



ஸ்ரீ தணிகை பஞ்சாங்கம் - பாலு சரவண சர்மா

புரோகிதர் - ஜோதிடர் - பஞ்சாங்க கணணம்

தொடர்பு நேரம் (பகல் 1 மணிக்கு மேல்) 98403 69677, prohithar@gmail.com
 எண் 9, 4வது குறுக்கு தெரு, கல்யாண் நகர், மேற்கு தாம்பரம், சென்னை 600045
<http://www.prohithar.com> <http://www.thanigaipanchangam.com>

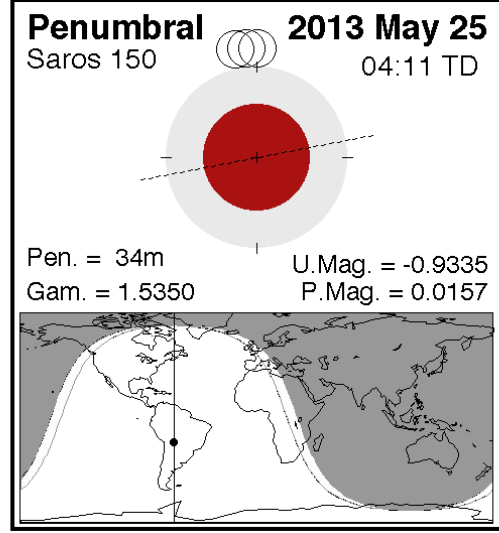
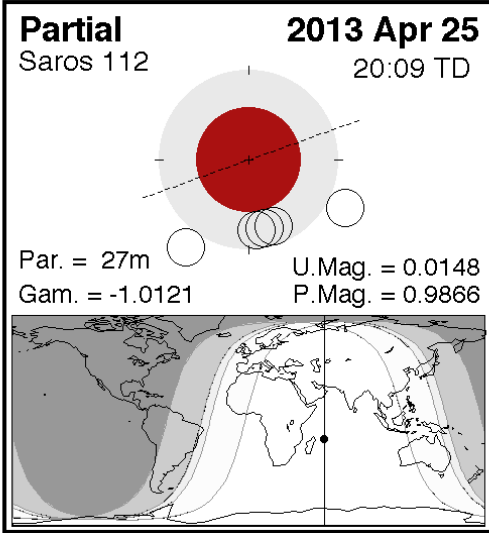
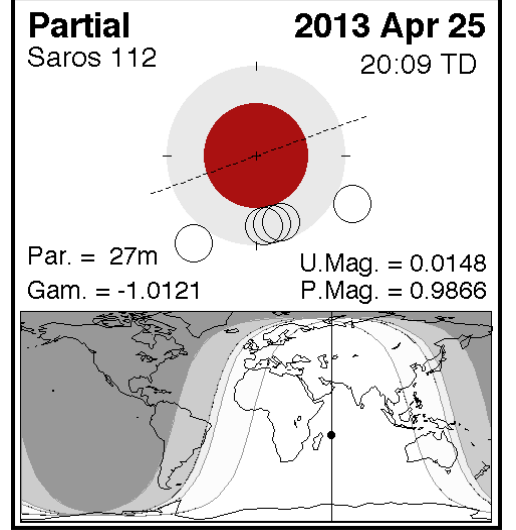
விஜய வரலட்சு கிரஹணங்கள் (Eclipse 2013)

இந்த ஆண்டு 2013(விஜய வரலட்சு) 1 சந்திர கிரஹணம், 2 சூரிய கிரஹணங்கள் என இந்த ஆண்டு மொத்தம் 3 கிரஹணங்கள் பூமியில் நிகழும். இது இன்றி புறநிலை சந்திர கிரஹணங்கள் 2 நிகழும்

- ◆ 25.4.2013 பகுதி சந்திரகிரஹணம்(Partial Lunar Eclipse) இந்தியாவில் தெரியும்
- ◆ 10.5.2013 சூரிய கிரஹணம்(Annular Solar Eclipse) இந்தியாவில் தெரியாது
- ◆ 3.11.2013 சூரிய கிரஹணம்(Hybrid Solar Eclipse) இந்தியாவில் தெரியாது
- ◆ 25.5.2013 புறநிலை சந்திர கிரஹணம்(Penumbral Lunar Eclipse) இந்தியாவில் தெரியாது
- ◆ 19.10.2013 புறநிலை சந்திர கிரஹணம்(Penumbral Lunar Eclipse) இந்தியாவில் தெரியும்
- ◆ 25.5.2013 & 19.10.2013 புறநிலை கிரஹணம் அனுஷ்டாமில்தலை
- ◆ இந்த ஆண்டு ஒரு (25.4.2013) சந்திரகிரஹணம் மட்டுமே இந்தியாவில் கடைபிடிக்கப்படும்.

25.4.2013 பகுதி சந்திரகிரஹணம்

இந்திய நேரப்படி 25.4.2013 அன்று இரவு 11:32 மணி முதல் 26.4.2013 அன்று அதிகாலை 3:43 வரை ராஹுலி கிரஹஸ்த சந்திர கிரஹணம் சுவாதி நட்சத்திரத்தில் நிகழும். பரிகார நட்சத்திரங்கள்: திருவாதிரை, சித்திரை, சுவாதி, விசாகம், சதயம்

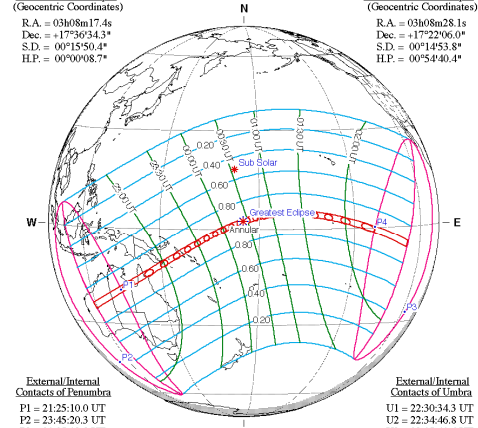


Annular Solar Eclipse of 2013 May 10

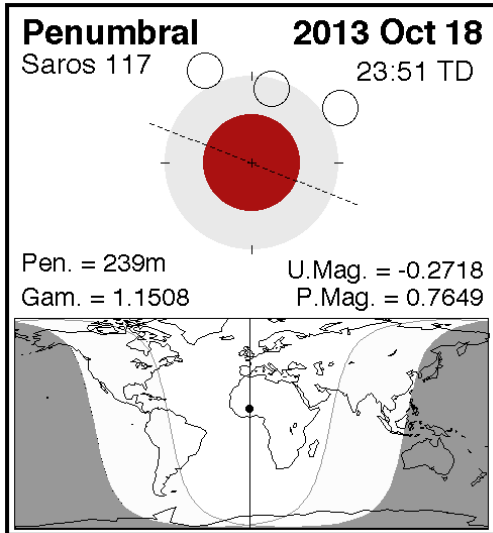
Geocentric Conjunction = 00:19:40.6 UT J.D. = 2456422.513664
 Greatest Eclipse = 00:25:13.0 UT J.D. = 2456422.517511
 Eclipse Magnitude = 0.9544 Gamma = -0.2695

Saros Series = 138 Member = 31 of 70

Sun at Greatest Eclipse (Geocentric Coordinates)
 R.A. = 03h08m17.4s Dec. = +17°30'54.3" S.D. = 00°15'50.4" H.P. = 00°00'08.7"
 Moon at Greatest Eclipse (Geocentric Coordinates)
 R.A. = 03h08m28.1s Dec. = +17°22'06.0" S.D. = 00°14'53.8" H.P. = 00°54'40.4"



External/Internal Contacts of Penumbra
 P1 = 21:25:10.0 UT P2 = 23:45:20.3 UT P3 = 01:05:13.8 UT P4 = 03:25:22.6 UT
 External/Internal Contacts of Umbra
 U1 = 22:39:34.3 UT U2 = 23:34:46.8 UT U3 = 02:15:41.6 UT U4 = 02:19:57.8 UT
 Local Circumstances at Greatest Eclipse
 Lat. = 02°12.8'N Sun Alt. = 74.4°
 Long. = 175°28.3'E Sun Azm. = 350.5°
 Path Width = 172.6 km Duration = 06m03.4s
 Ephemeris & Constants
 Eph. = Newcomb/ILE
 ΔT = 69.9 s
 k1 = 0.2724850
 k2 = 0.2722810
 Δb = 0.0" Δl = 0.0"
 Geocentric Libration (Optical - Physical)
 l = 3.06°
 b = 0.34°
 c = -17.25°
 Brown Lun. No. = 1118



ECLIPSES, 2013

In the year 2013, there are three eclipses, two of the Sun and one of the Moon.

I	April	25	Partial eclipse of the Moon	328
II	May	9-10	Annular eclipse of the Sun	320-323
III	November	3	Total eclipse of the Sun	324-327

In addition, there are two penumbral eclipses of the Moon	May 25	329
	October 18-19	330

II-Annular Eclipse of the Sun, May 9-10, Thursday-Friday
Not visible in India

ELEMENTS OF THE ECLIPSE						
Universal Time of Conjunction in Right Ascension : May 10 ^d 00 ^h 19 ^m 39 ^s .900						
	MOON			SUN		
	h	m	s	h	m	s
Right Ascension	3	8	16.50	3	8	16.50
Hourly Motion			125.24			9.76
	°	'	"	°	'	"
Declination	17	21	35.31	17	36	30.66
Hourly Motion		5	29.24			39.28
Equatorial Horizontal Parallax		54	40.50			8.71
True Semi-diameter		14	53.87		15	50.37

CIRCUMSTANCES OF THE ECLIPSE										
	Universal Time			Indian Standard Time			Latitude		Longitude	
	d	h	m	d	h	m	°	'	°	'
Eclipse begins	9	21	25.1	10	2	55.1	-19	3.9	+134	06.0
Central eclipse begins	9	22	32.7	10	4	02.7	-24	28.7	+119	14.0
Greatest eclipse*	10	0	25.2	10	5	55.2	+2	13.0	+175	28.3
Central eclipse ends	10	2	17.8	10	7	47.8	-5	26.9	-127	5.9
Eclipse ends	10	3	25.4	10	8	55.4	+0	00.8	-142	14.8

*Magnitude of the eclipse = 0.956 : Maximum duration of annular phase = 5m 57s

ECLIPSES, 2013
BESSELIAN ELEMENTS OF THE ANNULAR ECLIPSE OF THE SUN
MAY 9-10

Terrestrial Time (TT)		Co-ordinates of the Centre of Shadow on the Fundamental Plane		Direction of the Axis of Shadow *					Radius of Penumbra and Umbra on the Fundamental Plane	
h	m	x	y	sin d	cos d	μ			l_1	l_2
						°	'	"		
21	20	-1.522236	-0.542037	+0.301986	+0.953312	140	54	56.6	+0.563413	+0.016943
	30	-1.438054	-0.527142	+0.302015	+0.953303	143	24	57.5	+0.563435	+0.026964
	40	-1.353868	-0.512253	+0.302045	+0.953294	145	54	58.5	+0.563456	+0.016985
	50	-1.269679	-0.497369	+0.302075	+0.953284	148	24	59.6	+0.563477	+0.017006
22	00	-1.185487	-0.482489	+0.302105	+0.953275	150	54	00.5	+0.563497	+0.017026
	10	-1.101293	-0.467615	+0.302134	+0.953265	153	24	01.5	+0.563516	+0.017045
	20	-1.017095	-0.452745	+0.302164	+0.953256	155	54	02.6	+0.563535	+0.017064
	30	-0.932895	-0.437881	+0.302194	+0.953247	158	24	03.5	+0.563554	+0.017082
23	40	-0.848693	-0.423022	+0.302223	+0.953237	160	54	04.5	+0.563571	+0.017100
	50	-0.764488	-0.408168	+0.302253	+0.953228	163	24	05.6	+0.563589	+0.017117
	00	-0.680283	-0.393319	+0.302283	+0.953218	165	54	06.5	+0.563605	+0.017134
	10	-0.596075	-0.378475	+0.302313	+0.953209	168	24	07.5	+0.563622	+0.017150
24	20	-0.511865	-0.363636	+0.302342	+0.953199	170	54	08.6	+0.563637	+0.017166
	30	-0.427654	-0.348803	+0.302372	+0.953190	173	24	09.5	+0.563652	+0.017181
	40	-0.343442	-0.333974	+0.302402	+0.953181	175	54	10.5	+0.563667	+0.017195
	50	-0.259228	-0.319151	+0.302431	+0.953171	178	24	11.6	+0.563681	+0.017209
25	00	-0.175014	-0.304334	+0.302461	+0.953162	180	54	12.5	+0.563694	+0.017222
	10	-0.090799	-0.289522	+0.302491	+0.953152	183	24	13.5	+0.563707	+0.017235
	20	-0.006582	-0.274714	+0.302520	+0.953143	185	54	14.5	+0.563719	+0.017247
	30	+0.077634	-0.259913	+0.302550	+0.953134	188	24	15.5	+0.563731	+0.017259
26	40	+0.161850	-0.245117	+0.302580	+0.953124	190	54	16.5	+0.563742	+0.017270
	50	+0.246067	-0.230326	+0.302609	+0.953115	193	24	17.5	+0.563753	+0.017281
	00	+0.330284	-0.215541	+0.302639	+0.953105	195	54	18.5	+0.563763	+0.017291
	10	+0.414500	-0.200761	+0.302668	+0.953096	198	24	19.5	+0.563772	+0.017300
27	20	+0.498717	-0.185986	+0.302698	+0.953087	200	54	20.5	+0.563781	+0.017309
	30	+0.582933	-0.171218	+0.302728	+0.953077	203	24	21.5	+0.563790	+0.017318
	40	+0.667147	-0.156455	+0.302757	+0.953068	205	54	22.4	+0.563798	+0.017325
	50	+0.751362	-0.141697	+0.302787	+0.953058	208	24	23.5	+0.563805	+0.017333
28	00	+0.835575	-0.126945	+0.302817	+0.953049	210	54	24.5	+0.563812	+0.017339
	10	+0.919787	-0.112199	+0.302846	+0.953040	213	24	25.4	+0.563818	+0.017345
	20	+1.003998	-0.097458	+0.302876	+0.953030	215	54	26.5	+0.563823	+0.017351
	30	+1.088207	-0.082723	+0.302905	+0.953021	218	24	27.4	+0.563829	+0.017356
29	40	+1.172415	-0.067994	+0.302935	+0.953011	220	54	28.4	+0.563833	+0.017361
	50	+1.256621	-0.053270	+0.302965	+0.953002	223	24	29.4	+0.563837	+0.017364
	00	+1.340825	-0.038553	+0.302994	+0.952993	225	55	30.4	+0.563840	+0.017368
	10	+1.425026	-0.023841	+0.303024	+0.952983	228	25	31.4	+0.563843	+0.017371
30	20	+1.509226	-0.009135	+0.303053	+0.952974	230	55	32.4	+0.563845	+0.017373
	30	+1.593422	+0.005565	+0.303083	+0.952964	233	25	33.4	+0.563847	+0.017375

$\tan f_1 = 0.004631$

$\tan f_2 = 0.004608$

TT hr	d			Variations per minute			
	°	'	"	x	y	μ	
				°	'	"	"
22	17	35	03	+0.008 419	+0.001 487	15	00
23	17	35	41	+0.008 421	+0.001 484	15	00
24	17	36	20	+0.008 422	+0.001 481	15	00
25	17	36	58	+0.008 422	+0.001 479	15	00
26	17	37	37	+0.008 421	+0.001 475	15	00
27	17	38	15	+0.008 420	+0.001 471	15	00

$\xi = 0.004364 \rho \cos \phi' \cos (\mu + \lambda)$

$\eta = 0.004364 \xi \sin d$

*d stands for declination and μ , hour angle

PATH OF CENTRAL PHASE DURING THE ANNULAR ECLIPSE OF THE SUN
MAY 9-10

Terrestrial Time (TT)	Northern Limit		Central Line		Southern Limit		Central Line
	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Duration of annularity
Limit	-23 31.6	+118 55.7	-24 28.7	+119 14.0	-25 25.9	+119 32.3	- -
22 40	-17 04.9	+136 00.3	-17 58.7	+136 13.2	-18 53.9	+136 23.5	4 26
50	-13 02.3	+144 37.3	-13 50.3	+144 56.4	-14 39.1	+145 14.4	4 41
23 00	-10 07.1	+150 11.6	-10 52.5	+150 31.9	-11 38.4	+150 51.6	4 54
10	7 44.2	154 28.6	8 27.9	154 49.1	9 12.1	155 09.1	5 05
20	5 42.1	158 02.2	6 24.8	158 22.5	7 07.9	158 42.3	5 15
30	3 55.2	161 08.5	4 37.4	161 28.2	5 19.9	161 47.6	5 24
40	2 20.7	163 56.6	3 02.5	164 15.6	3 44.8	164 34.4	5 33
50	-0 56.5	+166 32.5	-1 38.4	+166 50.8	-2 20.6	+167 08.8	5 40
24 00	+0 18.4	+169 00.5	-0 23.7	+169 17.8	-1 06.1	+169 35.0	5 47
10	1 24.8	171 23.6	+0 42.3	171 40.0	-0 00.5	171 56.2	5 52
20	2 23.1	173 44.7	1 40.2	173 59.9	+0 56.9	174 15.1	5 56
30	3 13.6	176 05.9	2 30.0	176 19.9	1 46.1	176 34.0	5 58
40	3 56.2	178 29.5	3 11.9	178 42.3	2 27.3	+178 55.0	5 58
50	+4 30.8	-179 02.3	+3 45.7	-178 50.9	+3 00.2	-178 39.5	5 56
25 00	+4 56.8	-176 27.0	+4 10.9	-176 17.1	+3 24.6	-176 07.1	5 53
10	5 13.8	173 41.9	4 26.9	173 33.5	3 39.7	173 24.9	5 48
20	5 20.6	170 43.2	4 32.7	170 36.4	3 44.6	170 29.3	5 40
30	5 15.7	167 25.9	4 26.8	167 20.7	3 37.5	167 15.0	5 32
40	4 56.6	163 42.5	4 06.4	163 38.8	3 15.9	163 34.5	5 21
50	4 19.1	-159 20.3	+3 27.4	159 17.9	+2 35.3	-159 14.8	5 09
26 00	+3 14.7	-153 54.2	+2 21.0	-153 52.7	+1 26.7	-153 49.9	4 55
10	+1 21.1	-146 16.6	+0 24.0	-146 13.7	-0 34.1	-146 08.6	4 39
Limit	-4 28.4	-126 50.7	-5 26.9	-127 05.9	-6 25.7	-127 20.8	- -

2. III-Total Eclipse of the Sun, November 3, 2013, Sunday.

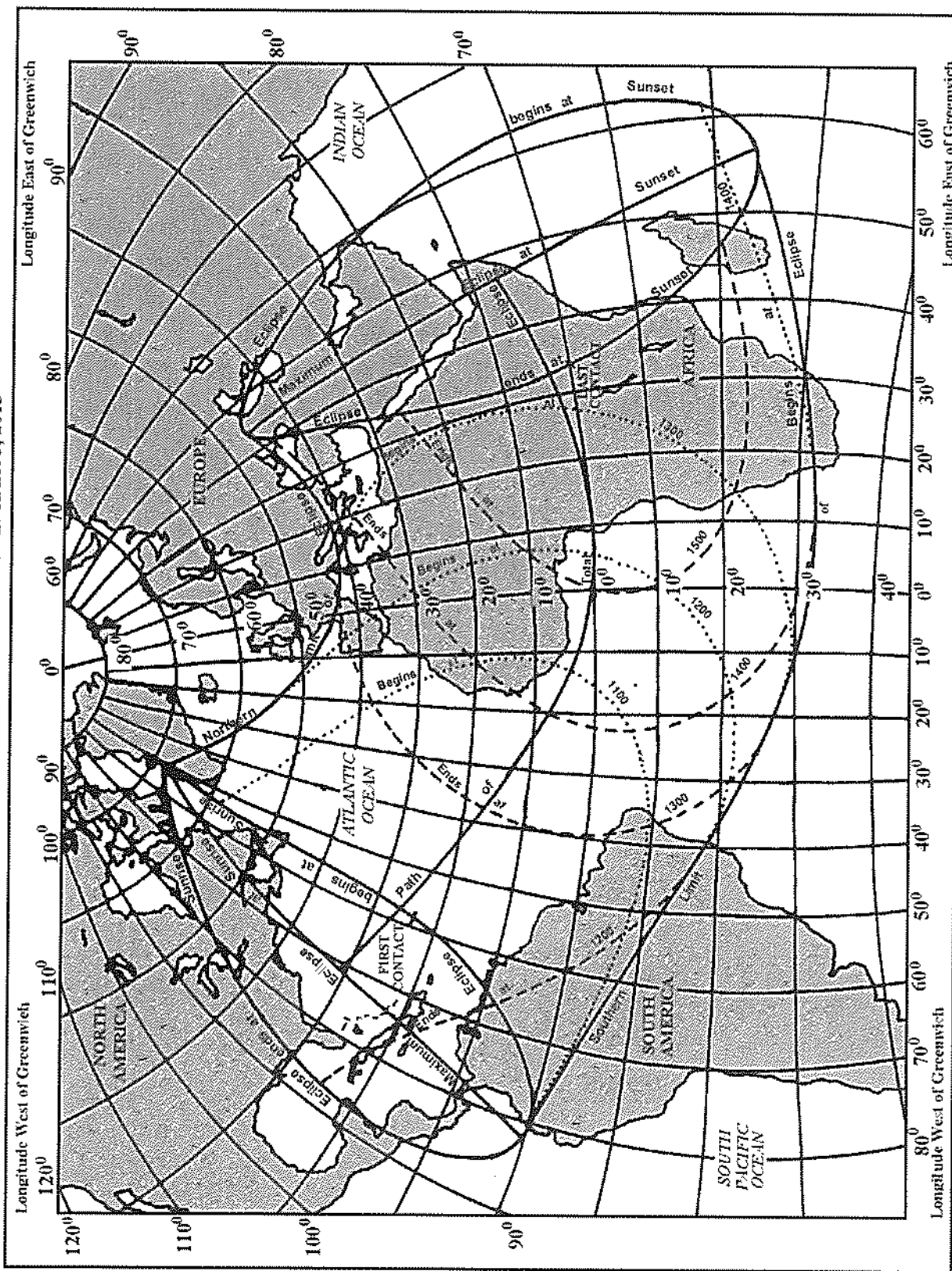
Not visible in India

ELEMENTS OF THE ECLIPSE						
Universal Time of Conjunction in Right Ascension : November 3 ^d 12 ^h 38 ^m 46 ^s .489						
	MOON			SUN		
	h	m	s	h	m	s
Right Ascension	14	35	18.65	14	35	18.6
Hourly Motion			143.45			9.87
	°	'	"	°	'	"
Declination	- 14	52	29.71	- 15	12	16.55
Hourly Motion		- 7	52.31			-46.57
Equatorial Horizontal Parallax		59	10.77			8.87
True Semi-diameter		16	07.51		16	7.51

CIRCUMSTANCES OF THE ECLIPSE										
	Universal Time			Indian Standard Time			Latitude		Longitude	
	d	h	m	d	h	m	°	'	°	'
Eclipse begins	3	10	04.4	3	15	34.3	23	49.9	-58	20.0
Central eclipse begins	3	11	05.3	3	16	35.3	30	26.5	-71	15.4
Greatest eclipse*	3	12	46.5	3	18	16.5	3	29.1	-11	41.8
Central eclipse ends	3	14	27.7	3	19	57.7	6	31.4	47	10.6
Eclipse ends	3	15	28.5	3	20	58.5	33	48.5	-0	09.2

*Magnitude of the eclipse = 1.017: Maximum duration of total phase = 1m 45s

TOTAL SOLAR ECLIPSE OF NOVEMBER 3, 2013



The timings of beginning and ending are expressed in UT

ECLIPSES, 2013
BESSELIAN ELEMENTS OF THE TOTAL ECLIPSE OF THE SUN
NOVEMBER 3

Terrestrial Time (TT)		Co-ordinates of the Centre of Shadow on the Fundamental Plane		Direction of the Axis of Shadow *					Radius of Penumbra and Umbra on the Fundamental Plane	
h	m	x	y	sin d	cos d	°	'	"	l ₁	l ₂
10	00	-1.457070	+0.655503	-0.261713	+0.965146	334	06	23.7	+0.546533	+0.000146
	10	-1.365974	+0.635421	-0.261748	+0.965136	336	36	24.5	+0.546526	+0.000139
	20	-1.274873	+0.615342	-0.261784	+0.965127	339	06	25.3	+0.546518	+0.000132
	30	-1.183765	+0.595267	-0.261819	+0.965117	341	36	26.1	+0.546510	+0.000123
	40	-1.092655	+0.575196	-0.261855	+0.965107	344	06	27.0	+0.546501	+0.000115
11	50	-1.001539	+0.555129	-0.261890	+0.965098	346	36	27.7	+0.546491	+0.000105
	00	-0.910418	+0.535065	-0.261926	+0.965088	349	06	28.5	+0.546481	+0.000095
	10	-0.819293	+0.515005	-0.261961	+0.965078	351	36	29.4	+0.546470	+0.000084
	20	-0.728164	+0.494949	-0.261997	+0.965069	354	07	30.1	+0.546458	+0.000072
	30	-0.637031	+0.474897	-0.262032	+0.965059	356	37	30.9	+0.546446	+0.000060
12	40	-0.545894	+0.454849	-0.262068	+0.965049	359	07	31.8	+0.546433	+0.000047
	50	-0.454754	+0.434804	-0.262103	+0.965040	1	37	32.5	+0.546419	+0.000033
	00	-0.363611	+0.414764	-0.262139	+0.965030	4	07	33.3	+0.546405	+0.000019
	10	-0.272464	+0.394728	-0.262174	+0.965021	6	37	34.1	+0.546390	+0.000004
	20	-0.181316	+0.374696	-0.262210	+0.965011	9	07	34.9	+0.546374	-0.000011
13	30	-0.090164	+0.354669	-0.262245	+0.965001	11	37	35.7	+0.546358	-0.000028
	40	+0.000990	+0.334645	-0.262281	+0.964992	14	07	36.5	+0.546341	-0.000045
	50	+0.092145	+0.314626	-0.262316	+0.964982	16	37	37.3	+0.546323	-0.000062
	00	+0.183303	+0.294611	-0.262352	+0.964972	19	07	38.1	+0.546305	-0.000081
	10	+0.274462	+0.274601	-0.262387	+0.964963	21	37	38.9	+0.546286	-0.000099
14	20	+0.365622	+0.254595	-0.262423	+0.964953	24	07	39.7	+0.546266	-0.000119
	30	+0.456784	+0.234594	-0.262458	+0.964943	26	37	40.5	+0.546246	-0.000139
	40	+0.547946	+0.214597	-0.262494	+0.964934	29	07	41.3	+0.546225	-0.000160
	50	+0.639109	+0.194604	-0.262529	+0.964924	31	37	42.1	+0.546203	-0.000182
	00	+0.730272	+0.174617	-0.262565	+0.964914	34	07	42.9	+0.546181	-0.000204
15	10	+0.821436	+0.154634	-0.262600	+0.964905	36	37	43.7	+0.546158	-0.000227
	20	+0.912600	+0.134655	-0.262635	+0.964895	39	07	44.5	+0.546134	-0.000251
	30	+1.003763	+0.114682	-0.262671	+0.964885	41	37	45.3	+0.546110	-0.000275
	40	+1.094926	+0.094713	-0.262706	+0.964876	44	07	46.1	+0.546085	-0.000300
	50	+1.186088	+0.074749	-0.262742	+0.964866	46	37	46.8	+0.546059	-0.000326
15	00	+1.277250	+0.054790	-0.262777	+0.964857	49	07	47.6	+0.546033	-0.000352
	10	+1.368410	+0.034836	-0.262813	+0.964847	51	37	48.4	+0.546006	-0.000379
	20	+1.459568	+0.014888	-0.262848	+0.964837	54	07	49.2	+0.545978	-0.000406
30	+1.550725	-0.005056	-0.262883	+0.964828	56	37	50.0	+0.545950	-0.000435	

$\tan f_1 = 0.004714$

$\tan f_2 = 0.004690$

TT hr	d			Variations per minute			
	°	'	"	x	y	'	"
10	-15	10	18	+0.009 110	-0.002 008	15	00
11	-15	11	04	+0.009 113	-0.002 005	15	00
12	-15	11	49	+0.009 115	-0.002 004	15	00
13	-15	12	35	+0.009 116	-0.002 001	15	00
14	-15	13	20	+0.009 115	-0.001 998	15	00
15	-15	14	06	+0.009 115	-0.001 995	15	00

$\xi = 0.004364 \rho \cos \phi' \cos (\mu + \lambda)$

$\eta = 0.004364 \xi \sin d$

*d stands for declination and μ , hour angle

PATH OF CENTRAL PHASE DURING THE TOTAL ECLIPSE OF THE SUN
NOVEMBER 3

Terrestrial Time (TT)	Northern Limit		Central Line		Southern Limit		Central Line Duration of annularity
	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	
Limit	+30 26.8	-71 15.3	+30 26.5	-71 15.4	+30 26.2	-71 15.5	--
11 10	+25 35.4	-56 40.3	+25 39.9	-56 41.5	+25 44.4	-56 42.6	0 16
20	20 39.4	45 00.4	20 47.1	44 59.0	20 54.9	44 57.7	0 36
30	17 19.1	38 16.7	17 28.7	38 13.9	17 38.3	38 11.0	0 51
40	14 37.2	33 16.3	14 48.2	33 12.3	14 59.1	33 08.4	1 03
50	12 18.8	-29 10.3	+12 30.8	-29 05.5	+12 42.8	-29 00.8	1 13
12 00	10 17.2	-25 37.3	+10 30.1	-25 32.0	+10 42.9	-25 26.7	1 22
10	8 28.9	22 25.5	8 42.5	22 19.8	8 56.1	22 14.1	1 30
20	6 51.8	19 27.4	7 06.0	19 21.5	7 20.2	19 15.6	1 36
30	5 24.6	16 37.7	5 39.3	16 31.7	5 54.0	16 25.7	1 41
40	4 06.6	13 52.4	4 21.6	13 46.4	4 36.7	13 40.5	1 44
50	2 57.2	-11 07.9	+3 12.6	-11 02.1	+3 27.9	-10 56.3	1 45
13 00	1 56.5	-8 21.2	+2 11.9	-8 15.6	+2 27.4	-8 10.1	1 44
10	1 04.5	5 29.0	1 19.9	5 23.8	1 35.4	5 18.5	1 42
20	0 21.8	-2 27.9	0 37.0	-2 23.0	0 52.3	-2 18.2	1 38
30	-0 10.9	+0 46.5	+0 04.0	+0 50.9	+0 18.8	+0 55.3	1 32
40	-0 32.1	4 19.8	-0 17.8	4 23.7	-0 03.5	4 27.7	1 24
50	-0 39.5	+8 20.2	-0 26.1	+8 23.7	-0 12.7	+8 27.2	1 15
14 00	-0 29.2	+13 01.6	-0 17.0	+13 04.7	-0 04.8	+13 07.8	1 03
10	+0 06.9	18 51.1	+0 17.4	18 53.9	+0 27.9	18 56.7	0 50
20	+1 30.4	+27 02.5	+1 38.5	27 05.2	+1 46.5	+27 08.0	0 33
Limit	+6 30.5	+47 10.7	+6 31.4	+47 10.6	+6 32.4	+47 10.4	--

ECLIPSES, 2013

II- Partial Eclipse of the Moon, April 25, 2013, Thursday
visible in India.

The Eclipse will be visible in the region covering Australia, Asia (except N.E. part), Africa, Europe and Antarctica.

The places from where the beginning of the umbral phase is visible at the time of moonset are eastern parts of Australia, Philippine Sea, Japan and Korea.

The places from where the ending of umbral phase is visible at the time of moonrise are parts of South Atlantic Ocean, very small parts of eastern Brazil, North Atlantic Ocean and United Kingdom.

The Eclipse is visible throughout India.

ELEMENTS OF THE ECLIPSE						
Universal Time of Opposition in Right Ascension : April 25 ^d 20 ^h 33 ^m 45 ^s .686						
	MOON			SUN		
	h	m	s	h	m	s
Right Ascension	14	13	55.5	2	13	55.5
Hourly Motion			146.41			9.44
	°	'	"	°	'	"
Declination	-14	29	29.33	13	26	56.19
Hourly Motion		-8	57.9			48.42
Equatorial Horizontal Parallax		60	2.15			8.74
True Semi-diameter		16	21.51		15	53.75

CIRCUMSTANCES OF THE ECLIPSE											
	Universal Time			Indian Standard Time			Position Angle measured from the North Point of Moon's Limb (N.E.S.W.)	The Moon being in the Zenith in			
	d	h	m	d	h	m		Latitude		Longitude	
Moon enters penumbra	25	18	01.8	25	23	31.8	63	-14	07	+87	34
Moon enters umbra	25	19	51.7	26	01	21.7	22	-14	23	+61	26
Middle of the eclipse*	25	20	07.5	26	01	37.5	--	-14	26	+57	00
Moon leaves umbra	25	20	23.4	26	01	53.4	05	-14	28	+53	47
Moon leaves penumbra	25	22	13.3	26	03	43.3	324	-14	44	+27	06

*Magnitude of the eclipse = 0.020 (Moon's diam = 1.0). Distance between the centers at middle 3644".8
Radius of shadow cone at Moon's distance: Penumbra 4649".3, Umbra 2703".6

EASTERN AND WESTERN LIMITS OF VISIBILITY

Eastern Limit Moonset at beginning (19h 51.7m U.T.)						Western Limit Moonrise at ending (20h 23.4m U.T.)					
Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
-50	+168	57	+10	+148	34	-50	-54	24	+10	-33	53
40	163	35	20	145	48	40	49	00	20	31	07
30	159	40	30	142	38	30	45	04	30	27	56
20	156	31	40	138	43	20	41	53	40	24	00
-10	153	45	50	133	21	-10	39	06	50	18	35
+0	+151	09	+60	+124	47	+0	-36	30	+60	-9	57

The eclipse is visible in the region west of the eastern limit and east of the western limit. Here, Moonset and Moonrise times relate to visibility of the center of the Moon on the horizon.

PENUMBRAL ECLIPSE OF THE MOON, May 25, 2013, Saturday.

CIRCUMSTANCES OF THE ECLIPSE											
	Universal Time			Indian Standard Time			Position Angle from the North Point of Moon's Limb (N.E.S.W)**	The Moon being in the Zenith in			
	d	h	m	d	h	m		Latitude		Longitude	
Moon enters penumbra	25	03	42.9	25	09	12.9	176	-19	23	-56	38
Middle of the eclipse*	25	04	10.0	25	09	40.0	-	-19	25	-63	07
Moon leaves penumbra	25	04	37.2	25	10	07.2	195	-19	25	-69	38

* Penumbral magnitude of eclipse: 0.041

** N.E.S.W stands for North, East, South and West

Note: - A penumbral eclipse of the Moon is not to be taken as an eclipse of the Moon in the ordinary sense, as the Moon is not covered by the real shadow of the Earth during such an eclipse.

ECLIPSES, 2013

PENUMBRAL ECLIPSE OF THE MOON, October 18-19, 2013, Friday-Saturday.

CIRCUMSTANCES OF THE ECLIPSE											
	Universal Time			Indian Standard Time			Position Angle from the North Point of Moon's Limb (N.E.S.W)**	The Moon being in the Zenith in			
	d	h	m	d	h	m		Latitude		Longitude	
	d	h	m	d	h	m	°	°	'	°	'
Moon enters penumbra	18	21	48.3	19	03	18.3	121	10	41	27	53
Middle of the eclipse*	18	23	50.3	19	05	20.3	-	11	00	-1	37
Moon leaves penumbra	19	01	52.1	19	07	22.1	208	11	19	-31	36

* Penumbral magnitude of eclipse: 0.791

** N.E.S.W stands for North, East, South and West

Note: - A penumbral eclipse of the Moon is not to be taken as an eclipse of the Moon in the ordinary sense, as the Moon is not covered by the real shadow of the Earth during such an eclipse.