THE LUNAR OBSERVER

A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.
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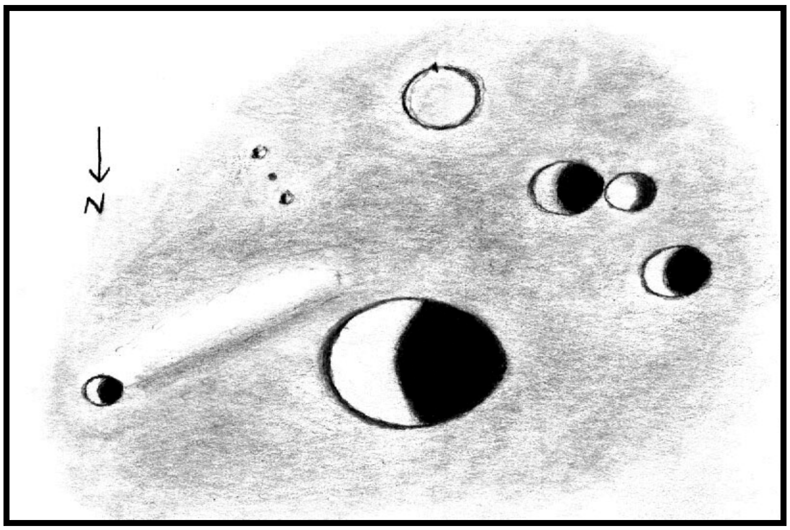
17 Autumn Lane, Sewell, NJ 08080
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – JANUARY 2014

LA CONDAMINE B



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
September 27, 2013 09:35-10:05 UT, 15 cm refl, 170x, seeing 8/10

I drew this feature and surrounding area on the morning of Sept. 27, 2013 while watching five occultations. This is the largest crater of a modest group in Mare Frigoris north of la Condamine. The main feature here is a crisp, slightly egg-shaped crater with the pointed end to the west. The substantial interior shadow showed a blunt point at its center. La Condamine T is the small crater to the east. A wide, low ridge or wrinkle starts at this crater and extends westward, petering out south of la Condamine B. A tight group of three craters are to the southwest. La Condamine E is the northwestern crater of this group, while la Condamine F is to the southeast. These two craters appear to be identical in size, depth and crispness. The third crater is between E and F, and is smaller and shallower than these two. This crater is shown, but not labeled on the Lunar Quadrant map. A very shallow ghost ring, about as wide as E and F, is to their southeast, and south of la Condamine B. This appears to be a flooded crater. What's left of it is a fine, narrow rim that appears to be complete, but there may be tiny unnoticed gaps. A dot of shadow on its south rim may indicate a high point. Two small peaks are east of the ghost ring, and a minute bit of shadow between them may be from a third peak.

LUNAR CALENDAR

JANUARY-FEBRUARY 2014 (UT)

Jan	01	11:14	New Moon
	01	21:00	Moon Perigee: 356900 km
	08	03:39	First Quarter
	09	11:26	Moon Descending Node
	13	08:14	Moon North Dec.: 19.5° N
	16	01:53	Moon Apogee: 406500 km
	16	04:52	Full Moon
	23	06:29	Moon-Mars: 3.9° N
	23	09:22	Moon-Spica: 1.4° S
	24	02:55	Moon Ascending Node
	24	05:19	Last Quarter
	25	14:18	Moon-Saturn: 0.6° N
	27	16:31	Moon South Dec.: 19.4° S
	29	02:36	Moon-Venus: 2.2° N
	30	09:58	Moon Perigee: 357100 km
	30	21:38	New Moon
Feb	05	12:41	Moon Descending Node
	06	19:22	First Quarter
	08	14:41	Moon-Aldebaran: 2.6° S
	09	15:21	Moon North Dec.: 19.3° N
	12	05:09	Moon Apogee: 406200 km
	14	23:53	Full Moon
	19	14:54	Moon-Spica: 1.7° S
	19	23:59	Moon-Mars: 3.3° N
	20	03:29	Moon Ascending Node
	21	22:39	Moon-Saturn: 0.3° N
	22	17:15	Last Quarter
	24	01:24	Moon South Dec.: 19.2° S
	26	05:23	Moon-Venus: 0.4° S
	27	19:52	Moon Perigee: 360400 km
	27	21:24	Moon-Mercury: 2.8° S

NEW ASSISTANT COORDINATOR

Jerry Hubbell has joined the ALPO staff as an assistant coordinator for the Lunar Topographic and Selected Areas Programs. Jerry will be sharing responsibility for preparing the TLO issues and also handling archiving of observations, so we would prefer that future digital submissions be submitted to both Jerry and me. (email addresses are in the box on the next page). Hard copy submissions should still be sent to my postal address.

Jerry has been a visual observer since 1987 and started astrophotography in 2008. He has submitted images to TLO and minor planet observations to the Minor Planet Center since 2010. He is also the author of *Scientific Astrophotography: How Amateurs Can Generate and Use Professional Data* published by Springer Books in 2012. Professionally, Jerry has just left an engineering position in the nuclear power industry, to join Explore Scientific. More information about Jerry is in the JALPO note (available at **http://www.alpo-astronomy.org/djalpo/56-1/JALPO56-1-Free.pdf** page 11).

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: ARISTARCHUS

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 2014** edition will be **Mare Frigoris.** Part of this mare is available at most phases, so timing is a minor constraint. 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 Mare Frigoris article is February 20, 2014

FOCUS ON: ARISTARCHUS

By Wayne Bailey

Coordinator: Lunar Topographical Studies

The Aristarchus area is one of the best known, easily recognizable, and most interesting areas on the Moon (Fig. 1). Aristarchus itself is the brightest feature on the near side, easily visible by Earthshine when the moon is a narrow, waxing crescent. The Aristarchus Plateau, on the other hand, is one of the darker areas. In ultraviolet it is the darkest area, as first pointed out by R.W. Wood, leading to the designation as "Wood's Spot". This is also one of the most

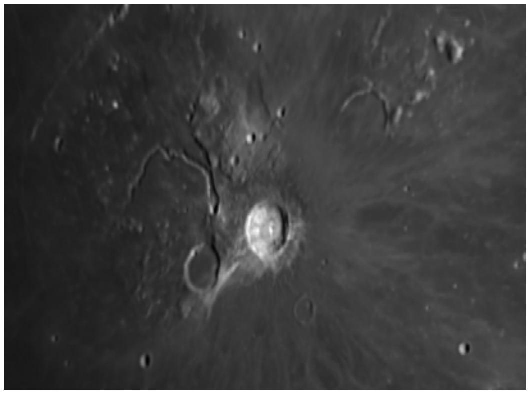


FIGURE 1. ***ARISTARCHUS REGION.*** *Praet Marnix- Stekene, Belgium. April 24, 201.3 GSO 12" Newtonian, 3X barlow, DMK 618, Red interference filter.*

vividly colored areas on the moon. Although the colors are subtle, reddish, yellowish and bluish tints are visible. Interesting features abound in this area. Nearby Herodotus appears much different from similar sized Aristarchus. The Cobra Head and Schröter's Valley (which has no connection to the crater Schröter) is the largest, most visible sinuous rille. A few small domes are visible, and a fascinating ray system intermingles with rays from Kepler and other craters.

Aristarchus is a moderate sized (40 km diameter), sharp-rimmed crater, with clearly terraced walls (Fig. 2). It formed on the south edge of the plateau, and ejecta can be seen on the adjacent mare, showing that it is younger than the mare surface. The small floor is flat, with a small central peak. Bright radial

FIGURE 2. ***ARISTARCHUS REGION.*** *Richard Hill – Tucson, Arizona, USA March 27, 2010 04:11 UT. Seeing 8/10. C-14 f/22 (2x barlow), DMK21AU04, UV/IR block filter.*

bands on its inner walls make it the most noticeable example of banded crater (Fig. 3). The bright bands appear to be composed of glassy beads whose distribution may have been modified by landslips on the walls. It is also a popular site for reported transient phenomena, a topic I won't pursue here, since Lunar Transient Phenomena (LTP's) are the subject of another ALPO program.

Rays from Aristarchus extend about 150 km to the south and east, intermingling with the raysystems of Kepler and Copernicus (Fig. 4). Lack of rays over most of the adjacent plateau, north and west of the crater may indicate a low angle impact from the

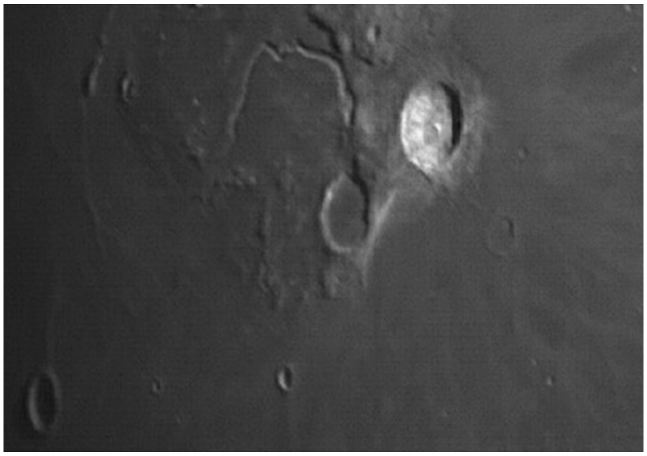


FIGURE 3. ***JAY ALBERT****-Lake Worth, Florida USA. August 19, 2013 03:03 UT. Seeing 610 Transparency 3/6. C-11, NextImage 5.*

northwest. Rays may be difficult to see on the plateau, but also don't appear beyond the plateau in these directions. A ray is superimposed on the southern rim of Herodotus, which indicates Aristarchus is the younger of the two.

Herodotus, to the west of Aristarchus, is about the same diameter, but obviously much shallower, with a broad, flat, dark floor. It has been flooded by mare lava, which, since there are no breaches in the wall, must have risen through floor fractures. It also formed near the south edge of the plateau, but unlike neighboring Aristarchus, no ejecta are visible on the adjacent mare surface, which indicates that it formed prior to the last eruption of lava that filled Oceanus Procellarum.

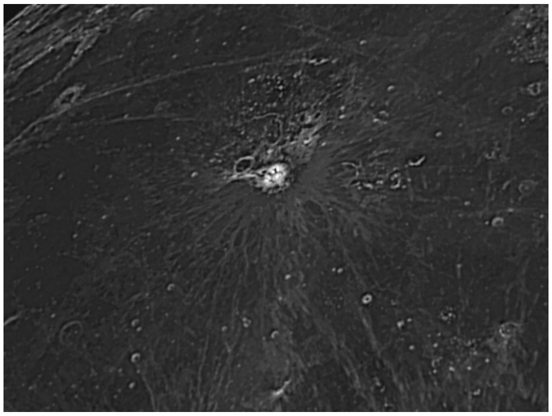


***FIGURE 4*. ARISTARCHUS RAYS.** *Orlando Benitez Sanchez -Canary Islands, Spain. May 6, 2012 02:10 UT. Seeing 8/10, Colongitude 89.3°. SCT 235mm, f/6.3, DMK21AU04.AS polarizing filter.*

Just north of Herodotus lies the Cobra Head, the slightly broadened south end of Schröter's Valley (Fig. 5). Fittingly, a small crater forms the mouth of the Cobra Head on the north slope of a mound or dome that fills the space between it and Herodotus. This crater seems to be the source of the lava formed Schröter's Valley as it flowed downhill to Oceanus Procellarum. The lava that formed Schröter's Valley must have been low viscosity, since its source on the plateau is about 2 km above the surrounding mare, and the valley is about 160 km long - an average slope of less than 1º. Schröter's Valley is up to 10 km wide and 1 km deep, so an easy feature to see. Under some lighting conditions and low resolution however it appears to connect to Herodotus, an illusion caused by the hill that intervenes (Fig. 6).

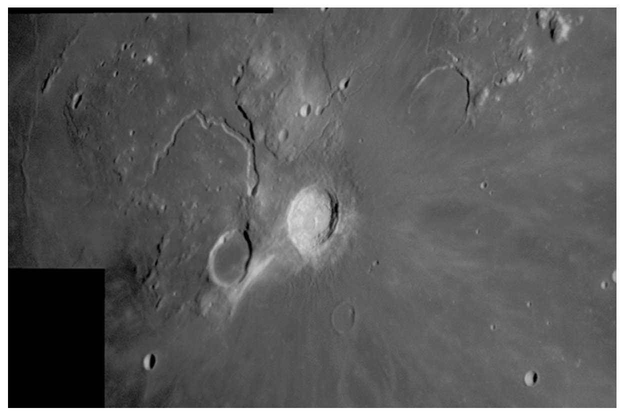


***FIGURE 5*. HERODOTUS & COBRA HEAD.** *Richard Hill – Tucson, Arizona, USA. February 16 2011 04:45 UT. Seeing 8/10. C-14 f/22 (2x barlow), DMK21AU04, UV/IR block filter.*

There are many more interesting features that will reward close examination of this area. The rectangular shape of the plateau itself is unusual (Fig. 7). On a small scale the surface is smooth, apparently covered with volcanic ash. Several smaller rilles can be found, as well as domes (Fig.8), wrinkle ridges, and rays (Fig. 9). This is also the most colorful area of the moon for those inclined to experiment with various filter combinations (Fig. 10). Radon gas was detected by Apollo 15 near Aristarchus, which may, or may not, be related to the many LTP reports in the area. The plateau is also the site of a thermal anomaly, cooling more quickly than average during lunar eclipses, which is likely due to the ash covering.

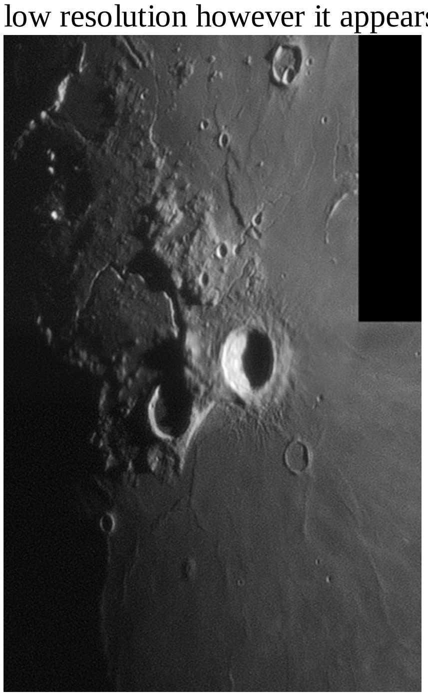
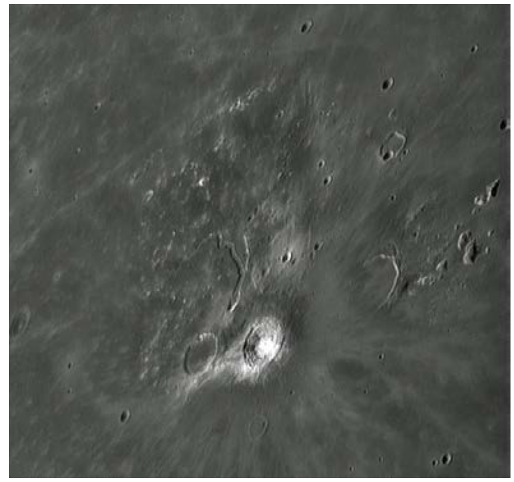


***FIGURE 6*. HERODOTUS.** *Richard Hill – Tucson, Arizona, USA May 3, 2012 02:39 UT. Seeing 7/10. TEC 8" f/20 Mak-Cass, DMK21AU04, UV/IR block filter.*

The Agricola Mountains parallel the northern edge of the plateau and may be structurally related. Also the Harbinger Mountains and the tilted, partially submerged crater Prinz lie just to the east (Fig. 11). Numerous sinuous rilles and a coating of volcanic ash seem to indicate similarities to the Aristarchus Plateau.

This is one of the best known and easily recognized regions of the moon, but don't let familiarity breed contempt. Close examination at various phases will be rewarded.

FIGURE 7. ***ARISTARCHUS PLATEAU -*** *Howard Eskildsen-Ocala, Florida, USA. August 29, 2013 09:35 UT. Seeing 9/10, Transparency 6/6. 6” f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.*



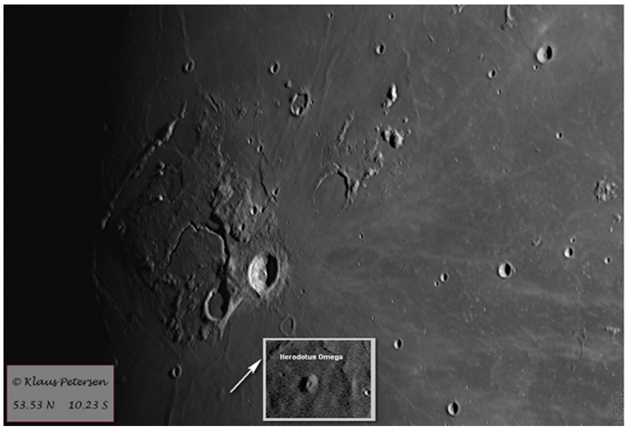
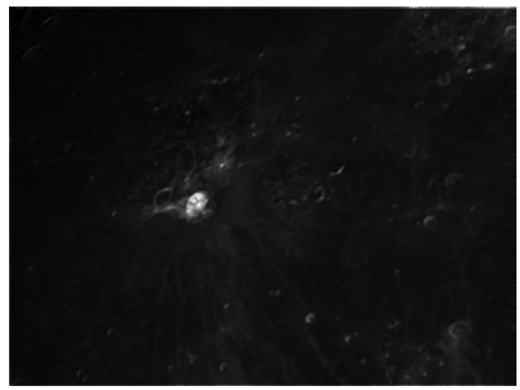


FIGURE 8. ***DOME HERODOTUS omega -*** *Klaus Petersen, Glinde,Germany. January 16, 2011 18:33 UT. Seeing 5/10, Transparency 4/6. 8” LX200 f/10 SCT, DMK 21AF04.AS, W25A filter.*



RAYS & BANDS **-** Michael Sweetman, Tucson, Arizona, USA, May 5, 2012 08:36 UT. 4” refractor, f/20. DMK21, IR block filter.

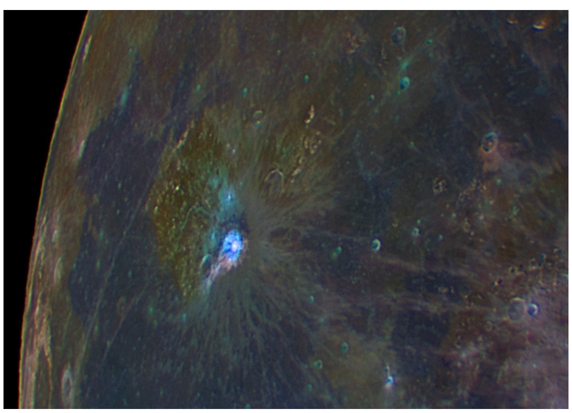
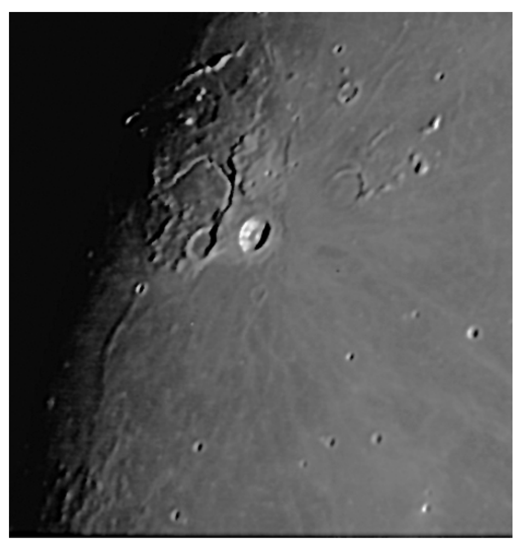


FIGURE 10. ***EXTENDED SPECTRAL RANGE (FALSE COLOR), SATURATED COLOR IMAGE OF ARISTARCHUS AREA -*** *Wayne Bailey, Sewell, New Jersey USA. December 10, 2006 07:05 UT. C-11, f/10, Skynyx 2-1M. Seeing 3/10, Transparency 5/6. Colongitude 149.6º. Infrared (>830 nm)-Red-Blue (Schuler IR83, R, B filters).*

FIGURE 11. ***ARISTARCHUS PLATEAU -*** *William Dembowski, Windber, Pennsylvania, USA. September 24, 2007 00:22 UT. C8 SCT f/10, Celestron NextImage. Colongitude 58.8, Seeing 3/10.*



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The-Moon Wiki. http://the-moon.wikispaces.com/Introduction

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 Aristarchus(2).

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 4 & 12 day Moon, Full Moon & Sinus Iridum.

ED CRANDALL – LEWISVILLE, NORTH CAROLINA, USA. Digital image of Montes Apenninus.

WILLIAM DEMBOWSKI – WINDBER, PENNSYLVANIA, USA. Digital image of Aristarchus.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Alpine Valley, Conon-Arago, Mare Fecunditatis, Mare Vaporum-Mare Tranquilitatis, Northern Moon, Palus Somni, Plato-Cassini & Sacrobosco.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Apianus, Clavius & South Pole.

KLAUS PETERSEN-GLINDE, GERMANY Digital image of Aristarchus.

ALEXANDER VANDENBOHEDE-ASSEBROEK, BELGIUM. Drawings of Gassendi & Hevelius. Digital images of Archimedes-Montes Apenninus, Bond-Mare Frigoris, Clavius, Eratosthenes & Mare Crisium-Mare Tranquilitatis..

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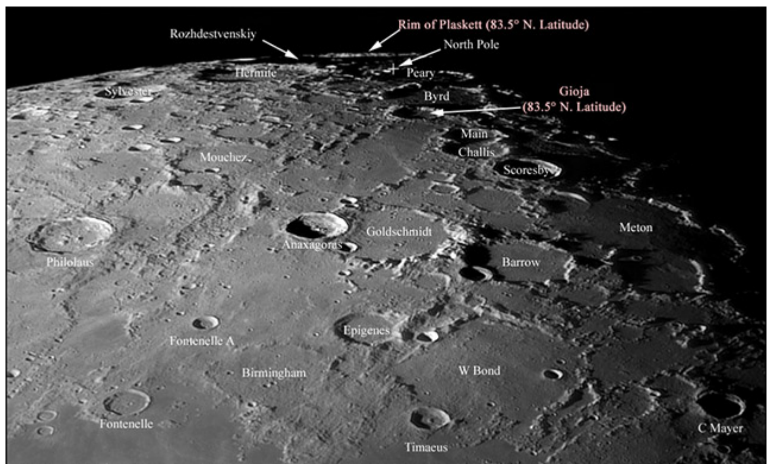
RECENT TOPOGRAPHICAL OBSERVATIONS

4-day MOON - Maurice Collins-Palmerston North, New Zealand. December 7, 2013 08:26- 08:34 UT. ETX-90, ASI120MC. North down.

RECENT TOPOGRAPHICAL OBSERVATIONS

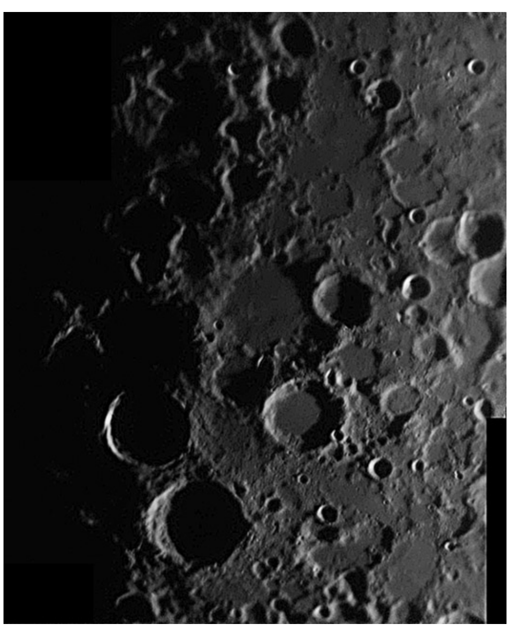
MONTES APENNINUS – Ed Crandall – Lewisville, North Carolina, USA. November 11, 2013 23:47 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam.

NORTHERN MOON - Howard Eskildsen- Ocala, Florida, USA. November 23, 2013 10:07 UT. Seeing 8/10, Transparency 5/6. 6” f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.



I knew that things were going to be good when I was able to focus in a matter of seconds, no question of whether I really hit the sweet spot thanks to a steady sky. Even better, there were some seldom-seen areas of the moon in view thanks to a 7° northern libration.

Notice the pink lables showing 83.5° north latitude. The top one shows the northeastern rim (left side of the crater as viewed in the image) of Plasket. At first I wanted to call it the northwestern rim (as if it were on earthward side of the pole), but it is on the other side of the north pole, so east and west are reversed. As Plasket's rim vanishes near the tip of the arrow denoting Rozhdestvenskiy, it drops lower than 83° latitude and is probably the farthest point beyond the lunar north pole that is visible from Earth. Next notice Gioja centered near 83.5° north latitude on the earthward side of the pole; it is interesting trying to imagine the latitude line circling around from one to the other.



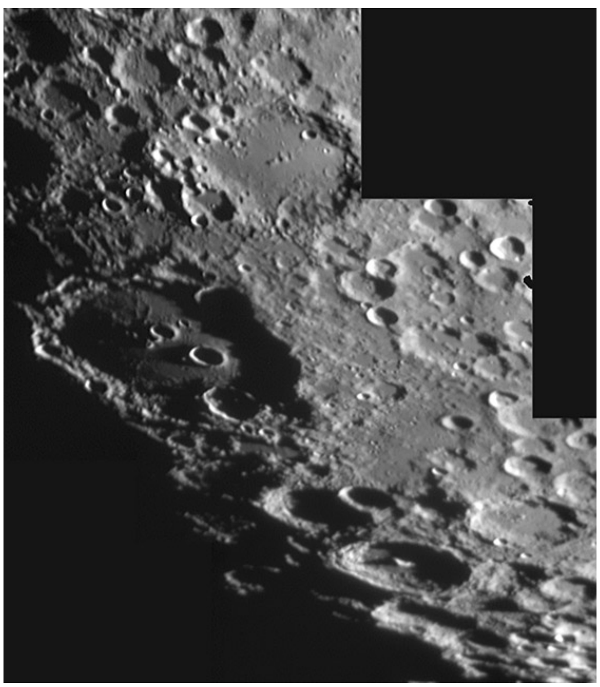
APIANUS – Richard Hill – Tucson, Arizona, USA December 10, 2013 01:40 UT. Seeing 6/10. TEC 8” f/20 MAK-CASS, SKYRIS 445. 656.3 nm filter.

The seeing was not great last night but it was finally clear. We've been in a "cold snap" which has led to a turbulent upper atmosphere and hence the poor seeing. However, this was a good night to get a look at the famous "X" on the moon near Apianus so, no choice.

The lower half of this image is dominate by the two circular pools of darkness that are Aliacensus (lower) and Werner above. A line between the centers of these two craters lead to the "X" formed by the walls of Blanchinus, La Caille, Purbach and several smaller features. This is one of the best views of this I ever had even if one could wish for 8 or 9 seeing.

RECENT TOPOGRAPHICAL OBSERVATIONS

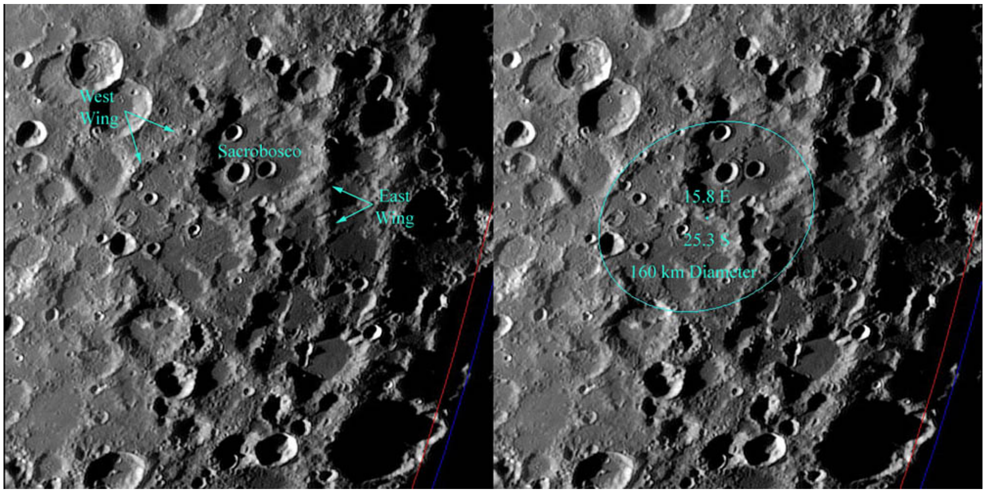
GASSENDI – Alexander Vandenbohede, Assebroek, Belgium. November 12, 2013 18:00-18:30 UT. C-8 f/10 SCT, seeing A III, colongitude 39.3º.



CLAVIUS – Alexander Vandenbohede, Assebroek, Belgium. November 12, 2013 18:40 UT C-8 f/20 (2x barlow) SCT, webcam.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

12 day MOON - Maurice Collins-Palmerston North, New Zealand. December 15, 2013 09:25-09:29 UT. FLT-110, ASI120MC. North down.



SACROBOSCO - Howard Eskildsen-Ocala, Florida, USA. November 23, 2013 09:47 UT. Seeing 8/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.

For several years I have been fascinated by the ancient terrain in the Sacrobosco area, southwest of Mare Nectaris. Sacrobosco's distinctive rim and associated craterlets readily stand out from the regional chaos and have served as a landmark for navigating that portion of the southern highlands.

Curiously, it appears to have two ridges drooping away from its rim; one from its eastern margin ("east wing" on photos), and one from its western rim ("west wing" on photos. They were obviously not formed at the same time, and likely, Sacrobosco appeared later, before both were scarred by the Imbrium impact. I have wondered about these strange wings for quite some time.

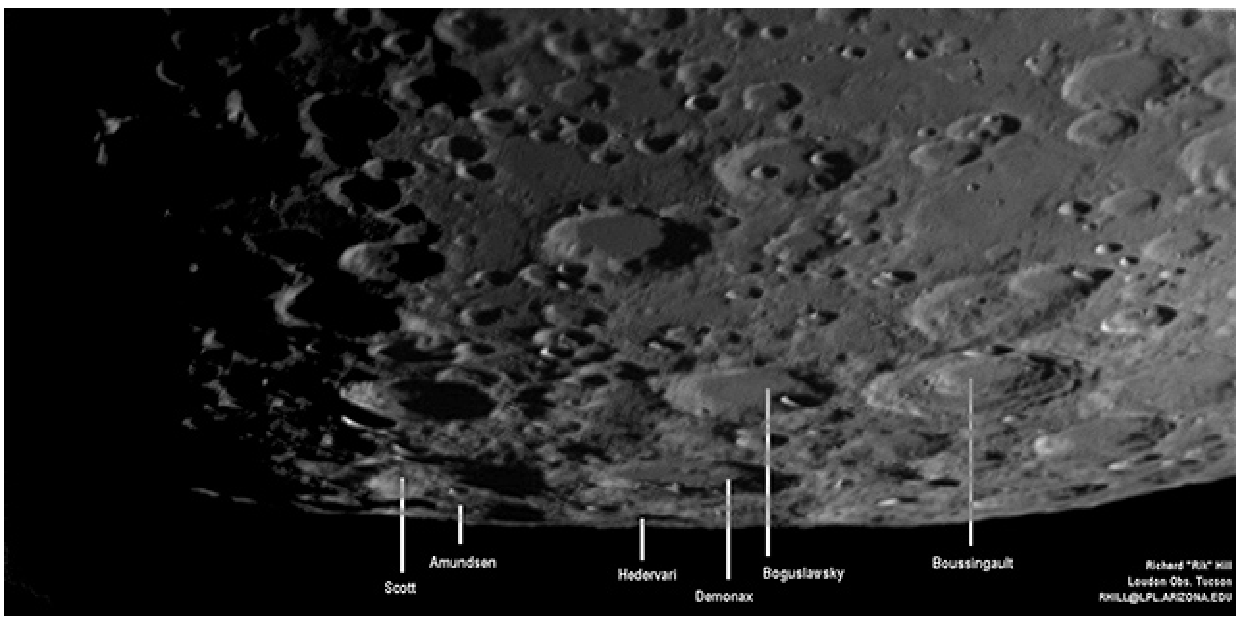
The ridges are most likely ancient crater rim remnants, and some work with LTVT (Lunar Terminator Visualization Tool) shows a possibility that both could be the remains of the same crater. I refer to the hypothetical crater as "Sacrobosco Major" since it would have been much larger than its 100 km diameter namesake. As portrayed on the LTVT composite image, the hypothetical crater would have been approximately 160 km in diameter and centered near 15.8 east longitude, 25.3 south latitude.

Note: The image was calibrated using the coordinates from LROC WMS Image Map of two small, unnamed craters near opposite corners of the image. The coordinates of the center of "Sacrobosco Major" were reproducible to about 0.05°, so were rounded to the nearest 0.1°. Diameter is estimated to ±5 km.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

MARE VAPORUM-MARE TRANQUILITATIS - Howard Eskildsen-Ocala, Florida, USA. November 23, 2013 09:42 UT. Seeing 8/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.

This image shows various faults and ridges with arrows overlain to suggest the directions forces acted to create them. The faults at left and center appear to have had tension across the surface that split them apart to form the rilles (faults). Perhaps the Ariadaeus rille in the center of the photo had some offset with the area north or the fault slightly displaced eastward relative to the southern area (see angled double arrow with question mark). The right of the image shows complex forces that pulled apart the terrain surrounding Mare Tranquillitatis as the center dropped downward in a synclinal fold. Wrinkle ridges appeared where compression forces within the mare were relieved by overthrust of some of the compressed terrain within the syncline. As for Lamont, the ghostly oval by the terminator, is it truly a buried crater, or could focused forces from the south, west and east have created its circumference?

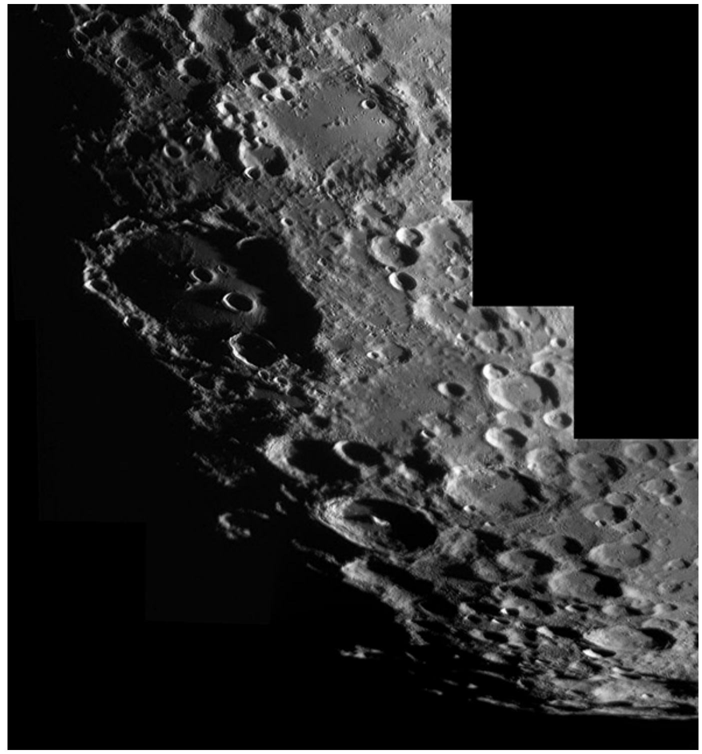


SOUTH POLE – Richard Hill – Tucson, Arizona, USA December 10, 2013 00:57 UT. Seeing 6/10. TEC 8" f/20 MAK-CASS, SKYRIS 445M, 656.3nm filter .

Here we have a view of the lunar south pole during a favorable libration. Note the features that are pointed out. Some are named after the famous antarctic explorers like Scott and Amundsen. I have always wondered why Shackleton was not among them.

My favorite in this image is Boussingault, one of the craters within a crater. Note the shadows in the bottom of Schomberger just north of Scott. More interesting shadows are seen in the bottom of Manzinus further north. There are many intersting formations here.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

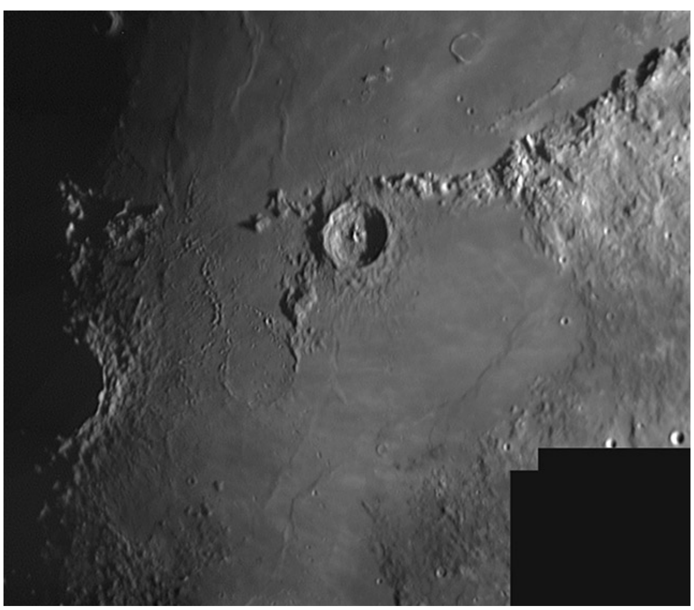


CLAVIUS – Richard Hill – Tucson, Arizona, USA November 12, 2013 02:25 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS, SKYRIS 445M, 656.3nm filter .

Though this image is entitled Clavius, it actually covers the region from Maginus to Moretus and beyond to the limb.

Checking LROC Quick Map I was able to identify numerous 2km craters in Manginus. There is a phenomena I've noticed that when the resolution gets to about 2km the region suddenly becomes peppered with roughness, such that there are no smooth areas of any extent. This was true with this image.

This limb is very near the libration point at the time of this image. As a result, on the limb in the lower right of this image can be seen the two craters Scott and Amundsen, two craters I don't believe I have imaged before!



ERATOSTHENES – Alexander Vandenbohede, Assebroek, Belgium. November 12, 2013 18:05 UT C-8 f/20 (2x barlow) SCT, webcam.

LUNAR TRANSIENT PHENOMENA

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LTP NEWSLETTER – JANUARY 2014

Dr. Anthony Cook - Coordinator

Best wishes for 2014 to our readers. Observations for November were received from the following observers: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Alphonsus, Copernicus, Gauss, Linne, Mons Piton, and the West Limb. Maurice Collins (New Zealand - RASNZ) observed Demonax, Theophilus, and took some whole Moon mosaics. Marie Cook (Mundesley, UK - BAA) observed Agrippa, Menelaus, and Plato. Rik Hill (Tucson, AZ, USA – ALPO) produced some large area mosaics of the Moon. Brendon Shaw (UK - BAA) imaged Albategnius, Aristarchus, Gassendi, Manilius, Picard, Plato, and Sinus Iridum.

News: In early December, an on-line seminar (webinar) was held about how amateur astronomers could help NASA's Lunar Atmospheric Dust Environment Explorer (LADEE) mission, by looking for impact flashes on the Moon's night side. If you want to take part in this exciting programme, searching for impact flashes, and have light sensitive cameras, such as those used in occultation, or meteor studies, then please get in contact with Brian Cudnik (cudnik@sbcglobal.net , or visit his web site on: http://alpo-astronomy.org/lunarupload/lunimpacts.htm . You can watch a recording of the LADEE webinar on http://connect.arc.nasa.gov/p4zpsnm6weh/; there you will see Rik Elphic a LADEE project scientist discussing early results from the mission, Brian Cudnik talking about observing impact flashes, Rob Suggs from NASA's Marshall Space Flight Center lunar impact flash programme, George Varros (another active observer), and Pete Gural – the writer of the free LunarScan software which analyses automatically Earthshine video tapes, looking for impact flashes. Early results from LADEE show that it has already flown through at least two dust plumes which were many orders of magnitude greater in dust count levels than the normal background levels. LADEE scientists are expecting the vast majority of dust plumes to be simply ejecta from meteorite impacts. Anyway it is vital for the NASA mission that amateur astronomers spot impact flashes, so that these can then be correlated with passages of the LADEE spacecraft through elevated dust plumes. LADEE scientists have also detected noble gas concentrations and found that Neon-20 content peaks in the late lunar night and falls before sunrise, whereas Argon-40 starts rising before sunrise and peaks a little afterwards. Early morning Argon-40 breezes were detected by Apollo instruments left behind on the Moon. The delay of the Argon emission peak depends upon the temperature of the lunar surface that the gas freezes/thaws out at.

China's Chang'e 3 lander and rover, touched down successfully, on 2013 Dec 14 UT 13:11 with preliminary determined landing coordinates at 19.51W, 44.12N (according to Spaceflight Now and the NASA LRO/LROC team – see the "x" in Fig 2 for its location). Surprisingly it landed earlier than the publicized landing time of 13:40, and despite the general idea that it would land in Sinus Iridum, it ended up 120 km south of Montes Recti instead, just on the edge of a deep crater. However any landing on the Moon, where the electronics are still functioning afterwards, can be regarded as successful, and it maybe that the rover will be made to drive in the direction of Sinus Iridum to make up for being in the wrong initial location. Anyway I really enjoyed watching the coverage on the Chinese "CCTV" news channel received via our satellite dish – it reminded me of the pioneering days of the Apollo missions, and it was nice to see the surface looking so colorful. It must be really quite something for the Chinese public to realize that they are the 3rd nation to have successfully soft landed a vehicle on the lunar surface.

Both the LADEE and Chang'e 3 missions offer an exciting opportunity to solve one of the main theories to explain LTP, namely that these are caused by dust clouds. During sunrise/set, Change'3 may be able to detect electrostatic levitated dust particle on the horizon, replicating results previously found by

NASA's Surveyor 7 lander in 1968, and photometric results from Lunohkod 2 in the 1973, which both revealed this effect. Although LADEE is primarily searching for impact ejecta dust, if it were to periodically find high dust levels in the lunar exosphere over specific areas of the Moon then this might suggest some local mechanism for dust emissions. Of course we still need to find out the density of the number of dust particles per cubic metre in order to work out whether scattered light from clouds of these could be seen from Earth. But it may offer us a big piece of evidence for whether LTP from dust clouds is a viable theory, or at least put a limit on how infrequent they must be. Present day ALPO/BAA/NASA catalog statistics, compared to routine observations, suggest that should LTP exist, then they must be exceedingly rare i.e. occurring at a frequency of one per hundreds to thousands of hours of Earth-based observing.

Finally a new web site has been set up to help observers who think that they have spotted a LTP, run through a checklist to make sure that there are not other simpler explanations for what they have spotted. You can find this on.. http://users.aber.ac.uk/atc/alpo/ltp.htm . Hopefully this will avoid a lot of false alarms that unsuspecting observers have made in the past – albeit unintentionally.

LTP Reports: No LTP reports were received in November. However a re-analysis of a LTP report by UAI observer R. Gutadini from 2013 Apr 25 UT 19:35, concerning a sprite-like feature on the eastern limb, shows that whatever the effect was, it was too fast to be lunar in origin, and so must be a terrestrial effect instead. This LTP has been given a weight of 0.

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

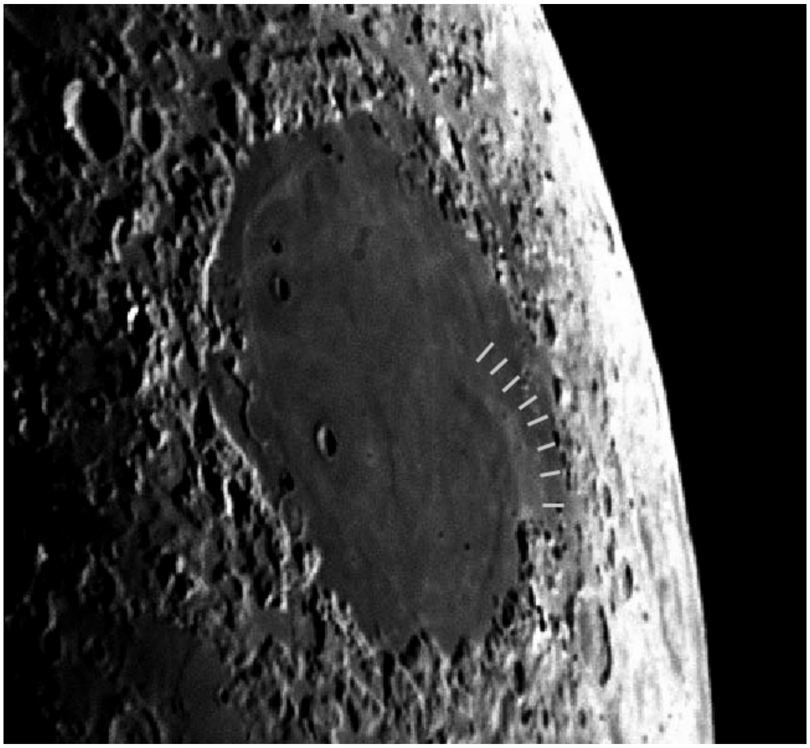

Figure 1. *Mare Crisium as image by Maurice Collins on 2013 Nov 07 UT 07:41-07:47 with north towards the top. The arrowed area refers to a curved wispy appearance area to the north of Promontorium Agarum which is probably just a wrinkle ridge or low relief feature.*

Promontorium Agarum: On 2013 Nov 07 Maurice Collins obtained a whole Moon image mosaic, and this contained the Mare Crisium area with an illumination (to within +/-0.5°) that matched that of an observation from J.G. Jackson of Hockessin, Deleware USA in 1882 May 21:

Cape Agarum 1882 May 21,22 UT 00:12-01:00 Observed by Jackson et al(Delaware, 6" reflector) "Curved feathery mist bounding W. side of great valley divided longitud. by dark line @ 160km long, 65-80 km wide, in color & appear. strikingly diff. from other places & from anything else he had ever seen. Nothing seen on 20th (loc. time) (confirmed). " NASA catalog ID #232. NASA catalog weight=5 (very good).ALPO/BAA weight=3.

Maurice's image (Fig 1) shows both a curved low-relief area (as indicated by the arrows) to the north of Agarum, and another curved wrinkle-ridge type feature just to the west. Both are of the order of the correct length described in the NASA catalog report above, though the more northerly one is more characteristic of the width specified. So has Maurice solved this historical Delaware mystery? Unfortunately I do not have the original observation – so as a measured response, until we find more details out about Jackson's observations, I would like to lower the ALPO/BAA weight from a 3 to a 2. Maurice's observation does pose another interesting question though, could the curved feature to the north of Agarum, be a continuation of the promontorium beneath the mare surface? Or could it be part of a buried crater, or submerged basin rim? Unfortunately topographic profiles through the LROC ACT Quick Map tool are difficult to interpret in this region due to the large scale gradients across the floor of Mare Crisium. Anyway it is something that imagers and users of LTVT could look out for in future – to prove this fanciful notion right or wrong? Finding new buried features on the Moon is one of the many pleasant spin-offs of repeat illumination work.

Menelaus: On 2013 Nov 09 UT 18:10-18:20 Marie Cook observed this crater under the same illumination as a LTP report from Danish observer Darnella in 1968:

1968 Apr 04 UT 18:45-19:20 Observed by Darnella (Copenhagen, Denmark, 6" refractor, x183) "Small area just E(ast.) of Menelaus was seen with a reddish color which gradually faded. Area was as large as Menelaus & had just come into sunlight. The dome just W.(IAU) of Menelaus?)." NASA catalog weight=3. NASA catalog ID #1065. ALPO/BAA weight=3.

Marie reports that details were sharp, but no reddish apron was seen either to the east or west vicinity of the crater, but there was a large dark, patch of shadow to the west. Her seeing conditions were Antoniadi II and transparency was moderate. In view of the lack of color here, this LTP will remain at a weight of 3 until we get some similar illumination images that we can experiment with for modeling spectral dispersion on.

***Figure 2**. The Sinus Iridum area by Brendan Shaw taken on 2013 Nov 14 UT 18:48, with north towards the top, with Promitorium Laplace arrowed. The small "x" is the approximate landing site of China's Chang'e 3 that landed nearly a month later. The arrow points to a shadow mentioned in the Beraud 1970 LTP report (see text).*

Promontorium Laplace: On 2013 Nov 14 at 18:49UT Brendan Shaw imaged the Sinus Iridum area (see Fig 2). This corresponded to the same illumination conditions as a dark spot LTP seen by Beraud in 1970:

Promontory Laplace 1970 Aug 13 UT 22:30 Observed by Beraud (England?) "Very dark spot at southmost tip. No other obj. in region gave any shadow. Region must be very high. (spot only 18deg from term. so need have a slope > 18 deg. There is an isolated mt. peak that is high just off, but separate from the Promontory. Pickering Atlas, plate 11E & 11B? shows a dark spot there)." NASA catalog weight=1. NASA catalog ID #1272. ALPO/BAA weight=1.

Unfortunately the 1978 catalog of LTP is peppered with several instances of shadows here being regarded as unusual. The fact of the matter is, this peak rises approximately 3 km above the Sinus Iridum floor, and the slope angle is at least 25° - steep for lunar slopes, but not impossibly steep. Therefore at this latitude it is not unusual to get a shadow. Because of this the LTP will have its weight changed from a 1 to a 0 (an ex-LTP). It is the purpose of these repeat illumination observations to eradicate bogus LTP reports on an observational demand basis, and Brendan's timely observation has helped enormously in this respect.

Gauss: On 2013 Nov 18 UT 02:30-03:05 Jay Albert observed Gauss under the same illumination conditions as a polarized light observation made by Chilton in 1967:

Gauss 1967 Sep 19 UT 02:33 Observer: Chilton (Hamilton, ON, Canada, 12.5" Gregorian, 200x and a 4" refractor). In a polaroid filter the west wall was missing. Effect seen in large scope and also in 4-in finder. His conclusion was that W. wall reflected polarized light. Cameron 1978 catalog weight=3 (good) and LTP ID #1047. ALPO/BAA weight=4.

Jay used a Celestron NexStar 6" SCT under mostly clear sky, transparency 2, with seeing at 7/10. "Favorable libration gave an excellent view of Gauss, one that was not as foreshortened as in Rukl Chart 16. The W wall was easily seen both with and without a variable polarizer filter. The W wall was even visible, although with difficulty, when the polarizer was at its darkest setting. The exterior W wall appeared fairly low and had a faint, very thin shadow along its interior. W wall shadows were also seen in Gauss A, B and at least one other unlabeled interior crater. He observed with 120x, 167x and 214x". Given that Jay did not see the west wall missing when using a polarized filter, this LTP report will remain at a weight of 4 as the effect from 1967 sounds intriguing. I guess though we will have to wait until both the illumination and topocentric libration are similar to what they were in 1967 to be sure it is not a normal surface polarization effect.

Suggested Features to observe in January: 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/tlp/tlp.htm. 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: +44 798 505 5681 and I will alert other observers. Twitter LTP alerts can also be accessed on http://twitter.com/lunarnaut.

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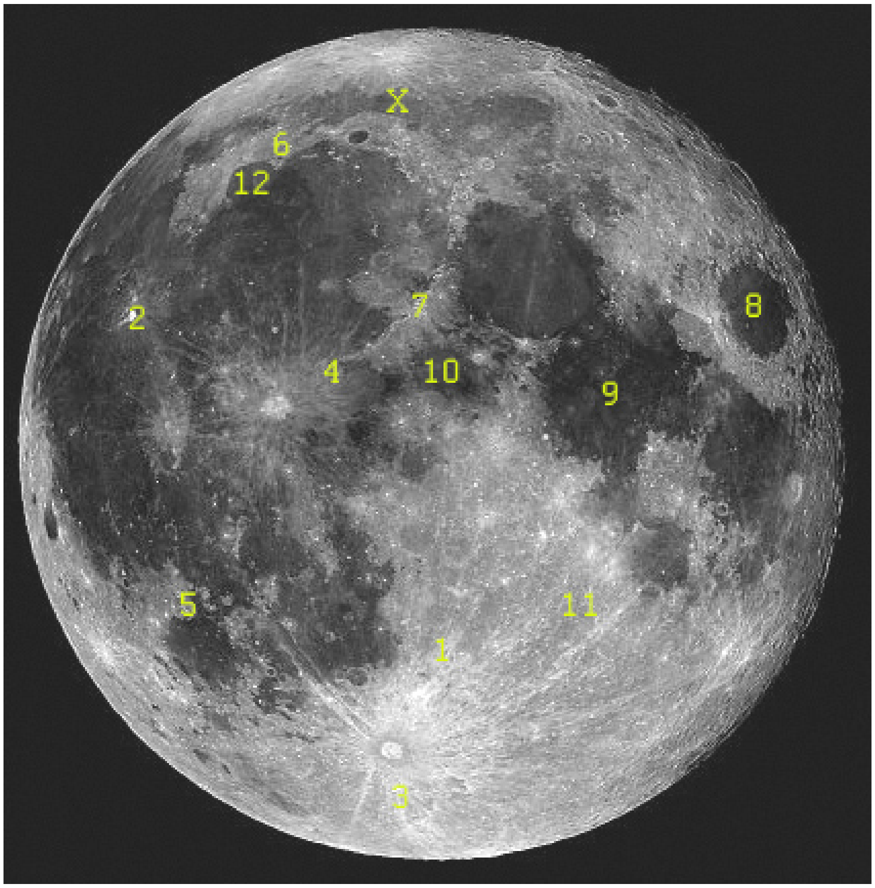
KEY TO IMAGES IN THIS ISSUE

1. **Apianus**
2. **Aristarchus**
3. **Clavius**
4. **Eratosthenes**
5. **Gassendi**
6. **La Condamine**
7. **Montes Apenninus**
8. **Mare Crisium**
9. **Mare Tranquilitatis**
10. **Mare Vaporum**
11. **Sacrobosco**
12. **Sinus Iridum**



FOCUS ON targets

X = Mare Frigoris (March)