THE LUNAR OBSERVER

RECENT BACK ISSUES: http://www.zone-vx.com/tlo_back.html

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

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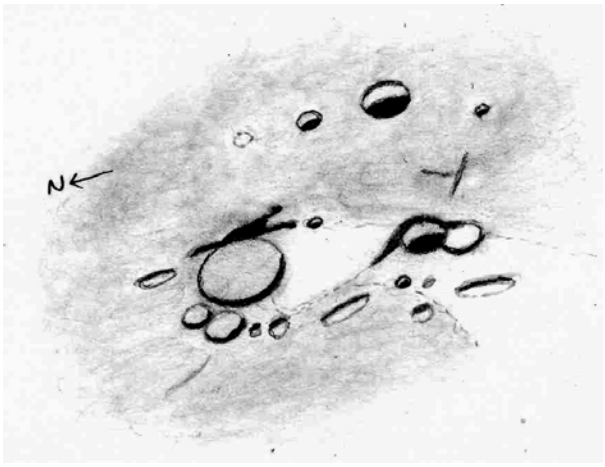
FEATURE OF THE MONTH - MAY 2008



BIOT & VICINITY

Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
December 26, 2007 - 10:35 to 11:05 UT
15cm Newtonian - 170x - Seeing: 6-8/10

I drew this crater and vicinity on the morning of Dec. 26, 2007 after eta Cancri emerged from occultation. This area is at the extreme southern end of Mare Fecunditatis. Biot itself is the easternmost (upper) crater in this sketch. It is a modest crater, but has a bright interior. Biot C is just north of Biot, and a small, shadowless bright spot is just north of C. A tiny pit is southwest of Biot; it is not labeled on the Lunar Quadrant Map. Biot A is west of Biot. This crater looks much like Biot, but its interior is not as bright. A ghost ring appears adjacent to the southwest side of Biot A, and a small pit is toward the northwest. There is substantial shadowing along the east edge of Biot A; this may indicate a relatively steep slope leading from Biot A down to the mare. Biot B is north of A. and is actually the largest crater in this sketch. It is much, shallower than Biot and Biot A, and its interior is the same tint as the mare. There are no breaks in its rim, however. Biot T is the small pit between A and B, There is much shadowing along and near the east rim of Biot B which may be similar to that along A. Two shallow rings are just north of Biot B, and are similar to the larger crater. There are two narrow faint strips of shadow between Biot and Biot A, and an assortment of shadows and elevations west of Biot A and B.

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.

LUNAR CALENDAR - MAY 2008 (UT)

May 01	20:00	Moon 1.0 Degrees NNW of Uranus
May 04	20:00	Moon 5.9 Degrees NNW of Venus
May 05	12:18	New Moon (Start of Lunation 1056)
May 06	03:00	Moon at Perigee (357,771 km - 222,309 miles)
May 06	22:00	Moon 2.5 Degrees N of Mercury
May 10	14:00	Moon 0.35 Degrees ENE of Mars
May 12	03:46	First Quarter
May 12	22:00	Moon 2.5 Degrees SSW of Saturn
May 20	02:11	Full Moon
May 20	15:00	Moon at Apogee (406,402 km - 252,527 miles)
May 24	12:00	Moon 2.4 Degrees SSE of Jupiter
May 27	02:00	Moon 0.60 Degrees NW of Neptune
May 28	02:57	Last Quarter
May 29	06:00	Moon 3.3 Degrees NNW of Uranus

CALL FOR OBSERVATIONS:
FOCUS ON: Aristarchus Plateau

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 **July 2008** edition will be the **Aristarchus Plateau**. 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 these fascinating features to your observing list and send your favorites to:

Dembowski@zone-vx.com or dembowski@alpo-astronomy.org

Deadline for inclusion in the Aristarchus Plateau article is June 20, 2008

FUTURE *FOCUS ON* ARTICLES:

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

Aristoteles to Eudoxus	**TLO Issue: Sept. 2008**	**Deadline: August 20, 2008**
Bullialdus to Kies	**TLO Issue: Nov. 2008**	**Deadline: October 20, 2008**

FOCUS ON: Rupes Recta & Vicinity

By William M. Dembowski, FRAS
Coordinator: Lunar Topographical Studies

INTRODUCTION:

All of the features discussed here lie within a 150 km ghost crater on the eastern shore of Mare Nubium. Although its eastern half is clearly defined, with Thebit at approximately the midpoint, a low sun angle is required to pick up the system of wrinkle ridges just beyond Birt A which mark its western half. Within these confines are a variety of interesting features worthy of hours of eyepiece time. (Figure 1)

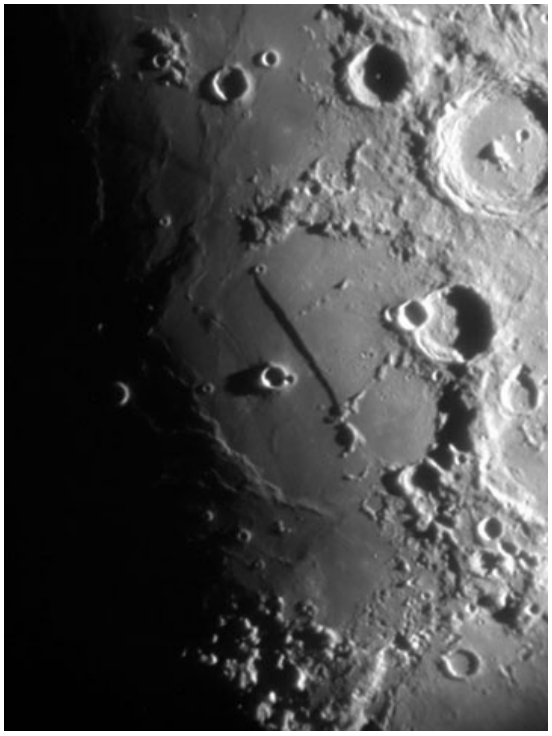


FIGURE 1
Digital image by John Sabia
Keystone College, T. G. Cupilliar Observatory
Fleetville, Pennsylvania, USA
February 29, 2004 – 01:32 UT
9-1/2 inch f/15 Refractor
15mm TeleVue Panooptic EP
Nikon 995 digital camera, afocal

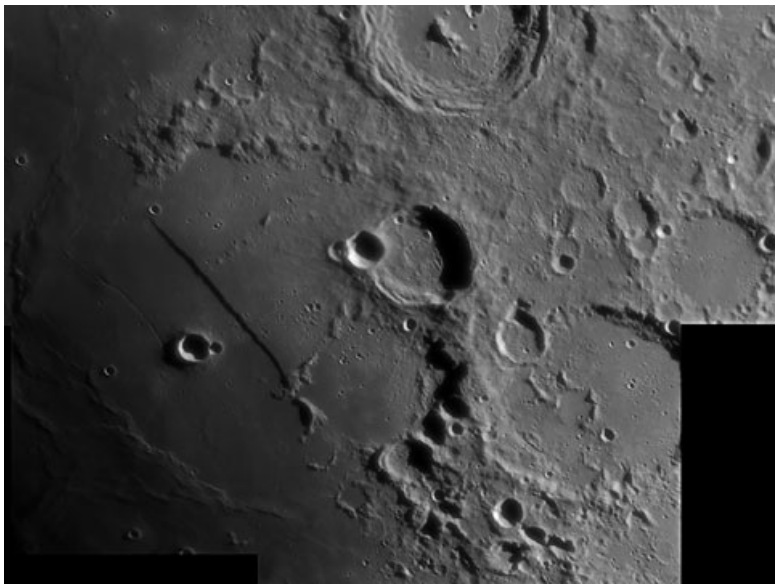
RUPES RECTA:

The ghost crater is bisected roughly from north to south by one of the classic lunar showpieces, Rupes Recta. The literal translation means Straight Fault but it is most often referred to as the Straight Wall, even though it is neither straight nor a wall.

Running for approximately 120 km, it is one of only three known thrust faults on the near side of the Moon. The eastern side of the fault is higher than the western which means that at the time of local sunrise (shortly after First Quarter) it appears as a wide, dark line. This aspect of the Straight Wall is visible even in the smallest telescope and, with all due respects to the facts, it does look like the sheer cliff early observers believed it to be. In reality, the Wall is a more gradual yet generous slope which rises from the mare at an angle no more than 40 degrees from the horizontal.

As the sun rises on Rupes Recta the shadow narrows but brings into view what Christian Huygens first compared to the handle of a sword, the Wall being its blade. This is a series of short ridge segments, also known as the Stag's Horn Mountains, where the Wall terminates in the south. (Figure 2)

FIGURE 2
Digital image by Tony Gondola
Las Cruces, New Mexico, USA
April 25, 2007 – 03:10-03:23 UT
10 inch f/7.2 Newtonian
3x Barlow (EFL 5486mm)
DMK-21AF04 Camera, 50 fps
4 Frame mosaic, 150 frame stacks



As the sun continues its journey across the lunar sky it eventually illuminates Rupes Recta from the western side. This occurs shortly after Third Quarter and causes the Rupes Recta to appear as a thin bright line since the sun now strikes the "face" of the Wall. Because of the narrowness of the illuminated face, this can be a somewhat more difficult feature for small telescopes.

A quick look through lunar literature will show quite a disparity in the quoted height of Rupes Recta with a maximum listed as anywhere from 250 to 450 meters. As a result, it is a favorite subject for those engaging in vertical studies of the lunar surface.

BIRT & RIMA BIRT:

To the west of Rupes Recta is the crater Birt (17 km) and, just outside its southeastern rim, Birt-A (7 km). Birt is an interesting crater because of the dusky bands on its floor and rim (Figure 3), and is one of the primary targets of the Banded Crater Program.

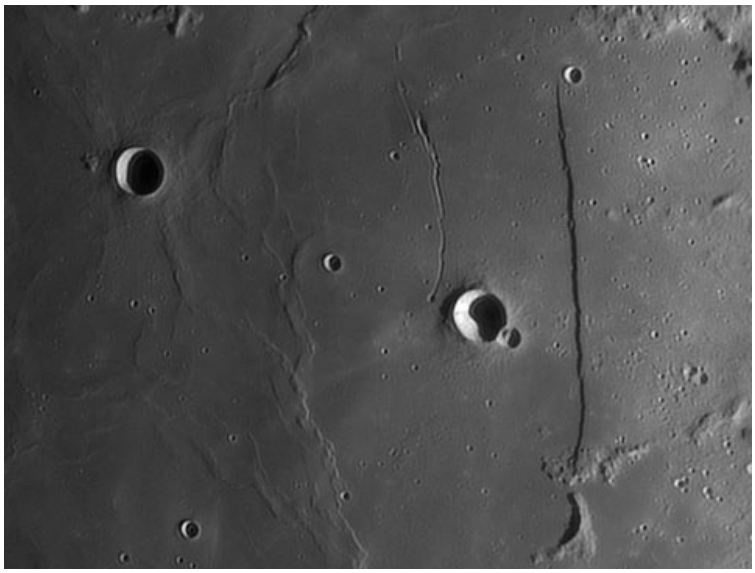


FIGURE 3
Digital image by Oliver Pettenpaul
Paderborn, Germany
February 15, 2008 – 19:54 UT
Seeng: 6-7/10 – Trans: 7/10
Celestron 9.25 XLT
2.5x Powermate
ImagingSource DMK21AF04.AS
30fps - 1/30s - 684 Frames used

Just to the west of Birt is a 50 km long rille, Rima Birt which runs parallel to Rupes Recta. Rima Birt is marked at each end by small craters, Birt-E to the north and Birt-F to the south. Both are in the 3-4 km range and can be a challenge visually and photographically. (Figure 4)

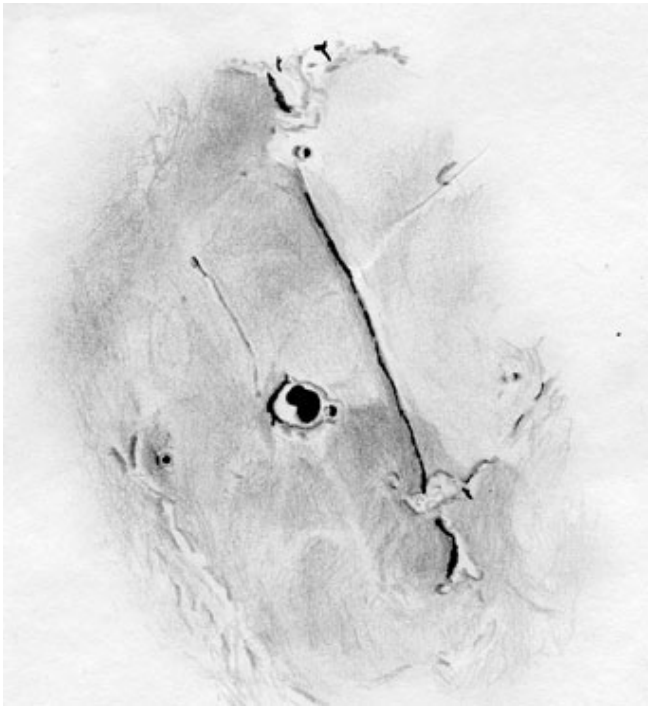


FIGURE 4
Drawing by Robert Wlodarczyk
Czestochowa, Poland
November 18, 2007 – 19:30 UT
18cm f/6.6 Newtonian
144x – 290x
Seeing: 5/10 – Trans: 4/6

FIGURE 5
Digital image by K. C. Pau
Hong Kong, China
October 19, 2007 – 11:32 UT – Colong: 9
Seeing: 4/10 – Trans: 4/10
250mm f/6 Newtonian – 2.5 Barlow
DMK31AF03.AS Camera
71 Frames stacked

THEBIT:

Just inside the eastern rim of the ghost crater is a classic overlapping crater formation consisting of Thebit (57 km in diameter, 3200 meters deep), Thebit-A (20 km in diameter, 3000 meters deep, and Thebit-L (10 km in diameter, 900 meters deep). Thebit has a floor scored by short, deep trenches and with a small isolated mountain in the northeast corner. Close examination reveals a small crater (Thebit-C) on the northern wall, terracing along the eastern wall, and a sizeable landslip of the southwestern wall. (Figure 5) The floors of Thebit-A and Thebit-L are relatively featureless but Thebit-L has a small central peak. (Figure 6)

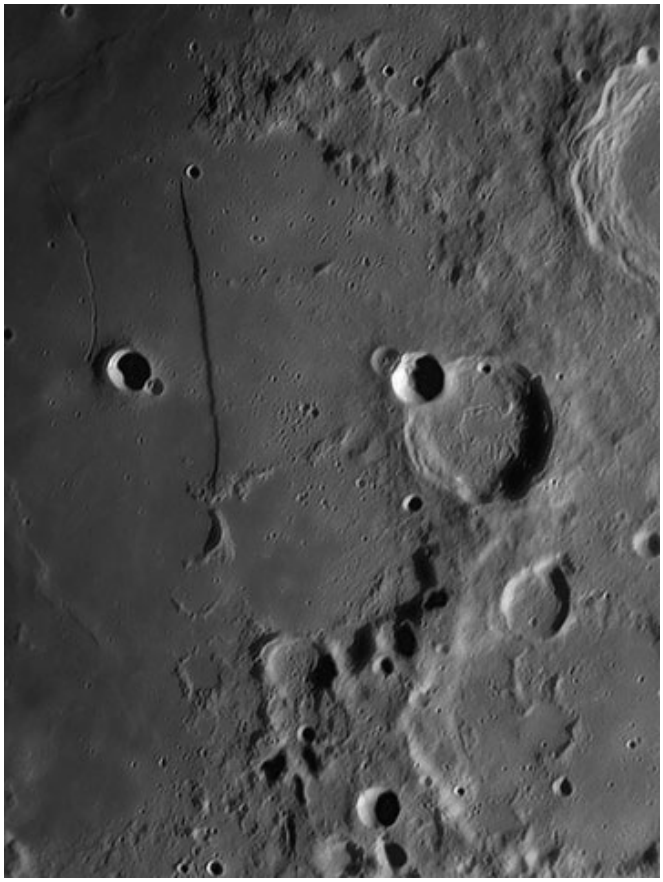


FIGURE 6
Digital image by Bob Pilz – Asheville, North Carolina, USA
December 29, 2006 – 00:56 UT
200mm f/6 Newtonian – 3x Barlow – IR Block Filter
DMK21BF04 B/W Camera

REFERENCES:

Cherrington Jr., Ernest H, "Exploring the Moon", Dover Publications (1969)
Dembowski, William M, "Rupes Recta", Selenology, (Vol.22 No.1 – Spring 2003)
Rukl, Antonin, "Atlas of the Moon", Hamlyn (1990)
Wlasuk, Peter T, "Observing the Moon", Springer-Verlag (2000)
Wood, Charles A, "The Modern Moon", Sky Publishing (2003)

THE STRAIGHT WALL & BIRT

By Phil Morgan – Worcestershire, England

Originally published in the BAA Lunar Section Circular (September 2007)

Drawing by Philip Morgan - Worcestershire, England
July 8, 2007 – 03:00 to 03:45 UT - Colong: 186.80 to 187.17
305mm f/5 Newtonian – 400x - Seeing 7/10 – Trans: 4/5

Lying between the craters Thebit and Birt, the Straight Wall is a spectacular sight, particularly when viewed under late afternoon lighting. Considering the comparatively low altitude of the Moon in the early hours of the 8th July, I was surprised to be able to secure the fairly detailed observation reproduced here.

First seen by Huygens in the 1670s, and some 120km in length, the Straight Wall is not of course, straight, curving westwards at its north and south ends. The vertical displacement of the Wall also appears to vary, with the middle section having the greatest altitude, roughly 400m, though this figure seems to rise or fall depending upon which authority one consults!

At its southern end the Wall terminates at the Stag's-Horn Mountains. These are the eastern remnants of two old and inundated rings, clearly seen at this late colongitude as darker areas, with a few low hills marking the sight of the submerged western walls. At the northern end the Wall curves around and terminates at the small crater Thebit D. Midway between this crater and the well known Birt dome, I see

a lesser dome, recorded several times previously. Curving southwards from the Birt dome is the famous Birt rille, first detected by Schroter, with several crater-like enlargements along its course. This rille has raised banks, since they can be seen to cast appreciable shadows under low angles of illumination. Another smaller dome, cleaved by a short rille, lies just north of the Birt dome. A larger dome with a summit pit, is situated due south (about 40km) of the small crater, Birt B. This feature is connected to the outer lower glacis of Birt by a spine or ridge

According to The Moon of Wilkins and Moore, R Barker discovered a cleft running along the foot of the Wall, and certainly something casts a line of darker shadow at the Walls base under evening illumination, clearly seen on this occasion, particularly along the central section. This feature is difficult to observe visually, and the photographs that I have studied fail to offer any great enlightenment as to its true nature. It may be scree at the foot of the slope that is casting a shadow eastwards, but it does appear to be a normal looking rille, at least in places. Could it be that the Straight Wall was once a rille, and this is all that remains of its western wall? After all the Cauchy fault turns into a rille along its length.

The upper edge of the Wall appears to be concave (curving upward) along the southern 2/3rds of its length, at least in places, while the northern 1/3 is more convex and lower. This anomaly may explain why at this late colongitude the upper reaches of the northern Walls surface remains illuminated much longer than the southern section (see drawing). Crossing this still illuminated portion of the upper surface is a shallow wide rille (not visible at this late colongitude) running at right angles to the fault face. A small notch or break in the Wall's scarp marks this rilles point of entry, about 35km south of Thebit D. There are at least four other similar notches or breaks dotted along the scarp face, but none of these is associated with rilles.

Starting at the Birt dome, running southwards, almost parallel, and equal in length to the Straight Wall, is a long linear trough or depression. This may also be a fault, or it could be a zone of compression caused by some heavier magma pulling the crust downwards. This feature appears on Neison's 1876 chart of the region, though he draws it as a thin dark line, as if he saw it as a cleft. Clearly this is not the case, and it is interesting to note that most of the Birt rays stop short upon reaching this feature when viewed under late afternoon lighting.

Birt itself is an interesting little crater about 17km across, and named after the English selenographer of that name. Linked to its eastern rim is the 6km craterlet Birt A. This small craters rim nestles below Birt's, since it can be seen from my observation there is no trace of it at late sunset, being hidden by the larger craters shadow. A case of a bigger crater overlying a smaller one perhaps? It is also interesting to note that the shadow from Birt bifurcates just before reaching the foot of the Wall, and running up over it as two separate spires of shadow. This of course is due to the sunlight streaming through the gap in the Birt eastern rim where A abuts.

The interior of Birt drops some 3,400m below the rims crest, and in 1941, E.J.Reese discovered some dusky bands on the inner west wall. Two or three possibly fainter bands can be found on the inner east wall. These are not really too difficult to see, and none are really radial to the craters centre, as is usually the case with banded craters.

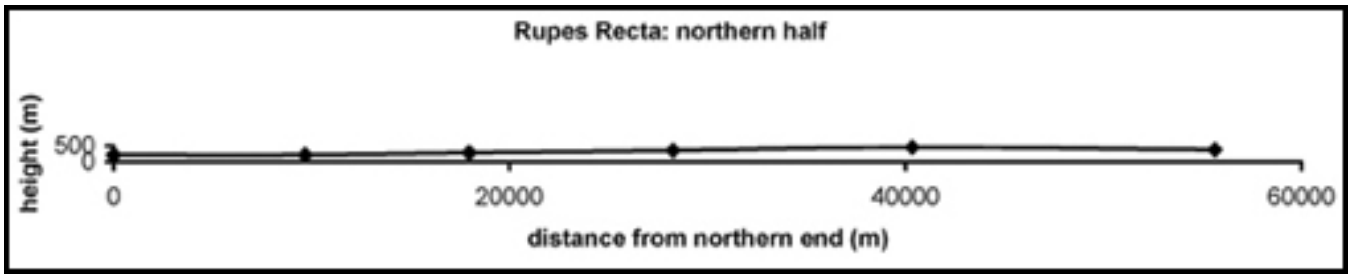
PROFILE OF RUPES RECTA

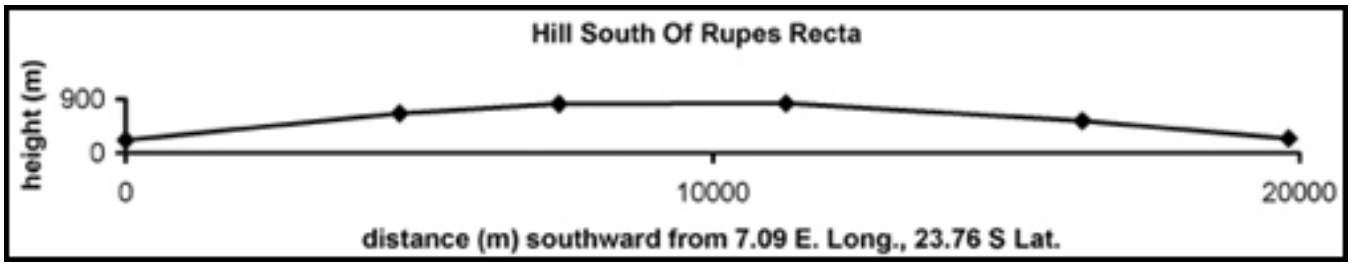
By Steve Boint – Sioux Falls, South Dakota

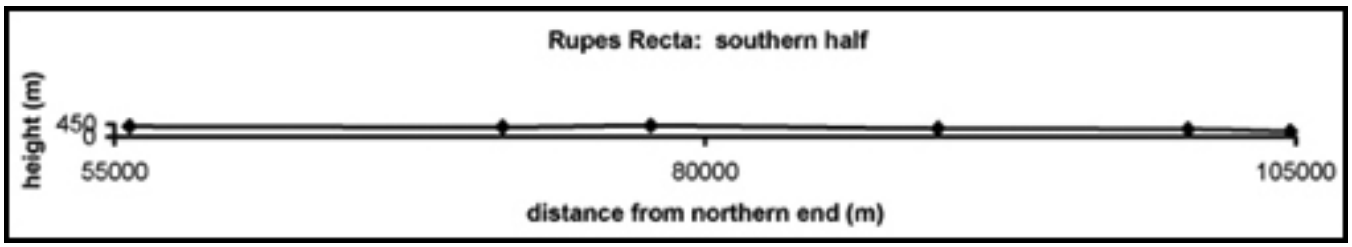
For reasons of scale, the profile of Rupes Recta has been divided into three parts. The photo from which the profile was generated was taken on 6-25-04 at 9:55pm CDST from 96 degrees 43.88 minutes west longitude, 43 degrees 31.76 minutes north latitude using a Newtonian with 10 inch primary, f/4.5, 2x Barlow, and SBIG 237a CCD camera. Adobe Photoshop and Maxim DL were used for image processing. Measurements were made with LTVT.

The results are presented as a profile because: 1) The feature has been measured before and the resolution of this image does not improve upon the previous precision of measurement, so the profile (which has not been previously published) is probably of more interest than are the individual measurements. 2) The image needed to be over-processed and therefore provides questionable values for specific heights but the error should be systematic and therefore the relationship of the measurements to each other should be valid. In other words, a profile can be adjusted up or down by a specific factor but still look pretty much the same. 3) There is slop room in the horizontal measurement. Again, the profile can be "stretched" and still hold its relative shape and value.

In one area, the results of this study differ significantly from the results of previous studies of Rupes Recta. Moving from north to south, the height rises in the middle of the length and then decreases. Previous studies by A. Vandenbohede ("Taking The Measures Of Rupes Recta," The Lunar Oberver, Jan. 2005) and myself ("Measuring Rupes Recta," Selenology: Journal Of The American Lunar Society, 2003) found the height reaching its maximum on the southern end. The GLR group has intentions of investigating this feature. Perhaps they will nail down the vertical displacement with greater accuracy.







A Shallow Lunar Declivity - Rima Lassell 1

By Antonius J Schalken
'Luar' Observatory, Melbourne, Victoria, Australia

Probably the most noteworthy feature on the eastern 'coast' of Mare Nubium is, arguably, Rupes Recta (or the Straight Wall). This article discusses another, albeit far less prominent, declivity to the north of the more famous Straight Wall – identified in USGS 'Geologic Map of the Purbach Quadrangle (Holt, 1974) as Rima Lassell 1 (Fig.1).

Fig.1 Rima Lassell 1(marked), Rupes Recta and the crater Birt.

Name and location of observer: Antonius J Schalken – 'Luar' Observatory, Melbourne, Victoria, Australia (37^{o} 54.6' S and 145^{o} 4.7' E)
Name of feature: **Region around Rupes Recta**
Date and time (UT) of observation **30/10/2006 10:13 UT**
Selenographic. Colongitude: 12.7^{o} (lunation 8.21 days after new Moon)
Size and type of telescope used: Maksutov 15cm f/10
Orientation of image: North marked
Seeing: 1 to 10 (1-Worst 10-Best) 7
Transparency: 1 to 6 (1-Worst 6-Best): 3
Medium employed: digital image obtained with Philips TouCam Pro II 740K
91 images stacked and processed
Image processing: Registax V3.0.19 and Adobe Photoshop 6

Extending in a northwesterly direction from Taenarium Promontory (Fig.1), this linear declivity appears to be approximately 80% of the length of Rupes Recta (say 80 to 90km) and to slope from the higher eastern terrain to the shallower western floor of Mare Nubium. The shadow of the depression, when the Sun is rising above the mare, is not prominent. Table 1, below, contains a list of other successful observations made of this feature.

Date and Time (UT)	Selenographic Colongitude	Lunation (Days)
08/01/2006 11:37	15.5°	8.35
05/06/2006 11:31	19.1°	9.25
04/07/2006 11:50	13.9°	8.82
30/10/2006 10:13	12.7°	8.21
28/12/2006 10:38	10.9°	7.86

Table 1 - Session dates and times of successful observations of Rima Lassell 1.

To successfully observe this feature the incident sunlight must come from the East; I have not been able to observe it when the Sun is from the West

Perusal of the available literature and photo libraries – Consolidated Lunar Atlas (CLA), Digital Lunar Orbiter Photographic Atlas of the Moon (i.e. LO iv_113_h2), Clementine Probe, Atlas de la Lune (Rűkl, 1993) and USGS cartographic services - only the USGS I-822 'Geologic Map of the Purbach Quadrangle', Lunar Aeronautical Chart (LAC) 95

http://www.lpi.usra.edu/resources/mapcatalog/LAC/lac95/

and CLA (low-oblique photos (section F, figure F14.jpg) show the presence of this sloping feature. In the USGS and LAC maps there is a feature - Rima Lassell 1 (cantered at 9.7° W and 17.5° S) - and it is represented as a very narrow rille. Note, however, that the IAU list of Rima and Rimae

http://www.lpod.org/cwm/DataStuff/UAI-Rilles.htm

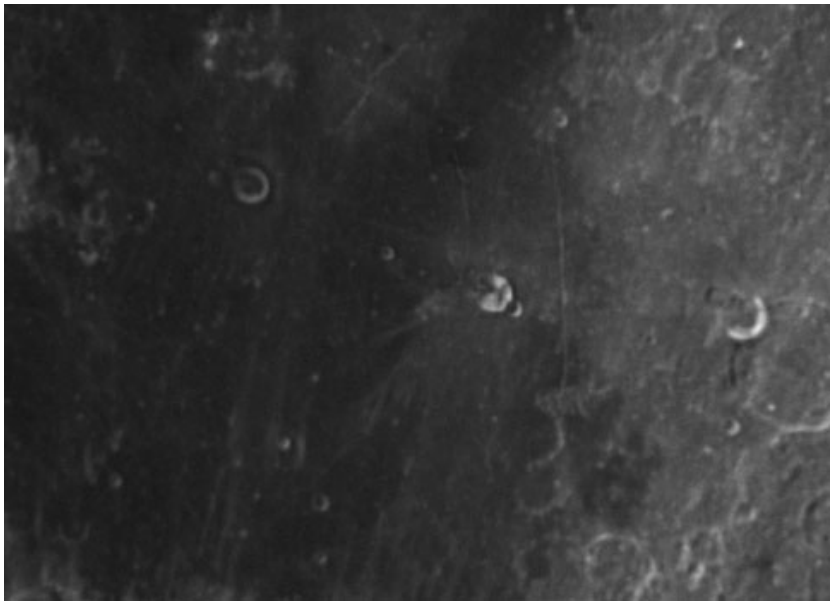
does not mention this feature. The image of Rima Lassell 1 in CLA - low-oblique photos (section F, figure F14.jpg) is similar to Fig.1 (above); none of the published photos appear to provide categorical evidence to the nature of this linear declivity and there appears to be no clear channel of Birt or Ariadaeus. The extended and very subtle shadows and highlights to either side of this feature argues for a very shallow sloping depression with no obvious channel or escarpment.

To conclude, this feature, though rarely reported upon, is interesting for its linearity and quite considerable size.

References:

Holt, H.E. (1974) Geologic Map of the Purbach Quadrangle, USGS
A Rükl (1993) Atlas de la Lune Librarie Grund, Paris

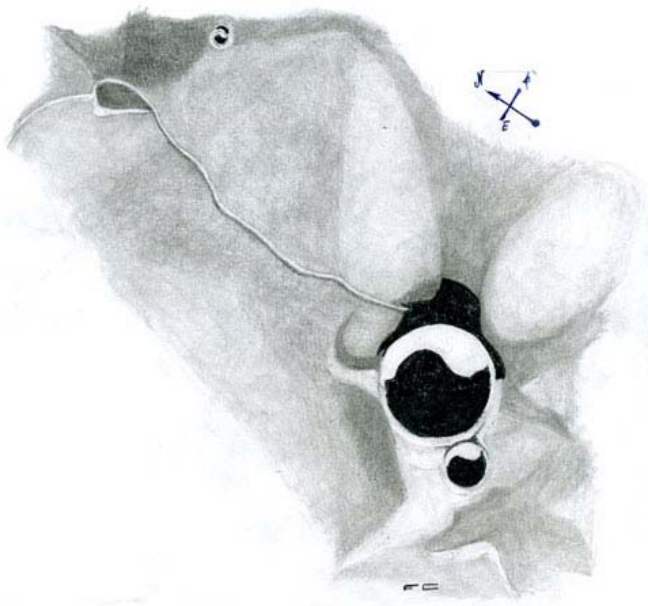
ADDITIONAL OBSERVATIONS OF RUPES RECTA & VICINITY



Digital image by Wayne Bailey – Sewell, New Jersey, USA
September 29, 2007 – 07:23 UT – Colong: 122.8 - Seeing: 3/10 – Trans: 4/6
Celestron C-11 SCT - Lumenera Skynyx 2-1M – Schuler IR72 Filter

Digital image by Rafael Benavides Palencia - Cordoba, Spain
November 18, 2007 – 20:45 UT
Seeing: 5/10 – Trans: 5/6
Celestron 11 inch SCT – 2x Barlow – Luna-QHY 5 Mono Cam.

ADDITIONAL OBSERVATIONS OF RUPES RECTA & VICINITY



Drawing by Fred Corno – Settimo Torinese, Italy
November 11, 2007 – 17:40 to 18:00 UT
Takahashi FS128 Refractor – 169x – Seeing A-IV

ADDITIONAL OBSERVATIONS OF RUPES RECTA & VICINITY

Digital image by Andy Miller – Conneaut, Ohio, USA
102mm Refractor – 17mm Plossl eyepiece
HP-635 Digital Camera, Afocal

Digital image by Larry Todd – Dunedin, New Zealand
April 6, 2006 – Orion Optics (UK) OMC200 f/20 – SAC7 Digital Camera

ADDITIONAL OBSERVATIONS OF RUPES RECTA & VICINITY

Digital image by Matt Wastell – Brisbane, Australia
April 11, 2008 – Meade LX90 – 2x Barlow – Meade LPI Camera

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)

LUNAR TOPOGRAPHICAL STUDIES

Coordinator - William M. Dembowski, FRAS
dembowski@zone-vx.com

OBSERVATIONS RECEIVED

WAYNE BAILEY - SEWELL, NEW JERSEY, USA
Digital images of Rupes Recta (3), Longomontanus
Banded crater report forms with digital images of Birt (3), Kies-A, Darney

STEVE BOINT – SIOUX FALLS, SOUTH DAKOTA, USA
Height profiles of Rupes Recta (3)

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND
Digital image of full moon

FRED CORNO - SETTIMO TORINESE, ITALY
Drawing of Rupes Recta

ED CRANDALL - WINSTON-SALEM, NORTH CAROLINA, USA
Digital images of Gassendi (2), Sinus Iridum, Kepler Rays

HOWARD ESKILDSEN - OCALA, FLORIDA, USA
Banded crater report forms with digital images of Messier (2), Proclus (3), Aristarchus, Burg, Damoiseau-E

ALEXANDROS FILOTHODOROS – SAMOS, GREECE
False color image of Northeastern Quadrant

TONY GONDOLA – LAS CRUCES, NEW MEXICO, USA
Digital image of Rupes Recta

ROBERT H. HAYS, JR. - WORTH, ILLINOIS, USA
Drawings of Rost & Weigel, Jansen. Photographs of February total lunar eclipse (6)

PAULO LAZZAROTTI - MASSA, ITALY
Digital images of Aristoteles & Eudoxus, Hercules & Endymion, Proclus

PHILIP MORGAN – WORCESTERSHIRE, ENGLAND
Drawings of Rupes Recta (2)

RAFAEL BENAVIDES PALENCIA - POSADAS, CORDOBA, SPAIN
Digital images of Rupes Recta, Reiner Gamma, Mons Rumker, Aristarchus Plateau

OLIVER PETTENPAUL – PADERBORN, GERMANY
Digital image of Rupes Recta

BOB PILZ – ASHEVILLE, NORTH CAROLINA, USA
Digital image of Rupes Recta

JOHN SABIA – FLEETVILLE, PENNSYLVANIA, USA
Digital image of Rupes Recta, Elgers Rille

MATT WASTELL – BRISBANE, AUSTRALIA
Digital image of Rupes Recta

ROBERT WLODARCZYK – CZESTOCHOWA, POLAND
Drawing of Rupes Recta

RECENT TOPOGRAPHICAL OBSERVATION

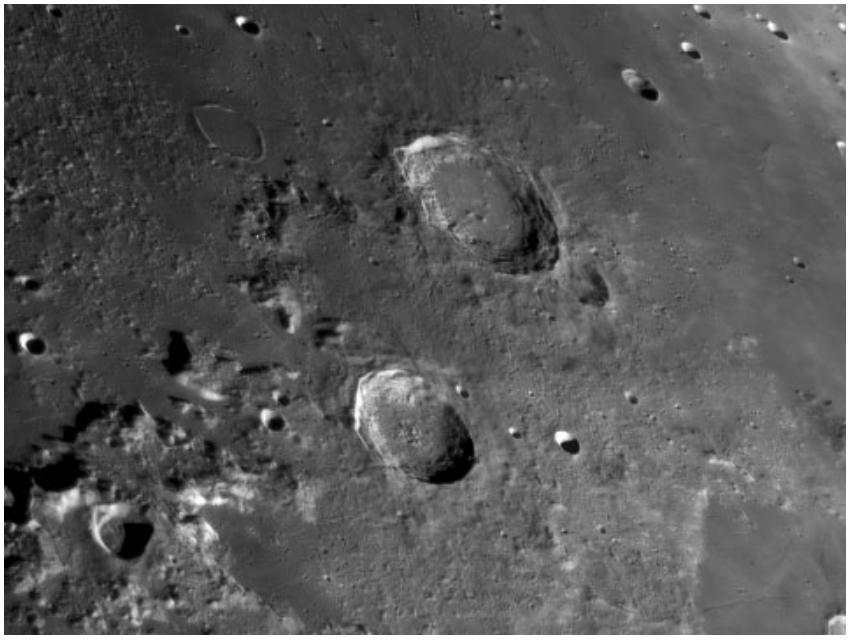
LONGOMONTANUS
Digital image by Wayne Bailey – Sewell, New Jersey, USA
February 21, 2008 – 03:16 UT – Colong: 36.5
Seeing: 4/10 – Trans: 4/6 – Schuler IR72 Filter
Celestron C11 SCT f/20 – Lumenera Skynyx 2-1M Camera

RECENT TOPOGRAPHICAL OBSERVATIONS

FULL LUNAR DISC
Digital image by Maurice Collins – Palmerston North, New Zealand
March 20, 2008 – Meade ETX90 – Meade LPI Camera

GASSENDI
Digital image by Ed Crandall – Winston-Salem, North Carolina, USA
April 17, 2008 – 01:30 UT – Colong: 46.2
Seeing: 4-5/10 – Trans: 4/6
110mm f/6.5 APO Refractor – 3x Barlow – Philips Toucam

RECENT TOPOGRAPHICAL OBSERVATION



ARISTOTELES & EUDOXUS
Digital image by Paolo Lazzarotti – Massa, Italy
February 14, 2008 – 19:52 UT – Seeing: 4-6/10 – Trans: 3/5
Gladius CF-315 Lazzarotti Opt. Scope – Edmund Optics R Filter
LVI 1392 Experimental Camera

BRIGHT LUNAR RAYS PROJECT

Coordinator - Willliam M. Dembowski, FRAS
Bright Lunar Rays Project Website:
http://www.zone-vx.com/alpo-rays.html

KEPLER RAY SYSTEM
Digital image by Ed Crandall
Winston-Salem, N. Carolina, USA
April 17, 2008 – 02:06 UT
Colong: 46.5
Seeing: 4/10 – Trans: 4/6
110mm f/6.5 APO Refractor
3x Barlow – Philips Toucam

BANDED CRATERS PROGRAM

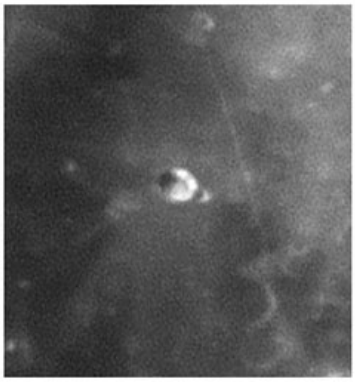
Coordinator - Willliam M. Dembowski, FRAS

Banded Craters Program Website: http://www.zone-vx.com/alpo-bcp.html

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

Crater Observed: Birt
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, 2X Barlow Filters: None
Seeing: 7/10 Transparency: 4/6
Date (UT): 2008/03/26 Time (UT): 10:11
Colongitude: 142.4°
Position of crater: Selen. Long. Selen. Lat.
8.5° West 22.4° South
Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

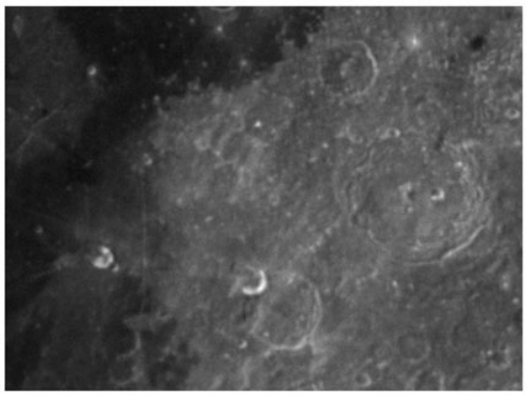
Image (north up): Comments:



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

Crater Observed: Birt
Observer: Wayne Bailey Observing Station: Sewell, NJ
Mailing Address: 17 Autumn Lane, Sewell, NJ 08080
Telescope: Celestron SCT 28 cm f/10
Imaging: Skynyx 2-1M Filters: Schuler IR72
Seeing: 4/10 Transparency: 4/6
Date (UT): 2007/08/01 Time (UT): 04 : 50
Colongitude: 121.1 Latitude: +0.8
Position of crater: Selen. Long. Selen. Lat.
08.5° West 22.4° South
Lunar Atlas Used as Reference: Rukl, Atlas of the Moon, Revised Updated Ed.

Image (North up): (East right):



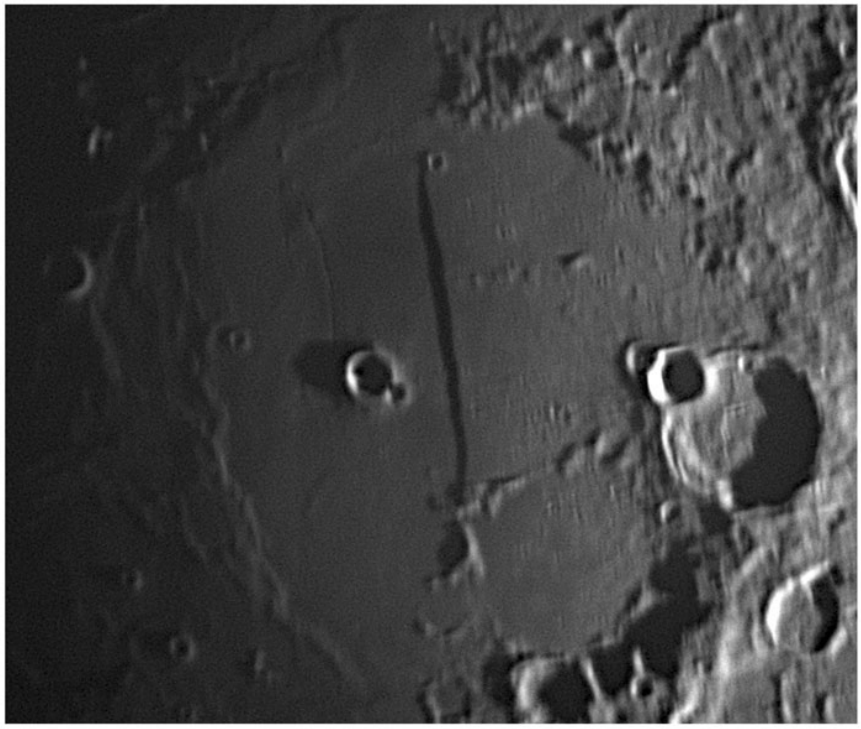
Comments:

Distinct, dark, chordwise band from east-north-east rim to south-south-west rim. Parallel to this is a dark area covering the southwest to north wall, with two darker bands superimposed. These two converge from the west and northwest, crossing the light central band north of the center to meet the eastern dark band.

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

Crater Observed: Birt
Observer: Wayne Bailey Observing Station: Sewell, NJ
Mailing Address: 17 Autumn Lane, Sewell, NJ 08080
Telescope: Celestron SCT 28 cm f/20
Imaging: Skynyx 2-1M Filters: Schuler IR72
Seeing: 4/10 Transparency: 4/6
Date (UT): 2008/02/15 Time (UT): 03:42
Colongitude: 12.5 Latitude: -0.1
Position of crater: Selen. Long. Selen. Lat.
08.5° West 22.4° South
Lunar Atlas Used as Reference: Rukl, Atlas of the Moon, Revised Updated Ed.

Image (North up): (East right):



Comments:

Dark band on outer wall joining Birt A. Faint, narrow light band extends from it to bright area on southwest wall with a dark bordering band on its north side on the inner west wall (oriented towards Birt B).

LUNAR TRANSIENT PHENOMENA

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

LTP NEWSLETTER - MAY 2008

Dr. Anthony Cook - Coordinator

Observations for March 2008 were received from the following observers: Jay Albert (FL, USA), Herbie Bradley (Great Malvern, UK), Maurice Collins (New Zealand), myself (Newtown, UK), and Marie Cook (Mundesley, UK).

On a very sad note I have received news that Peter Foley, the British Astronomical Association (BAA) Lunar Section LTP coordinator (1979-1991) and BAA Lunar Section director (1988-1991) passed away in March this year. As yet I have no further details, but would like to send our condolences to Peter's wife, Eileen. Peter was quite influential on the LTP front in the BAA in the late 1970's - early 1990's when interest in both LTPs and observer numbers were at an all time high. Many of the best British observers cut their teeth learning observing techniques applied to the BAA LTP program before branching into other areas. I certainly remember the debriefing sessions with him by phone following a LTP alert – he would often phone back observers who he had alerted so that he could get a report ready in time for the next section circular. As a legacy, many of his observational reports are quoted and referenced in the 1978 Cameron catalog (and the more recent revised Lunar Transient Phenomena Catalog Extension), and so will be of great use to future LTP researchers.

On the subject of catalogs, I have been busy reorganizing the directory structure of my digitized LTP archive. This presently fits on a Dual Layer DVD and will eventually probably need the storage capacity of a Blue-Ray disk. Directories are organized in a descending tree structure by year, feature, month, day, and UT (or UT range). A listing of directories can then go straight into a database and be accessed by specialist software that I use. Alternatively the listing of the directories could be loaded up into an Excel file. It will be a while before the directory contents are fully re-organized, but hopefully after this I can begin a long over due full analysis on LTP and also start making use of "ALL" repeat illumination observations provided by you over the last few years. This will help to whittle down the large catalog of LTP down to a more manageable size by being able to remove wrongly identified LTP reports that match with repeat illumination observations. The directory structure and file names used permit, for the first time, details about the affiliation of the observers who made the LTP reports and observations e.g. ALPO, BAA, Society for Popular Astronomy etc – this information is needed by future researchers so that they can contact to respective organizations for permission to use observational reports.

Now as promised, here is summary of what I learnt at the Lunar and Planetary Science Conference in Houston in March – my apologies for this being late, but the conference spanned the BAA Lunar Section Circular deadline and a copy of this forms the ALPO newsletter. There was not so much discussion on the direct subject of LTP as last year, but I will detail information about other relevant science, theories and space missions. First of all results from the Japanese Kaguya (SELENE) were very prominent with the whole of a parallel session Monday afternoon being devoted to this spacecraft, The spacecraft is in a nominal 100km circular orbit and will collect some 10 Terra bytes of information for each year that it operates. Some startling High Definition video from the spacecraft was being shown in

the conference foyer – the surface appeared to have a light brown cast to me and the camera is still working despite earlier fears of long term radiation damage. The laser altimeter (LART) will achieve 5m height accuracy with measurements every 1.6 km. The onboard stereo camera is presently capturing stereo imagery with 10m spatial resolution, far surpassing Clementine's UVVIS camera resolution – an example was shown of boulders on the central peak slope of Pythagoras crater where the slope was 30 deg and the peak was 3km above the floor. A spectral profiler will measure detailed spectral response of the surface from 0.5 to 2.6 microns with a spatial resolution on the ground of 500m – again surpassing what can be done from the Earth. At present there are some calibration issues with this instrument and its spectral reflectance errors are about 6%. Another instrument, a multi-band imager will map the surface in 9 wavebands at an even higher surface resolution of 20m (415nm, 750nm, 900nm, 950nm and 1000nm) and 62m (1000nm, 1050nm, 1250nm, and 1550nm). The spacecraft also carries a charged particle detector which should be cable of detecting alpha particles and so can presumably pickup Radon gas emissions, like was done with Apollo and Lunar Prospector. This device is many times more sensitive though than the previous instruments, but still has a spatial resolution of ~100km due to the random walk of the alpha particles. Finally getting back to one of the cameras, the Kaguya team were very proud to announce that there was no significant stray light component detected so far in their camera. So it is actually possible to see inside crater shadows that are illuminated by Earthshine. I might be wrong, but I thought that they showed a view of the inside of Shackleton crater at the lunar south pole, but it was only on the screen for a second or two, and it is possible that I misunderstood (perhaps it was another crater that they showed as an analog as to what they could do?). The Japanese lecturers did a gallant job at speaking, but sometimes it was difficult to hear in the large auditorium specific details clearly. Anyway the image appeared to show some debris? or impact melt? near the centre of the floor.

A completely different topic, in another session, the re-analysis of the Apollo seismic data was discussed. Of the 12,558 seismic events originally reported, some ~1700 were classified as meteoroid impacts, 28 were shallow quakes and 1380 deep quakes. The new study however finds that there were actually ~8000 deep quakes and that these appear to come from at least 160 deep seated source areas, originating at ~900km depth and lying mostly beneath the mare filled impact basins. Deep seated quakes are caused typically by tidal stresses. The shallow quakes are more spatially located towards the edges of basins, although some can be found in highland areas too. It was hoped that future surface missions would extend coverage to the far side. Interestingly the largest lunar quake ever detected was of magnitude 5, and this was of a shallow type, however the vast majority of quakes are very weak in comparison. It has often been commented that LTP are related to Moon quakes, so knowing the locations of deep and narrow quakes will give us better data to correlate with LTP locations. I suppose a magnitude 5 quake might kick up some dust and make a temporary obscuration?

Prof Paul Spudis talked about what volatiles one could expect to find in doubly shadowed craters at the lunar south pole. A doubly shadowed crater is a craterlet on the floor of an already permanently shadowed crater that is deep enough such that the interior cannot see the illuminated rim of the main crater. In doubly shadowed craters, the temperature can be as low as 50 K. Here we would expect to detect frozen volatiles such as: species from passage through the Earth's magneto-tail, comet and asteroid impact debris, lunar volcanic out-gassing remnants, and potentially even the frozen contents of passages through giant molecular clouds that the solar system sweeps through on the order of once per 100 million years. So one would expect to see a wide range of frozen volatiles here, not just hydrogen, but also water, helium, nitrogen, sulfur, and maybe even carbon monoxide, methane and ammonia molecules. Given that the south pole offers such an incredible time capsule of the volatile history of the solar system, the argument is very compelling to send missions (manned or unmanned) there to investigate this environment. Interestingly at the North Pole, the hydrogen signature found did not seem to correlate with flat floored craters but instead with non-flat mountains – so there was some speculation that it maybe locked up in Clathrate Hydrates which can protect hydrogen at higher temperatures.

Of particular interest to our LTP studies was a poster by Prof. Arlin Crotts of Columbia University, USA. He has been running some robotic telescopes over in Cerro Tololo which monitor the brightness of features on the whole lunar disk (apart from the terminator) several times a minute, looking for brightness fluctuations on the surface down to the 1% level. White light events make up the bulk of most LTP reports. As mentioned in earlier articles, Prof Crotts has written several papers describing how outbursts of Radon gas can kick up some dust and this in turn may create transient brightness changes as seen from Earth. As yet some 400 hours of imagery have been collected by his team, but time and resources have so far prevented analysis. His robotic telescopes will be putting in 300 hours of observing each month from now on. Prof Crotts has a second lunar monitoring station in Grove Creek, Australia and plans for a third in Utah and another in western Russia to obtain nearly continuous coverage. In addition he has obtained, using IRFT and MDM 2.4m and Kitt Peak 2.1m telescopes, optical and IR waveband imagery of the Moon. At the end of the Kaguya mission he plans to image the Moon again and to look for permanent spectral differences that would occur from out-gassing, but which might not be detectable by the human eye. Prof Crotts asked if I could generate some repeat illumination/libration predictions for past LTP for his robotic observing stations and this I will gladly do.

Lastly some news from Newtown in the UK, I put in another couple of hours of Radon and Argon emission line detection during March. The weather was none too good in mid Wales. Unfortunately nothing was detected, so my accumulative total for monitoring the Moon at these wavelengths is now 7 hours. I have recently purchased some more filters, and through the help of technicians at the Institute of Mathematical and Physical Sciences at the University of Aberystwyth have enhanced the Moon Blink device. So in addition to the existing 840nm Argon and 860nm Radon filters, I will now be able to utilize two Polaroid filters (centered on 656nm Hydrogen alpha) to look for Hydrogen emissions and/or polarized light LTP. It is also planned to motorize the Moon blink device to make it more systematic during observing runs. Whether or not the modifications to the device will be ready for the April lunation remains to be seen. Also some snags have been found over the last couple of months. One of these was that the low light sensitive Watec CCTV camera was having problems coping with going bright in one filter, to dark (the gap between filters), to bright again and would sometimes loose picture synch on bright areas of the Moon. We may now add a few holes between the filter gaps to reduce the drop in brightness – these can always be covered over again if light leakage becomes a problem. Another issue was the viewing time in each filter – I was settling on about 0.5-1 sec before switching between filters – it would have been nice to have had a more rapid alternation between filters, but because the filters are circular, this is not possible. With the new visible light filters (Polaroid/Hydrogen Alpha at 656 nm) there may be issues with focusing as the existing near IR filters are 200nm further up in wavelength and this is not helped by the fact that extra glass is involved with the Polaroid filters. There may in addition be issues with internal reflection off the draw tube introducing a background polarization signature – so please watch this space for further developments. However if anybody is interested in reproducing this piece of equipment, or wishes to investigate other likely wavebands that might be associated with LTP, then please get in touch.

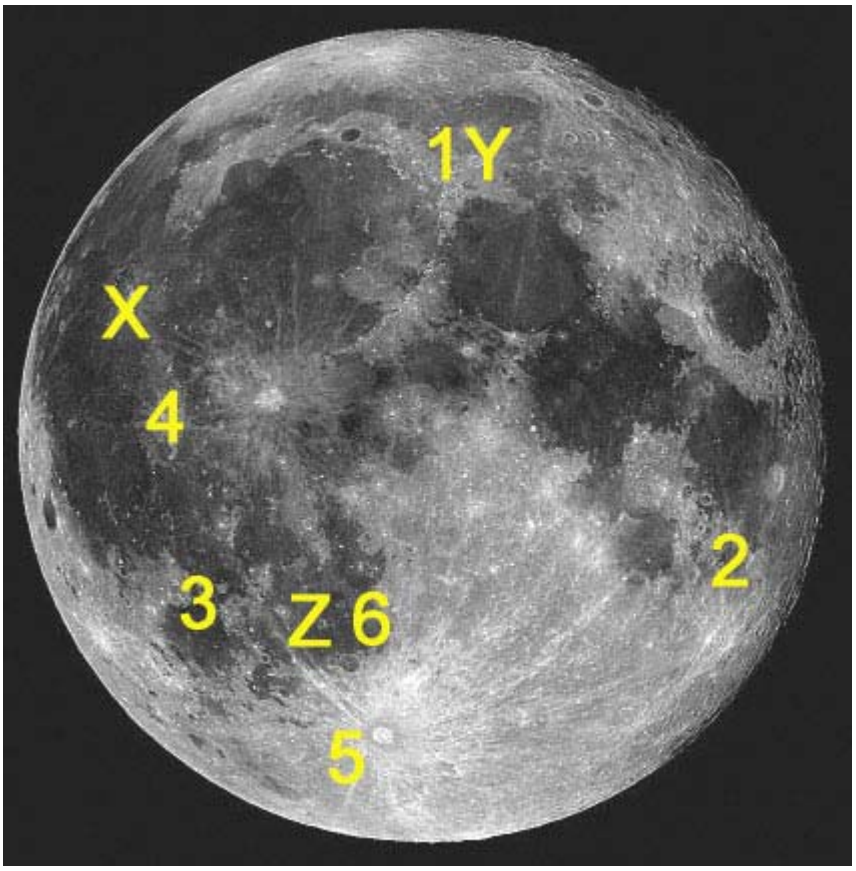
Predictions, for repeat illumination and repeat libration conditions that match past LTP can be found on the following web site: http://users.aber.ac.uk/atc/LTP/LTP.htm . For members who do not have access to the internet, please drop me a line and I will post predictions to you. If you would like to 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!

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. Aristoteles
2. Biot
3. Gassendi
4. Kepler
5. Longomontanus
6. Rupes Recta

Focus On Targets:
X = Aristarchus Plateau
Y = Aristoteles to Eudoxus
Z = Bullialdus to Kies



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