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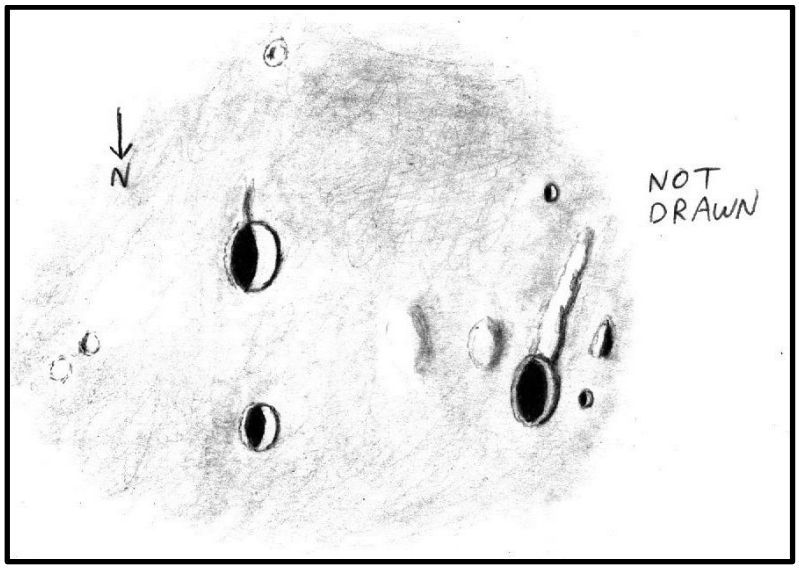
THE LUNAR OBSERVER

A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.
EDITED BY: Wayne Bailey wayne.bailey@alpo-astronomy.org
17 Autumn Lane, Sewell, NJ 08080
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – JANUARY 2016

GALILAEI



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
October 26, 2015 03:32-03:58 UT, 15 cm refl, 170x, seeing 8-9/10

I sketched this crater and vicinity on the evening of Oct. 25/26, 2015 after the moon hid ZC 109. This was about 32 hours before full. Galilaei is a modest but very crisp crater in far western Oceanus Procellarum. It appears very symmetrical, but there is a faint strip of shadow protruding from its southern end. Galilaei A is the very similar but smaller crater north of Galilaei. The bright spot to the south is labeled Galilaei D on the Lunar Quadrant map. A tiny bit of shadow was glimpsed in this spot indicating a craterlet. Two more moderately bright spots are east of Galilaei. The western one of this pair showed a bit of shadow, much like Galilaei D, but the other one did not. Galilaei B is the shadow-filled crater to the west. This shadowing gave this crater a ring shape. This ring was thicker on its west side. Galilaei H is the small pit just west of B. A wide, low ridge extends to the southwest from Galilaei B, and a crisper peak is south of H. Galilaei B must be more recent than its attendant ridge since the crater's exterior shadow falls upon the ridge. Cavalerius U is the pit south of Galilaei B, and is very much like Galilaei H. A low, domelike swelling is just northeast of Galilaei B, and an even more subtle swelling is indicated by weak shadowing to its east, toward Galilaei. The areas southeast and southwest of Galilaei appear to be very smooth.

LUNAR CALENDAR

JANUARY-FEBRUARY 2016 (UT)

2016		UT	
Jan	02	05:30	Last Quarter
	02	11:53	Moon Apogee: 404300 km
	03	18:45	Moon-Mars: 1.6° S
	06	23:57	Moon-Venus: 3.3° S
	07	04:57	Moon-Saturn: 3.6° S
	08	17:56	Moon Extreme South Dec.: 18.4° S
	10	01:30	New Moon
	14	15:48	Moon Descending Node
	15	02:10	Moon Perigee: 369600 km
	16	23:26	First Quarter
	20	02:16	Moon-Aldebaran: 0.5° S
	21	16:41	Moon Extreme North Dec.: 18.4° N
	24	01:46	Full Moon
	26	05:10	Moon-Regulus: 2.8° N
	27	23:58	Moon Ascending Node
	28	01:14	Moon-Jupiter: 1.6° N
	30	09:10	Moon Apogee: 404600 km
Feb	01	03:28	Last Quarter
	01	08:48	Moon-Mars: 3° S
	03	19:05	Moon-Saturn: 3.8° S
	05	04:34	Moon Extreme South Dec.: 18.3° S
	06	07:32	Moon-Venus: 4.5° S
	06	16:47	Moon-Mercury: 3.9° S
	08	14:39	New Moon
	10	20:46	Moon Descending Node
	11	02:42	Moon Perigee: 364400 km
	15	07:46	First Quarter
	16	07:41	Moon-Aldebaran: 0.4° S
	17	23:18	Moon Extreme North Dec.: 18.3° N
	22	12:48	Moon-Regulus: 2.7° N
	22	18:20	Full Moon
	24	03:58	Moon-Jupiter: 1.9° N
	24	06:10	Moon Ascending Node
	27	03:28	Moon Apogee: 405400 km
	29	18:16	Moon-Mars: 3.9° S

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
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

CALL FOR OBSERVATIONS:

FOCUS ON: Mare Nubium

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 2016** edition will be **Your Favorite Feature. This is your opportunity to show your favorite images and tell us why you like them.** 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):

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

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

Deadline for inclusion in the Your Favorite Feature article is February 20, 2016

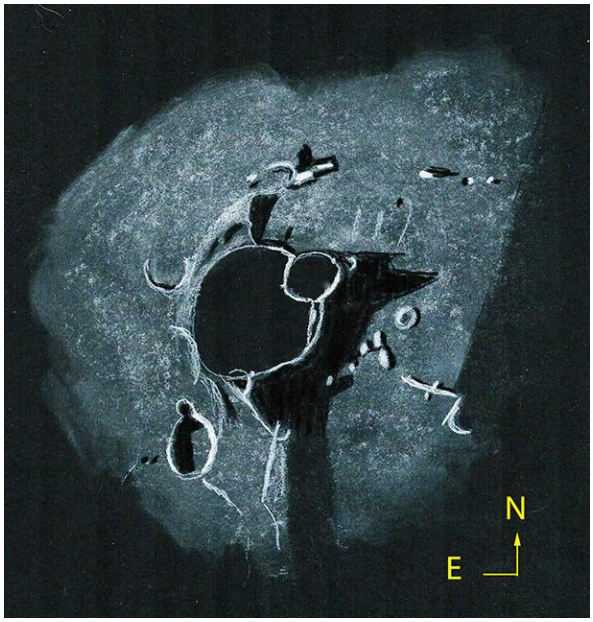
FUTURE FOCUS ON ARTICLES:

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

Subject	TLO Issue	Deadline
Kepler	May 2016	April 20, 2016

THEBIT

David Teske



I made this sketch on the early evening of 20 October 2015 (21 October 2015 UT) using a 60 mm f/16.7 fl 1000 mm Moon Raker refractor telescope. A 5 mm Baader Planetarium Hyperion eyepiece was used with a magnification of 200. The telescope was mounted on a Losmandy GM8 mount. The observation was made between 2345 and 0037 UT. Seeing was 7/10 under mostly clear skies. The moon was waxing crescent phase. Medium was white and black pastel with white pencil on black cardstock. The observation was made by David Teske in Starkville, Mississippi.

Thebit is a wonderful triple crater that was lit by the rising sun. Thebit is 57 km across and is mostly in shadow. On the northwest side of the crater is slumping. North of this slumping is Thebit A, a 20 km diameter crater that overlaps Thebit to the northwest. A is in shadow. Northwest of this is the 10 km diameter Thebit L. There is impressive shadow to the west of this triple crater formation. During the duration of the study the shadows noticeably shortened and some shadow left the floor of Thebit. Southwest of Thebit I have five low hills drawn. Due west of Thebit is Thebit J, a 9.6 km diameter shallow crater. Southwest of this is a hill with a hook of a partial ring to the southwest. This marks the terminator. The Straight Wall marks the terminator north-northwest of this partial ring. Northwest of Thebit L are some small hills on "ancient Thebit" and some low ridges leading towards Thebit. North of Thebit some hills mark the shore of ancient Thebit. The rim of Thebit is wide to the north of Thebit and thins to the southeast. The rim to the north has some depressions in it as indicated by shadows. East of Thebit is a degraded partial ring. Southeast of Thebit is the 30 km crater Purbach G. To its north is a small crater that makes the crater appear rather like a bowling pin. Southeast of G, the large crater Purbach is not drawn. From the south side of Thebit running southwest is a ridge. The end of the ridge near Thebit has a partially circular ring that extends into Thebit.

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ANOTHER CRACK IN THE MOON

Richard Hill
Tucson, Arizona USA

This is such a wonderful sight when you first come upon it. My first reaction has more than once been to say that there must be a hair in the optics but it's just the an old friend the "Straight Wall", now called Rupes Recta (once even called "the Railroad!). This 114km long fault extends to the northwest with a cluster of mountains on the south end that used to be called the Stags-Horn Mountains due to the prominent curved mountain in the chain. To the left of the rupes is the very circular 17km diameter crater Birt with the little Birt A on its right wall. Note Rima Birt that runs north from the left side of the crater, roughly parallel to the rupes. This is about the best image of this feature that I ever captured. Further to the left is the 15km crater Nicollet deep in shadow. To the north of that crater you can see a few isolated mountains and mixed in are some domes.

***Figure 1.* Rupes Recta.** *Richard Hill. Tucson, Arizona, USA March 29, 2015 02:36UT. Seeing 8/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 656.3 nm filter.*

In the upper right corner of this image is the great 100km crater Arzachel with its terraced walls and the wonderful rimae on its floor. Left of Arzachel is the 41km crater Apetragius with it's odd "egg-in-a-basket" central peak. I believe I first read that description in Patrick Moore's book THE MOON back in the early 1960s. See the peninsula of highland material sticking out to the left into Mare Nubium? This interesting feature is Promontorium Taenarium. Further to the left of Apetragius is the flooded 24km crater Lassell and just to its left is an interesting cluster of small craters forming a cat's paw.

A very interesting area all in all!

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Robert Garfinkle, Union City, California USA, added the following historical information.

The "Stag's-Horn Mountains" (lat 23.50°S, long 07.05°W) were named by William Birt in 1863. The International Astronomical Union (IAU) did not adopt this designation in 1932, because neither Edmund Neison nor Julius Schmidt used it on their 1870s lunar maps and thus it was not included by Mary Blagg and Karl Müller in *Named Lunar Formations* (1932-35). In the 1950s, Hugh Percy Wilkins revived this "Stag's-Horn Mountains" designation by adding it to his 300-inch map and submitted this "new" name to the IAU, but they did not accept this naming. Thus, it remains an unofficial lunar name. These crater rim arcs combined with the thin line of the rupes, give the impression of a lunar sword. Notice the apostrophe in the word Stag's.

***MARE* NUBIUM, or "*MARE PANDEMONIUM*"?**

Alberto Martos**,** Carlos de Luis, Ruth Ortega, Luis Leyva and Antonio Noya
Madrid Amateur Astronomical Association.

The magmatic *planitia* called Mare Nubium, completely occupies the main area of an old basin located at the Mid-southwestern lunar region. Its 690 km diameter rim, ranks it as one of the largest one-ring basins in the nearside of the Moon (Spudis). But this ring is completely out-of-sight, beneath the heavy magmatic ejections that fell upon its original rim and hid it under a thick coating of debris, during the so-called "cataclysmic bombardment epoch", that underwent all Solar System bodies. Such an old landform, along with other similar impact structures formed around, were originated in pre-Nectarian times, as it couldn't be otherwise.

Later on, magmatic lava soared from mantel depths, flowed into the basin, filled up the cavity and spilled over the surrounding lands, unifying all their particular appearances under an all-black aspect layer. So, spotting the only visible remnant of the ring of this basin, requires hawkeyed and archaeologically minded observers, otherwise the novice (as these writers are) will miss its presence, no matter how hard he tries to identify the feature. This is the reason why we nickname it "Mare Pandemonium".

We observed this area several times, but last one was on November 20th, from a large park downtown Madrid, under clear skies and using several telescopes of different types and sizes. However we have collected our pictures from old files taken with a 20 cm reflector and under some better conditions (out of Madrid).

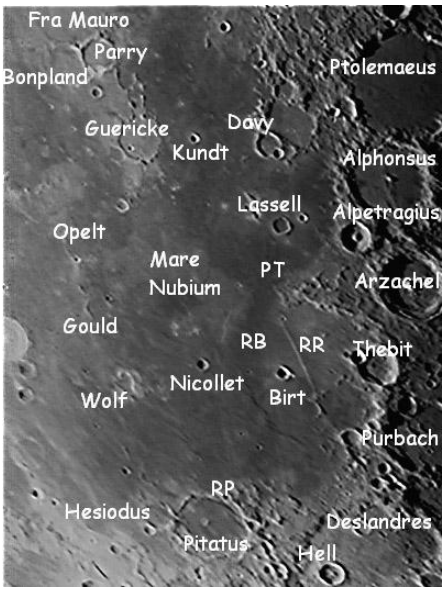


PHOTO 1. *Mare Nubium (Eastern Border). North up. PT=Promontorium Taenarium; RR=Rupes Recta; RB=Rima Birt; RP=Rimae Pitatius.*

Mare Nubium is located among several well preserved impact structures, formed many millions of years later. As shown in photo 1, the Eastern border is framed by well unmistakable large features, as walled plains Ptolemaeus, Deslandres (last time "focus on" target for TLO observers) and Purbach; mountain ring Alphonsus, and craters, Alpetragius ("the Juicer") Arzachel, and Thebit.

We realized that Mare Nubium dark floor is far from being uniformly tinted, but its magma show some well noticeable differences in hue, which bring to light their origin as successive lava outflows. Darkness increases towards the center of the basin, a facet that our picture reproduces faithfully. Besides these characteristics, we found notorious the lack of evenness shown by the floor, as phantom craters can be spotted hither and thither, as the trio formed by the walled plain Fra Mauro (target point for Apollo 12 mission), Bonpland and Guericke, and the craters Parry, Gould, Opelt, and Wolf. Two more phantom craters, Kiers and Lubiniezky, were perceived in the western region during our second-round observation.

All these strange structures are actually very old impact craters, formed on the basin floor millions of year before the lava outflow. So that, when the volcanic episode got underway, those craters became flooded and faded away, only the very rim of their ramparts being visible. The closer to the basin border, became the more visible, because the lava thickens towards the center. We understand that this is the reason why Opelt, Gould and Wolf are worse visible than Fra Mauro, Parry and Bonpland.

At the southern end of Mare Nubium, there is another walled plain almost flooded by magma: Pitatus. This impact structure belongs to the category of Floor Fractured Craters (FFC) just because it rides on the very rim of the basin. As a matter of fact, the floor of this crater cracked as a result of the collapse of the basin floor, triggered at its time by the formation of a *mascon* (mass concentration) on the

bottom of the basin. A *mascon* consists of a bunch of solidified lava (magma) gathered together at the center of the basin, whose density overpasses that of the equivalent liquid lava. The cracks in Pitatus floor shows up as a set of curved grabens (rilles) running along the Northern wall, called Rimae Pitatus.

Inside Mare Nubium's basin, a sight-appealing feature called our attention from the very beginning of our life as lunar observers: Rupes Recta or the Straight Wall. It is all about a step fault, or escarpment, 110 km long and as much as 400 m height (although in Wood's opinion it may reach 450 m). Despite its awesome name (rupes is Latin for abyss), the scarp is rather gentle, a 20 deg slope.

A comparison between photo 1, taken with the fault under waxing illumination, and photo 2, taken under waning illumination, makes evident that the fault configuration is step-down from East to West. And this assumption is relevant to discern its origin. Although a widely supported explanation relaying on the fact that the fault points at the center of the Imbrium basin, so its origin must be a crack in the lunar crust triggered by the Imbrium impact, the stepping-down towards the center of the Nubium basin might offer another point of view.

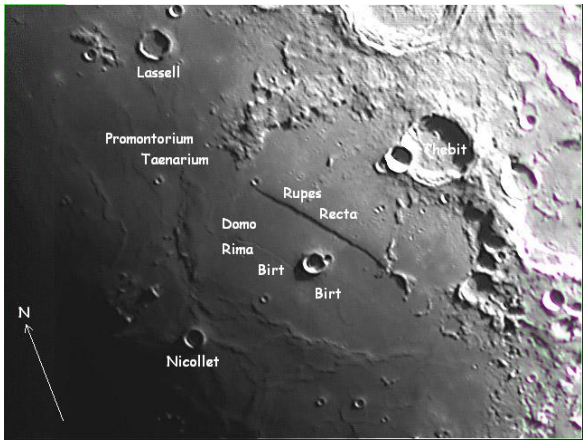


PHOTO 2. *Rupes Recta &Rima Birt.*

As Wood points out, Rupes Recta lies almost exactly at the center of an old phantom crater. And we can see the rim of this crater "splashing" into the mare shores, in Promontorium Taenarium. This rim can be traced back running around crater Thebit, but further on is disintegrated by several impact craters. Nevertheless, it can be pinpointed again, as an anonymous wrinkle ridge that runs under the Mare Nubium magma and reaches close to the small crater Nicollet.

This phantom crater (Old Thebit for Woods) belongs also to the FFC family, as its position riding on the rim of the basin, permits us to assume. If we are allowed to suppose this nature, then Rupes Recta, splitting the crater and properly oriented, becomes the visible fracture originated by the basin floor collapse.

And this is not all, because starting North of crater Birt, we can find Rima Birt, a narrow rille running parallel to Rupes Recta. If one contents himself with the view of this rille and looks for another feature, one will loose a great, but difficult show. There is a dome (a lunar volcano) at the Northern end of the rille. This dome is topped with a small vent, which served as a relief valve for the lava flowing along Rima Birt in ancient times. We recognize that viewing these delicate objects in the picture is a lot easier than thru the telescope.

Keeping up with the phantom features, we may observe the Southern end of Rupes Recta. If the whole scarp recalls a sword, the Southern end is in the same way the hilt. But a close look at this hilt will reveal another phantom crater, whose position matches with an FFC structure..

As we look towards North of Rupes Recta region, we find another sight challenging feature: Catena Davy. Starting due West of Ptolemaeus, it runs across Davy Y crater and is composed of many small craterlets in an all-in-line array. Photo 3 shows the delicate aspect of the chain, whose craterlets are too small to be resolved with our 20 cm reflector, but four of them are clearly discernible. And also, a thin whitish line can be seen joining all, as a symptom that is composed of even smaller pits.

The origin of this chain poses a puzzle for selenographers. By their size, they ought to be secondary craterlets from a larger impact structure. But the problem is that there is not such a larger structure in a nearby place. All other craters located around Davy are much older than catena Davy's members. And they also do not look like volcanic features, as we see in Alphonsus floor. So its origin is uncertain.

A rain of small debris from a larger asteroid, which might have been disrupted by Earth tidal forces before impacting the Moon, seems to us unlikely, because the Roche's limits must have a limit in itself. Otherwise the shepherd satellites in Saturn rings would have been torn to pieces by Saturnian tides.

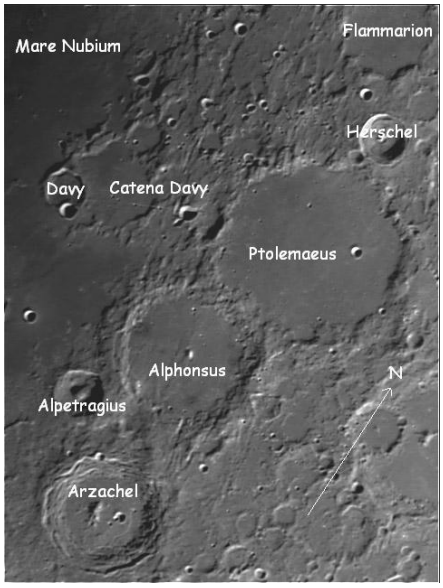
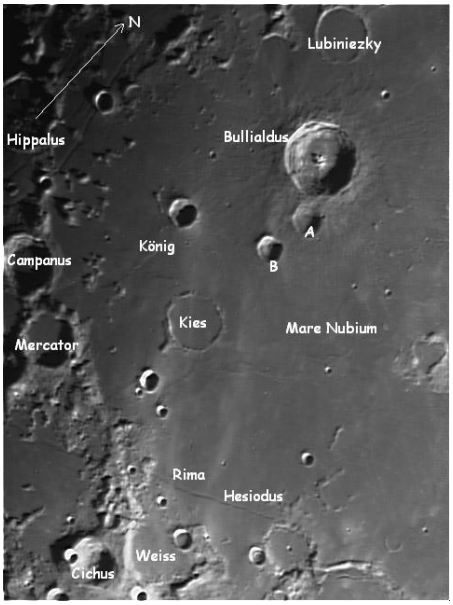


PHOTO 3. *Region of Catena Davy.*

But tides act as a result of differential gravitational strengths in opposite sides of a planet, developed by differential of distances from these sides to the body that produces the tides. So, the smaller the asteroid, the smaller the tides because the small difference of distances.

The western part of Mare Nubium could not be observed in its due time because the weather conditions. We have already mentioned a couple of phantom impact structures, Lubiniezky and Kies. Besides these very old craters we can see a very young one, Bullialdus, recognizable by its unscratched aspect. Photo 4 shows the region and the concerned structures.



But the most important features captured in these photos, lie at the bottom. As we stated at the very beginning of this report, the ring of Mare Nubium basin was heavily destroyed by the violent phenomena occurred during the cataclysmic epoch, well after the formation of the basin. Only skillful observers can discover the remnants of this ring, among the chaotic terrain visible at the eyepiece.

PHOTO 4. *Southwestern Border of MareNubium.*

Nevertheless, the South-western part of this ring has been identified by some sharp sighted specialists, as a heavily tormented terrain located between craters Weiss and Mercator. But it is not difficult to extend this arcuate rocky terrain until crater Hippalus. Still around the ring, we could see the dark mare magma crossed by whitish radiations which converge at the splendid crater Tycho.

And finally, a very long rille (300 km), called Rima Hesiodus, crosses the rim remnant as a straight line. Although it does not reach so far, it runs in the direction of Mare Nectaris (out of the photos).

EPHEMERIS

Num.	Date	Time	Moon age	Colong.	Ang. size	LibLat	LibLon
Photo 1	2008-11-20	03:15:00	22,17	175º 18'	31' 45"	2º 24'	7º 34'
Photo 2	2012-10-23	19:17:00	08,30	014º 30'	31,40'	-6º 03'	6º 21'
Photo 3	2011-01-13	20:59:00	09,50	21º 18'	30,49'	-5º 14'	-5º 49'
Photo 4	2011-01-14	21:39:00	10,53	33º 48'	30,90'	-4º 13'	-6º 31'

Telescopes:

Newtonian reflector 20 cm f/7.2
Camera: Philips TouCam Pro.

FOCUS ON: MARE NUBIUM

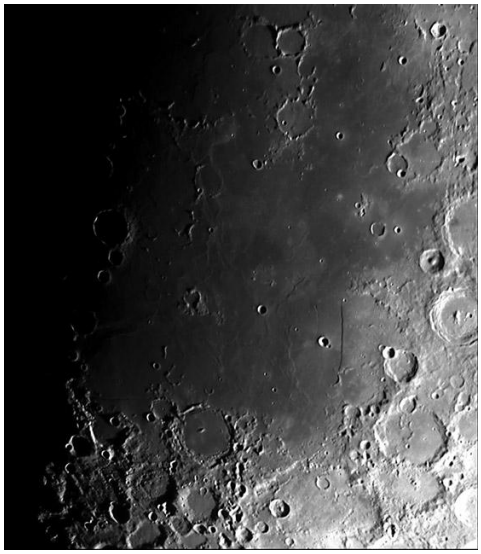
By Wayne Bailey

Coordinator: Lunar Topographical Studies

Mare Nubium (fig. 1) is one of the few maria in the southern half of the moon. Observationally, the boundaries of its basin are obscure, particularly to the north and northwest, where Nubium, Mare Cognitum and Oceanus Procellarum blend together in a continuous, dark mare surface spotted with lighter islands of highland material. Palus Epidemiarum also confuses the boundaries to the southwest. On the east, several large craters, and a multitude of smaller structures mark the edge of the mare, but even there, any remnants of a basin rim are difficult to identify. Despite its relative obscurity, there are numerous interesting features in the vicinity.

Figure 1. Maurice Collins, Palmerston North, New Zealand. December 25, 2015 10:15-10:18 UT. FLT-110, f/7.

An overall view of Mare Nubium can be seen in figure 2. The best known feature in the area is Rupes Recta, also known as the Straight Wall, which is well described in the accompanying article by Rik Hill. East of the Straight Wall, between the craters Arzachel and Purbach, is Thebit. The overlapping trio, Thebit, Thebit A and Thebit L make an interesting sight. David Teske gives more discussion of Thebit in his accompanying article. Martos, de Luis, Ortega, Levya & Noya also provided an extensive discussion of the Mare Nubium area, so I'll limit my remarks rather than repeat their comments.



One of the most obvious albedo features is the double ray from Tycho that crosses the western portion of Nubium between Bullialdus and Mare Humorum. Along the way it crosses Rima Hesiodius, Kies, and Konig. It, along with other tonal variations on the mare can be seen in fig. 3.

Figure 2. *Franco Taccogna, Gravina in Puglia (BA), Italy. November 20, 2015 18:01 UT. 200mm f/5 Newtonian, 2x APO barlow. ASI120mm, #21 red filter.*

The remains of the flooded crater Wolf, near the center of Nubium contain a lot of fine detail (fig. 4). Is this a shallow area of the Nubium Basin, or did Wolf form after the basin was partially flooded? There's also an interesting area north of Bullialdus that seems to be surrounded by flooded craters (including Opelt, Gould and Lubiniezky).

Birt, Nicollet and Thebit A are among the banded craters in this area. Many smaller examples are also shown on the charts and lists available at moon.scopesandscapes.com. Birt and Darney are among the ray craters in this area, however none are particularly outstanding. When near the terminator, a complex pattern of low wrinkle ridges can also be seen.

Mare Nubium itself may not be a popular choice for observation, but careful examination will be rewarded with a wealth of interesting detail.

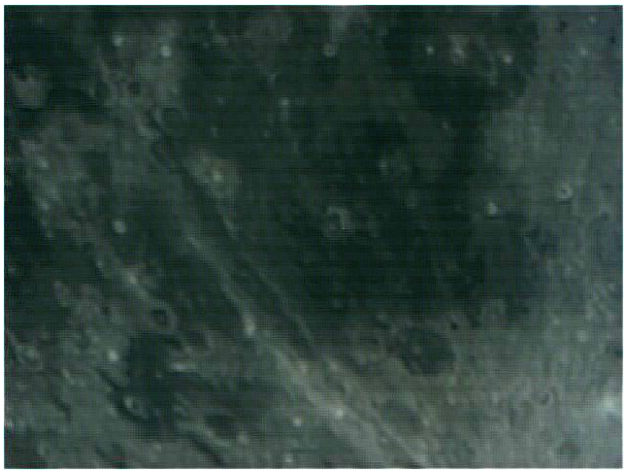


Figure 3. Alberto Anunziato-Oro Verde, Argentina. November 28, 2015 06:31 UT. LX200 250 mm SCT, SPC900NC webcam.

Figure 4. Alberto Anunziato-Oro Verde, Argentina. December 20, 2015 00:17 UT. LX200 250 mm SCT, 106X, Canon EOS digital Rebel XS.

ADDITIONAL READING

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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 Albategnius, Atlas, Manilius, Mare Nubium(2), Menelaus, Proclus & Tycho.

JUAN MANUEL BIAGI - ORO VERDE, ARGENTINA. Digital images of Aristarchus(2), Bullialdus, Mons LaHire & Plato.

FRANCISCO ALSINA CARDINALI-ORO VERDE, ARGENTINA. Digital images of Aristarchus, Cleomedes, Colombo, Copernicus, Gassendi, Meteus, Plato, Pytheas & Santbach.

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 12 & 15 day moon, Aristarchus(3), Full Moon, Kepler, Mare Crisium, Mare Humorum, Moretus, Plato, Shickard & Tycho.

CRANDALL, ED – LEWISVILLE, NORTH CAROLIA, USA. Digital images of Eratosthenes & Plato.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Anaxagoras, Apollo 16 site, Atlas, Burg, Hipparchus & Plato.

DAVID JACKSON - REYNOLDSBURG, OHIO, USA. Drawings of Atlas & Tycho.

ALBERTO MARTOS – MADRID, SPAIN. Digital images of Mare Nubium(4).

MICHAEL SWEETMAN – TUCSON, ARIZONA USA. Digital image of Faraday-Stoffler.

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

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RECENT TOPOGRAPHICAL OBSERVATIONS

ATLAS- Alberto Anunziato-Oro Verde, Argentina. November 29, 2015 04:13 UT. LX200 250 mm SCT, 106X, Canon EOS Digital Rebel XS.

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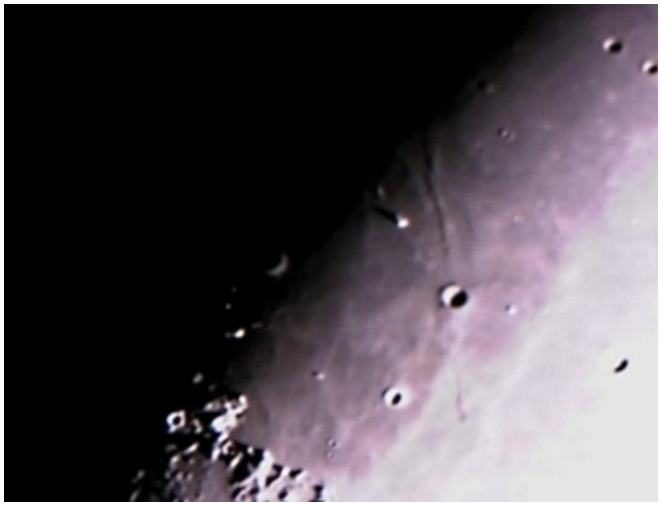
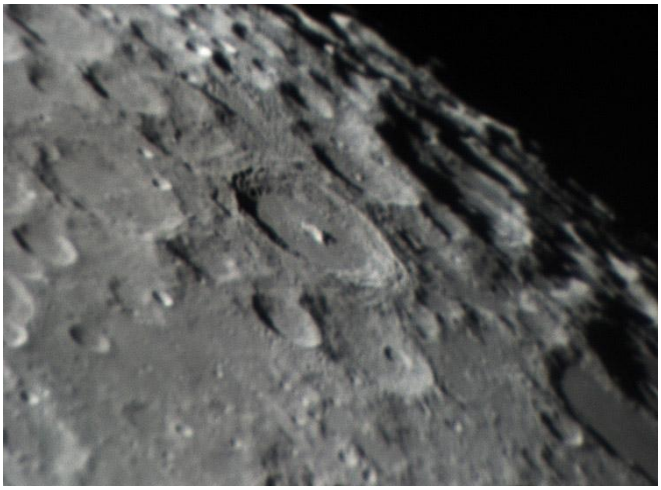
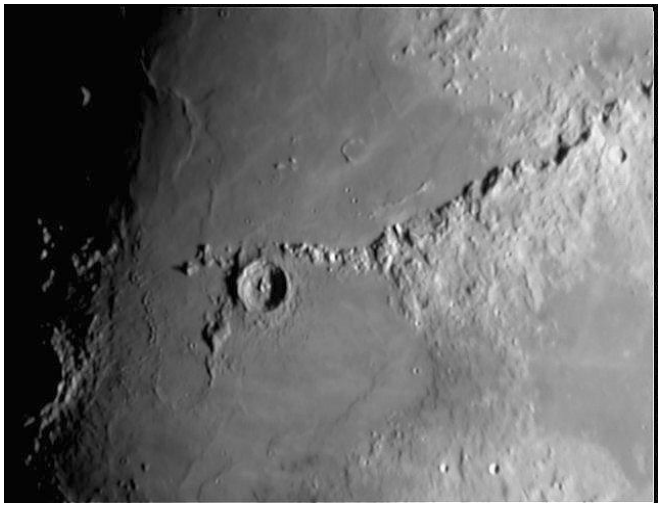


MONS LA HIRE- Juan Manuel Biagi-Oro Verde, Argentina. November 21, 2015 03:21 UT. LX200 250 mm SCT, Phillips SPC900NC.

COLOMBO- Francisco Alsina Cardinali-Oro Verde, Argentina. November 29, 2015 05:37 UT. LX200 250 mm SCT, 106X, Canon EOS Digital Rebel XS.

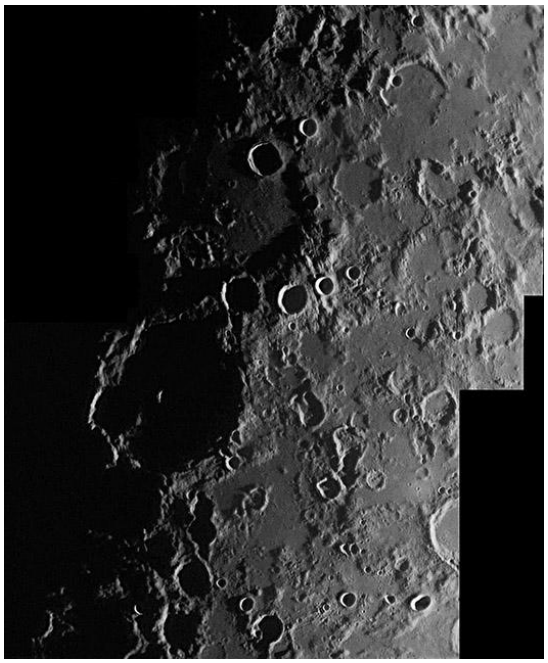


MORETUS - Maurice Collins, Palmerston North, New Zealand. October 24, 2015 07:20-07:28 UT. FLT-110, ASI120MC.



ERATOSTHENES – Ed Crandall, Lewisville North Carolina, USA. December 19, 2015 23:24 UT. 110 mm, f/5.6 APO, 2X barlow. Seeing A-III. Colongitude 18.6º. ToUcam.

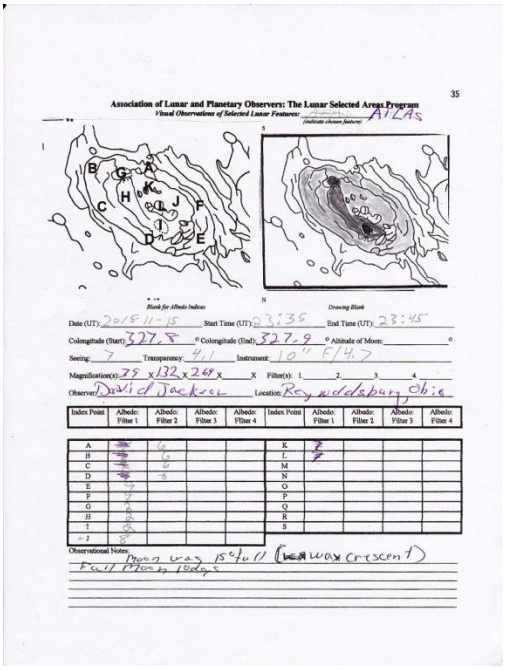
HIPPARCHUS – Richard Hill – Tucson, Arizona, USA October 20, 2015 01:03 UT. Seeing 9/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 656.3 nm filter.



So where is Hipparchus? The big black circle near the center of this image is the 136km diameter crater Albatignius with the 45km Klein cutting a cirque-like piece out of the left side. Above it are two similar sized craters, the 36km Halley (left) and the 30km Hind (right). Above these is another 30km crater, Horrocks. This latter crater sits in the northern floor of 151km Hipparchus with the aforementioned Halley and Hind marking the southern end of the great crater. This is a very ancient crater having been formed some 4-4.5 billion years ago.

Look to the right of Horrocks and you's see a beautiful example of a hexagonal crater. This is the 45km crater Saunder. and above it is a little larger (56km) more ruined example of the same thing, Lade. Note that the crater walls and mountains of the area are scarred with deep gouges alined from the upper left to the lower right (or 11-5 o'clock) carved out by flying debris the size of mountains.

Just below center is a pear or tear-drop shaped crater, Abulfeda D. Look at the shadow on the floor of this crater. Sunrise is pouring through a narrow pass in the mountains creating the "v" shape. I like the gorge coming north from this crater. This is bulfeda J with a very curious termination on the north end.



Association of Lunar and Planetary Observers: The Lunar Selected Areas Program

Visual Observations of Selected Lunar Features: ATLAS

Date (UT): 2015-11-15 Start Time (UT): 23:35 End Time (UT): 23:45

Colongitude (Start): 327.8° Colongitude (End): 327.9° Altitude of Moon:

Seeing: 7 Transparency: 4/1 Instrument: 10" F/4.7

Magnification(s): 75 x 132 x 264 x X Filter(s): 1 2 3 4

Observer: David Jackson Location: Reynoldsburg, Ohio

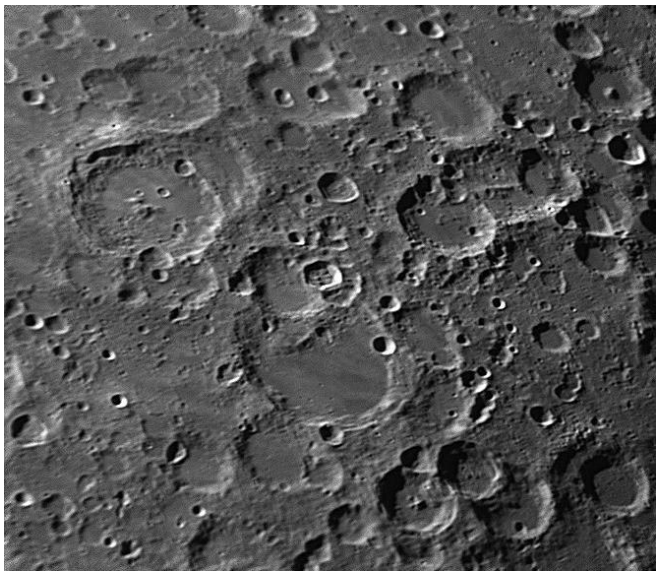
Index Point	Albedo: Filter 1	Albedo: Filter 2	Albedo: Filter 3	Albedo: Filter 4	Index Point	Albedo: Filter 1	Albedo: Filter 2	Albedo: Filter 3	Albedo: Filter 4
A	7	6			K	8			
B	7	6			L	8			
C	7	6			M				
D	7	5			N				
E	7				O				
F	7				P				
G	7				Q				
H	8				R				
I	8				S				
J	8								

Observational Notes: Moon was 15% Full (Waxing crescent)

Full Moon today

ATLAS – David Jackson – Reynoldsburg, Ohio USA November 15, 2015 23:35-23:45 UT. Seeing 7/10. Transparency 4.1/6, colongitude 327.9º , 10", f/4.7, 39x, 132x, 264x.

FARADAY & STOFFLER. Michael Sweetman, Tucson, Arizona, USA, November 20, 2015 04:55 UT. Seeing 4-5/10, transparency 3/6. 5" f/22.5 APO. DMK21, Baader IR cut-off filter.



LUNAR GEOLOGICAL CHANGE DETECTION PROGRAM

Coordinator – Dr. Anthony Cook – atc@aber.ac.uk
Assistant Coordinator – David O. Darling - DOD121252@aol.com

Observations/Studies for November were received from: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Anaximander, Aristarchus, Eratosthenes, Piazzi Smyth, Plato, Proclus, Promontorium Agarum, Torricelli B, and Vallis Alpes. Alberto Anunziato (Argentina – AEA) observed/imaged: Albategnius, Aristarchus, Atlas, Bullialdus, Cleomedes, Colombo, Fabricius, Manilius, Mare Nubium, Menelaus, Mons La Hire, Plato, Proclus, Pytheas, Santbech, and Tycho. Kevin Berwick (Ireland – ALPO) observed Alphonsus and Aristarchus. Juan Manuel Biagi (Argentina – AEA) imaged Aristarchus and Plato. Francisco Cardinali (Argentina – AEA) imaged: Aristarchus, Copernicus and Gassendi. Marie Cook (Mundesley, UK) observed Copernicus and Plato. Darryl Davis (Albany, OR, USA – ALPO) observed: South. Pasquale D'Ambrosio (Italy - UAI) imaged Birt. Rik Hill (Tucson, AZ, USA - ALPO) imaged Stadius. Bill Leatherbarrow (Sheffield, UK – BAA) imaged: Langrenus, Petavius, and Vendelinus. Franco Taccogna (Italy, UAI) imaged: Proclus.

News: Firstly I would like to wish a happy New Year to all our readers, and even more so, plenty of clear sky to observe the Moon through. Hopefully as my teaching load is lighter in the Spring semester, I can return to doing a more complete analysis of each observation we cover in this section of the newsletter. I will also try to re-boot the web-site for looking for changes on the Moon between LROC images.

As promised, below in Table 1, is a summary of the 38 or so repeat illumination events covered in the last three months of newsletters, with adjusted weights in the right most column.

LTP Reports: No LTP reports were received in November – well perhaps with the exception of a Promontorium Agarum observation by Jay Albert, but it maybe that it was just natural surface color that he was detecting at this illumination angle – see below for the full details under Routine Reports

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

Proclus: On 2015 Nov 17 UT 17:14-18:49 Franco Taccogna (Italy, UAI) imaged Proclus under the same illumination conditions (to within ±0.5˚) to the following LTP report:

> *On 2004 Jun 24 at UT 01:15-03:15 J. Albert (Lake Worth, FL, USA, seeing 8/10 and transparency = mag 3) noticed that the shadow on the east wall of Proclus looked unusual. It was divided by a bright vertical feature. To the south of this feature, the shadow on the crater wall was black (as would be expected). To the north of the bright vertical feature, however, the shadow started black, but gradually lightened until it ended where the crater wall was brightly sunlit. Observer used to seeing lunar shadows as black with sharp boundaries, so this struck him as odd. Since he had never looked closely at Proclus before, it's possible that what he saw was normal for this solar angle and the intensity difference is due to the color of the feature. He took a photo with a digital camera which shows the intensity difference, but poorly and certainly not as well as he saw it in the eyepiece at 311x (using a Celestron NexStar 11" SCT with a 9mm orthoscopic eyepiece). He made a sketch which more clearly showed the intensity gradation. The ALPO/BAA weight=1.*

Franco, using a 20cm Newtonian, took a series of images, the sharpest of which is shown in Fig1 (Left). For comparison another similar illumination image, taken by Brendan Shaw is shown on the right, albeit a few years earlier and at a different topocentric libration. You can see Jay's sketch in the center. Based upon some comments when I showed Jay, Brendan's image in 2011, Jay noted then that:"*Thanks for sending me Brendan Shaw's amazing photo. It's extremely close to what I saw. The only difference is that the light, vertical line seemed brighter to me than indicated in the photo. That line is probably a bit exaggerated in my sketch because it was hard to draw it as thin as it probably was. I rechecked my own photos from June 2004 and*

discovered that there is a faint hint of that line when I magnify the photo on the computer screen. One or two other vertical bands are also evident in these photos. I guess this was Proclus' normal appearance and not a LTP." The reason why I kept Jay's 2004 observation on the LTP list was to wait to see if we could get a view from another topocentric libration (ideally similar), however now that we have, I think it is safe to remove it from the catalog by assigning a weight of 0. The issue over Jay saying that he thought the line between the two shadows was brighter, could simply be due to a combination of resolution and contrast between the eye and modern day CCD cameras. Anyway there is now no longer anything that we could consider as being extraordinary about Jay's original observation, other than the majority of his sketch seems to be remarkably accurate.

Ref No.	LSC	Page	Feature	TLP Date	Repeat Obs	Observer	Society	Old Weigh	New Weight
1	2015 Oct	17	Copernicus	1954 Nov 05	2015 Aug 25	Jay Albert	ALPO	3	3
2	2015 Oct	17-18	Plato	N/A	2015 Aug 23	Alberto Anunziato *et al.*	AEA	N/A	N/A
3	2015 Oct	18	Plato	1982 Jun 02	2015 Aug 25	Tonon	UAI	3	2
4	2015 Oct	18-19	Gassendi	1967 Mar 22	2015 Aug 26	Maurice Collins	ALPO	3	2
5	2015 Oct	19	Aristarchus	2009 Dec 28	2015 Aug 26	Marc Charon	Reading	1	1
6	2015 Oct	19-20	Aristarchus	1967 Nov 15	2015 Aug 27	Cook/Taccogna/Ward/Berwick	UAI/BAA/ALPO	4	4
7	2015 Oct	19-20	Cobra's Head	1979Aug 06	2015 Aug 27	Cook/Taccogna/Ward/Berwick	UAI/BAA/ALPO	1	1
8	2015 Nov	10-11	Plato	1916 Jan 27	2015 Sep 06	Alberto Anunziato	AEA	3	3
9	2015 Nov	11	Messier	1968 May 05	2015 Sep 22	Brian Halls	BAA	1	1
10	2015 Nov	11	Aristarchus	1966 May01	2015 Sep 24	Marie Cook	BAA	4	4
11	2015 Nov	12	Gassendi	1961 Aug 25	2015 Sep 26	Kevin Berwick	ALPO	1	0
12	2015 Nov	12	Aristarchus	1961 Aug 26	2015 Sep 28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
13	2015 Nov	12	Picard	1927 Dec 08	2015 Sep 28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	2	2
14	2015 Nov	12	Copernicus	1982 Jan 09	2015 Sep 28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	2	1
15	2015 Nov	12	Aristarchus	1898 Dec 27	2015 Sep 28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
16	2015 Nov	13	Aristarchus	1889 Jul 12	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	2	2
17	2015 Nov	13	Thaetetus	1902 Oct 16	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	3	3
18	2015 Nov	13	Dionyius	1917 Jan 08	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	2	2
19	2015 Nov	13	Plato	1989 Feb 20	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
20	2015 Nov	13	Several Features	1790 Oct 22/23	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
21	2015 Nov	13	Lunar Eclipse	1962 Jun 12	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
22	2015 Nov	13	Grimaldi	1967 Apr 24	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	2	2
23	2015 Nov	13	Aristarchus	1902 Apr 22	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
24	2015 Nov	13	Several Features	1985 May 04/05	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
25	2015 Nov	13	Aristarchus	1949 Apr 13	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
26	2015 Nov	13	Stofler	1910 Nov 16/17	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	3	3
27	2015 Nov	13	Picard	1865 Apr 10	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	2	2
28	2015 Nov	13	Plato	1685 Dec 10	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
29	2015 Nov	13	Proclus	1898 Jul 03	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	2	1
30	2015 Nov	13	Copernicus	1772 Oct 11	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	2	1
31	2015 Nov	14	Plato	1970 Aug 17	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
32	2015 Nov	14	Eratosthenes	1949 Oct 07	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	1	1
33	2015 Nov	14	Aristarchus	1982 Dec 30	2015 Sep28	Albert/Caron/Cook/Pyka	ALPO/BAA/Reading	3	3
34	2015 Dec	13	Lichtenburg	1966 Jun 02	2015 Oct 26	Jay Albert	ALPO	3	2
34½	2015 Dec	13	Gassendi	1985 May 30	2015 Oct 24	Francisco Cardinalli *etc al.*	AEA	1	1
35	2015 Dec	13-14	Plato	1981 Aug 11	2015 Oct 24	Anunziato/Collins	AEA/ALPO	3	2
36	2015 Dec	14-15	Aristarchus	1963 Nov 28	2015 Oct 24	Franco Taccogna	UAI	2	2
37	2015 Dec	14-15	Aristarchus	1997 Oct 13	2015 Oct 24	Franco Taccogna	UAI	4	4
38	2015 Dec	16	Proclus	1990 Mar 09	2015 Oct 24	Marie Cook/Kevin Berwick	BAA/ALPO	1	1

Table 1. Summary of repeat illumination observations covered in the LSC for Sep-Dec 2015.

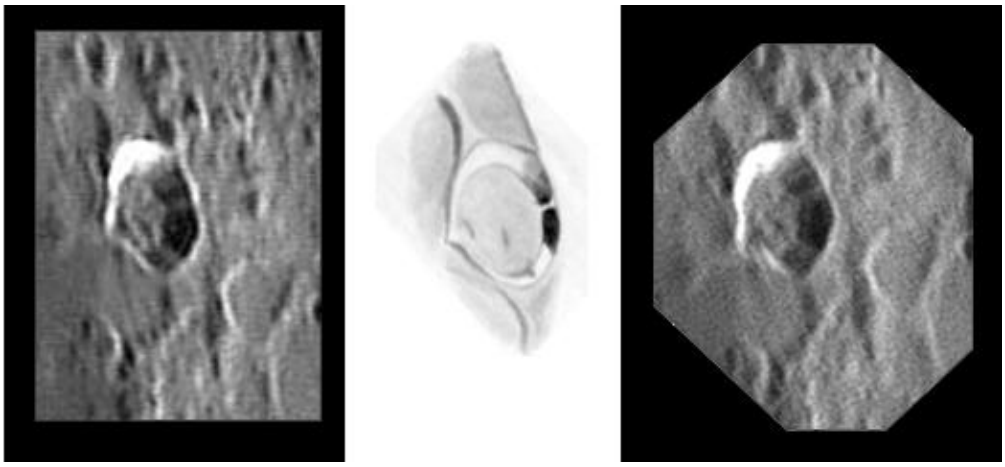


Figure 1. Proclus orientated with north towards the top.**(Left)** Image by Franco Taccogna (UAI) taken on 2015 Nov 17 UT 17:14. **(Center)** The original sketch by Jay Albert from 2004 Jun 24 UT 02:30. **(Right)** Image by Brendan Shaw from 2011 Jul 06 UT 20:09.

Birt: On 2015 Nov 20 UT 18:35-19:43 Pasquale D'Ambrosio (UAI) imaged this crater under identical illumination conditions (to within ±0.5˚) to the following LTP report by the famous planetary astronomer Charles Capen:

Birt 1955 Apr 15 UT 03:20-05:00 Observed by Capen (California Seeing=Excellent) "Small craters between Birt & wall were invis. at times under excellent seeing, while craterlets on w.side were continually obs." NASA catalog weight=4. NASA catalog ID #586. ALPO/BAA weight=3.

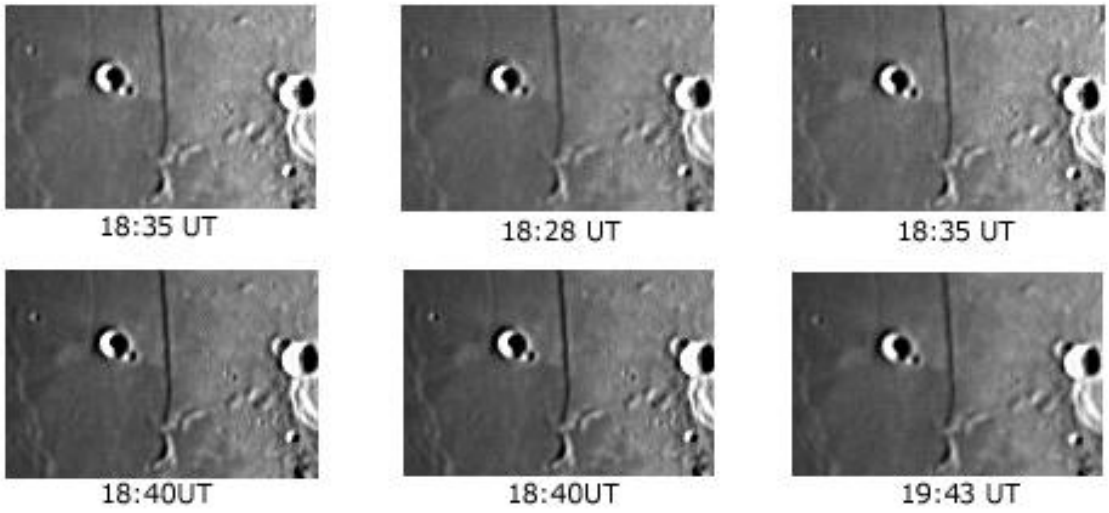


Figure 2. Birt as imaged by Pasquale D'Ambrosio (UAI) on 2015 Nov 20 at the UTs given in the above images. The images have been sharpened, contrast stretched and were then orientated with north towards the top approximately.

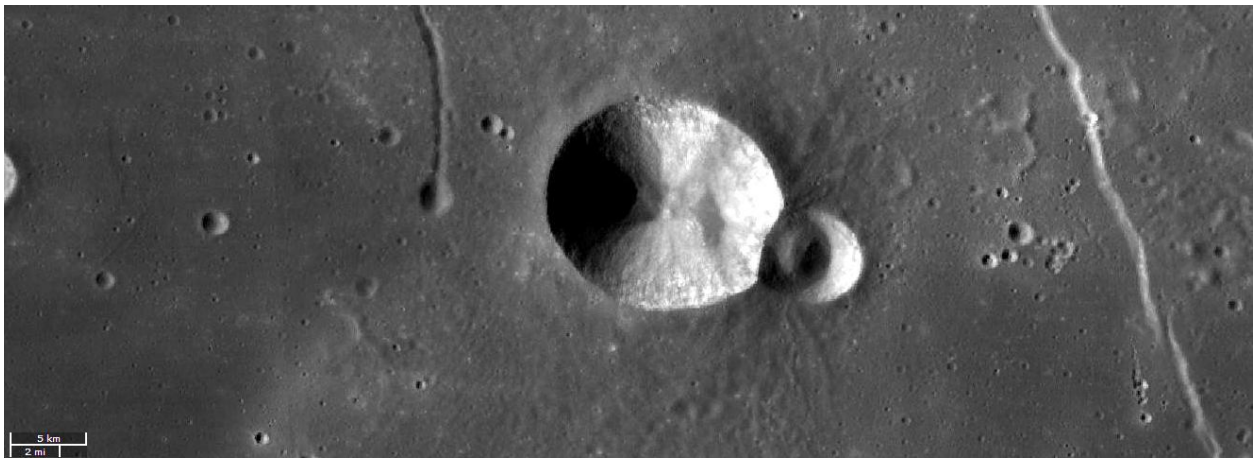


Figure 3. Birt as seen from NASA's LRO spacecraft (WAC mosaic from the http://target.lroc.asu.edu/q3/ web site).

Now Birt is 16 km in diameter from north to south, so I would imagine that Pasco's images have a spatial resolution of the order of 2-3 km. The largest of the craters between Birt and Rupes Recta (formerly the Straight Wall) is only 2 km in diameter (see the spacecraft image in Fig 3 above), so at best Pasquale's image might see these as spots, if the image contrast was good enough. Pasquale's images are sufficient in resolution to detect the extent of Rima Birt to the west of Birt, but are perhaps just on the limit of detecting Capen's craters. We shall therefore leave the weight of this 1955 report at 3 because common sense tells that if Capen could see the craterlets just to the west, which were smaller, then surely he should have seen those to the east too? We will monitor this repeat illumination crater in future to see if we can out do the resolution that Pasquale obtained.

Copernicus: On 2015 Nov 20 UT 20:10-20:15 Marie Cook BAA) observed this crater under the same illumination conditions (to within ±0.5˚) to the following LTP report:

On 1990 Apr 04 at UT 21:30-21:50 Barry Lefranc (Milton Keynes, UK, Seeing was very good) reported observing a white flame effect in Copernicus crater (sketch made) - though Foley comments that the actual location was east of the crater. The Cameron 2006 catalog ID=398 and the weight=2. The ALPO/BAA weight=2.

Marie was using a 9cm Questar telescope at x80, under II seeing conditions and moderate transparency. She commented that the crater was about half shadow filled, that the detail was sharp, but that there was no sign of a white flame effect either inside the crater or beyond it. So everything appeared quite normal. Clearly what was reported in 1990 was abnormal, however as we have very little information to go on, i.e. no sketches or images, I think we had better keep the weight at 2. If anybody knows the email address of Barry Lefranc, please get in contact as I would like to try to get hold of a copy of their sketch.

Plato: On 2015 Nov 21 UT 03:30-03:42 Alberto Anunziato (AEA) observed/imaged Plato under the same illumination conditions (to within ±0.5˚) to the following past LTP reports:

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.

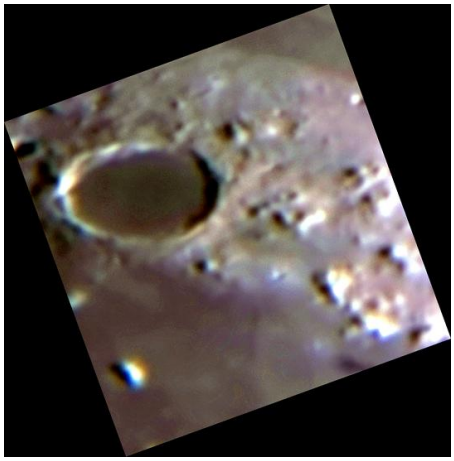


Figure 4. Plato as imaged by Alberto Anunziato (AEA) on 2015 Nov 21, some time between 03:30-03:42 UT. The image has been orientated with north towards the top, sharpened and had its color saturation increased. No attempt has been made to remove atmospheric spectral dispersion.

The image that Alberto took, has been examined in separate red and blue components and shows the floor to be slightly darker in blue than in red light, which is at odds with the 1972 report. There is some red/brown casts in places in the image, but it is possible that at least some of this could be due to atmospheric spectral dispersion effects on contrasty edges, or on brightness gradients. However seeing that the 1972 observation was made under poor to very poor seeing conditions, I will keep the weight at 1 for now, and would be interested to see if we can obtain other repeat illumination images of this event in color, so verify the colors that Alberto obtained, or if they are more in agreement with the 1972 results?

Concerning the 2009 report, I still have not gotten around to checking my CCD video from Aberystwyth University telescopes, however the image scale was probably too low to detect the floor patches mentioned, so may not be of much help. Alberto's images do not show the normal floor patches either, so unfortunately we cannot comment on whether they were brighter or darker in red or blue light. The weight for the 2009 report will stay at 2.

South: On 2015 Nov 23 UT 02:55-03:00 Darryl Davis (ALPO) observed the crater South and the Herschel area about 1.5 hours after the end of the following repeat illumination event from the World War One era:

40-54W, 54N-60N i.e. nr. South? or J.Herschel 1913 Jun 15 UT 22:00? Observer: Maw (Surrey, UK, 6" & 8" refractors) "Small distinct reddish spot which became diffused into a patch as term. advanced on the plateau NE of the crater South. When the plateau was on the term. (Goodacre says the crater was J.Herschel for same date -- 2 different spots or misident. for one?" NASA catalog weight=3. NASA catalog ID #345. ALPO/BAA weight=2.

Darryl was using a Questar telescope at x80 with seeing=4/10 and transparency=3rd magnitude. He was observing primarily to check out a black rectangle effect he had seen previously back on 2015 Sep 25 UT 03:28-03:40. This clearly had not been a LTP, but was worth investigating. The rectangle effect was because of a shadow formed by the NE wall of South. That wall was fairly straight and must have had a fairly uniform elevation which made the shadow appear to have fairly uniform width along its length. On the Nov observing session, the illumination was higher because the shadow had begun to be less dark and some of the unevenness

along the wall of South was beginning to show minor undulations. Darryl made no comments about the 1913 repeat illumination event, so we will leave that at a weight of 2.

Promontorium Agarum: On 2015 Nov 24 UT 00:50-01:15 Jay Albert (ALPO) observed with a Celestron C11 (x224) scope, under seeing 4/10 and transparency 3rd magnitude, under the same illumination conditions (to within ±0.5˚) to the following LTP report from 1980:

On 1980 Sep 22 at UT05:00? D. Louderback (South Bend, WA, USA, 8" reflector, x140 and 2.5" refractor) observed in Promontorium Agarum that one of his pre-designated points, called "A", through to "C and "D" was at least 5 brightness points brighter in red than in blue light. The reverse was true on Sep 25th. Tonight the red seemed to be on a narrow strip on the western edge. The Cameron 2006 catalog ID=109 and the weight=3. The ALPO/BAA weight=3.

Jay performed many blink attempts with W25 red and W44A blue filters and noted that the promontory appeared slightly brighter in red light than in blue. However, the effect was not limited to the narrow edge as described in the original LTP report but was evident in the overall area. He saw no color whatsoever in white light. It is interesting that Jay detected color and not anywhere else that night. It is definitely worth leaving the Louderbeck observation at a weight of 3 to encourage others to re-observe and see if they can detect natural(?) surface color here too – though why Louderbeck saw it on the western edge and Jay over the entire feature is a puzzle.

Aristarchus: On 2015 Nov 28 UT 06:19 Juan Manuel Biagi (AEA) imaged this crater, using a Meade LX200 scope under the same illumination and viewing angle (to within ±1˚) to the following LTP report from the 1970's:

Aristarchus and vicinity 1975 Feb 28 UT 03:20-03:45 Observers LeCroy Jr & Sr (Springfield, VA, USA). NASA catalog states: "Orange flash in crater that then spread over whole crater then turned to bluish haze at 0320h. Couldn't see surface underneath. All W. hemisphere was brighter than normal. Blue was only on Aris. Rest of Moon was examined for phenom. but none seen elsewhere. Gone by 0343h (just a few hrs after Eng. obs. -- not likely U.S. obs. had temp. inversion high press. sys. W. of him too). 4.5" reflector 45x, 150x. NASA catalog weight=4. NASA catalog LTP ID No. #1401. ALPO/BAA weight=4.

Figure 5. Color image of the Aristarchus area taken by Juan Manuel Biagi (AEA) on 2016=5 Nov 28 UT 06:19. The image has been orientated with north towards the top and has been sharpened and had its color saturation increased to 60%.

Although Juan's image (see Fig 5) is saturated inside Aristarchus, it does at least show that Aristarchus would have been extremely bright at the time, and this in itself might have made it difficult to see the interior surface of the crater. This does not reveal any clues though as to the "orange" flash effect that was reported in 1975, and so the weight will remain at 4.

Gassendi: On 2015 Nov 29 UT 04:47 Francisco Cardinalli (AEA) imaged (See Fig 6) Gassendi under the same illumination conditions (to within ±0.5˚) to the following 1960's Patrick Moore report:

Gassendi 1966 Sep 02 UT 22:55-02:55 Observed by Moseley, Moore, Gill, Harris, Frost and Hall (Armagh, Northern Ireland, 10" refractor + Moon Blink, Seeing=fair) and by Cave (England using a Moon blink) "Eng. Moonblink sys. detected red glows on c.p. & around it; seen vis. too. (Corralitos obs.at the time? did not see anything?)" Note that the Armagh observers were all using the same telescope, The observing times of M. Cave are not given but they saw a blink SW of the central peaks. NASA catalog ID 972. NASA catalog weight=5. ALPO/BAA weight=3.

Figure 6. Color Gassendi on 2015 Nov 29 UT 03:43 as imaged by Francisco Cardinalli and others (AEA). This image is orientated with north towards the top and has been sharpened and then had its color saturation increased to 80%.

You can see the color image that Francisco captured in Fig 6 – this is the normal appearance that Moseley, Moore, Gill etc, should have seen. As a Moon Blink device was in operation, at some point, it is difficult to explain how a blink effect was detected if the colors had been due to atmospheric spectral dispersion, or even chromatic aberration. I have tried producing some synthetic spectral dispersion views of the image anyway and although one can produce red on bright features such as the central peaks, it is always on the same side with blue on the other side, and anyway even stronger on more contrasty areas. The 1966 report will remain at a weight of 3 as we do not know the time that the Corralitos team were observing, and as they were located in New Mexico, it seems unlikely that they could have observed at the same time?

Alphonsus: On 2015 Nov 29 UT 23:53-00:19 Kevin Berwick (ALPO) observed visually this crater under the same illumination conditions (to within ±0.5˚), to the following 1959 H.P. Wilkins report:

Alphonsus 1958 Nov 29 UTC 22:00? Observed by Wilkins (Kent, UK, 15" reflector) "Near site of Kozyrev's outbreak saw a circular patch, black pit center, & red, round masses all around it." NASA catalog weight=4. NASA catalog ID #708.ALPO/BAA weight=3.

Kevin reported that he was particularly interested in this repeat illumination session because of its association with Kozryrev, a Russian astronomer who claimed to have spectroscopic evidence of a LTP. In addition, the Wilkins LTP report had a high weight. From Dublin the clouds cleared at 23:20 UT and Kevin was able to make a sketch (Fig 7) showing the usual dark patches on the crater floor, together with a couple of bright patches also. Kevin was using a Televue TV101 4 inch apochromatic refractor, but did not report any color. He wondered if chromatic aberration might have explained the colors that Wilkins saw, but this seems unlikely as the 1958 report was made with a 15" Newtonian telescope. Atmospheric spectral dispersion seems unlikely too as the Moon was 43˚ above the horizon at the time, assuming Cameron's UT estimate is correct. The weight of the Wilkins report shall therefore remain at 3.

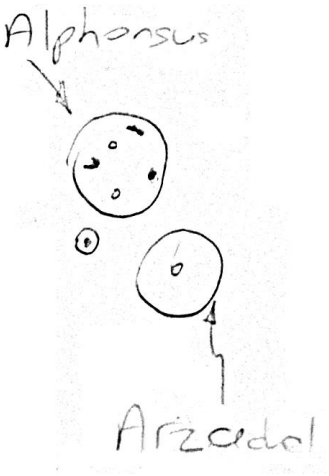
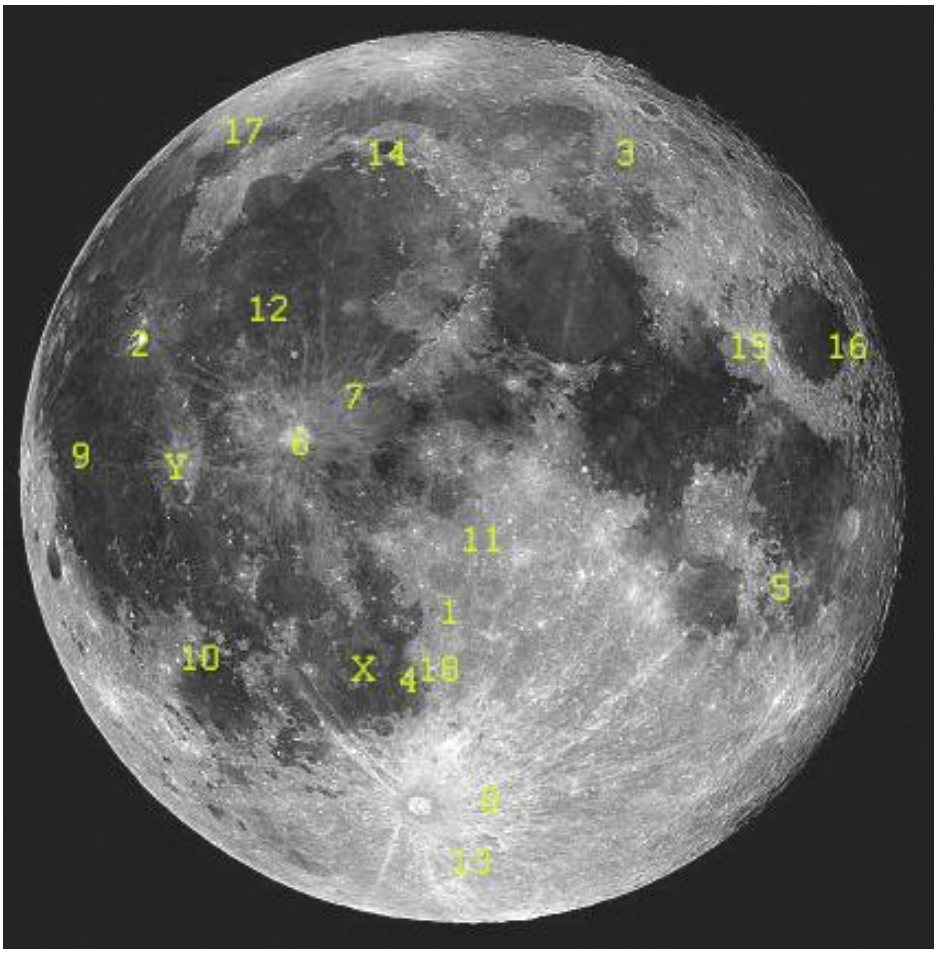


Figure 7. Sketch of the Alphonsus area by Kevin Berwick from 2015 Nov 29/30 UT 23:53-00:19.

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 .

Dr Anthony Cook, Institute of Mathematical and Physical Sciences, University of Wales Aberystwyth, Penglais, Aberystwyth, Ceredigion, SY23 3BZ, WALES, UNITED KINGDOM. Email: atc @ aber.ac.uk.

KEY TO IMAGES IN THIS ISSUE



1. **Alphonsus**
2. **Aristarchus**
3. **Atlas**
4. **Birt**
5. **Colombo**
6. **Copernicus**
7. **Eratosthenes**
8. **Faraday**
9. **Galilaei**
10. **Gassendi**
11. **Hipparchus**
12. **Mons La Hire**
13. **Moretus**
14. **Plato**
15. **Proclus**
16. **Promontorium Agarum**
17. **South**
18. **Thebit**

FOCUS ON targets

X = Mare Nubium
Y = Kepler