THE BRITISH ASTRONOMICAL ASSOCIATION

LUNAR SECTION CIRCULAR

Director Alan Wells
Assistant Director/Editor John Pedler

Volume 42 No. 2 Data on pages 7-8 are for Mar. 2005 Lunations 1016-1017 Feb. 2005

TOPOGRAPHICAL SUB-SECTION COLIN EBDON

I am pleased to be able to report that the Christmas and New Year period saw some clear skies over Essex for a change and it was a joy to be able to undertake some serious observing at the eyepiece after months of life in the astronomical equivalent of the Doldrums. I do hope that others around the country were able to find the odd fine night or two over the holiday period and that by the time this appears I will have received an avalanche of material from members (well, a steady trickle anyway).

During February, the libratory aspects mean that the Southern limb regions are favoured with the tilt in Latitude gradually increasing from first Quarter onwards and Libration in longitude slowly decreasing from the East towards the moving terminator. Hence as the terminator moves from night to night it will be possible to attempt observation of difficult regions on the limb from East to West.

For those who prefer to stay with easier targets, there is plenty to see. In the October issue of the Circular I said something about the giant walled plain Deslandres. Since then, I have received a Mosaic picture from Michael Hather of the southern uplands, a cropped version of which is included here. Details: 2004 19 December 21.20 UT. Nikon D-70 Camera with 140mm Maksutov- Cassegrain f14 1/20 sec. @ ISO 200. This shows just how impressive this feature is when on the terminator. Deslandres is not perfectly placed this month, but sunrise over the first half of this formation can be witnessed from 21hrs onwards on 16 February. By the following night it will be much less prominent, but try picking it out anyway.

The same hour on 17 February sees sunrise over Clavius - always an impressive sight. The following night will provide the perfect opportunity to capture a fine view of sunrise over the Riphaean Mountains.

Further South try taking a look at the interesting couplet of Hainzel and Mee on 19 February. On the 20th we have a fine opportunity to follow up earlier work on the Schiller Annular Plain.

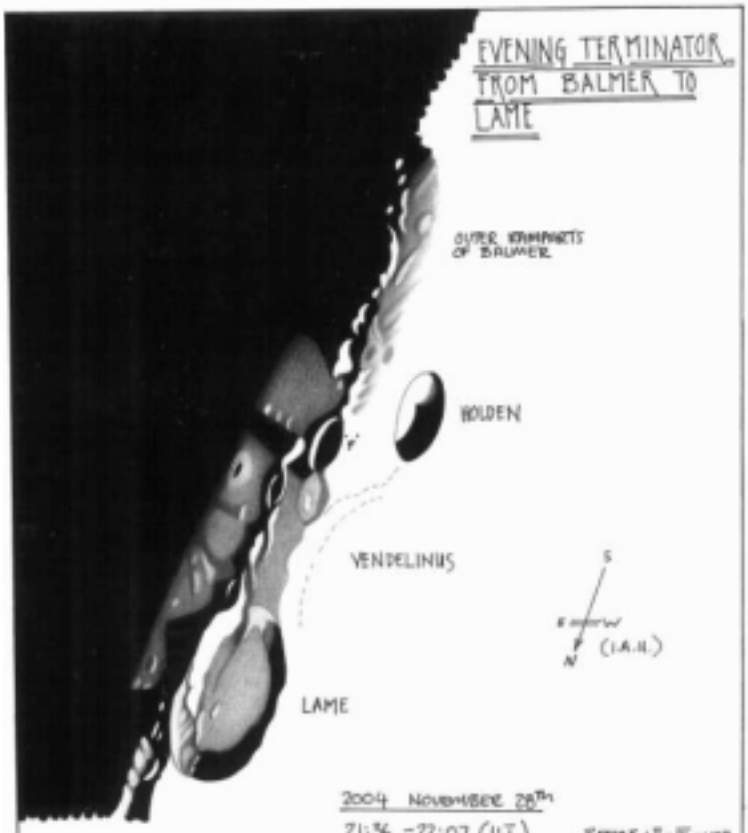
On the Southern limb regions Newton is well placed on 19th and the 20th and 21st will present a decent opportunity to observe the Drygalski and Le Gentil regions.

To help kick-start the New Year I have also included here a fine image of Maurolycus and Stofler by Ed Crandall. Details: 110mm APO Refractor f6.5 2" SD, IRB Filter + TOUCAM. 2004 December 19 01.49 UT. Seeing: 6-7/10. Also included is a detailed observation of the interesting dome-like feature on the Western shoreline of the Mare Crisium from Phil Morgan and a beautiful rendering of the evening terminator from Balmer to Lame provided by Nigel Longshaw.

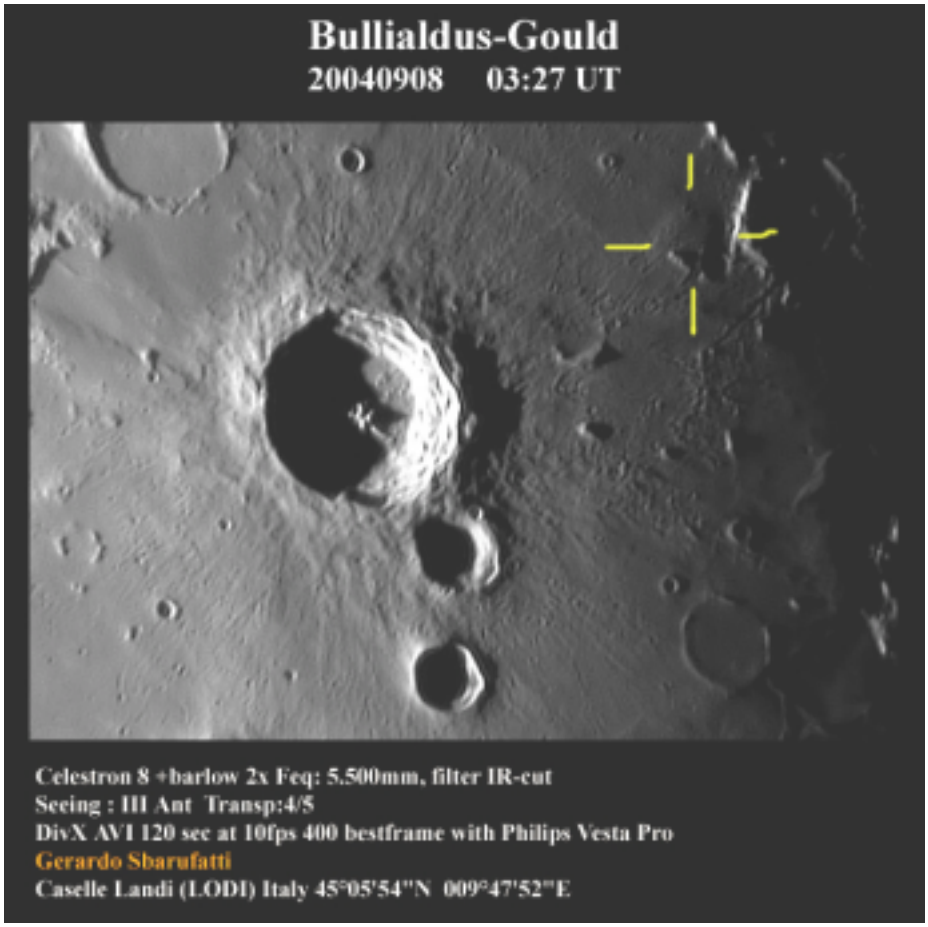
Good luck and good seeing in 2005!

Western shore of Mare Crisium at Sunset

OBSERVATION BY PAUL MORGAN. 2004 NOVEMBER 30TH.
305mm f/5 NEWTONIAN ×400. 02·20 & 03·00 UT.
SEEING 5/10 TRANSPARENCY 3/5
SUN'S COLONGITUDE 126°·26 & 126°·60.
GEOCENTRIC LIBRATION LONG. −0·7
LAT. −6·4



Lunar domes are fascinating and elusive features. Although the Moon has been observed and imaged by the space probes for decades it seems that this happened under unfavourable conditions for domes to be discovered. Many of them still need to be reported, and every now and then amateur astronomers are able to add new items to the dome catalogues by observing those lunar features that lie just on the terminator line. Moreover in some instances domes remain unrecognised on the old photographic plates and atlases until they are noticed by chance or during researches for other purposes. This is the case with a gentle but prominent surface swelling located ENE of the Eratosthenian crater Bullialdus, in Mare Nubium (see Rukl table no. 53) just W of the ruined crater Gould. Coordinates are Long. 18.25° W and Lat. 19.20° S. The swelling is clearly reported on the plates F14, F15, F17 and F20 of the Consolidated Lunar Atlas. The LAC table no. 94 also report it. Italian amateur Gerardo Sbarufatti photographed the dome on September 8th, 2004 at 03:27 UT while imaging crater Bullialdus (details are on the image itself). Based on this photograph and on those from the CLA it seems that the dome is roughly trapezoidal in shape with the major axis along the SW-NE direction and dimensions of about 13.5 x 17 km. The slope steepness is variable. On the SW side the dome lies along the remnant of an ancient structure, the steepness of the other sides seems to decrease in the counter-clockwise direction but further observations are needed to obtain a detailed profile of the feature.



Mare Nubium occupies the site of the ancient pre-Nectarian (i.e. more than 4 b.y. old) Nubium basin that Wilhelms [1] reports was 690 km wide. Lavas in this area are low-Titanium type basalts and are relatively young (2.77 b.y. old) compared with the basin age [2]. Volcanism in Mare Nubium left many considerable features that are common to other lunar maria as wrinkle ridges, ghost craters, lava flows and lunar domes. The most conspicuous domes are located around crater Kies, where there is also one of the most prominent lunar volcanoes, Kies Pi, whose summit pit can be observed even in small telescopes. The swelling W to crater Gould, instead, lack of any eruptive vent thus it cannot be a true volcano. The tiny craters that batter the lava surface here are impact craters including secondary elongated craters from Bullialdus' impact. Most probably this irregular dome is the surface manifestation of a shallow tabular intrusion of an evolved and relatively viscous magma and could fall in the groups 4 or 5 of the dome classification scheme by Head and Gifford [3].

References:

[1] Wilhelms, D.E., The geologic history of the Moon, U.S. Geol. Surv. Prof. Pap., 1348, 1987

[2] Hiesinger H., Head III J.W., Wolf U., Jaumann R., Neumuk G, Ages and stratigraphy of mare basalts in Oceanus Procellarum, Mare Nubium, Mare Cognitum and Mare Insularum, J. Geophys. Res., 108 (E7), 5065, doi:10.1029/2002JE001985

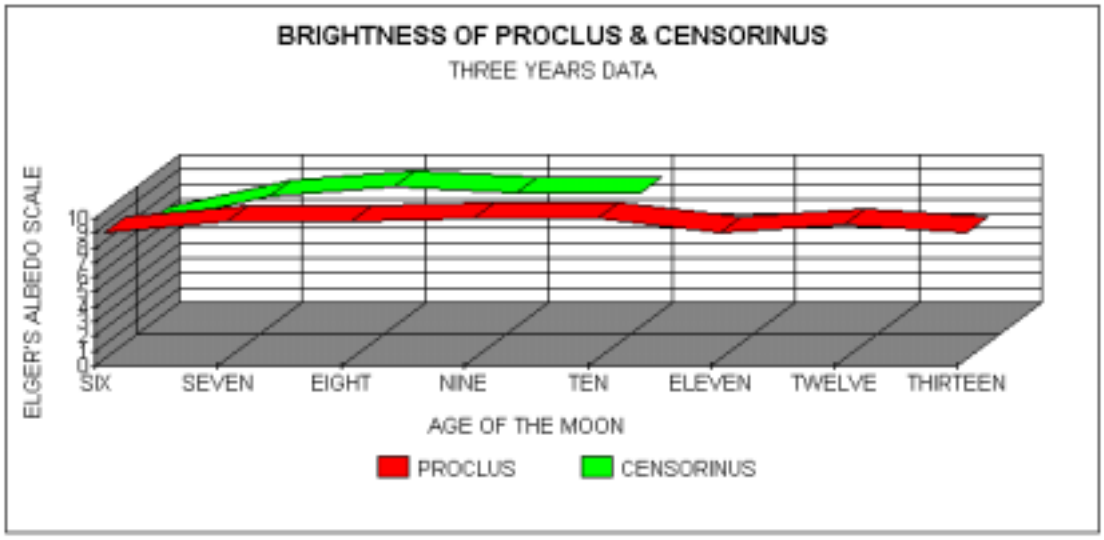
[3] Head J.W., Gifford A., Lunar Mare Domes: Classification and modes of origin, The Moon and the Planets 22 (1980) 235-238

BAA/ALPO TRANSIENT LUNAR PHENOMENA

David Darling

Due to teaching pressures at University over the next 6 months, David Darling (Assistant TLP coordinator for ALPO) has volunteered to write the monthly TLP articles (his first one is below) and to receive BAA/ALPO observation. Please give him your full support. - Tony Cook

HISTORY OF BRIGHT CRATERS: During the month of December we had several observers report increased brightening to some already bright craters on the Moon. These lunar formations were: Aristarchus, Censorinus, and Birt. The crater Aristarchus was reported on 2004 DEC 02 UT 01:55 - 02:45 by Clive Brook of Plymouth, UK. He could see variations in brightness and contacted Dr.Cook. I received this information by email from Dr. Cook and passed it on to all my observers. I had two observers: Michael Amato of West Haven CT, USA who confirmed the variation in brightness on 2004 DEC 02 UT 03:00, and Robin Gray of Winnemucca, NV, USA made an albedo reading showing Aristarchus going through changes in brightness on 2004 DEC 03 UT 08:40 - 10:03. Unfortunately none of the observers reported variations in brightness at the same time, failing to give us the confirmation of the event I had hoped for. I checked out different correlations such as the Solar activity and perigee and apogee. http://www.dxlc.com/solar/ .I found that the sunspot activity and solar flux had peaked during the time of the event. The fluctuation in brightness of the crater may have been caused by the earth's atmosphere but to have it behave the same way across the Atlantic Ocean and for two consecutive days makes that unlikely. I got the impression from the report that the fluctuation reported was behaving similar to Aurora



Borealis as it pulsed and danced across the night sky. We also had a report for Censorinus on 2004 DEC 18 UT 02:00 showing a period of brightening by Frank Serio of Houston, Texas, USA. It is unclear at this time if something unusual had taken place with this crater or not; it may have been an artifact of Registax. When checking the solar data site I did find that Solar Flux, Sunspot activity and Planetary K index were all on the increase. The crater Birt was reported by Robin Gray on 2004 DEC 20 UT 2:51-3:26 to show exceptional brightness to nimbus surrounding it. This correlates closely with a repeat lighting event made on 1969 Nov 17 where pulsation were reported on the west wall of Birt. This could be a strong indication that this crater becomes bright at this time and the pulsation reported in 1969 may have been seeing related? The Solar activity showed all three plots having increased activity. When examining the perigee & apogee date 4 DEC 2004 and 21 DEC 2004 we find both events land close to both days, indicating possible tidal stress effect. See hyperlink http://www.fourmilab.ch/earthview/pacalc.html I have put a graph showing the brightness of two craters during eight days of lunation to show how they in fact they change in brightness. I also want to point out that if you are taking albedo measurements using Elger Albedo Scale it is important to measure a secondary feature as well as a near by Lunar Maria to get the most accurate results. If all three target spots on the Moon go through fluctuation in brightness that would indicate Earths atmospheric may be a cause. The same is true if you are taking brightness reading from your CCD image to make sure you place a secondary feature that is also bright in the same field of view. When taking an albedo measurement of the near by Lunar Maria it should be in the same longitude as your

primary target. There are more directions on how to do albedo measurements available on my web site under L. T. P. Observing Manual. You will find that once you begin looking at the lunar features as variation in albedo brightness the Moon comes alive as a great tapestry of light and dark splotches that come and go as the solar angle changes. When you begin to accumulate your albedo measurements on the craters you been monitoring you can become very excited when an albedo variance takes place for no apparent reason. You will find the data you been collecting confirms that a real L.T. P. event has taken place. I want to close now and remind you that when you submit a drawing or image with your report it is critical that the UT date and time be indicated for these attachments. Failing to do so will reduce the quality of the report and increase the correspondence load since an email will have to be sent to request that information.

The following repeat illumination and libration events for UK observers occur for February:

Event: Aristarchus (Taboada, 1969 Jan 12) can be seen on/from (UT): 2005 Feb 03 (03:38-06:44) - *[Monitor brightness near to the Schroter's Valley cleft and look for colour anywhere in the region]*

Event: Herodotus (Bartlett, 1976 Aug 21) can be seen on/from (UT): 2005 Feb 05 (06:50-07:48) - *[Is there a pseudo peak visible on the floor?]*.

Event: Aristarchus (Brown, 1966 Apr 02) can be seen on/from (UT): 2005 Feb 21 (00:49-05:42) - *[Do you find the central peak to be very bright and glistening?]*.

Event: Plato (Schmidt, 1873 Apr 10) can be seen on/from (UT): 2005 Feb 23 (03:42-06:22) - *[Look for faint bright fuzzy patches in the east of the crater]*.

Event: Lichtenberg (Baum, 1951 Jan 21) can be seen on/from (UT): 2005 Feb 22 (17:29-21:30) - *[Look for a tiny red spot]*.

Event: Aristarchus (Bartlett, 1955 Oct 31) can be seen on/from (UT): 2005 Feb 23 (20:53-05:07) - *[Check the crater for colour]*.

Event: Timocharis (Firsoff, 1955 Aug 03) can be seen on/from (UT): 2005 Feb 24 (05:54-06:56) - [Is this crater bright in blue light, large and diffuse?].

Event: Manilius (Firsoff, 1955 Aug 03) can be seen on/from (UT): 2005 Feb 24 (05:54-06:56) - [Would you judge this crater to be unusually bright through a blue filter?].

Event: Lalande (Galgoey, 1973 Jul 17) can be seen on/from (UT): 2005 Feb 25 (19:52-20:06) - [Do you see any star-like point brightness variations at low magnification?].

David Darling, Tel. (USA) 608 837-7787, Email: **Error! Reference source not found.**

Occultation subsection news — Andrew Elliott

Four grazing occultations – tracks 4-7 in last month's LSC – are predicted for February although none are suitable for observers to the south of the Highlands. There is also a graze of Antares on February 4 which unfortunately just misses the UK but will be visible at low altitude from continental Europe. Dutch observers are organising a graze expedition for this potentially spectacular event.

Track 4 on February 4 involves a 6th magnitude star after 05:00 UT, but the moon will be at only 5 degrees altitude and the track crosses the south west coast of Devon near Dartmouth only.

Track 5 on February 10 crosses the northern Scottish Highlands region, from south west to east, passing just south of Inverness and crossing the Moray Firth coast near Forres. The graze involves a 4.5 magnitude star at around 10 degrees altitude but will occur in strong twilight just after sunset.

Track 6 on February 17 travels parallel to, and just inland from, the extreme north coast of the Scottish mainland, passing south of Thurso. The track commences at around 19h 48m in the west and involves a 6.8 magnitude star. Unfortunately the data for the main graze program appears to have missed this graze. If anyone wants the prediction, I will try to obtain it from the program's author.

Finally, track 7 on February 21 also crosses the Highlands travelling south east from the north west coast passing through the Highland and Grampian regions near Inverness, Forres, and Aberdeen. The star is 5.9 magnitude omega Cancri (ZC 1206) and the graze commences around 0h 35m UT. The graze will be quite favourable with the moon at 48 degrees altitude in the south west, although the graze does take place near the moon's terminator.

Total occultation predictions are also in the last LSC, with quite a few favourable ones. Good luck (especially with the weather!).

Observations

Ken Hall, Great Sankey, Warrington, has submitted 15 occultation observations for the second half of 2004. Many thanks to Ken for these.

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

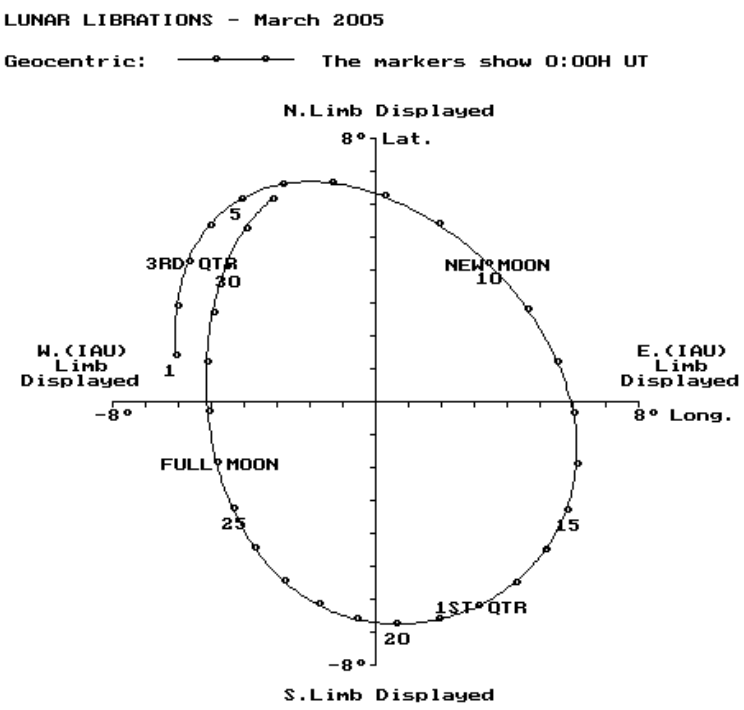
March 2005

Day	Time-UT H	M	S	D	P	Object Reference	O V	Max Mag	Sp	% Snlt	Elg Alt	Sn Alt	Mn Az	Mn	CA	PA Angle	Watts	a Min/°	b	Star's apparent RA	Dec
(No early-March occultations due to new moon.)																					
12/19	09	34		D		PPM 144616	75	8.6	K0	7+	31-10		16	263	74S	84	105	-.3	-1.4	12659.4	83744
12/19	41	47		D		PPM 144637	75	8.9	K0	7+	31		12	269	85S	73	94	-.2	-1.1	12759.2	84818
13/19	37	35		D		PPM 118097	65	8.5	A0	14+	44		24	263	51S	109	127	-.4	-2.4	21732.6	142920
13/20	10	20		DC		PPM 118107	75	8.0	F0	14+	44		19	269	24S	136	154	.1	-5.4	21819.2	142924
14/19	13	41		D		PPM 118822	55	8.3	K0	22+	56-10		38	251	37S	125	140	-.7	-3.2	30726.8	192303
14/20	55	26		D		PPM 92249	46	7.7	K0	22+	56		24	273	34N	17	31	-.8	1.3	31002.1	200116
14/21	30	07		D		FK5 114	39	4.5	K0	23+	57		18	279	49S	114	129	.1	-2.6	31154.3	194448
ABOVE STAR IS A VARIABLE STAR																					
14/22	15	56		R		FK5 114	26	4.5	K0	23+	57		12	288	-53S	216	230	-.3	-.1	31154.3	194448
15/19	01	54		D		SAO 76366	16	7.8	K0	31+	67	-8	50	239	69N	56	66	-1.0	.1	35920.9	233840
15/20	08	51		D		PPM 93164	25	8.8	G5	31+	68		40	256	50S	118	128	-.6	-2.4	40122.3	232933
15/22	12	44		D		PPM 93231	15	8.2	F8	32+	69		22	280	85S	83	93	-.2	-1.4	40532.9	234846
15/23	48	29		D		PPM 93282	15	7.0	K2	32+	69		9	298	75S	93	103	.4	-1.6	40909.4	235311
16/23	30	34		DM		PPM 93975	15	7.8	B5	42+	81		21	287	67N	61	66	-.3	-.9	50137.5	263238
17/01	21	42		DV		PPM 94057	15	6.6	B5	43+	82		6	307	82S	92	97	.6	-1.5	50612.0	262621
17/19	17	44		D		PPM 94879	16	8.0	A3	50+	90-10		62	212	66S	113	114	-1.1	-1.2	54804.4	273825
17/20	34	40		D		PPM 94941	16	7.3	K0	50+	90		54	240	42S	137	138	-.7	-2.8	54957.3	273318
17/21	16	45		D		PPM 94958	27	7.1	F5	51+	91		48	251	29S	151	151	-.2	-4.1	55058.9	273032
17/21	02	48		D		PPM 94962	16	7.8	M1	51+	91		50	248	80S	100	100	-.9	-1.3	55107.3	274123
17/21	36	10		D		PPM 94985	15	8.3	K0	51+	91		46	256	61N	60	60	-1.0	-.3	55159.4	275045
17/22	25	33		DV		FK5 1158	19	4.5	A0	51+	91		39	266	71S	109	109	-.4	-1.9	55338.9	273657
ABOVE STAR IS A VARIABLE STAR -- MINIMUM MAGNITUDE = 4.6.																					
17/23	29	53		RV		FK5 1158	15	4.5	A0	51+	91		29	279	-82S	261	261	-.3	-1.4	55338.9	273657
ABOVE STAR IS A VARIABLE STAR -- MINIMUM MAGNITUDE = 4.6.																					
17/23	34	01		D		PPM 95089	16	7.5	B2	52+	92		29	279	74N	74	74	-.4	-1.2	55559.5	274308
18/01	04	16		D		PPM 95189	15	7.6	B9	52+	92		16	295	86S	94	94	.3	-1.6	55924.9	273353
18/01	51	40		DT		PPM 95226	17	6.1	B8	52+	93		10	303	83N	83	83	.4	-1.4	60119.7	273431
18/21	15	35		DX		PPM 96498	17	6.8	K0	60+	102		56	237	84S	101	97	-1.0	-1.2	64554.7	274013
19/02	22	27		D		PPM 96757	15	7.0	B9	62+	104		12	299	75N	82	77	.3	-1.4	65615.7	271654
19/18	52	20		D		PPM 97714	16	8.4	K0	69+	112	-6	62	150	76N	87	78	-1.2	.5	73540.6	263536
20/00	27	10		D		PPM 97900	28	5.4	K5	70+	114		34	269	48S	145	135	.2	-2.6	74426.3	254626
ABOVE STAR IS A VARIABLE STAR																					
20/19	52	15		DV		PPM 98739	48	6.1	A5	78+	123		60	157	41N	59	45	-1.5	1.8	82855.8	240746
ABOVE STAR IS A VARIABLE STAR -- MINIMUM MAGNITUDE = 6.1.																					
22/00	25	25		D		PPM 126426	76	6.7	G5	86+	136		43	242	19N	42	25	-2.5	1.3	92503.7	194554
22/01	48	48		D		PPM 126454	65	7.6	A3	86+	136		31	261	37S	166	149	.4	-2.7	92652.7	190217
22/19	42	41		D		PPM 127101	67	6.3	F0	91+	145		43	127	67S	140	120	-.8	-.6	100558.7	154356
24/00	11	31		D		PPM 157382	85	7.4	K2	96+	158		45	206	64N	95	74	-1.2	-.6	105829.1	94024
26/01	44	37		R		PPM 178799	95	6.8	M1	100-	178		32	205	35N	313	292	-.8	-1.1	122926.6	-22737
ABOVE STAR IS A VARIABLE STAR -- MINIMUM MAGNITUDE = 7.0.																					
ABOVE OCCULTATION CLOSE TO SMOOTH-MOON TERMINATOR																					
30/02	36	12		RX		PPM 264828	87	5.4	B5	81-	128		12	167	86N	289	278	-1.0	.2	155413.0	-243302
30/05	08	29		R		PPM 264936	77	5.4	B8	80-	127	-6	10	201	64N	310	300	-1.0	-.8	155854.0	-245054
ABOVE STAR IS A VARIABLE STAR -- MINIMUM MAGNITUDE = 5.5.																					

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.

LIBRATION March 2005

Date	Libration amount	PA	Feature presented
1.0	5.8	69	Balboa
2.0	6.4	57	Rontgen
3.0	7.0	46	Bunsen
4.0	7.4	37	Repsold
5.0	7.6	28	Cleostratus
6.0	7.6	19	John Herschel
7.0	7.3	9	Philolaus*
8.0	6.8	357	Scoresby*
9.0	6.2	343	Cusanus*
10.0	5.8	327	Chevallier*
11.0	5.4	309	Rynin*
12.0	5.3	290	Cannon
13.0	5.4	272	Peek
14.0	5.6	257	Ritz
15.0	5.8	242	W. Humboldt
16.0	6.0	229	Gum
17.0	6.1	216	Brisbane
18.0	6.2	205	Gill
19.0	6.2	193	Boussingault
20.0	6.2	182	Simpelius
21.0	6.1	171	Klaproth
22.0	6.0	161	Bettinus
23.0	5.7	149	Pingre*
24.0	5.3	137	Catalan*
25.0	5.0	122	Wright*
26.0	4.7	105	Maunder
27.0	4.7	86	Hedin
28.0	5.0	68	Bartels
29.0	5.6	52	Lavoisier
30.0	6.2	40	Galvani
31.0	6.8	29	Oenopides



Program by Bob Roberts.
Observer at: Lat. 51.0øN, Long. 1.0øW
* indicates that the feature is not illuminated.

Section Director Alan E. Wells, 135 Elmdon Lane Marston Green, Birmingham. B37 7DN 0121 7795082
E-mail awells@citycol.co.uk
Assistant Director/Editor John F. Pedler, 25 Beverley Hills Park, Porton Road, Amesbury, Wilts. SP4 7LH 01980 622314
E-mail jhnpedler@aol.com
TLP Co-ordinator Dr. Tony Cook, School of Computer Science & IT, Nottingham University, Jubilee Campus, Wollaton Road,Nottingham, NG6 1BB. U.K. Phone (alerts only) 0798 505 5681
E-mail acc@cs.nott.ac.uk
Topographical Co-ordinator Colin Eddon, "Briar Patch", Heath Road, Fordham Heath, Colchester, Essex. CO3 5TW.
E-mail colin@ebdon.wanadoo.co.uk
Occultation Co-ordinator Andrew Elliott, White Lodge, Bank Lane, Warton, Preston, Lancs. PR4 1TB. 01772 632450
E-mail andrew@elliott0.demon.co.uk
Geological Co-ordinator Raffaello Braga, viaE Curiel 22, Corsico-MI 20094 ITALY.
E-mail Rafbraga@tin.it
Section Historian Bob Garfinkle, F.R.A.S., 32924 Monrovia Street, Union City, CA94587, U.S.A.
E-mail ragarf@earthlink.net
Cloudwatch Andrew Bytnar, Central Club, Mansfield Road, Sutton-in-Ashfield, NG17 4EJ.
E-mailASByt@aol.com
Computing Co-ordinator Mike Carson-Rowland, Barnstead, 141 Ecclesfield Road, Chapeltown, Sheffield, S35 1TD.
E mail Mike@BAALunarSection.org.uk
Section Archivist. E mail **BrendanShaw@btinternet.com** or by post through the Editor.
Photographic Co-ordinator Nick Atkinson,, "Stellar View", 25 Mt. Pleasant Drive, Queens Park, Bournemouth, BH8 9JL. 01202 395466
E-mail nick.atkinson@hmce.qsi.gov.uk

Physical Data for Lunations: 1016 - 1017 — Computed by Gareth Williams

2005 MAR.	Age d	Phase	Earth's Selenographic Longø	Earth's Selenographic Latø	Sun's Selenographic Colongø	Sun's Selenographic Latø	R.A. h m	Dec. ø	Rises h m	Sets h m	Transit h m	Alt ø
1.0	20.1	0.782	-6.1	1.4	151.8	-1.09	14 14	-14.7	.. ..	08 24	03 46	22
2.0	21.1	0.688	-6.1	2.9	164.0	-1.06	15 06	-19.8	00 18	08 43	04 35	17
3.0	22.1	0.583	-5.7	4.2	176.1	-1.03	16 02	-24.0	01 44	09 09	05 30	13
4.0	23.1	0.471	-5.1	5.3	188.3	-1.00	17 01	-26.9	03 08	09 48	06 29	10
5.0	24.1	0.359	-4.1	6.2	200.5	-0.97	18 05	-28.2	04 20	10 46	07 32	9
6.0	25.1	0.252	-2.9	6.6	212.7	-0.94	19 10	-27.6	05 14	12 04	08 36	11
7.0	26.1	0.157	-1.4	6.6	224.9	-0.91	20 14	-25.1	05 51	13 35	09 38	14
8.0	27.1	0.081	0.3	6.2	237.1	-0.89	21 15	-21.0	06 17	15 09	10 36	19
9.0	28.1	0.028	1.9	5.4	249.3	-0.86	22 13	-15.5	06 35	16 42	11 30	25
10.0	29.1	0.003	3.4	4.2	261.5	-0.84	23 07	-9.2	06 49	18 10	12 21	32
11.0	0.6	0.006	4.6	2.8	273.7	-0.82	23 59	-2.4	07 01	19 36	13 09	39
12.0	1.6	0.035	5.5	1.2	285.9	-0.80	00 49	4.2	07 12	21 00	13 56	45
13.0	2.6	0.086	6.0	-0.4	298.1	-0.78	01 38	10.6	07 25	22 22	14 43	52
14.0	3.6	0.156	6.1	-2.0	310.3	-0.76	02 28	16.2	07 39	23 24	15 31	57
15.0	4.6	0.238	5.8	-3.4	322.5	-0.75	03 19	21.0	07 58	.. ..	16 20	61
16.0	5.6	0.329	5.2	-4.6	334.7	-0.73	04 11	24.7	08 22	01 02	17 11	64
17.0	6.6	0.424	4.3	-5.5	346.9	-0.72	05 04	27.1	08 56	02 14	18 03	66
18.0	7.6	0.520	3.1	-6.2	359.1	-0.71	05 58	28.2	09 42	03 16	18 55	66
19.0	8.6	0.614	1.9	-6.7	11.3	-0.69	06 52	28.0	10 41	04 04	19 45	64
20.0	9.6	0.703	0.6	-6.8	23.4	-0.68	07 45	26.6	11 49	04 39	20 35	62
21.0	10.6	0.785	-0.6	-6.7	35.6	-0.66	08 36	23.9	13 03	05 04	21 21	58
22.0	11.6	0.858	-1.8	-6.2	47.8	-0.64	09 25	20.2	14 18	05 22	22 06	54
23.0	12.6	0.918	-2.8	-5.5	59.9	-0.62	10 12	15.6	15 33	05 36	22 49	48
24.0	13.6	0.964	-3.7	-4.5	72.1	-0.59	10 58	10.4	16 48	05 48	23 31	42
25.0	14.6	0.992	-4.4	-3.3	84.2	-0.56	11 43	4.6	18 04	05 58	.. ..	..
26.0	15.6	1.000	-4.9	-1.9	96.4	-0.53	12 28	-1.4	19 21	06 08	00 13	36
27.0	16.6	0.986	-5.1	-0.4	108.6	-0.50	13 14	-7.5	20 41	06 19	00 55	30
28.0	17.6	0.951	-5.2	1.2	120.7	-0.46	14 02	-13.4	22 05	06 32	01 43	24
29.0	18.6	0.894	-5.0	2.7	132.9	-0.42	14 53	-18.8	23 32	06 48	02 32	18
30.0	19.6	0.817	-4.6	4.1	145.0	-0.39	15 48	-23.3	.. ..	07 11	03 26	14
31.0	20.6	0.724	-4.0	5.2	157.2	-0.35	16 48	-26.5	00 57	07 46	04 24	11
1 Apr	21.6	0.618	-3.2	6.1	169.4	-0.32	17 50	-28.2	02 13	08 37	05 25	9
2.0	22.6	0.505	-2.2	6.6	181.6	-0.28	18 54	-28.1	03 12	09 48	06 28	10
3.0	23.6	0.391	-1.1	6.8	193.8	-0.25	19 57	-26.1	03 53	11 13	07 29	12
4.0	24.6	0.282	0.0	6.5	206.0	-0.21	20 57	-22.5	04 21	12 44	08 26	17
5.0	25.6	0.184	1.2	5.7	218.2	-0.18	21 54	-17.5	04 40	14 15	09 20	22
6.0	26.6	0.103	2.4	4.7	230.4	-0.15	22 48	-11.5	04 55	15 43	10 10	29
7.0	27.6	0.044	3.4	3.3	242.6	-0.12	23 39	-5.1	05 07	17 08	10 58	35
8.0	28.6	0.009	4.2	1.8	254.8	-0.09	00 29	1.6	05 19	18 32	11 45	42
9.0	0.1	0.000	4.8	0.2	267.1	-0.06	01 18	8.1	05 31	19 55	12 32	49
10.0	1.1	0.016	5.0	-1.4	279.3	-0.04	02 08	14.1	05 44	21 18	13 20	55
11.0	2.1	0.053	5.0	-2.9	291.5	-0.02	02 58	19.3	06 00	22 39	14 09	59
12.0	3.1	0.109	4.7	-4.2	303.7	0.00	03 51	23.4	06 22	23 56	15 00	63
13.0	4.1	0.180	4.0	-5.3	316.0	0.02	04 45	26.4	06 52	.. ..	15 52	65
14.0	5.1	0.261	3.2	-6.1	328.2	0.04	05 39	28.1	07 33	01 04	16 45	66
15.0	6.1	0.350	2.1	-6.6	340.4	0.06	06 34	28.3	08 27	01 58	17 37	65

To receive regular copies of this circular, please send stamped addressed envelopes to the Director. Envelopes at least 110mm by 220mm will ensure no damage in transit.

Members who have Internet access may care to receive their Circulars (colour version) by E mail. Please contact the Director for details.

Contributions related to a specific sub-section should be sent to the appropriate co-ordinator, but send any material of a more general nature to the Editor at:

John Pedler, 25 Beverley Hills Park, Porton Road, Amesbury, Wilts. SP4 7LH.
Tel. No. 01980 622314 Email jhnpedler@aol.com

Items for the March 2005 circular should reach the Editor by the 10th February 2005