THE LUNAR OBSERVER

A PUBLICATION OF THE LUNAR SECTION OF
THE ASSOCIATION OF LUNAR AND PLANETARY OBSERVERS
EDITED BY: William M. Dembowski, F.R.A.S. - Elton Moonshine Observatory
219 Old Bedford Pike (Elton) - Windber, PA 15963 - Dembowski@zone-vx.com

FEATURE OF THE MONTH - JULY 2004

AUTOLYCUS

Sketch and Text by: Robert H. Hays, Jr. – Worth, Illiinois, USA
January 1, 2004 – 0:38 to 1:08 UT
15cm Newtonian – 170x – Seeing 7-8/10

I sketched this crater this past New Year's Eve (UT Date Jan. 1, 2004) while timing three occultations. This crater is in extreme eastern Mare Imbrium near Archimedes and Aristillus. It looks reasonably oval at first glance, but the rim has a substantial point on the east side ad the northwest rim appears slightly dented, possibly by the pit Autolycus A. This crater does not really have a central peak but there are four low elongated mounds on the floor. The internal shadow appeared straight except on the inside south wall and a notch near the interior mounds that may indicate another peak. The inside east wall showed strips of shadow that made Autolycus look like a cracked bowl. This crater appears to be fairly deep, but there is little evidence of a raised rim.

There are many hills nearby, the largest being Autolycus alpha to the south. The Lunar Quadrant Map shows a spot labeled AutolycusB, east of alpha, but I saw three small hills there. Autolycus eta is plotted just west of Autolycus but I saw a loose group of four peaks in the general area. That designation may refer to the nearer of the two larger hills that I saw west of Autolycus. There were more small hills near Autolycus alpha and two small, low peaks east of Autolycus. A small strip of shadow was seen to the north.

Editor: Autolycus can be found on Map 12 of Rukl's Atlas of the Moon.

LUNAR TOPOGRAPHICAL STUDIES

Acting Assistant Coordinator – William M. Dembowski, FRAS
Dembowski@zone-vx.com

OBSERVATIONS RECEIVED

MICHAEL AMATO - WEST HAVEN, CONNECTICUT, USA
Ray Maps of Menelaus (2), Messier (2), Proclus (2), Aristarchus (2), Kepler

DANIEL DEL VALLE - AGUADILLA, PUERTO RICO
Sketches of Hercules, Dome near Birt, Cardanus & Kraft, Wargentin
Digital image of Maurolycus, Lambert, Theophilus (sunset), Kepler (sunset)

COLIN EBDON - COLCHESTER, ESSEX, ENGLAND
Sketches of Fabricus & Metius & Brenner, Schiller Annular Plain

ROBERT H. HAYS, JR. - WORTH, ILLINOIS, USA
Sketches of Cauchy w/rupes & rima, Maskelyne E & Cauchy tau, Beaumont A, Tacitus

RODRIGO VIEGAS – MONTEVIDEO, URUGUAY
Sketches of Theophilus, Rumker Plateau, Sinus Iridum

ROBERT WLODARCZYK - CZESTOCHOWA, POLAND
Sketches of Menelaus w/ray, Regiomontanus & Purbach

Observations submitted should include the following:

Name and location of observer
Name of feature
Date and time (UT) of observation
Size and type of telescope used
Magnification (for sketches)
Medium employed (for photos and electronic images

NOTE:

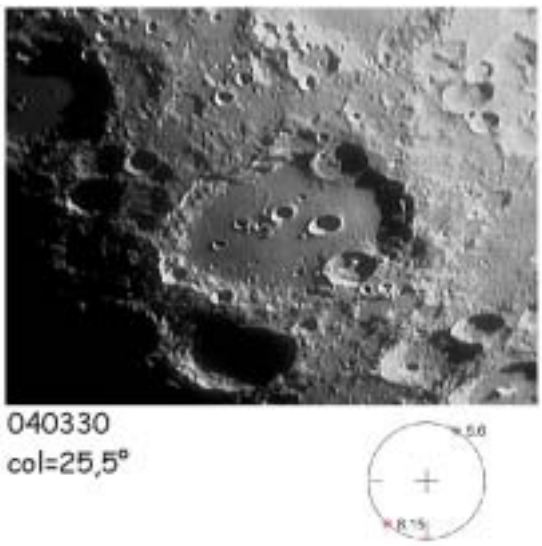
I apologize to Robert H. Hays, Jr. for failing to give him proper credit for his sketch of Sabine, Ritter, Schmidt, & Dionysius in the June issue. Robert has been unfailingly writing and illustrating our "Feature of the Month" since the July 1997 issue when TLO was not yet an A.L.P.O. publication. I, therefore, also offer my congratulations and sincere thanks for his contributions over the past seven years. My deepest appreciation for a job well done.

…….. **WMD**

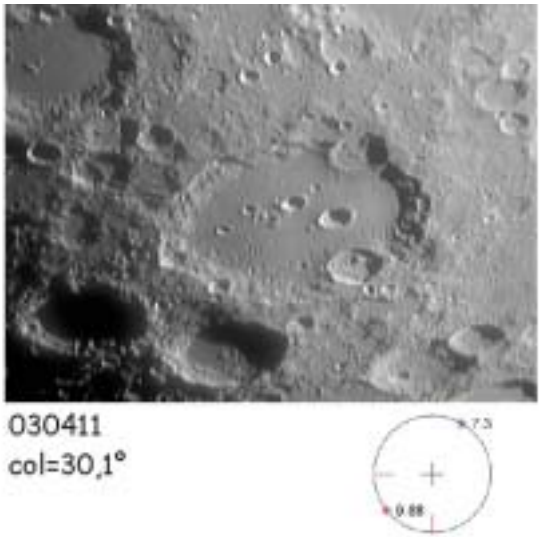
CLAVIUS

Alexander Vandenbohede – Gent, Belgium

Clavius (58.4° S, 14.4° W) is one of the largest craters or walled plains on the Moon. It is a Nectarian crater that is sculptured by ejecta of younger craters and impact basins. Numerous craters therefore batter its floor and walls. For instance on the south part of its floor a chain of craters point to the Orientale impact basin. This series of pictures shows Clavius from sunrise to just over local noon. Thereby the crater changes from easily recognisable because of its size and mighty shadows too hard to find due to the brilliant ejecta blanket of Tycho. Its crater floor is full of detail. One thing to observe are ridges between Porter and Rutherfurd. These are very well seen under low sun heights. If the sun rises above Clavius, the ridges become more difficult to observe and the terrain becomes somewhat brighter than its surroundings.

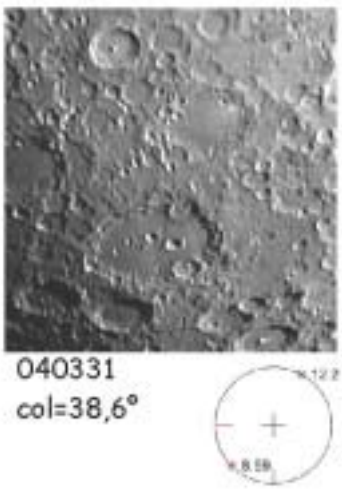


040330
col=25,5°

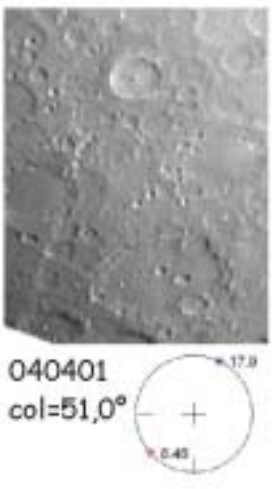


030411
col=30,1°

030211
col=32,2°

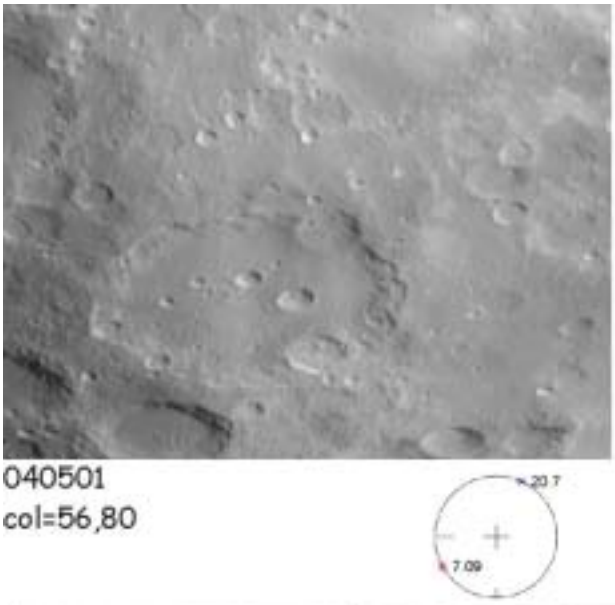


040331
col=38,6°

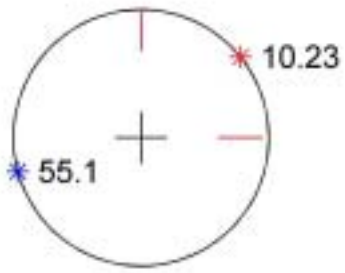


040401
col=51,0°

Towards local noon, it can be seen that one of the bright rays of Tycho crosses this part of Clavius. The ridges are perhaps part of or sculptured by Tycho's ejecta blanket. Or is it part of Rutherfurds ejecta blanket? Similar but less distinct ridges are also seen north of Clavius C. One of Tycho's rays also crosses this part of Clavius. Of note is also the very hummocky appearance of the north-west side of the crater floor.



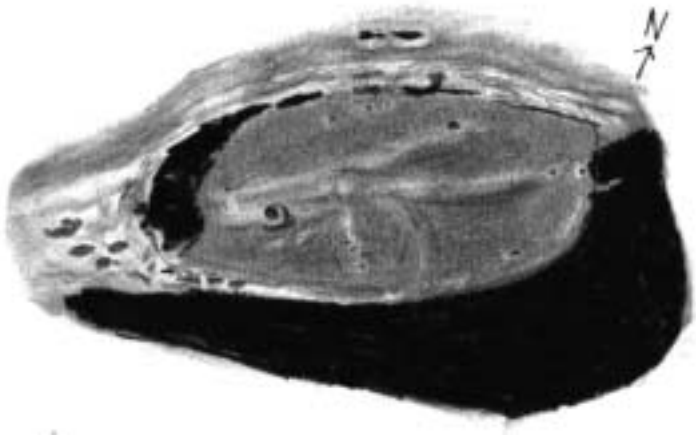
	date & time	topocent. libr. long. (°)	topocent. libr. lat. (°)	topocent. libr. angle (°)	phase	colongitude (°)	equipment
040330	30/03/2004 1930 UT	-5,18	-6,08	220,4	0,774	25,5	20 cm F6 D webcam
030411	11/04/2003 1940 UT	-7,74	-6,14	213,6	0,799	30,1	20 cm F15 R webcam
030211	11/02/2003 2255 UT	-5,73	-1,33	256,9	0,800	32,2	20 cm F15 R webcam
040331	31/03/2004 2120 UT	-5,91	-6,10	224,1	0,862	38,6	20 cm F6 D webcam
040401	01/04/2004 2145 UT	-6,04	-5,82	226,1	0,929	51,0	20 cm F6 D webcam
040501	01/05/2004 2120 UT	-6,20	-3,43	241,1	0,949	56,8	20 cm F15 R webcam
030315	15/03/2003 2130 UT	-6,15	-6,10	225,2	0,968	61,9	20 cm F15 R webcam
040402	02/04/2004 2145 UT	-5,74	-5,21	227,8	0,975	63,2	20 cm F6 D webcam
040404	04/04/2004 2200 UT	-4,19	-2,97	234,6	0,996	87,6	20 cm F6 D webcam
040408	08/04/2004 300 UT	-0,76	2,53	343,2	0,842	126,7	20 cm F6 D webcam



This figure can be quite handy to compare different observations of a formation. Here crater Copernicus (20°W and 9.7°N) is used as an example. The date is 06/07/2004 at 2200 UT. Libration conditions (topocentric) are indicated in red. The red lines give with their relative lengths the topocentric libration in longitude (here 7,95°) and latitude (here 6,43°). Here both are positive, otherwise the lines are indicated on the opposite side. Since it is mostly the result of the two that is of interest, the red asterix depicts the position of maximum librations (relative to the north, top of figure) and the value with which this side is inclined to the observer. The blue asterix denotes the height of the Sun. Its position shows it azimuth. So here sunheight is 55,1° and the sun would be visible almost in the west for an observer fortunate enough to be in Copernicus.

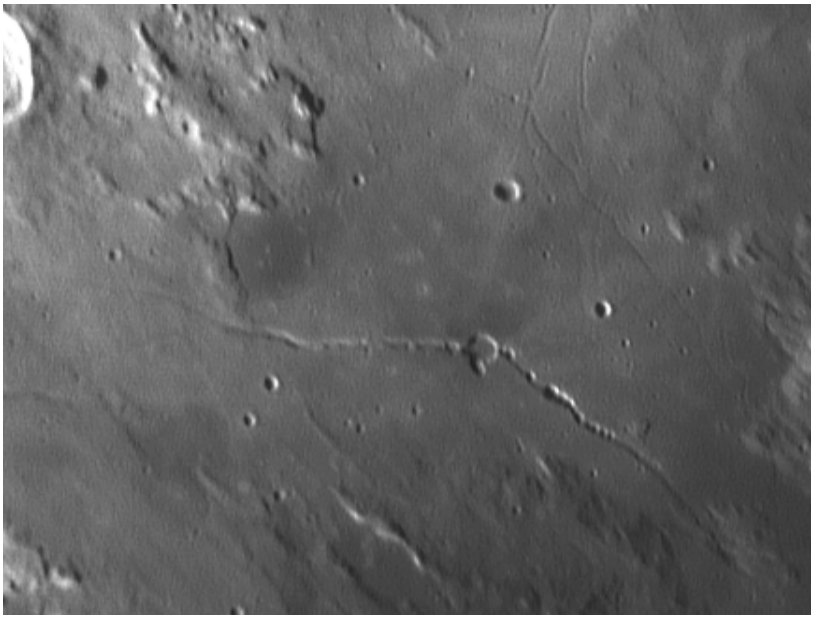
RECENT TOPOGRAPHICAL OBSERVATIONS

MAUROLYCUS
Digital image by Howard Eskildsen – Ocala, Florida, USA
March 28, 2004 – 00:56 UT
10 inch f/16 Refractor (owned by Jose Olivarez) – 2x Barlow
Afocal w/40mm MaxView – Nikon Cookpix 4300

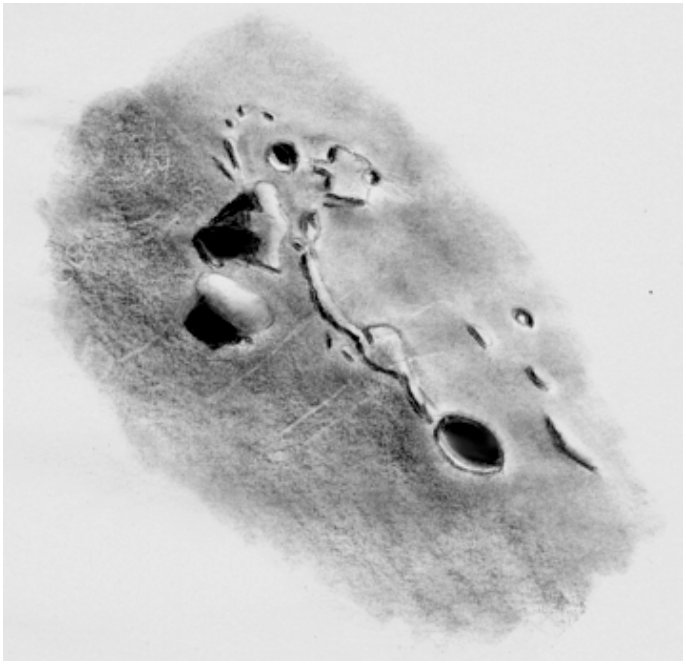


WARGENTIN
Sketch by Robert del Valle – Aguadilla, Puerto Rico
May 31, 2004 – 00:23 to 01:01 UT
8 inch SCT – Seeing 6/10

RECENT TOPOGRAPHICAL OBSERVATIONS



HYGINUS RILLE
William Elsbury – Mason City, Iowa, USA
April 28, 2004 – 01:40 UT
12.5 inch Cassegrain – Philips 740 PC Camera



MONS GRUITHUISEN
Sketch by Guido Santacana – San Jose, Puerto Rico
October 7, 2003 – 01:05 UT
120mm f/8 Refractor – 300x – Seeing 6/10

INTERNATIONAL BRIGHT LUNAR RAYS PROJECT

EXCERPT OF THE MONTH (Part 1):

LUNAR CRATER RAYS: COMPOSITIONS AND MODES OF ORIGIN

B.R. Hawke 1, D.T. Blewett 1, P.G.Lucey 1, C.A. Peterson 1, J.F. Bell III 2, B.A. Campbell 3, and M.S. Robinson 4,

1 Planetary Geosciences/HIGP, Univ.of Hawaii, Honolulu, HI 96822,
2 CRSR, Cornell Univ., Ithaca, NY 14853,
3 CEPS, National Air & Space Museum, Washington, DC 20560,
4 Dept. of Geological Sciences, Northwestern Univ., Evanston, IL 60208.

Introduction:

The nature and origin of lunar crater rays has long been the source of major controversy. Some lunar scientists have proposed that rays are dominated by primary crater ejecta, while others have emphasized the role of secondary craters in producing rays [e.g., 1,2,3]. Pieters et al. [2] presented the results of a remote sensing study of a portion of the ray system north of Copernicus. They provided evidence that the present brightness of the Copernicus rays in this sector is due largely to the presence of a component of highland ejecta intimately mixed with local mare basalt and that an increasing component of local material is observed in the rays at progressively greater radial distances from the parent crater. These results have been questioned, and the origin of lunar rays is still uncertain [e.g., 4]. In an effort to better under-stand the processes responsible for the formation of lunar rays, we have utilized a variety of remote sensing data to study selected rays associated with Olbers A, Lichtenberg, the Messier crater complex, and Tycho [6,9,12]. The data include near-IR reflectance spectra (0.6-2.5 μm) and 3.8- and 70-cm radar maps. In addition, Clementine UV-VIS images were utilized to produce high-resolution FeO, TiO2, and maturity maps for the various rays using the methods presented by Lucey and co-workers [10,11].

Results and Discussion:
Messier Crater Complex.

Messier (14 km in long dimension) and Messier A (diameter = 11 km) are located near 2° S, 47° E in Mare Fecunditatis. Major rays from these craters occur to the south and west of the parent craters. Spectra were obtained for portions of the rays west and south of the crater complex, as well as for Messier A and nearby mature mare regions. The spectrum of Messier A exhibits an extremely deep (29%) ferrous iron absorption band centered at 0.98μm, and a fresh mare composition is indicated. Both the near-IR spectrum and the FeO image clearly demonstrate that Messier A did not penetrate the Fe-cunditatis mare fill. In addition, Messier A crater exhibits strong returns on both the 3.8- and 70-cm depolarized radar images [6,7,8]. The spectrum collected for the ray west of Messier A has a 15% absorption feature centered at 0.99 μm. The ray has slightly enhanced values in the depolarized 3.8-cm radar image, but no enhancement is apparent in the70-cm data set. The mature mare unit adjacent to this ray has a spectrum with a shallower band depth (12%) and a similar band center. The FeO image indicates that the west ray exhibits FeO values similar to adjacent mare de-posits. The brightness of the ray west of Messier A is due to the presence of large amounts of fresh mare basalt. Near-IR spectra as well as the FeO, TiO2, and maturity maps indicate that the ray south of the Messier complex is also dominated by fresh mare material.

References:

[1] Shoemaker E. (1962) in Physics and Astronomy of the Moon, 283.

[2] Pieters C. et al. (1985) J. Geophys. Res., 90, 12393.

[3] Oberbeck V.(1971) Moon, 2, 263.

[4] Schultz P. and Gault D. (1985) J. Geophys. Res., 90, 3701.

[5] Blewett D. et al. (1995) J. Geophys. Res., 100, 16959.

[6] Camp-bell B. et al. (1992) Proc. Lunar Planet. Sci., 22, 259.

[7] Zisk S. et al. (1974) Moon, 10, 17.

[8] Thompson T. (1987) Earth, Moon, Planets, 37, 59.

[9] Hawke B. et al. (1996) Lunar Planet Sci. XXVII, 507.

[10] Lucey P. et al. (1995) Science, 268, 1150.

[11] Lucey P. et al. (2000) J. Geophys. Res., submit-ted.

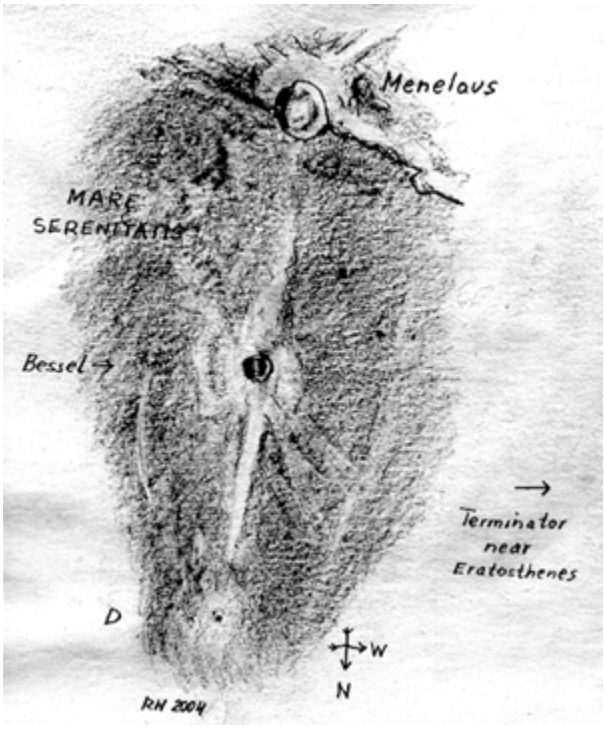
[12] Hawke B. et al. (1999) Workshop on New Views of the Moon II, 22

RECENT RAY OBSERVATIONS

ARISTARCHUS
Digital image by K. C. Pau – Hong Kong, China
May 1, 2004 – 12:44 UT – Colong. 52
10 inch f/6 Newtonian – 5x Barlow
Philips Toucam Pro – 147 Frames stacked

RECENT RAY OBSERVATIONS

KEPLER
Digital image by Daniel del Valle – Aguadilla, Puerto Rico
June 12, 2004 – 09:33 UT
8 inch SCT – Logitech QuickCam



MENELAUS & BESSEL
Sketch by Robert Wlodarczyk – Czestochowa, Poland
May 27, 2004 – 20:30 UT
15cm f/6 Newtonian – 110x 156x – Seeing Ant. III

TRANSIENT LUNAR PHENOMENA

Coordinator – Dr. Anthony Cook – acc@cs.nott.ac.uk
Assistant Coordinator – David O. Darling – DOD121252@AOL.COM

BAA/ALPO TRANSIENT LUNAR PHENOMENA NEWSLETTER

Firstly, thanks for David Darling for covering for me during May and June. Observations for May have been received from: Clive Brook (Plymouth, UK), Tony Cook (Nottingham, UK), Marie Cook (Mundesley, UK), Robin Gray (Winnemucca, NV, USA), Gerald North (Narborough, UK), Brendan Shaw (UK). Observations received for April-June are now on the web site.

For new members that David Darling has recruited to participate in simultaneous observation of the Moon from the ground and from ESA's SMART-1 I would just like to say welcome onboard to the TLP observing program! Altogether there are fifty observers who belong to ALPO, the BAA, or who have registered an interest. This newsletter forms part of the British Astronomical Associations Lunar Section Circular, and also the Association of Lunar and Planetary Observer's: "The Lunar Observer". Both publications appear monthly. Our aim is to investigate transient lunar phenomenon (TLP), or as they say in America (LTP). TLP are typically faint transient coloured glows or loss of detail that pertain to a particular area. Theories to explain these reports have included out-gassing on the lunar surface, landslides, meteorite impacts etc. Undoubtedly most TLP are aberations caused by normal terrestrial atmospheric effects e.g. spurious colour, poor seeing, and perhaps even poorly trained observers in the past. In 1978 Dr Winifred Cameron produced a NASA catalog listing 1463 of these reported events covering the years 557AD-1978. Our task is to try to observe these features again but under the same illumination angles (and if possible libration/viewing angles) in order to record their normal appearance. Hopefully we can then eliminate many of these reports and leave ourselves with a core set of reliable observations that we may then study analytically. Another aspect of the ALPO/BAA work is the tradition started in the Apollo era to observe the Moon at the same time it is being surveyed by spacecraft, so that in the unlikely event that a TLP is observed, it can be studied from both the ground and from spacecraft and then comparisons made with past TLP events. Joint observing programs have taken place with Apollo, Clementine and Prospector space missions and David Darling is in contact with mission scientists over near term future missions e.g. he has recently been in contact with the president of the Trans Orbital Company, involved in a private lunar mission: "Trail Blazer". David states that they were interested in a ground-based observing program with amateur astronomers. Trail Blazer is due for launch in Dec 2004.

Both Dr Julius Benton and David Darling have forwarded me an email from Michael and Lois van Son from Bremerton, Washington State, USA, who on 1st May 2004 at 19:34 PST observed a white flash on the Moon (comparable to Venus) in the upper Mare Serenitatis area. Was anybody else observing the Moon at this time? Although they could have witnessed an impact flash, one has to consider other possibilities such as sun glint from a satellite - this is still being checked out.

Raffello Lena (GLR) reports that he received an observation from May 1st from an Italian observer that suggested blue on the walls of Aristarchus at 22:20UTC. This coincided with the predicted repeat illumination conditions for a 1963 Dec 28 TLP observation by Olivarez where they reported "*in poorer moments of seeing, red on Aris. rim & Sch. Valley. Spurious seeing effect*". The NASA catalog of TLP gives this 1963 observation a very low weight. Alas at present I do not have any further information about the GLR observation, so it is difficult to say if the most likely cause is spurious seeing effects this time?

Although the UK was under quite a bit of cloud cover during the May 4th total lunar eclipse, BAA observers: Tony Cook, Marie Cook, Maurice Gavin, David Graham, Mark Kidger, Martin Mobberley, Gerald North, Damien Peach, and John Rogers have communicated what they saw. So far there are no reports of any impact flashes being seen. I took some video from the end of totality onwards, so can easily verify any reports of flashes. Francois Kritzinger (South Africa) reported seeing two bright spots during totality - probably these will turn out to be ray craters, but the image is still being checked out Aadil Desai (Mumbai, India) reports that although most of the eclipse was invisible due to rain, he made it a pretty dark eclipse and noted the colour as grayish red at mid totality. Marie Cook (Norfolk, UK) estimated the eclipse to be Danjon 4 and bright orange at 20:43UTC. Mark Kidger made it Danjon 2. I guess the uncertainty can be explained by the low altitude of the Moon and local weather conditions.

A set of predictions for when the illumination only, or illumination and libration, for past TLP events repeats, can be found on the following web site:

http://www.lpl.arizona.edu/~rhill/alpo/lunarstuff/ltp.html

Please try to observe some of these as this will help to eliminate many past TLP reports.

If in the unlikely event you see a TLP, please call on Tony Cook's cell phone: +44 (0)798 505 5681 and he 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, School of Computer Science & IT, Nottingham University, Jubilee Campus, Wollaton Road, Nottingham, NG6 1BB, UNITED KINGDOM. Email: acc@cs.nott.ac.uk

A.L.P.O. LUNAR COORDINATORS

Julius L. Benton, Jr. – Coordinator, Selected Areas Program
jlbaina@msn.com

Dr. Anthony Cook – Coordinator, Transient Lunar Phenomena
acc@cs.nott.ac.uk

Brian Cudnik – Coordinator, Lunar Meteoritic Impact Search
cudnik@sbcglobal.net

David O. Darling – Asst. Coordinator, Transient Lunar Phenomena
DOD121252@aol.com

William M. Dembowski – Acting Asst. Coordinator, Lunar Topographical Studies
Dembowski@zone-vx.com

Marvin W. Huddleston – Coordinator, Lunar Dome Survey
kc5lei@comcast.net

Michael D. Reynolds – Coordinator, Eclipses
Astrogator90@aol.com