

# THE BRITISH ASTRONOMICAL ASSOCIATION



## LUNAR SECTION CIRCULAR

Director Alan Wells  
Assistant Director/Editor John Pedler

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Data on pages 7-8 are for Oct. 2006

Lunations 1036/1037

Sept. 2006

### Introducing Peter Grego, the new Topographical Coordinator, BAA Lunar Section

In July, I assumed the post of Topographical Coordinator of the BAA Lunar Section, taking over from Colin Ebdon. Like many, I learned a great deal from Colin during his nine year tenure, and I would like to thank him for devoting so much of his time to correspondence, for all of his friendly help and advice, in addition to taking the time to send me electronic and hard copies of his lunar observations and *The New Moon* journal. Thankfully, Colin intends to remain an active member of the Lunar Section and will continue to contribute observations.

By way of an introduction, I would like to present the following summary of my interests and activities:

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Skype: ptgrego

Website: [www.lunarobservers.com](http://www.lunarobservers.com)

The website hosts occasional live imaging web broadcasts of the Moon and bright planets.

Born on 6 December 1965.

Married to Tina in 1997. She likes astronomy in very small doses. I've a young daughter, Jacy, who enjoys telescopic glimpses of the Moon.

My interest in space began with the landing of Apollo 11 in July 1969 – an event I can distinctly recall watching on TV as a 3.5 year old. I've been a regular watcher of the night skies since 1976, and began studying the Moon in detail in 1982. I observe mainly from my garden in Rednal (on the very southern fringes of Birmingham), UK, with a variety of instruments, including a 127mm Maksutov and two 200mm SCTs (an LX90 and Harold Hill's Dynamax 8). My primary astronomical interests are observing and imaging the Moon and bright planets, but I occasionally like to 'go deep' during the dark of the Moon, mainly using big binoculars. I maintain an observing log which currently contains 1,232 individual observational entries (most of them observational drawings).

I'm also fascinated by space exploration and astronautics, but the nearest I've been to a trip into outer space came in 1985 when he was the official cabin guide to several hundred passengers aboard two Halley's Comet special flights over the Irish Sea, hosted by British Airways.

During the late 1980s I served as Director of Observation for the Birmingham Astronomical Society, regularly organizing and running group observing sessions at a large private observatory in Edgbaston using a magnificent restored 19<sup>th</sup> Century 175mm Cooke refractor (sadly, now no longer there).

I've constructed three astronomical telescopes, including grinding and polishing the primary mirrors of two 150mm Newtonians and a 300mm Newtonian.

I've delivered numerous talks to astronomical societies/events around the UK and I have given TV, radio and newspaper interviews on astronomy and space. For an example of an audio interview, listen to [www.bbc.co.uk/radio4/factual/opencountry\\_20021005.shtml](http://www.bbc.co.uk/radio4/factual/opencountry_20021005.shtml) given on BBC Radio 4's *Open Country*.

I've directed the Lunar Section of Britain's Society for Popular Astronomy since 1984. I edit four astronomy publications – *Luna* the Journal of the SPA Lunar Section, the *SPA News Circulars*, *Popular Astronomy* magazine and (although my first issue is yet to be produced) *The New Moon*, the journal of the BAA Lunar Section.

My written and observational work has appeared in many diverse publications in the UK and around the world, including articles and illustrations in *Fortean Times*, *Gnomon*, *BBC Sky at Night* magazine, *Astronomy Now*, *Sky and Telescope*, *Birmingham Evening Mail*, several books by Ian Ridpath, Brian Jones and Robin Scagell, *Selenography*, *The Lunar Observer*, *The New Moon*, *The Encyclopedia of Astronomy and Astrophysics*, *Window on the Universe* CD-ROMs, *Hoshinavi*.

Since 1997 I have written and illustrated the monthly *MoonWatch* in UK's *Astronomy Now* magazine and since 2005 I have been the astronomical observing advisor and Q&A writer for the *BBC Sky at Night* magazine.

I received an RMN qualification in nursing in 1990. My last 'proper' jobs, before taking up writing and editing as a full time occupation, were as manager of a ward at All Saints Hospital, Birmingham, and night manager at a private nursing home in Handsworth Wood. Writing is a far easier, less stressful occupation than nursing!

I am the author of the following books:

*Guide to Astronomical Observation* (BAS, 1988).

*Collision: Earth!* (Cassell, 1998).

*Moon Observer's Guide* (Philip's/Firefly, 2004); plus associated *Moonwatch* observer's pack.

*Need to Know? Stargazing* (Collins, 2005).

*The Moon, and How to Observe It* (Springer, 2005).

*Observer's Map of the Moon* (Self-published, 2005)

*Solar System Observer's Guide* (Philip's/Firefly, 2006); plus associated *Solar System* observer's pack.

*Need to Know? Universe* (Collins, 2006).

*Observer's Map of the Moon* (self-published, 2006).

I'm currently working on two mainstream astronomy books, plus a series of children's astronomy books, all due for publication in 2007.

I am a member of the Society for Popular Astronomy, the British Astronomical Association, the Society for the History of Astronomy and I am an elected Fellow of the Royal Astronomical Society.

## **Outlook**

My first aim is to establish communication with all current active lunar observers within the BAA Lunar Section, and following this I hope to continue where Colin Ebdon left off. I already know, or have corresponded with, a number of Lunar Section members over the years, but I have yet to correspond with many prominent members whose names and observations I have long been familiar with through publication in various media. It will be a pleasure to make new acquaintances who share a fascination with the Moon.

It will be desirable to define the role of the visual lunar observer in the early 21<sup>st</sup> century, determine the scientific usefulness of established lunar observational practices and to investigate new and exciting avenues of visual lunar research.

would be delighted to receive your lunar observations, either as high resolution scans of observational drawings sent by email, or as originals or good quality prints/laser/photocopies submitted by regular post. I'm acutely aware that these days many people don't have the time to produce a neat, finished drawing both for their own records and for the files of the BAA Lunar section, so providing a suitable SAE is sent to me, I will be happy to return original observational drawings after I have scanned and databased them.

In the interests of furthering research, it is my intention to build up a searchable electronic archive of all the observations sent to me, as I am currently doing with the archives of the SPA Lunar Section. The archive may, in due course, be established online, but initially I will be able to provide members with specific requests for archived observations of features, or a list or a CD-ROM containing their own observations, when requested. Given time, it is hoped that to scan and database all the available observational drawings in the BAA Lunar Section archives.

I hope to produce a copy of *The New Moon* towards the end of this year. Of course, I will be relying on your input, be it in the way of articles (short or long), observations, letters or comments.

Best wishes,

**Peter Grego, FRAS**

**Topographical Coordinator, BAA Lunar Section**

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Apologies again – the top lines of the graze table became mangled again, due to factors beyond my control, when I repeated it in last month’s circular. I won’t repeat it again here as it refers to this month’s only graze on September 2<sup>nd</sup>. This is track number 13 on the chart that passes only over the south eastern corner of Ireland (leaving the coast just south of Dublin) before being lost due to low altitude and twilight.

**Observations**

Ken Hall (Great Sankey, Warrington) has submitted a copy of his timings of 17 events for the first half of 2006.

**Predictions for 52°27'41.4"N 1°44'44.0"W (Birmingham) – October 2006**

Day	Time-UT	P	Object	O	Max Sp	%	Elg	Sn	Mn	Mn	CA	PA	Watts	a	b	Star's	apparent	
	H	M	S	D	Reference	V	Mag	Snlt	Alt	Alt	Az	Angle	Min/°	RA	Dec			
1/20	33	45	DK	PPM	270451	28	4.8	G5	65+	108	10	196	90N	77	88	-1.1	-.4	195615.8-261701
1/22	16	13	DV	PPM	270516	35	5.0	G5	66+	108	3	218	47S	120	130	-1.3	-1.6	195922.6-261046
3/19	44	29	D	PPM	239414	66	6.5	K0	85+	134	18	159	56N	34	53	-.8	1.0	215036.4-164848
9/22	28	49	RT	PPM	92534	87	6.1	G5	89-	141	37	101	83S	244	257	-.4	1.7	32851.4 224949
10/05	49	00	DU	FK5	136	85	3.8	B5P	86-	137	-6	44	251-58S	105	117	-.7	-1.5	34517.7 240814
10/06	47	46	RU	FK5	136	86	3.8	B5P	86-	137	3	35	264 70S	232	244	-.7	-.2	34517.7 240814
10/06	56	26	RX	PPM	92818	95	4.4	B5	86-	137	4	34	266 33N	309	321	-.2	-2.6	34537.7 242927
10/06	19	20	DX	PPM	92841	85	4.0	B5	86-	137	-1	40	258-79N	61	73	-.8	-.4	34614.8 242329
10/07	19	33	RX	PPM	92841	85	4.0	B5	86-	137	8	31	271 65N	278	290	-.3	-1.5	34614.8 242329
10/06	48	55	D	M	45	98	1.6		86-	137	3	36	264-34S	128	140	-.2	-2.6	34713.2 240825
ABOVE PREDICTION IS FOR CENTRE OF GALACTIC NEBULAR OBJECT - DURATION ~248.0 MIN																		
10/07	30	22	R	M	45	98	1.6		86-	137	9	29	272 49S	212	224	-.8	.4	34713.2 240825
ABOVE PREDICTION IS FOR CENTRE OF GALACTIC NEBULAR OBJECT - DURATION ~263.0 MIN																		
10/07	12	59	DK	FK5	139	95	3.0	B5P	86-	136	7	32	269-20S	143	155	.2	-3.7	34754.3 240743
10/07	41	04	RK	FK5	139	96	3.0	B5P	86-	136	11	28	274 35S	198	210	-1.1	1.5	34754.3 240743
10/19	43	33	RY	PPM	93459	76	5.4	B9	81-	129		8	57 67S	233	243	.7	1.8	42300.6 253851
11/02	49	04	RG	PPM	93649	77	6.5	F0	79-	125		63	160 67N	281	289	-1.1	-.1	43855.6 265719
11/22	35	47	RX	PPM	94443	65	7.4	F8	71-	115		24	76 74S	249	252	.1	1.9	53149.0 274633
11/23	57	54	RX	PPM	94504	65	8.1	K2	70-	114		36	90 72S	247	250	-.3	1.9	53504.7 275408
12/00	00	02	R	PPM	94505	65	8.1	B8	70-	114		37	91 74N	281	283	-.5	1.0	53505.4 280327
12/03	04	21	R	PPM	94661	65	8.4	M3	69-	113		61	140 70S	246	248	-1.0	1.3	54128.8 280643
ABOVE STAR IS A VARIABLE STAR -- MINIMUM MAGNITUDE = 12.0.																		
12/05	13	28	RM	PPM	94792	65	8.2	A0	69-	112-12	64	203	79S	256	257	-1.1	.1	54525.3 281157
12/05	20	17	R	PPM	94795	65	8.3	A5	69-	112-11	64	206	88N	269	270	-1.1	-.3	54535.9 281526
12/08	03	04	RY	PPM	94967	85	5.6	K0	68-	111	13	45	258 40S	217	218	-1.4	.8	55124.3 275818
12/23	12	03	RX	PPM	96140	65	7.5	K5	61-	102		21	72 69N	293	290	-.2	1.0	63328.0 274919
13/01	51	27	RC	PPM	96301	66	7.4	A2	60-	101		44	102 87N	276	272	-.7	1.0	63919.6 274759
13/05	28	17	RX	PPM	96498	67	6.8	K0	58-	100-10	65	181	81S	265	261	-1.1	.1	64601.0 274003
13/06	10	26	G	PPM	96546	95	8.4	K0	58-	99 -3	64	201	8S	192	188	*****		64810.3 272320
ABOVE OCCULTATION CLOSE TO SMOOTH-MOON TERMINATOR																		
14/00	23	28	RC	PPM	97667	65	7.8	A2	50-	90		22	76 54N	315	307	-.4	.3	73337.8 260603
14/04	31	11	R	PPM	97842	65	8.6	K2	48-	88		57	132 53N	317	308	-.9	-.8	74142.4 255228
14/05	10	40	D	PPM	97900	75	5.4	K5	48-	87		60	147-46N	56	47	-1.3	2.0	74431.8 254610
ABOVE STAR IS A VARIABLE STAR																		
14/06	03	18	R	PPM	97900	79	5.4	K5	48-	87 -5	63	171	36N	335	326	-.7	-2.0	74431.8 254610
15/06	15	09	RC	PPM	98857	65	7.8	G0	38-	76 -3	58	156	70S	266	252	-1.2	.5	83703.6 220904
16/00	52	15	R	PPM	126276	65	6.9	A3	30-	67		7	68 87S	286	270	.2	1.1	91649.6 184701
16/01	40	28	RM	PPM	126306	65	8.0	F0	30-	67		14	77 72N	307	291	-.2	.5	91839.5 184516
16/04	13	29	R	PPM	126391	86	7.7	K0	29-	65		36	108 40S	239	223	-.8	3.2	92310.7 180617
16/05	07	06	RK	PPM	126412	65	8.5	G0	29-	65		43	121 86S	285	269	-.9	.6	92427.7 180928
16/05	24	15	RO	SAO	98552	67	7.1	G0	29-	65-11	45	125	86S	286	269	-.9	.5	92453.5 180650
17/05	42	24	RO	PPM	127187	88	6.4	F5	21-	54 -9	38	122	31N	351	332	-.5	-1.8	101159.5 131924
19/03	57	13	R	PPM	157980	96	6.7	K5	8-	33		3	90 54S	258	236	.0	2.3	113356.3 22748

**N.B. Don't forget to add 1 hour to the above times during BST (until October 29<sup>th</sup>)!**

Predictions courtesy of the International Occultation Timing Association – European Section – (IOTA/ES) “OCCMOON” program.

A letter in the "D" column indicates a possible double star.

See LSC 35, 5 (May 1999) for comments on recording observations using the predictions.

Only one set of observations were received for July – Michael Amato (West Haven, CT, USA) reported Aristarchus to be normal in appearance on July 15<sup>th</sup>. From the UK the Moon has been incredibly low on the horizon (and orange) and I certainly do not encourage our observers to make observations when it is so low, unless there is a repeat illumination/libration event in the predictions.

Following on from the “blob in Copernicus” report from June I can now supply more details as one of our Belgium observers, Rony De Laet, has kindly forwarded a sketch and an image that he took prior to Geoff Burt’s report. There is a sequence shown in Fig 1 that includes the reports from these two observers, a consolidated Lunar Atlas photo, and two images from Brendan Shaw - just to get some idea of illumination chronology.

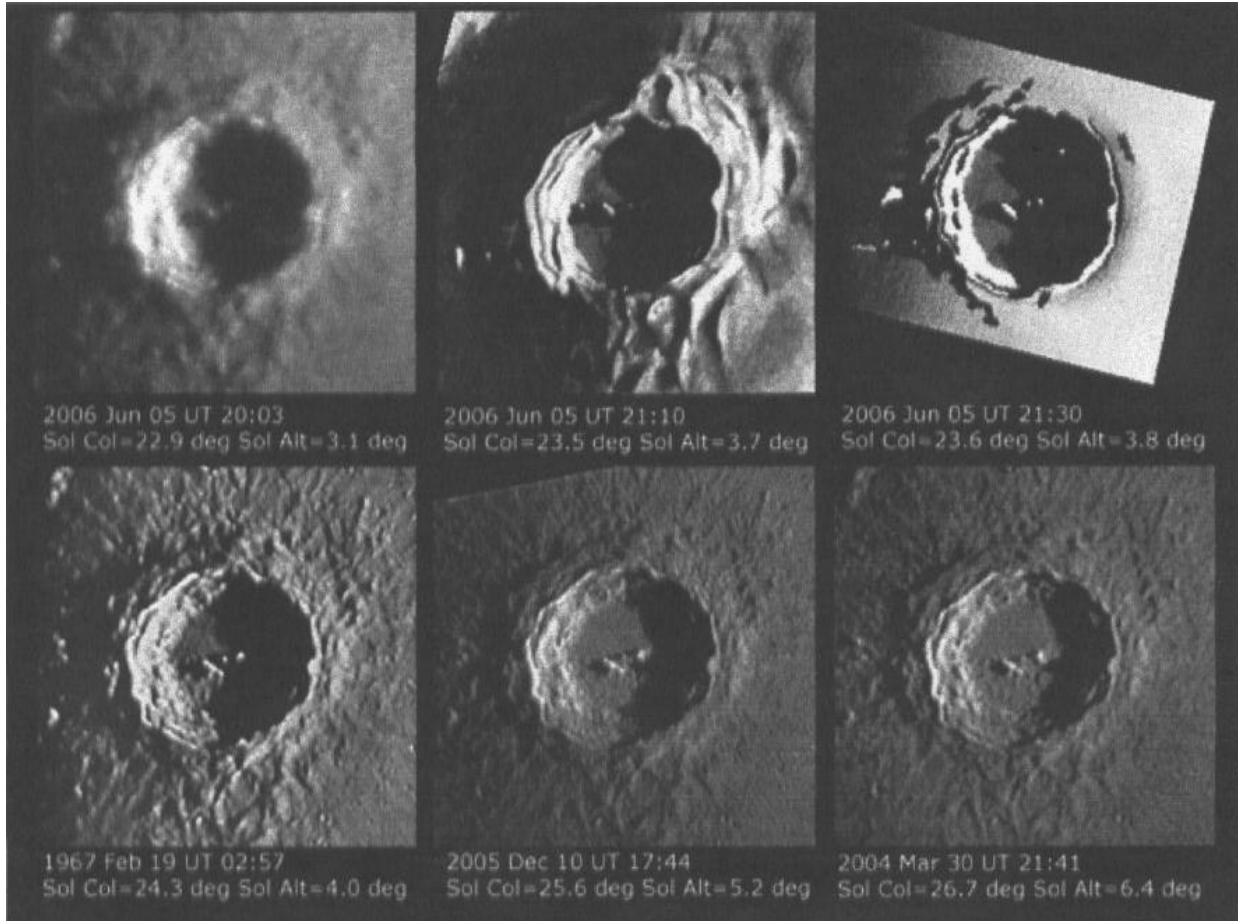


Figure 1. Top left – mobile phone CCD image by Rony De Laet; Top center sketch by Rony De Laet; top Right sketch by Geoff Burt (Society for Popular Astronomy observation); bottom left – consolidated Lunar Atlas (CLA) photo D17 (plate C4195); bottom center and bottom right – CCD images by Brendan Shaw. All images have been affine transformed to match the CLA photograph arranged in order of increasing solar altitude.

You can see quite clearly the blob in the north corner of the shadowed floor of the crater. I have been in email correspondence with both observers. Rony was using an ETX 105 at a magnification of x240, and seeing was Antoniadi II. Geoff was using a 20cm Newtonian at x130 with seeing at Antoniadi II-III. Both observers took approximately one hour to make their sketches, centred upon the UT values given above. In analyzing these observations three relevant points should be considered, and I will attempt to answer these:

- 1) Could the blob just be terrain emerging from shadow or a shaft of light from a valley in the crater rim hitting some raised peaks temporarily? Shadows and rays of light are very directional so close to the terminator and fractions of a degree can make a lot of difference.
- 2) The two observers may have overlapped in time during their sketches, so why did one see a blob and the other not?
- 3) Could it be that what Geoff Burt really saw was just a ridge emerging from Sun light on the north east rim as seen in Brendan Shaw’s images, but that for some reason it was displaced in his sketch?

Taking a look at (1) you can see from the sequence of images that a blob does not appear in the correct location in the lower two images, so this seems an unlikely explanation, unless there was a narrow valley in the NE rim that just happened to allow through a shaft of sunlight, that just happened to intercept some raised topography for a short while. This seems improbable, but we can check this out by observing at similar solar azimuth's and elevations to within a tolerance of +/-0.5 deg to allow for the diameter of the solar disk.

Concerning (2), whether the two observers may have overlapped in time, it is possible, but as they recorded only the mid point of their observations, we cannot be sure. Also lunar sketches are very subjective in the way that different observers go about making these. Here is a comment from Rony that I think is very relevant to interpreting this set of observations, and indeed any sketches made in the past by others: *"I observed for about an hour. I used the following procedure. First I paid attention to the shadows in the crater, the central peaks and the structure of the inner walls. Then I studied the outer walls of the crater. I can imagine that, while being focused at drawing a feature outside the crater, I totally neglected other areas of the scene. Therefore it can be possible that the TLP already started during my watch on an area that I mapped earlier. I was not looking for TLP's as such let alone that I would recognize one"* A comment from Geoff adds: *"Copernicus is 93km in diameter (quoted from the internet Wikipedia entry) and as shown in my sketch is 25mm in diameter, giving roughly 4km/mm. The bright spot on my sketch is 1mm in size, so assuming it to be a gas/dust cloud it would have appeared around the time Rony's observation finished and mine began, expanding rapidly to about 4km in diameter and staying more or less the same size and brightness for at least an hour, throughout my observation."*

Concerning (3), whether the location of the spot could have been misdrawn/displaced from the one on the rim that shows up in Brendan's images, this seems unlikely as the ridge concerned does not appear on the Consolidated Lunar Atlas photograph and so probably should not have been seen at Col.=23.6 deg. In addition I received the following communication from Geoff, again..... *"I haven't overcrowded the sketch with detail because there is plenty to contend with. Firstly, to attempt all the detail would probably have taken too long, bearing in mind that the light's changing all the while and secondly, at the x130 magnification I was using it would be difficult to accurately depict fine detail apart from high contrast features like the bright central peaks. My original sketch is also quite small, less than 50mm square, with the crater being about 25mm in diameter".* He then goes on to add..... *"I guess that however much one attempts to take a scientific approach when sketching, there is an inevitable element of subjectivity. If we had been observing in the same location at the same time, our sketches wouldn't have been identical. Any discrepancies should be minor however, which seems to be the case here apart from that mysterious spot. Obviously, there are going to be nuances in form and tone but as I've mentioned before, it does seem odd if I've drawn a bright spot in an area of deep shadow if it wasn't there to begin with! I used to make my living as a technical illustrator and also trained at life drawing, so my sketches should be reasonably accurate."* So these would seem to rule out this possibility of (3).

Given that all three explanations listed above are improbable, I have decided to add the 2006 Jun 05 observation to the TLP catalog. If any members out there have images/sketches of Copernicus taken around a colongitude of 23.1-24.1 deg, then please get in contact as I would be very interested to see these for a comparison! In addition here are some future dates and times for which the selenographic colongitude should be the same – however please check on the Moon's visibility above the horizon from your locality:

2006 Sep 02 UT 07:11	2006 Oct 01 UT 19:35	2006 Oct 31 UT 08:45
2006 Nov 29 UT 23:02	2006 Dec 29 UT 13:35	2007 Jan 28 UT 04:04
2007 Feb 26 UT 18:01	2007 Mar 28 UT 07:07	2007 Apr 26 UT 19:22
2007 May 26 UT 06:45	2007 Jun 24 UT 18:01	2007 Jul 24 UT 05:05
2007 Aug 22 UT 16:29	2007 Sep 21 UT 04:34	2007 Oct 20 UT 17:31

When you read this, in September, the European Space Agency's lunar probe SMART-1 may have been crashed onto the Moon. This should occur at approximately 05:41UT on 2006 Sep 03, or one orbit earlier at 02:37UT at ~46W, ~36S (at the time of writing). The two possible times are a result of orbit and topography uncertainties. This area is on the night side of the Moon, but there is a small chance that ejecta thrown 20 km upwards might make it into sunlight and be visible from Earth. The terminator is approximately 60 arc sec away. There is also a very slight chance of seeing the impact flash, although the crash velocity is relatively low at 2 km/sec compared to typical meteorite velocities. According to ESA dust thrown up might obscure the surface around the crash site for 5-10 minutes, a man made kind of TLP! Observing sites in the western US, Hawaii, South America, and possibly Australia and New Zealand might capture the event – but please check that the

Moon is above your horizon at this time before attempting this. Observations can be made with CCD video or just looking through a telescope – be careful of glare though from the terminator. Unfortunately from the UK, where I am writing this newsletter from, the Moon will be below the horizon at the time. There may also be changes in the impact time due to course corrections at the end of Aug/start of September so please check the ESA web site for news on: <http://www.esa.int/SPECIALS/SMART-1/index.html>

Finally a correction to the ALPO only version of this newsletter that appeared in the TLO – Fig 1 should have read: “University of Nottingham Robotic Telescopes” and Fig 2 should have read: “BAA Exhibition Meeting at the Cavendish Laboratory, Cambridge – Lunar Section Stand”

The following repeat illumination and libration events for UK observers occur for September...

Event: Near Gra Mauro (Bell, 1970 Aug 14) can be seen on/from (UT): 2006 Sep 04 (18:51-21:29) - *[Look out for any bright small craterlets that pop into visibility during rare good moments of seeing]*

Event: Herodotus (Bartlett, 1971 Jul 05) can be seen on/from (UT): 2006 Sep 04 (18:51-20:40) - *[Any sign of a psuedo-peak with evidence of shadow?]*

Event: North Pole Limb (Unknown observer, 1881 Jul 04) can be seen on/from (UT): 2006 Sep 29 (17:45-19:06) - *[Observe the shape and surface irregularities of the north pole limb area - low power telescope can be used]*

Event: Plato (Elger, 1887 Feb 01) can be seen on/from (UT): 2006 Sep 30 (17:43-19:58) - *[Observe shadow of peaks on west border and contrast sharpness/fuzziness to the mountains outside]*

Event: Plato (Markov, 1916 Jul 08) can be seen on/from (UT): 2006 Sep 30 (17:43-20:10) - *[Look for shadings/light areas in the shadow]*

Further predictions, including the more numerous illumination only events can be found on the following web site: <http://www.lpl.arizona.edu/~rhill/alpo/lunarstuff/ltp.html>. 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 TLP 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 TLP, 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, School of Computer Science & IT, Nottingham University, Jubilee Campus, Wollaton Road, Nottingham, NG6 1BB, UNITED KINGDOM. Email: [acc@cs.nott.ac.uk](mailto:acc@cs.nott.ac.uk)

## CLOUDWATCH

Andrew Bytnar

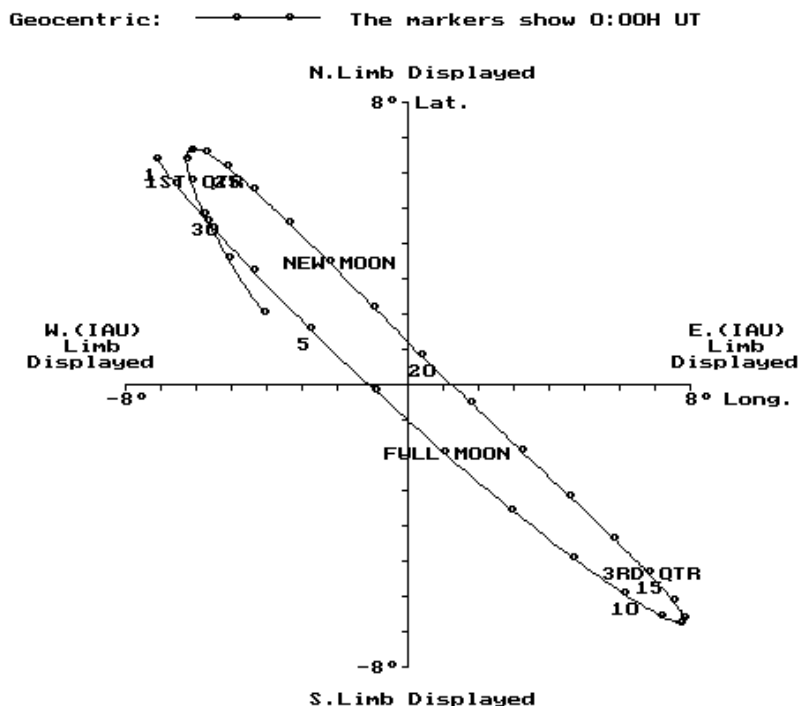
### Tabulated data for July 2006

<u>Observer and location</u>	<u>Excellent</u> <i>days</i>	<u>Cloudy</u> <i>days</i>	<u>Overcast</u> <i>days</i>	<u>Hazy</u> <i>days</i>	<u>No watch</u> <i>days</i>
P.Burt (Chatham)	18 (58%)	6 (19%)	5 (16%)	1 ( 3%)	1 ( 3%)
A.Bytnar (Mansfield)	2 ( 6%)	4 (13%)	5 (16%)	0 ( 0%)	19 (61%)
M.Cook (Cromer)	8½ (27%)	16½ (53%)	5½ (18%)	0½ ( 2%)	-----
K.Hall (Warrington)	14½ (47%)	5½ (18%)	9½ (31%)	0½ ( 2%)	1 ( 3%)
A.Heath (Nottingham)	14 (45%)	9 (29%)	8 (26%)	0 ( 0%)	-----
J.Wrigley (Reading)	9 (29%)	9½ (31%)	5 (16%)	1½ ( 5%)	6 (19%)

## LIBRATION Oct 2006

Date	Libration amount	PA	Feature presented
1.0	10.5	48	Bunsen*
2.0	9.7	49	Lavoisier*
3.0	8.3	50	Lavoisier*
4.0	6.4	52	Lavoisier*
5.0	4.1	56	Ulugh Beigh
6.0	1.5	70	Balboa*
7.0	1.5	210	Petrov
8.0	4.1	224	Oken
9.0	6.5	228	Marinus*
10.0	8.4	230	Gum*
11.0	9.7	232	Gum*
12.0	10.4	233	Abel*
13.0	10.4	234	Abel*
14.0	9.9	236	Abel*
15.0	8.9	238	Barnard*
16.0	7.6	240	Barnard*
17.0	5.9	244	W. Humboldt
18.0	4.1	251	Schorr*
19.0	2.4	271	Peek*
20.0	1.7	329	Endymion*
21.0	2.8	13	Poncelet*
22.0	4.5	27	Babbage*
23.0	6.1	33	Xenophanes*
24.0	7.5	36	Volta*
25.0	8.6	39	Galvani*
26.0	9.4	41	Galvani*
27.0	9.8	43	Gerard*
28.0	9.8	45	Gerard*
29.0	9.3	47	Bunsen*
30.0	8.5	51	Lavoisier*
31.0	7.2	55	Ulugh Beigh*

LUNAR LIBRATIONS - October 2006



Program by Bob Roberts.

Observer at: Lat. 51.00N, Long. 1.00W

\* indicates that the feature is not illuminated.

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2006 OCT.	Age d	Phase	Earth's		Sun's		R.A. h m	Dec. °	Rises		Sets		Transit		Alt °
			Selenographic Longø	Latø	Selenographic Colongø	Latø			h	m	h	m	h	m	
1.0	8.5	0.559	-7.1	6.4	14.0	-0.31	19 05	-27.6	15 39	22 51	19 10	12			
2.0	9.5	0.666	-6.6	5.7	26.2	-0.34	20 04	-24.9	16 06	.. ..	20 07	16			
3.0	10.5	0.769	-5.7	4.7	38.4	-0.37	21 03	-20.6	16 25	00 21	21 02	22			
4.0	11.5	0.860	-4.4	3.3	50.6	-0.40	21 59	-15.0	16 40	01 54	21 54	28			
5.0	12.5	0.932	-2.8	1.6	62.7	-0.44	22 53	-8.5	16 53	03 27	22 46	36			
6.0	13.5	0.980	-0.9	-0.2	74.9	-0.47	23 47	-1.3	17 05	04 59	23 37	43			
7.0	14.5	1.000	1.0	-1.9	87.0	-0.51	00 41	6.0	17 18	06 32	.. ..	..			
8.0	15.5	0.988	3.0	-3.6	99.2	-0.54	01 35	12.9	17 34	08 07	00 29	50			
9.0	16.5	0.948	4.7	-4.9	111.3	-0.58	02 32	19.0	17 55	09 42	01 25	57			
10.0	17.5	0.883	6.2	-6.0	123.5	-0.61	03 31	23.8	18 24	11 14	02 23	62			
11.0	18.5	0.801	7.2	-6.6	135.7	-0.64	04 32	27.1	19 07	12 36	03 22	65			
12.0	19.5	0.706	7.8	-6.8	147.8	-0.67	05 34	28.6	20 04	13 40	04 22	66			
13.0	20.5	0.605	7.9	-6.6	160.0	-0.70	06 34	28.4	21 15	14 26	05 20	66			
14.0	21.5	0.503	7.5	-6.1	172.2	-0.72	07 31	26.6	22 31	14 57	06 14	63			
15.0	22.5	0.404	6.8	-5.4	184.4	-0.75	08 24	23.6	23 48	15 18	07 04	60			
16.0	23.5	0.311	5.8	-4.4	196.6	-0.77	09 14	19.6	.. ..	15 33	07 50	56			
17.0	24.5	0.226	4.6	-3.2	208.8	-0.79	10 00	14.9	01 03	15 45	08 32	51			
18.0	25.5	0.152	3.2	-1.9	221.0	-0.81	10 44	9.7	02 15	15 54	09 13	45			
19.0	26.5	0.091	1.8	-0.5	233.2	-0.83	11 26	4.2	03 25	16 03	09 51	39			
20.0	27.5	0.044	0.4	0.9	245.4	-0.85	12 07	-1.5	04 35	16 12	10 30	34			
21.0	28.5	0.014	-1.0	2.2	257.6	-0.86	12 49	-7.1	05 46	16 21	11 10	28			
22.0	29.5	0.001	-2.3	3.5	269.8	-0.88	13 33	-12.5	06 59	16 33	11 51	22			
23.0	0.8	0.007	-3.4	4.6	282.0	-0.90	14 18	-17.6	08 14	16 47	12 35	18			
24.0	1.8	0.031	-4.4	5.6	294.2	-0.91	15 06	-21.9	09 31	17 07	13 23	14			
25.0	2.8	0.074	-5.2	6.2	306.4	-0.93	15 58	-25.4	10 48	17 37	14 15	11			
26.0	3.8	0.135	-5.8	6.6	318.6	-0.95	16 53	-27.7	11 58	18 20	15 09	9			
27.0	4.8	0.212	-6.2	6.7	330.8	-0.96	17 51	-28.6	12 56	19 20	16 06	9			
28.0	5.8	0.303	-6.3	6.4	343.0	-0.98	18 50	-27.9	13 39	20 35	17 03	11			
29.0	6.8	0.404	-6.2	5.8	355.2	-1.00	19 48	-25.7	14 08	22 00	17 59	14			
30.0	7.8	0.513	-5.8	4.9	7.4	-1.02	20 45	-22.0	14 29	23 28	18 52	19			
31.0	8.8	0.624	-5.1	3.6	19.6	-1.04	21 40	-17.0	14 45	00 56	19 43	25			
NOV.															
1.0	9.8	0.731	-4.1	2.1	31.7	-1.07	22 33	-10.9	14 59	00 58	20 33	32			
2.0	10.8	0.828	-2.8	0.5	43.9	-1.09	23 25	-4.2	15 11	02 27	21 23	40			
3.0	11.8	0.908	-1.3	-1.3	56.0	-1.12	00 17	2.9	15 23	03 56	22 14	47			
4.0	12.8	0.965	0.4	-2.9	68.2	-1.14	01 10	9.9	15 37	05 28	23 07	54			
5.0	13.8	0.995	2.1	-4.4	80.3	-1.17	02 06	16.3	15 55	07 02	.. ..	..			
6.0	14.8	0.996	3.8	-5.5	92.5	-1.20	03 04	21.7	16 20	08 37	00 04	59			
7.0	15.8	0.969	5.3	-6.3	104.6	-1.22	04 06	25.7	16 57	10 07	01 01	63			
8.0	16.8	0.917	6.3	-6.6	116.8	-1.24	05 08	28.0	17 49	11 23	02 05	66			
9.0	17.8	0.847	7.0	-6.6	128.9	-1.27	06 11	28.5	18 56	12 18	03 06	66			
10.0	18.8	0.763	7.2	-6.2	141.0	-1.28	07 11	27.2	20 13	12 56	04 03	64			
11.0	19.8	0.670	7.0	-5.4	153.2	-1.30	08 07	24.5	21 32	13 21	04 56	61			
12.0	20.8	0.573	6.3	-4.5	165.4	-1.32	08 58	20.8	22 48	13 39	05 45	57			

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**Items for the October 2006 circular should reach the Editor by the 10th September 2006**