THE LUNAR OBSERVER

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

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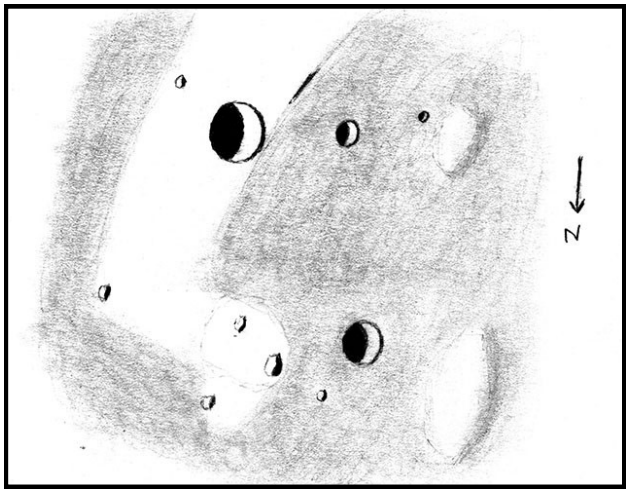
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – DECEMBER 2016
FRA MAURO A



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
September 12, 2016 01:52-02:28 UT, 15 cm refl, 170x, seeing 6-7/10,

I observed this crater and vicinity on the evening of Sept. 11/12, 2016 before the moon hid ZC 2833. This crater is near the north edge of Mare Cognitum, west of Fra Mauro itself. Fra Mauro A is the largest crater on this sketch, and is a crisp, symmetrical crater. Fra Mauro B is northwest of A, and is nearly as large. Fra Mauro C is a short distance west of A, and a tiny pit is west of C. This pit is not shown on the Lunar Quadrant map and was first noted as a small bit of shadow but it certainly appeared as a pit when the view was steadiest. All of these craters are round, deep features, differing only in size. Fra Mauro omicron is the small peak southeast of Fra Mauro A, and Fra Mauro epsilon is the similar peak northeast of A. Four peaks form a loose group east of Fra Mauro B; the largest of them is Fra Mauro lambda. A large, low mound is evident west of Fra Mauro B, and a smaller, vaguer swelling is west of Fra Mauro C and the tiny pit. There is a tongue of bright terrain extending up from the southwest and taking in Fra Mauro A. This area then bends to the northwest and ends at Fra Mauro lambda. The patch around Fra Mauro lambda and the peak to its south is the brightest portion of this tongue. Fra Mauro epsilon is right at the outer bend of this area. Its outlines are fuzzy near the northern end, but are quite sharply defined near Fra Mauro A. A short sharp strip of shadow is on the tongue's boundary between Fra Mauro A and C.

LUNAR CALENDAR

DECEMBER 2016-JANUARY 2017 (UT)

		UT	EVENT
Dec 2016	01	19:56	Moon Extreme South Dec.: 18.9° S
	03	12:34	Moon-Venus: 6.3° S
	05	10:39	Moon-Mars: 3.1° S
	06	17:35	Moon Descending Node
	07	09:03	First Quarter
	12	23:27	Moon Perigee: 358500 km
	13	04:14	Moon-Aldebaran: 0.4° S
	14	00:05	Full Moon
	14	21:43	Moon Extreme North Dec.: 18.9° N
	18	18:14	Moon-Regulus: 1.1° N
	19	04:46	Moon Ascending Node
	21	01:56	Last Quarter
	22	16:37	Moon-Jupiter: 2.7° S
	25	05:55	Moon Apogee: 405900 km
	29	03:30	Moon Extreme South Dec.: 19° S
	29	06:53	New Moon
Jan 2017	02	09:20	Moon-Venus: 2° S
	03	06:47	Moon-Mars: 0.3° S
	05	19:47	First Quarter
	09	14:07	Moon-Aldebaran: 0.4° S
	10	06:07	Moon Perigee: 363200 km
	11	09:32	Moon Extreme North Dec.: 18.9° N
	12	11:34	Full Moon
	15	04:07	Moon-Regulus: 0.9° N
	19	05:26	Moon-Jupiter: 3° S
	19	22:14	Last Quarter
	22	00:14	Moon Apogee: 404900 km
	24	10:37	Moon-Saturn: 4° S
	25	11:59	Moon Extreme South Dec.: 18.9° S
	26	00:46	Moon-Mercury: 4° S
	28	00:07	New Moon
	31	14:34	Moon-Venus: 4.2° N

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: Montes Taurus & Taurus-Littrow Valley

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 **January 2017** edition will be **the Montes Taurus & Taurus-Littrow Valley**. 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 Montes Taurus & Taurus-Littrow Valley article is December 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
Rupes Recta (the Straight Wall)	**March 2017**	**February 20, 2017**

A very thin lunar crescent spotted by Lunar Group members of Madrid Amateur Astronomy Society (AAM)

Antonio Noya, Nieves del Río, José Castillo and Alberto Martos

As stated in the heading, a very thin (16 arcsec) and somehow short (116º, vs. 180º) lunar crescent (*Neomenia*) was sighted on the evening of October 31 by a group of Madrid Astronomy Association members. The observation was planned in advance using data from MoonCalc (Dr. Monzur Ahmed) program and intended as one of "historical value", that's to say not because of its geological interest, since no details can be observed in such a thin meniscus, but because of its historical relevance related to the ancient lunisolar calendar.

Another minor point of interest in this sort of activity, could be related with the dynamics of the Sun-Earth-Moon model (the oldest three-body problem in celestial mechanics[1]), by confirming lunar thin crescent visibility under very restrictive circumstances.

Although we made use of binoculars to search for the Moon and the lunar azimuth and elevation for Madrid were known at the "best time" (17:27:52 UT), the glare of city lights posed some difficulties for sighting the Moon at that particular time. Finally the crescent was spotted at 17:32 UT less than 3 deg over horizon

As an illustration of the difficulty entailed in some special instances by this kind of historical observations, intended for calendar keeping, I attach a photo (taken at 17:56:00 UT) of the crescent spotted by the Group. Are you able to see it in the frame? Please, accept the challenge and try to find it. I promise you it is present in the awful glare of Madrid's city lights.

[1] http://www.afhalifax.ca/bete/DALEMBERTIMAGES/lune/gutzwiller-moon-earth-sin%20rmp.70.589.pdf

In case of difficulty you can find the crescent, marked by an arrow, in this cropped version.

MOON DATA & LUNAR EPHEMÉRIS AT SIGHTING		
New Moon	October 30	17:39:35
Best Time	October 31	17:27:52
Elongation	11d 44m 39s	
Semi-Diameter	0.245 deg	
Distance to Earth	406.664 km	
Age	23 hour 57 min	
Phase	0.0106	
Magnitude	-5,16	
Crescent width	0,27 arcmin	
Crescent length	116 deg	
Moon RA	15h 10m 45s	
Moon DEC	-13d 40m 41s	
Moon AZ	15h 10m 45s	
Moon EL	**5d 10m 03s**	
Colongitude	280º 7' 51"	
Libration in latitude	-5.554 deg	
Libration in longitude	-0.98 deg	
Selenographic Sun latitude	1.324 deg	
Selenographic Sun longitude	168.911 deg	
Paralactic angle	46.276 deg	
Bright limb angle	264.842 deg	
OBSERVATORY DATA		
Geographic latitude	40:23:54 N	
Geographic longitude	03:39:19 W	
Altitude over the sea level	685 m	

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

GUILHERME GRASSMAN - AMERICANA, SÃO PAULO, BRAZIL. Digital image of Mare Nubium..

ROBERT HAYS - WORTH, ILLINOIS, USA. Drawing of Beer-Feuillée.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Aristarchus, J. Herschel, Posidonius Vitruvius, Taurus-Littrow(7), Vlacq..

ALBERTO MARTOS, NIEVES del RÍO, JOSÉ CASTILLO, & ANTONIO NOYA – MADRID, SPAIN. Digital images of thin crescent moon.

FRANCO TACCOGNA - GRAVINA IN PUGLIA (BA), ITALY. Digital image of Earthshine on crescent moon

DAVID TESKE - STARKVILLE, MISSISSIPPI, USA. Digital image of Sinus Iridum.

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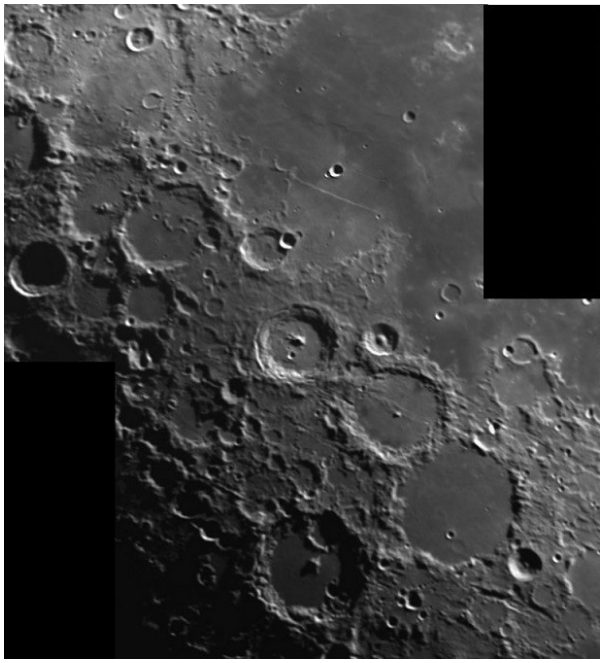
RECENT TOPOGRAPHICAL OBSERVATIONS

MARE NUBIUM- Guilherme Grassman - Americana, São Paulo, Brazil. November 21, 2016 06:51 UT. 10" SCT, f/25, Seeing 6/10, Transparency 5/7.



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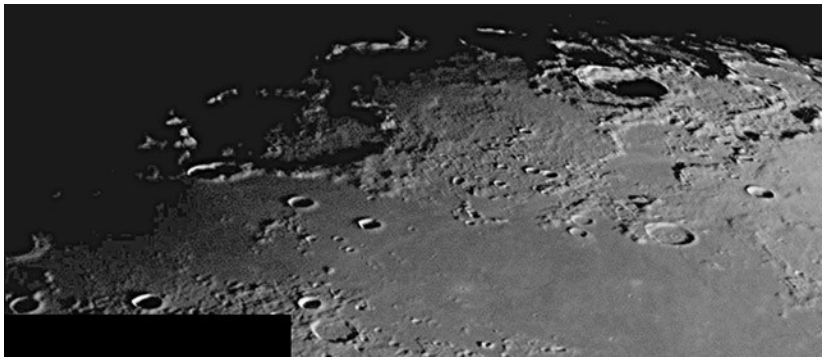
RECENT TOPOGRAPHICAL OBSERVATIONS

ARISTARCHUS - Richard Hill – Tucson, Arizona, USA November 12, 2016 04:24 UT. Seeing 8/10. 8" Mak-Cass, f20, SKYRIS 445M, 656.3 nm filter.

Rising as high as 2km over Oceanus Procellarum is the large block of lunar crust some 200km across called the Aristarchus Plateau, named after the very bright crater Aristarchus (41km across) in one corner of that plateau, the brightest of the large craters on the moon. This region has a lot going on and is worth a night's study. Most obvious is the serpent like valley, Vallis Schröteri with the teardrop shaped end on it called "the cobra's head" with a crater at the very end. This valley has a total length of 165km and it's width varies from 6-8km. Similar to Vallis Alpes there is a rille or rima that runs down this valley but is much more difficult to see, requiring more focal length that my telescope has! You can see a bit of the rima at the tapered end of the valley. The head of the valley points to the crater Herodotus (36km). Below this crater at the bottom of this image is a mild swelling with a dimple in the top. This is Herodotus 1 or Herodotus Omega, a well known dome.

Above Aristarchus is the sharp young crater Vaisala (9km). Note all the rimae between Aristarchus and Vaisala. I can find no name for these features which does seem surprising since they are so eye-catching. At the top of this image is the long ridge Montes Agricola, also about 165km long. They mark the upper edge of the plateau. Off the right end of these mountains is an odd, wide, unnamed valley that appears to be a graben. Below that valley is a thin rille, part of the RImae Aristarchus most of them being too thin to be seen in all but the most oblique lighting. To the right of Aristarchus is the partial crater Prinz and just above it the thin rilles that are the Rimae Prinz. Further right are the Montes Harbinger. These are not on the plateau and are only the very tops of what must have been a magnificent range of mountains before they were flooded by the lavas that made Oceanus Procellarum.

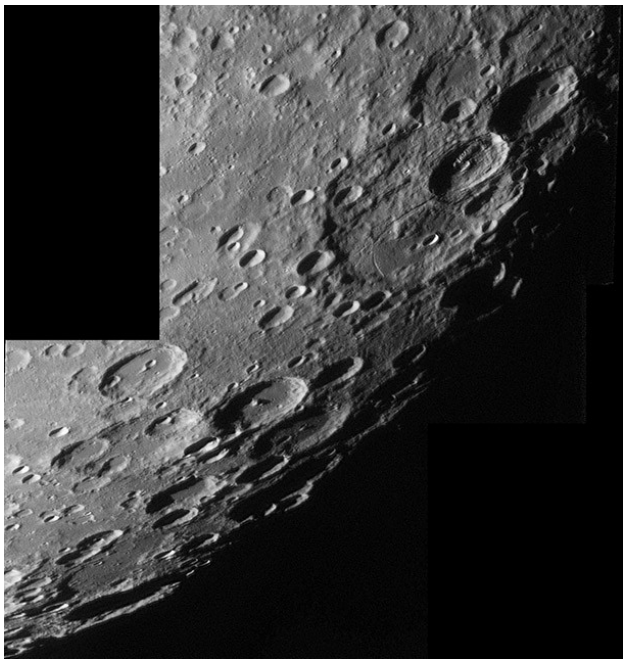


MARE FRIGORIS - Richard Hill – Tucson, Arizona, USA October 12, 2016 02:07 UT. Seeing 7/10. 8" Mak-Cass, f20, SKYRIS 445M, 656.3 nm filter.

It's sunrise on the "Sea of Cold", Mare Frigoris, the flat expanse at the bottom of this image. It stretches for more than twice what you see here from Keldysh north of Atlas and Hercules to Harpalus out past Sinus Iridum. It's the longest mare in selenographic longitude.

The very clear crater on the right side of this image is the 73km Philolaus a rather recent crater less than a billion years old. In contrast is the ring just left of center that is J.Herschel (160km) just over 4 billion years old. You can infer the large difference in age by looks alone. Philolaus with it's sharp terraced walls and central peak just catching the first rays of sunlight hints of little "space weathering" where smaller impacts would erode the walls and terraces. J.Herschel, on the other hand, is only a shadow of its former self. Walls are eroded, the crater itself is flooded and younger craters overlap all around. What could you say about La Condamine (37km) at the bottom of the image and Fontenelle (39km) on the other side of Mare Frigoris and to the right? If you guess they were approximately the same relative age, you would have been right. This is how relative ages of craters were determined until we got samples and could give more precise ages.

RECENT TOPOGRAPHICAL OBSERVATIONS



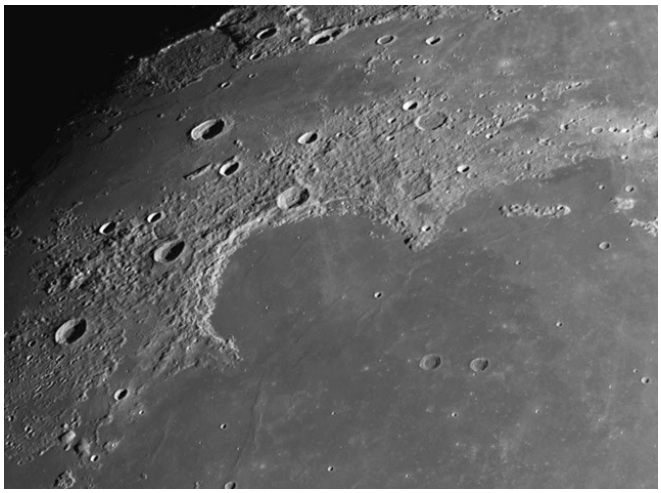
VLACQ – Richard Hill – Tucson, Arizona, USA October 19, 2016 07:02 UT. Seeing 8/10. 8" Mak-Cass, f20, SKYRIS 445M.

Below center in this image is a nicely defined crater with a tiny central peak. This is the 92km diameter Vlacq, named after , Adriaan Vlacq, a 17th century dutch book publisher who authored mathematical tables. Just below and to the right of Vlacq is Rosenberger (99km). An interesting point about these two craters, both are similar size but one has a central peak and the other has a central crater. It turns out that the small crater actually mostly destroyed the central peak in Rosenberg. The crater to the lower left from Vlacq is Nearch (78km) and to the upper left, with an off center small crater on its floor, is Pitiscus (85km).

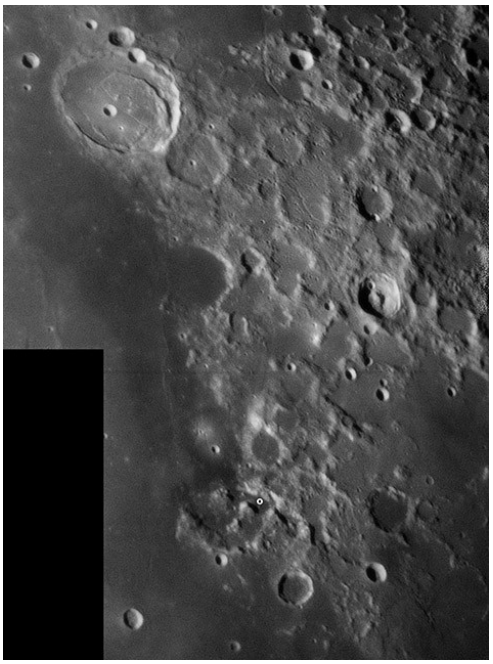
The upper right corner of this image has some real gems. The large crater half in shadow in that corner is Metius (90kim) and below and to the left is Fabricius (80km). Metius sits on the destroyed northern wall of the large basin to the lower left. This is the largest feature in this area, Janssen (196km). Look at the great rilles on the floor of this large crater. Looking at it here It's hard to imagine that Janssen is larger than Ptolemaeus (158km). Looking back at Fabricius, the youngest large crater in this region, notice that there is something other than the central peak in this crater. There is a short range of mountains running roughly north-south in the bottom of this crater. It has been described as a "double central peak" but I suspect this range is of a separate, very recent origin since in LROC images it shows a rima coming off the south end like little river. Since it is the youngest crater in the area a source for the material being deposited would have to be some distance away. All these features and more make this region worth study at any sun angle

EARTHSHINE ON CRESCENT MOON-
Franco Taccogna - Gravina in Puglia (BA), Italy. November 2, 2016 16:41 UT. Colong. 305.4º. 150mm f/10 NexStar-SE. Nikon 7100, ISO 400, exp. 10s.

RECENT TOPOGRAPHICAL OBSERVATIONS



SINUS IRIDUM –David Teske - Starkville, Mississippi, October 13, 2016 01:49 UT, Seeing 4/10, North/Up, East/Right, Celestron 9.25" Edge HD SCT. Malincam GMTm..



POSIDONIUS-VITRUVIUS - Richard Hill – Tucson, Arizona, USA October 19, 2016 06:34 UT. Seeing 7/10. 8" Mak-Cass, f20, SKYRIS 445M, 656.3 nm filter.

On the eastern shore of Mare Serenitatis we find a north-south string of attractions that make any selenographer's evening. At top in this image is the 99km crater Posidonius. On its floor are several nice rimae worth a few minutes study. Further east (right) we see another larger crack, Rima G. Bond. Another system of these fissures extends across the crater at the southern wall of Posidonius, Chacornac (53km). A little further south is a smaller version of Sinus Iridum, this one being Le Monnier (63km) about one seventh the size of the former. To the east of Le Monnier is the very clear crater Romer (41km) and between them, closer to Romer, is the north-south rille Rima Romer which if followed north appears to be involved with Rima G. Bond.

Near the bottom center of the image is the very round Vitruvius (31km) and to its left is Dawes (19km) and to the right Gardner (also 19km). Just above the former is a broken ring with several mountains contained within. This is the site of the Apollo 17 "Taurus-Littrow" landing site (marked with a "o" here). The crater Littrow (32km) is just above the landing site. Once you learn this site it stands out at just about any phase. The three, nearly horizontally arranged mountains with the one below become quite distinctive.

LUNAR GEOLOGICAL CHANGE DETECTION PROGRAM

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

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

Firstly I would like to wish our readers a Happy Holidays for this time of the year. Observations for October were received from the following observers: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Alpetragius, Alphonsus, Aristarchus, Atlas, Endymion, Eratosthenes, Plato, and Timocharis. Alberto Anunziato (Argentina – AEA) observed: Fracastorius, Heraclitus, Maurolycus, Metius, Sabine, and Theophilus. Francisco Cardinalli (Argentina – AEA) observed: Alphonsus and Mare Vaporum. Anthony Cook (Aberystwyth/Newtown, UK – ALPO/BAA) imaged several features. Marie Cook (Mundesley, UK – BAA) observed: Atlas and Plato. Desireé Godoy (Argentina – AEA) observed: Linne and Proclus. Marcelo Grundlach (Bolivia – IACCB) was unable to observe due to poor weather, so has sent in an earlier observation from 2015 of Atlas, which has been added to our database. Rik Hill (Tucson, AZ, USA – ALPO) observed: Le Monier, Mare Frigoris, and Valcq.

Figure 1. Winnie Cameron in the garden, with her observatory, at her home in Sedona, AZ, USA - taken by Tony Cook in the early 1990's.

News: 2016 has been a really bad year for the loss of famous lunar scientists and amateurs alike. I have just come across the news that Winifred Sawtell Cameron (known as Winnie Cameron to many of us), passed away on Mar 29th this year at her home at Lehigh Acres, Florida. Winnie carried on the LTP study torch from Barbara Middlehurst, whilst working at NASA's Goddard Space Flight Center. She organized an observing campaign with ten specially built Trident electronic Moon Blink devices, distributed to professional observatories across the USA, in the 1960's. These made LTP observing an order of magnitude more analytical than it had been. Rather than relying upon the human eye sight of observers to tell if there were colors on the Moon, often associated with LTP, her system utilized a monochrome TV-like camera equipped with a color filter wheel. Red and blue filters would

be alternated in front of the camera automatically. Any slight hint of red or blue on the Moon would make the black and white TV picture flash or blink; the stronger the effect, the stronger the color. The electronic Moon Blink device was unphased by the false color effects of atmospheric spectral dispersion, or by chromatic aberration (these just caused images to change in position slightly, or image scale), but would detect real color on the Moon. The system was not without it problems as there were sometimes mechanical faults, and it had to be calibrated with neutral density filters to compensate for reddening from absorption in our atmosphere as the lunar altitude varied. Also, I am not entirely sure that it compensated well for the fact that the filters used, both red and blue Kodak Wratten filters, leaked near infrared light, which might have lowered the devices color sensitivity. Three detections of LTP were made (Alphonsus 1964 Oct 27, Aristarchus 1965 Aug 21, and Aristarchus 1965 Nov15) with these device (at the time of the Oct 1966 NASA Contractor report), however the numbers of hours that observing was attempted has not to my knowledge been published. A rival system, using a much larger telescope at the Coralitos Observatory in New Mexico, which took 6466 hours of observations with a different TV camera/filter wheel system failed to find any LTP – though again near-IR filter leakage may have reduced the color sensitivity of that system too, and no refereed papers were ever published about the Corralitos results, unlike Winnie Cameron's Project Moonblink. With hindsight, I am very surprised that in none of the publications that resulted was there any mention about natural surface color on the lunar surface e.g. the blueness of Aristarchus and other young impact craters – again this may reflect the color sensitivity of such systems using near-IR leaky filters.

Winnie Cameron went on to produce a NASA catalog of LTP in 1978, the most comprehensive catalog of historical reports of this phenomenon. She readily admitted that it was produced in a bit of a hurry towards the end, hence some typographical errors, and she was displeased that the NASA archival process kept it only as a poor reproduction microfiche copy. Although in this newsletter we are sometimes critical of the observations that have ended up in the catalogue, and the high weights attributed to some of the observations, please remember that we judge with hind sight and modern observing techniques, such as repeat illumination observations, which have shown that at least some of these reports were just normal appearances of craters. What is interesting for the lunar science community is that a small number of LTP remain unexplained, despite many repeat illumination observations with modern equipment, and attempts to simulate terrestrial atmospheric effects and telescope resolution. A catalog extension was produced by Winnie covering 1978 to 2005, and was entered into a spread sheet by Jerry Stuart - a retired NASA JPL Viking Lander engineer, and son of Leon Stuart (The observer who photographed a possible lunar impact flash in 1953). Winnie legacy includes enabling Project Moon Blink, which resulted in three observational reports of LTP, several papers on statistical analysis of LTP, and the extensive fact finding work that went into her two LTP catalogs. She was one of the first of three female astronomers to work for NASA, was on duty during John Glenn and Scott Carpenter's orbital Mercury missions, and participated in the selection of the Apollo landing sites. I only met her once, but was amazed by her incredible memory – capable of recalling details about any of the LTP reports that I asked her about, without the need to consult her card index system.

NASA's LROC team have found over 200 new fresh impact craters that have formed over the duration of the LRO mission, by comparing old and new images of the surface. They have also found over 14 thousand surface changes, which they refer to as "splotches" which show no obvious craters, however for now they consider these are probably impact craters or ejecta at below the resolution of the camera. They estimate that some 99% of the surface gets "churned" (or at least the top few mm to cm) over by these erosional effects in 81 thousand years – a lot faster than anyone had previously suspected. The LRO mission has now been granted an extension till 30 Sep 2018, to continue looking for changes via repeat illumination imaging, akin to the technique we use in the Lunar Section.

Just a reminder to readers, that for the next month I am still probably 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 . 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 over this time period, but please do not hesitate to send observations in.

LTP Reports: No LTP reports were received during October. However one LTP report has emerged after I

checked my Twitter account (I normally just login to post alerts - not normally to read notifications/messages sent from others). Anyway back on 2016 Jul 17 UT 03:49 Paul Zeller (Indianapolis, IN, USA - ALPO) imaged the Aristarchus area, and recorded what looked like a pseudo peak at the center of the floor of Herodotus (See Fig 2 – Left). There have been a number of reports of this effect in the past, but all were seen visually. However we must be careful, Paul is wary that it might be an image artifact as the image resolution was not high, and I tend to agree with him. There is also another dark spot, albeit a smaller one, further north in the image, and some evidence that Paul's image has some slight motion blur in the N-S direction. Nevertheless I think it is worth giving a weight of 1 for now, until we find out if anybody else was observing at the time. Two other observers were studying the area that night, Alberto Anunziato (AEA, Argentina) observed the crater visually from 01:38-01:45UT, and reported nothing unusual. Marcelo Gundlach (Bolivia) imaged at 05:08 UT (See Fig 2 (Right)) and recorded the normal appearance too.

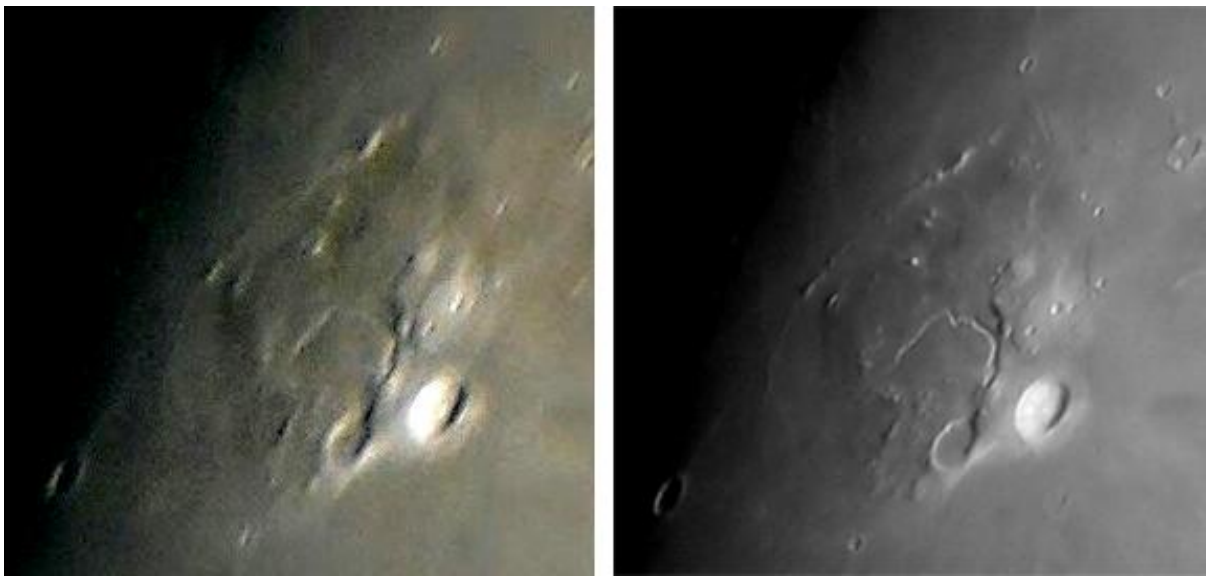


Figure 2 Herodotus, just to the west of Aristarchus, orientated with north towards the top. **(Left)** A color Image by Paul Zeller (ALPO) from 2016 Jul 17 UT 03:49, showing a pseudo-peak effect on the floor of Herodotus. **(Right)** A monochrome image by Marcello Gundlach from 2016 Jul 17 UT 05:08.

Routine Reports: Below is a selection of reports received for August that can help us to re-assess unusual past lunar observations. Unfortunately I have to leave my usual analysis off due o pressure of work, but we will summarize how the weights have changed in the January newsletter in the form of a table.

Maurolycus: On 2016 Oct 08 UT 00:36 Alberto Anunziato (AEA) imaged (Fig 3) this crater under similar illumination (to within ±0.5˚) to the following report:

Maurolycus 2000 Aug 06 UT 23:45 observed by Gundlach (Bolivia, telescope with Sony Camcorder) "Observer reported capturing an abnormality near the rim. Darling, suspects that this is a normal appearance based upon a later observation under similar illumination." ALPO observation. ALPO/BAA weight=1. **[REF 9]**

Alphonsus: On 2016 Oct 9 UT 00:24-00:27 Francisco Cardinalli (AEA) imaged (See Fig 4) this crater under the same illumination conditions (to within ±0.5˚) to the following two reports:

Alphonsus 1958 Nov 19 UT 04:00-04:30 Observed by Poppendiek. Large plume-like diffuse cloud over central peak, very large compared to central peak (@ approx 30 km diameter) with intensity much different from other parts. Brightness between walls and shadowed floor. Would take 3 minutes to collapse, so continuously fed. 13-14 days later, at SS, central peak was normal. Kuiper took photos after Kozyrev's observations, but saw nothing abnormal. Drawing. Haas saw nothing in 12inch reflector at the time. Cameron 1978 catalog LTP ID=705 and weight=4. ALPO/BAA weight=2. **[REF 10]**

Alphonsus 1966 Jun 26 UT 04:30-04:40 Observed visually by D.Harris and E.Arriola (Whittier, CA, USA, 19" reflector x146, and spectrum, S=4, T=1-0) "Absorp. spectrum (visual) of c.p. band at 475+/-5nm (1st est.); 2nd est. at 485+/-5nm. Band degraded towards the viol. Band nr. Hydrogen Beta. as if abnormally broadened. So sign of anything unusual visually in central peak in white light. Absorption appeared only on C.P., not over walls. Calibration corrections put band at 491+/-4nm" NASA catalog weight=5. NASA catalog ID #948. ALPO/BAA weight=5. **[REF 11]**

Figure 3. Maurolycus from a subsection of an image of Heraclitus, taken by Alberto Anunziato (AEA) on 2016 Oct 08 UT 00:36. Orientated with north towards the top.

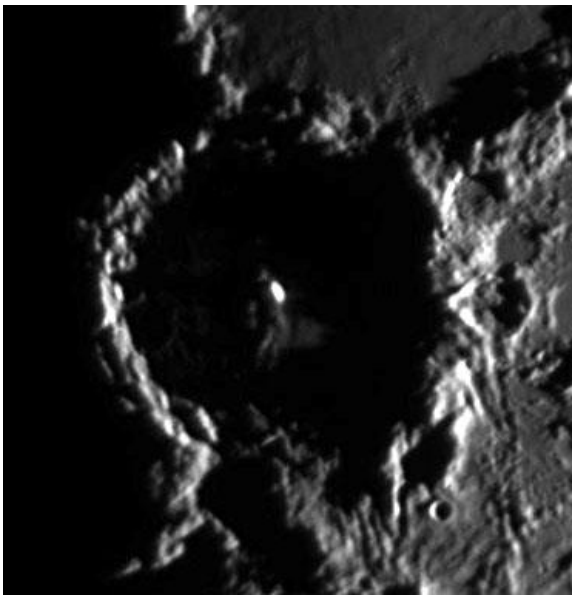


Figure 4. Alphonsus from an image by Francisco Cardinalli (AEA) taken on 2016 Oct 9 UT 00:24, orientated with north towards the top.

Linne: On 2016 Oct 9 UT 02:53 Desireé Godoy (AEA) imaged Mare Serenitatis (Fig 5) under the same illumination and topocentric libration (both to within ±1˚) to the following report from Johann Schmidt, as seen from Athens in 1866:

In 1866 Oct 16 at UT 23:00 Schmidt (Athens, Greece, 7" refractor) observed that Linne crater had disappeared and been replaced by a white patch with a small hill or craterlet. White part seems to increase in size. Cameron says probably not a LTP. The Cameron 1978 catalog ID=145 and the weight=0. The ALPO/BAA weight=1. **[REF 12]**

Figure 5. Mare Serenitatis on 2016 Oct 09 UT 02:53, with Linne located just slightly above the center. Taken by Desireé Godoy (AEA), with the image orientated with north towards the top.

Plato: On 2016 Oct 10 UT 00:55-01:30 Jay Albert (ALPO) observed this crater under the same illumination conditions (to within ±0.5˚) to the following report:

Plato 1970 Apr 15 UT 05:38-05:40,05:51-05:53 Observed by Cross (Las Cruces, NM, USA, 108mm Schiefspiegler or 152mm refractor, S=6, T=5.5=VG). The observer noted a lack of detail inside the crater floor, despite visibility of detail outside the crater. Spectra were normal for color. (obs. similar to historic reports. Apollo 13 watch?)" NASA catalog weight=1 and catalog ID #1253. ALPO/BAA weight=2. **[REF 13]**

Jay commented that the "edges of the crater were sharply defined with the E wall shadow black and sharp along the floor and the W landslip brightly outlined by sunlight. The N part of the floor was slightly lighter running E-W. The central craterlet was seen and the N pair of craterlets sometimes seen with difficulty". He did not see the S or W craterlets, and saw no color in or around the crater.

Plato: On 2016 Oct 10 UT 18:35-18:40 Marie Cook (BAA) observed this crater under the same illumination conditions (to within ±0.5˚) to the following report:

Plato 1966 Jun 27 UT 21:40-21:55 Observed by Robinson (Teignmouth, England, 10.5" reflector) and Sartory (England, 8.5" reflector + Moon blink) "Color (red?) on SE wall detected by Eng. moon blink sys. (confirm)." NASA catalog weight=5. NASA catalog ID 949. ALPO/BAA weight=3. **[REF 14]**

Marie commented that the detail was sharp and clear with no sign of atmospheric spectral dispersion. Using filters she could see no blink on the SE wall. She also checked out the SW wall and saw no blink here either. In other words the crater was normal in appearance. Observations had to cease due to increasing cloud cover.

Anaximander: On 2016 Oct 12 UT 02:07 Rik Hill (ALPO) imaged (in monochrome) Mare Frigoris (Fig 6) and in doing so, covered the crater Anaximander under the same illumination conditions (to within ±0.5˚) to the following report:

On 1963 Nov 27 at UT 03:00 Olivarez (New Jersey?, USA, 17" reflector) and Fisher (Colfax, CA, 8" reflector, x300) observed a red glow in Anaximander in the dark part of the Moon. The Cameron 1978 catalog ID=784 and weight=5. The ALPO/BAA weight=3. **[REF 15]**

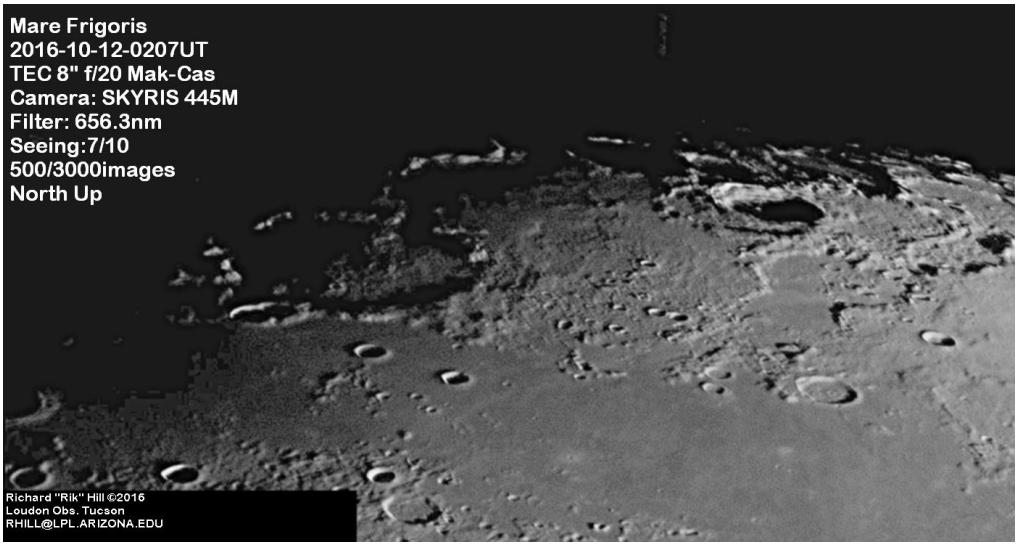


Figure 6. J. Herschel and Anaximander by Rik Hill (ALPO), orientated with north towards the top.

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

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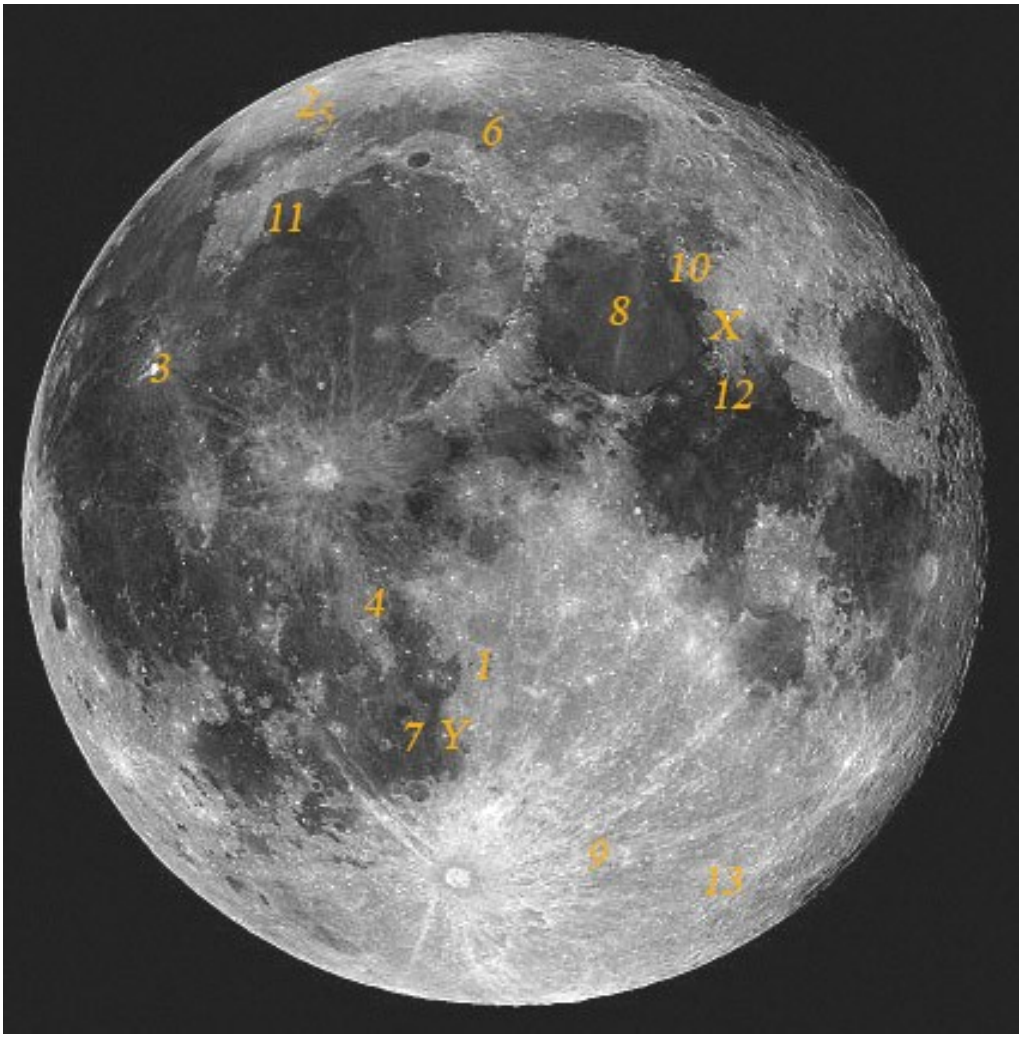
KEY TO IMAGES IN THIS ISSUE

1. **Alphonsus**
2. **Anaximander**
3. **Aristarchus**
4. **Fra Mauro**
5. **J. Herschel**
6. **Mare Frigoris**
7. **Mare Nubium**
8. **Mare Serenitatis**
9. **Maurolycus**
10. **Posidonius**
11. **Sinus Iridum**
12. **Vitruvius**
13. **Vlacq**



FOCUS ON targets

X = Montes Taurus & Taurus-Littrow Valley
Y = Rupes Recta