THE LUNAR OBSERVER

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

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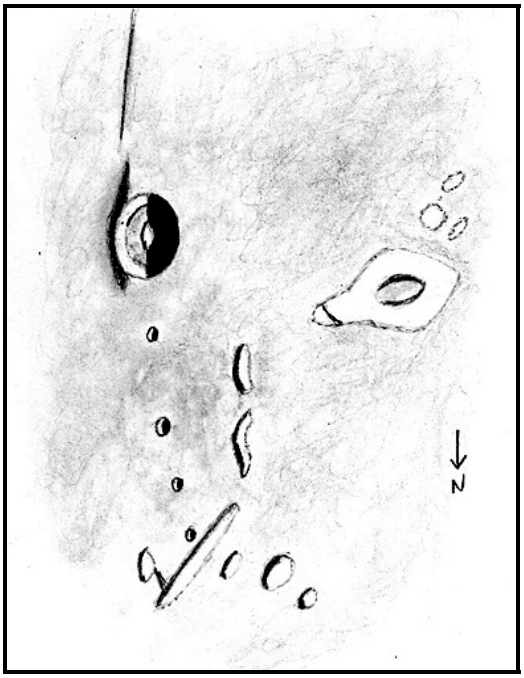
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – FEBRUARY 2012

REINER & REINER γ



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
September 23, 2011 10:18-10:40 UT, 15 cm refl, 170x, seeing 6-7/10

I observed this area on the morning of Sept. 23, 2011 while watching the moon uncover four stars. This area is in western Oceanus Procellarum. Reiner itself is a relatively large crater with a substantial central peak elongated north-south. The exterior shading on Reiner's east side does not look like ordinary shadowing, but may be from additional sloping. A long, straight strip of shadow is just south of Reiner near some of the east side shading. A chain of four small craters extends north from Reiner. The second and largest of them is Reiner H. The pit Reiner L is between Reiner H and Reiner, and Marius X is north of

Reiner H. The craterlet north of Marius X is not shown on the Lunar Quadrant map. A long, low ridge is just north of this pit, and there are several other low ridges and mounds in this area. The long ridge may be Marius tau and the curved feature just to its south may be Marius sigma, according to the LQ map. The bright, diamond-shaped area Reiner gamma is to the west. This strange feature has a bright extension on its east side and a dusky oval in its middle. This oval has dark edges on its north and south sides. The eastward extension is crossed by a narrow, dark line, appearing like a crack. Three small bright patches are southwest of Reiner gamma, and, like this feature, appear shadowless. The main diamond area of Reiner gamma looks smooth with no mottling.

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LUNAR CALENDAR

FEBRUARY-MARCH 2012 (UT)

Feb. 03	07:12	Extreme North Declination
Feb. 07	21:55	Full Moon
Feb. 10	04:00	Moon 9.0 Degrees SSW of Mars
Feb. 11	18:33	Moon at Perigee (367,919 km – 228,614 miles)
Feb. 12	22:00	Moon 6.0 Degrees SSW of Saturn
Feb. 14	17:05	Last Quarter
Feb. 16	08:36	Extreme South Declination
Feb. 17	22:00	Moon 1.7 Degrees SSE of Pluto
Feb. 21	20:00	Moon 5.5 Degrees NNW of Neptune
Feb. 21	22:36	New Moon (Start of Lunation 1103)
Feb. 23	01:00	Moon 5.6 Degrees NNW of Mercury
Feb. 24	08:00	Moon 5.3 Degrees NNW of Uranus
Feb. 25	21:00	Moon 3.2 Degrees N of Venus
Feb. 27	03:00	Moon 3.8 Degrees NNW of Jupiter
Feb. 27	14:03	Moon at Apogee (404,862 km – 251,570 miles)
Mar. 01	01:22	First Quarter
Mar. 01	16:12	Extreme North Declination
Mar. 07	24:00	Moon 9.1 Degrees SSW of Mars
Mar. 08	09:41	Full Moon
Mar. 10	10:03	Moon at Perigee (362,399 km – 225,184 miles)
Mar. 11	03:00	Moon 5.9 Degrees SSW of Saturn
Mar. 14	14:12	Extreme South Declination
Mar. 15	01:26	Last Quarter
Mar. 16	02:00	Moon 1.4 Degrees SSW of Pluto
Mar. 20	02:00	Moon 5.6 Degrees NNW of Neptune
Mar. 22	12:00	Moon 1.4 Degrees NNW of Mercury
Mar. 22	12:00	New Moon (Start of Lunation 1104)
Mar. 22	20:00	Moon 5.2 Degrees NNW of Uranus
Mar. 25	23:00	Moon 3.0 Degrees N of Jupiter
Mar. 26	06:05	Moon at Apogee (405,779 km – 252,139 miles)
Mar. 26	21:00	Moon 2.0 Degrees SSE of Venus
Mar. 28	23:42	Extreme North Declination
Mar. 30	19:41	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 non-member 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.alpoastronomy.org/index.htm** 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.

Note: The published images now contain links to the original, full resolution images. Clicking on an image while connected to the internet, will download the original image, which in some cases has significantly higher resolution than the published version.

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 always be included:

Name and location of observer
Name of feature
Date and time (UT) of observation
Size and type of telescope used
Orientation of image: (North/South - East/West)
Seeing: 1 to 10 (1-Worst 10-Best)
Transparency: 1 to 6
Magnification (for sketches)
Medium employed (for photos and electronic images)

CALL FOR OBSERVATIONS: FOCUS ON: Archimedes

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 2012** edition will be **Archimedes**, which is conveniently available with sunrise just after 1st quarter. 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 Archimedes to your observing list and send your favorites to:

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

Deadline for inclusion in the Archimedes article is February 20, 2011

FUTURE FOCUS ON ARTICLES:

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

Pyrenees Mts.	**May 2012**	**April 20, 2012**

LUNAR TOPOGRAPHICAL STUDIES

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

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

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

OBSERVATIONS RECEIVED

ORLANDO BENITEZ-CANARY ISLANDS, SPAIN. Digital images of Aliacensis-Werner, Demonax-Manzinus,Licetus, Mosting, Plato, Timocharis and Walter.

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 7 & 8 day moon, Full Moon.

ED CRANDALL – LEWISVILLE, NORTH CAROLINA, USA. Digital images of Theophilus (3), Torricelli and Rupes Altai.

JOHN DUCHEK – CARRIZOZO, NEW MEXICO, USA. Digital image of Archimedes.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Full Moon ray atlas images.

RICHARD HILL – TUCSON, ARIZONA, USA Digital image of Fabricius - Vallis Rheita.

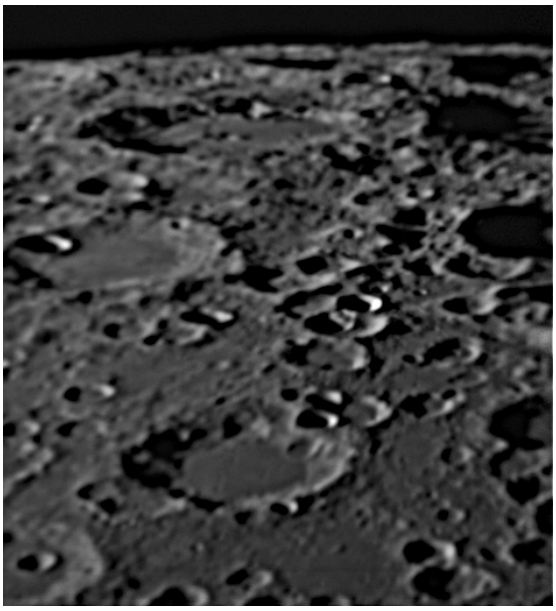
HAYS, ROBERT - WORTH, ILLINOIS, USA. Drawings of LaCondamine, Lansberg C and Nicollet..

JERRY HUBBELL – LOCUST GROVE, VIRGINIA, USA. Digital images of Aristarchus, Clavius, Gassendi, Mons Rumker, Pythagoras, Reiner gamma, Schickard, Schiller, Tycho.

MILLER, ANDY – CONNEAUT, OHIO, USA. Digital image of Archimedes and Pyrenees Mountains.

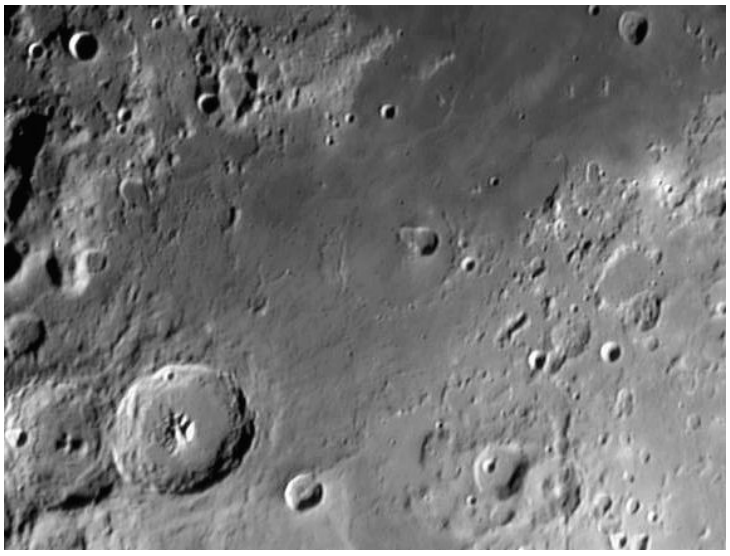
PHILLIP MORGAN –LOWER HARTHALL-TENBURY WELLS, WORCESTERSHIRE, ENGLAND. Drawing of Archimedes.

RECENT TOPOGRAPHICAL OBSERVATIONS



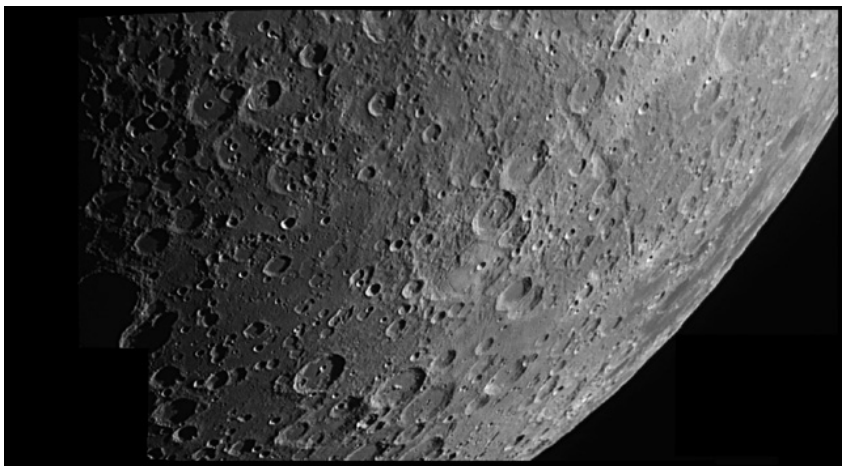
DEMONAX-MANZINUS-Orlando Benitez-Canary Islands, Spain. January 1, 2012 20:03 UT. Seeing 6/10, Transparency 6/10, Colongitude 4.1°. SCT 235mm, f/20, DMK21AF04.

8.6-day MOON - Maurice Collins-Palmerston North, New Zealand. January 2, 2012 08:44-09:26 UT. Seeing A-V. C-8 SCT, LPI.

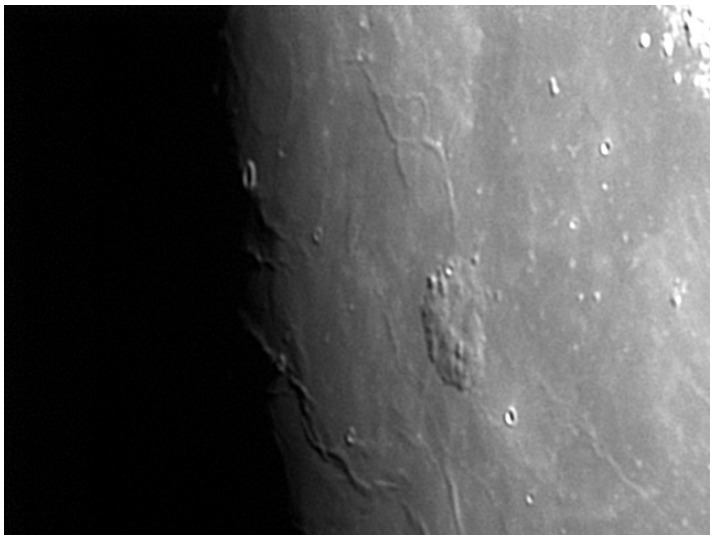


TORRICELLI – Ed Crandall – Lewisville, North Carolina, USA. December 1, 2011 23:07 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam

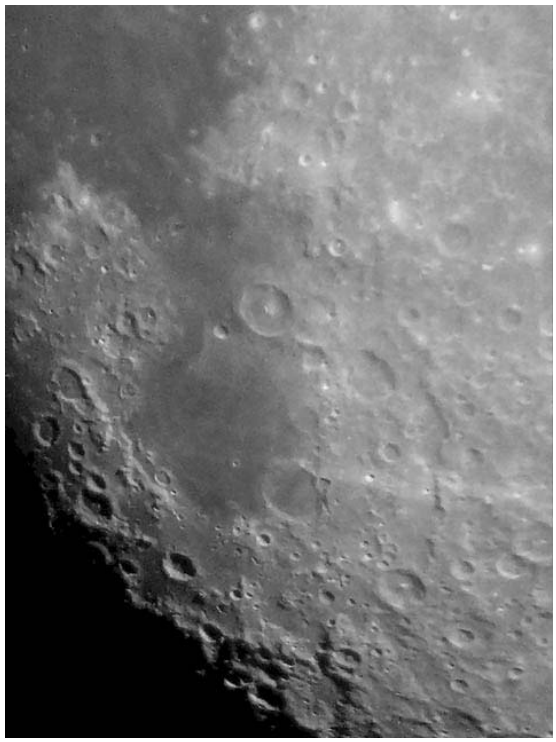
RECENT TOPOGRAPHICAL OBSERVATIONS



FABRICIUS-VALLIS RHEITA – Richard Hill – Tucson, Arizona, USA September 4, 2011 01:56 UT. Seeing 8/10. C5, 2x barlow, f/20, SCT. DMK21AU04. Wratten 23filter.

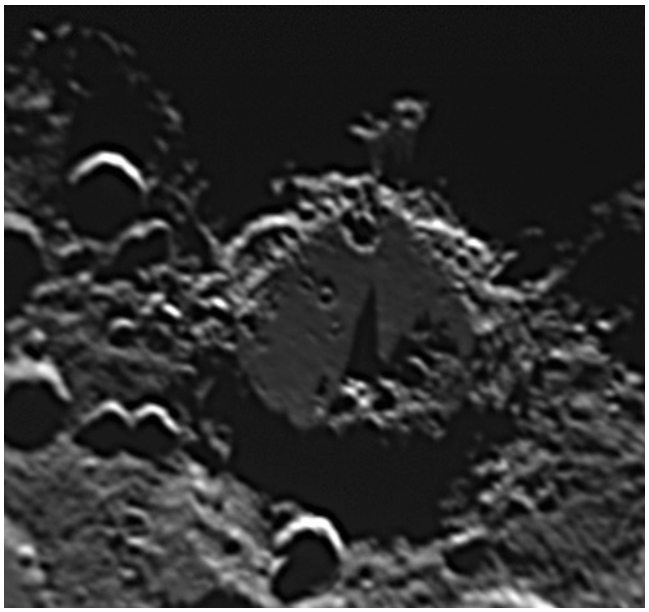


MONS RUMKER– Jerry Hubbell, Locust Grove, Virginia, USA. January 7, 2012 02:33 UT. Colongitude 68.5º, Seeing 7-8/10, Transparency 5-6/6. Explore Scientific 125 ED APO CF, 4x Barlow, f/30, DMK21AU04.AS, red filter.

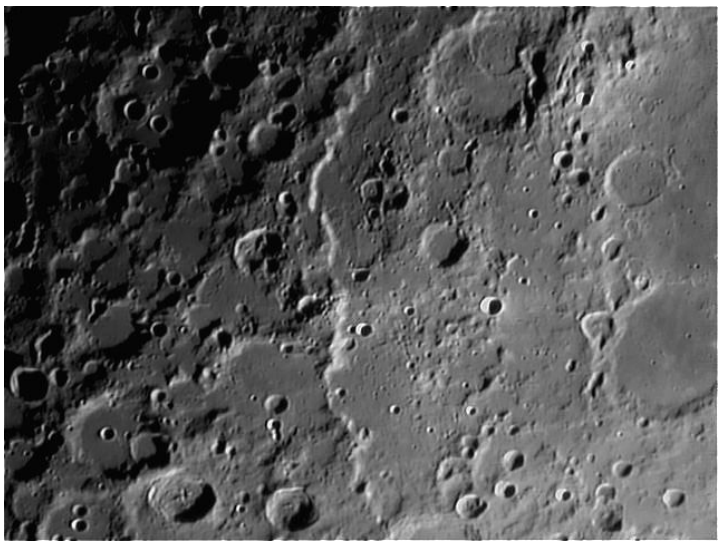


PYRENEES MTNS – Andy Miller, Conneaut, Ohio, USA. September 18, 2008 UT 08:30 UT. Seeing 6-8/10, Transparency 5-6/6. 4" Refractor, f/8, afocal, 16mm eyepiece, HP 635 point & shoot digital camera.

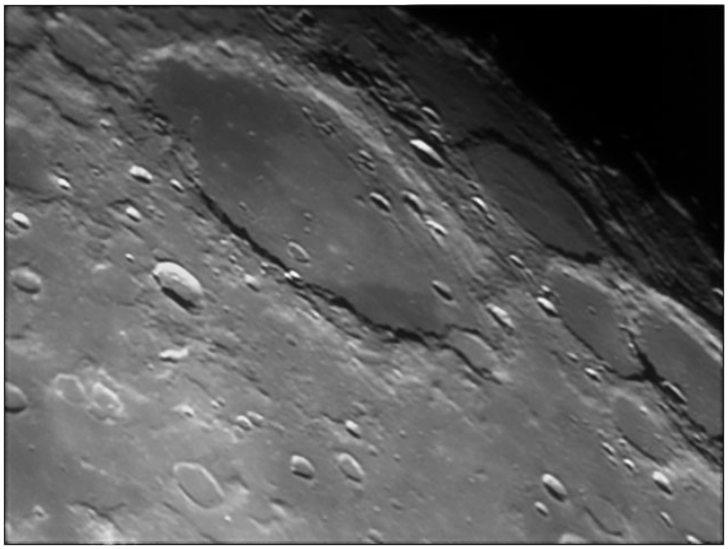
ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



WALTER-Orlando Benitez-Canary Islands, Spain. January 1, 2012 19:44 UT. Seeing 7/10, Transparency 7/10 Colongitude 3.9°. SCT 235mm, f/20, DMK21AF04.



RUPES ALTAI – Ed Crandall – Lewisville, North Carolina, USA. December 1, 2011 22:59 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam



SCHICKARD– Jerry Hubbell, Locust Grove, Virginia, USA. January 7, 2012 01:37 UT. Colongitude 68.0, Seeing 7-8/10, Transparency 5-6/6. Explore Scientific 125 ED APO CF, 4x Barlow, f/30, DMK21AU04.AS.

LUNAR TRANSIENT PHENOMENA

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

LTP NEWSLETTER – FEBRUARY 2012

Dr. Anthony Cook - Coordinator

Observations for December 2011 were received from the following observers: Jay Albert (Lake Worth, FL, USA) observed: Beaumont, Copernicus, Earthshine, Lichtenberg, Mare Tranquilitatis, Peirce, Piccolomini, South Pole, and Sirsalis A. Raffaello Braga (Italy) observed Mare Crisium, Theophilus, and Torricelli. Maurice Collins (New Zealand) imaged Theophilus and took whole disk images of the Moon Marie Cook (Mundesley, UK) observed: Archimedes, Censorinus, Gassendi, and Torricelli. I imaged: Tycho (from Newtown, UK) and also took time lapse video of the Moon through narrow band filters from Aberystwyth University. Peter Grego (St Dennis, UK) observed Tycho. Kevin Kilburn (Manchester, UK) imaged Aristarchus and Kepler. Rolf Hempel (Germany) took a whole disk image of the Moon. Kerry Koppert (New Zealand) took some whole disk images of the Moon. Brent Russell (New Zealand) imaged the lunar eclipse. Brendan Shaw imaged Gassendi, Archimedes, Aristarchus, Censorinus, Herodotus, Langrenus, Mons La Hire, Philolaus, Piazzi Smyth, Plato, Proclus, Sinus Iridum, and visually observed Earthshine.

News: Antonio Mercatali emailed me to say that he is coordinating the UAI LTP team and looks forward to collaborating with the BAA and ALPO. Bob O'Connell drew my attention to an LPOD image, http://lpod.wikispaces.com/December+26%2C+2011 which shows a side-looking close up view of Aristarchus crater, taken by NASA's LRO at an altitude of just 26 km above the lunar surface. The image shows some black deposits which are probably volcanic pyroclastic material. This is interesting because Aristarchus is geologically young at 175 million years old, and volcanism should have died out by one billion years ago. Is this where the crater has punctured through a buried layer of dark pyroclastic material, or is there evidence that the material lies on top of the Aristarchus ejecta blanket? Bob O'Connell has also pointed out to me that in the February 2012 Sky and Telescope, Chuck Wood discusses research by Prof Lionel Wilson of Lancaster University that supports the notion that Hyginus crater is volcanic in origin, rather than impact produced. Chuck's article also mentions that LRO images reveal smooth features and small depressions on the floor of Hyginus crater that infer that these features maybe as young as only a few million years old. Note that these depressions were found originally (or independently) by MoonZoo citizen scientists (http://blogs.zooniverse.org/moonzoo/2010/07/07/looking-for-change/).

Routine Reports: As usual, space is rather limited to describe all of the supply of routine reports sent in, but here are a few highlights from December 2011:

1) The Ghostly Central Peaks of Tycho: Back in the August 2011 LTP newsletter I mentioned the sighting of a ghostly appearance of the central peak(s) of Tycho on 2003 May 09 at UT 21:04-21:09 by Brendan Shaw in some digital images. The interesting thing was that the central peak should not have seen any sunlight until the 9th May at 22:57UT according to an LTVT simulation that Brendan ran. Even allowing for the 0.5 degree diameter of the solar disk, the central peak was being detected way too early. One possible explanation could be that it was being illuminated by light scattered internally off the sunlit western rim into the interior of the crater. Well if so then the effect should repeat under very similar illumination conditions. Back in August I set out some dates and UTs to re-observe. Unfortunately the weather has not been kind to us since then, but on 2011 Dec 03 the unlucky observing spell was broken, at least for a couple of us. Brendan was unfortunately clouded out, but from 22:37-22:41 UT Peter Grego was able to observe using his 20cm SCT scope at x200 in white light, albeit only for about four 10 sec glimpses, free of cloud. He saw

absolutely no interior detail inside the shadowed floor of Tycho. From mid-Wales I noticed a gap in the cloudy conditions and used a webcam on my 20cm Dobsonian to capture some images. The seeing was moderate-poor due to wind buffeting, but some reasonable views were obtained, one of which can be seen in the centre of figure 1. Compared to Brendan's original image (Left in Figure 1) it is clear that the image quality is not as good, but the illumination appearance is similar. I tried stacking 23 frames to reduce image noise and the result can be seen on the right hand side of figure 1. This is more blurred, but is effectively a deeper exposure than Brendan's original images. Again no central peak is visible. I have also tried blurring Brendan's image to make this similar in appearance to my 2011 Dec 03 image, and the central peak survives the blurring process. So it is a puzzle why the central peak was visible on 2003 May 03, but not on 2011 Dec 03? Another possibility is that the central peak was being illuminated by Earthshine inside the shadowed floor of Tycho and the Earthshine was stronger back in 2003 than in 2011. But of course this would show up other features in shadow elsewhere on the Moon and on the night side – but there is no sign of this. Anyway whatever the reason, I would urge strongly that people to re-observe at the dates and times listed in Table 1 below, and let me know what you detect – please enter these into your diary – though remember for many of these, depending upon your location, the Moon could well be below the horizon or in day light?

Jan-02 UT12:01-15:01	Mar-16 UT02:55-05:55	May-29 UT04:31-07:31	Aug-10 UT18:21-21:21	Oct-23 UT13:16-16:16
Jan-16 UT23:24-02:24	Mar-31 UT07:12-10:12	Jun-12 UT18:32-21:32	Aug-25 UT10:55-13:55	Nov-07 UT05:19-08:19
Feb-01 UT03:46-06:46	Apr-14 UT16:36-19:36	Jun-27 UT14:06-17:06	Sep-09 UT05:50-08:50	Nov-22 UT04:33-07:53
Feb-15 UT13:05-16:05	Apr-29 UT18:27-21:27	Jul-12 UT06:39-09:39	Sep-23 UT23:18-02:18	Dec-06 UT17:54-20:54
Mar-01 UT18:19-21:19	May-14 UT05:51-08:51	Jul-27 UT00:00-03:00	Oct-08 UT17:23-20:23	Dec-21 UT20:27-23:27

Table 1. *Suggested times to look for the central peak of Tycho, whilst it is still in shadow during 2012. Note that observers must check that the Moon will be visible from their geographical observing site before attempting these.*

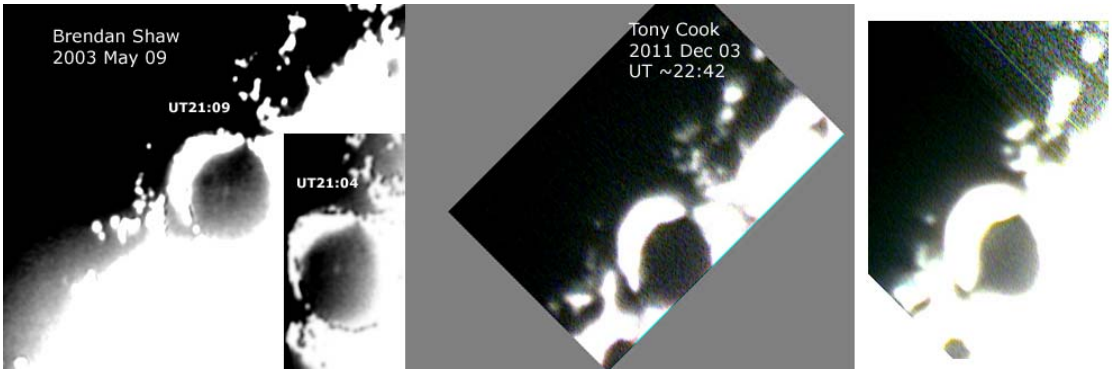


Figure 1 *(Left) Tycho's central peak during the 2003 May 29 LTP(?). (Centre) Single frame webcam image taken under similar illumination conditions on 2011 Dec 03. (Right) Stacked webcam images from 2011 Dec 03 – the effective exposure is ~23x longer than the centre image, but despite this no central peak is visible!*

2) Lichtenberg in the Red: On 1940 Oct 20 at 05:00(?) UT Barcroft (Madera, CA, USA), using a 6" reflector, saw a moderate reddish-brown or orange color on Lichtenberg. This had apparently been more marked the previous night, and very slightly visible on Oct 22. Cameron gives this a weight of 3. On 2011 Dec 14, Jay Albert (Florida, USA) re-observed under similar illumination and found no color. Of course Lichtenberg has been the site of other important LTP, such as a red spot seen by Baum in 1951. Madler also observed a red spot near to this crater. A case of natural surface color perhaps? Maybe not if Jay's negative observation is anything to go by? Let us keep on checking out this crater when the predictions flag it up.

3) Bartlett's Glaringly Blue Aristarchus: The amateur astronomer Bartlett (Baltimore, USA) made more observations of LTPs than any other astronomer, and most of these were of Aristarchus and concerned blueness. Some might say this is a bit suspicious! However I have noticed that he is generally accurate in what he observed and reported, albeit often very poor at interpreting whether the effect was normal or not. Let us just suppose that he had good blue sensitivity eyesight (some people can see further than is normal into the violet, whilst others can see into the near IR). Aristarchus is known to be a young blue fresh crater, however the Earth's atmosphere is particularly good at absorbing blue, violet, and even more so UV light – but this is dependent upon the altitude of the Moon, weather conditions and atmospheric scattering. Now color on the Moon is difficult to see with the eye at the best of times, but if an astronomer has good blue sensitivity, then blue craters, such as Aristarchus (it's the bluest of most of them) will only be seen "blue" under the optimum of conditions, where as other craters will stay their normal shades of grey. Consequently this is maybe why Bartlett, and some other astronomers, mistakenly thought that Aristarchus was abnormal every time that they saw a blue color present. On 1959 Mar 25 at UT 05:06-05:42 Bartlett, using a 4" reflector at x240 observed an intense blue-violet glare on the whole length of the east rim of Aristarchus and on the EWBS (East Wall Bright Spots), and also a dark violet nimbus. He reported that the crater was filled with haze and could not focus on it. Herodotus was unaffected. His seeing was 7 and the transparency was 5. Now on 2011 Dec 10 at 21:44 UT, Rolf Hempel (Germany) imaged the Moon in color and I enclose a sub-section in Figure 2. You can see clearly on this that there is a blue-violet glare along the east rim (assuming that the IAU system applies to the EWBS notation found in Cameron's catalog). I am not sure what the nimbus refers to exactly – if it's around the central peak area, then this cannot be seen below, but if it's around the northern edge of the crater, then there is some violet here. Although some aspects of the Bartlett observation maybe due to natural colour, Rolf's image does not show a hazy interior, so therefore I am lowering the Cameron weight of 4 to an ALPO/BAA weight of 1. Rolf's image shows the power and usefulness of color imaging and it is one of the reasons why the BAA's lunar section has started a lunar color imaging campaign, being organized by Chris Kilburn.

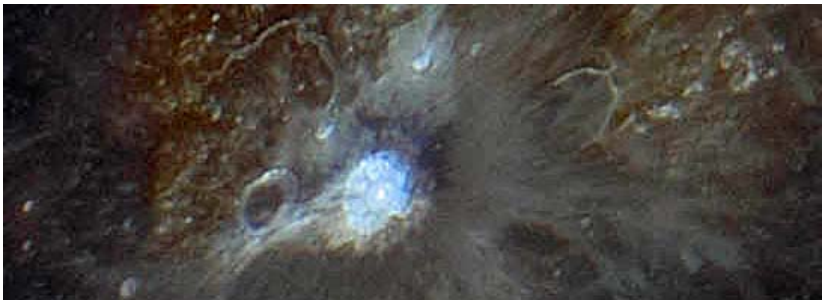


Figure 2. *Rolf Hempel's color image of Aristarchus from 2011 Dec 10. North is towards the top.*

4) Herodotus Pseudo Peak: Several observations have been made in the past of a central peak on the floor of Herodotus – however the crater has no central peak, even when viewed in spacecraft imagery – hence it is referred to as a "pseudo peak". On 2011 Dec 7th, several similar illumination events cropped up for Herodotus pseudo-peak sightings by Haas (2003 May 13), Wilkins (1950 Mar 30), and Bartlett (1956 Nov 15). Kerry Koppert imaged the Moon on Dec 7th from UT 07:55-08:05 and Maurice Collins from UT 10:45-11:10. The former spanned the Haas and almost the start of the Wilkins sightings and the latter

spanned the Bartlett sighting. I enclose Kerry's and Maurice's images in Figure 3 – alas no pseudo peak is visible this time at the image resolutions used, but please make special efforts to observe when this comes up in the repeat illumination predictions.

Figure 3. *North is at the top in both images of Herodotus (Left) Maurice Collins image. (Right) Kerry Koppert's image.*

5) Are the Walls of Archimedes Yellow-Green?: A 1984 paper in Earth, Moon and Planets by Hilbrecht and Kuveler describes several LTP observations witnessed by European observers in the early 1970's – mostly however these were made using small instruments. One of these is an observation made by Theiss, using a 75 mm refractor, on 1973 Jan 13 UT 19:06-19:40, where they state that they saw yellow to green colors on the walls of Archimedes and that these varied in brightness. Again could the variation be due to natural surface color that appears to vary because it is on the limits of detection through our atmosphere? Under similar illumination conditions, Marie Cook re-observed on 2011 Dec 04 and reported no color at all in the crater. Brendan Shaw took a 3 waveband image and I show this below in Figure 4, with colors enhanced – again no obvious sign of natural color. The weight for the LTP report by Theiss I am leaving at 1 because the telescope used had a small aperture, however we can now safely say that it was not due to natural surface color on the Moon.

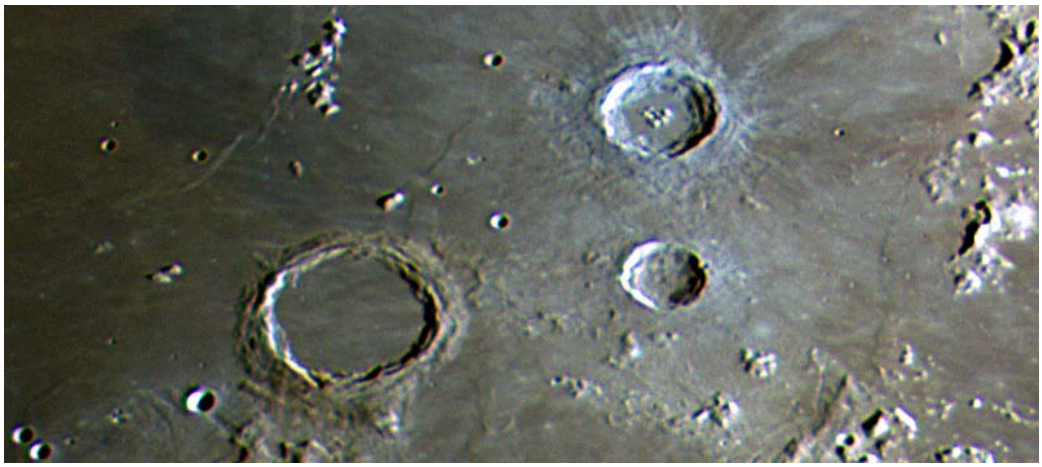


Figure 4*. Bendan Shaw's image of Archimedes with north towards the top.*

LTP Reports: Raffeallo Braga (Milan, Italy) noted that on 2011 Dec 31, when he started his visual observing session at 16:39 UT that the north rim of Torricelli was bright, but by around 17:00 UT it was considerably dimmer. He was unsure whether this was normal. In view of the fact that he was using a

relatively small 80 mm diameter refractor, and because conditions were not good enough to use a larger instrument, I will assign a weight of 1 to this report.

Suggested Features to observe in February: For repeat illumination (only) LTP predictions for the coming month, these can be found on the following web site: http://users.aber.ac.uk/atc/tlp/tlp.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. For members who do not have access to the internet, please drop me a line and I will post predictions to you. 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, 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.

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.

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KEY TO IMAGES IN THIS ISSUE

1. **Demonax-Manzinus**
2. **Fabricius-Vallis Rheita**
3. **Mons Rumker**
4. **Reiner**
5. **Rupes Altai**
6. **Schickard**
7. **Torricelli**
8. **Walter**

FOCUS ON targets

X = Archimedes (March)
Y = Pyrenees Mts. (May)