

# THE LUNAR OBSERVER

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

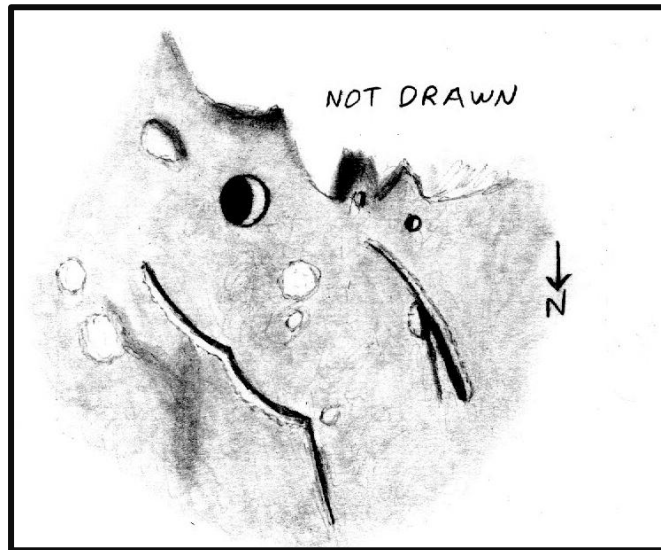
EDITED BY: Wayne Bailey [wayne.bailey@alpo-astronomy.org](mailto:wayne.bailey@alpo-astronomy.org)

17 Autumn Lane, Sewell, NJ 08080

RECENT BACK ISSUES: [http://moon.scopesandscapes.com/tlo\\_back.html](http://moon.scopesandscapes.com/tlo_back.html)

## FEATURE OF THE MONTH – JUNE 2015

### SULPICIUS GALLUS



**Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA**  
**January 28, 2015 02:10-02:38 UT, 15 cm refl, 170x, seeing 7-8/10**

I sketched this crater and vicinity on the evening of Jan. 27/28, 2015 after watching the moon hide two stars. This crater is near the southwest edge of Mare Serenitatis. The jagged edge of the Montes Haemus is nearby, and a small peak and pit are close to this edge west of S. Gallus. The main crater is relatively deep and fresh-looking. A rille begins near the two small features and curves gently to the northwest, then northward. This rille is much wider toward its north end, past a large mound. A narrow strip of shadow extends northward from this mound, and nearly parallels the rille. This may be a secondary rille. (The Lunar Quadrant map shows branching rilles in that area.) A wrinkle ridge begins northeast of S. Gallus, and runs northwestward, almost mirroring the rille. This ridge has two kinks, and is much finer at its northern end. Two fuzzy strips of shadow are near the ridge's southern end, and one of them ends near two extremely vague semi-bright patches. A relatively conspicuous bright patch is north of S. Gallus, and a small bright dot is just to its north. Another small bright dot is near the northern kink of the ridge. There is an isolated, large but fairly low mound southeast of S. Gallus close to the mare edge.

# **LUNAR CALENDAR**

## **JUNE-JULY 2015 (UT)**

2015		UT	
Jun	01	20:02	Moon-Saturn: 2° S
	02	16:19	Full Moon
	03	21:10	Moon South Dec.: 18.4° S
	09	15:42	Last Quarter
	10	04:39	Moon Perigee: 369700 km
	10	23:29	Moon Descending Node
	16	14:05	New Moon
	16	19:47	Moon North Dec.: 18.5° N
	20	11:28	Moon-Venus: 6.3° N
	23	17:01	Moon Apogee: 404100 km
	24	11:03	First Quarter
	24	17:23	Moon Ascending Node
	29	01:27	Moon-Saturn: 2.1° S
Jul	01	06:48	Moon South Dec.: 18.4° S
	02	02:20	Full Moon
	05	18:54	Moon Perigee: 367100 km
	08	00:07	Moon Descending Node
	08	20:24	Last Quarter
	12	17:55	Moon-Aldebaran: 0.9° S
	14	04:24	Moon North Dec.: 18.4° N
	16	01:24	New Moon
	18	17:34	Moon-Jupiter: 4.5° N
	19	01:06	Moon-Venus: 0.5° N
	21	11:02	Moon Apogee: 404800 km
	21	19:32	Moon Ascending Node
	24	04:04	First Quarter
	26	08:43	Moon-Saturn: 2.4° S
	28	17:34	Moon South Dec.: 18.3° S
	31	10:43	Full Moon

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

**The Lunar Observer** is a publication of the Association of Lunar and Planetary Observers that is available for access and participation by non-members free of charge, but there is more to the A.L.P.O. than a monthly lunar newsletter. If you are a nonmember you are invited to join our organization for its many other advantages.

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

Our quarterly journal, **The 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.

## **2015 ALPO CONVENTION**

The 2015 ALPO Convention will be held in Las Cruces, NM Monday –Saturday, July 6-11, 2015 in conjunction with the Astronomical League's ALCON2015. Details are available in the Spring 2015 issue of the Journal of the ALPO (vol. 57 #2). Registration, schedule and accommodation information is available on the ALCON2015 website ([alcon2015.astroleague.org](http://alcon2015.astroleague.org)). Las Cruces is the home of Walter Haas, the ALPO's founder, who recently passed away. There will be a special tribute to Walter at the Star-B-Que on Friday evening.

There will be a separate session for ALPO papers. You are encouraged to submit a paper for presentation. The Spring JALPO includes instructions for submission.

### **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: 1 to 10 (1-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](mailto:wayne.bailey@alpo-astronomy.org)  
and Jerry Hubbell – [jerry.hubbell@alpo-astronomy.org](mailto:jerry.hubbell@alpo-astronomy.org)

### **CALL FOR OBSERVATIONS:**

#### **FOCUS ON: Mare Tranquillitatis**

**Focus on** is a bi-monthly series of articles, which includes observations received for a specific feature or class of features. The subject for the **July 2015** edition will be **Mare Tranquillitatis, including its surface and margins**. 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](mailto:wayne.bailey@alpo-astronomy.org)

**Jerry Hubbell –** [jerry.hubbell@alpo-astronomy.org](mailto:jerry.hubbell@alpo-astronomy.org)

**Deadline for inclusion in the Mare Tranquillitatis article is June 20, 2015**

### **FUTURE FOCUS ON ARTICLES:**

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

<b><u>Subject</u></b>	<b><u>TLO Issue</u></b>	<b><u>Deadline</u></b>
Dionysius-dark ray craters	September 2015	August 20, 2015

# LUNAR TOPOGRAPHICAL STUDIES

Coordinator – Wayne Bailey - [wayne.bailey@alpo-astronomy.org](mailto:wayne.bailey@alpo-astronomy.org)

Assistant Coordinator – William Dembowski - [dembowski@zone-vx.com](mailto:dembowski@zone-vx.com)

Assistant Coordinator – Jerry Hubbell – [jerry.hubbell@alpo-astronomy.org](mailto:jerry.hubbell@alpo-astronomy.org)

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

## OBSERVATIONS RECEIVED

RAFAEL BENAVIDES – PORSADAS (CORDOBA), SPAIN. Digital images of Agatharchides, Copernicus & Mare Tranquilitatis.

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 6, 7, 10, 11(2), 14(2) day Moon, Arago, Ariadaeus Rille Aristarchus, Aristoteles-Eudorus, Bailly, Bullialdus, Copernicus(2), Descartes, Gassendi(2), Kepler, Mare Crisium, Mare Orientale, Mare Serenitatis, Maurolycus, Meton, Plato, Prinz, Schiller, Sinus Iridum, Theophilus(2), Tycho & Western Maria.

ROBERT HAYS - WORTH, ILLINOIS, USA. Drawings of Protagoras & Sulpicius Gallus.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Clavius, Copernicus, Fra Mauro & Montes Alpes.

DAVID JACKSON-REYNOLDSBURG, OHIO, USA. Drawing of Hercules.

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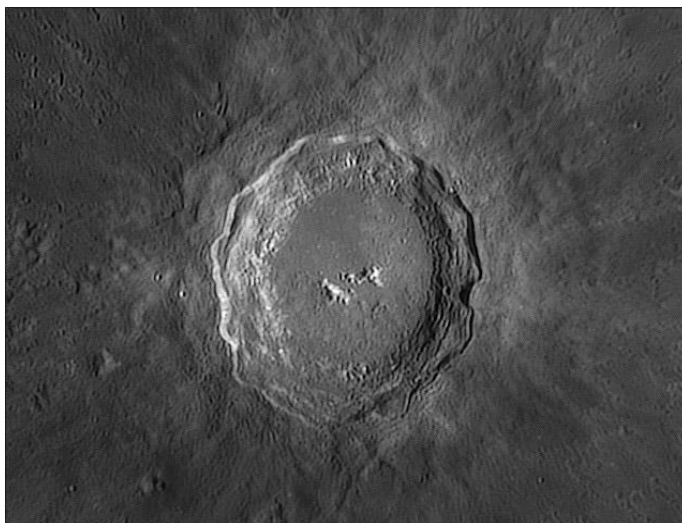
## RECENT TOPOGRAPHICAL OBSERVATIONS



**AGATHARCHIDES D** - Rafael Benavides, Posadas (Córdoba), Spain March 1, 2015 21:16 UT. C-11, 2x barlow. Seeing 7/10, transparency 5/6. DMK21AU618. Baader IR pass filter.

## **RECENT TOPOGRAPHICAL OBSERVATIONS**

**COPERNICUS** - Rafael Benavides, Posadas (Córdoba), Spain March 1, 2015 21:30 UT. C-11, 2x barlow. Seeing 7/10, transparency 5/6. DMK21AU618. Baader IR pass filter.



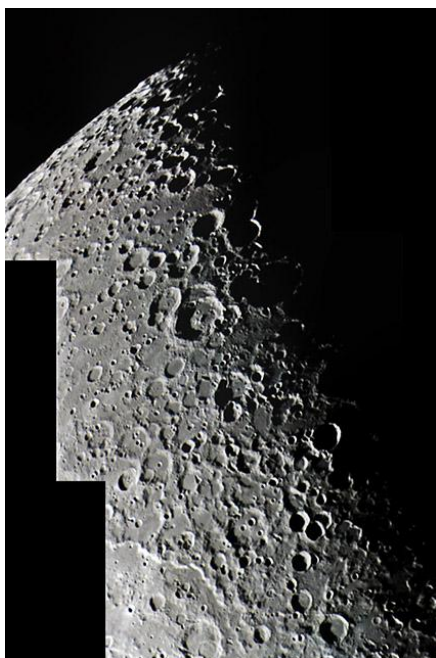
**GASSENDI** - Maurice Collins, Palmerston North, New Zealand. May 3, 2015 07:42 UT. FLT-110, f/21.

**GASSENDI** - Maurice Collins, Palmerston North, New Zealand. May 29, 2015 05:46 UT. FLT-110, f/21.





# RECENT TOPOGRAPHICAL OBSERVATIONS



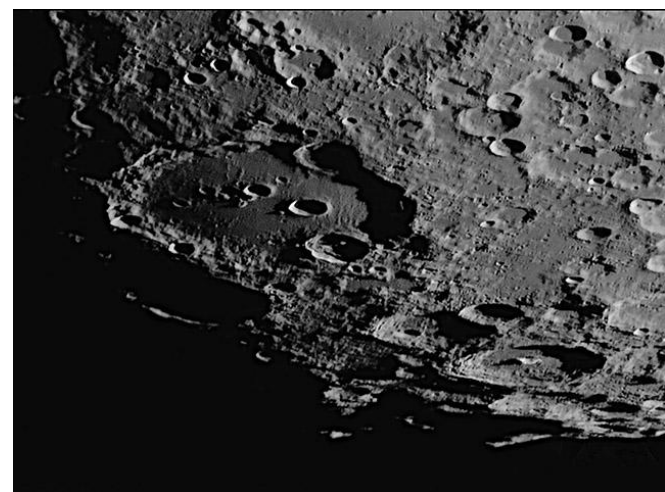
**MAUROLYCUS** - Maurice Collins, Palmerston North, New Zealand. May 25, 2015 07:08 UT. FLT-110, f/21.

**METON** - Maurice Collins, Palmerston North, New Zealand. May 25, 2015 07:04 UT. FLT-110, f/21.



**CLAVIUS** – Richard Hill – Tucson, Arizona, USA  
April 28, 2015 03:11 UT. Seeing 9/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 656.3 nm filter.

*The center of attention of this image is the great 230km diameter Clavius. I so like the radial impact ejecta striations about the crater Rutherford, that cross the floor of Clavius. Look to the right of the great crater and you can easily see the features that predate the Clavius impact event and those that were formed after. The ejecta from Clavius has softened the older features while the on formed afterwards are sharp and clear. To the lower left of Clavius is the*



*shadow filled oval of 109km Blancanus. Farther away to the lower right is the large terraced crater Moretus*

*At the bottom right of the image on the limb is a distinct mountain and an isolated bright peak to its left. The isolated peak is part of the crater wall of Newton. It's a little hard to tell this at this libration. The other peak is very close to and possibly associated with the crater Cabeus only 100km from the south pole. Does that name sound familiar? It should. This is the place where the impactor portion of the LCROSS satellite was deliberately crashed in an effort to raise a plume of debris that would show the presence of water at the lunar south pole. I'll leave it to you and your curiosity to look up the results.*

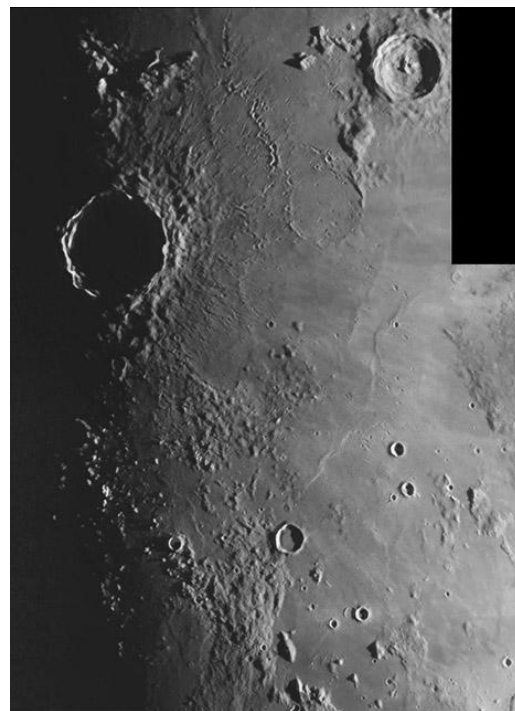
# RECENT TOPOGRAPHICAL OBSERVATIONS

**COPERNICUS** – Richard Hill – Tucson, Arizona, USA April 28, 2015 02:36 UT. Seeing 9/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 656.3 nm filter.

*Few features elicit a gasp like the earliest sunrise on Copernicus. This 95km diameter hole is almost visible to the naked eye from earth, and certainly with it's spectacular ray system seen under higher sun, it is easily seen. In this image you can see the ghost crater Stadius peppered with that wonderful system of secondary craters and finally, continuing on, the great terraced walls of the 60km Eratosthenes.*

*Halfway to the bottom of this frame is the stark ring of Gambart. To its right, on the way to the twin over-under craterlets of Gambart B (lower) and Gambart C (upper), are the famous Gambart Domes. There are many domes in this area and I encourage you to go to the Lunar Domes Atlas to locate more of them.*

*At the very bottom of the image is a curious mountain shaped like a spear tip pointing down. This is Fra Mauro Eta. I really like this distinctive feature as it is always eye-catching. There are other peaks nearby that have similar shape. I cannot find a height for Eta but it seem that it would be fairly easy to determine after 3rd Quarter when it's shadow stretches across the adjacent smooth plain.*



**FRA MAURO** – Richard Hill – Tucson, Arizona, USA April 28, 2015 01:20 UT. Seeing 9/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 656.3 nm filter.

*Originally planned as the landing site for the ill fated Apollo 13, Fra Mauro became the base for the Apollo 14 lander "Antares". But most people remember it as the first extra terrestrial driving range for it was here that veteran astronaut Alan Shepard used a cobbled together six iron to hit a couple golf balls one of which went hundreds of yards. Not bad for a one handed hit in a space suit!*



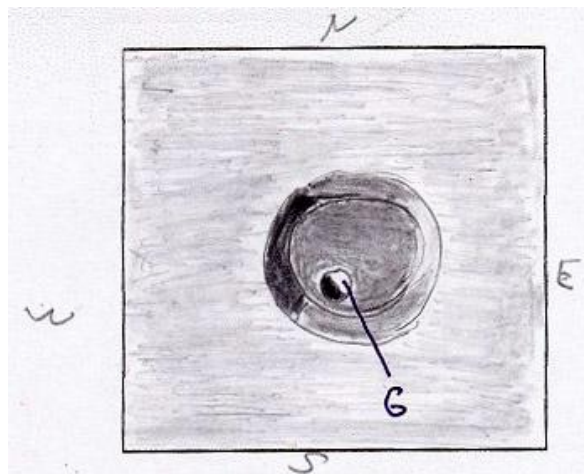
*Fra Mauro is the large ruined crater in the center of the image with all the wrinkles and rimae on the bottom. The smallest crater identified in this image is about 1.5km across. Below are two more craters. The one to the lower right with deep rimae crossing it's walls is the 49km diameter Parry. To its left is the 61km Bonpland. Look at the tiny rimae on the floors of these craters. At the top of this image is the odd mountain shaped like a spear point called Fra Mauro Eta. There's a smaller version of this mountain just below it. The plain to the right of these craters is part of Mare Nubium.*

*The well formed crater on the right side of this image is Lalande. Look at the rugged terrain just below it. This is probably the result of the Nubium impact.*



## RECENT TOPOGRAPHICAL OBSERVATIONS

**HERCULES** – David Jackson – Reynoldsburg, Ohio USA  
May 25, 2015 02:09 UT. Seeing 5/10. Transparency 4/6,  
colongitude 352.5°, ETX-125, 146X.



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### BRIGHT LUNAR RAYS PROJECT

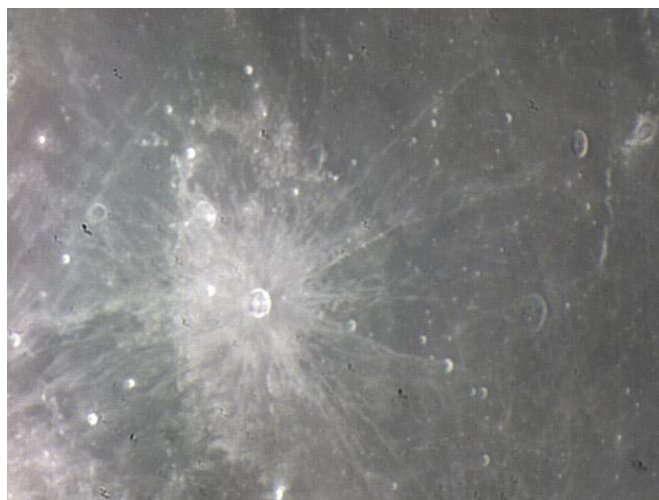
Coordinator – Wayne Bailey – [wayne.bailey@alpo-astronomy.org](mailto:wayne.bailey@alpo-astronomy.org)

Assistant Coordinator – Jerry Hubbell – [jerry.hubbell@alpo-astronomy.org](mailto:jerry.hubbell@alpo-astronomy.org)

Assistant Coordinator – William Dembowski – [dembowski@zone-vx.com](mailto:dembowski@zone-vx.com)

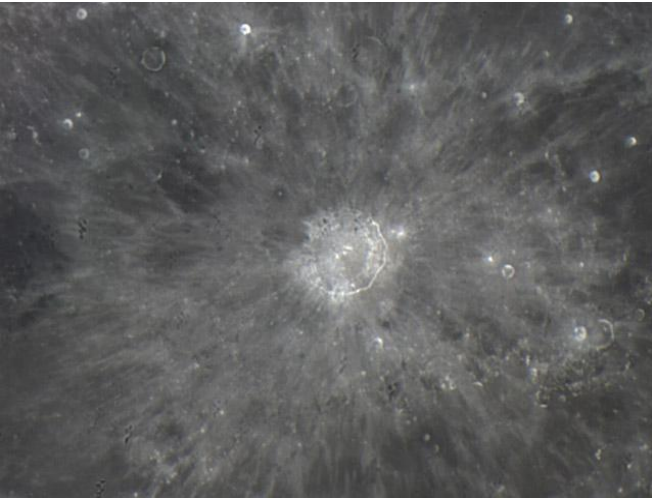
Bright Lunar Rays Website: <http://moon.scopesandscapes.com/alpo-rays.html>

## RECENT RAY OBSERVATIONS



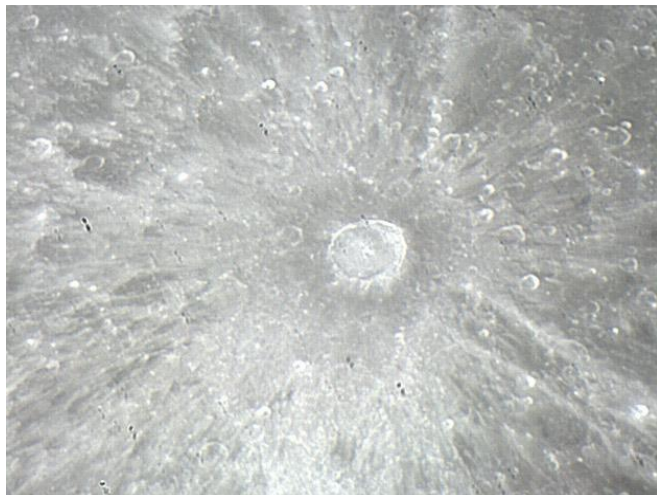
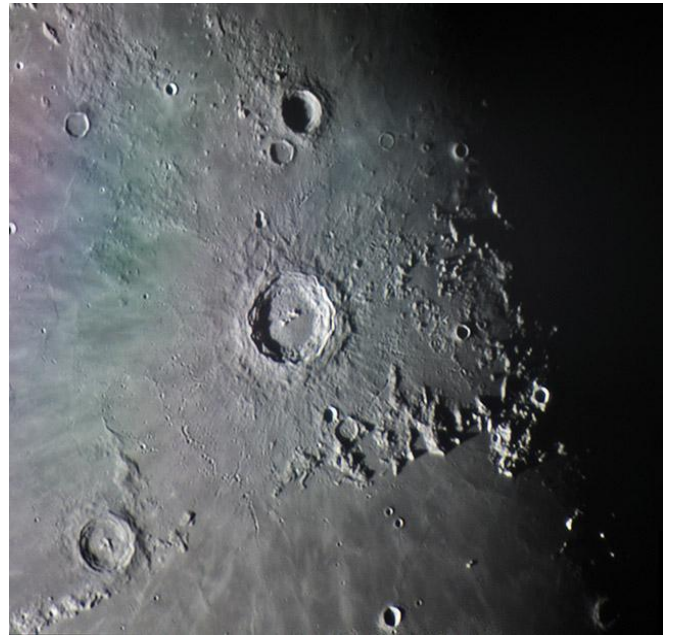
**KEPLER** - Maurice Collins, Palmerston North, New Zealand. May 3, 2015 07:48 UT. FLT-110, f/21.

## **RECENT RAY OBSERVATIONS**



**COPERNICUS** - Maurice Collins, Palmerston North, New Zealand. May 3, 2015 07:46 UT. FLT-110, f/21.

**COPERNICUS** - Maurice Collins, Palmerston North, New Zealand. May 28, 2015 06:20 UT. FLT-110, f/21.



**TYCHO** - Maurice Collins, Palmerston North, New Zealand. May 3, 2015 07:42 UT. FLT-110, f/21.

# **LUNAR GEOLOGICAL CHANGE** **DETECTION PROGRAM**

**Coordinator – Dr. Anthony Cook – [atc@aber.ac.uk](mailto:atc@aber.ac.uk)**

**Assistant Coordinator – David O. Darling - [DOD121252@aol.com](mailto:DOD121252@aol.com)**

**Aims:** (1) To examine spacecraft imagery from two or more eras and to search for, and confirm metre to km scale changes caused by meteorite impacts, landslides etc. (2) To resolve past historical observations, where observers have claimed to have seen permanent or transient (LTP) change on the lunar surface, utilizing repeat illumination observing, (3) To confirm any live LTP reports through a network of observers. (4) Support role for international Impact Flash observing programs.

**Observations/Studies for April:** Jay Albert (Lake Worth, FL, USA - ALPO) observed: Aristarchus, Copernicus, Grimaldi, the lunar eclipse, the N.E. limb, and Picard. Jay also participated in detecting sun-glint (?) differences in LRO images in an area surrounding the Apollo 14 landing site. Kevin Berwick (Ireland, ALPO) observed: Aristarchus, Mare Vaporum, and Picard. Maurice Collins (New Zealand, ALPO) imaged: Alexander, Earthshine, Posidonius, Prinz, Theophilus and also made some whole Moon image mosaics. Anthony Cook (Newtown, UK – BAA) imaged: several features, videoed Earthshine. Marie Cook (Mundesley, UK – BAA) observed: Aristarchus, Gassendi, Kant, Kepler, Mare Imbrium, and Proclus. Rik Hill (Tucson, AZ, USA) imaged: Clavius, Fra Mauro, Mare Imbrium, and several other features. Brendan Shaw (UK, BAA) imaged: Oenopides. Thierry Speth (France) imaged: Copernicus, Proclus and Stadius. Fontani Valerio (Italy, UAI) imaged: Herodotus.

**News:** As you can see we have changed the title of the LTP program, to become more socially acceptable amongst lunar observers, and made our aims more general in light of the LRO findings of 46 thousand candidate very small scale, changes on the lunar surface – see:

<http://www.hou.usra.edu/meetings/lpsc2015/pdf/2325.pdf> .,

Another change to the LTP program, that I mentioned a couple of months ago, was a revamp of the repeat illumination web site. During June I will introduce an observing schedule planner that will list the dates and UTs for different observing sites around the world, to support a number of general observing programs of ALPO, the BAA, or indeed any organization requesting observations/images of selected areas of the Moon under specific ranges of selenographic colongitude and/or librations. This is intended to be less cluttered and more targeted than the monthly LTP repeat illumination listings. I welcome requests from organizers of observing programs – just email me on: “atc @ aber.ac.uk” stating: **Feature, Organization** (e.g. ALPO/BAA/GLR/REA/UAI etc), **Email** of who to send observations to, **Start & End dates** of the intended Observing Program, **Start & End Selenographic Colongitudes**, a paragraph **Description** of the purpose of the request for observation - you can include a web link if you have illustrative images – in the description you can state the type of observation e.g. images, visual description, sketches, minimum size of scope etc. Additional/optional information can include: a **Minimum Altitude** to observe the Moon at, a range of **Topocentric Librations** in longitude and latitude. The observing site to visit in future will be: [http://users.aber.ac.uk/atc/lunar\\_schedule.htm](http://users.aber.ac.uk/atc/lunar_schedule.htm) , but we will continue to run the existing LTP schedule in parallel for the time being – linked to that web site.

Francis Ridge of the [Lunascan](#) Project (not to be confused with the impact flash detection software) has been in communication on the subject of LTP. Whilst I do not endorse most of the theories that you will find on that particular website, I did promise to include his observing station on the repeat illumination web site – the theory being that the more images taken of the Moon, to disprove past LTP reports, the better! I was also able to

show though that a [video](#) on that website of a supposed “moving object”, claimed to be in orbit (??) around the Moon, was most likely simply the reappearance of the 4<sup>th</sup> magnitude star Rho Sagitari, on 1996 Sep 21 UT 00:26.

Finally I would like to correct some typographical errors that crept into the May Newsletter, which resulted from a rush to ready the article. The mention of an image of Petavius by Thomas Biamchi was incorrect – it was actually by Aldo Tonon (UAI). Neither did Thomas supply images of Copernicus for March, instead it was Franco Taccogna (UAI) and Pasquale D’Ambrosio, (UAI) - indeed in last month’s Fig 7, the 17:34 image was taken by Pasquale D’Ambrosio.

**LTP Reports:** No LTP reports were submitted in April, however on 2015 May 24 UT 19:10-19:45(55?) Lajos Bartha (Budapest – Hungarian Astronomical Society), using a 3” refractor, x83, at 19:10 observed in the Aristarchus-Herodotus area a conspicuous 10-15” extremely bright spot that was brighter than Copernicus, and about the equivalent to a naked eye magnitude 3 star (if viewed without a telescope) – it did not fluctuate in brightness. Although I have some general doubts over reports of brightening in Aristarchus in Earthshine (see Maurice Collins’ image and Kevin Berwick’s observation below), Lajos has been observing Earthshine since 1949 and is very familiar with its appearance – he comments that on May 24<sup>th</sup> Aristarchus crater was one of the brightest of the two dozen brightest appearances he had seen. I should point out that Lajos was interrupted by cloud throughout the middle of this session. He also comments that the crater had a similar appearance to a 2012 Apr 04 report he made. I was observing at 21:05-21:34UT, on 2015 May 24, with a low light sensitive CCTV camera attached to my 8” Newtonian, and although I videoed Earthshine, I would not say that Aristarchus was exceptionally bright – though I concede that it was probably brighter than Copernicus – however I was suffering from image glare from the dayside of the Moon at the time. On 2015 May 25 UT 21:40 Bruno Cantarella (UAI) imaged the night side of the Moon, but Aristarchus was barely visible. Was anyone else observing on the night of 2015 May 24, during 19:10-19:45 UT?

**Spot the Difference:** On 1971 Feb 06 Apollo 14 lifted off from the lunar surface, and as it did so it left behind reflective heat insulation material, distributed across the lunar surface – some of which you can see in Fig 1 below. Now using a pair of NASA’s LROC images, taken 6 months apart and at very similar illumination conditions, it is possible to see small differences, which presumably are sun-glint effects from the said shiny material in Fig 2. I am assuming this to be the case on the basis that 17 out of the 18 brightenings occur in the 2010 image, and so seem unlikely to be image artifacts due to radiation on the CCD.

Only one person (apart from me) participated in [Spot the Difference](#) from last month, and that was Jay Albert. Jay found 5 differences around the Apollo 14 landing site as shown by the red rectangles in Fig 2. I found a further 13 (two of which are in the same inset frame). The two images we used could be compared by either viewing them side by side, or by placing them into layers in an image processing program, and blinking between layers. The registration was not perfect due to stereo parallax effects, but good enough to notice differences. The original images came from this web site, where additional Apollo 14 images are available: [http://lroc.sese.asu.edu/featured\\_sites/lroc\\_features/Apollo%2014/feature\\_highlights](http://lroc.sese.asu.edu/featured_sites/lroc_features/Apollo%2014/feature_highlights) . For the next “*Spot the Difference*” we will move away from rather obvious sun glint effects from spacecraft debris, and try steep slopes.





Figure 1. A re-orientated view of the 1971 Feb 06 Apollo 14 lift off from the lunar surface, extracted from a frame from the following youtube video: <https://www.youtube.com/watch?v=JEFxZNqFlN0>. Note the yellow streaks which are quite possibly golden heat insulation material stripped off the descent stage platform at high velocity. Notice also the US flag fluttering in the rocket exhaust induced wind on the Moon – the only time it can behave like a real flag – at other times it needed a vertical bar to hang by.

**Routine Reports:** Below is a selection of reports received for April that can help to re-assess past LTP observations.

**Herodotus:** On 2015 Apr 01 UT 18:53-21:05 Fontani Valerio (UAI) imaged this region under similar illumination conditions to the following LTP report:

*Herodotus 1965 Jun 11 UT 21:35-21:40 Observed by Porta, Garau (Mallorca, Balears, 4" refractor x250) "Red glow in crater at 2140, then clouds stopped obs. After clouds, floor was abnormal rose color" NASA catalog weight=5. NASA catalog ID #879. ALPO/BAA weight=4*



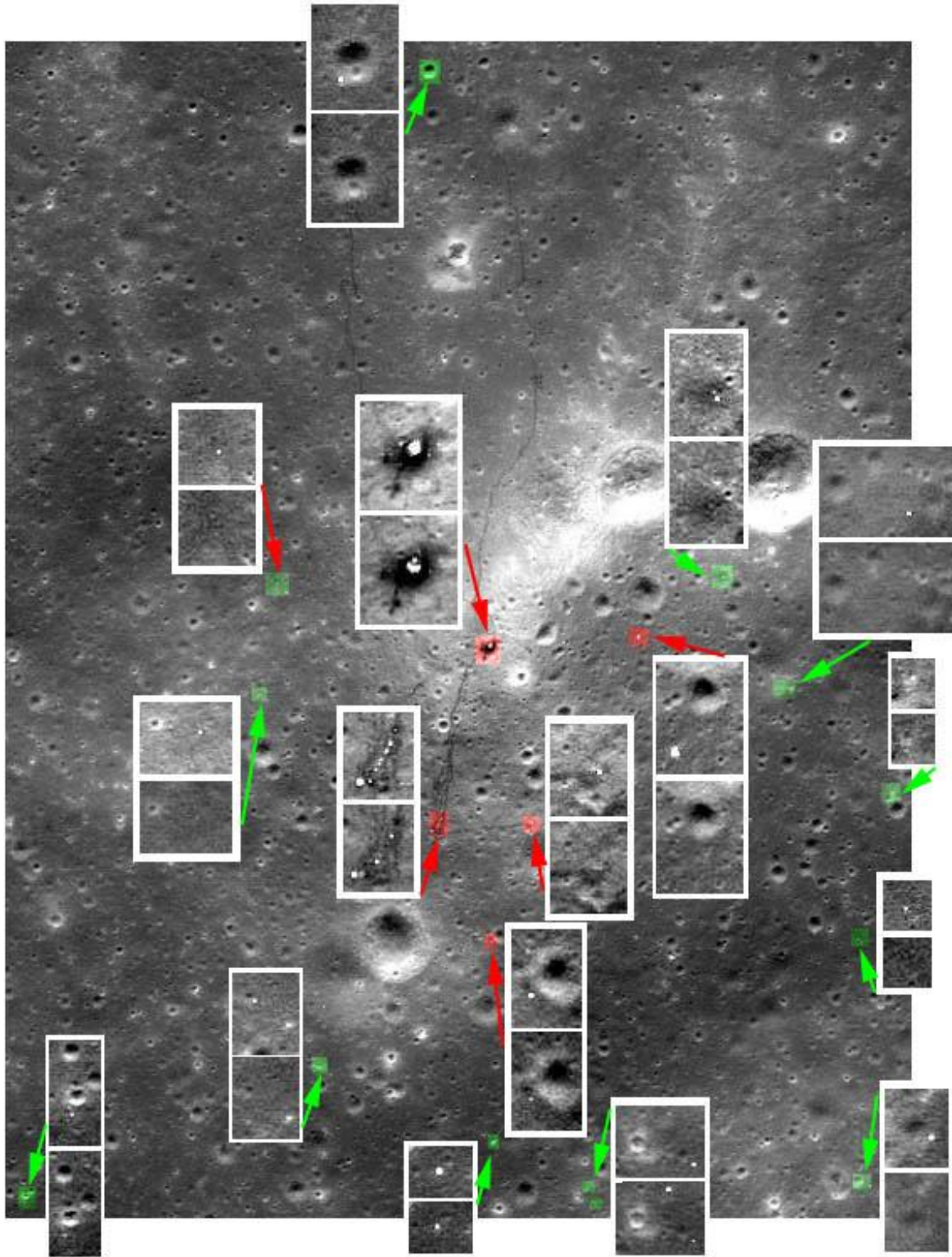
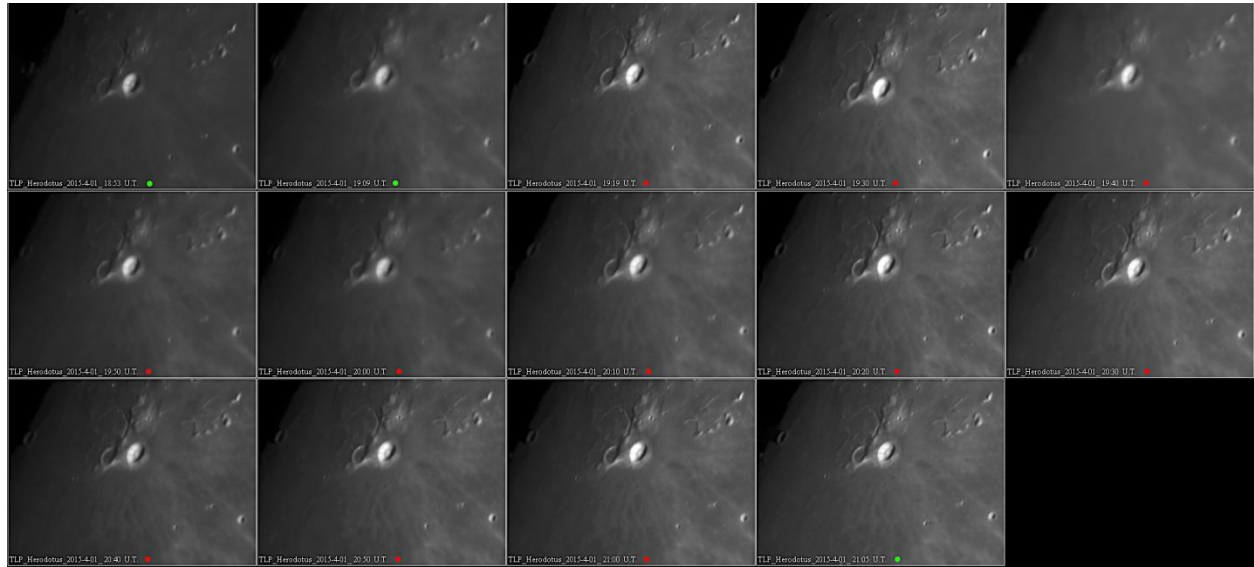


Figure 2. Part of NASA's LROC image, M127049821R, centred on the Apollo 14 landing site. Red rectangles and arrows show changes found by Jay Albert, green by Tony Cook, between M127049821R (2010 Apr 27) and an earlier image: M111708164L (2009 Nov 1). Note that the above image is orientated with north towards the left, in order to fit it onto the page. The lower part of the insets are from 2009, and the upper part from 2010. The Sun was illuminating from an altitude of  $60.5 \pm 0.5^\circ$  in both images, but the azimuth was  $87^\circ$  and  $80^\circ$  respectively. The spacecraft was almost nadir pointing in the 2009 image but  $15^\circ$  off-nadir in the 2010 image.



**Figure 3.** Color image sequence of the Aristarchus-Herodotus region, taken by Fontani Valerio (UAI) between 18:53 and 21:05 UT, orientated with north towards the top. The red dots at the bottom indicate that the images are within  $\pm 0.5$  of the same illumination as the Porta LTP, and green that they lie outside the predicted observing window of 19:17-21:01 UT.

The images taken by Fontani (Fig 3) clearly show no color in this image sequence. Therefore what was seen in 1965 remains an unsolved problem. I note that the LTP report by Porta was made through a refractor, and only a 4" in size, therefore I will reduce the ALPO/BAA weight to 3. Fontani should be congratulated on taking such a regular set of images – this is an excellent way to check for changes on the lunar surface.

**Copernicus:** On 2015 Apr 04 UT 03:00-03:20 Jay Albert, and his granddaughter, observed the crater under the same illumination conditions to within  $\pm 0.5$  to the following LTP report:

*On 1966 Oct 29 at UT00:45-01:30 G.Walker observed a red spot in Copernicus crater. The Cameron 1978 catalog ID=991 and the weight=2. The ALPO/BAA weight=2.*

Jay comments that no red spot was seen in the crater with, or without, a polarizing filter to reduce the glare. Copernicus' central peak though was extremely bright, and the ejecta blanket and rays were very impressive. In view of this I will keep the weight of Walker's LTP at 2 for now.

**Aristarchus:** On 2015 Apr 21 UT 20:30-20:40 Kevin Berwick (ALPO) observed Earthshine visually under the same lunar phase and same topocentric libration (both to within almost  $\pm 1^\circ$ ) to the following LTP reports:

*In 1835 Dec 22 at UT17:00-18:30 Piazzi-Smyth (Edinburgh, UK) at 18:30UT observed near Aristarchus a bright spot of magnitude 9-10 and at 17:00UT Baily (England) observed a star-like point, in Aristarchus. The Cameron 1978 catalog ID=113-114 and the weight=5. The ALPO/BAA weight=3.*

*On 1866 Jun 15 at UT21:30? Temple (Marseilles, France) observed Aristarchus crater to have a reddish-yellow color in the Earthlit part of the Moon. The Cameron 1978 catalog ID=144 and the weight=4. The ALPO/BAA weight=3.*

Kevin comments that he began viewing with a 4" refractor at 20:30 under a still very bright sky as the Sun had just set. The terminator was West of Langrenus and touching the Western edge of Petavius. No Earthshine was visible as it was obscured by daylight. Even by 21:00 no Earthshine was visible. At 21:04 he tried a 4mm Zoom eyepiece in an attempt to darken the night sky. While it worked, he could not keep an eye on Aristarchus as easily at this higher magnification so he switched back to the 7mm Nagler, around 21:09, as

earthshine was beginning to become faintly visible. One thing he did notice was a little flare since the illuminated portion of the Moon was off axis. The flare generally appeared at the opposite side of the Moon, and this may have accounted for some anomalies in the appearance of Aristarchus when illuminated by earthshine. Around 21.30, Aristarchus did appear to brighten, and initially it was the only bright area seen on the non-illuminated part of the Moon. It was a diffuse source, not a point. Its brightness grew slightly over time until about 21.40. By 21:40 it was no brighter than the area west of Grimaldi that he was using for brightness comparisons. Unfortunately the Moon was obscured by trees shortly after this.

Kevin suspects that this is a real effect caused by Earthshine illuminating Aristarchus and the sky background darkening. It was a shame that the observation had to be done under conditions of bright dusk, it would be interesting to see if this anomaly would be suppressed or enhanced if it had occurred when the sky is darker. The fact that the area west of Grimaldi brightened soon afterwards, eventually surpassing Aristarchus, indicates that it is merely a trick of the light. However I will keep the weight of the 1835 LTP at 3, because the spot referred to was not Aristarchus itself, but was just near to the crater. Also, I will keep the weight of the 1866 event at 3 because color was seen in the crater during the LTP, and this can be difficult to explain.

**Aristarchus:** On 2015 Apr 24 UT 07:27 Maurice Collins (ALPO) imaged Earthshine under the same lunar phase to within +/-0.5 to the following Victorian era LTP report:

*On 1867 Apr 09 at UT 19:30-21:00 Elger (Liverpool? UK, 4"? aperture telescope) observed that Aristarchus was shining like a 7th magnitude star-like point, becoming fainter, almost extinguished at 9PM. He had seen lights before but never so strong. The Cameron 1978 catalog ID=151 and he weight=4. The ALPO/BAA weight=2.*



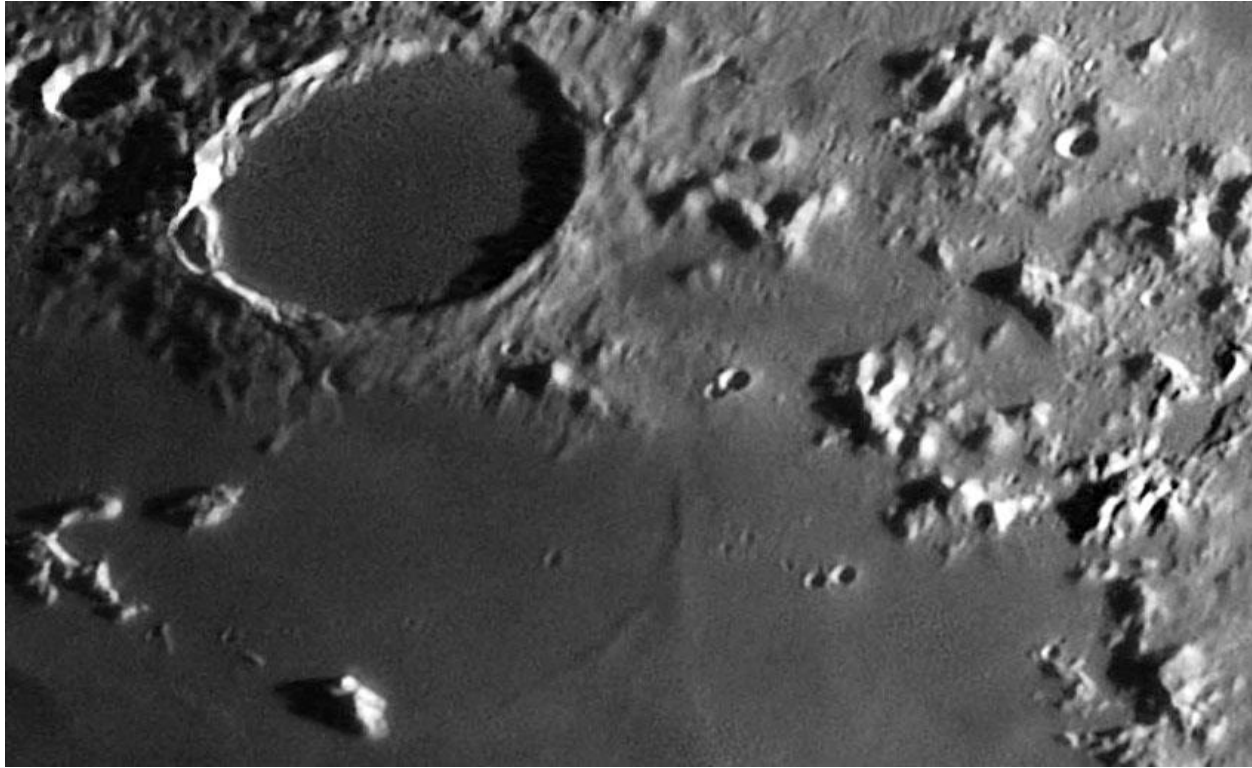
**Figure 4.** Earthshine image by Maurice Collins (ALPO) taken on 2015 Apr 24 UT07:27 orientated with north towards the top. Note the streak of light off the limb (ignore the green and blue ones which are imaging artifacts). This was caused by a passing satellite (?) during the exposure.

Now this image shows two things. Firstly Aristarchus can appear bright – possibly easily magnitude 7 as Elger states – though we do not have a star in the field of view to compare against. Note the Bartha May 2015 LTP report above also comments that the crater was brighter than Copernicus (but is a month later), as we see in image taken by Maurice. Secondly Maurice has recorded a satellite(?) passing by the Moon in this 0.7 exposure. This does happen from time to time and can confuse unsuspecting observers, especially if it passes across the lunar disk. I will keep Elger's weight at 2 because he mentioned a fade in the brightness of the crater.

**Plato:** On 2015 Apr 28 UT 03:05 Rik Hill (ALPO) imaged Plato under the same illumination conditions to within +/-0.5 to the following LTP report from 1949:



*Plato 1949 Mar 09 UT 02:00-03:00 E.J.Reese (6" reflector x240) and one hour later T.R.Hake (5" refractor x300) both unable to see any detail on the floor of Plato, despite both being able to see a "difficult to see" cleft near to the crater Cannon. Reese was able to see detail under similar illumination back in 1948 and 1947 and saw the floor craterlets in Plato clearly then. ALPO/BAA weight=2.*



**Figure 5.** *Plato – a small section of a Mare Imbrium image by Rik Hill (ALPO) taken on 2015 Apr 28 UT 03:05, orientated with north towards the top.*

Now as you can see from Rik’s detailed image (Fig 5), taken with one of these new Skyris cameras, despite seeing plenty of detail elsewhere, we are instead “*unable to see any detail*” on the floor of Plato – so this is perfectly normal in appearance! The ALPO/BAA weight of the confirmed 1949 LTP report was at a 2. I will down grade this to 1 because of the 1947 and 1948 accounts, mentioned above, suggested that under similar illumination we should see detail on the floor – this needs a bit of archival work to track down the dates and UTs referred to in those 1940’s accounts to be sure. But my gut reaction is that this was probably not a LTP.

**Proclus:** On 2015 Apr 28 UT 22:15-22:25 Marie Cook observed Proclus to within +/-0.5 to the following LTP report from 1982:

*Proclus – 1982 Feb 23 - M.C. Cook (Frimley, UK) got an abnormally low brightness reading for Proclus, despite nearby Censorinus being normal. Crater Extinction Device used. The Cameron 2006 Extension catalog ID was 163 and the weight was 3. The ALPO/BAA weight was 2 too.*

Marie comments that the crater had its normal brightness this time around, and interior detail looked sharp, with the usual dark shading/spot on the floor. As a comparison – although taken just outside of the repeat illumination window on that night, Thierry Speth had an excellent view of the crater in Fig 6, and although not showing Censorinus for comparison, Proclus looks normal – i.e. not too bright, and not too dark.



*Figure 6 Proclus as imaged by Thierry Speth on 2015 Apr 28 UT 19:53, orientated with north towards the top.*

**Suggested Features to observe in June:** 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](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/spot\\_the\\_difference.htm](http://users.aber.ac.uk/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 <http://twitter.com/lunarnaut>.

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## KEY TO IMAGES IN THIS ISSUE

1. Agatharchides D
2. Aristarchus
3. Clavius
4. Copernicus
5. Fra Mauro
6. Gassendi
7. Hercules
8. Kepler
9. Maurolycus
10. Meton
11. Plato
12. Proclus
13. Sulpicius Gallus
14. Tycho

### FOCUS ON targets

X = Mare Tranquillitatis

Y = Dionysius

