cassini B. Outside of the walls of Cassini to the west there was a ring of ejecta that was low and wavy. It gives the appearance that Cassini formed on a muddy surface. This wall terminated at Cassini M, a crater similar in appearance to Cassini B, but a bit smaller with a diameter of 8 km. The interior of Cassini M was in shadow. Northeast of Cassini M was a low arching hill. Due north of Cassini was a large, unnamed, blocky, square-shaped hill. This hill cast a long shadow. Arching southeast of this hill was a low hill. This hill terminated near another low but straight hill. This was the eastern side of the ejecta ring that was much better seen of the western side of Cassini due to the evening illumination.

LUNAR TOPOGRAPHICAL STUDIES

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

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

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

Website: http://moon.scopesandscapes.com/

OBSERVATIONS RECEIVED

ALBERTO ANUNZIATO—ORO VERDE, ARGENTINA. Digital images of Aristillus, Atlas-Hercules, Copernicus(2) & Sinus Iridum.

FRANCISCO ALSINA CARDINALI - ORO VERDE, ARGENTINA. Digital images of Agrippa(2), Eratosthenes, Macrobius(2), Messier, Proclus, Rupes Recta, Schiller(2), Tauruntius & Tycho.

CÉSAR FORNARI - ORO VERDE, ARGENTINA. Digital images of Alphonsus, Copernicus, Montes Apenninus & Plato.

DESIREÈ GODOY - ORO VERDE, ARGENTINA. Digital images of Alphonsus, Aristarchus(2), Clavius, Langrenus, Mons Hadley, Moretus & Plato(2).

GUILHERME GRASSMAN - AMERICANA, BRAZIL. Digital images of Clavius, Copernicus, Hadley, Plato, Tycho & Valis Alpes.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Agrippa, Maginus & Wolf.

JUAN PABLO LESCANO - ORO VERDE, ARGENTINA. Digital images of Endymion, Langenus, Macrobious & Tycho.

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

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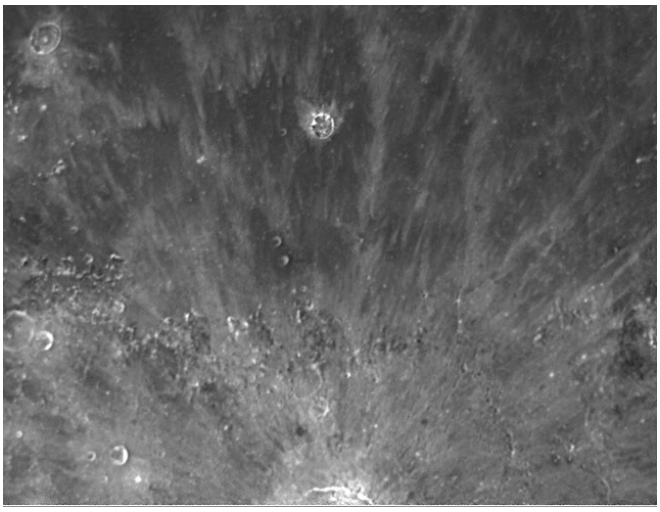
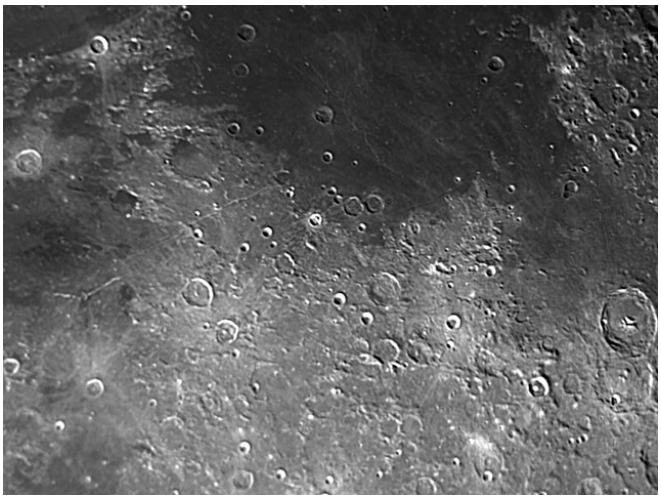
RECENT TOPOGRAPHICAL OBSERVATIONS

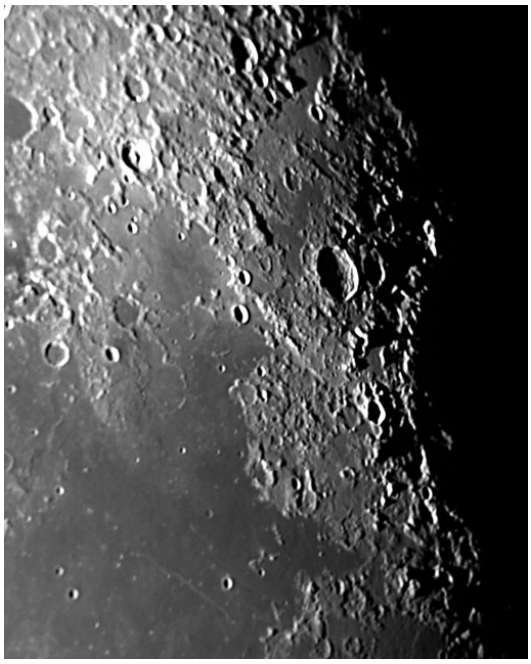
COPERNICUS-PYTHEAS– Alberto Anunziato-Oro Verde, Argentina. August 21,, 2016 05:34 UT. 250 mm LX-200 SCT, QHY5-II, 742nm IR pass filter.



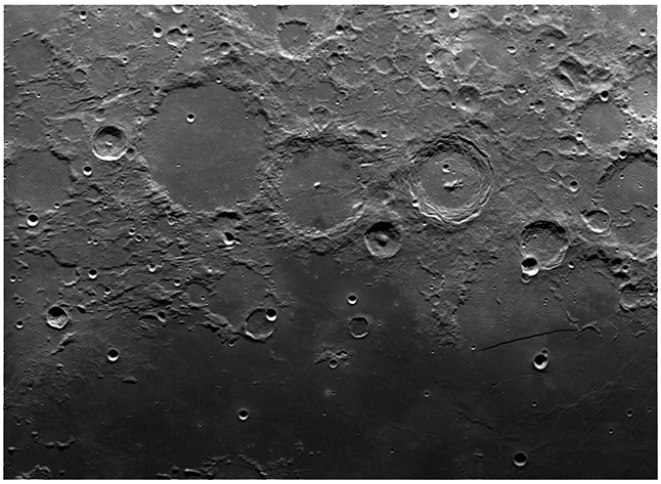
RECENT TOPOGRAPHICAL OBSERVATIONS



AGRIPPA - Francisco Alsina Cardinali-Oro Verde, Argentina. August 21, 2016 04:21 UT. 250 mm LX-200 SCT, QHY5-II, 742nm IR pass filter.

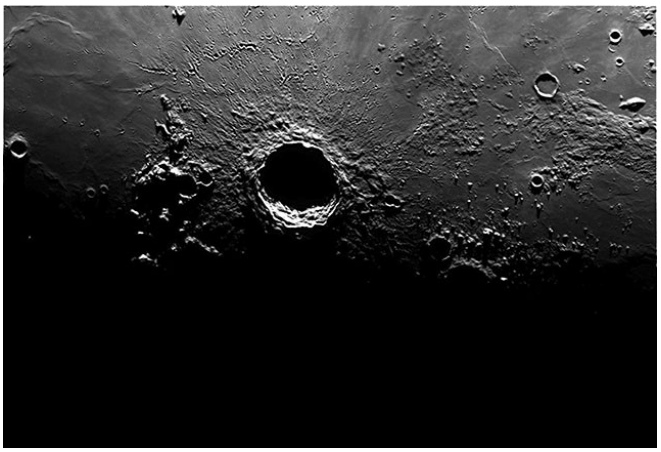


MACROBIUS - Francisco Alsina Cardinali-Oro Verde, Argentina. August 21, 2016 04:29 UT. 250 mm LX-200 SCT, QHY5-II, 742nm IR pass filter.

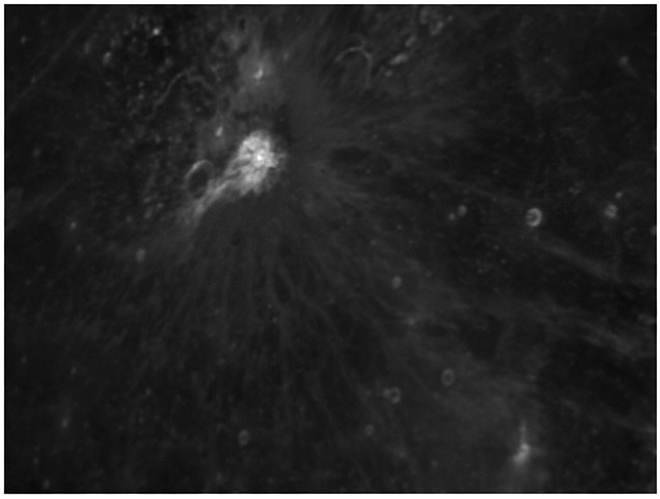


ALPHONSUS - César Fornari -Oro Verde, Argentina. September 10, 2016 21:48 UT. C-11 edge HD SCT, QHY5-II.

RECENT TOPOGRAPHICAL OBSERVATIONS



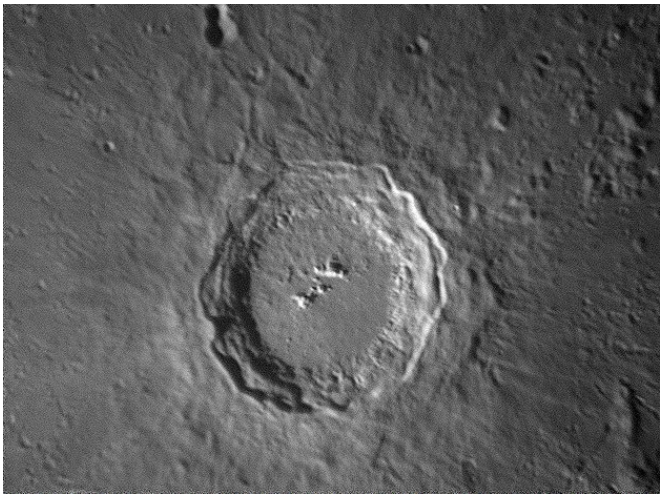
COPERNICUS - César Fornari -Oro Verde, Argentina. September 10, 2016 23:05 UT. C-11 edge HD SCT, QHY5-II.



ARISTARCHUS - Desireé Godoy-Oro Verde, Argentina. August 21, 2016 03:37 UT. 250 mm LX-200 SCT, QHY5-II, 742nm IR pass filter.

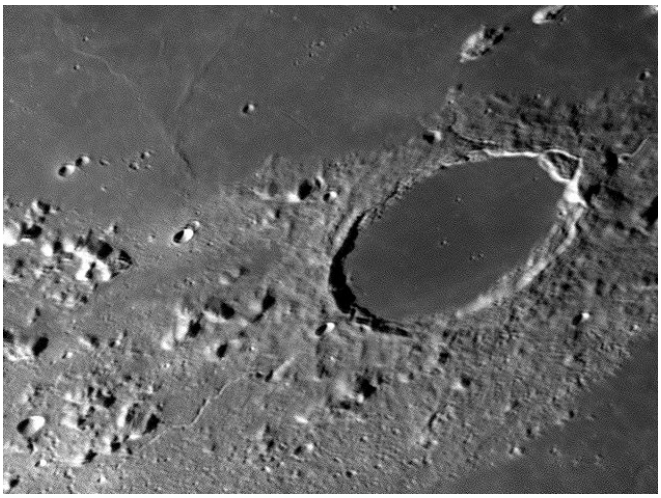
LANGRENUS - Desireé Godoy -Oro Verde, Argentina. September 11 2016 00:50 UT. C-11 edge HD SCT, QHY5-II.

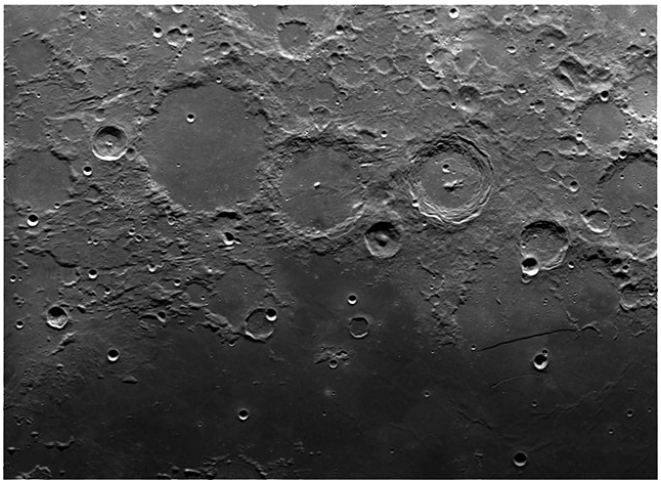
RECENT TOPOGRAPHICAL OBSERVATIONS



COPERNICUS- Guilherme Grassman - Americana, Brazil. September 11, 2016 20:57 UT. 10" SCT, Seeing 8/10, Transparency 4/6. Lumenera camera.

PLATO- Guilherme Grassman - Americana, Brazil. September 11, 2016 21:27 UT. 10" SCT, Seeing 8/10, Transparency 4/6. Lumenera camera.

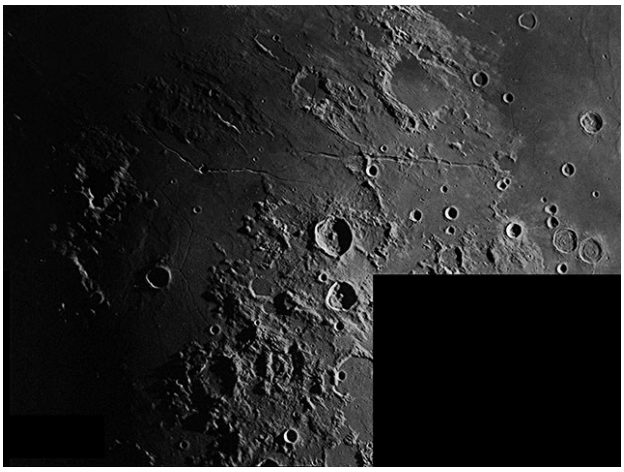




ALPHONSUS - César Fornari -Oro Verde, Argentina. September 10, 2016 21:48 UT. C-11 edge HD SCT, QHY5-II.

RECENT TOPOGRAPHICAL OBSERVATIONS

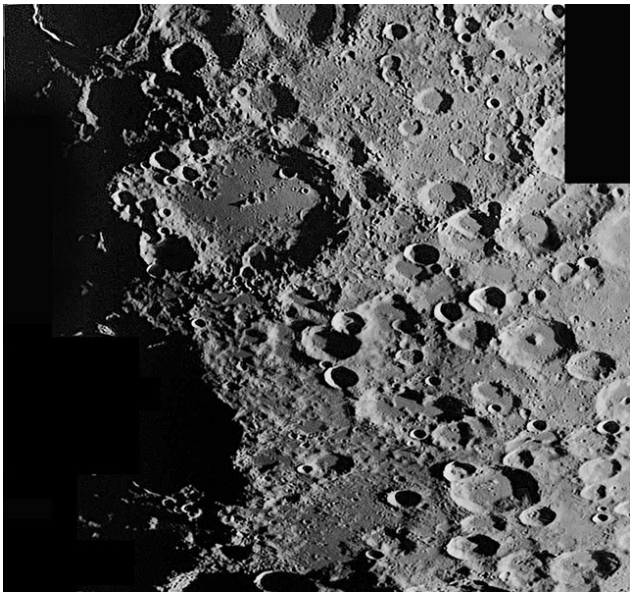
AGRIPPA – Richard Hill – Tucson, Arizona, USA July 12, 2016 03:13 UT. Seeing 8/10. 8" Mak-Cass, f10, SKYRIS 445M, 656.3 nm filter.



In the middle of the moon there are some often overlooked gems that I hope I can bring to your attention. This region from Sinus Medii (just coming into the sunlight on the left side of this image) to Mare Tranquillitatis on the right is often missed because of the spectacular clefts or rimae of this region. Briefly the rimae are Rima Ariadaeus, the long ditch just above and right of center, the flat "v" shaped Rima Hyginus with the 10km diameter crater Hyginus in the middle further left and then the system of Rimae Triesnecker around the crater Triesnecker (27km) that is filled with shadow below and slightly left of Hyginus. These rimae range from 1-2km wide as shown here.

The title feature for this image is the teardrop shaped crater just above and left of the corner of the title block. This is the 48km diameter Agrippa with another oddly shaped crater just below, Godin (36km). A line through the centers of these two extended an equal distance south points to the very polygonal fuined crater Lade listed as 58km diameter. Straight left from this crater is a rather ratty looking crater, on the edge of Sinus Medii. This is Rhaeticus listed as 51km diameter but is clearly non-round. On LROC Quick Map I measure it to be closer to 40x60 km.

Just above the title block on the right side of the image, are the twin craters Sabine (below) and Ritter (above). These two are not far from the Apollo 11 landing site, Tranquility Base. Above these, halfway to the top of the image, is a very interesting crater, Arago (27km). It has fascinating interior structure due to slumping of the walls. Moving left we come to the large, flat floored crater Julius Caesar listed as 94km diameter but again very non-round. For this one I measured roughly 80x100km. We end with the crater to the left of this, another deformed and largely ruined crater, Boscovich (48km). This one is worth a good look due to the rima on its floor and the flow of formerly molten material to the lower right pointing toward Rima Ariadaeus.



MAGINUS – Richard Hill – Tucson, Arizona, USA July 12, 2016 03:13 UT. Seeing 8/10. 8" Mak-Cass, f10, SKYRIS 445M, 656.3 nm filter.

Another view from the heavily cratered lunar highlands. The featured crater is obvious just above and to the left of middle on this image. This is the 168km diameter Maginus named for Giovanni Antonio Magini, a contemporary of Galileo's and probably an adversary since he supported a geocentric cosmogony. The formation of this crater dates back to the earliest lunar cratering epoch (Pre-Nectarian) as much as between 3.9 to 4.5 billion years ago. It has been standing as a sentinel watching all of geological history, life history and human history on the Earth! Just above Maginus is a raggedy 54km crater named Proctor for Mary Proctor, the early 20th century astronomer and astronomy popularizer. It too is a Pre-Nectarian crater standing watch with its bigger brother.

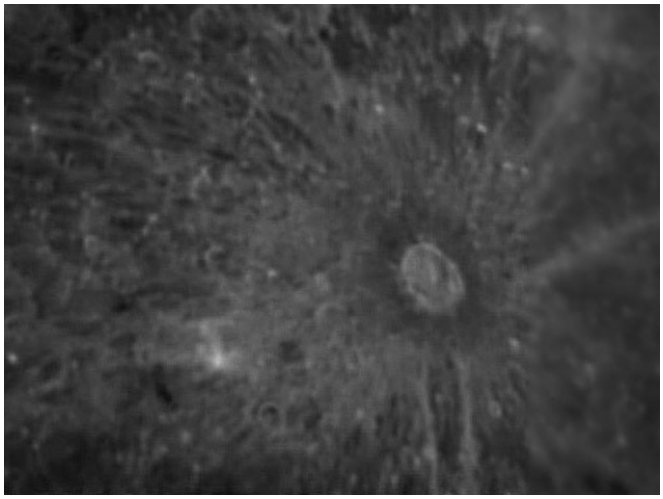
Just below Maginus the large shadowed cirque that is Clavius. Below and right of Maginus is a much smaller crater Deluc (49km) flanked by two of its satellite craters, H above and D below. Further down and lunar-east is another relatively flat bottomed crater, Zach (73km) and in the bottom right corner of this image is Pentland (58km) with an odd off-center central peak. Going back up, near the corner of the cutout at the upper right, can be seen the unusual feature Heraclitus with its central ridge pointing down to the 52km crater Heraclitus D at the southwest end (lower left). Between Zach and Heraclitus D is the crater Lilius (63km) with a clear, sharp central peak.

Notice that the surface is everywhere peppered with small craterlets down to the limits of the 1.5km resolution of this image. Also notice the hummocky blanket of ejecta directly below Maginus, that was excavated during the great Clavius impact event.

RECENT TOPOGRAPHICAL OBSERVATIONS

ENDYMION - Juan Pablo Lescano-Oro Verde, Argentina. September 18, 2016 04:09 UT. 250 mm LX-200 SCT, SPC900NC.

TYCHO - Juan Pablo Lescano-Oro Verde, Argentina. September 18, 2016 04:07 UT. 250 mm LX-200 SCT, SPC900NC.



LUNAR GEOLOGICAL CHANGE DETECTION PROGRAM

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

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

Observations/Studies for August were received from the following observers: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Aristarchus, Helicon, Mare Crisium, Mons Pico, Moretus, Pickering, Plato, Proclus, Promontorium Laplace, Ptolemaeus, Sinus Iridum, and the western limb. Alberto Anunziato (Argentina – AEA) observed: Aristillus, Atlas, Copernicus, Herodotus, Herschel, Messier, Moretus, Schiller, Sinus Iridum, Taruntius, and Tycho. Francisco Cardinali (Argentina – AEA) observed Agrippa, Alphonsus, Aristarchus, Macrobius, and Plato. Maurice Collins (New Zealand – ALPO) imaged a halo around the Moon. Anthony Cook (BAA – on vacation near Sergiev Posad - Russia) took some color images of the whole Moon. Marie Cook (Mundesley, UK – BAA) observed Aristarchus and Plato. Pasquale D'Ambrosio (Italy – UAI) observed Sinus Iridum. Valerio Fontani (Italy, UAI) observed Aristarchus and Herodotus. Desireé Godoy (Argentina – AEA) observed Gassendi. Rik Hill (Tucson, AZ - ALPO) observed Montes Caucasus. Thierry Speth (France – BAA) observed Aristarchus. Gary Varney (Pembroke Pines, FL, USA - ALPO) observed Mare Tranquillitatis, Rimae Triesnecker, and Rupes Altai.

News: For a number of years now I have been putting in image requests to NASA's Lunar Reconnaissance Orbit spacecraft targeting web site, which is open for public use (see: http://target.lroc.asu.edu/output/lroc/lroc_page.html). Here I have been selecting past LTP sites, or areas in old Apollo images that looked Ina like, or had sinuous rilles or lobate scarps, and did not feature in NASA's current target lists of the time. Usually the images returned have shown these to be moderately interesting, but not especially exciting. However one recent acquisition of part of Rimae Sosigenes (19.07˚E, 8.35˚N) of an Ina like formation is quite geologically different to others in its surrounding context. Ina-like formations differ to most areas of the Moon. They are usually in a sunken depression and on the floor of this we see meniscus-like lava flow features (often with a typical mare-like cratered surface), and in between these (or underneath) are brighter chaotic rough terrain with relatively few craters. Many Ina like features are geologically very young and may indicate that the Moon was volcanically active as early as a few tens of millions of years ago (see http://lunarnetworks.blogspot.co.uk/2013/03/new-views-of-hollows-of-rimae-sosigenes.html), because crater counts on these objects produce a very low density of craters per square kilometer (the longer an area of the surface is exposed to space, the more craters result across its surface). Other people have suggested out gassing, blowing away the top soil, as an explanation of Ina formations, however to me this does not appear to account for the smooth curved edges of the overlying meniscus-like features – I would have expected the edges to be more fractured and fretted perhaps? Anyway back to this interesting example which turned up in one of my requested images (See Figure 1) what struck me as an odd appearance is if you compare the bottom two images which were taken at different sun angles. There are three large light rough areas between the meniscus regions in the bottom left image, but when you look at these under the higher sun angle image in the bottom right, two of these remain light (typical of geologically fresh rocky areas) but the lower one is dark. Texturally all three look similar in the bottom left image – so why the difference? Furthermore you can see some considerable albedo differences in the surrounding mare-like meniscus material elsewhere. I would be interested to know what others make of this area when they examine the images on the LROC web site. Just out of curiosity, I will be putting up past and more recent images of this area on the Spot the Difference web site.

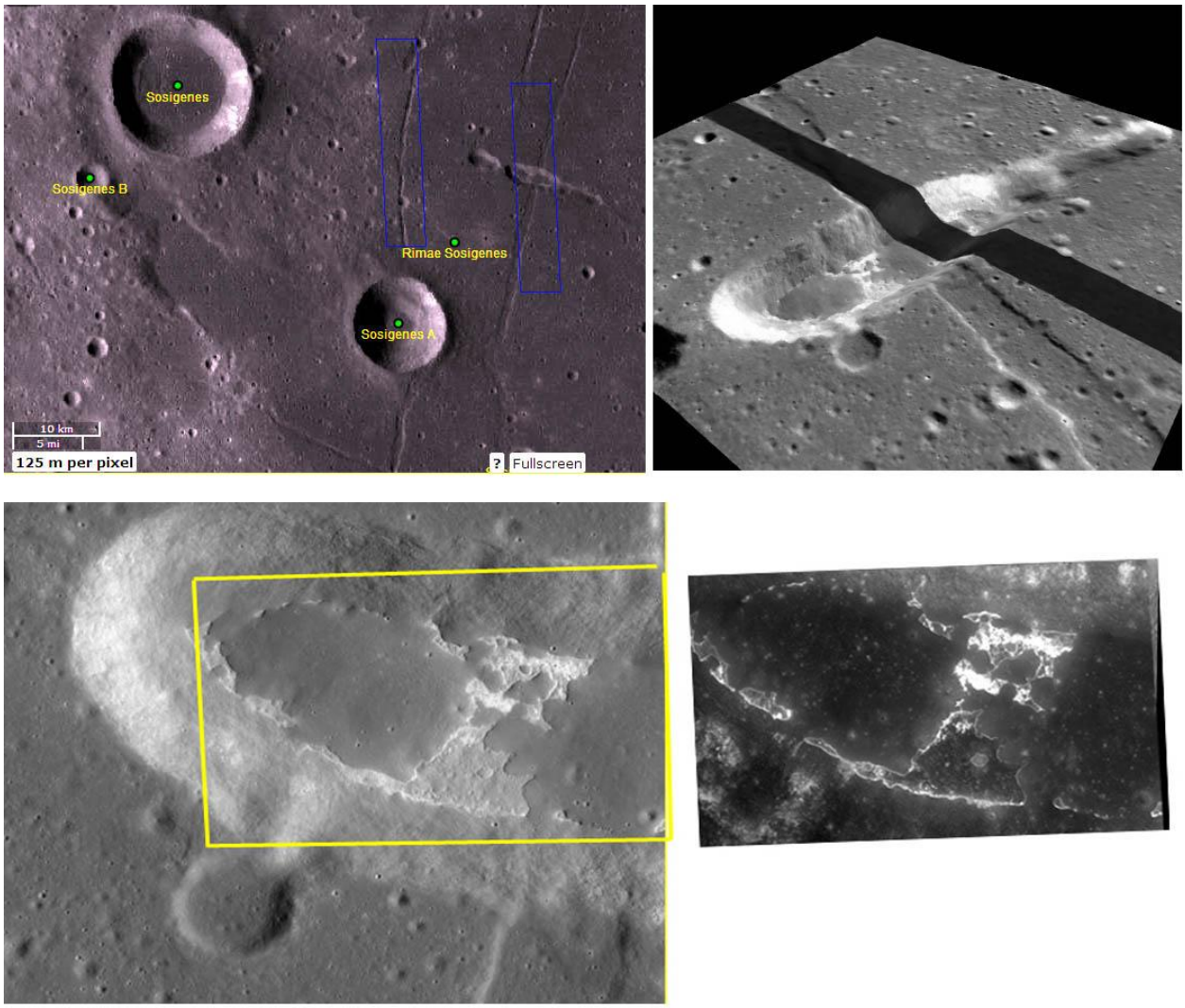


Figure 1. *Views of Rimae Sosigenes courtesy of NASA's http://target.lroc.asu.edu/q3/ web site.* ***(Top Left)*** *A wide angle LROC WAC mosaic view showing the locations of two requested target areas to image.* ***(Top Right)*** *A 3D view of the area as seen from the south west, with x2 vertical exaggeration.* ***(Bottom Left)*** *A context view from image [M1123469770LC](M1123469770LC) taken with the Sun 23˚ above the horizon – the yellow rectangle depicts a region of interest shown in the image on the right.* ***(Bottom Right)*** *A subsection of LROC image [M1208241804RC](M1208241804RC) taken with the Sun 74˚ above the horizon.*

Some observers have sent in images from earlier months to help complete our records. Maurice Collins sent in reprocessed images from April. Franco Taccogna has sent in some Full Moon images to help in a study to compare the appearance of Aristarchus in earthshine to that at Full Moon. Essentially the crater is illuminated under close to zero phase angle in both situations, however sometimes Aristarchus is very bright in earthsine and at other times it is dull. We are attempting to see if the same happens during Full Moon and whether this is related to topocentric libration (tilt angle of the crater with respect to the observer). This has been investigated in the past, by David Darling, and also myself. However now with CCD imagery we have the potential to do this in a more analytical way. If any of you would like to take part in this project, see the Lunar Schedule web site for dates and UTs to observe on. Collin Henshaw has sent in an earthshine image from July and will be participating in this program. Several observers imaged the September lunar eclipse and we will have more to say about this next month. John Duchek (ALPO) emailed to say that he would be contributing to our repeat illumination observing program in future.

Concerning Ken Warren's image from 2016 Jul 27 UT 10:23 (See Fig 2 – Left) of the area to the north west of the Montes Spitzbergen (see last month's newsletter) – although I suggested that it was just overlapping wrinkle ridges, I also floated the idea that maybe it might have been a buried crater chain (in the direction of the arrow) due to some curved edges? I have since received another image of a different wrinkle

ridge area (See Fig 3 – Right), this time in Mare Tranquilitatis and taken by Gary Varney showing perhaps a similar effect? I will leave it up to the reader to decide which theory is more likely as old lunar geology is out of the remit of our discussions.

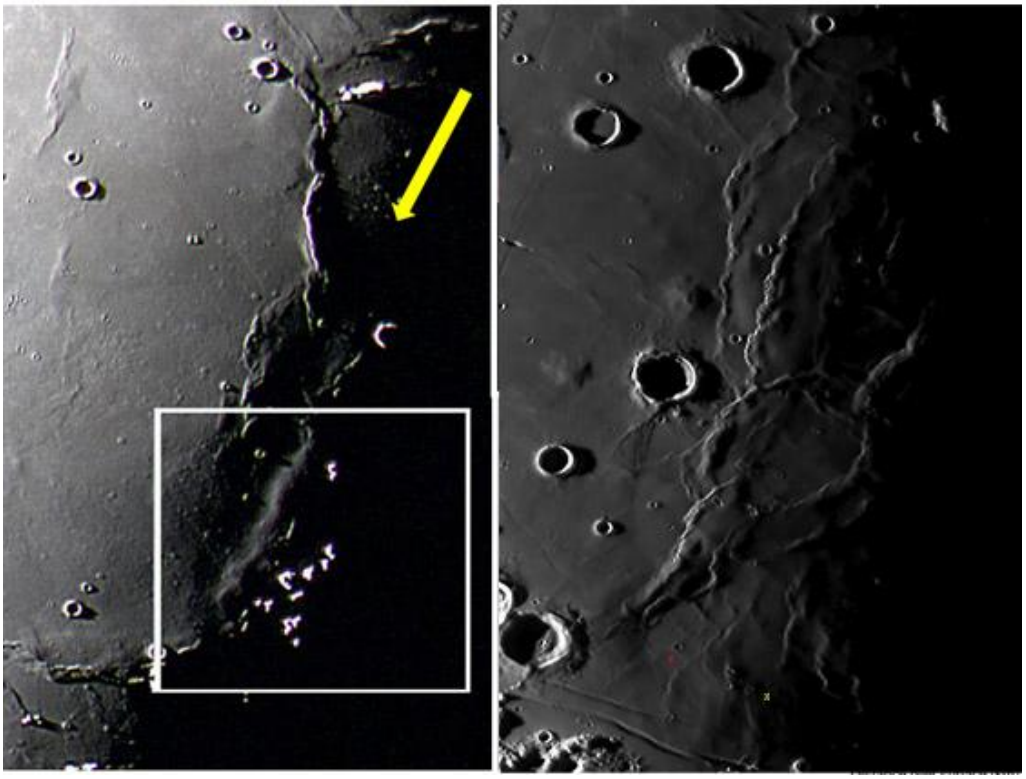


Figure 2. *Examples of wrinkle ridges, orientated with north towards the top.* ***(Left)*** *Image taken by Ken Warren (ALPO) of a region north west of Montes Spitzbergen, taken on 2016 Jul 27 UT 10:23 – the arrow shows the line of candidate sunken craters in a chain and the box is an area we enlarged upon last month* ***(Right)*** *Another example of overlapping wrinkle ridges, taken by Gary Varney (ALPO) on 2016 Aug 23 UT09:04, this time in Mare Tranquilitatis..*

Peter Grego's, widow, Tina Grego, has kindly asked if I could mention a donation web site that has been set up in his memory, by the British Heart Foundation. The web site is on: https://giftofhope.bhf.org.uk/In-Memory/peter-grego in case any of you think that you have been influenced strongly by his many books, articles, observing organization efforts etc.

Just a warning to readers, that for the next 3 months I am tied up with teaching degree level students, and so we will be doing what we did last year, mentioning observations received, listing what repeat illumination events they refer to, but there will be no time to do analysis like we normally attempt. As soon as January arrives, I will produce a summary table of what we have learnt from your observations, then we will go back to normal. You may also find my response to emails will slow down during the next three months, but please do not hesitate to send observations in. If you can make use of the observational upload website, to send me observations, on: http://support.imaps.aber.ac.uk/aao/login.php this would be greatly appreciated in order to stream line the receipt of observations directly into the database. I can send you login names and passwords if you do not have these already.

LTP Reports: No LTP reports were received during August.

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

Sinus Iridum: On 2016 Aug 13 UT 18:37-18:38 Pasquale D'Ambrosio (UAI) imaged this feature under the same illumination conditions (to within ±0.1˚) to the following report:

Sinus Iridum 1996 Apr 28 UT 20:00 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.

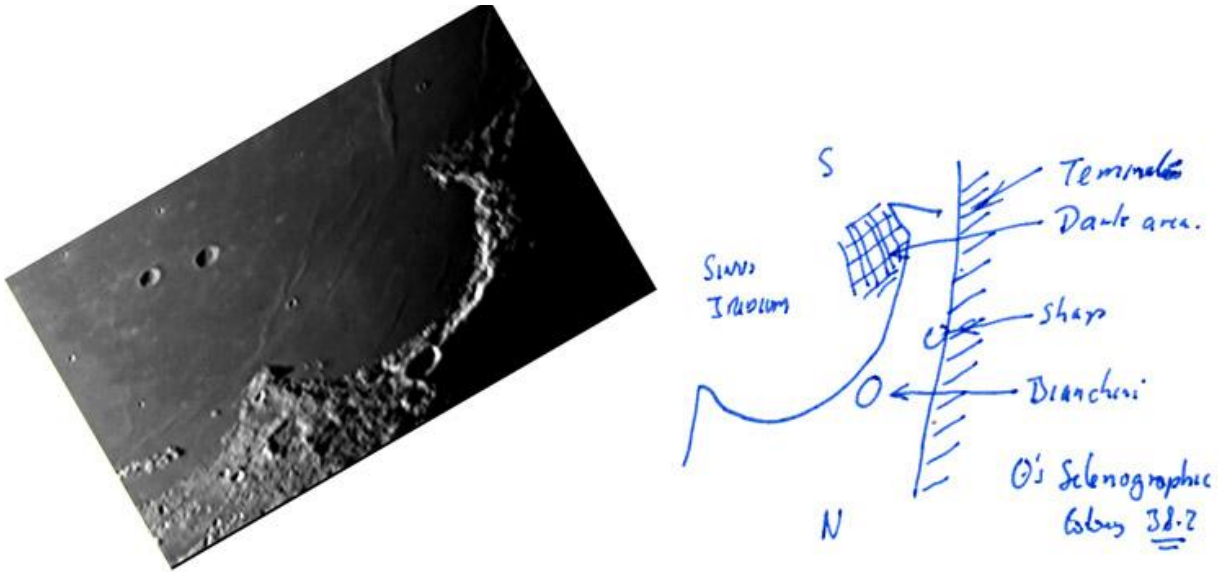


Figure 3: *The Sinus Iridum orientated with north towards the bottom right.* ***(Left)*** *Image by Pasquale D'Ambrosio (UAI) taken on 2016 Aug 13 UT 18:37-18:38.* ***(Right)*** *Sketch made by Clive Brook on 1996 Apr 28 UT 20:00.*

Because of the very tight similarity in illumination (0.1˚ tolerance), Pasquale's image (Fig 3 Left) and Clive's sketch (Fig 3 Right) should be pretty much identical, apart libration effects. However although Pasquale has some shading on the western floor, it is not confined to the ¼ floor area patch as shown in Clive's sketch. Furthermore Clive has the terminator just past Sharp, but in Pasquale's image Sharp is still in shadow. So my suspicion is that Clive may have written down the wrong UT, and it could perhaps be off by 1 hour. During that time of the year one needs to convert from British Summer Time to UT, and it is not unheard of for observers to occasionally add an hour instead of subtracting an hour, especially if they are fatigued. A quick look at p157 in the Hatfield SCT Lunar Atlas 2014 edition has simulated views of Sinus Iridum at Selenographic Colongitudes of 37.7˚ and 40.7˚, and this suggests a UT of 21:00 might be about right. I will therefore adjust the UT of Clive's report to 21:00UT and keep the weight at 1. Pasquale's image has been useful in highlighting the discrepancy in the 1996 LTP report.

Gassendi: On 2016 Aug 14 UT 03:53 Desireé Godoy (AEA) imaged this crater about three and a half hours after the following repeat illumination event (Despite being after the target time I am including their observation as they are a first time observer here):

Gassendi 1977 May 28 UT 20:45-21:15 Observed by D. Sims (Dawlish, Devon, UK, 10" Cassegrain reflector,) saw a hazy area on the south east floor that was normal in red and white light but completely blacked out in blue. This was partly confirmed by J-H Robinson (Devon, England, 10" reflector) 21:24-23:12 who saw the south east floor of Gassendi to have a loss of detail - but no color seen, although at 21:57-21:58 it was slightly brighter in red than in blue briefly. P. Doherty (22:45-23:15) did not see anything unusual. D. Jewitt (22:22-22:55) did not reveal anything unusual, apart from spurious color. The Cameron 1978 catalog ID=3 and ID=1463. The ALPO/BAA weight=3.

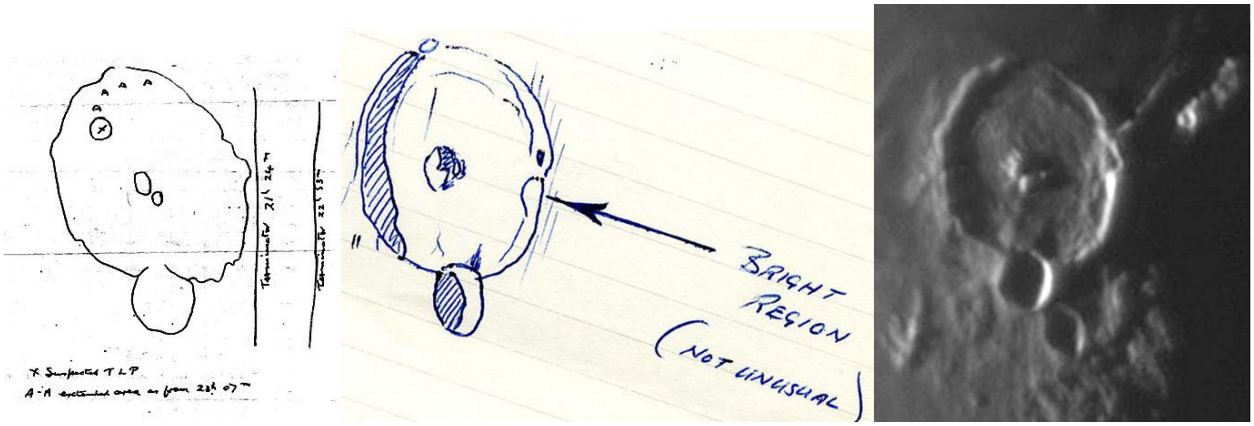


Figure 4. *Gassendi orientated with north towards the bottom to match the text orientation in the sketches.* ***(Left)*** *A sketch by J-Hedley Robinson (BAA) made on 1977 May 28 whilst observing between 21:24 and 23:27UT.* ***(Centre)*** *A sketch made by Paul Daugherty (BAA) made on 1977 May 28 UT 23:00 using Patrick Moore's 15" reflector.* ***(Right)*** *Image by Desireé Godoy (AEA), taken on 2016 Aug 14 UT 03:53.*

Although Desireé imaged the crater (Fig 4 – Right) after the predicted repeat illumination time, their image can be useful in pin-pointing the coordinates of the primary source as depicted by Hedley Robinson (Fig 4 – Left) – Donald Sims did not provide a sketch. Hedley comments on his written report that he regarded this as a "*doubtful identity of a LTP*" because there was a diffuse patch anyway here on the SE floor- though he does concede though that he thought the patch might be brighter than normal when he compared it to a Harvard photograph of the area. Hedley also found the SE patch was slightly brighter in red than in blue. Unfortunately on that night, many of the BAA Lunar Section members were travelling back from a Lunar Section meeting, and so missed the chance to take part in an alert by telephone. Two observers who did come on line later failed to see anything unusual (Fig 4 – Centre), though by this time the effect had lessened and their atmospheric conditions were perhaps non-optimal. Donald Sims commented that the strength of the color effect he saw was at its strongest between 20:45 and 21:15UT. Despite Hedley's comments, I will keep the weight of this report at 3, as Donald had 10 years previous experience as an observer and saw the event at its strongest and earliest in the evening. Based upon a comparison between Hedley's sketch and Desireé's image, we can now give a location of the bright patch on the SE floor as: 39.1˚W, 18.3˚S with an uncertainty of approximately ±5km.

Plato: On 2016 Aug 14 UT 04:02 Francisco Cardinali (AEA) imaged this crater under the same illumination conditions (to within ±0.5˚) to the following report:

> *1982 Jun 02 UT22:00 Mobberley could not see the central craterlet on the floor of Plato tonight. Foley notes that he could only just see the central craterlet on nights of 2-5th Jun and it was reduced in brightness from normal. North reported that the floor seemed nearly black, but brighter in a green filter (x144 magnification used). All three observers compared the Plato area to other areas for reference. Cameron 2006 extension catalog ID 170 and weight=5. BAA/ALPO weight=3.*

Although Francisco's monochrome image (Fig 5) is reasonably sharp, and the central craterlet is not really visible, it is not surprising that Martin Mobberley could not see it very well back in 1982. Indeed Peter Foley makes a similar comment, that it was reduced in brightness from normal for 1982 Jun 2-5, though he does not state what "normal" is i.e. this stage in the lunar phase, or generally at other times? Martin noticed no central cratelet visible on 1982 Jun 04 too. So in effect the report so far does not sound out of the ordinary i.e. the Sun is high up so there should be little shadow in the central craterlet, but not high enough up for ray-like ejecta to outline the location of the central craterlet well enough. So let us look at Gerald's comments about the floor of Plato being almost black? Fig 5 certainly shows it darker than the mare to the north and south, but we cannot check to see if it is much lighter in green light as Francisco image was monochrome. So the onus of this LTP report from 1982 basically relies upon the observations of whether the floor was darker than normal, and whether it had a green coloration. I will keep the weight at 3 because I gather that Gerald checked for color elsewhere on the Moon and did not find any other examples.

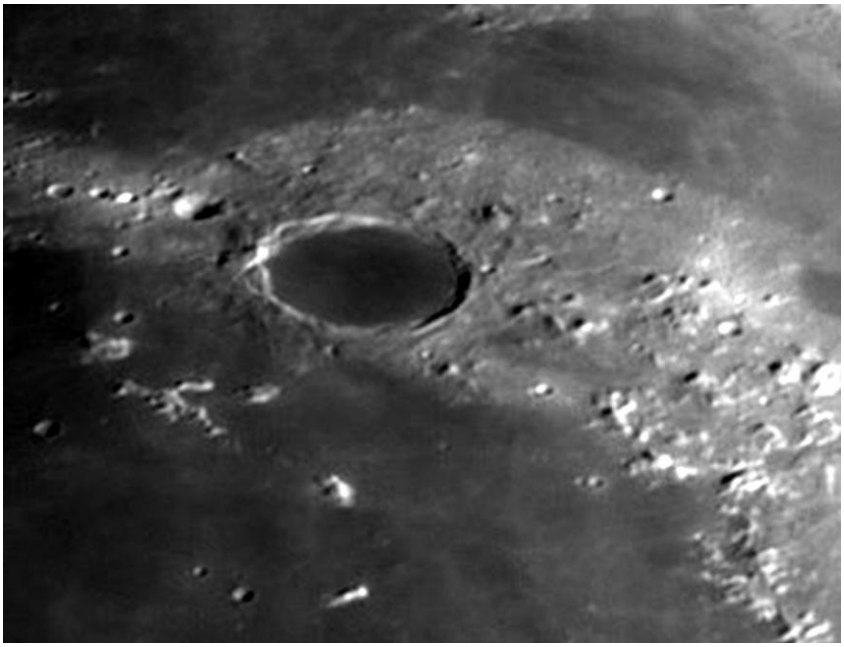


Figure 5 *Plato as imaged by Francisco Cardinali (AEA) on 2016 Aug 14 UT 04:02 orientated with north towards the top,*

Aristarchus: On 2016 Aug 14 UT 20:30-22:55 Thierry Speth (BAA) observed this crater under the same illumination conditions (to within ±0.5˚) to the following reports:

Aristarchus 1971 Sep 01 UT 20:45-21:05 Observed by Neville, Cunnington (Nottingham, England, 4" refractor x180, altitude, low) "Saw a bright glow, especially in E. wall (Confirm. but not indep.?)" NASA catalog weight=3. NASA catalog ID #1310. ALPO/BAA weight=2.

Aristarchus 1975 Jun 20 UT 22:14 Observed by Moore (Selsey, UK, 15.25" reflector, x360, seeing 5). Aristarchus bands very enhanced in red light. ALPO/BAA weight=1.

Aristarchus 1975 Oct 16 UT 20:00? Observed by Foley (Kent, England, 12" reflector) "Deep blue-viol. spot in NW (IAU?) interior corner.". NASA catalog weight=3. NASA catalog ID #1413. ALPO/BAA weight=2.

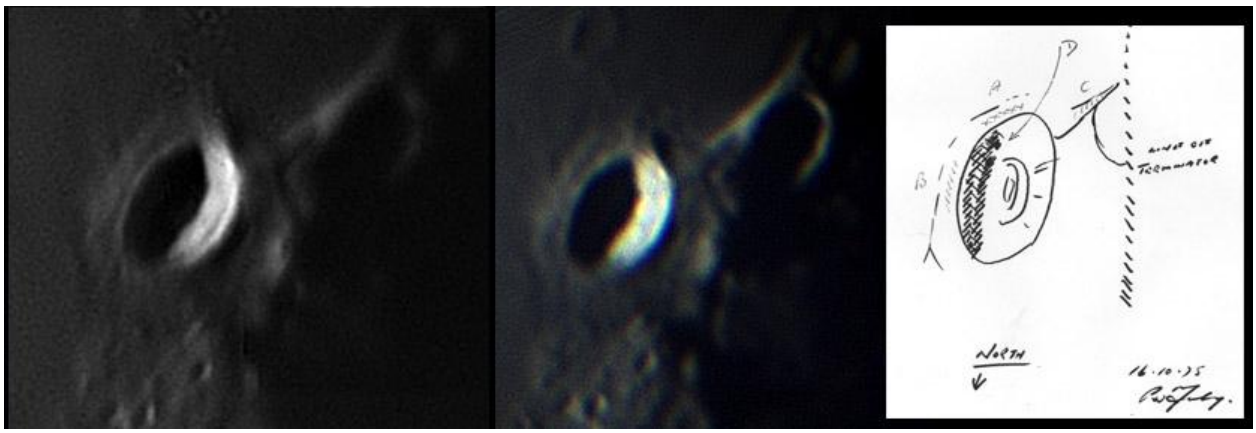


Figure 6. *Aristarchus orientated with north towards the bottom, so that the annotation in the sketch remains upright.* ***(Left)*** *A monochrome image by Thierry Speth (BAA) taken on 2016 Aug 14 UT 21:17.* ***(Centre)*** *A color image by Thierry Speth (BAA) taken on 2016 Aug 14 UT 22:55UT.* ***(Right)*** *A sketch by Peter Foley (BAA) made on 1976 Oct 15 depicting the crater during a LTP observation – "A" refers to an area of the SE rim/exterior that appeared to be variable in brightness. "B" and "C" are areas that were used to compare against. "D" is the interior SE corner that appeared greenish in color.*

Thierry undertook the observations of the above repeat illumination events in two ways. For the two 1975 events he made a visual check and found that there was a kind of pulsating patch between the two main radial bands, however his observing conditions suffered from turbulence in the field of view from

wind, and high altitude fog. He found with a red filter that the bright patch was less visible visually, but the radial bands were more clearly seen. For the Patrick Moore observation from 1975, this pretty much agrees with what Thierry saw, and as Patrick Moore had Antoniadi V seeing conditions (the worst), I think we can safely assign a weight of 0 and remove this from the LTP database. Fig 6 (Centre) although captured outside the repeat illumination window, was an attempt to see if Thierry could record the color of the bands, however the contrast is not quite good enough to do this, but at least the seeing had improved from earlier in the evening and the bands were visible.

Concerning the October 1975 LTP report, Thierry makes no mention of whether the bright patch was a deep blue-violet, and reading through Peter Foley's notes from the time is a little confusing. In one document it mentions a small, deep violet spot about 9km in diameter, which he was certain was too small to be caused by atmospheric spectral dispersion (I am assuming this was written by Peter Foley as it has no name associated with it?), though interestingly in a separate document - a diagram (this does have his name on it!) he indicates a region on the SE rim/exterior of the crater as being the location of the variable bright spot, and on the inner SE corner of the crater he noticed a green color. The shadow in Peter Foley's sketch appears too narrow (Fig 6 – Right) when you compare it to Therry's images. Another observer who was also observing shortly after Peter Foley raised a telephone alert, Bill Peters, found pink color on the SW rim, but pink on some other features too e.g. Harbinger Mts. He checked these with a Moon Blink device and found a blink too. He checked again later and found no color anywhere. So quite a lot of confusion here by all accounts, and I would like to reduce the weight from 2 to reflect this. However to encourage more imagery to better interpret what was seen I shall set the weight at 1, so that it remains on our Radar screens, but of lower importance.

With regards to the 1971 observation, which has similar illumination to Fig 6 (Left), reading through the archives, I can see it was not just Neville and Cunningham who were observing that night but others too. Both Neville and Cunningham saw this effect at the same time over 20:45-21:05, however Cunningham was using just a 2" refractor, even smaller than Neville's scope (See BAA Lunar Section Circular from 1971 October, p76 & 77). J.S. Burgess, using an 8.25" reflector, had been observing the crater from 20:15-20:21 and had seen nothing unusual, even with filters. At 20:30 C.D. Blake (or Possibly Richard Baum – the records are not clear?) used a 4.5" refractor on the crater and found nothing unusual either. Between 21:33 and 21:35 J.S. Burgess examined the crater again and found the crater normal – it should be said that his observations were hampered by scattered cloud during both sessions. One thing I do note is in the write up in the BAA Lunar Section circular, the "E Wall" is mentioned, and if this was in the classical sense, then it was really the W wall, which is what you can see from Thierry's image is naturally illuminated, and bright. Unfortunately the other two observers do not overlap Neville and Cunningham's time slot, and reading the evidence we are presented with, this LTP report seems pretty weak, so I shall reduce the weight to 1.

Herschel: On 2016 Aug 15 UT 00:48-01:00 Alberto Anunziato (AEA) sketched this to within ±0.15˚ in Selenographic Colongitude (and within ±1˚ in sub-solar latitude) to the following report from last year:

> *On 2015 Sep 25 UT 03:28-03:40 D. Davis (Albany, OR, USA, Questar telescope used, x80 and x120, seeing 6, transparency 2) saw a very black rectangular feature along the western side of Herschel and slightly to the north. The effect was first noticed at 03:28-03:32 and it was checked again at 03:37-03:40. The length was ~4x the width and it was roughly 80-100 km long by 15-20km wide. Probably not a LTP, but it's worth checking again under similar illumination. ALPO/BAA weight=1.*

You can see Alberto's sketch in Fig 7 that the crater, located north of Ptolemaeus has relatively small amounts of shadow, and Alberto commented that he could not see anything resembling a rectangular feature mentioned in the Davies report. Examining the Hatfield Lunar Atlas, I see that there is an ejecta scour mark on the east of Herschel, which might fit the description, it looks more like a Greek letter λ and is clearly on the wrong side to fit Darryl's report. Although I still have some doubts about this being a LTP, so won't raise the weight just yet, certainly some more repeat illumination observations would be welcome, especially if Darryl could make some using the same scope?

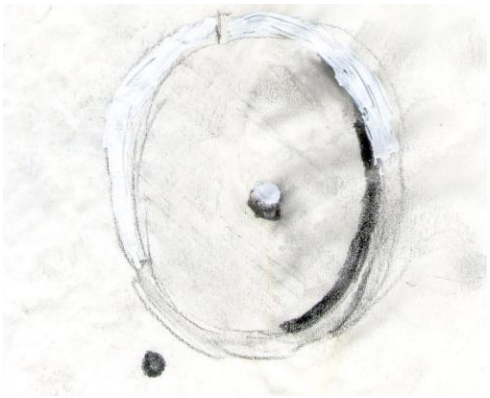


Figure 7. *A sketch of Herschel by Alberto Anunziato, (AEA) orientated with north towards the top, made on 2016 Apr 15 UT 00:48-01:00.*

Aristarchus: On 2016 Aug 15 UT 20:52-21:12 Valeri Fontani (UAI) observed this crater to within ±0.1˚ in Selenographic Colongitude (ignoring sub-solar latitude) to the following Italian report from 1996:

> *Aristarchus 1996 Jun 28 UT 21:04 F. Ferri and D. Zompatori (Anzio), using a 20cm f/6 reflector, reported that (translation) "Using a blue filter the area was invisible". This is a UAI observation from Italy. ALPO/BAA weight=2. Original Italian version reads: "28 giugno 1996 21:04 47.7 W-23.7 N (Aristarchus) Usando il filtro Blu la zona non era visible Ferri Fernando, Zompatori Davide (Anzio) D=200mm f6 spec."*

This observing slot also encompassed similar illumination conditions to within ±0.5˚ (this time including both sub-solar longitude and latitude) to the following past LTP reports:

> *Aristarchus 1964 Aug 11 Observed by Firsoff (Somerset, England, 6.5" reflector, x200) "Brilliant in red filter, variable)" NASA catalog weight=4. NASA catalog ID #570. ALPO/BAA weight=3.*
>
> *Aristarchus-Herodotus 1971 Sep 02 UT 20:00 Observed by Ayeau (Paris, France, 12" reflector, x100) "Brownish-red or maroon seen on Aris. W.wall ridge to Herod. on S.wall of Herodotus" NASA catalog weight=2. NASA catalog ID #1311*
>
> *Aristarchus 1975 Jun 21 UT 2150-2245 Observed by Foley (Kent, England, 12" reflector, S=P) "Following an alert call in Mersenius Foley reported color in it but also a crater to S. of it & Aris., prob. due to seeing conditions." NASA catalog weight=0. NASA catalog ID #1408. ALPO/BAA weight=1.*
>
> *Herodotus. On 1995 Oct 06/07 at UT 22:45-00:00 P. Mirteto (a UAI observer, RI, Italy, 20cm reflector) observed some brightness changes in Herodotus. Please note that this description is a summary of the material on the UAI web site. The ALPO/BAA weight=2.*
>
> *Prinz. On 1995 Oct 06/07 at UT 23:05-00:00 P. Mirteto (a UAI observer, RI, Italy, 20cm reflector) observed some brightness changes in Prinz. Please note that this description is a summary of the material on the UAI web site. The ALPO/BAA weight=2.*

For the 1996 report, it is difficult to understand how that whole area (Aristarchus?) becomes invisible through a blue filter. Through a blue filter in Valerio's images in Fig 8, some of the wall spots and the central peak are a little brighter than in white light. I wonder if something has been lost in translation? I will keep this at a weight of 2 as two observers were involved, and the telescope they were using was a good sized 8" reflector.

For the 1964 report, by amateur lunar geology book author, Axel Firsoff, if there was any redness present then Aristarchus would be significantly fainter in the blue filter, and it clearly is not in Valerio's images, therefore the weight shall remain at 3.

Concerning the French LTP report from 1971, again if there was any natural red or maroon color present on the west wall ridge to Herodotus, or indeed on the south of Herodotus, then this should be darker in Valerio's blue images, and it is not –though there may be a hint of the extension of the southern rim looking slightly more in focus in the white light images than in the blue? I shall keep the weight at 2, though wish that Ayeau had stated whether they used filters or not to check the color in 1971.

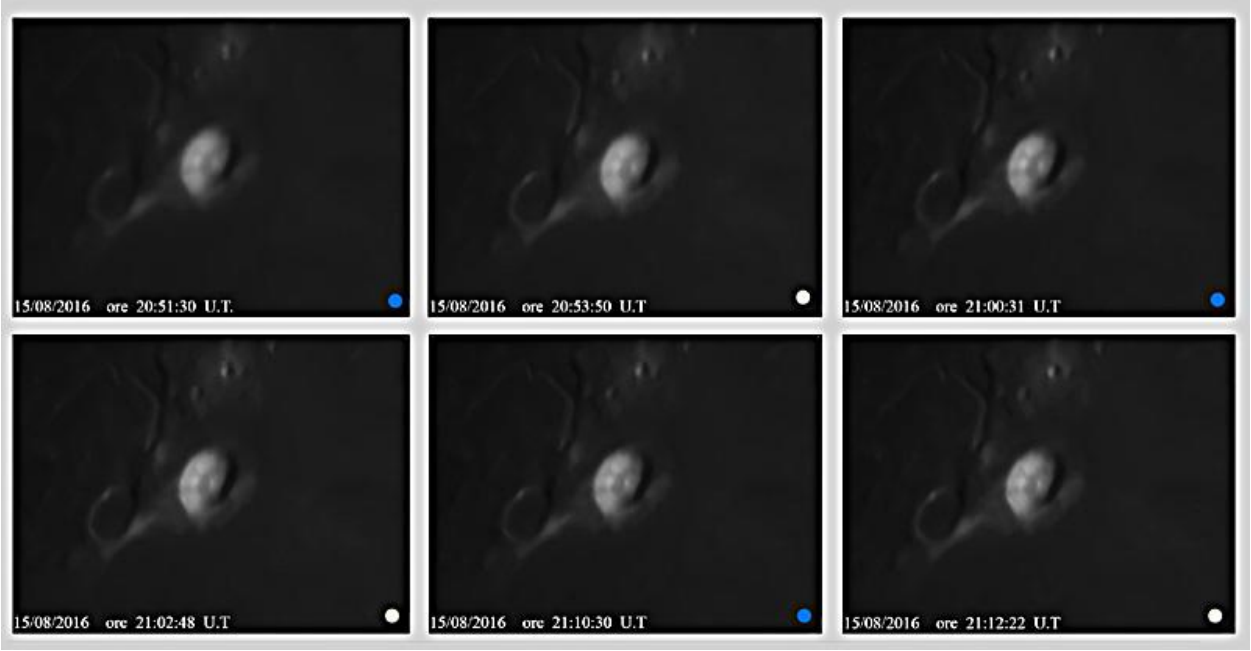


Figure 8. *Images of Aristarchus taken by Valerio Fontani on 2016 Aug 15, orientated with north towards the top. The blue circles indicate the images are taken through a blue filter and the white circles, without a filter, i.e. white light.*

The 1975 report by Peter Foley I will set at a weight of 0, like in the Cameron catalog – am not sure why this showed up in the ALPO/BAA database if color was seen elsewhere? In Peter Foley's report he complained of bad observing conditions, and also Patrick Moore who overlapped in the observing session claimed Aristarchus was normal!

Finally for the 1995 UAI report, although Prinz is not covered in Valerio's image there are some slight variations in the brightness of parts of the Aristarchus/Herodotus area over time, but this appears to be due to image definition in the seeing conditions being experienced at the time. I am tempted to lower the weight to 1, but without further details, I am hesitant to do this, and would like to see some more images under similar illumination. It might just be that as the Sun rises, sunward facing slopes get brighter – which of course would not be a LTP!

Aristarchus: On 2016 Oct 16 UT 02:30-02:45 Jay Albert (ALPO) observed this crater under similar illumination, to within ±0.5˚, to this Montreal report from 1968:

> *Aristarchus 1968 Oct 05 UT 23:30? Observed by Jean et al (Montreal, Canada, 4" refractor and 6" reflector) "Bright spot to right (west?) of Aris. (she says this obs. was 1 day before ecl. but was 5 days before) & on Oct 5, 1955 before ecl. of moon. (again date is wrong as age was 18d, more than 3d after FM)." NASA catalog weight=3. NASA catalog ID #1095.*

Jay comments that he did actually see a bright spot W of the crater, possibly the one reported by Jean in 1968. The spot was located on the W end of the bright streak connecting Aristarchus with Herodotus and just off the SE exterior wall of Herodotus. He used a Celestron Sky Prodigy 90mm Maksutov, at magnifications of 114x and 139x under seeing 7/10 and transparency 1st magnitude conditions. As this sounds similar to the Jeans description, I will reduce the weight 0, effectively removing it from the ALPO/BAA LTP database.

Aristarchus: On 2016 Aug 19 UT 23:45-23:55 Marie Cook (BAA) observed this crater under similar illumination, to within ±0.5˚, for a couple of past reports:

> *Aristarchus 1947 Nov 30 UT 00:00? Observed by Favarger (France?) "3 bright points on inner w. slopes." NASA catalog weight=2. NASA catalog ID #499. ALPO/BAA weight=1.*
>
> *On 1986 Oct 20 at UT 03:30 Slager (Grand Rapids, MI, USA) detected color in Aristarchus, red on the south wall and a blue "washed out gun metal color on the "whole" inner north wall. A 2nd*

observer confirmed the observation. Cameron suspects that this is simply spectral dispersion. The Cameron 2006 catalog ID=288 and the weight=1. The ALPO/BAA weight=1.

Marie was using a 90mm Questar telescope, x80 under III seeing and moderate to poor transparency. She noted that no color was seen in the crater and detail was faint, in other words what one would expect under these observing conditions. Both these reports shall therefore remain at a weight of 1.

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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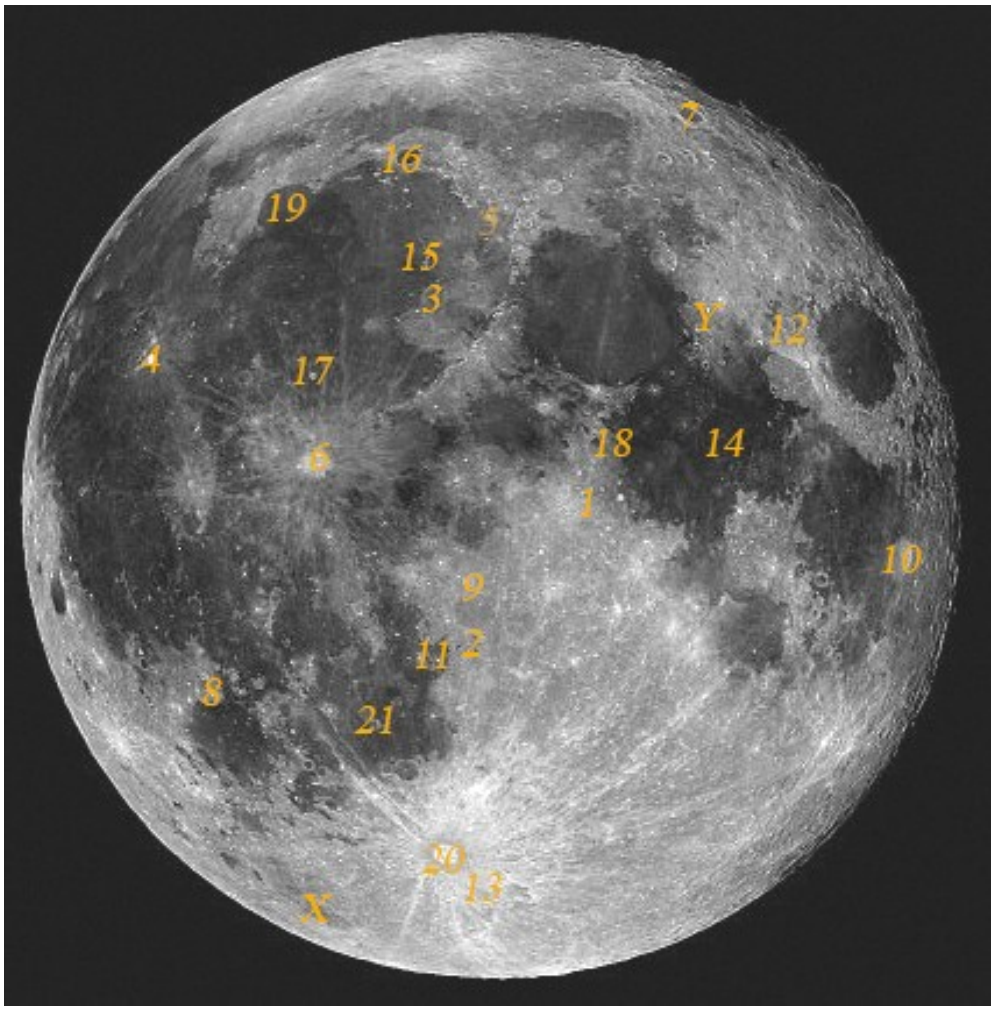
KEY TO IMAGES IN THIS ISSUE

1. **Agrippa**
2. **Alphonsus**
3. **Archimedes**
4. **Aristarchus**
5. **Cassini**
6. **Copernicus**
7. **Endymion**
8. **Gassendi**
9. **Herschel**
10. **Langrenus**
11. **Lassell**
12. **Macrobius**
13. **Maginus**
14. **Mare Tranquilitatis**
15. **Montes Spitzbergen**
16. **Plato**
17. **Pytheas**
18. **Rimae Sosigenes**
19. **Sinus Iridum**
20. **Tycho**
21. **Wolf**



FOCUS ON targets

X = Schiller-Zuchius Basin
Y = Montes Taurus & Taurus-Littrow Valley