

THE LUNAR OBSERVER

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

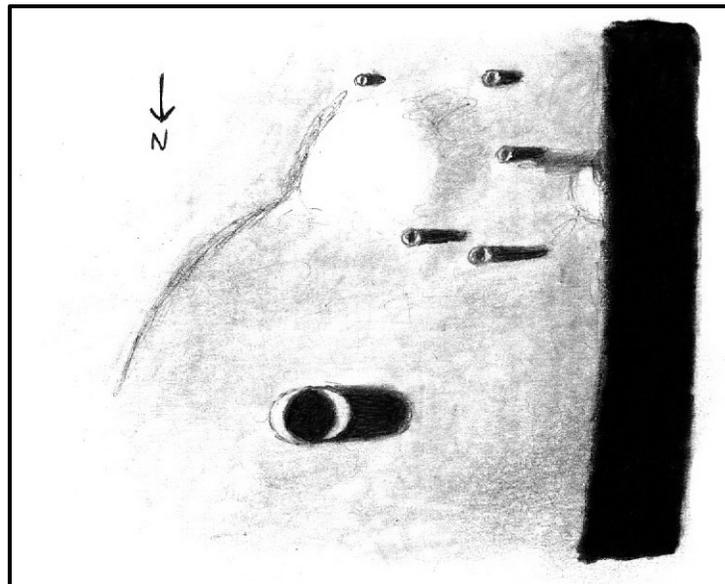
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RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – FEBRUARY 2015

CARLINI



**Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
November 2, 2014 01:00-01:22 UT, 15 cm refl, 170x, seeing 8-9/10**

I drew this crater and vicinity on the evening of Nov. 1/2, 2014. This area is in central Mare Imbrium south of Sinus Iridum. Carlini is a mid-sized, shadow-filled crater with substantial exterior shadow. Its exterior eastern side is also quite bright. A group of small craters is south of Carlini, and all cast much exterior shadow. They appear to be hills with central pits, and remind me of an old theory that postulated a volcanic origin for lunar craters. Their interior shadows are bracketed by bright eastern exteriors and western interiors, and are really small versions of Carlini. The pair nearest Carlini to the southwest are Carlini H and G. The latter is slightly larger and to the west nearer to the terminator. Carlini K is the tiny pit south of Carlini H, and Carlini L is west of K. Another pit, not shown on the Lunar Quadrant map, is between Carlini G and L. Its shadow merged with a dusky streak which reached the terminator at that time. A relatively bright patch was just north of this streak and may be a sunward-facing slope. A conspicuous wrinkle has its southern end near Carlini K, and extends northeastward from there, ending east of Carlini. This wrinkle has a kink east of Carlini H. Some vague shadowing was evident between Carlini H and K, and was adjacent to a slightly brighter area to its east near the southern end of the wrinkle. I had the impression of a very low swelling there.

LUNAR CALENDAR

FEBRUARY-MARCH 2015 (UT)

Feb	03	23:09	Full Moon
	06	06:25	Moon Apogee: 406200 km
	08	17:10	Moon Ascending Node
	12	03:50	Last Quarter
	13	00:10	Moon-Saturn: 2.3° S
	14	17:18	Moon South Dec.: 18.4° S
	17	06:20	Moon-Mercury: 3.5° S
	18	23:47	New Moon
	19	07:29	Moon Perigee: 357000 km
	21	00:56	Moon-Venus: 2° S
	21	01:28	Moon-Mars: 1.5° S
	21	16:05	Moon Descending Node
	25	17:14	First Quarter
	25	23:02	Moon-Aldebaran: 1° S
	27	07:19	Moon North Dec.: 18.3° N
Mar	05	07:35	Moon Apogee: 406400 km
	05	18:05	Full Moon
	07	21:04	Moon Ascending Node
	12	08:25	Moon-Saturn: 2.4° S
	13	17:48	Last Quarter
	14	01:39	Moon South Dec.: 18.3° S
	19	19:38	Moon Perigee: 357600 km
	20	09:36	New Moon
	20	09:46	Total Solar Eclipse
	21	02:19	Moon Descending Node
	21	22:13	Moon-Mars: 1° N
	22	19:51	Moon-Venus: 2.9° N
	25	06:55	Moon-Aldebaran: 0.9° S
	26	14:29	Moon North Dec.: 18.2° N
	27	07:43	First Quarter

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.

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

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

CALL FOR OBSERVATIONS:

FOCUS ON: Hainzel

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 2015** edition will be **Hainzel**. 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 Hainzel article is February 20, 2015

FUTURE FOCUS ON ARTICLES:

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

<u>Subject</u>	<u>TLO Issue</u>	<u>Deadline</u>
Rimae Sirsalis	May 2015	April 20, 2015

2015 ALPO CONVENTION

The 2015 ALPO Convention will be held in Las Cruces, NM in conjunction with the Astronomical League's ALCON2015. Details should be available in the next issue of the Journal of the ALPO. Preliminary information is available on the ALCON2015 website (alcon2015.astroleague.org) which gives the dates as Monday –Saturday, July 6-11, 2015.

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

JAY ALBERT – LAKE WORTH, FLORIDA, USA. Digital images of Hainzel & Mare Smythii.

RANDOLPH BARON-SARASOTA, FLORIDA, USA. Drawing of Hypatia.

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 6 & 9 day Moon, Alphonsus-Ptolemaus, Deslandres & Plato.

RALPH EIKELENBERG-OETINGEN, BELGIUM. Digital image of lunar K (Riechenbach area).

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Ptolemaus, Sinus Medii-Hipparchus, Sinus Medii-Ptolemaus..

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Agrippa, Arzachel-Ptolemaus, Montes Alpes, Montes Apenninus, Rupes Altai & Theophilus.

ALEXANDER VANDENBOHEDE-ASSEBROEK, BELGIUM. Digital images of Agrippa, Anaxagoras, Endymion, Mare Crisium-Mare Smythii, Montes Caucasus, Strabo.

IN THE GRIP OF AGRIPPA

Richard Hill

This is a region that is probably familiar to many involved in lunar studies. The crater in the center is the 48km diameter Agrippa and just below it is the smaller Godin. Take note of the odd depressions to the right of Agrippa. The lower one is Tempel and the upper one is not separately named. Very strange features that I hope to image in more detail in the future.

The big crack is the 226km long Rima Ariadaeus with it's namesake crater the largest in the pair at the right end of the rima. Just below, and a little left of middle of the rima is the fairly young crater Silberschlag, sitting on what appears to be an unnamed dorsum. On the north end of this dorsum is the ruined crater Boscovich. The sun-ward side wall is casting a large shadow on the floor of this crater but you can just barely see the crack on the crater floor coming out from under the shadow. This is Rima Boscovich as you might have guessed. To the right of Boscovich is the 94km diameter crater Julius Caesar, the largest crater in this image.

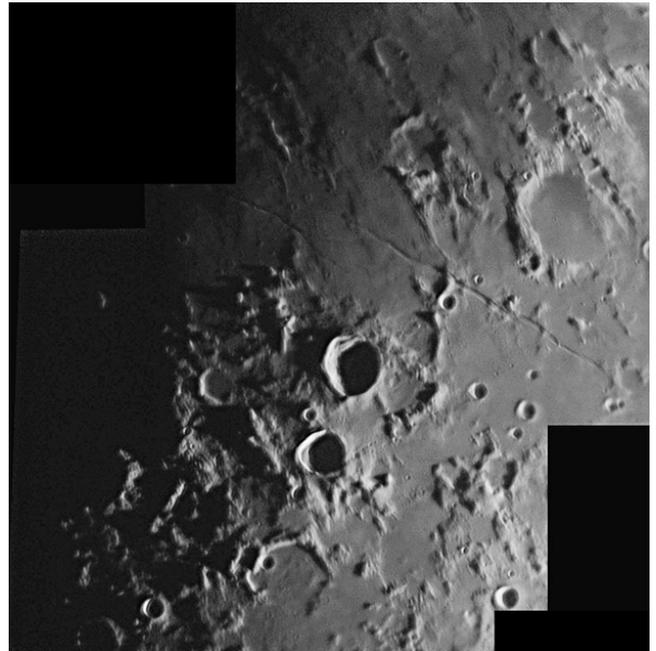
***Figure 1. Agrippa.** Richard Hill – Tucson, Arizona, USA
November 29, 2014 01:01 UT. Seeing 8/10. TEC 8" f/20
MAK-CASS, SKYRIS 445M. 656.3 nm filter.*

Look at the dorsum as it comes out of the crater Boscovich. It displays clear flow striae along it's length. Below Boscovich and just above Rima Ariadaeus is a nice little dome and off the left tip of the rima are a pair of small domes, only about 3-4km in diameter. There are many such domes in this image.

Below Godin is the strikingly polygonal, ruins of the roughly 58km diameter crater Lade. There is another polygonal crater similar to it but smaller, forms an isosceles to the left of and with Godin and Agrippa. This crater is the 27km diameter Dembowski.

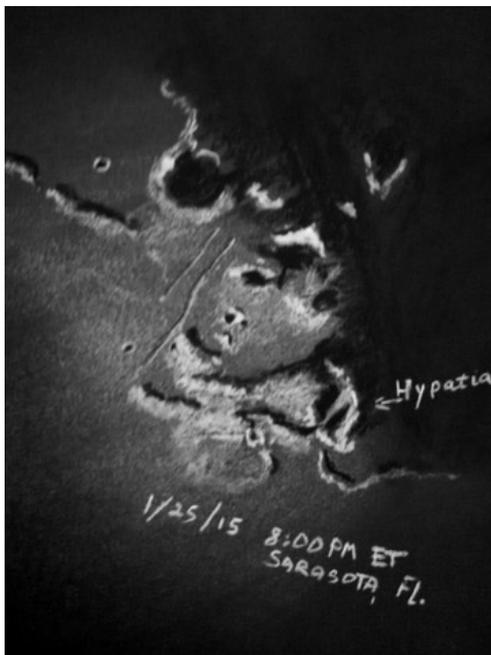
South of the middle of the rima and to the right of Agrippa are the twin 15km diameter craters Whewell and Cayley. In this region I was able to identify several craters just over 2km in diameter using LROC Quick Map images. Below Cayley is the small 10km crater De Morgan and further the ruined crater D'Arrest. So much more to see that I'll leave the rest to you.

The two images that made this montage were stacked using AutoStakkert and further processed with GIMP, IrfanView and assembled with AutoStitch



RECENT TOPOGRAPHICAL OBSERVATIONS

MARIA SMYTHII & MARGINALIS - Jay Albert, Lake Worth, Florida USA. January 3, 2015 02:23 UT. Seeing 7-8/10 Transparency 2/6. 6" Nextstar SCT, NexImage 5



HYPATIA – Randolph Baron, Sarasota, Florida USA. January 26, 2015 01:00-01:15 UT. Sketch.

9-day Moon - Maurice Collins, Palmerston North, New Zealand. January 29, 2015 08:28-08:33 UT. FLT-110 APO Refrac.



RECENT TOPOGRAPHICAL OBSERVATIONS



DESLANDRES - Maurice Collins, Palmerston North, New Zealand. January 28, 2015 08:56 UT. FLT-110 APO Refrac, 2x barlow.

REICHENBACH & Lunar K- Ralph Eichelenberg, Oetingen, Belgium. January 8, 2015, 21:51 UT. Skywatcher 10" refl., afocal, 11mm Explore Scientific ep, 2x barlow, 218x. Nikon J1.



PTOLEMAUS - Howard Eskildsen, Ocala, Florida, USA. November 30, 2014 00:31 UT. Seeing 6/10, Transparency 6/6. Mewlon 250, 1.5x barlow, IR block filter, DMK 41AU02.AS.

RECENT TOPOGRAPHICAL OBSERVATIONS

SINUS MEDII-HIPPARCHUS - Howard Eskildsen, Ocala, Florida, USA. November 30, 2014 00:46 UT. Seeing 6/10, Transparency 6/6. Mewlon 250, 1.5x barlow, IR block filter, DMK 41AU02.AS.



MONTES APENNINUS – Richard Hill – Tucson, Arizona, USA November 30, 2014 01:31 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS, SKYRIS 445M. 656.3 nm filter.

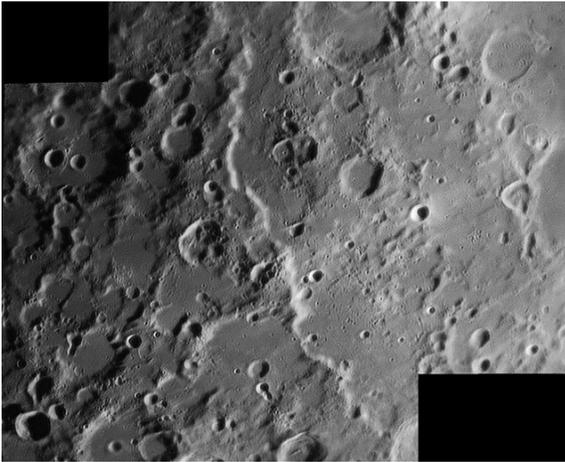
Standing as a lone sentinel near the middle of the Montes Apenninus is the relatively recently formed 22km diameter crater (Copernician age) Conon seen near the middle of this sunrise image. These mountains are basically just crater walls to a colossal crater that is Mare Imbrium. Straight down and slightly left of Conon is a little flat area known as Sinus Fidei, and embayment off of Mare Vaporum. Winding more or less down the middle of this embayment is Rima Conon. There appears to be a dome on the left 'shore' of this Sinus. Just to the right is another long thin embayment stretching down from Conon. This is Sinus Felicitatis.



To the right of Conon are two more relatively recent craters aligned north-south. These are the 10km diameter Aratus (north) roughly the same age as Conon, and the slightly smaller and much older Galen (south). About an equal distance north, on the other side of the mountains, you can see a little piece of a north-south rima, this is Rima Hadley. Just above the shadow is where the Apollo 15 lunar module "Falcon" touched down. The illuminated mountain pointing to this rima is Mons Hadley Delta. The impressive rampart just to the right of Delta is Mons Hadley itself.

Further to the north of these peaks is Rima Fresnel, a deep gash in the surface running from the upper right to lower left, into the large smooth area known as Palus Putredinis. It appears that there are several domes in this area. On the other side of Palus Putredinis, and almost in line with Rima Fresnel, is another canyon, Rima Bradley. Notice how it is buried and broken on the right end showing how it is much older than the basalts that flooded over it. Directly below Rima Bradley are Mons Bradley casting their dark shadow across the selenoscape. Take some time and enjoy prowling around this scene.

RECENT TOPOGRAPHICAL OBSERVATIONS



RUPES ALTAI – Richard Hill – Tucson, Arizona, USA
November 29, 2014 00:47 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS, SKYRIS 445M. 656.3 nm filter.

As old-timers a lot of us learned this feature as the Altai Scarp. Today it is Rupes Altai and is well seen about 5 days after new moon. It is a wall from the Mare Nectaris impact, extending from Picolomini in the south (just a bit seen at the bottom of this image) almost to Cyrillus, just under 500 km. The shallow non-round crater just above and right of center is Polybius and just to the left of Polybius is a cluster of smaller craters showing some curious shapes. Polybius F is the crater shaped like a backwards "D" with a little craterlet in the center. Just to the right of it, sitting as a forwards "D", is Polybius C. The shared wall between them was formed from the impact of F which appears to be somewhat younger than C.

On the other side of the rupes near the middle is a formation that looks like a bear paw print. This is Pons with Pons D forming the one toe on the right. Note below Pons and to the right and left are two "keyhole" shaped craters, Rothmann H and J on the right and Wilkins A and B on the left. I'll bet these are secondary craters made from low velocity impacts during the formation of one of the nearby maria.

Up in the upper left corner is the crater Sacrobosco with a couple of central craters that have an interesting set of rilles or rimae between them. At the very top is about half of the large 104 km crater Catharina, a well known landmark to most lunar observers. Look at the secondary cratering on the floor of Catharina. These are around 1km in size.

MARIA CRISIUM, SMYTHII & MARGINALIS – Alexander Vandenbohede, Brugge, Belgium. December 28, 2014 UT. 20cm f/15 Refrac, ToUcam

Libration was favorable for the Mare Marginis and Mare Smythii region, and some "details" (e.g. the swirls) can be distinguished. I also replotted the image as if the region would be found at the centre of the lunar sphere (for an earthling)..



MONTES CAUCASUS – Alexander Vandenbohede, Brugge, Belgium.
December 28, 2014 UT. 20cm f/15 Refrac, ToUcam

BRIGHT LUNAR RAYS PROJECT

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

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

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

RECENT RAY OBSERVATIONS

ANAXAGORAS– Alexander Vandenbohede, Brugge, Belgium. January 2, 2015 UT. 20cm f/15 Refrac, ToUcam



STRABO– Alexander Vandenbohede, Brugge, Belgium. January 2, 2015 UT. C-8 SCT, f/10, ToUcam.

LUNAR TRANSIENT PHENOMENA

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

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

LTP NEWSLETTER – FEBRUARY 2015

Dr. Anthony Cook – Coordinator

Observations from the following observers were received in December: Paul Abel observed Earthshine (Leicester, UK - BAA), Jay Albert (Lake Worth, FL, USA - ALPO) observed: Aristarchus, Copernicus, Grimaldi, Kepler, Mons Lahire, Oceanus Procellarum, Plato, Proclus, Promatorium Laplace, and Sinus Iridum. Maurice Collins (New Zealand, RASNZ) observed several features. Anthony Cook (Newtown & Mundesley, UK – BAA) imaged several features and observed Earthshine. Marie Cook (Mundesley, UK – BAA) observed Aristarchus and Plato. Chris Garrison (near Granada, Spain) imaged and visually observed Earthshine. Brian Halls (Lancing, UK - BAA) imaged the Cepheus A area. Collin Henshaw (Saudi Arabia – BAA) imaged Earthshine. George Ionas (New Zealand – NZ Astronomers) imaged several features. Martin Homan (Grand Rapids, MI, USA) imaged the whole lunar disk. Brent Russell (New Zealand – NZ Astronomers) imaged Mare Nectaris. David Scanlan (Romsey, UK - BAA) imaged Plato. Brendan Shaw (UK – BAA) imaged Alpetragius, Alphonsus, Censorinus, Eimmart, Linne, Pico B, Pitiscus, Plato, Posidonius, Proclus, Purbach, Ross D, Swift, Theophilus, and Tycho. He also observed Earthshine through binoculars. Franco Taccogna (Italy – UAI) imaged Plato. Ivor Waltom (Cranbrook - CADSAS) imaged Plato, and several other features.

News: Nothing much to report in the way of news over the last month. I am still working my way through Prof Arlin Crotts' book and have reached the start of the LTP chapter. Please do not regard my slow progress as reflecting upon the content of the book – it is just that the last few months have been rather hectic, with not much time available to sit down and read!

LTP Reports: Professor Crotts, of Columbia University (USA), alerted me to an observation of Aristarchus by Martin Homan from 2014 Dec 04 UT 03:14-03:15. This showed some color forming on the exterior area of Aristarchus crater. The images were taken with a Nikon P520 camera operating with a 42x optical zoom! Although I cannot be 100% sure, I think that I can see examples of other colors elsewhere on the terminator area of the Moon – perhaps typical of what one expects with MPEG compressed images in the darker parts of images. But just in case, I would like to request that if anybody else was imaging the Moon at this time, that they please send any captured images to me so that I can check these out.

On 2014 Dec 05 UT 20:20-21:32 David Scanlan (LX90, 76x-222x, Seeing III-IV, transparency Good) noticed that the NE wall of Plato appeared contorted and had a dusky shading. This effect was not seen in other craters, nor could it be found in on-line images of Plato, or the Virtual Moon Atlas, that he consulted afterwards. The effect was present when checked with a blue (#82A) filter. But David comments that the blurred appearance effect was not visible when viewed with his 26mm eyepiece (x76), whereas all higher power eyepieces did reveal the effect. This effect was still present at 21:32. I put out a limited alert to some of our European observers, and here are the results: 20:57-20:58 UT - Ivor Walton imaged the crater in color. 21:49-00:09 UT - Brendan Shaw imaged the crater periodically. 22:55-23:00 UT - Marie Cook did not see anything unusual, from 22:55-23:00UT, but her transparency conditions were terrible. 23:30-23:44, 23:47-00:02UT - I imaged the Moon (from Newtown, UK) with a 20cm Dobsonian, but observing conditions were appalling. Thierry Speth (France) was clouded out. UAI observers were clouded out too.

Now if this were a LTP, then the appearance should have changed over time. Fig 1. shows a sequence of images, one from Ivor Walton and the rest from Brendan Shaw. Although they show the NW wall to be less distinct than the others in appearance, there is no change, beyond the limits of image resolution and seeing, which were much worse earlier in the evening. I also found an appearance identical to Ivor Walton's image in

one of my own CCD images that I captured nearly 14 years earlier on 1990 Dec 31 UT 22:21. A follow up image, taken almost a day later by Franco Taccogna (UAI), on 2015 Dec 06 UT 20:02 also revealed the NE rim to be less distinct than elsewhere. The fact that David found the NE rim clearer at lower power possibly has something to do with image contrast being better – scenes often look sharper when they are nice and bright and contrasty. Therefore we can safely say that this was the normal appearance of the crater and that this was not a LTP. David Scanlan did the correct thing though in alerting us to this appearance, and he followed standard practice in changing eyepieces, and he did check other craters. Lastly this was good practice to test out our little used LTP alert system – most alerts these days are raised many hours, or days, after images have been taken because it takes a while for observers to process and study images. In a way visual observers have the edge over CCD astrophotographers, when detecting LTP. Though it should be said that CCD images are always better from an analytical point of view, if available!

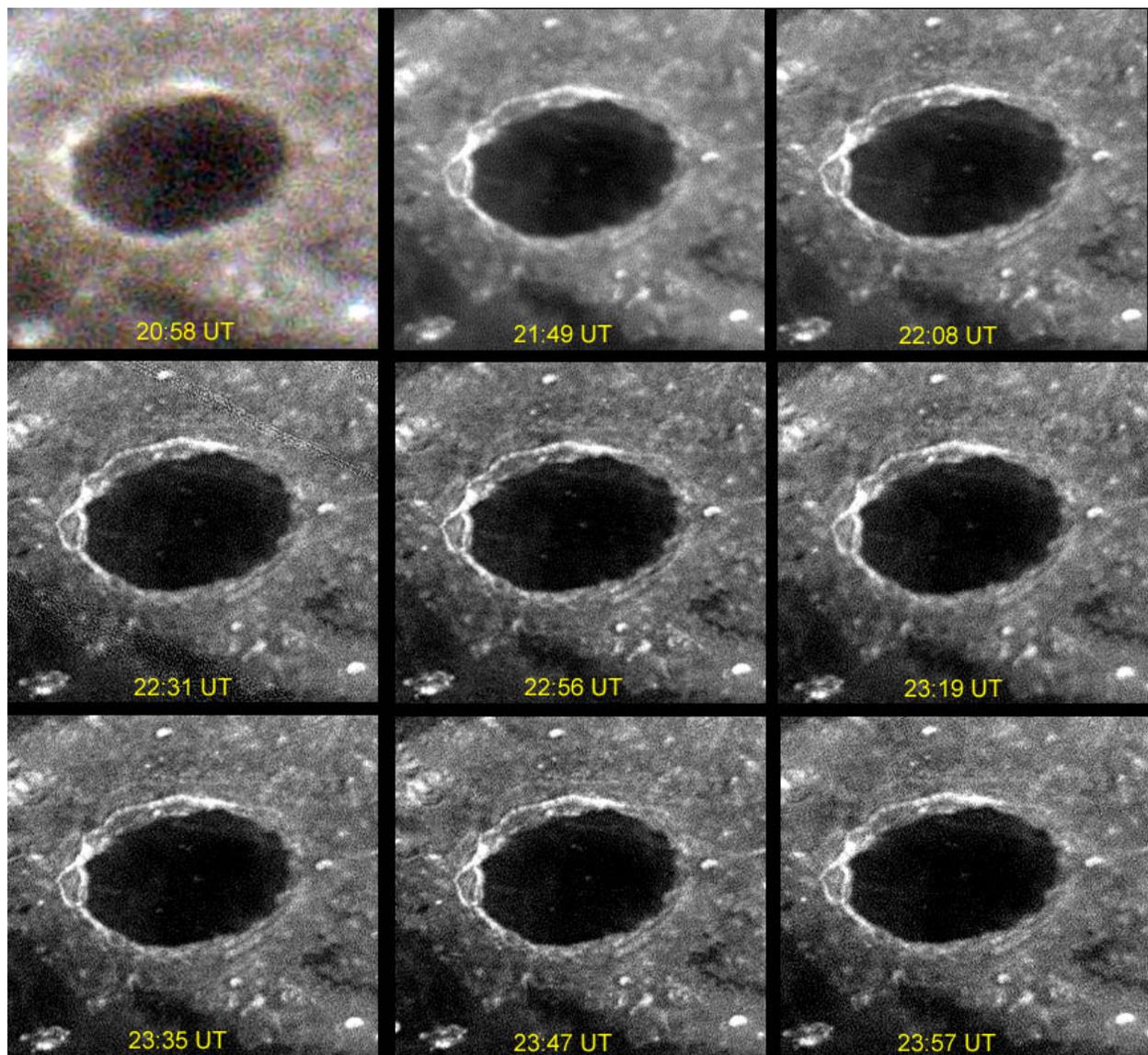


Figure 1. 2014 Dec 05 CCD images of Plato orientated with north towards the top. All images have been high pass filtered, and contrast stretched. The 20:58 UT image is by Ivor Walton (CADSAS). The remaining images: 21:49-23:57UT, are by Brendan Shaw (BAA) and were taken through a green filter..

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

Aristarchus: On 2014 Dec 05 UT 18:45-18:50 visual observations by Marie Cook, using a 3.5" Questar telescope (seeing III, transparency poor), matched the illumination conditions, to within +/-0.5° to the following past LTP:

Aristarchus 1959 Jan 23 UT 06:20 - Observer: Alter (Mt Wilson, CA, 60" reflector x700) "Brilliant blue in interior later turning white. Photos obtained. (MBMW has this entry twice for diff. dates because source gave UT date as 23rd.)." NASA catalog weight=5. NASA catalog ID = #712. ALPO/BAA weight=4.

Aristarchus-Herodotus 1964 Sep 20 UT 04:15-04:50 - Observers: Crowe & Cross (Whittier, CA, USA, 19" reflector x390) "Several red spots in area between the 2 craters. No change in phenom. so stopped observing" NASA catalog weight=5. NASA catalog ID #849. ALPO/BAA weight=3.

On 1965 Sep 09 at UT 13:20 Presson observed an orange-red strip on the floor of Aristarchus. Cameron says that this was confirmed later by Bartlett? The Cameron 1978 catalog ID=892 and weight=2. The ALPO/BAA weight=2.

On 1979 Oct 04 at UT 21:05-23:40 P.W. Foley (Kent, UK, 12" reflector, x360, seeing=II) detected color in Aristarchus (and also in Bullialdus - there was a LTP alert at this time for Bullialdus, but nowhere else on the Moon. Aristarchus had a CED brightness value of 3.8 at 21:05 (though at this time no color) and 3.4 at 23:40 and the floor was now slate blue/gray in color. Other features remained constant in brightness. The Cameron 2006 catalog ID=72 and the weight=0. The ALPO/BAA weight=1.

Near Aristarchus 1788 Apr 19 UT 20:00? Observed by Schroter (Lilienthal, Germany) NASA Catalog Event #44, NASA Weight=4. Event described as: "Small area very brilliant & other bright spots". No additional references given. ALPO/BAA weight=1.

Marie saw no red spots in the area between Herodotus and Aristarchus, and no sign of any atmospheric spectral dispersion either. She saw no sign of blue in Aristarchus. For now, and in view of the observing conditions, it is probably best to leave the weights of the above LTP as they are

Plato: On 2014 Dec 05 UT 20:20-00:09 visual observations by David Scanlan (BAA), and CCD imagery by Ivor Walton (CADSAS – color imagery) and Brendan Shaw (BAA – monochrome imagery) – see Fig 1, were at the same illumination to the following two LTP:

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

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

It is interesting to note that with these 1938 and 2005 observations, that neither observer comments about the NE wall being less distinct, but perhaps their seeing and image contrast were sufficient on these occasions? Ivor Walton's image shows no sign of any yellow or golden color on the NE rim. Therefore the weight of these observations will remain at 3 and 1 respectively.

Grimaldi: On 2014 Dec 16 UT 10:05-10:20 Jay Albert (ALPO) using a Nexstar 6" SCT at x214 (Seeing 7-8/10 and transparency 4th magnitude) observed this crater under the same illumination, to within +/-0.5° to a LTP seen by Jorgensen in 1971:

Grimaldi 1971 Jun 18 UT 02:12-02:31 Observed by Jorgensen (Denmark, 36" refractor, 60, 200x) "Dark reddish spot in SW part of crater. At 60x. Became clearer at 200x & seen in midwest also. At 0331h phenom. clearest in west, while S. region had faded. Air turb. & dawn ended obs. at 0331h. Seen best in yellow filter, well in red, invis. in green & blue." NASA catalog weight=3. NASA catalog ID #1298. ALPO/BAA weight=3.

Jay comments that the crater was fully sunlit and the floor was dark, with an especially dark patch on the SW floor. That dark patch probably relates to the "dark reddish spot" in the LTP description from 1971, however, he saw no red, or any other color. Also, unlike the LTP description, there was little or no atmospheric turbulence during his observation. Jay wonders whether the turbulence experienced by Jorgensen, was the cause of the color he saw – however after examining the report on p70 of the BAA Lunar Section Circular from 1971, I see that the observer notes that the seeing started off good, but worsened. Now the altitude of the Moon at the time of the 1971 LTP was between 20° and 23° above the horizon which is starting to get a bit on the low side. Also although a large telescope of 36" diameter was used, it was a refractor and these do suffer from chromatic aberration. Nevertheless Jorgensen utilized a yellow filter, which is a standard way of minimizing such effects. For now I will leave this LTP at a weight of 3, though it would be useful if I could have found additional write ups of this report, and leant for example if the observer checked for spectral dispersion on other lunar features?

Aristarchus: On 2014 Dec 24 UT the topocentric libration of the Moon, and the illumination (phase) were exactly the same as they were for a Sir William Herschel LTP from 1783 May 04 UT ~20:00. Herschel observed several occurrences of what he referred to as volcanoes (which of course they weren't) and these have become the stuff of legends. The following description, from the Cameron catalog, is perhaps not one of the most famous of his observations, but nonetheless we have effectively a time machine tool to go back and see what the Moon should have looked like on that night:

William Herschel and Mrs Lind saw a red, 4th magnitude brightness, less than 3 arc sec in diameter. Herschel believed that he was seeing a lunar volcano in eruption. NASA catalog weight=5, catalog ID=26. ALPO/BAA weight=3.

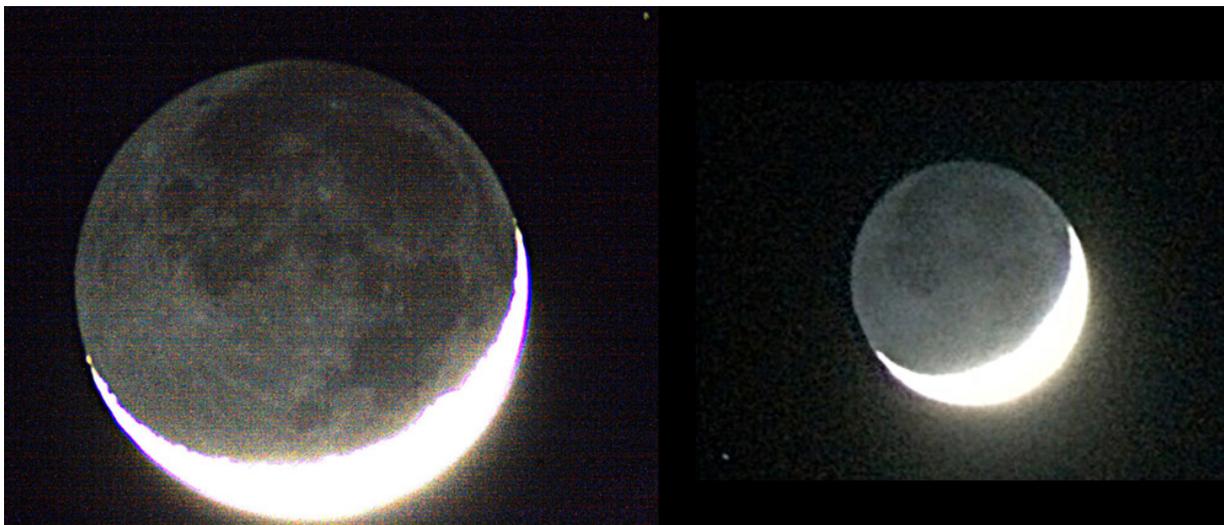


Figure 2 Earthshine images orientated with north towards the top right. Both images have been sharpened, and contrast stretched. **(Left)** 2014 Dec 24 UT 16:41 by Nigel Henshaw. **(Right)** 2014 Dec 24 UT 17:59 by Christopher Garrison.

A number of observations were made under these repeat conditions, and when you read them you get the impression of how local observing conditions, and instruments being used can affect the appearance of Earthshine. I will list the reports, in sequence, according to their UT, and discuss them later:

16:19 UT Tony Cook started to attempt to observe Earthshine, looking through a 24mm eyepiece on a Questar 3.5" telescope at Mundesley. But twilight was too bright to see anything. Seeing IV.

16:21 UT Tony Cook noticed that Earthshine was just starting to become visible, but no sign or recognizable features on the lunar disk.

16:32 UT Tony Cook commented that the Earthshine visibility was noticeably better.

16:34 UT Tony Cook could now see that the SW limb was bright, but the Moon was setting behind a tree, and so the telescope had to be relocated.

16:38-16:48 UT Tony Cook resumed observations. At 16:43 Aristarchus was at last located, but only just! Grimaldi was visible. Image quality was improved by switching to a 15mm eyepiece. Aristarchus was definitely not as bright as a star to the SW of the Moon, and it was clear that Aristarchus was not especially bright. The Moon was finally blocked by trees at 16:48 UT.

16:41 UT Nigel Henshaw managed to snap the image in Fig 2 (Left). This has been enhanced, sharpened and contrast stretched, But I think you can clearly see that Aristarchus is not exceptionally bright. If anything, Copernicus is the brighter and more noticeable of the usual three Earthshine features: Aristarchus, Kepler and Copernicus.

17:20 UT Paul Abel made a visual observation under and commented "*The Earthshine tonight is quite fantastic- quite possibly the strongest I've ever seen. I observed the Moon at 67x on my 203mm Newtonian reflector with some interesting results*"

17:26 UT Paul Abel (at 67x), examined the lunar surface and noted that all of the lunar 'seas' on the unilluminated side were visible. Aristarchus was clearly visible, although it's light was somewhat 'ghostly' in appearance.

17:28 UT Paul Abel commented that the effect seemed to be even more pronounced. Aristarchus appeared to have a dull/soft yellowish glow - it was now even visible in the 10x50 finder and was the most obvious feature in Earthshine. He had never seen the crater so bright on the dark side of the Moon, but added that Tycho was probably slightly brighter, but the color in Aristarchus was to his eyes more prominent.

17:30 UT Paul Abel ceased observing because the Moon was now below the observatory wall.

17:59 UT Christopher Garrison (Near Granada, Spain) imaged Earthshine but was hindered by sky conditions and the optics that he was using. Consequently his image is not quite the same resolution that Collin Henshaw obtained (See Fig 2 Right), but nevertheless is an important time stamp of what the Earthshine looked like 18 minutes after Collin's image.

~18:00 UT Brendan Shaw (Southern England) could not acquire the Moon with his telescope, so had to resort to binoculars. He reported that he could not see any craters whatsoever in Earthshine.

Before discussing these modern day observations, it is perhaps worth investigating, in a little more detail, the accounts of what Herschel saw in 1783, rather than relying upon the description in italics above, from the Cameron catalog. Corliss states: "*William Herschel saw what he believed was a lunar volcano in eruption*". Some digging around on the Internet came up with the following additional descriptions:

Firstly here is a 2nd hand account published in 1881 in: Sir William Herschel: His Life and Works, by Edward S. Holden - Chapter III – Life at Datchet, Clay Hall, and Slough; 1782-1822, p69.....

In 1787 Herschel wrote his paper "On three Volcanoes in the Moon," which he had observed in April of that year. In this he mentions previous observations of the same sort. I do not remember that the following account of these has ever been put on record in English. Baron von Zach writes from London to Bode:[1]

"Probably you have heard also of the volcanoes in the moon, which Herschel has observed. ... I will give you an account of it as I heard it from his own lips. Dr. Lind, a worthy physician in Windsor, who has made himself known through his two journeys in China, and who is a friend of our Herschel's, was with his wife one evening on a visit to Herschel in Datchet [1783, May 4]. On this evening there was to be an occupation of a star at the moon's dark limb. This was observed by Herschel and Doctor Lind. Mrs. Lind wished also to see what was occurring, and placed herself at a telescope and watched attentively.

"Scarcely had the star disappeared before Mrs. Lind thought she saw it again, and exclaimed that the star had gone in front of, and not behind the moon. This provoked a short astronomical lecture on the question, but still she would not credit it, because she saw differently. Finally Herschel stepped to the telescope, and in fact he saw a bright point on the dark disc of the moon, which he followed attentively. It gradually became fainter and finally vanished."

An alternative 2nd hand account can be found in the Royal Society Transactions from 1912.....

".... Though Herschel in his short account of what he saw in 1787 promised to communicate his observation of 1783 to the Royal Society, he never did so, and it will perhaps be well to give here his own account of it, from a letter to his Portuguese acquaintance, Magellan, who had asked for it:- "

"May 4, 1783. I perceived in the dark part of the moon a luminous spot. It had the appearance of a red star of about the 4th magnitude. It was situated in the place of Havelii Mons Porphyrites, the instrument with which I saw it was a 10 feet Newtonian Reflector of 9" aperture. Dr Lind's lady who looked in the telescope immediately saw it, tho' no person had mentioned it, and compared it to a star. Dr Lind tried to see it in an achromatic of 3 ½ feet of Dolland's but could not perceive it, tho' he easily saw it in my reflector. However, I could also tho' with difficulty perceive it in the refractor."

The Royal Society version of events mentions an occultation, and a simulation using the World Wide Telescope software, came up with the following for the Herschel's Slough location in the UK:

19:29 UT Sunset

19:53 UT Occultation of the star near the Moon's equator

20:00 UT Moon at 26° altitude above the horizon.

20:08 UT Civil twilight ends

20:18 UT Earthshine should start to become visible (rule of thumb 10 min after end of civil twilight).

20:36 UT HR1750 to N of Moon and mag 7.4

20:56 UT Occultation on SW limb of Moon

22:48 UT Bright occultation at lunar equator

23:23 UT Moonset

So depending upon what their local horizon was like, the events reported could have taken place at around 19:53, 20:56 or 22:48 UT. It is disturbing though that the two accounts differ. The first has a mention of a star like point that fades over time – the Cameron catalog even quotes a diameter of < 3", or < 6 km, on the lunar surface. Now the second account is of a red 4th magnitude equivalent star like point that was not well visible in a smaller aperture instrument. It gives a name to the location: "Mons Porphyrites", or a name that Hevelius gave to what we refer to now as Aristarchus crater. This clearly identifies the crater – but we are left with a puzzle, the first account states the area affected was < 6 km across, but Aristarchus is 40 km in diameter. So what are we to make of this? Was this the central peak area? There is no way to know? Did Herschel's memory of this event merge with recollections of other events he had seen in Earthshine, and that is where the

“red” effect came from? Was the fade caused by the Moon getting closer to the horizon and more light being absorbed, making the feature fade from view, or was it simply that the cloud cover of the Earth changed, thus affecting the contrast of the lunar night side visible from Earth and making Aristarchus and all less bright features fade from view? The long focal length telescopes of that era were not small f/No ratio scopes, which we would traditionally use for looking at wide area regions of the sky, so they were not really suitable for Earthshine observing. So in practice, only the brightest features would normally show up in Earthshine, and light levels would probably be too faint to activate the color sensitive cones in the eye. If Aristarchus were bright enough, and the Moon was low enough, leading to reddening of light during passage through our atmosphere, then this might perhaps have activated the cone color receptors in human eyes, and made it look red, where as all other features might have been too dim to have been seen in color? Fig 2 suggests though that Aristarchus would not have been especially bright at this libration with respect to the other features, at least at this image scale?

Then we have the visual accounts of the 2014 repeat illumination/libration views from myself, Paul Abel and Brendan Shaw. Both Brendan, and myself, were using relatively small aperture instruments, and did not see much in Earthshine. Paul had a larger instrument, probably better sky conditions, and did see Aristarchus had some color: yellow, but not red. He says that Aristarchus was quite bright, but that Tycho was brighter. I wonder if image scale has something to do with it. Although Fig 2 is illustrative, the image scale is not sufficient to resolve inside Aristarchus, and that is maybe where Herschel’s and Paul Abel’s observations differ to others. It is difficult to come to any conclusion over the different 2nd hand historical accounts, but at the same time, Herschel was quite adamant over what he had seen and had clearly described to other astronomers that it was not just ordinary Earthshine he was seeing – though he did quieten down talking about his volcanoes on the night side in later years. The fact that the effect described was possibly seen by three observers, would normally lead to a weight of 4 or 5, but the current weight of 3 for one experienced observer seems about right in view of the discrepancies in the 2nd hand reports. Anyway we should actively seek to observe the Earthshine again in future if any of his other sightings repeat in illumination and topocentric libration, as there is much to learn, especially from his better reported firsthand accounts.

Cepheus A: On 2014 Dec27 both Brian Halls (BAA), and myself, (BAA) observed Cepheus A close to the same illumination, and topocentric libration, to a rather interesting LTP report from Maurice Collins - from the year 2000:

Cepheus A 2000 Oct 04 UT 08:15-08:50 Observer: Maurice Collins (New Zealand, 90cm ETX, seeing 3) - observer noted that crater was extremely bright - wasn't sure if this was normal and at the time rated it as the brightest (contrasty?) crater that he had ever seen on the Moon. ALPO/BAA weight=2.

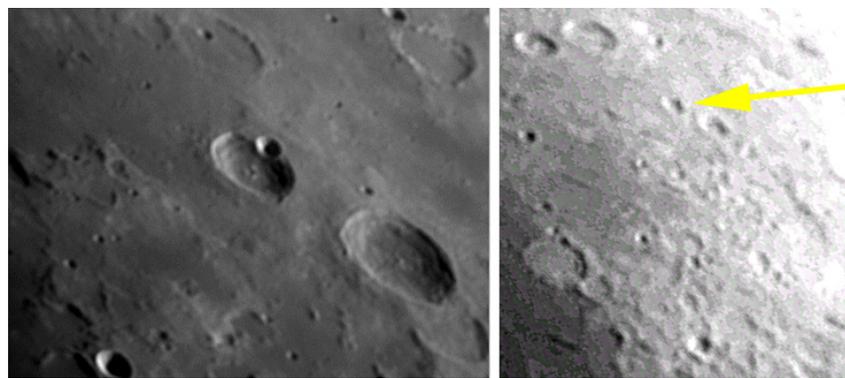


Figure 3. Cepheus A craterlet perched on the NW rim of Cepheus. Images taken on 2014 Dec 27 and orientated with north towards the top. **(Left)** Image by Brian Halls (BAA) from 16:38UT. **(Right)** Much lower resolution, and under very poor seeing conditions, wider angle context image by Tony Cook (BAA) from 21:36UT.

I remember this report arriving in my email inbox in 2000, and it has always fascinated me looking out for repeat illumination observations (all of which did not show this effect), and then finally after a long wait we now have a detailed image from Brian Halls, just before the $\pm 1^\circ$ repeat illumination/libration window of 18:49-22:41, and a much lower resolution image of my own - affected by poor seeing in the latter half of this window. As you can clearly see in both the high and low resolution views in Fig 3, Cepheus A does not look like the brightest crater, nor extremely bright either. The weight of the original observation was 2, so I sent the images off to Maurice Collins for his opinion. He checked his original report and sent me a transcription from his notebook:

“Noticed a bright hump on crater wall of Censorius (misspelt and crossed out) Cepheus (a crater not far from Atlas and Hercules). It was shining very brightly in the sun light. Couldn’t tell if it was a crater on the wall or what (yes). Will have to investigate. As far as eyepieces are concerned, the 4mm works best.”

Commenting on his report, from some 14 years later, with hindsight Maurice then goes onto add:

“(1) The seeing would have been poor. I rate it as 3, but it could have been worse at times due to Cumulonimbus (CB) clouds around that I noted. So the air being unstable has the effect of temporarily magnifying bright points of light on the Moon to flash like stars very brightly as I have noticed since, with that telescope especially. (2). The date and time are correct as the age of the Moon matches, and that is the time I would have been out observing around 8:15-8:50pm. (3). I was using a small telescope, the ETX-90 at high magnification, not a good combination! (4). The crater may have been mis-identified as I crossed out Censorius (misspelled in my notes) and put in Cepheus after looking it up inside and noted it was a crater by Atlas and Hercules. I am not familiar with Chevalier A (can’t find it on my charts even now) but perhaps it could have been? (5). In conclusion, since your testing over the years has shown Cepheus to be normal looking at similar lighting,...I tend to think it was just the poor seeing, perhaps some other crater, high magnification and a small telescope, and novice (at that time) observer. - So maybe it can be removed from the list or lowered in weight as there is not enough hard data to support it being unusual? A pity, but it is just too long ago and we can’t get any repeat lightings that show anything so I think my report is unreliable.”

I will follow Maurice’s line of thoughts and reduce the weight from 2 to 1, but think that it is still worth keeping on the list, but perhaps only for repeat illumination/libration. My reasoning is as follows – if it was an extremely bright point source, poor seeing, and or a small telescope, would blur this, making it fainter, or making it flash in turbulence. Maurice did not report any flashing aspect to this spot, only that it was very bright. The fact that no brilliant point of light can be seen in Brian’s high resolution image, suggests the atmospheric blurring explanation might not be tenable. Maurice’s mis-identification theory maybe possible though, as you can see in my rather blurry context image (Fig 3 – Right), there are plenty of other bright areas, but not as bright as the eastern limb. So this just leaves two alternatives, either a mis-identification, or something happened on the Moon. The former is the more preferable theory, but it would be helpful to have some additional high resolution images at closer repeat illumination/librations to Maurice’s 2000 report.

Alphonsus: On 2014 Dec 29 at 08:32 George Ionas (NZ Astronomers) imaged the Alphonsus area within ± 0.5 of the following LTP:

On 1993 Mar 30 at UT19:35-21:15 J. Knott (England, UK, 8.5" reflector, x180 and x216, seeing=II and Transparency=good) observed at 19:35 the central peak of Alphonsus appeared to be extra bright although was normal later, however the observer suspects that this was a contrast related and was not confident to send out a LTP alert. The Cameron 2006 catalog ID=458a and 458b and weights=0. The ALPO/BAA weight=1.

George’s image (see Fig 4) is clearly before the emergence of the central peak, and the predictions are produced to within $\pm 0.5^\circ$ of the same illumination as the original LTP. So it is a useful context image and provides a time stamp, namely that the central peak is not expected to appear until the colongitude exceeds 2.97° . The weight of the 1993 report will remain at 1 for now, at least until we can obtain a sequence of slightly later colongitude images.



Figure 4. Ptolemaeus and Alphonsus with north towards the top as imaged by George Ionas (NZ Astronomers) on 2014 Dec 29 UT 06:32. Image extracted from a larger supplied image and contrast stretched. Although not related to the material in this section of the newsletter, please note the interesting finger print like texture at this sun angle e.g. between Gylden and Hipparchus, and other fine scale parallel ridge/groove like structures. Such structures can be seen elsewhere on the Moon under shallow lighting conditions e.g. near the outskirts of Theophilus and in the highland areas north and south of Vallis Alpes.

Suggested Features to observe in February: For repeat illumination (and a few repeat libration) LTP predictions for the coming month, these can be found on the following web site: <http://users.aber.ac.uk/atc/tp/tp.htm>. By re-observing and submitting your observations, we will get a clear understanding of what the feature ought to have looked like at the time. Only this way can we really fully analyze past LTP reports.

If you would like to join the LTP telephone alert team, please let me know your phone No. and how late you wish to be contacted. If in the unlikely event you 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. Agrippa
2. Alphonsus
3. Anaxagoras
4. Aristarchus
5. Carlini
6. Cepheus
7. Deslandres
8. Grimaldi
9. Hipparchus
10. Hypatia
11. Mare Crisium
12. Mare Marginalis
13. Mare Smythii
14. Montes Apenninus
15. Montes Caucasus
16. Plato
17. Ptolemaus
18. Reichenbach
19. Rupes Altai
20. Strabo
21. Sinus Medii

FOCUS ON targets

X = Hainzel

Y = Rimae Sirsalis

