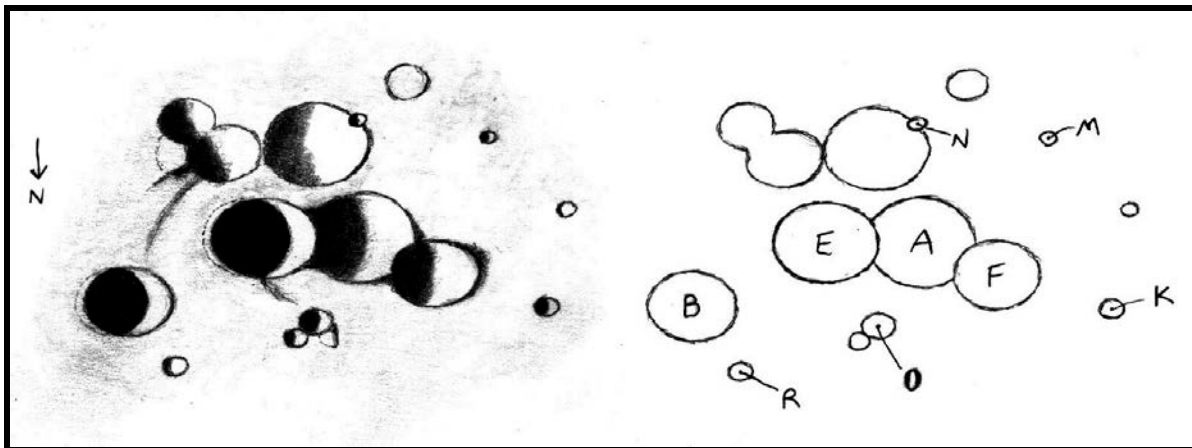




A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.
EDITED BY: Wayne Bailey wayne.bailey@alpo-astronomy.org
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RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – APRIL 2013
CUVIER LETTERED CRATERS



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
November 21, 2012 01:52-02:28 UT, 15 cm refl, 170x, seeing 8-9/10

I drew this area on the evening of Nov. 20/21, 2012 after the moon hid 44 Aqr. The dominant features are the four craters Cuvier B, E, A and F, in a gentle curve from east to west. They appear to form a crater chain at first, but on inspection, this is very unlikely. They have varying degrees of sharpness. Cuvier B and E are very crisp with dark, substantial interior shadow at that time, Cuvier A and F are much less crisp with lighter, fuzzier interior shadow. Cuvier A appears more degraded than F, and is overlapped by that crater and Cuvier E, so A should be the oldest one. Cuvier O is the smaller crater north of A, and is between E and F in condition. A small, shallow saucer is just northeast of O and a low hill is northwest of O. Cuvier R is the shallow crater north of B. Cuvier M and K are small, crisp pits south and west of Cuvier F, and a small saucer is between them. Cuvier K, M and their companion are in a very smooth area. A large, shallow crater is just south of Cuvier E and A, and Cuvier N is the pit on its southwest rim. Cuvier N is a smaller version of M. There is a very shallow, but apparently complete ring southwest of Cuvier N. A moderately shallow double ring is just east of the crater containing Cuvier N, and south of Cuvier E. The Lunar Quadrant map shows one unlabeled ring there, but I saw it as double. A bright patch with adjacent shadow is just east of this feature, and a vague strip of shadow nearby points to Cuvier B. I made a referral sketch that matches the craters with their letters. They are all associated with Cuvier, which lies to their northwest. This was a slightly hazy evening with steadier seeing than usual. Fog came a few hours later.

LUNAR CALENDAR

APRIL-MAY 2013 (UT)

Apr. 01	12:06	Extreme South Declination
Apr. 03	01:00	Moon 0.99 Degrees NNW of Pluto
Apr. 03	04:38	Last Quarter
Apr. 06	22:00	Moon 5.6 Degrees NNW of Neptune
Apr. 08	04:00	Moon 6.6 Degrees NNW of Mercury
Apr. 09	13:00	Moon 3.9 Degrees NNW of Uranus
Apr. 10	09:38	New Moon (Start of Lunation 1117)
Apr. 10	15:00	Moon 2.7 Degrees N of Mars
Apr. 10	19:00	Moon 3.2 Degrees N of Venus
Apr. 14	20:00	Moon 2.2 Degrees SSE of Jupiter
Apr. 15	05:30	Extreme North Declination
Apr. 15	22:23	Moon at Apogee (404,864 km – 251,571 miles)
Apr. 18	12:31	First Quarter
Apr. 25	19:59	Full Moon (Partial eclipse of Moon)
Apr. 26	00:00	Moon 3.5 Degrees SSW of Saturn
Apr. 27	19:49	Moon at Perigee (362,267 km – 225,102 miles)
Apr. 28	19:06	Extreme South Declination
Apr. 30	05:00	Moon 1.5 Degrees NW of Pluto
May 02	11:16	Last Quarter
May 04	03:00	Moon 5.7 Degrees NNW of Neptune
May 06	22:00	Moon 3.8 Degrees NNW of Uranus
May 09	15:00	Moon 0.75 Degrees NE of Mars
May 09	21:00	Moon 0.81 Degrees ENE of Mercury
May 10	00:31	New Moon (Start of Lunation 1118) (Annular Eclipse)
May 11	00:00	Moon 1.4 Degrees S of Venus
May 12	14:00	Moon 2.6 Degrees S of Jupiter
May 13	22:23	Moon at Apogee (405,826 km – 252,169 miles)
May 18	04:35	First Quarter
May 23	06:00	Moon 3.7 Degrees SSW of Saturn
May 25	04:26	Full Moon (Penumbral eclipse of Moon)
May 26	01:46	Moon at Perigee (358,374 km – 222,683 miles)
May 27	17:00	Moon 1.5 Degrees NE of Pluto
May 31	10:00	Moon 5.6 Degrees NNW of Neptune
May 31	18:59	Last 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.alpoastronomy.org/index.htm](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.

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 (**Bold items are required**):

Name and location of observer

Name of feature

Date and time (UT) of observation

Size and type of telescope used

Magnification (for sketches)

Orientation of image: (North/South - East/West)

Seeing: 1 to 10 (1-Worst 10-Best)

Transparency: 1 to 6

Medium employed (for photos and electronic images)

CALL FOR OBSERVATIONS:

FOCUS ON: Mare Insularum

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 **May 2013** edition will be **Mare Insularum**. 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 the moon for objects to your observing list and send your favorites to:

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

Deadline for inclusion in the Mare Insularum article is April 20, 2013

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>
Domes	July 2013	June 20, 2013

ALCon 2013 In Atlanta

This year, the annual ALPO meeting will again be held in conjunction with the Astronomical League's ALCon, Wednesday July 24, 2013 through Saturday July 27, 2013 at Fernbank Science Center, near Atlanta, GA. Detailed information can be found in the JALPO vol. 55, #2, Spring 2013, which is freely available at <http://www.alpo-astronomy.org/djalpo/55-2/JALPO55-2 - FREE with ALCon 2013 Registration.pdf> or on the Astronomical League's website <http://alcon2013.astroleague.org/>.

A discounted room rate is available at the Emory Conference Center Hotel.

This year, all technical papers will be mainstreamed and presented at one location. Previously, the ALPO technical papers were presented separately from the others. Papers will be presented on Wednesday, July 24, and Thursday, July 25. If you would like to present a paper please submit by June 15, 2013, the following:

- Title of the paper being presented.
- A four- or five-sentence abstract of each paper.
- The format in which the presentation will be.
- A 100-word biography and a recent photograph of the presenter for posting on the ALCon 2013 website and inclusion in the printed program guide.

E-mail is the preferred method for contact: ken.poshedly@alpo-astronomy.org If regular mail must be used, address all materials to:

ALCon 2013
c/o Ken Poshedly
1741 Bruckner Court
Snellville, Georgia 30078 USA

The preferred format is Microsoft PowerPoint, though 35mm slides are also acceptable. The final presentation should not exceed 20 minutes in length, to be followed by no more than five (5) minutes of questions from the audience. A hard-copy version of the paper should be made available for future web site publication.

Three side-trips are also available: Deerlick Astronomy Village; Agnes Scott College Bradley Observatory for the Star BBQ; and the Atlanta Astronomy Club's Walter F. Barber Observatory. In addition to these attractions, vendors will be available to discuss their exhibits, wares and services. The ALPO board meeting, which is open to all members, will be held Friday morning.

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

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 8, 9, 10 11 & 16(2) day Moon, Aristarchus(3), Clavius, Copernicus(2), Full Moon, Mare Humor, Mare Orientale.

JOHN DUCHEK – CARRIZOZO, NEW MEXICO, USA. Digital image of Copernicus-Kepler.

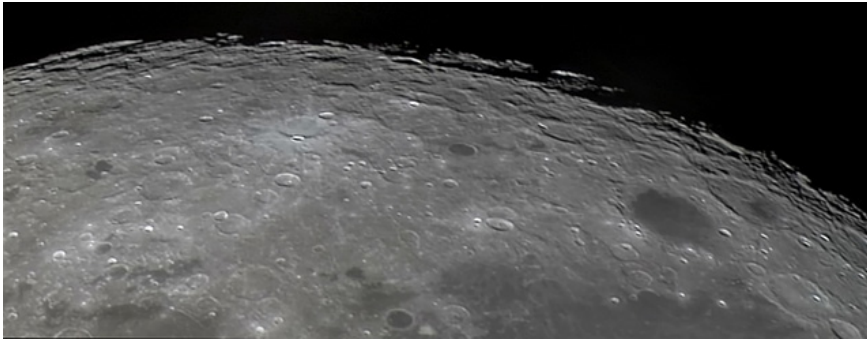
HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Albategnius, Byrd-Eudoxus, Cassini, Conan, Quarter Moon, Heraclitus, Hipparchus, Hyginus, Pitiscus, Sacrobosco & Stoffler.

RICHARD HILL – TUCSON, ARIZONA, USA Digital images of Anaxagorus, Archimedes, Bullialdus, Clavius, Copernicus & Philolaus.

DAMIAN PEACH-SELSEY, WEST SUSSEX, UNITED KINGDOM. Digital images of Plato(2) & Triesnecker.

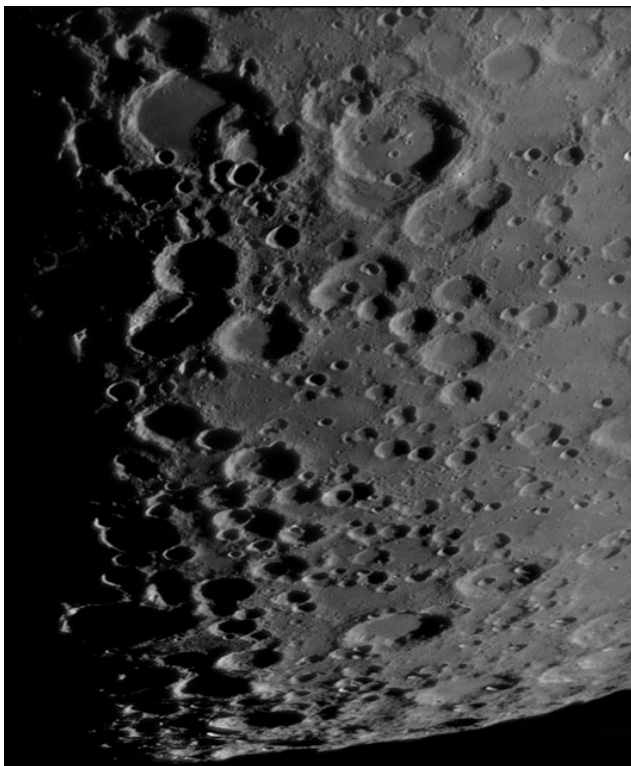
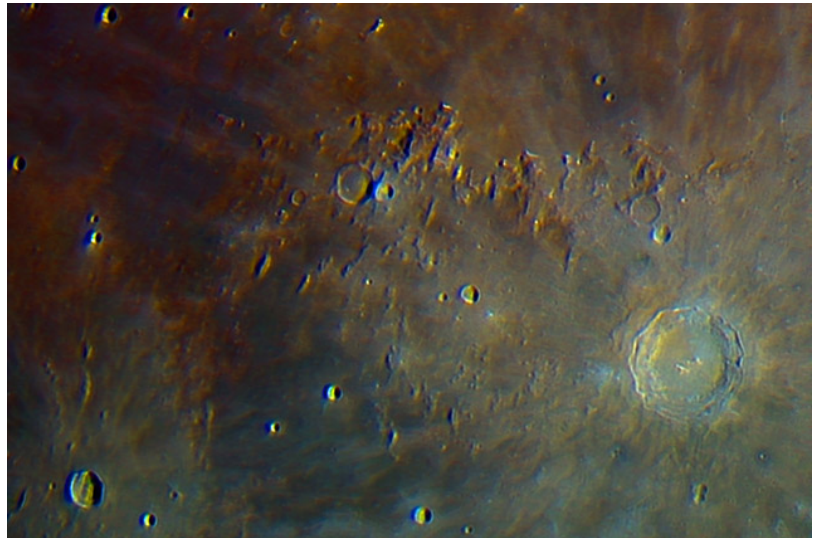
PHILLIP MORGAN –LOWER HARTHALL-TENBURY WELLS, WORCESTERSHIRE, ENGLAND. Drawing of Lassell.

RECENT TOPOGRAPHICAL OBSERVATIONS



MARE ORIENTALE - Maurice Collins-Palmerston North, New Zealand. March 26, 2013 09:28-09:32 UT. Seeing A-II. WO FLT-110, Refr, f/21(3x barlow), LPI.

COPERNICUS-KEPLER - John Duchek-Carrizozo, NM, USA. March 4, 2012. 10" Newtonian. Canon Tli 500D. North up.



LICETUS-CUVIER-HERACLITUS - Howard Eskildsen-Ocala, Florida, USA. February 18, 2013 UT 00:31 UT. Seeing 6/10, Transparency 6/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.

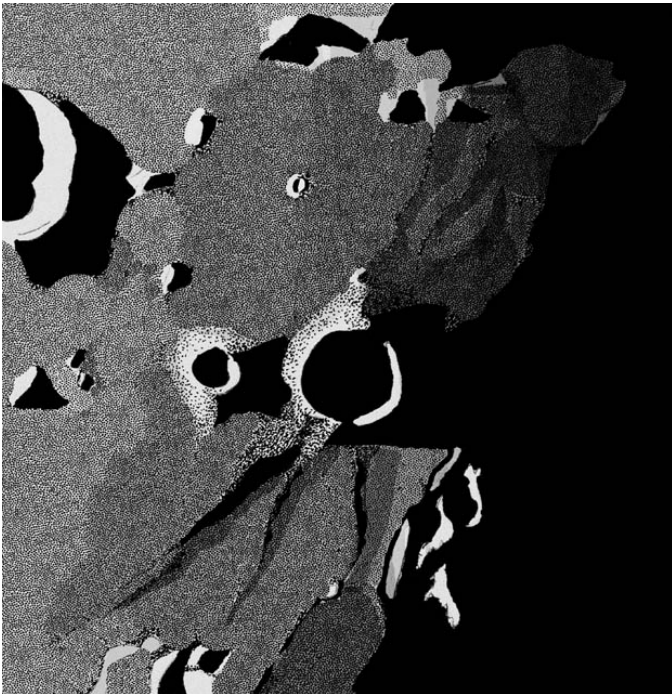
RECENT TOPOGRAPHICAL OBSERVATIONS

TRIESNECKER – Richard Hill – Tucson, Arizona, USA February 20, 2013 01:38 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. 656.3 nm filter.

Ever since I read Patrick Moore's book *The Moon*, as a teenager in the 1960s, I have been fascinated by the region of Sinus Medii and Mare Vaporum. This image of that region is with a little higher sun than what is usually done. There are many things going on here that cannot be seen with the typical terminator lighting.

The rilles can still be seen in all their glory. The Triesnecker, Hyginus, Ariadaeus and Boscovich rill systems are well seen across the image. But what I find more interesting are the dark patches in the region. From the area just east of Triesnecker E, to the area just south of Hyginus, the area Hyginus S sits in, to Boscovich and the unusual dark region in Julius Caesar, all are interesting and tell a story of the history of this region. The layered nature of the interior of Julius Caesar seems to imply altitudinal differences like a slope change from low to high as one moves north to south.

I also like the ray system about Dionysius which is often lost among all the features of this area.

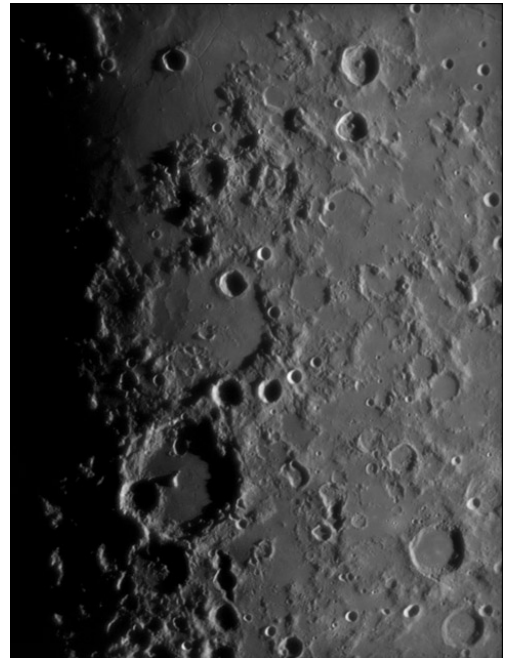


LASELL – Phillip Morgan – Lower Harthall-Tenbury Wells, Worcestershire, England. February 18, 2013 18:20-18:45 UT. 305 mm f/5 Newtonian, x400. Seeing 7/10 Transparency 3/6. Colongitude 8.9-9.1°.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



ARISTARCHUS - Maurice Collins-Palmerston North, New Zealand. March 23, 2013 08:35 UT. WO FLT-110, Refr, LPI.



TRIESNECKE, AGRIPPA, HIPPARCHUS, ALBUFEDA- Howard Eskildsen-Ocala, Florida, USA. February 18, 2013 UT 00:38 UT. Seeing 6/10, Transparency 6/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.



PLATO – Richard Hill – Tucson, Arizona, USA February 20, 2013 01:25 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. 656.3 nm filter

(right) Here's another view of the Plato region. It never gets old. Because of the libration it's a little more difficult to see the rill in the Vallis Alpes. I like the walls of Plato A.

(left) In 1996, when I was doing imaging with a small video camera (see attached), I responded to a request of images of Plato showing the "hook-shaped" shadow on the floor that had been reported before. I caught it and have been trying to get it ever since. I was obviously a day late here but I'll keep trying..

LUNAR TRANSIENT PHENOMENA

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

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

LTP NEWSLETTER – APRIL 2013

Dr. Anthony Cook - Coordinator

Observations for February were received from the following observers: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Aristarchus, Earthshine, Hyginus, Mons Pico, Poisson, Proclus, and Snellius. Maurice Collins (New Zealand - RASNZ) observed: Aristarchus, Bullialdus, Copernicus, Mare Humorum, Pythagoras, Mons Rumker, Schickard, and imaged several features. Marie Cook (Mundesley, UK) observed Cepheus A, Proclus, Theophilus, Mare Angius, and Plato. Rik Hill (Tucson, AZ, USA) imaged: Archimedes, Anaxagoras, Clavius, Copernicus, Triesnecker, and Plato. Bill Leatherbarrow (Sheffield, UK) imaged the Lassell area. Phil Morgan sketched: Lassell. Brendan Shaw (UK) imaged: Agrippa, Alphonsus, Atlas, Birt, Biot, Censorinus, Cepheus A, Clavius, Conon, Copernicus, Eudoxus, Gutenberg, Jansen, Linne, Macrobius, Mare Angius, Mare Crisium, Mons Piton, Plato, Posidonius, Proclus, Ross D, Swift, Theophilus, and Tycho. We also received some additional observations from January, of Promontorium Agarum, from Italian observers: Claudio Vantaggiato (UAI) and Franco Taccogna (UAI).

News: An interesting paper on LTP frequency and the sunspot cycle, by Jill Scambler, appeared in last month's BAA Lunar Section Circular. This dispelled the idea, from a 1945 paper by H.P. Wilkins, that LTP frequency correlate with the solar cycle. Three independent methods were used to test this theory, and all three came back negative. It also used more up-to-date LTP reports than were available in Wilkins time. Of course it does not mean that at least some processes on the Moon are influenced by solar activity; for example charging of dust particles is expected to increase during high solar activity. But as a main driver of LTP, there is no evidence that the sunspot cycle influences this with measurable significance.

LTP Reports: No LTP reports were received in February, although it is worth mentioning a couple of reports that came to light, one of which we are sure is not a LTP, and the other maybe, or maybe not?:

Lassell: Peter Grego, found a wrinkle ridge adjacent to this crater in a sketch (Figure 1a) drawn by Phil Morgan, that Peter had not noticed previously in his own sketches (Figure 1e) made under similar illumination. As we all know Peter Grego is a very careful and skilled observer, so the Morgan observation needed further investigation. Bill Leatherbarrow had been observing that night too and submitted an image (Figure 1b) which sort of shows this ridge, and I came across a Harold Hill sketch too (Figure 1d). Just as an independent check, I ran (Figure 1c) an ALVIS simulation (a similar lunar crater visualization tool can be found at: <http://lvt.wikispaces.com/LTVT+Download>) for the start of Peter's sketch. The ridge concerned is part of a broad NW-SE trending wrinkle ridge. As this is shallow, it is difficult to see, and does not have a well defined sharp edge. When making sketches of very fine detail, through the Earth's turbulent atmosphere, with a wealth of other detail also to map, it is not always possible to portray accurately everything, and some detail may not always be noticed, especially if it is on the limit of visibility under those observing conditions. It is not just this highlighted ridge seen in the sketches and images in Figure 1, but other features in and around the crater also differ too when you compare sketches with an image or a simulation. For example in Harold Hill's sketch the ridge is light, whereas in the Phil Morgan sketch it is dark? Sketches have been the main observing technique in the past tens of decades, and are still useful as it is more often than not, during a visual session that LTPs are detected – images are often obtained over a very short time period, and may not be studied by the human eye as much as a real live view of the Moon at the eyepiece. So sketches are good, but as with images, more subtle low contrast detail needs to be treated cautiously.

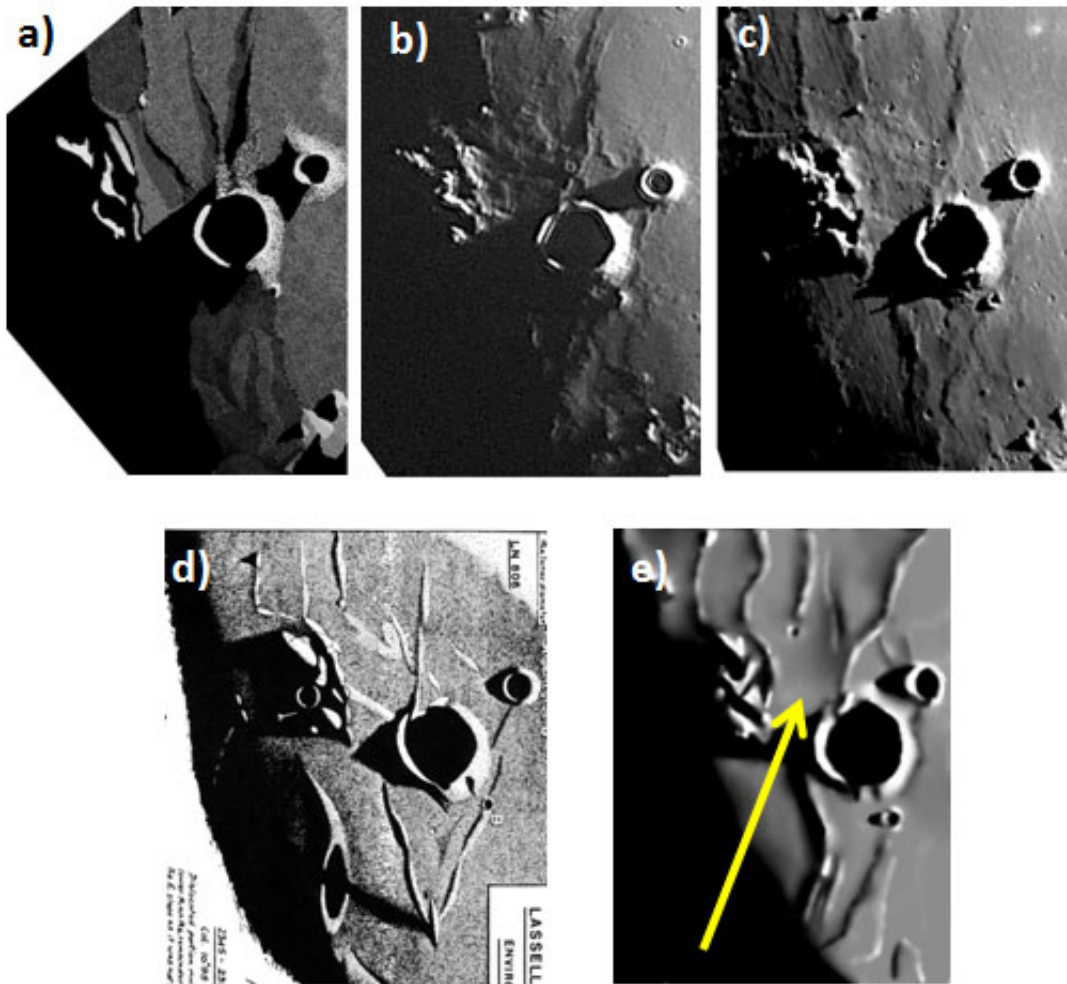


Figure 1. Lassell crater with north towards the top left. **a)** A sketch by Phil Morgan from 2013 Feb 18 UT 18:20-18:45, Col.= 8.9°-9.1°. **b)** An image by Bill Leatherbarrow from 2013 Feb 18 UT 18:37, Col.= 9.0°. **c)** An ALVIS simulation for 2010 May 21 UT 20:25, Col.= 10.5° to match the start of Peter Grego's initial sketch. **d)** A Harold Hill sketch from 1988 Feb 25 UT 22:50-23:45, Col.= 10.4°-10.9°. **e)** Peter Grego's sketch from 2010 May 21 UT 20:25-20:50, Col.=10.5°-10.7°) – the yellow arrows shows where the NW-SE trending ridge should have been.

Plato: I forgot to mention in the past newsletter, that I had received an observation from Raffaello Braga (Italy, Milan, 115mm refractor) from 2013 Jan 25 UT 19:05-10:15 where he noted the crater to be: “overall normal, but E. Rim showing a remarkable gold hue”. This was at a similar illumination to a W.E. Fox LTP report from 1938 Feb 14 where he noted a golden-brown spot on the E. Wall with a yellow diffuse glow, spreading over the floor. Now I emailed Raffaello to ask him if he thought what he observed in Jan could be regarded as a LTP, but he commented: “I must say that the yellow-gold hue was remarkable. Would I have noticed this color without knowing in advance the above report? May be not, so I would not consider it as abnormal, but in my opinion this appearance is worth of further investigations”. In order to help promote future observations of this, and to see if it repeats, I will give this observation a LTP weight of 1, so that it shows up in the system. If Raffaello is correct then it should presumably happen again at predicted times, in which case we can demote it to a non-LTP status with a weight of 0, and the cause would have been due to natural surface color.

Routine Reports: Here is a selection of reports received during February that can help to re-assess some past LTP observations:

Poisson: On 2013 Feb 18 UT 02:41-02:51 Jay Albert observed Poisson under the same illumination conditions to a 1982 report listed below. Jay found the crater to be bright and its “lima bean” shape was easily seen. It was not hazy and there was no obscuration. Many internal and peripheral details were clearly seen. Because Poisson, was quite degraded, Jay wondered if this was why the LTP observer thought it was hazy. The small size of the telescope used in 1982 possibly did not help either. As we do not have more than the description given below from the Cameron catalog, it is difficult to assess if the, weight, already a 1, deserves a demotion to non-LTP status. Nevertheless it was worth checking out in future.

"On 1982 Aug 26 at UT 21:00 Arsyukhin (Moscow, Russia, 3" reflector) found that Poisson appeared hazy. The Cameron 2006 catalog ID=181 and weight=3. The ALPO/BAA weight=1."

Cleostratus-Pythagoras: On 2013 Feb 23 UT 08:54 Maurice Collins imaged (see Figure 2) this area under similar illumination to a LTP report from Chris Lord from 1974 – see below. The image was color enhanced, but no sign of the surface being brighter in the areas referenced in the report was seen. The fact Chris Lord used standard Moon Blink Kodak Wratten filters, would have meant that these should have eliminated both spectral dispersion from the atmosphere, or optical chromatic aberration. The large lunar altitude at the time should have precluded atmospheric spectral dispersion effects anyway. The weight for this LTP report shall therefore remain at 3 as there was no independent confirmation observation.

1974 Feb 05 UT 01:45,02:45 observed by Lord (St Anne's-on-Sea, Eng., 3" refractor, x135, seeing 1, lunar altitude 55°) "Event normal in integrated light. Light, full surface detail in red filter, dark, with full surface detail in blue filter. Other term. features did not show it. Only E.floor of Pythag., Babbage northern crater chain & NW floor of Cleostr. (According to Fitton's criteria this was a tenuous gas above the surface. NASA catalog weight=3. NASA catalog ID=#1387. ALPO/BAA weight=3.

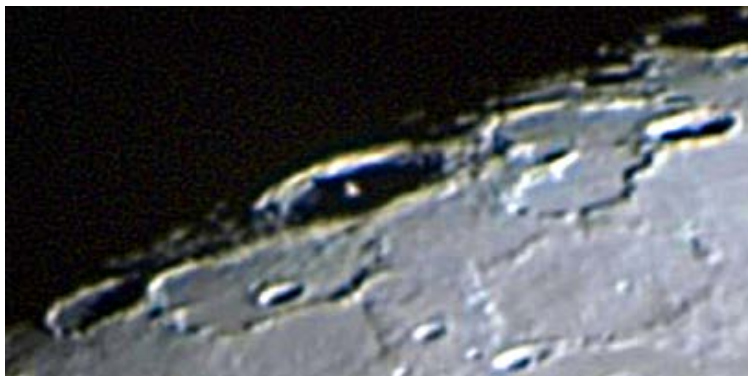


Figure 2. *The Pythagoras area as imaged by Maurice Collins on 2013 Feb 23 UT 08:54. North is towards the top and color saturation has been enhanced to 60%.*

Cepheus A: On 2013 Feb 16 UT 19:35-19:50 Marie Cook observed Cepheus A under the same conditions to when Maurice Collins saw it in 2000 Oct 04. Brendan Shaw also observed the crater and obtained an image at 19:40 UT (see Figure 3). Both these observations confirm that Cepheus A was not a very brilliant crater, unlike what Maurice Collins reported back in 2000. Marie found it to have the same brightness as Maury crater. In view of the discrepancy in reported brightness, between these different epochs, and numerous attempts to re-observe and nothing unusual being seen, I have decided to promote the weight of the Maurice Collins report from a 2 to a 3.

2000 Oct 04 UT 08:15-08:50 Observer: Maurice Collins (New Zealand, 90cm ETX) - 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.

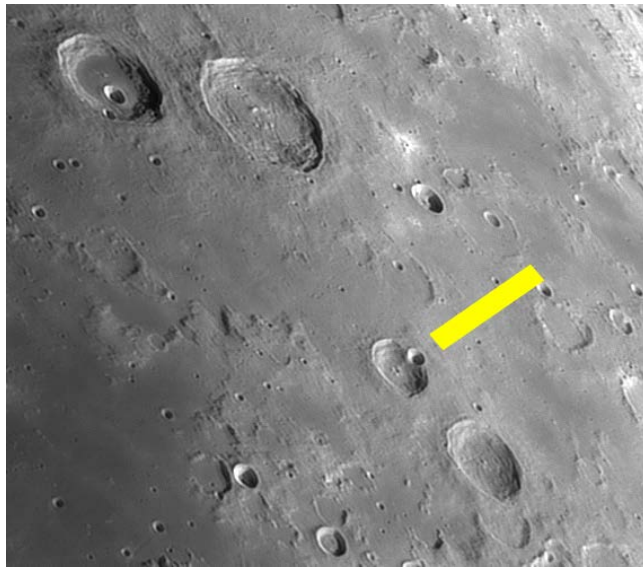


Figure 3. *The Cepheus A area as imaged by Brendan Shaw on 2013 Feb 16 UT 21:16 UT. The craterlet is to the left of the yellow marker. North is towards the top.*

Plato: On 2013 Feb 20 UT 02:25 Rik Hill imaged Plato at almost the same illumination as a report from da Silva from 1970 Apr 15. As you can see, Plato Y is perhaps not especially brighter than its surroundings (it depends upon which part of it one refers to), and the landslip area, alias the “lozenge” shape, is dark, but not necessarily more so than the inner wall. Unfortunately no color information is present in Rik’s image, so it is not possible to check for the 1970’s report of a yellow-white on the bright part of the wall. There is some difference in descriptions of what was seen between 1970 and 2013, so it might be a LTP? However as da Silva considers it to be normal, I will keep this at a very low weight of 1. The yellow white color seen perhaps is natural color and might be related to what Raefello Braga and W.E. Fox both saw? So please keep a look out in this area for color in future.

Near and on Plato 1970 Apr 15 UT 21:45-22:04 Observed by da Silva (Sao Paulo, Brazil, 10" & 20" refractors) "Crater chain W. of Plato -- 3rd crater W. (Plato Y) was brighter than surroundings. Lozenge on W. Wall (landslip?) was darker than inner wall. Bright part of wall was yellowish-white. da Silva reports this as neg. (normal aspects)obs (Apollo 13 watch probably normal as Y is a bright halo crater)." NASA catalog weight=0. NASA catalog ID #1255. ALPO/BAA weight=1.

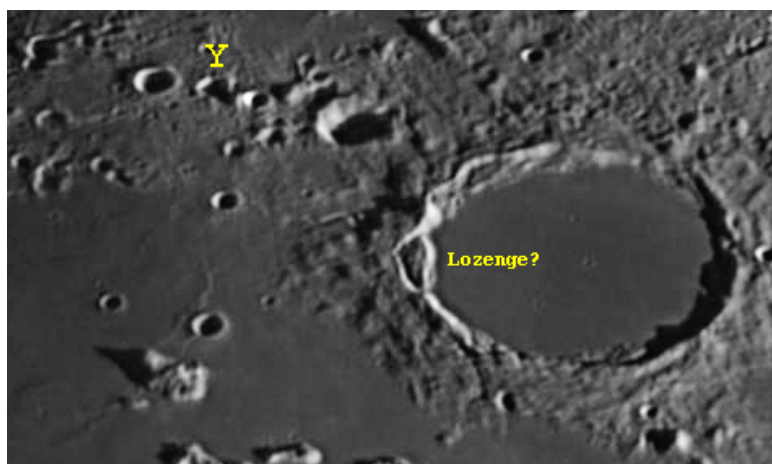


Figure 4. *Plato as imaged by Rik Hill on 2013 Feb 20 UT 02:25 with north towards the top. Areas mentioned in the 1970 LTP are indicated.*

Suggested Features to observe in April: 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>. 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.

KEY TO IMAGES IN THIS ISSUE

1. Aristarchus
2. Copernicus
3. Cuvier
4. Heraclitus
5. Hipparchus
6. Lassell
7. Mare Orientale
8. Plato
9. Triesnecker

FOCUS ON targets

X = Mare Insularum (May)
 Domes (July)

