

BRITISH ASTRONOMICAL ASSOCIATION



LUNAR SECTION CIRCULAR

Director Alan Wells
Assistant Director/Editor John Pedler

Volume 41 No. 3

Data on pages 7-8 are for April 2004

Lunations 1005-1006

Mar. 2004

BAA/ALPO TRANSIENT LUNAR PHENOMENA

Tony Cook

For January, observations have been received from: myself (UK), Clive Brook (Plymouth, UK), Maurice Collins (New Zealand), Gerald North (Narborough, UK), and Brendan Shaw (UK). Just a brief report this month - owing to pressure of work:

During the lunar eclipse in November, did anyone see a brief flash of light +/- 5 min of mid totality? Steve Ringwood (UK) saw a visual flash around this time. I have video of the eclipse Moon also - one video through a camcorder but at low sensitivity, and another video through the telescope at high sensitivity but alas not all the Moon - and so far I have failed to detect the flash, but am still looking. On 2nd Jan at 09:05 UTC Maurice Collins in New Zealand reported a "possible" flash in Mare Imbrium (35N, 16W) in averted vision using his ETX-90 + 7.5mm eyepiece. Was anyone in the US (or elsewhere?) observing at this time?

The following repeat illumination and libration events occur for March:

Event: Alphonsus (Jennings, 1966 Apr 01) can be seen on/from (UTC): 2004 Mar 01/02 Atlanta (00:28-00:57); DC, New York, Puerto Rico (23:00-00:57); Orlando (00:06-00:57); Pittsburgh (00:35-00:57) [*look for colour on floor between central peaks and west wall*]

Event: Plato (Birt, 1870 May 11) can be seen on/from (UTC): 2004-Mar-02/03 Germany, Italy, UK, New York (23:18-03:14); Atlanta, DC, Madison, Orlando, Puerto Rico (00:08-03:14); Harrisburg, Houston (01:00-03:14); Las Cruces, Phoenix, Winnemucca (02:00-03:14) [*sketch/image*]

Event: Gassendi (Moseley, 1967 Mar 22) can be seen on/from (UTC): 2004-Mar-03 Atlanta, DC, Harrisburg, Houston, LA, Las Cruces (06:14-08:32); New York, Phoenix, Pittsburgh (06:14-08:32); Orlando (05:47-08:32); Puerto Rico (04:56-07:59) [*check for colour between central peaks and ESE wall, near junction of 3 clefts*]

Event: Kepler (Lugo, 1954 Nov 07) can be seen on/from (UTC): 2004 Mar 03 Germany, Italy (19:31-23:25), UK (20:00-23:25); New York, Puerto Rico (23:00-23:25) [*check for luminous point(s) - outside E-wall?*]

Event: Cobra Head (Bestwick, 1955 Sep 28) can be seen on/from (UTC): 2003 Mar 03/04 Germany, Italy (23:43-03:37); UK (00:32-03:37) [*look for signs of obscuration*]

Event: Aristarchus (Bartlett, 1955 Sep 29) can be seen on/from (UTC): 2004 Mar 04 Germany, UK (03:23-04:52); Italy (03:23-03:59); Atlanta, Houston, LA, Las Cruces, Orlando, Phoenix, Pittsburgh, Puerto Rico, Winnemucca (04:24-07:52); DC, Harrisburg (03:58-07:52); Madison (04:24-06:59); New York (03:41-07:52) [*is the floor a blue-clay colour?*]

Event: Aristarchus area (Sartory, 1967 Mar 23) can be seen on/from (UTC): 2004-Mar-04 Germany (03:59-04:52); UK (04:34-04:59); Madison (03:59-06:50) [*look for a coloured patch*]

Event: Gassendi (Sartory, 1967 Mar 23) can be seen on/from (UTC): 2004-Mar-04 Germany, UK (03:59-04:52); LA (03:59-07:16); Las Cruces, Madison, Phoenix (03:59-06:20); Winnemucca (03:59-07:39) [*check for colour on S wall*]

Event: Herodotus (Kozyrev, 1955 Oct 28) can be seen on/from (UTC): 2004-Mar-04 Atlanta, DC, Harrisburg, Houston, Madison, New York, Orlando, Pittsburgh (06:15-09:59); LA, Winnemucca (07:17-10:03); Las Cruces (06:29-10:03); Phoenix (06:49-10:03); Puerto Rico (06:15-08:57) [*spectroscopic detection of luminosity down the violet/UV end of the spectrum*]

Event: Aristarchus (Bartlett! 1954-Oct-11) can be seen on/from (UTC): 2004-Mar-04 Germany (17:00-18:43); Italy, UK (18:00-18:43) [*look for violet tint on floor, E-wall and central peak*]

Event: Stevinus and Furnerius (Cameron, 1961-May-29) can be seen on/from (UTC): 2004-Mar-04 Germany, UK (18:19-22:57) [*look for glistening points*]

Event: Aristarchus Area (Firsoff, 1955 Sep 30) can be seen on/from (UTC): 2004-Mar-05/06 Germany, Italy, UK (21:32-01:26); Atlanta, DC, Madison, Orlando, Pittsburgh (00:00-01:26); Harrisburg, Houston (01:00-01:26); New York; Puerto Rico (23:00-01:26) [*is there a westwards yellow smear?*]

Event: Gassendi (Kelsey, 1966 Dec 27) can be seen on/from (UTC): 2004-Mar-06 Atlanta (10:15-11:56); DC, Harrisburg, New York, Pittsburgh (10:05-10:59); Houston (10:40-11:59); LA, Winnemucca (10:05-13:59); Las Cruces, Phoenix (10:05-12:59); Orlando (10:40-10:59) [*check for faint colour on the floor*]

Event: Aristarchus (Farrant, 1967 Dec 16) can be seen on/from (UTC): 2004 Mar 06 Germany (17:25-21:21); Italy, UK (18:00-21:21) [*check for colour on walls*]

Event: Aristarchus (Bartlett, 1955 Oct 02) can be seen on/from (UTC): 2004-Mar-07 New Zealand (08:00-11:38) [*check for colour and sharpness of the crater*]

Event: Aristarchus (Wildevy, 1962 May 20) can be seen on/from (UTC): 2004-Mar-07 New Zealand (14:22-17:59) [*Measure brightness and colour of Aristarchus over time comparing to other features*]

Event: Bullialdus and Kepler (Wildevy, 1962 May 20) can be seen on/from (UTC): 2004-Mar-07 New Zealand (14:22-17:59) [*check brightness of the crater over time and compare to other features*]

Event: Ray near Bessel and Aristarchus (Granger, 1961 May 31) can be seen on/from (UTC): 2004-Mar-07 Italy (18:00-20:35) [*check for*

colour in UV/violet]

Event: Schroter's Valley (Gruithuisen, 1824 Nov 08) can be seen on/from (UTC): 2004 Mar 08 Germany, Italy, UK (00:41-04:34)

[*sketch/image and look for colour*]

Event: Aristarchus (Bartlett, 1955 Oct 03) can be seen on/from (UTC): 2004 Mar 08 New Zealand (08:00-09:50) [*Check sharpness of*

Aristarchus and compare to Herodotus]

Event: Theophilus and Cyrrillus (Jean, 1968 Mar 04) can be seen on/from (UTC): 2004-Mar-25 Germany, Italy (18:00-21:19); UK (19:00-21:19) [*Check of obscuration*]

Event: Proclus (Marchart, 1971 Jan 01) can be seen on/from (UTC): 2004-Mar-25 Germany, UK (22:33-22:47) [*check for colour inside and on N. wall*]

Event: Agrippa (Bartlett, 1962 Jul 10) can be seen on/from (UTC): 2004-Mar-29 Atlanta, Pittsburgh (00:00-02:30); DC, Harrisburg, New York, Orlando (00:00-02:08); Houston, Madison (01:00-02:31); Las Cruces, Phoenix (02:00-02:31) [*how dark is the shadow of the central peak compared to other shadows?*]

Event: Agrippa (Bartlett, 1962 Jul 11) can be seen on/from (UTC): 2004-Mar-30 Atlanta, DC, New York, Orlando, Pittsburgh (00:00-02:00); Houston, Madison (01:00-02:07); Las Cruces, Phoenix (02:00-02:07) [*how dark is the shadow of the central peak compared to other shadows?*]

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!

TOPOGRAPHICAL SUB-SECTION

COLIN EBDON

At the time of writing (early February) the weather is wild and windy, with a gibbous moon slipping in and out of low scudding cloud. This, following on from a severe cold snap in January and an excess of cloudy nights, has meant that I have received fewer than usual observations from members. I am therefore including one of my own observations made near the start of the new year.

This is of the semi-circular walled plain Balmer, described in Rukl as 'the remains of a flooded walled plain'. (See page 7).

If that name has you reaching for a Moon map, rest assured that I had to do the same before I started drawing this feature.

I have, in the past, made the mistake of drawing a small, unfamiliar area, then looking it up the next day, only to remain undecided about exactly what I had been viewing the night before, even when there has been a 'landmark' crater not too far away. This is because, whilst many maps and atlases are accurate enough as to identifiable features such as craters, rilles, mountains etc, they can be very sketchy when it comes to the topography of the surface in between. This situation is even more noticeable towards the lunar poles.

Balmer itself is well depicted in Rukl's atlas, but on many maps that I have it is unnamed, and the lunar surface between here and the nearby spectacular crater Vendelinus is dealt with in a cursory manner.

Nevertheless, I do not think that I would have ever considered Balmer as part of my lunar observing programme had it not been such a noticeable feature on the terminator at the time this drawing was made.

I can still recall being startled by the view at the eyepiece some years ago when confronted by what appeared to be a massive walled plain that I had not even noticed before. How could I have missed it? This turned out, on further investigation, to be the giant degraded walled plain Deslandres, almost twice the size of the more familiar walled plain Walter, adjacent to it. On the terminator, the true nature of Deslandres as a feature in its own right was apparent. Under higher lighting conditions, however, it just blends with the background.

The moral is a simple one; the Moon is a vast place, and there is always something new to see. So, if one night you look through the eyepiece and think 'what's that' - take the opportunity to record what you see and look it up there and then - before it is too late!

MOSAICING Brendan Shaw

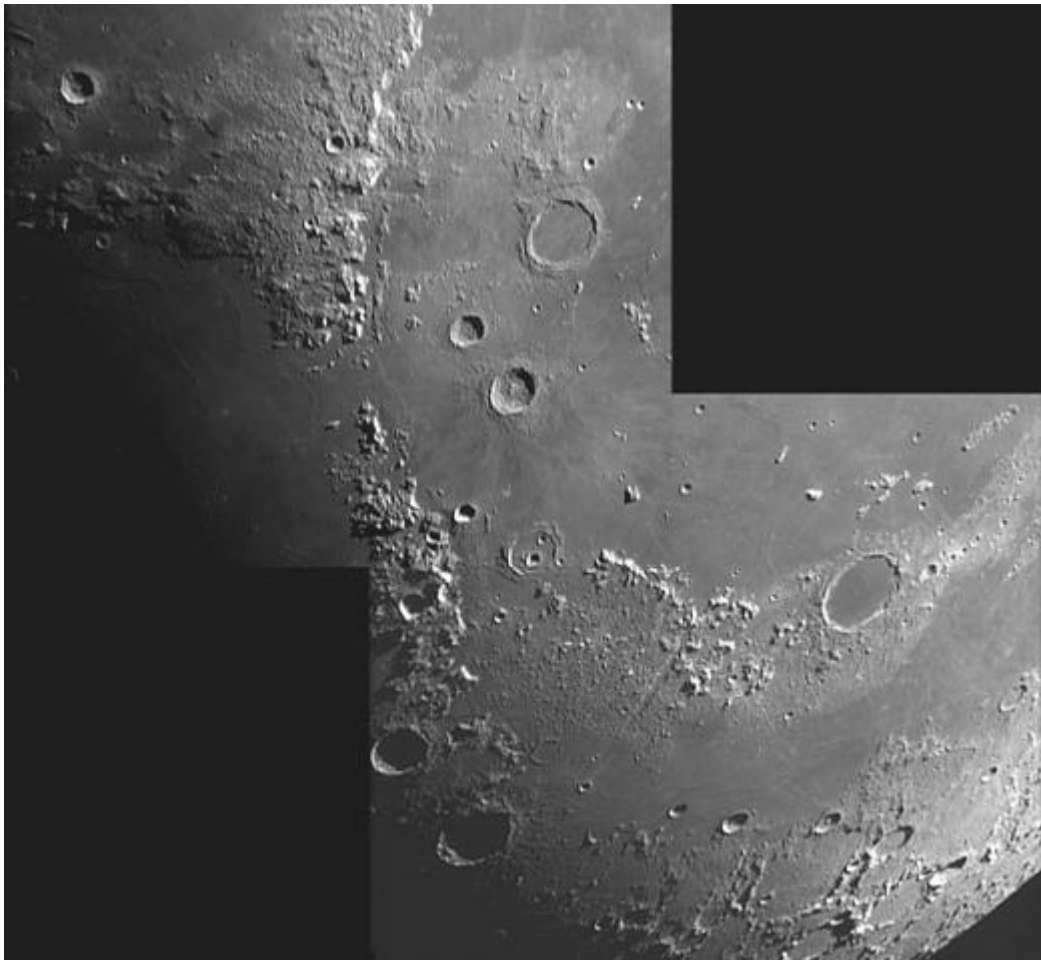
I've been messing around recently with image "mosaicing", i.e. stitching several lunar pictures together to make one big one. I know now that I need to go out to the 'scope with the specific idea of taking pictures for a mosaic, as it's important not to rotate the camera or change brightness settings or filters between shots. I was aware of this of course, but I had expected to be able to make brightness adjustments and rotate pictures using PC software, but, so far, it hasn't been 100% successful.

However, fortuitously, some pictures have stitched together well. And in stitching them together, I've noticed things that I overlooked before, probably because I tend to process my new pictures on a bit of a "production line" and don't spend that much time examining them. Shame on me! Anyway, one mosaic in particular (taken on the 17th September 2003, around 0036UT, with a 5" refractor and a video-camera) drew my attention to something I've not noticed before - the edge of Mare Imbrium shows what looks like a second "Alpine Valley", or more accurately an Apennine Valley!

It starts about 125 km to the south-east of Archimedes, seeming to follow the line of Rimae Archimedes, cuts across Rima Bradley, on into the Apennines north of the high peak north of Conon (still with me?), on through the Apennines running just to the south of Galen, finishing up in something that rejoices in the splendid name of Lacus Odi! It's hard to say if there really is a valley there, it may just be a chance alignment of shadows and wotnot, but it did present that appearance to my eye. I hasten to add that there are no joins in this part of the mosaic.

Other things : note the furrow running from Plato-T into the north-east corner of Plato. Something "continues" on eastwards (offset slightly to the south), but I don't think it is the same "thing". It may even be a processing artefact. Another small furrow can be seen on the east side of Archimedes, cutting through the glacia, running roughly due north. The floor of Archimedes is attractive, with a striped, almost chevroned, appearance. If you have sharp eyes you can probably just make out the Hadley Rille, particularly to the south of that small crater (the designation of which eludes me). It's still amazing to think that men walked (and drove!) here once. Will we ever return? Slightly further to the north, the coarser parts of Rimae Fresnel can be seen. And look just to the east of where Mare Imbrium joins Mare Serenitatis and you should be able to see the "Valentine" dome, though not the rille that cuts it unfortunately. Very low lighting is needed to show domes and I was obviously lucky enough to catch this one at a good moment!

Photos next page...



I have orientated the images to the classical view, e.g., S at the top with E to the left.

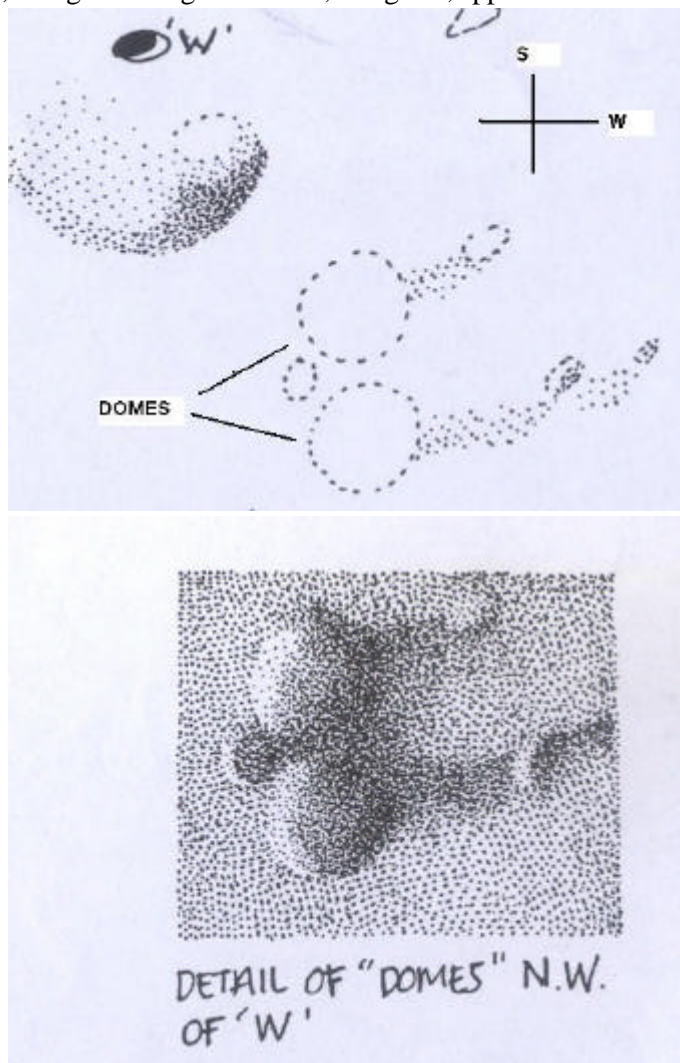
Incidentally, the Lacus Odi means the Lake of Hate!

Ed.



The following is a partial list of some of the most interesting domes from the BAA Lunar Section observing program that will be visible under grazing illumination during March 2004 (Sun's altitude as been set at 2°). The complete list has been greatly improved since the beginning of the lunar dome program, so I prefer to send it to section's members via e-mail or ordinary mail. In the near future the list will be located on the English page of the web site of Unione Astrofili Italiani (UAI) thus saving space on the Circular. The list below gives date, UT, rising or setting conditions, Long/Lat, approximate location of the dome.

03.03.2004, 00:36, R, -44.16+25.85, Inside crater Prinz
 04.03.2004, 23:41, R, -69.24-19.03, Inside crater Darwin
 04.03.2004, 20:44, R, -67.48-03.50, Inside crater Grimaldi
 04.03.2004, 22:50, R, -68.57-04.47, Inside crater Grimaldi
 04.03.2004, 23:39, R, -68.69-04.07, Inside crater Grimaldi
 05.03.2004, 01:18, R, -69.82-05.05, Inside crater Grimaldi
 10.03.2004, 04:41, S, +44.07-12.12, Inside crater Magelhaens
 11.03.2004, 05:39, S, +30.07+32.21, Inside crater Posidonius
 11.03.2004, 03:34, S, +32.56-19.27, Inside crater Fracastorius
 11.03.2004, 05:26, S, +31.05+10.60, N of crater Sinas E
 11.03.2004, 05:06, S, +31.20+11.30, N of crater Sinas
 11.03.2004, 04:45, S, +31.37+11.54, N of crater Sinas
 11.03.2004, 04:33, S, +31.55+10.40, NE of crater Sinas E
 11.03.2004, 04:59, S, +31.36+07.47, S of crater Sinas
 11.03.2004, 00:52, S, +33.96-22.27, Inside crater Fracastorius
 11.03.2004, 03:39, S, +31.95+10.72, NE of crater Sinas E
 11.03.2004, 04:17, S, +31.73+07.01, SW of crater Sinas
 11.03.2004, 01:09, S, +33.79-19.57, Inside crater Fracastorius
 11.03.2004, 03:05, S, +32.29+08.74, E of crater Sinas
 30.03.2004, 20:32, R, -20.83+58.65, S of crater Fontenelle B
 30.03.2004, 20:15, R, -20.74+58.32, W of crater Fontenelle G
 30.03.2004, 00:21, R, -14.05-30.60, Inside crater Pitatus
 30.03.2004, 00:17, R, -14.02-28.95, Inside crater Pitatus
 30.03.2004, 00:58, R, -14.37-29.01, Inside crater Pitatus
 30.03.2004, 00:59, R, -14.38-30.46, Inside crater Pitatus
 31.03.2004, 00:16, R, -26.16-34.12, Inside crater Capuanus
 31.03.2004, 01:08, R, -26.60-34.26, Inside crater Capuanus
 31.03.2004, 01:28, R, -26.77-33.64, Inside crater Capuanus



The subsection observing program focuses mainly on highland and intracrateric domes as well as on some selected mare domes. Among these I am collecting a fine set of observations of the domes in Mare Frigoris - which have been described on the vol. 39 no. 8 (8/2002) of LSC. Nigel Longshaw sent me a beautiful and detailed drawing (partially reproduced here) made on 2003 February 11th of the two (three ?) domes at -20.74/+58.32 and -20.83/+58.65. The Sun was already 4.5° high above the features, however they were still most in shadow and fairly defined. Nigel reported that "...there certainly seems to be a cluster of 3 domes in the area NW of the small crater W". Moreover something like lobate scarps (lava flow fronts ?) were also reported. I would very much welcome any drawings, images and detailed descriptions of this area to complement a scientific paper under preparation about this interesting lunar region. The two domes described by Nigel will be well placed for observations on next March 30.

Occultation subsection news

Andrew Elliott

I was very sorry to hear of the sudden and untimely death of Jeremy Cook. Jeremy and family contributed much to the activities of Reading Astronomical Society during much of my own membership there. He was always very helpful to me and other members, and took on the job of Lunar Section Director with much enthusiasm. I well remember visiting him once to find the whole of the house covered with neat rows of the pages of the next Lunar Section Circular which he had been laboriously hand cranking from the old stencil machine! It was very heartening that the astronomical community, both amateur and professional, were well represented at his funeral. I would like to take this opportunity of expressing my own condolences to Marie and Tony.

Once again, this month's grazing occultations are not particularly favourable. Graze track 12 on March 30 (see January LSC) is only visible from the west coast of Ireland and then only against the bright limb of the moon. Graze track 13 on March 31 is more favourable but just clips the south western coast of Ireland and then Cornwall between Camborne, Falmouth, Redruth and Truro. If we have any members in that area...

Predictions for 52°27'41.4"N 1°44'44.0"W Birmingham

April 2004

Day	Time-UT	P	Object	O	Max	Sp	%	Elg	Sn	Mn	Mn	CA	PA	Watts	a	b	Star's	<u>apparent</u>
	H	M	S	D	Reference	V	Mag	Snlt	Alt	Alt	Az		Angle	Min/°			RA	Dec
APRIL																		
1/03	30	46/D	PPM 126426	35	6.7	G5	79+	125		10	290	78N	100	82	.2-1.3		92459.9	194611
2/01	01	56/D	PPM 127175	55	7.8	F0	86+	136		35	248	80S	126	106	-.4-1.4		101057.1	154103
2/19	03	48/DK	PPM 127764	87	6.8	K0	91+	146	-4	34	119	32S	177	156	-.4-2.3		105122.3	113323
9/03	24	47/R	PPM 265557	95	6.9	A2	82-	130		12	180	42S	233	225	-1.1 .3		162830.7-252753	
9/04	05	41/R	PPM 265598	98	4.9	B3	82-	130-12		12	189	26N	345	338	-.6 -.7		163028.1-250733	
22/21	32	58/D	PPM 93565	86	7.1	A0	10+	37		10	296	28S	140	148	.8-2.5		43035.9	233555
25/22	02	30/DK	PPM 97120	16	7.9	K0	33+	69		29	276	58S	127	119	.1-1.8		70954.4	263106
25/22	56	27/D	PPM 97160	27	6.8	K0	33+	70		21	286	52S	133	126	.3-1.8		71144.6	262405
25/23	15	51/DX	PPM 97190	15	7.8	K0	33+	70		19	289	79N	85	77	.0-1.2		71245.9	263335
26/20	54	28/D	PPM 98213	16	8.0	A0	41+	80		45	251	40S	150	139	-.1-2.3		80040.8	250129
26/21	00	11/D	FK5 1211	19	5.9	K0	42+	80		45	252	41N	52	40	-1.1 .0		80110.5	252301
26/21	22	05/DC	PPM 98236	18	6.2	A0	42+	80		42	257	78S	113	101	-.4-1.4		80158.4	250449
26/21	40	17/D	PPM 98244	15	8.5	K7	42+	80		39	261	59S	132	120	-.2-1.8		80220.0	245802
26/22	01	29/D	PPM 98263	15	8.5	K5	42+	80		36	265	75S	116	104	-.2-1.5		80310.3	245829
27/21	22	36/D	PPM 99136	15	8.6	G5	51+	92		46	243	84S	112	97	-.6-1.2		85417.6	221723
27/21	36	17/D	PPM 99139	16	7.6	G5	51+	92		44	246	70S	126	110	-.4-1.5		85433.1	221150
27/23	14	23/D	FK4S 2708	17	7.0	G5	52+	93		30	267	58S	139	123	.0-1.8		85719.5	215046
28/22	30	06/D	PPM 126781	15	7.9	G0	62+	104		40	244	81S	120	101	-.5-1.3		94701.2	180552
28/23	48	39/D	PPM 126822	15	7.8	K0	62+	104		29	262	44N	65	46	-.7 -.8		94919.5	180223
29/19	36	51/D	FK5 1272	38	5.7	M0	71+	114	-1	51	168	29N	53	32	-1.4 1.7		103225.5	140659
ABOVE STAR IS A VARIABLE STAR																		
29/23	17	22/D	PPM 127558	35	7.5	A0	72+	116		36	241	37S	168	147	.0-2.1		103715.3	125041

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 new format predictions.

Computing Sub-section

Mike Carson-Rowland, Co-ordinator

My first task, as the new Computing Co-ordinator, is to get the Lunar Section web site up to date. A new domain has been registered: www.BAALunarSection.org.uk, which can be accessed either directly or via the main BAA web site (www.britastro.org/lunar). By the time you read this, the new site will be well under way.

I welcome any ideas about what should be included. I don't promise to implement them, but I do promise that they will be given proper consideration! One thing I do hope to have available is a Guest Book, which can be accessed by all members so that they can post ideas and comments. Extracts from previous LSCs should also prove to be informative.

Suitable images will be welcomed: email them to the address below.

Mike@BAALunarSection.org.uk

From the Director...

Can I echo the words of the new computing co-ordinator? Have you visited the web site recently? There is a great chance to add work from the section so that the wide range of activities that are undertaken can be shared. He is looking for some recent images that may have been taken, if you have these can you send them to him, with details of the equipment used and time and date etc. He would also be pleased to hear of any other suggestions of things that could be put on the site. Help him to make the Website a good thing to look at.

BALMER

Observer Colin Ebdon.
 Date 2004 Jan 8.
 Time 22.45 to 23.45 UT.
 Transparency Excellent.
 Seeing II-III then III.
 10 inch f6.5 Newtonian X236
 Lunation 1002

Earth's Sel. Long. -4.6 (0h 9th)
 Earth's Sel. Lat. -6.4 (0h 9th)
 Sun's Selen. Co-Long. 96.96-97.3
 Sun's Selen. Lat. -1.36 (0h 9th)

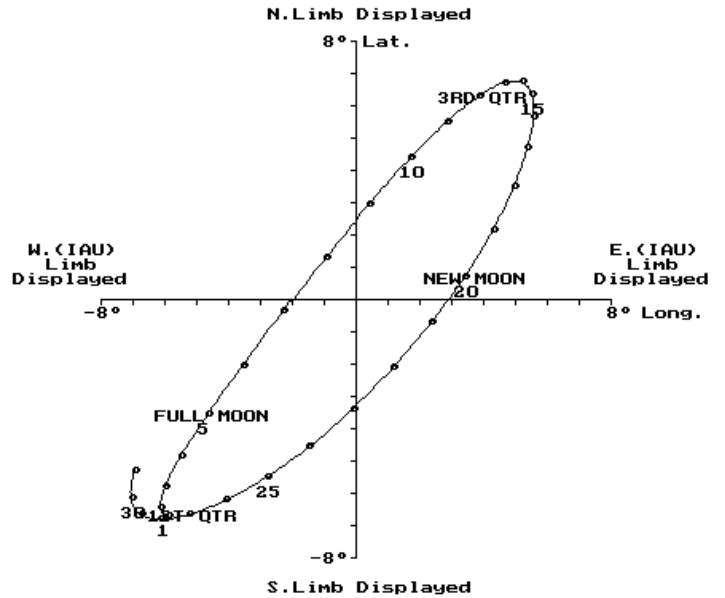
(All values in degrees)



LIBRATION April. 2004

LUNAR LIBRATIONS - April 2004

Geocentric: —●— The markers show 0:00H UT



Date	Libration amount	PA	Feature presented
1.0	8.7	135	Graff*
2.0	8.6	133	Graff*
3.0	8.0	131	Drude*
4.0	6.8	128	Bouvard*
5.0	5.3	123	Shaler
6.0	3.5	112	Eichstadt
7.0	1.9	78	Bohr
8.0	2.2	12	Poncelet
9.0	3.9	346	Petermann*
10.0	5.7	336	Strabo*
11.0	7.2	332	Endymion*
12.0	8.3	328	Endymion*
13.0	9.0	326	Chevallier*
14.0	9.3	324	Mercurius*
15.0	9.1	321	Zeno*
16.0	8.5	319	Zeno*
17.0	7.6	315	Boss*
18.0	6.4	311	Riemann*
19.0	5.0	305	Gauss*
20.0	3.4	295	Liapunov
21.0	2.0	271	Peek
22.0	1.6	208	Petrov
23.0	2.7	167	Wilson*
24.0	4.3	153	Phocylides*
25.0	5.8	145	Pingre*
26.0	7.1	140	Inghirami*
27.0	8.2	136	Catalan*
28.0	8.9	133	Graff*
29.0	9.3	130	Drude*
30.0	9.1	126	Shaler*

Program by Bob Roberts.

Observer at: Lat. 52.00N, Long. 0.00W

* indicates that the feature is not illu-

2004 APR.	Age d	Phase	Earth's Selenographic		Sun's Selenographic		R.A.		Dec. ø	Rises		Sets		Transit		Alt ø
			Longø	Latø	Colongø	Latø	h	m		h	m	h	m	h	m	
1.0	11.1	0.779	-5.9	-6.8	40.0	-0.84	09	19	21.1	13	24	04	42	21	21	55
2.0	12.1	0.858	-6.2	-6.5	52.2	-0.82	10	10	16.7	14	45	05	00	22	09	49
3.0	13.1	0.924	-6.0	-5.9	64.3	-0.79	11	00	11.3	16	07	05	15	22	56	43
4.0	14.1	0.972	-5.5	-4.9	76.5	-0.76	11	49	5.3	17	30	05	28	23	43	36
5.0	15.1	0.997	-4.7	-3.6	88.7	-0.73	12	39	-1.2	18	55	05	40	..	..	..
6.0	16.1	0.996	-3.6	-2.1	100.8	-0.70	13	30	-7.7	20	24	05	54	00	31	30
7.0	17.1	0.968	-2.4	-0.4	113.0	-0.66	14	24	-14.0	21	56	06	10	01	24	23
8.0	18.1	0.913	-1.0	1.3	125.2	-0.63	15	20	-19.5	23	27	06	31	02	19	18
9.0	19.1	0.836	0.4	2.9	137.3	-0.59	16	21	-23.8	00	52	07	01	03	18	13
10.0	20.1	0.740	1.7	4.4	149.5	-0.56	17	24	-26.6	00	53	07	43	04	20	11
11.0	21.1	0.632	2.9	5.5	161.7	-0.52	18	28	-27.6	02	04	08	43	05	23	10
12.0	22.1	0.519	3.9	6.3	173.9	-0.49	19	31	-26.8	02	57	09	58	06	24	11
13.0	23.1	0.407	4.6	6.7	186.1	-0.46	20	32	-24.3	03	32	11	22	07	22	14
14.0	24.1	0.302	5.2	6.7	198.3	-0.43	21	29	-20.4	03	57	12	46	08	15	19
15.0	25.1	0.207	5.5	6.4	210.5	-0.40	22	21	-15.6	04	14	14	08	09	04	24
16.0	26.1	0.128	5.6	5.7	222.7	-0.38	23	10	-10.1	04	28	15	27	09	50	30
17.0	27.1	0.067	5.4	4.7	234.9	-0.35	23	57	-4.3	04	40	16	43	10	33	36
18.0	28.1	0.025	4.9	3.5	247.2	-0.33	00	42	1.6	04	51	17	57	11	15	42
19.0	29.1	0.003	4.3	2.1	259.4	-0.31	01	27	7.4	05	03	19	11	11	58	48
20.0	0.4	0.002	3.4	0.7	271.6	-0.29	02	13	12.8	05	15	20	26	12	41	53
21.0	1.4	0.020	2.4	-0.7	283.8	-0.26	02	59	17.6	05	30	21	40	13	26	57
22.0	2.4	0.056	1.1	-2.1	296.1	-0.25	03	47	21.6	05	49	22	53	14	12	61
23.0	3.4	0.108	-0.2	-3.4	308.3	-0.23	04	37	24.8	06	15	..	..	15	01	64
24.0	4.4	0.173	-1.5	-4.6	320.5	-0.21	05	29	26.8	06	50	..	..	15	52	65
25.0	5.4	0.250	-2.9	-5.5	332.7	-0.19	06	22	27.6	07	37	00	58	16	43	65
26.0	6.4	0.337	-4.1	-6.2	345.0	-0.17	07	16	27.2	08	37	01	45	17	34	64
27.0	7.4	0.430	-5.3	-6.7	357.2	-0.15	08	09	25.4	09	46	02	19	18	24	61
28.0	8.4	0.528	-6.2	-6.9	9.4	-0.13	09	00	22.5	11	01	02	45	19	12	57
29.0	9.4	0.627	-6.8	-6.7	21.6	-0.11	09	51	18.5	12	19	03	05	19	59	52
30.0	10.4	0.723	-7.1	-6.2	33.8	-0.08	10	40	13.6	13	39	03	20	20	45	46
1 (May)	11.4	0.813	-7.0	-5.4	45.9	-0.05	11	29	7.9	15	00	03	34	21	32	40
2.0	12.4	0.891	-6.5	-4.2	58.1	-0.02	12	18	1.6	16	24	03	46	22	19	33
3.0	13.4	0.952	-5.6	-2.8	70.3	0.01	13	08	-4.9	17	51	03	59	23	09	26
4.0	14.4	0.989	-4.3	-1.1	82.5	0.04	14	01	-11.4	19	23	04	14	..	..	..
5.0	15.4	1.000	-2.7	0.6	94.7	0.08	14	57	-17.4	20	57	04	32	00	04	20
6.0	16.4	0.981	-1.0	2.4	106.8	0.12	15	57	-22.3	22	30	04	58	01	00	15
7.0	17.4	0.933	0.8	4.0	119.0	0.15	17	01	-25.8	..	..	05	35	02	05	11
8.0	18.4	0.860	2.6	5.2	131.2	0.19	18	08	-27.5	..	..	06	30	03	11	10
9.0	19.4	0.768	4.1	6.2	143.4	0.22	19	14	-27.2	00	53	07	43	04	15	11
10.0	20.4	0.663	5.3	6.7	155.6	0.26	20	17	-25.1	01	35	09	06	05	16	13
11.0	21.4	0.552	6.2	6.8	167.8	0.29	21	15	-21.5	02	03	10	33	06	12	17
12.0	22.4	0.442	6.7	6.5	180.0	0.32	22	09	-16.8	02	22	11	56	07	02	22

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Editor@BAALunarSection.org.uk

Items for the April 2004 circular should reach the Editor by the 10th March 2004