THE LUNAR OBSERVER

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

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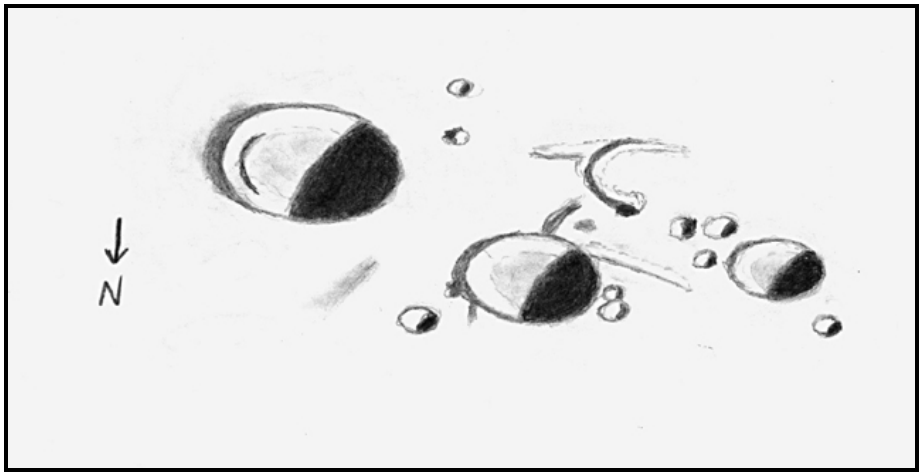
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – OCTOBER 2009

CRATERS INSIDE CLAVIUS



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
August 12, 2009 5:45-6:17 UT
15 cm refl, 170x, seeing 8

I drew some of the detail inside the large crater Clavius on the morning of August 12, 2009 while watching two occultations. This huge feature has interior detail worthy of attention in its own right. The three main craters in this sketch are, fron east to west, Clavius D, C and N; their sizes also decrease in that order. These three craters appear basically similar with proportional inner shadows and moderate outer rim shadowing. Clavius D shows evidence of terracing, and Clavius C has at least one high spot on its east rim. Clavius CB is just northeast of C and Clavius Y is just southeast of N; CB and Y look alike. Clavius 0 is northwest of N, and two more craters are east of N and Y. The one north of Y is relatively shallow, and the

one east of Y appeared to have an odd squarish shape. Clavius CA is a shallow crater just west of C, and a similar but smaller shallow crater is just to its south. Clavius DB is southwest of D, and the conspicuous peak Clavius theta is near D and DB. A partial ring is evident south of C and east of N; there is a noticeable peak at its north end. There are several other ridges and strips of shadow in the area which I drew as I saw them.

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LUNAR CALENDAR

OCTOBER-NOVEMBER 2009 (UT)

Oct. 02	22:00	Moon 5.0 Degrees NNW of Uranus
Oct. 04	06:11	Full Moon
Oct. 11	08:56	Last Quarter
Oct. 12	01:00	Moon 1.1 Degrees SSW of Mars
Oct. 13	12:29	Moon at Perigee (369,067 km - 229,328 miles)
Oct. 16	07:00	Moon 6.4 Degrees SSW of Saturn
Oct. 16	14:00	Moon 6.1 Degrees SSW of Venus
Oct. 17	05:00	Moon 6.8 Degrees SSW of Mercury
Oct. 18	05:32	New Moon (Start of Lunation 1074)
Oct. 25	23:19	Moon at Apogee (404,166 km - 251,137 miles)
Oct. 26	00:41	First Quarter
Oct. 27	06:00	Moon 3.0 Degrees NNW of Jupiter
Oct. 27	19:00	Moon 2.9 Degrees NNW of Neptune
Oct. 30	04:00	Moon 5.1 Degrees NNW of Uranus
Nov. 02	19:14	Full Moon
Nov. 07	07:31	Moon at Perigee (368,899 km - 229,223miles)
Nov. 09	04:00	Moon 3.2 Degrees SSW of Mars
Nov. 09	15:57	Last Quarter
Nov. 12	20:00	Moon 6.8 Degrees SSW of Saturn
Nov. 15	16:00	Moon 6.1 Degrees SSW of Venus
Nov. 16	19:13	New Moon (Start of Lunation 1075)
Nov. 17	10:00	Moon 2.8 Degrees S of Mercury
Nov. 22	20:08	Moon at Apogee (404,734 km - 251,490 miles)
Nov. 23	19:00	Moon 3.4 Degrees NNW of Jupiter
Nov. 24	03:00	Moon 3.1 Degrees NNW of Neptune
Nov. 24	21:38	First Quarter
Nov. 26	13:00	Moon 5.2 Degrees NNW of Uranus

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 can be found on-line at: **http://www.alpo-astronomy.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 is 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: Menelaus

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 **November 2009** edition will be Menelaus. Observations 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 banded & ray crater to your observing list and send your favorites to:

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

Deadline for inclusion in the Menelaus article is October 20, 2009

FUTURE FOCUS ON ARTICLES:

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

Atlas & Hercules	**TLO Issue: Jan. 2010**	**Deadline: Dec. 20, 2009**
Snellius-Furnerius	**TLO Issue: Mar. 2010**	**Deadline: Feb. 20, 2009**

LCROSS STATUS

On September 28th, NASA announced a change of target crater for LCROSS. Based on the latest evaluation of Lunar Prospector, Lunar Reconaissance Orbiter, Chandrayaan-1, and Kaguya data, the target is now Cabeus itself instead of Cabeus A1 (a small crater on the rim of Cabeus A). The Shepherding Spacecraft may be the only observer in position to see the actual impact, since it is targeted for a shadowed portion of the inner wall that's not visible from Earth. The impact flash is unlikely to illuminate the other walls sufficiently to be visible in amateur telescopes. A valley in Cabeus' wall should provide illumination of the ejecta plume to lower altitudes than previously expected for Cabeus. The plume will have to reach higher altitudes to be visible from Earth, but a dark shadow will be behind it, enhancing the contrast.

John Westfall found an image from the Pic du Midi Observatory that shows the South Polar Region of the moon with lighting and libration conditions similar to those at the scheduled impact time (fig. 1).

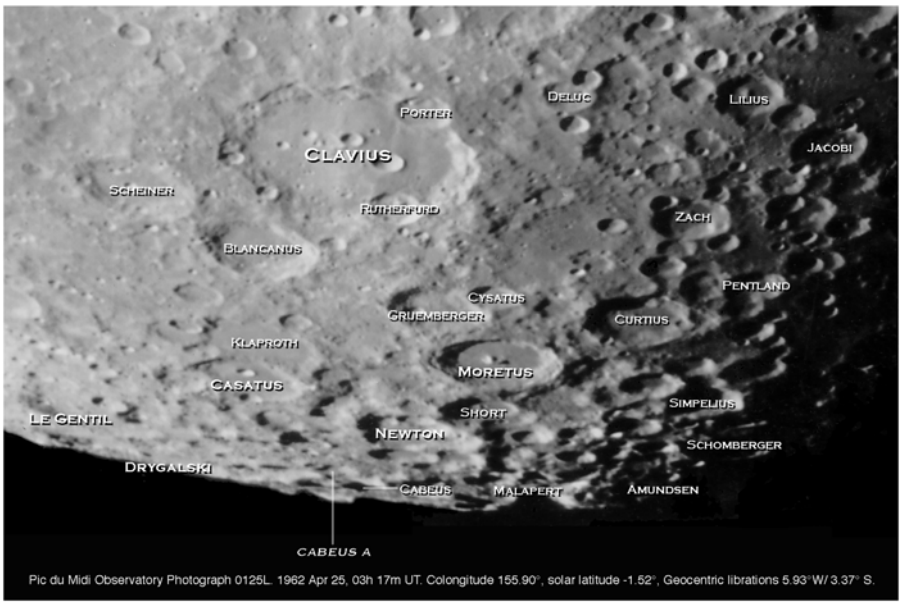

FIGURE 1: LUNAR SOUTH POLAR REGION (north at top), showing the location of Cabeus. The lighting and libration conditions, calculated by the JPL "HORIZONS" website, are quite similar to those at the scheduled time of impact, October 9, 2009, 11h 30m UT.

The ejecta plume may be as bright as magnitude 5 (more likely a couple of magnitudes fainter), but keep in mind that this is an integrated magnitude of an extended object and it's adjacent to the bright lunar surface. More information can be found on page 16 within the LTP Newsletter. I would particularly emphasize that accurate times of observation are important, and that observations just before and/or after the event will be very helpful for isolating the ejecta plume. Time sequences of observations will also be of interest to follow the development and dissipation of the plume.

The impacts will be broadcast on NASA TV and http://www.nasa.gov. Science centers and planetariums are also planning public events to view the impacts. Additional information about the spacecraft, mission, and science, as well as the current status of the mission, including lists of known public events, can be found at http://www.nasa.gov/lcross, and http://lcross.arc.nasa.gov/. There are twitter and facebook links on these pages, as well as news sections and blogs for the latest information. Kurt Fisher's presentation on LCROSS, which includes useful information on observing the impact, is available at http://members.csolutions.net/fisherka/astronote/observed/LCROSS/20090916LCROSSImpactUpdate.pdf., and http://groups.google.com/group/lcross_observation/web/finders has suggestions for locating Cabeus.

A Google group has been created (http://groups.google.com/group/lcross_observation) to organize amateur observations and any observations should also be submitted to the ALPO Lunar Transient Phenomena, Meteoritic Impact Search and Topographical/Selected Areas Programs (Dr. Anthony Cook atc@aber.ac.uk, Brian Cudnick DOD121252@aol.com, and Dr. Wayne Bailey wayne.bailey@alpo-astronomy.org).

HIGH-SUN OBSERVING: PROCLUS & PALUS SOMNI

William M. Dembowski, FRAS
Assistant Coordinator, Lunar Topographical Studies

Under a high sun, Proclus may be the easiest to find 28km crater on the Moon. Located only 70km west of Mare Crisium (Figure 1), the brilliant interior and ray system of Proclus makes it the second brightest crater on the Moon (Aristarchus is generally recognized as being number one). But it is this brilliance that makes it so difficult to

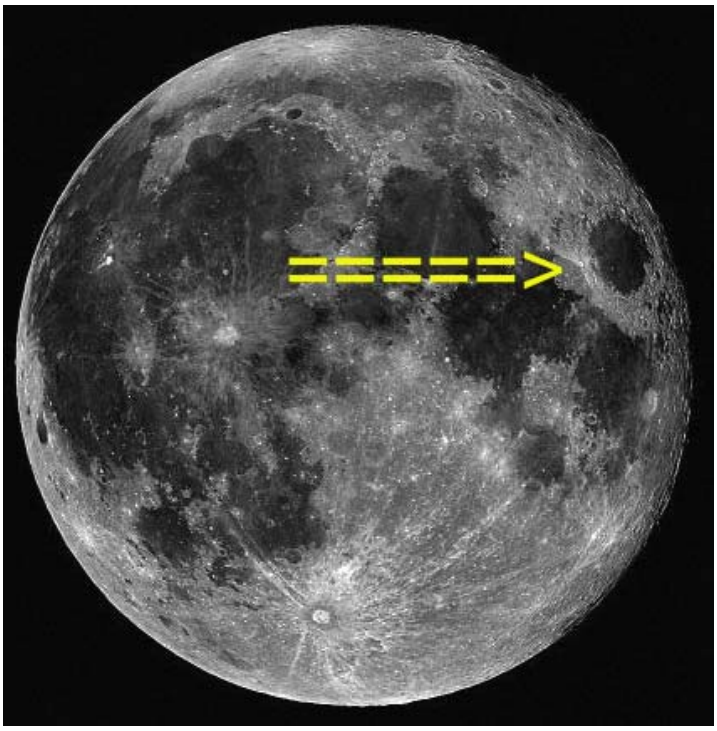

FIGURE 1. PROCLUS & PALUS SOMNI AT FULL MOON.

study under a high sun. When imaging Proclus care must be taken not to over-expose the rim and interior of the crater. Equally important, and more easily overlooked, is controlling the contrast.

The most distinctive feature of the crater is, of course, its ray system. The ray system of Proclus is strikingly asymmetrical with a 140 degree gap to the southwest. This fan-shaped pattern is the result of an oblique impact from the direction of the gap. The rays bordering this gap are the brightest and longest, about 150km, and serve to delineate the Palus Somni (Figure 2).

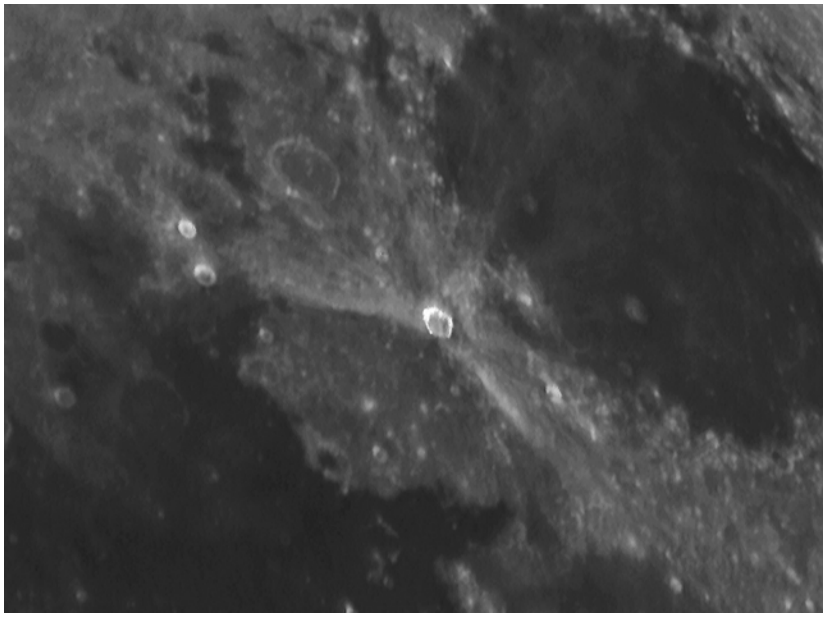

FIGURE 2. PROCLUS & PALUS SOMNI. William Dembowski, Windber, Pennsylvania, USA. September 2, 2009 01:38 UT, colongitude 62.2º, Seeing 4/10. Celestron 9.25", f/10 SCT, DMK41, UV/IR filter. Processed to retain detail in Proclus and its rays.

The true nature of Palus Somni, the Marsh of Sleep, was not clearly understood for many years. In fact, as recently as the early 1960's, Dinsmore Alter (Director Emeritus of the Griffith Observatory) believed it was the result of a "partial sinking" of the lunar surface. We now know that it is simply a region that was not covered by the Proclus rays following the initial impact and not the cause of their obscuration at some later date.

Although not a separate and distinct topographical feature, Palus Somni is still a rewarding telescopic sight with a nice array of bright spots under a high sun. The problem one can encounter when imaging Palus Somni is that increasing the contrast and brightness to emphasis the bright spots will generally obscure detail in Proclus itself and its ray system. Unless one's sole purpose in imaging the Moon is to make "pretty pictures" the obvious solution is to simply make two images, each emphasizing a different area of interest (Figure 3).

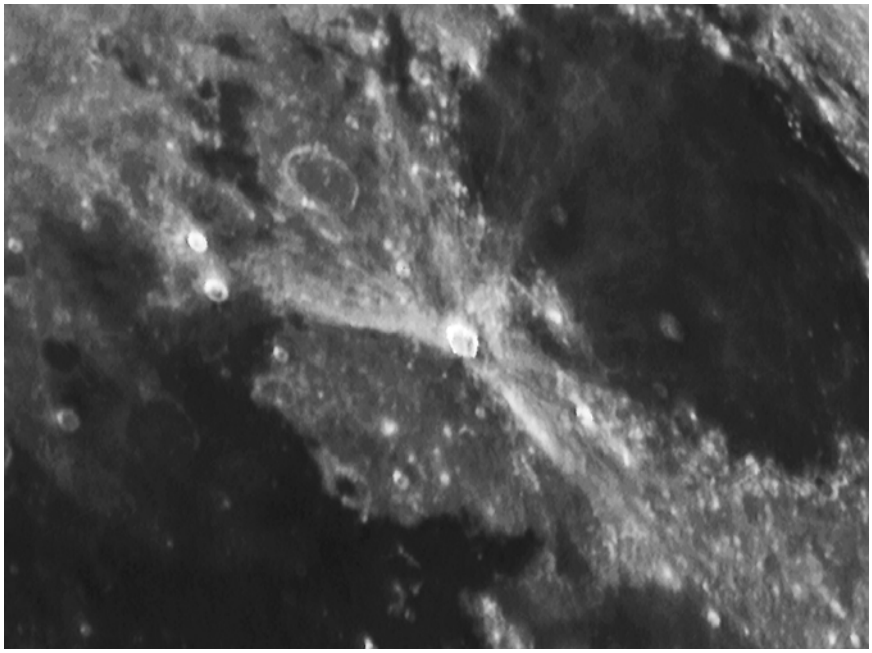

FIGURE 3. PALUS SOMNI & PROCLUS. Same as Figure 2, processed to retain detail in Palus Somni.

REFERENCES:

Alter, Dinsmore - "Pictorial Guide to the Moon", Thomas Crowell Co. (1963)
Wood, Charles A. - "The Modern Moon: A Personal View", Sky Publishing (2003)

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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

MICHAEL BOSCHAT – HALIFAX, NOVA SCOTIA, CANADA Digital image of Menelaus.

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND Digital images of 1.5, 2.5, 8, 15, 16, 17 day moon, 1st Quarter Moon, Earthshine on Crescent Moon (2), Apennines-Alps, Humboldt, Langrenus, Mare Crisium, Mare Humboltianum, Mare Orientale, Petavius, Plato, Southeastern terminator, Theophilus & Cyrillus, and Triesnecker & Hyginus Rilles.

ED CRANDALL – WINSTON-SALEM, NORTH CAROLINA, USA Digital images of Menelaus(3).

WILLIAM DEMBOWSKI – WINDBER, PENNSYLVANIA, USA Digital images of Copernicus & Pytheas, Mare Fecunditatis, Mare Humorum & Gassendi, Plato-Goldschmidt-Anaxagoras, Proclus & Palus Somnii, and Schiller & Longomontanus. Banded crater reports for Menelaus, Proclus and Pytheas.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA Banded crater reports for Agatharchides A (2), Anaxagoras, Aristarchus, Aristillus (3), Bessarion, Birt (3), Bode (3), Brayley, Burg (2), Conon (3), Damoiseau E, Davy A & G, Maury, Menelaus (2), Messier, Nicollet, Proclus (2), Pytheas, Rosse and Theaetetus (2).

ROBERT HAYS – WORTH, ILLINOIS, USA Drawings of Torricelli, and craters in Clavius.

RICHARD HILL – TUCSON, ARIZONA, USA Digital image of Lamont.

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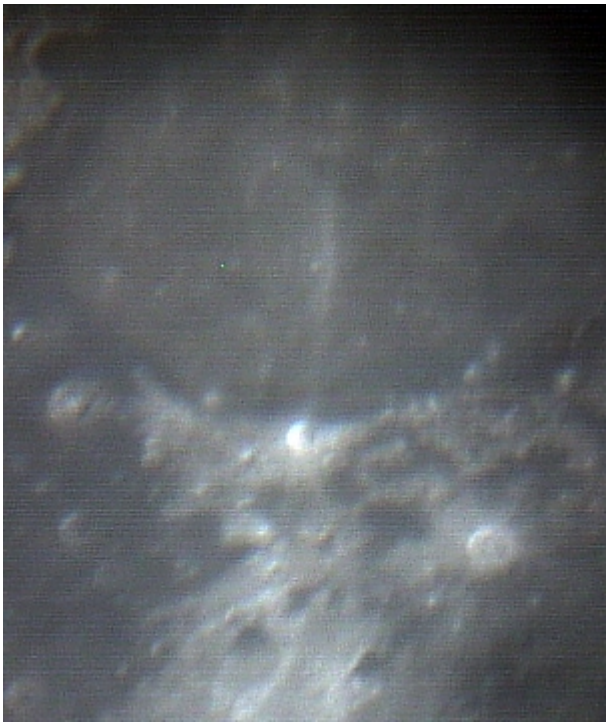
RECENT TOPOGRAPHICAL OBSERVATIONS

SCHILLER & LONGOMONTANUS – William Dembowski, Windber, Pennsylvania, USA, September 1, 2009 01:23 UT, Seeing 5/10, Colongitude 49.8º. Celestron 9.25", f/10 SCT, DMK41, UV/IR filter.

RECENT TOPOGRAPHICAL OBSERVATIONS

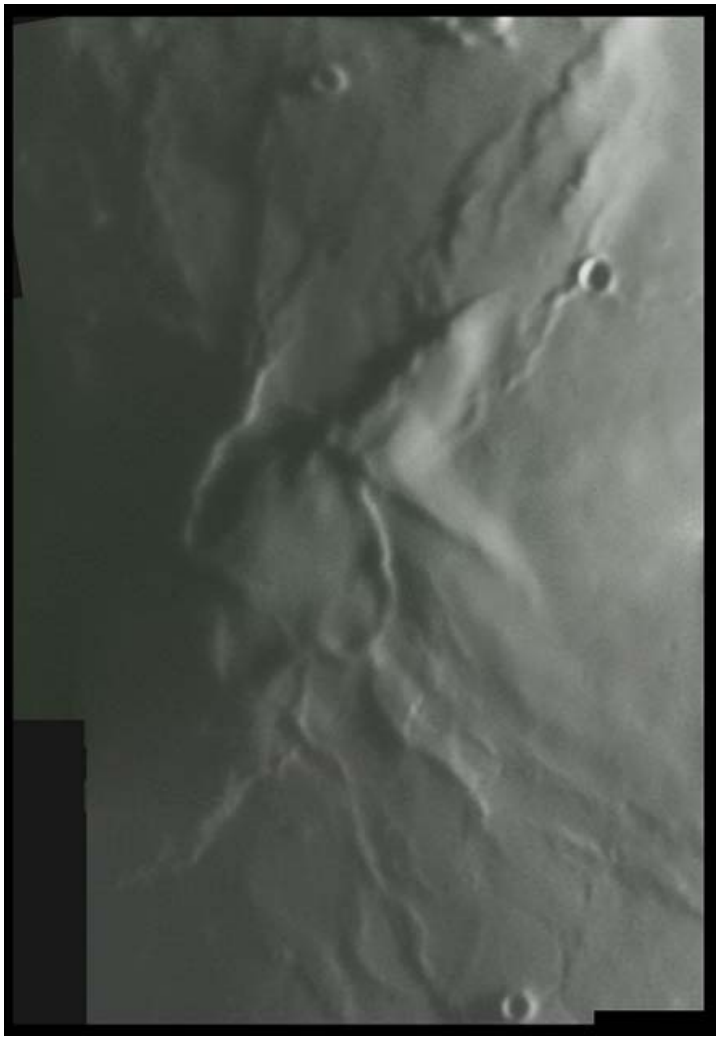
THEOPHILUS-CYRILLUS - Maurice Collins - Palmerston North, New Zealand, September 26, 2009 09:36 UT. C8, 3x barlow, LPI.

MENELAUS – Michael Boschat – Halifax, Nova Scotia, Canada, September 6, 2009 00:35 UT. Seeing 7/10, Transparency 4/6, C8, f/10, 134x, Centrios 3.0 MP DSC-3020 Digital Camera mounted over eyepiece set at 1.6 zoom.

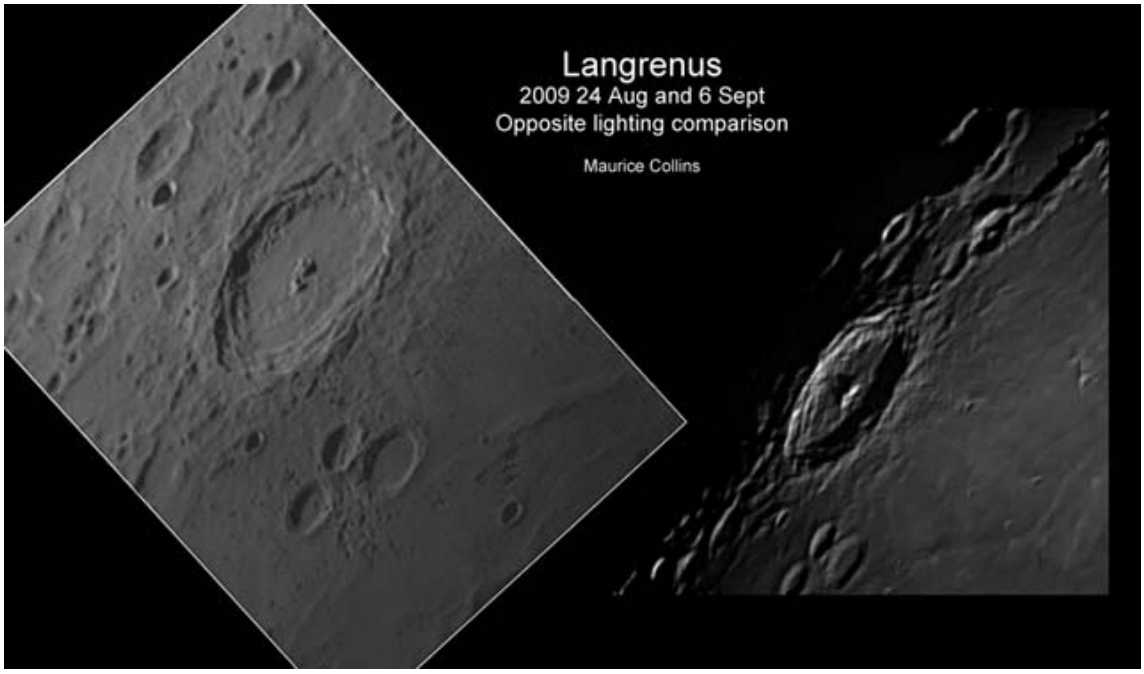


RECENT TOPOGRAPHICAL OBSERVATIONS

LAMONT – Richard Hill, Tucson, Arizona, USA. April 30, 2009 03:01 UT. Seeing 8/10, C14, 2x barlow, f/22, DMK21AU04, UV/IR blocking filter.

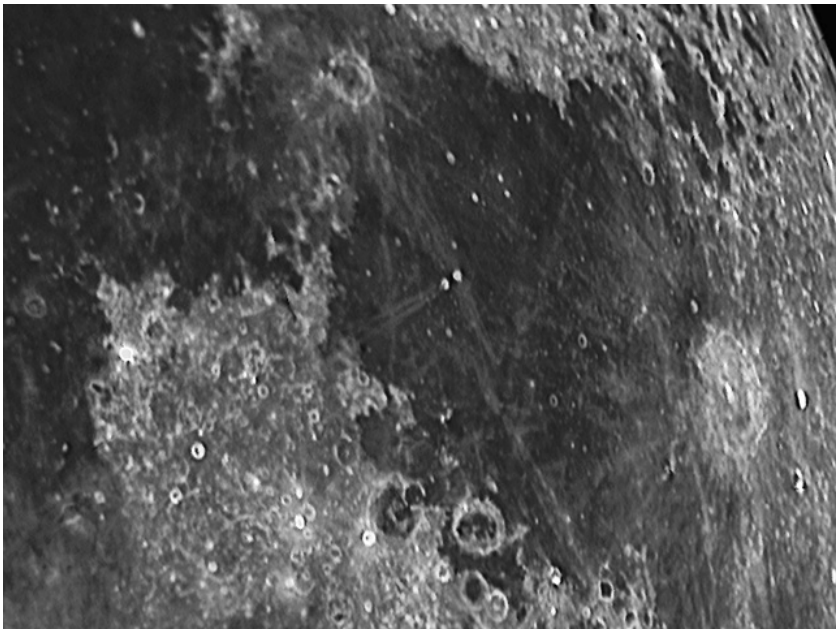


ADDITIONAL TOPOGRAPICAL OBSERVATIONS



LANGRENUS - Maurice Collins - Palmerston North, New Zealand, C8, LPI.

In this view I have compared the sunrise and sunset view of Langrenus. The libration is different also but interesting to compare details as they change under the different angle of illumination. Construction of this was prompted by Bob Evans, on nzastronomers list, noticing that the central peak of the sunset image looked flatter than normal. I put it down to the different libration and lighting angle as we are seeing the peak at a more oblique angle in the sunset view so the peaks will merge together. Also the seeing was not as good then either. Made me check it out anyway.



MARE FECUNDITATIS - William Dembowski, Windber, Pennsylvania, USA, September 2, 2009 01:08 UT. Seeing 4/10, Colongitude 61.9º. Celestron 9.25", f/10 SCT, DMK41, UV/IR filter.

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

MENELAUS– Ed Crandall – Winston-Salem, North Carolina, USA, May 26, 2007 01:17 UT, Seeing 6-7/10, 110mm APO, ToUcam.

PLATO-GOLDSCHMIDT-ANAXAGORAS - William Dembowski, Windber, Pennsylvania, USA, September 1, 2009 01:29 UT. Seeing 5/10, Colongitude 49.8º. Celestron 9.25", f/10 SCT, DMK41, UV/IR filter.

BANDED CRATERS PROGRAM

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

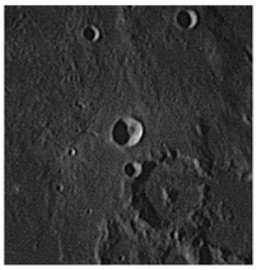
Assistant Coordinator – William Dembowski - dembowski@zone-vx.com

Banded Craters Program Website: http://moon.scopesandscapes.com/alpo-bcp.html

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Bode
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: P.O. Box 830415, Ocala, Florida, 34483
Telescope: Meade Refractor 15.2 cm f/8
Imaging: Orion StarShoot II (640 X 480), 5X TeleXtender, Filter: None
Seeing: 8/10 Transparency: 3/6
Date (UT): 2009/08/12 Time (UT): 09:54
Colongitude: 172°
Position of crater: Selen. Long. Selen. Lat.
2.4° West 6.7° North
Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

Image (north up): Comments:

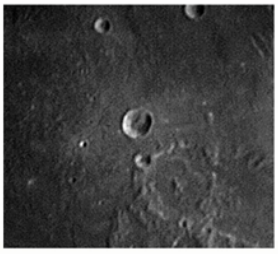


There appears to be a small hill in the bright side of the crater interior.

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Bode
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: P.O. Box 830415, Ocala, Florida, 34483
Telescope: Meade Refractor 15.2 cm f/8
Imaging: Orion StarShoot II (640 X 480), 5X TeleXtender, Filter: None
Seeing: 7/10 Transparency: 5/6
Date (UT): 2009/08/31 Time (UT): 00:45
Colongitude: 39°
Position of crater: Selen. Long. Selen. Lat.
2.4° West 6.7° North
Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

Image (north up): Comments:

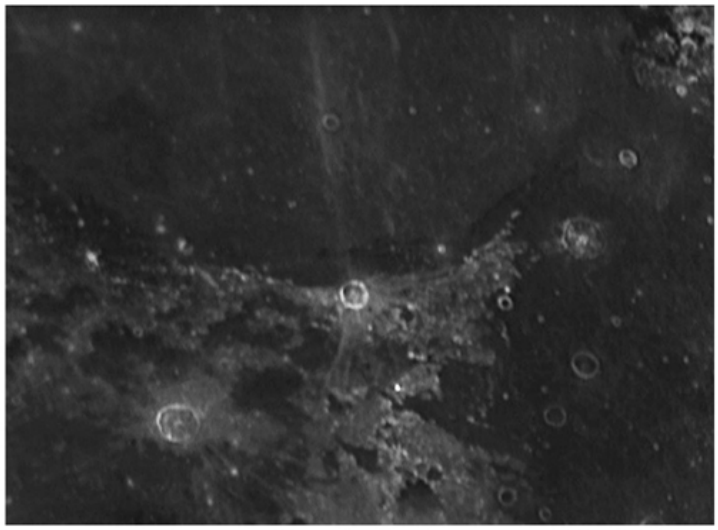


A ridge arcs from the center of the crater towards the north rim. On the SW rim three bright patches are separated by thin, slightly darker bands. I wonder if the bright areas are due to landslides down from the rim.

A.L.P.O. Lunar Section - Banded Craters Observing Form

Crater Observed: Menelaus
Observer: William M. Dembowski Observing Station: Elton Moonshine Observatory
Mailing Address: 219 Old Bedford Pike, Windber, PA 15963
Telescope: Celestron SCT 23.5 cm f/10
Imaging: ImagingSource DMK41 Filters: UV/IR cutoff
Seeing: 4/10 Transparency: 2/6
Date (UT): 2009/09/02 Time (UT): 01:06
Colongitude: 61.9

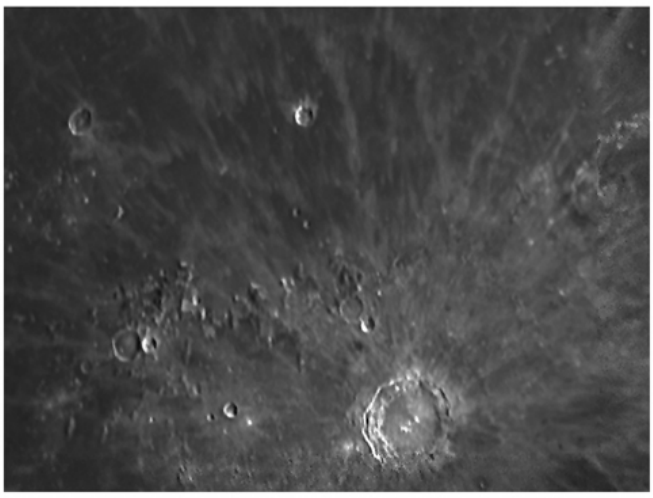
Image: (North up) (East right)



A.L.P.O. Lunar Section - Banded Craters Observing Form

Crater Observed: Pytheas
Observer: William M. Dembowski Observing Station: Elton Moonshine Observatory
Mailing Address: 219 Old Bedford Pike, Windber, PA 15963
Telescope: Celestron SCT 23.5 cm f/10
Imaging: ImagingSource DMK41 Filters: UV/IR cutoff
Seeing: 4/10 Transparency: 2/6
Date (UT): 2009/09/02 Time (UT): 01:31
Colongitude: 62.1

Image: (North up) (East right)



LUNAR TRANSIENT PHENOMENA

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

LTP NEWSLETTER – OCTOBER 2009

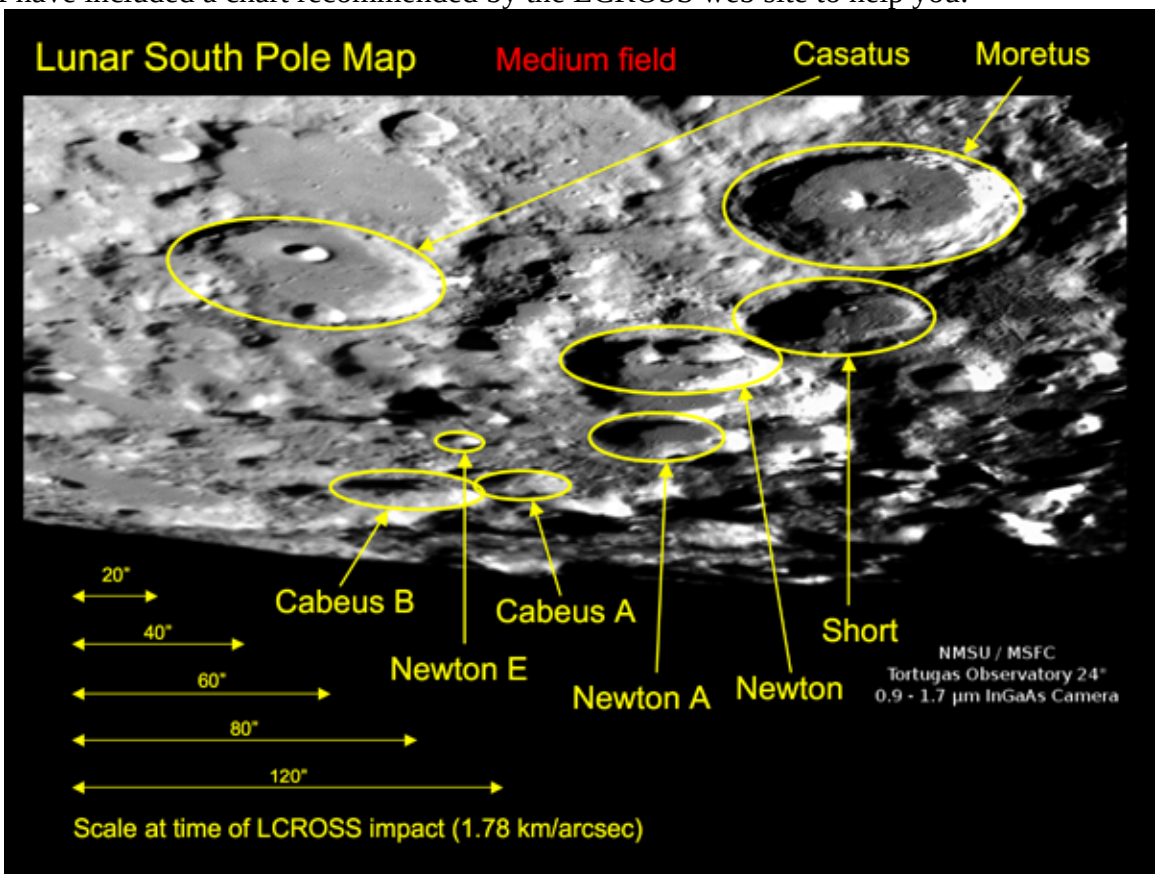
Dr. Anthony Cook - Coordinator

Observations for Aug 2009 were received from the following observers: Jay Albert (Lakeworth, FL, USA), Maurice Collins (Palmerston North, New Zealand), myself (Aberystwyth, UK), Marie Cook (Mundesley, UK), Shavarsh Khachatryan (Armenia), Hamish Watchman (New Zealand) and Mike White (Levin, New Zealand).

I have recently set up a Twitter LTP alert page http://twitter.com/lunarnaut – if you wish to be alerted in this way, please contact me and I will grant you permission to access these LTP alert Tweets. If you chose to then you can even receive live LTP alerts as texts from Twitter on your mobile phone.

LTP reports: Occasionally LTP reports are received for which I can offer no explanation, and in August, one such report was received by email from Shavarsh Khachatryan of Yerevan, Armenia. The following is an account that I have built up after extensive email questioning with the observer involved. On 2009 Aug 28 at UT 17:00:15-17:00:42 Shavarsh (127mm Maksutov-Cassegrain, x171, seeing 9 (1=worst and 10=best), Transparency 5-6 on a scale of 1 to 6) observed in the Chacornac area a series of fiery sparks (dot like with tiny rays), slightly elongated with the multitudinal rays orientated towards the south west direction. The color was mostly red, with some yellow. The final flash was the most clear. The LTP was tiny in area, but "was distinctly bright against any other object on the Moon". The positional uncertainty of the location of the spark effect was approximately +/- 150 km, based upon an examination of an atlas afterwards. Just prior to the spark effect, something dark, small and fuzzy (only just discernable to the eye, through the eyepiece) was seen to pass from the west across the Moon in a slight curve, round the surface of the Moon to the east (post observation estimate: seen for 3.5 sec and covered roughly 8% of the lunar diameter in that time). The area of the dark object was comparable in size to (or slightly less than?) craters such as Autolycus F (diameter 3km) or Le Monnier E (diameter 4km) i.e. on the limits of vision of the scope used. No attempt was made during this observation to move the scope to check that the LTP remained stationary against the Moon. The location of the flash was not exactly at the same location as the dark object passed across, but gave the impression of starting from it? A back of the envelope calculation using the lunar diameter covered in the time quoted gives an approximate horizontal speed (at the lunar distance) of 80km/s, or on the very high end acceptable for sporadic meteors. Using recalculated velocities at hypothetical closer distances one can deduce that it was unlikely to have been a satellite in low Earth orbit (~20m/sec at 100km distance), but could perhaps be a bird or insect at a few km range? This however does not explain the subsequent sparkling effect. So was this dark object something in our atmosphere, perhaps by chance passing across the field of view close to the time of the LTP flare, or was it at the lunar distance and related to the LTP? I normally assign a weight of 1 to all moving object LTP, however the replies to my extensive questioning did suggest that he was very certain that he had seen something. Therefore I am tentatively assigning an ALPO/BAA weight=2 – this is still at the lower end of the scale of 1 to 5, As always, if anybody else was observing at the time, then we can prove/disprove that this was an effect originating at the Moon's distance. Please do therefore get in touch if you were observing at 2009 Aug 28 UT 17:00-17:01.

LCROSS news: At the time of writing (Sep 27), LCROSS has been targeted at a small crater that overlaps Cabeaus A. The LCROSS Centaur upper stage impact should happen at 11:30UT followed by the shepherding satellite at 11:34UT on 2009 Oct 09. But please do check the LCROSS website for up-to-date information http://lcross.arc.nasa.gov/observation.htm . From Europe this event will be in daylight, but the US, west of the East coast should be better off, especially the further west you are. The expected plume will be anywhere between magnitude 6 and 9, however the Moon will still be bright – 5 days past full, so observation will be difficult and you need plenty of practice prior to the impact in order to identify the crater. I have included a chart recommended by the LCROSS web site to help you.

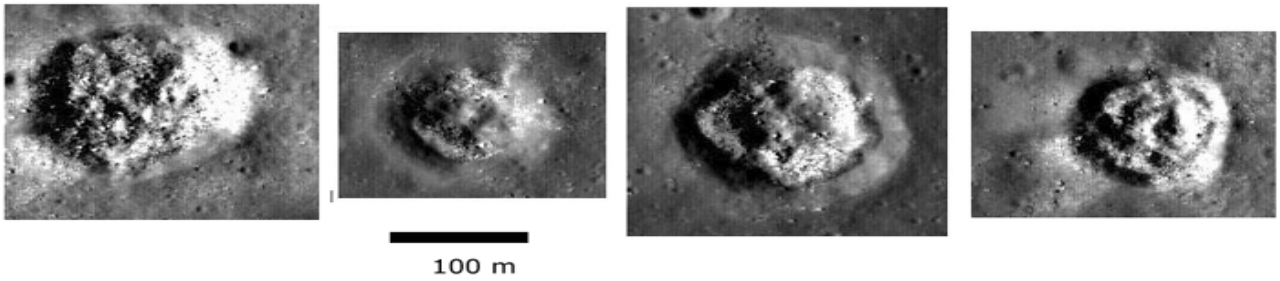


NMSU / MSFC LCROSS Ground Based Impact Observation Web Site – finder chart for Cabeaus A with south at the bottom. Beware if you are using a star diagonal because the image will be E-W reversed too.

. The LCROSS web site will recommend the types of observation that you can make. Please however try to incorporate accurate times into your observations e.g. short wave radio time signals or GPS times in UT. This will make any subsequent analysis easier to study the sequence of events. If you wish to specialize and have spare scope capacity, then by all means try capturing images through filters e.g. UBVRI, or narrow band interference filters centered around H or OH emission lines. However as some of the permanently shadowed craters at the lunar south pole have temperatures as cold as 10C above absolute zero, according to the latest LRO Diviner experiment results, they might have accumulated other volatiles during the hundreds of millions of years that they have been exposed to space. Therefore it could also be worth trying to image in narrow band filters such as methane, sodium or indeed anything that constitutes a comet's composition. Be sure though to keep any images taken just before the impact, as these can be subtracted from images taken during the impact and help to show up the impact plume if it is weak. Also please keep an eye on the impact site for a few days afterwards, just in case there is a remote chance that disturbed frozen volatiles (if they exist?) kicked, up by the impact (but remaining in shadow initially) are eventually exposed to the sun, and are subsequently vaporized, ionized and undergo photoemission. This is

unlikely, but it will not hurt to look/ Apart from sending in reports to the LCROSS web site, please remember to copy your observations to ALPO's lunar section so that we can report on your efforts, even if unsuccessful.

LRO news: The US mission continues to take amazing images at the 1m resolution level. One interesting thought I had was that if we have arm chair (or clouded out) astronomers with internet access, then you can keep a look out for oddly looking surface features that might exhibit freshly disturbed surfaces perhaps - from outgassing. We are not sure what freshly disturbed surfaces would look like precisely, possibly like Ina formations as described by Prof Pete Schultz (see http://science.nasa.gov/headlines/y2006/09nov_moonalive.htm), however with LRO images being made available on-line (see http://wms.lroc.asu.edu/lroc_browse) one can start to examine these and look for and categorize unusual features and then place them into a sorted catalog (taxonomy) of clipped out images. Officially we are not allowed to do science with these until the public release of images on the NASA Planetary Data System (PDS) in a few months time, but there is no harm in looking. Below are some examples I found on the Apollo 12 area LRO raw image file: M104662862R.tif.I am not sure what these represent, but there seem to be several occurrences of these "Verruca" like craters in the above image foot print!



Incidentally in a few month's time the "Galaxy Zoo" research team will be starting a "Moon Zoo" web site to encourage members of the public, and amateur astronomers, to click on craters for measurement purposes within LRO images. So please keep a look out for further news about this as this could be a new direction for amateur lunar studies to investigate.

Chandrayan-1 News: On 2009 Aug 28 at 20:00UT telemetry was lost with the Indian Moon mission and it was soon established by the Indian Space Agency that communications were extremely unlikely to be restored, so the mission had effectively ended. This was a blow to teams involved in a UK constructed C1XS X-ray Fluorescence spectrometer, that had been built at the Rutherford Appleton Laboratory. Aberystwyth University (where I work) was one of the research groups involved in this experiment! As our experiment could observe only when the Moon was illuminated by X-rays from solar flares, we were hoping that the mission would continue past the current rather extended period of solar minimum so that we could map the whole surface for elemental abundances during the expected build up to a solar maximum. However it was discovered that \the C1XS experiment was more sensitive than we had expected, so therefore despite the early mission end, C1XS had managed to obtain geochemical abundance measurements during some minor flares and this will undoubtedly keep the research teams busy churning out papers for the next few months.

UPDATE: On Sep 24 a NASA press conference announced that the C^3 hyperspectral mapper onboard Chandrayan-1 had proven, along with earlier unpublished results from Cassin's VIMs and the former Deep Impact (Now called Epoxi), that OH and H_2O molecules exist in the lunar soil at amounts of 0.1%. So if you had one ton of rock/soil, then this would hold 32 ounces of water. Water concentration was stronger towards the poles. However the speculation as to the source of the hydrogen was that it came from the solar wind, and not from comets, and the water and OH formed within the plentiful supply of oxides in the lunar surface and rocks.on the surface of the plentiful supply of oxides in the lunar surface. Although

the results look very convincing, and water had been known about since Apollo moon rocks were returned (but at the time was thought to be contamination) the science appears to be all up in the air. For example it was not explained (in the press conference) why Lunar prospector did not find this signature everywhere, or why lunar surface experiments did not find much evidence for these gases in the weak lunar atmosphere, being driven off the surface under the heat of noon. I am sure more will be revealed in the next few months though!

A Lunar Spacecraft Sun Glint Project: I did a back of the envelope calculation to work out if it might be possible to see Sun glint off the solar panels of Chandrayan-1 from Earth? Please let me know if you spot something wrong as I am only human:

- Solar panel area = 2.15x1.8m
- If the panels were a perfect mirror and acted like a pin-hole camera at the Moon's distance, then it would intercept 1 / 2.5 million million'th the angular area of the solar disk
- The Sun has an apparent magnitude of -26.8, so the proportion reflected by the solar panels (if acting like perfect mirror) back to Earth would be about 31 magnitudes fainter than this, or magnitude +4.2.
- Now solar panels are not perfect mirrors, so if we assume a pessimistic case of 1% reflectivity, then we would expect to see Sun glint of around magnitude 9.
- Assuming that the spacecraft panels are still locked on the Sun, and that it is not far from the terminator, then, if the alignment is right, then we might see quite a lengthy Sun glint flare (many seconds or minutes) around Full Moon time. As the spacecraft is in a 200km orbit this translates to out to anywhere up to 100 arc sec beyond the limb. If the spacecraft's orbit has rotated E-W though then a safer bet would be to look closer to the poles as it must always pass over these. Incidentally LRO has larger solar panels and could give magnitude 8 sun glint flares and furthermore we can predict where that spacecraft is from the LRO web site. LRO will be closer to the poles though, only 25 seconds of arc at maximum.
- If the Chandrayan-1 is no-longer Sun-locked and spinning slightly, then we could get flashes of light at other times, but these would be best looked for against the blackness of space near the poles, or when the spacecraft is within approximately 800km (or 8 Plato widths) on the Earthshine/night side of the current morning terminator.

Equipment to observe sun glint from either spacecraft would be your own eyes at the telescope or with a low light CCTV camera such as those used for impact flash or occultation work. Please do not expect to go out and detect these sun glint flares/flashes immediately (especially from Chandrayan-1 as we do not have accurate tracking data!), their visibility depends upon precise alignment of the solar panels with respect to the Sun and the observer, and any sun glint must compete against the glare from the Moon. However it is theoretically possible to see and so if you are doing occultation or impact flash studies, or indeed illuminated limb/terminator topographic sketches, then please do keep your eyes peeled for a slow moving faint dot..

Routine reports: Just to show you the incredible usefulness of routine non-LTP observations are, below I have listed some routine reports that match the illumination (to within +/-0.5 deg) of the following two LTPs:

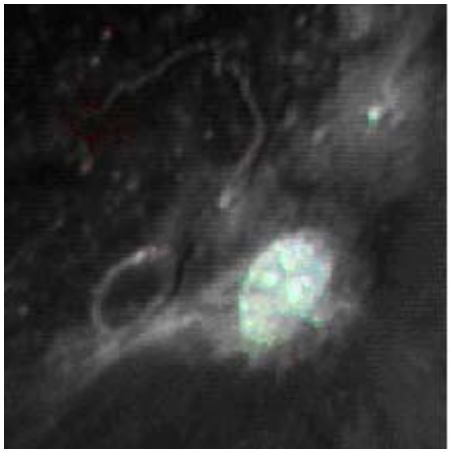
Aristarchus 1965 May 15 UT 01:40-02:15 Observed by Weresuik, McClench, Johnson (Pt. Tobacco, MD, USA, 16" reflector x240, S=F, T=G) and Delano (Massachusetts, USA, 12" reflector). "Crater had color(red?) detected by Trident MB & photos were obtained. There were pulsations. Delano saw E. wall of crater unusually bright (confirm. if at same time)." NASA catalog weight=5. NASA catalog ID #876. ALPO/BAA weight=5.

Aristarchus 1963 Dec 29/30 UT 23:00-03:00 observed by Doherty "Several saw color in crater. All agreed it was purple-blue. Sketch. NASA catalog weight=5 (very high quality)". ALPO/BAA weight=3.

The following archive routine reports match these illuminations:

2007 Mar 05 UT09:30-11:00 Maurice Collins (New Zealand) reported that: Aristarchus is very white, a hint of yellow-brown to the plateau." Can see bands, one on the west, one further round to the north. Can see Herodotus which is dark floored. Vallis Schroteri meandering around to the west from the north. There are some bright craters to the North and NW and it has that bright tail pointing westwards."

2009 Aug 05 UT02:05-02:45 Jay Albert (FL, USA) Aristarchus "I didn't detect any color. The crater was mostly a brilliant white. No pulsations were seen, although the crater is so bright it almost seems to vibrate! At this viewing angle from Earth, there is little of the E interior wall visible. What could be seen wasn't unusually bright. The W wall was extremely bright with the darker vertical bands really standing out. Aristarchus [no ID#, by Doherty]- I didn't see "purple-blue" (or any other) color. Aristarchus observed 02:34 - 02:45."



2003Dec 07 UT 23:42 Brendan Shaw (UK) captured the RGB image (left) of Aristarchus – this has been color equalized and saturation increased slightly to bring out the color more. Note that North is at the top.

So what do these three sets of routine observations tell us? Brendan Shaw's color image does not detect color inside the crater, though there is natural surface color outside, and any way parts of the interior are slightly saturated. The crater looks bright but it is difficult to judge without a comparison to other bright ray craters on the lunar surface. Maurice Collins picks up on the brownish color to the plateau to the north-west and confirms the bands seen in Brendan's image. Jay did not see any color, but color perception is very observer dependent. Both Jay and Maurice confirm that the crater is bright, though none of the routine observation confirm the east wall to be bright. Nevertheless Jay's comments about the libration not being the same – maybe relevant as the 1965 and 1963 LTP reports differed in viewing angle by almost 5 degrees to the routine observations. So in conclusion, out of the effects described in the original LTPs, it is only the colors that we probably cannot explain easily and so there maybe grounds to presume that these could have been real events?

For repeat illumination 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 but you will need to contact me to ask for permission to access these.

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KEY TO IMAGES IN THIS ISSUE

1. **Anaxagoras-Goldschmidt**
2. **Bode**
3. **Clavius**
4. **Lamont**
5. **Langrenus**
6. **Mare Fecunditatis**
7. **Plato**
8. **Proclus-Palus Somni**
9. **Pytheas**
10. **Schiller-Longomontanus**
11. **Theophilus-Cyrillus**

FOCUS ON targets
X = Menelaus (November)
Y = Atlas & Hercules (January)
Z = Snellius & Furnerius (March)