

THE
ASTRONOMICAL SOCIETY
OF
SOUTHERN AFRICA

HANDBOOK FOR
1963

THE ASTRONOMICAL SOCIETY OF SOUTHERN AFRICA

1962 - 1963

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The Astronomical Society of South Africa was formed in July 1922, by the amalgamation of the Cape and Johannesburg Astronomical Associations which had been in active existence for several years. Its name was changed to the Astronomical Society of Southern Africa in 1956. The declared objects of the Society are:—

- (1) The encouragement and stimulation of the study of Astronomy in Southern Africa;
- (2) The association of observers and their organisation in the work of astronomical observation and research;
- (3) The dissemination throughout Southern Africa of such current astronomical information as may be helpful to observers;
- (4) The publication from time to time of the results of the work accomplished by the Society.

Membership is open to all who are interested in Astronomy. The Society issues, usually, eleven numbers of "The Monthly Notes of the Astronomical Society of Southern Africa" (M.N.A.S.S.A.) each year, and distributes to each member copies of "Sky and Telescope", an illustrated monthly astronomical magazine published in the United States.

Candidates for election as members of the Society must be proposed and seconded by two members (not associate or student members). The annual subscription for members is R5.00 with an entrance fee of R2.50.

M.N.A.S.S.A. is also on sale to non-members of the Society. Enquiries concerning subscriptions and remittances by non-members should be addressed to the Circulation Manager, Mr. H. E. Krumm, 3, Leewendal Crescent, Cape Town.

All other communications for the Society should be addressed to the Hon. Secretary, Astronomical Society of Southern Africa, c/o The Royal Observatory, Observatory, Cape Province.

SOCIETY'S CALENDAR FOR 1963

Material and Notes for M.N.A.S.S.A. by 20th of the month.

Nominations for Gill Medal by April 8.

Essay Competition closes May 31.

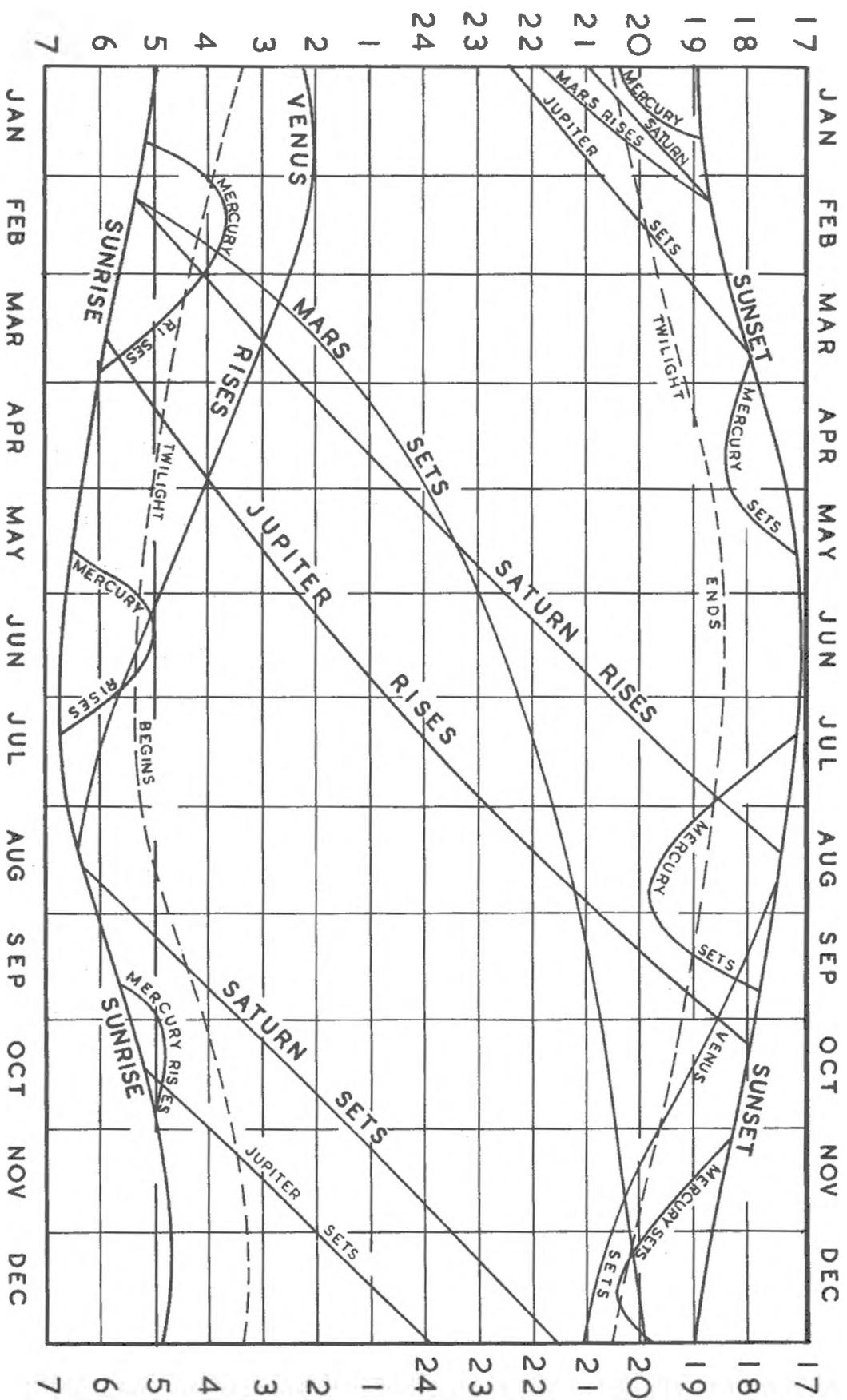
Nominations for Officers and Council by June 15.

Subscriptions due July 1.

Annual General Meeting at all Centres 4th Wednesday in July.

THE PLANETS AS SEEN FROM SOUTH AFRICA

1963



LONGITUDE 30° EAST

LATITUDE 30° SOUTH

THE
HANDBOOK
OF THE
ASTRONOMICAL SOCIETY
OF
SOUTHERN AFRICA
1963

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Price to Non-Members: 25 cents

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Acknowledgement is made to the following Members of the Society, who have assisted in the preparation of the Handbook:- Messrs. G. R. Atkins, J. S. Bondietti, J. Churms, Dr. David S. Evans, Dr. K. G. Fuhr, Messrs. M. J. Greeff, R. F. Horn, H. R. King, R. P. de Kock, R. J. S. Leibbrandt, H. B. Molyneux, N. Saville, J. Simenhoff, S. C. Venter and I. Weinberg: to Miss Y. Z. R. Thomas who typed the manuscript, and to H. M. Nautical Almanac Office for the occultation predictions.

Although every care has been taken in the compilation of this Handbook, it is distributed and sold on the explicit condition that neither the Astronomical Society of Southern Africa nor any of its members accepts any responsibility for errors.

INTRODUCTION

All the times given in this booklet are South African Standard Time, that is, mean solar time for a meridian 30° , or two hours, east of Greenwich. This is also the Standard Time in use in the Central African Federation, the Protectorates, Mozambique, and the eastern part of the Congo Republic.

To obtain the local mean time at other places the longitude differences shown in Table I must be applied to the ordinary S.A.S.T.

TABLE I

CORRECTION FOR LONGITUDE

Bloemfontein	-15^{m}	Grahamstown	-14^{m}
Cape Town	-46	Johannesburg	-08
Durban	$+04$	Port Elizabeth	-18
East London	-08	Pretoria	-07
Salisbury	$+04$	Bulawayo	-06

Conversely, to obtain the S.A.S.T. from the local mean time these longitude corrections must be applied with the sign reversed. Thus the S.A.S.T. of local mean noon (i.e. 12h 00m local mean time) at Port Elizabeth is 12h 18m.

Owing to the fact that the Earth does not go round the Sun with uniform circular motion in the plane of the Earth's equator, the local apparent solar time (i.e. the time shown by a sundial) differs from the local mean solar time by a quantity which is usually referred to as the "Equation of Time". The Equation of Time must be added to the mean solar time to give the apparent solar time. Its effect is shown in the third column of Table II which gives the S.A.S.T. of apparent noon, that is, of the Sun's transit over the meridian.

For example, the S.A.S.T. of apparent noon at Port Elizabeth on 1963 November 17 is 12.03 S.A.S.T., found by applying the longitude correction of $+18\text{m}$ to the tabulated value for 30° E, 30° S.

For many purposes, sidereal time, that is, local time as measured by the stars, is extremely useful. The sidereal time can be found by applying the S.A.S.T. (on a 24 hour basis) to the corresponding "Sidereal Time at 0 hours S.A.S.T." which is given in the fourth column of Table II, and correcting for longitude by means of Table I. A further small correction is needed to allow for the four-minute difference in length between the solar and sidereal days.

The correction is +1m for times between 03.00 and 09.00 S.A.S.T., +2m between 09.00 and 15.00, +3m between 15.00 and 21.00, and +4m between 21.00 and 23.59.

Example: Find the sidereal time at 8.15 p.m. on October 18 at Port Elizabeth.

Sid. time at 00 ^h 00 ^m	S.A.S.T. on October 18	01 ^h 43 ^m
	S.A.S.T. elapsed	20 15
		<hr/>
		21 58
Correction for longitude		-18
Interval correction		+ 3
		<hr/>
Required sidereal time		21 43
		<hr/>

For recording the time of variable star observations, the Julian Day calendar is usually used. This numbers the days consecutively from the beginning of the Julian era in 4713 B.C. The Julian Day begins at Greenwich mean noon, that is, at 14.00 (2 p.m.) S.A.S.T.

The position of a star in the sky is fixed by its right ascension and declination, much as the position of a point on the Earth is fixed by its longitude and latitude. In fact, the right ascension and declination of any star are the longitude and latitude of the point on the Earth directly beneath it at zero hours sidereal time at Greenwich. Latitude and declination are always measured in degrees north or south of the equator. Longitude and right ascension are measured either in degrees or in time, 360° being equal to 24 hours (1° equals 4 minutes; 15' equals 1 minute). Right ascension is always measured eastwards from the zero celestial meridian, and thus is the equivalent of the longitude measured eastwards from the Greenwich meridian.

For considering the motions of the Sun, Moon, and planets, the system of co-ordinates known as celestial latitude and longitude is very convenient. These co-ordinates define the position of a celestial body with reference to the ecliptic in exactly the same way as right ascension and declination define its position with reference to the celestial equator. The (celestial) latitude is the angular distance of the body north or south of the ecliptic, while the longitude is the distance from the vernal equinox as measured eastwards along the ecliptic. Celestial latitude and longitude are usually measured in degrees.

The ecliptic is defined by the apparent path of the Sun about the Earth. The latitude of the Sun is therefore always (approximately) zero, whilst its longitude increases by approximately 1° per day.

TABLE II

Date 1963	Julian Date at 14 hours	S. A. S. T. of Sun's transit Longitude 30°E	Sidereal Time for Longitude 30° E			S.A.S.T. 0 hours		S.A.S.T. 18 hours	
			h.	m.	s.	h.	m.	h.	m.
January 1	2,438,031.0	12 03 20	6 39			0 43			
" 11	041.0	12 07 44	7 19			1 22			
" 21	051.0	12 11 12	7 58			2 01			
" 31	061.0	12 13 26	8 38			2 41			
February 10	071.0	12 14 17	9 17			3 20			
" 20	081.0	12 13 52	9 56			3 59			
March 2	091.0	12 12 22	10 36			4 39			
" 12	101.0	12 10 00	11 15			5 18			
" 22	111.0	12 07 09	11 55			5 58			
April 1	2,438,121.0	12 04 08	12 34			6 37			
" 11	131.0	12 01 15	13 14			7 17			
" 21	141.0	11 58 51	13 53			7 56			
May 1	151.0	11 57 10	14 32			8 36			
" 11	161.0	11 56 21	15 12			9 15			
" 21	171.0	11 56 28	15 51			9 54			
" 31	181.0	11 57 30	16 31			10 34			
June 10	191.0	11 59 12	17 10			11 13			
" 20	201.0	12 01 18	17 50			11 53			
" 30	211.0	12 03 25	18 29			12 32			
July 10	2,438,221.0	12 05 09	19 08			13 11			
" 20	231.0	12 06 13	19 48			13 51			
" 30	241.0	12 06 23	20 27			14 30			
August 9	251.0	12 05 32	21 07			15 10			
" 19	261.0	12 03 43	21 46			15 49			
" 29	271.0	12 01 06	22 26			16 29			
September 8	281.0	11 57 53	23 05			17 08			
" 18	291.0	11 54 23	23 44			17 47			
" 28	301.0	11 50 54	0 24			18 27			
October 8	2,438,311.0	11 47 45	1 03			19 06			
" 18	321.0	11 45 19	1 43			19 46			
" 28	331.0	11 43 53	2 22			20 25			
November 7	341.0	11 43 41	3 02			21 04			
" 17	351.0	11 44 52	3 41			21 44			
" 27	361.0	11 47 26	4 20			22 23			
December 7	371.0	11 51 12	5 00			23 03			
" 17	381.0	11 55 49	5 39			23 42			
" 27	391.0	12 00 46	6 19			0 22			

	CAPE TOWN				DURBAN				BLOEMFONTEIN			
	SUNRISE		SUNSET		SUNRISE		SUNSET		SUNRISE		SUNSET	
Jan 1	05 ^h	38 ^m	20 ^h	01 ^m	04 ^h	58 ^m	19 ^h	01 ^m	05 ^h	21 ^m	19 ^h	18 ^m
11	05	46	20	02	05	06	19	02	05	29	19	18
21	05	55	19	59	05	14	19	00	05	37	19	17
Feb 1	06	07	19	52	05	24	18	55	05	46	19	13
11	06	17	19	44	05	32	18	48	05	54	19	06
21	06	26	19	33	05	41	18	39	06	02	18	57
Mar 1	06	33	19	23	05	46	18	30	06	08	18	48
11	06	41	19	11	05	53	18	19	06	13	18	38
21	06	49	18	58	05	59	18	08	06	18	18	27
Apr 1	06	58	18	41	06	06	17	53	06	25	18	13
11	07	04	18	30	06	11	17	43	06	30	18	03
21	07	13	18	17	06	17	17	31	06	35	17	52
May 1	07	20	18	05	06	24	17	22	06	42	17	44
11	07	28	17	57	06	31	17	14	06	49	17	36
21	07	34	17	50	06	36	17	08	06	54	17	30
Jun 1	07	43	17	45	06	43	17	04	07	01	17	27
11	07	48	17	44	06	48	17	03	07	05	17	26
21	07	51	17	44	06	51	17	04	07	08	17	27
Jul 1	07	53	17	48	06	53	17	07	07	10	17	30
11	07	51	17	52	06	51	17	11	07	08	17	34
21	07	47	17	58	06	48	17	16	07	05	17	39
Aug 1	07	39	18	06	06	42	17	22	07	00	17	45
11	07	30	18	13	06	34	17	29	06	53	17	51
21	07	19	18	20	06	24	17	35	06	42	17	55
Sep 1	07	06	18	27	06	12	17	40	06	31	18	01
11	06	52	18	34	06	00	17	46	06	19	18	06
21	06	38	18	41	05	48	17	51	06	07	18	10
Oct 1	06	25	18	48	05	37	17	57	05	57	18	16
11	06	12	18	55	05	25	18	03	05	45	18	22
21	05	58	19	04	05	12	18	09	05	33	18	27
Nov 1	05	46	19	13	05	02	18	17	05	24	18	35
11	05	38	19	23	04	55	18	26	05	17	18	44
21	05	31	19	33	04	49	18	34	05	12	18	52
Dec 1	05	29	19	43	04	48	18	42	05	11	19	00
11	05	28	19	50	04	48	18	50	05	11	19	07
21	05	32	19	57	04	52	18	57	05	15	19	14

The table gives for five typical places in Southern Africa the S.A.S.T. of Sunrise and Sunset, i.e. the times when the upper limb of the Sun, as affected by refraction, is on the horizon. The last three columns give the approximate duration of Twilight at Durban, Bloemfontein and Johannesburg. For Cape Town the durations given must be increased by 2, 4, and 6 minutes for Civil, Nautical and Astronomical Twilight respectively, while for Luanshya they must be decreased by 3, 6, and 9 minutes.

	JOHANNESBURG			LUANSHYA			DURATION OF TWILIGHT (mins)		
	SUNRISE	SUNSET ^h	SUNSET ^m	SUNRISE	SUNSET ^h	SUNSET ^m	CIVIL	NAUTICAL	ASTRON
Jan	05 ^h 18 ^m	19 ^h 04 ^m		05 ^h 44 ^m	18 ^h 38 ^m		27	59	94
	05 25	19 05		05 50	18 42		27	59	92
	05 33	19 04		05 55	18 42		26	57	90
Feb	05 42	19 00		05 59	18 40		25	55	87
	05 49	18 55		06 03	18 37		25	54	85
	05 56	18 47		06 06	18 34		25	53	83
Mar	06 00	18 39		06 09	18 31		25	53	81
	06 06	18 29		06 10	18 25		24	52	80
	06 11	18 19		06 11	18 18		24	52	79
Apr	06 17	18 06		06 12	18 09		24	52	79
	06 21	17 56		06 13	18 04		24	52	79
	06 25	17 47		06 14	17 58		24	52	79
May	06 31	17 38		06 15	17 53		24	52	80
	06 37	17 31		06 17	17 50		25	53	81
	06 41	17 26		06 20	17 48		25	54	83
Jun	06 47	17 23		06 23	17 47		25	55	84
	06 52	17 22		06 26	17 47		25	55	84
	06 55	17 24		06 28	17 48		26	55	85
Jul	06 57	17 27		06 31	17 51		26	55	85
	06 55	17 30		06 31	17 54		26	55	84
	06 53	17 35		06 30	17 57		25	54	84
Aug	06 48	17 41		06 27	18 00		25	54	83
	06 41	17 46		06 24	18 01		25	53	81
	06 32	17 50		06 19	18 02		25	52	80
Sep	06 21	17 54		06 13	18 03		24	52	79
	06 11	17 59		06 05	18 03		24	52	79
	05 59	18 03		05 57	18 03		24	52	79
Oct	05 50	18 08		05 51	18 04		25	52	80
	05 39	18 12		05 44	18 05		25	52	81
	05 27	18 17		05 38	18 06		25	54	83
Nov	05 19	18 24		05 33	18 09		25	55	85
	05 13	18 32		05 30	18 13		25	55	87
	05 08	18 39		05 29	18 17		26	57	89
Dec	05 07	18 46		05 31	18 22		26	59	92
	05 08	18 53		05 33	18 27		27	60	94
	05 12	19 00		05 37	18 32		27	60	94

Civil Twilight is defined as beginning or ending when the Sun's centre is 6° below the horizon and includes the time during which operations requiring daylight may still continue. Nautical Twilight begins and ends when the Sun's centre is 12° below the horizon which, for all practical purposes, is the time when it is "dark". The limit of Astronomical Twilight corresponds to the Sun's centre being 18° below the horizon, at which time there is no light from the Sun whatever.

PERIGEE			APOGEE		
Date	S. D.	H. P.	Date	S. D.	H. P.
Jan 4 ^d 10 ^h	16° 09"	59° 16"	Jan 17 ^d 10 ^h	14° 46"	54° 13"
Jan 29 09	16 15	59 38	Feb 14 06	14 45	54 09
Feb 26 02	16 30	60 33	Mar 13 22	14 43	54 02
Mar 26 10	16 41	61 13	Apr 10 05	14 42	53 57
Apr 23 21	16 44	61 25	May 7 06	14 42	53 58
May 22 06	16 39	61 07	Jun 3 16	14 44	54 03
Jun 19 10	16 28	60 25	Jul 1 08	14 46	54 11
Jul 16 20	16 15	59 37	Jul 29 02	14 47	54 15
Aug 11 02	16 10	59 22	Aug 25 20	14 46	54 13
Sep 6 18	16 22	60 04	Sep 22 15	14 44	54 05
Oct 4 17	16 36	60 54	Oct 20 04	14 42	53 58
Nov 2 02	16 44	61 26	Nov 16 08	14 42	53 56
Nov 30 15	16 44	61 26	Dec 13 11	14 42	53 58
Dec 29 02	16 35	60 53			

S.D. = Semi-diameter

H.P. = Horizontal Parallax

The distance of the Moon from the Earth in miles may be found by dividing 817,500,000 by the H.P. in seconds of arc.

MAXIMUM LIBRATION

Longitude			Latitude		
+ West Limb exposed			+ North Limb exposed		
- East Limb exposed			- South Limb exposed		
Jan 11	+5.1°	Jul 9 -5.2°	Jan 4 +6.7°	Jul 14 +6.8°	
24	-5.4	23 +5.4	18 -6.9	27 -6.8	
Feb 6	+5.0	Aug 5 -5.1	31 +6.7	Aug 10 +6.7	
20	-6.6	19 +4.9	Feb 14 -6.8	24 -6.7	
Mar 5	+6.1	Sep 1 -5.9	28 +6.7	Sep 6 +6.6	
21	-7.6	14 +5.7	Mar 14 -6.6	20 -6.6	
Apr 1	+7.1	29 -7.0	27 +6.5	Oct 4 +6.5	
18	-7.9	Oct 11 +6.9	Apr 10 -6.6	17 -6.6	
30	+7.4	27 -7.7	23 +6.5	31 +6.6	
May 16	-7.4	Nov 8 +7.7	May 7 -6.6	Nov 13 -6.7	
28	+7.1	24 -7.7	21 +6.6	27 +6.7	
Jun 12	-6.1	Dec 6 +7.6	Jun 3 -6.7	Dec 10 -6.8	
25	+6.3	22 -6.8	17 +6.7	25 +6.8	
			30 -6.8		

MOONRISE AND MOONSET

1963 JANUARY

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG		CAPE TOWN	
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
T 1.	... 030.4	5.0	10 ^h 33 ^m	23 ^h 26 ^m	11 ^h 07 ^m	... ^h ... ^m
W 2	031.4	6.0	11 35	.....	12 .12	0 10
T 3	032.4	7.0	12 36	0 .06	13 .18	0 46
F 4	033.4	8.0	13 38	0 .46	14 24	1 21
S 5	034.4	9.0	14 41	1 27	15 31	1 59
S 6	035.4	10.0	15 44	2 10	16 36	2 39
M 7	036.4	11.0	16 47	2 .58	17 42	3 24
T 8	037.4	12.0	17 47	3 .49	18 45	4 12
W 9	038.4	13.0	18 45	4 .42	19 42	5 05
T 10	039.4	14.0	19 38	5 .40	20 33	6 02
F 11	040.4	15.0	20 25	6 .38	21 19	7 02
S 12	041.4	16.0	21 08	7 .35	21 59	8 02
S 13	042.4	17.0	21 47	8 .31	22 35	9 00
M 14	043.4	18.0	22 23	9 .25	23 .06	9 57
T 15	044.4	19.0	22 56	10 .18	23 .37	10 53
W 16	045.4	20.0	23 28	11 .08	.....	11 47
T 17	046.4	21.0	.....	11 .59	0 .06	12 41
F 18	047.4	22.0	0 01	12 .49	0 .36	13 34
S 19	048.4	23.0	0 35	13 .41	1 .06	14 30
S 20	049.4	24.0	1 11	14 .34	1 39	15 25
M 21	050.4	25.0	1 50	15 .28	2 .17	16 22
T 22	051.4	26.0	2 34	16 .24	2 .58	17 20
W 23	052.4	27.0	3 23	17 19	3 46	18 17
T 24	053.4	28.0	4 17	18 .15	4 39	19 11
F 25	054.4	29.0	5 16	19 .08	5 39	20 01
S 26	055.4	0.3	6 17	19 .56	6 43	20 48
S 27	056.4	1.3	7 21	20 .42	7 50	21 31
M 28	057.4	2.3	8 25	21 .25	8 .57	22 10
T 29	058.4	3.3	9 28	22 .07	10 .04	22 47
W 30	059.4	4.3	10 30	22 47	11 11	23 23
T 31	060.4	5.3	11 32	23 28	12 16	23 59

PHASES OF THE MOON

First Quarter	Jan 3 ^d	03 ^h	02 ^m
Full Moon	10	01	09
Last Quarter	17	22	35
New Moon	25	15	42

MOONRISE AND MOONSET

1963 FEBRUARY

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG		CAPE TOWN	
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
F 1	061.4	6.3	12 ^h 34 ^m	... ^h ... ^m	13 ^h 23 ^m	... ^h ... ^m
S 2	062.4	7.3	13 36	0 11	14 28	0 39
S 3	063.4	8.3	14 38	0 55	15 33	1 21
M 4	064.4	9.3	15 38	1 43	16 35	2 07
T 5	065.4	10.3	16 36	2 35	17 33	2 57
W 6	066.4	11.3	17 30	3 30	18 26	3 52
T 7	067.4	12.3	18 19	4 27	19 13	4 50
F 8	068.4	13.3	19 03	5 24	19 55	5 49
S 9	069.4	14.3	19 43	6 20	20 32	6 48
S 10	070.4	15.3	20 20	7 15	21 05	7 45
M 11	071.4	16.3	20 54	8 08	21 36	8 42
T 12	072.4	17.3	21 27	9 00	22 06	9 37
W 13	073.4	18.3	22 00	9 50	22 35	10 31
T 14	074.4	19.3	22 33	10 41	23 05	11 24
F 15	075.4	20.3	23 07	11 32	23 37	12 19
S 16	076.4	21.3	23 45	12 24	.......	13 14
S 17	077.4	22.3	.....	13 17	0 12	14 09
M 18	078.4	23.3	0 26	14 11	0 51	15 06
T 19	079.4	24.3	1 11	15 06	1 34	16 02
W 20	080.4	25.3	2 02	16 01	2 23	16 57
T 21	081.4	26.3	2 58	16 54	3 20	17 49
F 22	082.4	27.3	3 58	17 45	4 23	18 38
S 23	083.4	28.3	5 02	18 33	5 29	19 23
S 24	084.4	29.3	6 07	19 18	6 36	20 04
M 25	085.4	0.8	7 12	20 01	7 46	20 44
T 26	086.4	1.8	8 17	20 43	8 55	21 21
W 27	087.4	2.8	9 21	21 25	10 04	21 59
T 28	088.4	3.8	10 26	22 08	11 13	22 38

PHASES OF THE MOON

First Quarter	Feb 1 ^d	10 ^h	50 ^m
Full Moon	8	16	52
Last Quarter	16	19	39
New Moon	24	04	06

MOONRISE AND MOONSET

1963 MARCH

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG		CAPE TOWN	
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
F 1	089.4	4.8	11 ^h 30 ^m	22 ^h 53 ^m	12 ^h 20 ^m	23 ^h 20 ^m
S 2	090.4	5.8	12 32	23 40	13 26	.....
S 3	091.4	6.8	13 33	.....	14 30	0 05
M 4	092.4	7.8	14 31	0 32	15 29	0 53
T 5	093.4	8.8	15 26	1 25	16 22	1 47
W 6	094.4	9.8	16 15	2 21	17 11	2 43
T 7	095.4	10.8	17 01	3 17	17 53	3 41
F 8	096.4	11.8	17 42	4 13	18 32	4 40
S 9	097.4	12.8	18 18	5 07	19 05	5 36
S 10	098.4	13.8	18 53	6 01	19 36	6 33
M 11	099.4	14.8	19 27	6 53	20 07	7 28
T 12	100.4	15.8	20 00	7 44	20 37	8 23
W 13	101.4	16.8	20 32	8 34	21 06	9 17
T 14	102.4	17.8	21 06	9 25	21 36	10 11
F 15	103.4	18.8	21 42	10 16	22 09	11 06
S 16	104.4	19.8	22 21	11 08	22 46	12 00
S 17	105.4	20.8	23 04	12 01	23 27	12 56
M 18	106.4	21.8	23 51	12 55	.....	13 51
T 19	107.4	22.8	.....	13 49	0 13	14 45
W 20	108.4	23.8	0 43	14 41	1 04	15 37
T 21	109.4	24.8	1 40	15 32	2 03	16 26
F 22	110.4	25.8	2 40	16 20	3 06	17 12
S 23	111.4	26.8	3 44	17 06	4 13	17 54
S 24	112.4	27.8	4 50	17 51	5 21	18 35
M 25	113.4	28.8	5 56	18 34	6 31	19 14
T 26	114.4	0.4	7 02	19 17	7 43	19 52
W 27	115.4	1.4	8 09	20 01	8 53	20 32
T 28	116.4	2.4	9 15	20 46	10 04	21 14
F 29	117.4	3.4	10 22	21 34	11 13	22 00
S 30	118.4	4.4	11 25	22 26	12 21	22 48
S 31	119.4	5.4	12 26	23 20	13 23	23 41

PHASES OF THE MOON

First Quarter	Mar 2 ^d	19 ^h	18 ^m
Full Moon	10	09	49
Last Quarter	18	14	08
New Moon	25	14	10

MOONRISE AND MOONSET

1963 APRIL

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG		CAPE TOWN	
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
M 1	120.4	6.4	13 ^h 23 ^m	.....	14 ^h 20 ^m	...h....m
T 2	121.4	7.4	14 14	0 ^h 16	15 10	0 ^h 38
W 3	122.4	8.4	15 00	1 13	15 54	1 35
T 4	123.4	9.4	15 42	2 08	16 33	2 34
F 5	124.4	10.4	16 20	3 03	17 08	3 31
S 6	125.4	11.4	16 55	3 56	17 39	4 27
S 7	126.4	12.4	17 28	4 48	18 10	5 23
M 8	127.4	13.4	18 01	5 39	18 39	6 17
T 9	128.4	14.4	18 33	6 30	19 08	7 11
W 10	129.4	15.4	19 06	7 20	19 38	8 05
T 11	130.4	16.4	19 41	8 12	20 09	8 59
F 12	131.4	17.4	20 19	9 03	20 45	9 54
S 13	132.4	18.4	21 00	9 56	21 24	10 50
S 14	133.4	19.4	21 45	10 49	22 07	11 45
M 15	134.4	20.4	22 34	11 42	22 55	12 39
T 16	135.4	21.4	23 28	12 34	23 50	13 30
W 17	136.4	22.4	.....	13 23	.....	14 19
T 18	137.4	23.4	0 25	14 11	0 50	15 05
F 19	138.4	24.4	1 26	14 57	1 53	15 48
S 20	139.4	25.4	2 28	15 41	2 59	16 27
S 21	140.4	26.4	3 33	16 23	4 07	17 06
M 22	141.4	27.4	4 38	17 05	5 16	17 43
T 23	142.4	28.4	5 45	17 49	6 28	18 23
W 24	143.4	0.1	6 52	18 34	7 40	19 03
T 25	144.4	1.1	8 00	19 22	8 51	19 49
F 26	145.4	2.1	9 08	20 14	10 02	20 37
S 27	146.4	3.1	10 13	21 09	11 10	21 30
S 28	147.4	4.1	11 14	22 06	12 12	22 27
M 29	148.4	5.1	12 10	23 04	13 06	23 27
T 30	149.4	6.1	12 58	.....	13 54	.....

PHASES OF THE MOON

First Quarter	Apr 1 ^d	05 ^h	15 ^m
Full Moon	9	02	57
Last Quarter	17	04	53
New Moon	23	22	29
First Quarter	30	17	08

MOONRISE AND MOONSET

1963 MAY

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG		CAPE TOWN	
	J.D. 2438000+	AGE	MOONRISE	MOONSET	MOONRISE	MOONSET
			S.A.S.T.	S.A.S.T.	S.A.S.T.	S.A.S.T.
W 1	150.4	7.1	13 ^h 45 ^m	0 ^h 02 ^m	14 ^h 34 ^m	0 ^h 26 ^m
T 2	151.4	8.1	14 22	0 58	15 11	1 25
F 3	152.4	9.1	14 57	1 52	15 43	2 22
S 4	153.4	10.1	15 30	2 44	16 13	3 18
S 5	154.4	11.1	16 03	3 35	16 43	4 12
M 6	155.4	12.1	16 36	4 26	17 11	5 06
T 7	156.4	13.1	17 08	5 17	17 40	6 00
W 8	157.4	14.1	17 42	6 07	18 11	6 55
T 9	158.4	15.1	18 19	6 59	18 46	7 49
F 10	159.4	16.1	18 59	7 52	19 23	8 45
S 11	160.4	17.1	19 43	8 45	20 05	9 41
S 12	161.4	18.1	20 30	9 39	20 52	10 35
M 13	162.4	19.1	21 22	10 31	21 44	11 28
T 14	163.4	20.1	22 10	11 21	22 41	12 17
W 15	164.4	21.1	23 16	12 08	23 42	13 03
T 16	165.4	22.1	.....	12 54	.....	13 45
F 17	166.4	23.1	0 16	13 37	0 45	14 24
S 18	167.4	24.1	1 17	14 18	1 50	15 01
S 19	168.4	25.1	2 20	14 58	2 56	15 38
M 20	169.4	26.1	3 24	15 39	4 04	16 14
T 21	170.4	27.1	4 30	16 21	5 14	16 54
W 22	171.4	28.1	5 37	17 08	6 26	17 36
T 23	172.4	29.1	6 45	17 58	7 37	18 23
F 24	173.4	0.8	7 52	18 53	8 48	19 14
S 25	174.4	1.8	8 57	19 50	9 55	20 11
S 26	175.4	2.8	9 57	20 49	10 55	21 12
M 27	176.4	3.8	10 51	21 50	11 47	22 14
T 28	177.4	4.8	11 38	22 47	12 32	23 15
W 29	178.4	5.8	12 21	23 44	13 11	.....
T 30	179.4	6.8	12 58	.....	13 45	0 13
F 31	180.4	7.8	13 33	0 38	14 17	1 11

PHASES OF THE MOON

Full Moon	May 8 ^d	19 ^h	24 ^m
Last Quarter	16	15	37
New Moon	23	06	00
First Quarter	30	06	56

MOONRISE AND MOONSET

1963 JUNE

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG		CAPE TOWN	
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
S 1	181.4	8.8	14 ^h 06 ^m	1 ^h 30 ^m	14 ^h 46 ^m	2 ^h 06 ^m
S 2	182.4	9.8	14 38	2 21	15 15	3 00
M 3	183.4	10.8	15 10	3 11	15 44	3 54
T 4	184.4	11.8	15 43	4 02	16 13	4 48
W 5	185.4	12.8	16 19	4 54	16 46	5 44
T 6	186.4	13.8	16 58	5 47	17 23	6 39
F 7	187.4	14.8	17 41	6 40	18 03	7 35
S 8	188.4	15.8	18 27	7 34	18 49	8 31
S 9	189.4	16.8	19 18	8 28	19 39	9 25
M 10	190.4	17.8	20 14	9 19	20 35	10 15
T 11	191.4	18.8	21 11	10 07	21 35	11 03
W 12	192.4	19.8	22 10	10 53	22 37	11 46
T 13	193.4	20.8	23 09	11 36	23 40	12 26
F 14	194.4	21.8	.....	12 17	.....	13 02
S 15	195.4	22.8	0 10	12 56	0 45	13 38
S 16	196.4	23.8	1 11	13 35	1 50	14 12
M 17	197.4	24.8	2 13	14 16	2 57	14 49
T 18	198.4	25.8	3 18	14 59	4 05	15 28
W 19	199.4	26.8	4 24	15 45	5 15	16 12
T 20	200.4	27.8	5 31	16 37	6 25	17 00
F 21	201.4	28.8	6 37	17 33	7 34	17 54
S 22	202.4	0.4	7 40	18 31	8 38	18 53
S 23	203.4	1.4	8 38	19 33	9 35	19 56
M 24	204.4	2.4	9 29	20 33	10 24	20 59
T 25	205.4	3.4	10 15	21 32	11 07	22 00
W 26	206.4	4.4	10 56	22 29	11 43	22 59
T 27	207.4	5.4	11 32	23 22	12 17	23 57
F 28	208.4	6.4	12 05	.....	12 47	.....
S 29	209.4	7.4	12 38	0 14	13 17	0 52
S 30	210.4	8.4	13 10	1 05	13 46	1 46

PHASES OF THE MOON

Full Moon	Jun	7 ^d	10 ^h	31 ^m
Last Quarter		14	22	54
New Moon		21	13	46
First Quarter		28	22	24

MOONRISE AND MOONSET

1963 JULY

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG		CAPE TOWN	
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
M 1	211.4	9.4	13 ^h 43 ^m	1 ^h 55 ^m	14 ^h 14 ^m	2 ^h 40 ^m
T 2	212.4	10.4	14 18	2 47	14 46	3 35
W 3	213.4	11.4	14 55	3 39	15 21	4 30
T 4	214.4	12.4	15 37	4 33	16 00	5 26
F 5	215.4	13.4	16 22	5 27	16 44	6 23
S 6	216.4	14.4	17 12	6 21	17 33	7 18
S 7	217.4	15.4	18 07	7 14	18 28	8 11
M 8	218.4	16.4	19 04	8 04	19 28	9 00
T 9	219.4	17.4	20 03	8 51	20 30	9 45
W 10	220.4	18.4	21 04	9 36	21 33	10 27
T 11	221.4	19.4	22 04	10 17	22 38	11 04
F 12	222.4	20.4	23 05	10 57	23 43	11 40
S 13	223.4	21.4	.....	11 35	.....	12 14
S 14	224.4	22.4	0 06	12 15	0 48	12 50
M 15	225.4	23.4	1 08	12 56	1 54	13 26
T 16	226.4	24.4	2 11	13 40	3 01	14 07
W 17	227.4	25.4	3 16	14 27	4 09	14 52
T 18	228.4	26.4	4 21	15 20	5 17	15 41
F 19	229.4	27.4	5 24	16 17	6 22	16 38
S 20	230.4	28.4	6 23	17 16	7 21	17 38
S 21	231.4	0.1	7 18	18 17	8 14	18 41
M 22	232.4	1.1	8 06	19 17	8 59	19 44
T 23	233.4	2.1	8 50	20 15	9 40	20 45
W 24	234.4	3.1	9 28	21 11	10 15	21 44
T 25	235.4	4.1	10 03	22 04	10 46	22 41
F 26	236.4	5.1	10 37	22 57	11 16	23 36
S 27	237.4	6.1	11 10	23 47	11 45	.....
S 28	238.4	7.1	11 42	.....	12 15	0 31
M 29	239.4	8.1	12 15	0 38	12 45	1 25
T 30	240.4	9.1	12 52	1 30	13 19	2 20
W 31	241.4	10.1	13 31	2 23	13 56	3 15

PHASES OF THE MOON

Full Moon	Jul 6 ^h	23 ^h	56 ^m
Last Quarter	14	03	58
New Moon	20	22	43
First Quarter	28	15	13

MOONRISE AND MOONSET

1963 AUGUST

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG				CAPE TOWN			
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
T 1	242.4	11.1	14 ^h 15 ^m	3 ^h 16 ^m	14 ^h 37 ^m		4 ^h	12 ^m		
F 2	243.4	12.1	15 03	4 11	15 25		5	07		
S 3	244.4	13.1	15 56	5 05	16 17		6	01		
S 4	245.4	14.1	16 53	5 56	17 16		6	53		
M 5	246.4	15.1	17 53	6 46	18 19		7	41		
T 6	247.4	16.1	18 54	7 32	19 23		8	24		
W 7	248.4	17.1	19 57	8 16	20 29		9	04		
T 8	249.4	18.1	20 58	8 57	21 35		9	40		
F 9	250.4	19.1	22 00	9 36	22 41		10	16		
S 10	251.4	20.1	23 02	10 15	23 47		10	52		
S 11	252.4	21.1	.....	10 55	.....		11	27		
M 12	253.4	22.1	0 05	11 38	0 54		12	06		
T 13	254.4	23.1	1 09	12 23	2 01		12	49		
W 14	255.4	24.1	2 11	13 13	3 07		13	36		
T 15	256.4	25.1	3 14	14 07	4 12		14	28		
F 16	257.4	26.1	4 13	15 04	5 12		15	26		
S 17	258.4	27.1	5 09	16 04	6 06		16	27		
S 18	259.4	28.1	5 59	17 04	6 54		17	30		
M 19	260.4	29.1	6 44	18 02	7 35		18	31		
T 20	261.4	0.6	7 25	19 00	8 12		19	31		
W 21	262.4	1.6	8 00	19 54	8 45		20	29		
T 22	263.4	2.6	8 35	20 47	9 16		21	25		
F 23	264.4	3.6	9 08	21 39	9 45		22	21		
S 24	265.4	4.6	9 40	22 30	10 15		23	15		
S 25	266.4	5.6	10 14	23 21	10 44		.....		
M 26	267.4	6.6	10 48	.....	11 16		0	10		
T 27	268.4	7.6	11 26	0 13	11 52		1	05		
W 28	269.4	8.6	12 08	1 06	12 31		2	00		
T 29	270.4	9.6	12 52	1 59	13 15		2	56		
F 30	271.4	10.6	13 43	2 53	14 04		3	50		
S 31	272.4	11.6	14 39	3 45	15 00		4	42		

PHASES OF THE MOON

Full Moon	Aug 5 ^d	11 ^h	31 ^m
Last Quarter	12	08	22
New Moon	19	09	35
First Quarter	27	08	54

MOONRISE AND MOONSET

1963 SEPTEMBER

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG		CAPE TOWN	
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
S 1	273.4	12.6	15 ^h 37 ^m	4 ^h 35 ^m	16 ^h 01 ^m	5 ^h 31 ^m
M 2	274.4	13.6	16 39	5 23	17 06	6 17
T 3	275.4	14.6	17 41	6 08	18 13	6 59
W 4	276.4	15.6	18 45	6 52	19 20	7 37
T 5	277.4	16.6	19 49	7 33	20 28	8 14
F 6	278.4	17.6	20 53	8 13	21 36	8 50
S 7	279.4	18.6	21 57	8 54	22 44	9 27
S 8	280.4	19.6	23 01	9 36	23 52	10 05
M 9	281.4	20.6	.....	10 20	.....	10 48
T 10	282.4	21.6	0 06	11 10	1 01	11 34
W 11	283.4	22.6	1 09	12 03	2 06	12 24
T 12	284.4	23.6	2 08	12 59	3 07	13 20
F 13	285.4	24.6	3 05	13 56	4 02	14 19
S 14	286.4	25.6	3 55	14 55	4 51	15 20
S 15	287.4	26.6	4 41	15 54	5 34	16 21
M 16	288.4	27.6	5 22	16 51	6 12	17 21
T 17	289.4	28.6	5 59	17 46	6 45	18 19
W 18	290.4	0.0	6 33	18 39	7 16	19 16
T 19	291.4	1.0	7 07	19 31	7 46	20 12
F 20	292.4	2.0	7 40	20 23	8 15	21 06
S 21	293.4	3.0	8 12	21 14	8 44	22 02
S 22	294.4	4.0	8 46	22 05	9 15	22 56
M 23	295.4	5.0	9 23	22 58	9 49	23 51
T 24	296.4	6.0	10 02	23 50	10 26	.....
W 25	297.4	7.0	10 46	.....	11 07	0 46
T 26	298.4	8.0	11 32	0 44	11 54	1 40
F 27	299.4	9.0	12 25	1 35	12 46	2 33
S 28	300.4	10.0	13 22	2 25	13 44	3 22
S 29	301.4	11.0	14 20	3 13	14 46	4 08
M 30	302.4	12.0	15 22	3 57	15 51	4 50

PHASES OF THE MOON

Full Moon	Sep 3 ^d	21 ^h	34 ^m
Last Quarter	10	13	43
New Moon	17	22	51
First Quarter	26	02	39

MOONRISE AND MOONSET

1963 OCTOBER

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG		CAPE TOWN	
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
T 1	303.4	13.0	16 ^h 25 ^m	4 ^h 43 ^m	16 ^h 58 ^m	5 ^h 31 ^m
W 2	304.4	14.0	17 30	5 25	18 06	6 08
T 3	305.4	15.0	18 35	6 05	19 16	6 45
F 4	306.4	16.0	19 41	6 47	20 27	7 22
S 5	307.4	17.0	20 48	7 30	21 38	8 00
S 6	308.4	18.0	21 55	8 15	22 48	8 43
M 7	309.4	19.0	23 01	9 04	23 57	9 28
T 8	310.4	20.0	.....	9 57	.....	10 18
W 9	311.4	21.0	0 04	10 54	1 02	11 14
T 10	312.4	22.0	1 02	11 51	1 59	12 13
F 11	313.4	23.0	1 54	12 50	2 50	13 14
S 12	314.4	24.0	2 40	13 48	3 35	14 15
S 13	315.4	25.0	3 23	14 46	4 13	15 14
M 14	316.4	26.0	4 00	15 40	4 48	16 13
T 15	317.4	27.0	4 35	16 33	5 18	17 09
W 16	318.4	28.0	5 08	17 26	5 48	18 05
T 17	319.4	29.0	5 41	18 17	6 17	19 00
F 18	320.4	0.4	6 13	19 08	6 46	19 55
S 19	321.4	1.4	6 45	20 00	7 16	20 50
S 20	322.4	2.4	7 22	20 52	7 49	21 45
M 21	323.4	3.4	8 00	21 44	8 24	22 40
T 22	324.4	4.4	8 41	22 37	9 03	23 33
W 23	325.4	5.4	9 26	23 28	9 47	.....
T 24	326.4	6.4	10 16	.....	10 36	0 26
F 25	327.4	7.4	11 09	0 18	11 30	1 17
S 26	328.4	8.4	12 06	1 05	12 29	2 02
S 27	329.4	9.4	13 04	1 51	13 32	2 45
M 28	330.4	10.4	14 05	2 35	14 36	3 25
T 29	331.4	11.4	15 07	3 16	15 43	4 01
W 30	332.4	12.4	16 12	3 56	16 50	4 38
T 31	333.4	13.4	17 18	4 36	18 01	5 13

PHASES OF THE MOON

Full Moon	Oct 3 ^d	06 ^h 44 ^m
Last Quarter	9	21 28
New Moon	17	14 43
First Quarter	25	19 21

MOONRISE AND MOONSET

1963 NOVEMBER

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG				CAPE TOWN			
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.				
F 1	334.4	14.4	18 ^h 26 ^m	5 ^h 19 ^m	19 ^h 13 ^m	5 ^h	52 ^m			
S 2	335.4	15.4	19 35	6 03	20 26	6	32			
S 3	336.4	16.4	20 43	6 52	21 39	7	17			
M 4	337.4	17.4	21 51	7 44	22 48	8	06			
T 5	338.4	18.4	22 53	8 41	23 51	9	02			
W 6	339.4	19.4	23 50	9 42	.....	10	03			
T 7	340.4	20.4	.....	10 42	0 47	11	05			
F 8	341.4	21.4	0 39	11 42	1 35	12	07			
S 9	342.4	22.4	1 24	12 40	2 15	13	08			
S 10	343.4	23.4	2 03	13 36	2 51	14	07			
M 11	344.4	24.4	2 37	14 29	3 22	15	04			
T 12	345.4	25.4	3 11	15 21	3 52	16	00			
W 13	346.4	26.4	3 43	16 13	4 21	16	55			
T 14	347.4	27.4	4 15	17 04	4 49	17	49			
F 15	348.4	28.4	4 48	17 55	5 18	18	44			
S 16	349.4	29.4	5 22	18 47	5 49	19	39			
S 17	350.4	0.6	5 59	19 40	6 24	20	35			
M 18	351.4	1.6	6 40	20 33	7 02	21	30			
T 19	352.4	2.6	7 23	21 25	7 44	22	23			
W 20	353.4	3.6	8 11	22 15	8 32	23	13			
T 21	354.4	4.6	9 03	23 03	9 23	23	59			
F 22	355.4	5.6	9 58	23 48	10 20	.....			
S 23	356.4	6.6	10 55	.....	11 19	0	44			
S 24	357.4	7.6	11 52	0 31	12 21	1	22			
M 25	358.4	8.6	12 51	1 11	13 24	1	59			
T 26	359.4	9.6	13 52	1 50	14 29	2	33			
W 27	360.4	10.6	14 55	2 29	15 36	3	08			
T 28	361.4	11.6	16 00	3 08	16 45	3	43			
F 29	362.4	12.6	17 08	3 50	17 58	4	21			
S 30	363.4	13.6	18 17	4 36	19 11	5	04			

PHASES OF THE MOON

Full Moon	Nov 1 ^d	15 ^h	56 ^m
Last Quarter	8	08	37
New Moon	16	08	51
First Quarter	24	09	56

MOONRISE AND MOONSET

1963 DECEMBER

DAY	At 0 ^h S.A.S.T.		JOHANNESBURG				CAPE TOWN			
	J.D. 2438000+	AGE	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.	MOONRISE S.A.S.T.	MOONSET S.A.S.T.
S 1	364.4	14.6	19 ^h 27 ^m	5 ^h 27 ^m	20 ^h 24 ^m	5 ^h 51 ^m				
M 2	365.4	15.6	20 34	6 23	21 32	6 44				
T 3	366.4	16.6	21 36	7 23	22 35	7 44				
W 4	367.4	17.6	22 32	8 26	23 28	8 48				
T 5	368.4	18.6	23 19	9 30	.....	9 53				
F 6	369.4	19.6	.....	10 30	0 12	10 57				
S 7	370.4	20.6	0 02	11 28	0 52	11 58				
S 8	371.4	21.6	0 39	12 24	1 25	12 57				
M 9	372.4	22.6	1 13	13 17	1 56	13 53				
T 10	373.4	23.6	1 46	14 09	2 24	14 49				
W 11	374.4	24.6	2 18	15 00	2 53	15 43				
T 12	375.4	25.6	2 50	15 51	3 21	16 38				
F 13	376.4	26.6	3 23	16 42	3 51	17 33				
S 14	377.4	27.6	3 59	17 35	4 25	18 29				
S 15	378.4	28.6	4 38	18 28	5 01	19 24				
M 16	379.4	29.6	5 21	19 21	5 42	20 19				
T 17	380.4	0.8	6 08	20 12	6 29	21 10				
W 18	381.4	1.8	6 59	21 01	7 19	21 59				
T 19	382.4	2.8	7 53	21 47	8 15	22 43				
F 20	383.4	3.8	8 49	22 31	9 13	23 23				
S 21	384.4	4.8	9 46	23 12	10 14	23 59				
S 22	385.4	5.8	10 43	23 49	11 15	.....			
M 23	386.4	6.8	11 42	.....	12 18	0 35				
T 24	387.4	7.8	12 41	0 26	13 21	1 08				
W 25	388.4	8.8	13 43	1 04	14 27	1 40				
T 26	389.4	9.8	14 47	1 43	15 34	2 16				
F 27	390.4	10.8	15 53	2 25	16 44	2 53				
S 28	391.4	11.8	17 01	3 11	17 57	3 37				
S 29	392.4	12.8	18 10	4 04	19 07	4 25				
M 30	393.4	13.8	19 15	5 01	20 14	5 22				
T 31	394.4	14.8	20 15	6 05	21 13	6 25				

PHASES OF THE MOON

Full Moon	Dec 1 ^d	01 ^h	55 ^m
Last Quarter	7	23	34
New Moon	16	04	07
First Quarter	23	21	55
Full Moon	30	13	04

ECLIPSES

During 1963 there are five eclipses, two of the Sun and three of the Moon.

1. January 9-10. Penumbral eclipse of the Moon.
2. January 25. Annular eclipse of the Sun.
3. July 6-7. Partial eclipse of the Moon.
4. July 20. Total eclipse of the Sun, invisible in southern Africa.
5. December 30. Total eclipse of the Moon, invisible in southern Africa.

Penumbral Eclipse of the Moon,

January 9-10

Moon enters penumbra	$9^{\text{d}}23^{\text{h}}05^{\text{m}}$	S.A.S.T. in P.A. 53° East of north point.
Middle of the eclipse	10 01 20	
Moon leaves penumbra	10 03 34	in P.A. 48° West of north point.
Penumbral magnitude	1.043	

Annular Eclipse of the Sun,

January 25

The detailed predictions for southern Africa given in MNASSA, Volume XXI, p. 176 are reproduced below as a special supplement to the Handbook. Separate copies are obtainable from the Society.

Partial Eclipse of the Moon,

July 6-7

Moon enters penumbra	$6^{\text{d}}21^{\text{h}}18^{\text{m}}$	S.A.S.T. in P.A. 128° East of north point.
Moon enters umbra	6 22 33	
Middle of the eclipse	7 00 03	
Moon leaves umbra	7 01 33	
Moon leaves penumbra	7 02 48	in P.A. 128° West of North point.
Magnitude of eclipse	0.711	

THE ANNULAR SOLAR ECLIPSE OF 1963 JANUARY 25

Data for visibility of this eclipse from southern Africa are given in two Tables and a Map. The first Table gives predicted circumstances for major centres in southern Africa, from which the eclipse will be seen as partial. The predictions are of the following quantities:

- (i) Beginning (technically, "First Contact"): the moment at which the black disc of the Moon first impinges on the Sun, together with the position angle, reckoned from the north point of the Sun anticlockwise to the naked eye, through east, south and west, of the point on the edge of the Sun at which this first contact will occur.
- (ii) Mid-eclipse. The time of maximum obscuration of the Sun together with the magnitude of the eclipse, expressed in percentage of the solar diameter then obscured.
- (iii) End, (technically "Last Contact"): the same information as for the beginning of the eclipse but referring to the last instant of the eclipse when the Moon is just leaving the Sun's disc.

The second Table and Map give predictions for points inside the annular belt. From points within the belt the Moon will, for a short time be seen completely silhouetted against the Sun leaving a narrow ring or annulus of light visible. For each selected station in the second Table the data for Beginning and End are as in the first Table. In addition, for points in the annular belt times and position angles of Second and Third Contacts are given. These contacts define the moments at which the Moon is just wholly in front of the Sun, with the edge of the Moon's disc just internally tangential to that of the Sun. The time of middle is midway between these contacts, and the actual contact times may be found by applying half the time of duration of annular phase to the time of mid-eclipse. Thus at Bredasdorp the duration is 36 seconds = 0.60 minutes = 2×0.30 minutes. Second contact, the beginning of the annular phase is thus at $16h\ 46m.04 - 0m.30 = 16h\ 45m.74$, and third contact at $16h\ 46m.04 + 0m.30 = 16h\ 46m.34$. The position angles of second and third contacts are given, and, throughout the annular phase 99.0% of the solar diameter will be covered at Bredasdorp. Circumstances at the other selected points in the second Table may be similarly deduced.

TABLE I

Partial Eclipse

Place	Beginning			Middle			End		
	Time	P.A.	Time	Mag.	Time	Mag.	Time	P.A.	
Cape Town	15 ^h 27 ^m .61	251°	16 ^h 45 ^m .80	96.4%	17 ^h 54 ^m .66	74°			
Johannesburg	15 52.89	246	17 03.86	89.9	18 06.42	79			
Pretoria	15 53.71	245	17 04.45	89.1	18 06.88	79			
Bloemfontein (Boyden)	15 46.29	249	16 58.93	94.5	18 02.91	76			
Port Elizabeth	15 37.25	255	16 50.63	94.7	17 55.80	70			
East London	15 41.39	255	16 53.38	94.2	17 57.29	70			
Durban	15 49.71	253	16 59.59	97.6	18 01.67	72			
Kimberley	15 44.86	247	16 58.40	92.1	18 03.12	79			
Windhoek	15 48.00	232	17 02.66	68.3	18 07.59	90			
Bulawayo	16 04.04	238	17 12.15	76.3	18 12.24	86			
Salisbury	16 09.77	236	17 15.61	73.4	18 13.86	88			
Livingstone	16 06.43	232	17 14.10	67.4	18 13.61	91			
Zeekoeagat	15 34.72	251	16 50.23	98.9	17 56.86	73			

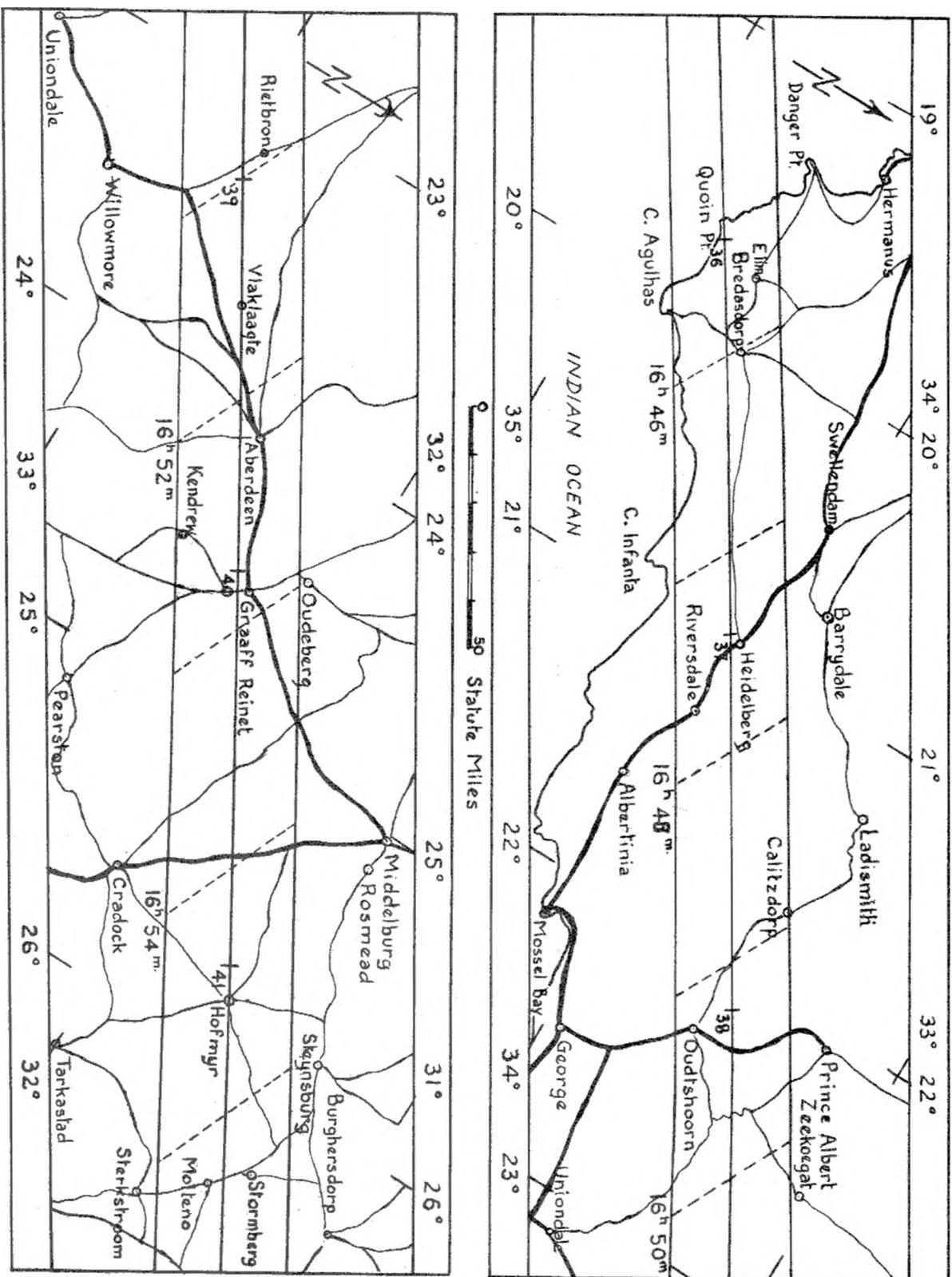
All Times in South African Standard Time

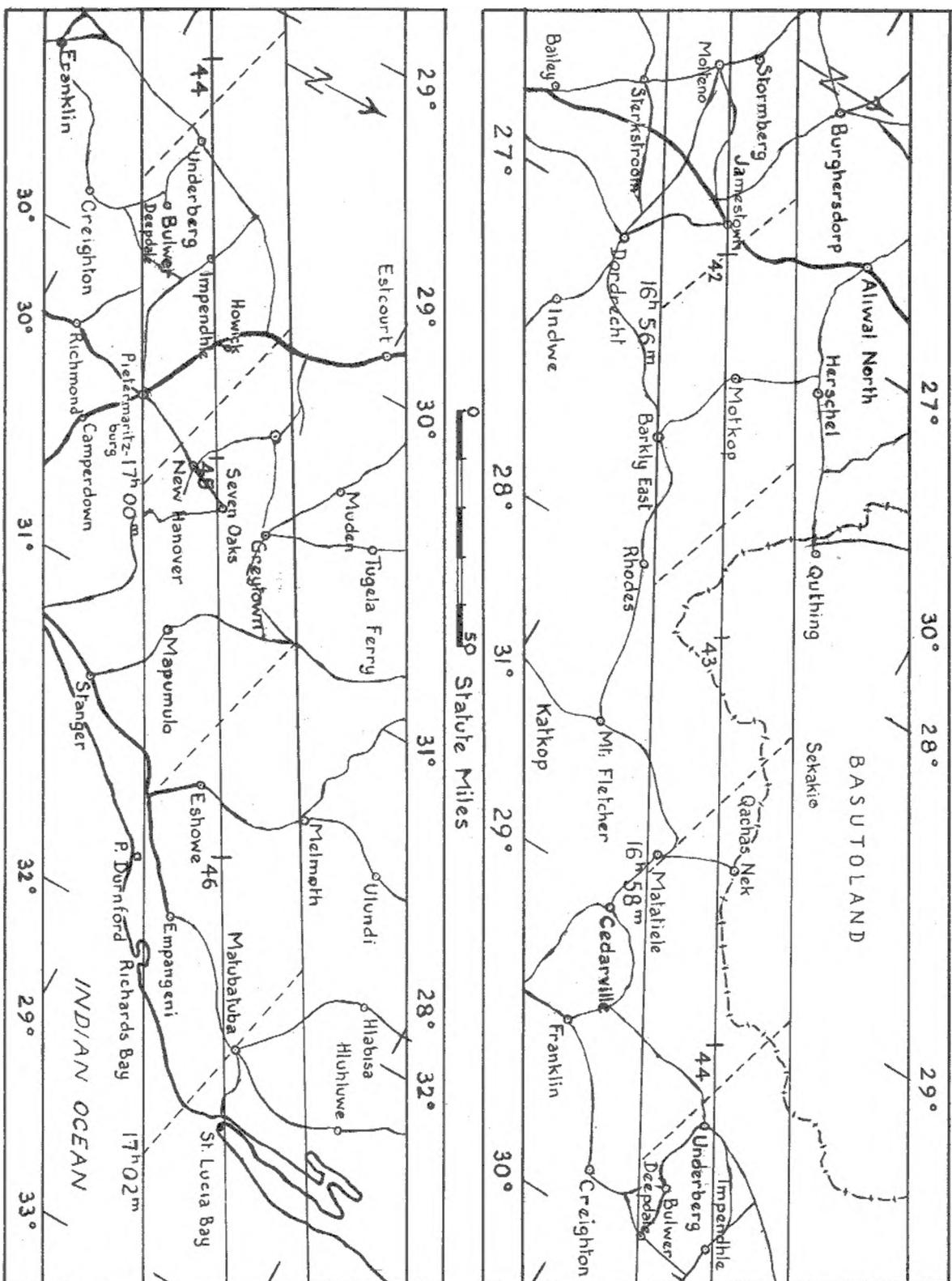
TABLE II

Annular Eclipse

Place	Beginning			Annular Phase				End	
	Time	P.A. 1 st Contact	Middle Time	Max Mag	P.A. 2 nd Contact	P.A. 3 rd Contact	Duration of Ann. Phase	Time	P.A. 4 th Contact
Bredasdorp	15 ^h 28 ^m .93	252°	16 ^h 46 ^m .04	99.0%	23°	85°	36 sec	17 ^h 54 ^m .11	73°
Heidelberg	15 30.92	252	16 47.47	99.0	243	81	37	17 55.02	73
Riversdale	15 31.40	252	16 47.71	99.0	293	32	28	17 55.07	73
Oudtshoorn	15 33.63	252	16 49.25	99.0	301	24	25	17 56.04	73
Graaf Reinet	15 38.72	252	16 52.86	98.9	247	77	40	17 58.33	73
Howick	15 49.49	252	16 59.83	98.7	269	56	43	18 02.24	73
Pietermaritzburg	15 49.47	252	16 59.74	98.7	323	2	14	18 02.10	72
Eshowe	15 51.61	252	17 01.14	98.7	271	54	43	18 02.89	73

All Times in South African Standard Time





For other places in the annular belt, approximate circumstances may be read off the Map. The three lines traversing the Map show the central line and northern and southern limits of the annular belt. Inclined dotted lines, drawn for times at intervals of one minute, with alternate ones marked, show the places where mid-eclipse will occur at the given times. Along the central line the duration of the annular phase in seconds is marked. The duration of the annular phase (from second to third contact) falls to zero on the northern and southern limiting lines.

To illustrate the use of the Map consider the prediction of eclipse circumstances at Vlaklaagte and Kendrew, for which special calculations have not been made. Vlaklaagte lies on the central line between the (unmarked) dotted line for 16h 51m and that for 16h 52m. Mid-eclipse will occur at Vlaklaagte at about 16h 51m 40s and the duration of the annular phase will be about 39s.3, equally distributed about this central line. To obtain an estimate of the times and positions of first and last contacts, the data for the nearest places given in the Tables may be interpolated. Thus Vlaklaagte is about half way between Zeekoegat and Graaf Reinet and interpolation (for circumstances of beginning and end only) give approximate times 15h 36m.7, 17h 57m.6 for beginning and end at position angles 252° and 73° respectively. In the same way, mid-eclipse at Kendrew will occur at about 16h 52m 30s, but since this lies on the southern edge of the annular belt, the annular phase will be very brief, in fact almost instantaneous. The first and last contacts will be closely similar to those given for Graaf Reinet in the second Table.

OCCULTATIONS OF BRIGHT STARS

Date	Z.C.	Sp	Mag	(1950.0) Dec.	Ph	Cape Town				
						P.A.	h.	m.	a	b
Jan										
2	83	KO	6.9	- 0° 47'	D	-	-	-	-	-
6	504	AO	7.3	+14 50	D	21°	01	13.7	-1.2	+3.2
7	658	A2	4.2	+17 49	D	-	-	-	-	-
7	663	AO	6.9	+18 06	D	103	01	15.9	-1.3	+0.6
7	793	KO	6.2	+20 05	D	-	-	-	-	-
15	1702	MO	4.2	+ 6 49	D	-	-	-	-	-
15	1702	MO	4.2	+ 6 49	R	-	-	-	-	-
29	49	KO	6.3	- 2 30	D	-	-	-	-	-
30	192	A2	5.3	+ 3 21	D	30	20	14.3	-0.9	+2.4
31	322	GO	5.7	+ 8 20	D	-	-	-	-	-
31	327	G5	4.5	+ 8 37	D	19	21	05.1	-1.0	+2.9
Feb										
1	454	G5	5.8	+13 00	D	-	-	-	-	-
1	464	G5	6.4	+12 52	D	-	-	-	-	-
2	610	KO	6.2	+17 12	D	62	23	15.4	-1.4	+1.7
3	760m	A2	6.5	+19 44	D	139	23	35.7	-1.3	-1.1
4	905	AO	6.7	+21 36	D	73	20	47.7	-2.1	+0.1
20	2720	F5	6.4	-21 03	R	243	04	39.1	-0.9	-0.2
22	Mercury		0.1	-19 05	D	-	-	-	-	-
22	Mercury		0.1	-19 05	R	-	-	-	-	-
26	128	G5	7.3	+ 1 31	D	-	-	-	-	-
Mar										
2	710	G5	7.1	+18 38	D	-	-	-	-	-
3	881m	B9	5.9	+20 51	D	-	-	-	-	-
6	1174m	F2	7.5	+21 15	D	162	01	25.5	+0.4	-2.1
6	1277	KO	5.5	+20 37	D	13	19	57.8	Graze	
6	1277	KO	5.5	+20 37	R	1	20	06.4	Graze	
6	1282	GO	6.6	+19 46	D	-	-	-	-	-
7	1292	FO	6.7	+19 57	D	103	00	18.5	-1.9	+0.3
7	1293	KO	6.7	+19 43	D	155	00	48.0	-0.5	-1.6
7	1294	AO	6.9	+19 44	D	149	00	47.9	-0.7	-1.2
7	1296	AO	6.5	+20 09	D	31	00	57.5	-	-
7	1296	AO	6.5	+20 09	R	9	01	12.7	-	-
7	1297	FO	6.8	+19 32	D	-	-	-	-	-
7	1298	G5	6.5	+19 51	D	114	00	47.6	-1.5	+0.1

m indicates that the star is not single

The approximate time of an occultation at a place $\Delta\lambda$ degrees west and $\Delta\phi$ degrees north of one of the standard stations given above may be found from

$$\text{Approximate time} = \text{predicted time} + a \cdot \Delta\lambda + b \cdot \Delta\phi$$

where a and b are in minutes of time.

OCCULTATIONS OF BRIGHT STARS

Date	Z.C.	Johannesburg					Luanshya				
		P.A.	h.	m.	a	b	P.A.	h.	m.	a	b
Jan											
2	83	57°	20	33.6	-1.4	+1.8	21°	21	03.3	-0.7	+3.0
6	504	-	-	-	-	-	-	-	-	-	-
7	658	132	00	51.9	-1.1	-1.0	88	00	51.0	-1.5	+0.5
7	663	79	.01	34.2	-1.0	+1.2	35	01	57.2	-1.4	+2.8
7	793	-	-	-	-	-	100	21	18.1	-3.1	-0.7
15	1702	181	03	08.5	-	-	138	02	24.6	-2.0	-2.5
15	1702	245	03	59.5	-	-	290	04	01.4	-3.1	-1.1
29	49	-	-	-	-	-	129	20	49.7	-1.1	-2.0
30	192	18	20	42.5	-0.6	+3.0	-	-	-	-	-
31	322	29	20	49.8	-1.2	+2.7	-	-	-	-	-
31	327	-	-	-	-	-	-	-	-	-	-
Feb											
1	454	27	20	28.7	-1.5	+2.8	-	-	-	-	-
1	464	-	-	-	-	-	107	23	14.7	-0.6	-0.2
2	640	35	23	44.8	-1.3	+2.8	-	-	-	-	-
3	760	108	23	45.3	-1.2	+0.2	69	23	54.8	-1.6	+1.2
4	905	61	21	14.2	-2.5	+1.1	-	-	-	-	-
20	2720	279	04	41.4	-0.8	-1.2	325	04	18.8	+0.2	-2.6
22	Mercury	154	05	41.6	-	-	96	05	14.0	-0.2	-0.7
22	Mercury	201	06	09.9	-	-	260	06	23.9	-1.1	-0.1
26	128	20	19	27.2	-0.3	+2.8	-	-	-	-	-
Mar											
2	710	-	-	-	-	-	134	18	50.7	-	-
3	881	-	-	-	-	-	141	23	34.2	0.0	-1.8
6	1174	117	01	21.6	-0.4	0.0	73	01	28.4	-1.1	+1.2
6	1277	-	-	-	-	-	-	-	-	-	-
6	1277	-	-	-	-	-	-	-	-	-	-
6	1282	-	-	-	-	-	153	22	01.7	-2.0	-3.4
7	1292	62	00	47.4	-2.5	+2.4	-	-	-	-	-
7	1293	115	00	51.6	-1.2	-0.1	71	00	59.1	-2.3	+1.5
7	1294	110	00	54.0	-1.3	+0.1	65	01	04.5	-2.5	+1.9
7	1296	-	-	-	-	-	-	-	-	-	-
7	1296	-	-	-	-	-	-	-	-	-	-
7	1297	148	01	25.1	-0.2	-1.4	104	01	16.8	-1.3	-0.1
7	1298	76	01	08.6	-1.8	+1.5	-	-	-	-	-

Date	Z.C.	Sp	Mag	(1950.0) Dec.	Ph	Cape Town				
						P.A.	h.	m.	a	b
Mar										
7	1299	A2	6.3	+19° 43'	D	140°	01 02.4	-0.8	-0.8	
7	1302	A5	6.7	+19 54	D	97	00 58.1	-1.7	+0.7	
7	1303	A3	6.8	+19 46	D	122	01 12.7	-1.1	-0.1	
15	2133	KO	5.6	-11 13	R	-	-	-	-	
15	2137	AO	6.4	-10 57	R	327	01 36.7	-0.8	-2.8	
15	2141	KO	6.0	-10 57	R	355	01 46.3	+0.2	-4.3	
16	2245	KO	6.4	-14 53	R	-	-	-	-	
22	3105	G5	6.2	-17 33	R	247	05 18.9	-0.7	-0.3	
23	3256	FO	6.2	-14 26	R	-	-	-	-	
29	663	AO	6.9	+18 06	D	-	-	-	-	
30	808	B2	6.8	+20 32	D	-	-	-	-	
31	976	MO	3.2	+22 32	R	340	19 06.6	-	-	
Apr										
1	1110	FO	3.5	+22 04	R	-	-	-	-	
1	1125	F5	6.4	+21 38	D	-	-	-	-	
1	1128	K5	6.9	+22 15	D	55	22 30.2	-2.2	+2.4	
1	1129	F5	5.3	+21 33	D	-	-	-	-	
2	1250	G5	5.9	+20 54	D	111	20 22.3	-2.3	-0.6	
2	1261	A5	7.2	+20 19	D	-	-	-	-	
4	1485	F8	7.2	+15 24	D	73	22 52.7	-3.2	+1.3	
5	1383	F8	6.6	+17 55	D	167	00 41.2	+0.3	-2.2	
5	1578	KO	6.8	+11 51	D	169	19 37.0	-	-	
7	1702	MO	4.2	+ 6 49	D	114	01 52.7	-1.6	-0.1	
7	1702	MO	4.2	+ 6 49	R	-	-	-	-	
12	2223	KO	4.0	-14 37	D	157	04 18.5	-1.5	-3.3	
12	2223	KO	4.0	-14 37	R	245	05 21.8	-2.2	+2.7	
15	2614	B1	6.2	-21 27	D	184	04 22.2			Graze
15	2614	B1	6.2	-21 27	R	195	04 30.8			
16	2746	KO	5.8	-21 25	R	259	00 44.0	-0.4	-0.8	
16	2779	KO	3.9	-21 49	D	154	06 12.8	-	-	
19	3190	A5	3.0	-16 21	D	-	-	-	-	
19	3190	A5	3.0	-16 21	R	-	-	-	-	
27	911	B8	6.3	+22 24	D	40	18 43.0	-2.2	+2.5	
28	1078	AO	5.9	+22 43	D	63	20 17.7	-1.9	+1.9	
29	1216	A2	7.3	+21 09	D	-	-	-	-	
May										
2	1553	AO	7.5	+13 08	D	-	-	-	-	
3	1659	KO	6.8	+ 8 56	D	156	19 56.2	-1.3	-2.7	
4	1755	AO	6.8	+ 4 20	D	-	-	-	-	
5	1773	KO	5.1	+ 3 35	D	83	02 40.5	-0.9	+1.6	

Date	Z.C.	Johannesburg					Luanshya				
		P.A.	h.	m.	a	b	P.A.	h.	m.	a	b
Mar											
7	1299	102	01	11.4	-1.2	+0.4	50	01	29.1	-	-
7	1302	50	01	29.3	-2.6	+3.6	-	-	-	-	-
7	1303	85	01	28.3	-1.4	+1.1	-	-	-	-	-
15	2153	265	01	01.8	-2.4	-0.6	302	00	46.3	-1.5	-1.8
15	2157	-	-	-	-	-	-	-	-	-	-
15	2141	-	-	-	-	-	-	-	-	-	-
16	2245	-	-	-	-	-	247	00	28.6	-2.1	+0.7
22	3105	281	05	20.5	-0.9	-1.3	-	-	-	-	-
23	3256	-	-	-	-	-	229	04	58.6	-0.6	+1.0
29	663	-	-	-	-	-	115	20	33.1	-0.6	-0.5
30	808	-	-	-	-	-	139	19	56.3	-1.2	-2.3
31	976	-	-	-	-	-	-	-	-	-	-
Apr											
1	1110	243	19	17.6	-3.0	+1.3	281	19	24.9	-3.0	-0.4
1	1125	-	-	-	-	-	126	22	32.4	-0.7	-0.9
1	1128	-	-	-	-	-	-	-	-	-	-
1	1129	-	-	-	-	-	134	23	05.4	-0.2	-1.2
2	1250	84	20	46.3	-2.8	+0.6	-	-	-	-	-
2	1261	134	23	52.6	-0.3	-0.6	91	23	51.4	-1.1	+0.4
4	1485	-	-	-	-	-	-	-	-	-	-
4	1383	122	00	36.6	-0.6	-0.2	76	00	41.6	-1.5	+1.2
5	1578	140	19	26.7	-1.7	-2.5	105	19	03.1	-2.0	-1.1
7	1702	68	02	17.9	-2.2	+2.5	-	-	-	-	-
7	1702	-	-	-	-	-	-	-	-	-	-
12	2223	118	04	23.1	-2.3	-0.8	67	04	29.4	-3.1	+2.2
12	2223	278	05	50.6	-1.5	+0.6	330	05	39.3	-1.9	-2.9
15	2614	-	-	-	-	-	-	-	-	-	-
15	2614	251	05	30.8	-2.8	+1.5	-	-	-	-	-
16	2746	293	00	38.4	-0.3	-1.6	349	00	05.7	-	-
16	2779	-	-	-	-	-	-	-	-	-	-
19	3190	-	-	-	-	-	102	02	49.3	-0.3	-0.9
19	3190	-	-	-	-	-	238	03	50.4	-1.2	+0.8
27	911	-	-	-	-	-	-	-	-	-	-
28	1078	-	-	-	-	-	-	-	-	-	-
29	1216	168	21	41.7	+0.8	-3.0	116	21	25.3	-0.8	-0.5
May											
2	1553	155	18	25.3	-1.6	-3.1	-	-	-	-	-
3	1659	124	19	56.3	-2.3	-1.6	88	19	43.6	-3.7	-0.1
4	1755	190	20	45.8	-	-	144	19	57.3	-1.8	-2.7
5	1773	-	-	-	-	-	-	-	-	-	-

Date	Z.C.	Sp	Mag	(1950.0) Dec.	Ph	Cape Town				
						P.A.	h.	m.	a	b
May										
9	2291	F8	5.5	-16° 23'	R	-	-	-	-	-
11	2436	B8	6.3	-19 28	D	185°	01 40.9			
11	2436	B8	6.3	-19 28	R	213	02 03.9			Graze
12	2704	A5	5.8	-21 25	R	306	23 21.4	-0.1	-2.1	
13	2851	A2	6.0	-21 25	R	248	22 54.3	-0.3	-0.5	
17	3288	G5	5.9	-13 47	R	199	03 41.8	-1.2	+2.6	
18	3419	KO	4.5	- 9 21	R	-	-	-	-	
18	3425	B5	4.6	- 9 27	R	-	-	-	-	
20	170	KO	6.2	+ 2 11	R	284	05 55.3	-1.0	-1.8	
26	1152	G5	6.9	+22 27	D	95	18 19.2	-1.7	+0.6	
27	1295	KO	6.5	+20 11	D	-	-	-	-	
27	1292	FO	6.7	+19 57	D	-	-	-	-	
27	1296	AO	6.5	+20 09	D	-	-	-	-	
28	1402	KO	7.5	+17 52	D	-	-	-	-	
Jun										
4	2133	KO	5.6	-11 13	D	150	18 43.9	-0.2	-2.6	
9	2802	KO	6.4	-21 45	R	-	-	-	-	
10	2838	KO	5.6	-21 53	R	231	04 21.3	-1.8	+2.5	
12	3113	B8	5.4	-18 12	R	212	05 02.4	-1.5	+3.0	
13	3256	FO	6.2	-14 26	R	270	05 37.2	-2.6	0.0	
18	401	AO	6.3	+10 32	R	192	05 43.7	+0.1	+2.0	
25	1479	FO	6.3	+16 00	D	57	20 16.4	-2.2	+3.3	
27	1702	MO	4.2	+ 6 49	D	-	-	-	-	
29	1897	M3	7.4	- 1 30	D	163	19 31.0	-0.9	-3.0	
30	2005	G5	7.0	- 6 41	D	-	-	-	-	
Jul										
2	2113m	F8	7.5	-10 37	D	78	00 14.8	-1.6	+1.9	
3	2223	KO	4.0	-14 37	D	148	00 08.2	-1.6	-2.1	
3	2341	F2	7.2	-17 16	D	163	19 36.8	-0.1	-3.8	
9	3069	AOp	6.2	-19 14	R	201	02 34.4	-1.4	+4.1	
9	3190	A5	3.0	-16 21	D	-	-	-	-	
9	3190	A5	3.0	-16 21	R	258	22 20.8	-0.5	-0.7	
11	3478	KO	6.5	- 7 44	R	-	-	-	-	
24	1647	A2	6.7	+ 9 27	D	-	-	-	-	
24	1647	A2	6.7	+ 9 27	D	-	-	-	-	
24	1659	KO	6.8	+ 8 56	D	136	20 46.1	-0.2	-0.5	
25	1755	AO	6.8	+ 4 20	D	-	-	-	-	
26	1854	KO	6.9	+ 0 20	D	-	-	-	-	
27	1965	AO	6.5	- 5 15	D	-	-	-	-	
29	2184	A2	7.0	-12 51	D	63	22 22.6	-2.0	+3.0	
29	2167	KO	7.5	-12 52	D	-	-	-	-	
30	2291	F8	5.5	-16 23	D	-	-	-	-	

Date	Z.C.	Johannesburg					Luanshya				
		P.A.	h.	m.	a	b	P.A.	h.	m.	a	b
May											
9	2291	-	-	-	-	-	233°	21	21.8	-	-
11	2436	-	-	-	-	-	-	-	-	-	-
11	2436	266°	02	55.1	-2.9	+0.7	314	02	45.0	-2.9	-2.6
12	2704	-	-	-	-	-	-	-	-	-	-
13	2851	282	22	49.7	-0.1	-1.2	-	-	-	-	-
17	3288	233	04	06.4	-1.7	-0.9	282	04	06.6	-2.2	-1.1
18	3419	261	02	45.8	-0.5	-0.5	330	02	21.3	-	-
18	3425	199	03	27.0	-0.9	+2.5	253	03	41.2	-1.1	+0.2
20	170	-	-	-	-	-	-	-	-	-	-
26	1152	57	18	47.2	-2.2	+2.3	-	-	-	-	-
27	1295	-	-	-	-	-	85	21	12.2	-0.7	+0.6
27	1292	-	-	-	-	-	142	21	13.0	+0.1	-1.3
27	1296	-	-	-	-	-	92	21	14.6	-0.6	+0.4
28	1402	173	18	25.8	-	-	-	-	-	-	-
Jun											
4	2133	119	18	31.6	-0.9	-1.8	84	18	16.9	-1.5	-0.2
9	2802	267	20	16.2	-0.1	-0.8	-	-	-	-	-
10	2838	247	04	53.4	-1.6	+1.7	292	05	01.9	-2.6	-0.8
12	3113	224	05	37.7	-1.5	+2.5	-	-	-	-	-
13	3256	-	-	-	-	-	-	-	-	-	-
18	401	209	05	58.3	-0.5	+1.5	-	-	-	-	-
25	1479	-	-	-	-	-	-	-	-	-	-
27	1702	-	-	-	-	-	116	22	25.4	-0.4	-0.5
29	1897	122	19	30.9	-2.3	-1.3	77	19	27.3	-	-
30	2005	-	-	-	-	-	180	21	51.8	-	-
Jul											
2	2113	-	-	-	-	-	-	-	-	-	-
3	2223	115	00	16.3	-1.7	-0.3	64	00	26.9	-1.7	+2.2
3	2341	122	19	23.7	-1.5	-2.0	82	19	09.6	-2.7	0.0
9	3069	219	03	13.7	-1.5	+2.7	261	03	36.6	-2.5	+0.7
9	3190	47	21	22.4	-0.7	+0.7	-	-	-	-	-
9	3190	293	22	16.7	-0.6	-1.9	-	-	-	-	-
11	3478	273	23	21.8	-0.5	-1.0	-	-	-	-	-
24	1647	120	18	02.9	-1.4	-0.4	-	-	-	-	-
24	1647	-	-	-	-	-	-	-	-	-	-
24	1659	-	-	-	-	-	-	-	-	-	-
25	1755	163	20	27.4	-0.2	-2.3	113	20	12.5	-0.9	-0.4
26	1854	87	18	46.0	-2.8	+0.9	-	-	-	-	-
27	1965	-	-	-	-	-	164	22	06.7	-0.6	-3.2
29	2184	-	-	-	-	-	-	-	-	-	-
29	2167	189	19	04.1	-	-	-	-	-	-	-
30	2291	148	19	32.2	-1.8	-3.1	104	19	07.2	-3.2	-0.9

Date	Z.C.	Sp	Mag	(1950.0) Dec.	Ph	Cape Town				
						P.A.	h.	m.	a	b
Aug										
1	2436	B8	6.3	-19° 28'	D	145°	00 05.9	-2.0	-2.1	
1	2556	A3	7.1	-20 49	D	11	22 54.4			
1	2556	A3	7.1	-20 49	R	1	23 02.8			Graze
7	3425	B5	4.6	- 9 27	R	213	21 27.1	-0.4	+1.0	
9	49	KO	6.3	- 2 30	R	231	05 58.6	-1.4	+1.8	
11	322	G0	5.7	+ 8 20	R	262	05 54.6	-2.3	+0.4	
11	327	G5	4.5	+ 8 37	D	30	05 54.7	-1.2	+1.9	
12	454	G5	5.8	+13 00	R	227	05 38.3	-1.5	+1.0	
13	590	B9	6.3	+17 09	R	301	04 09.2	-2.3	-2.8	
15	911	B8	6.3	+22 24	R	296	05 44.3	-1.6	-2.0	
25	2128	KO	5.8	-11 42	D	-	-	-	-	
26	2247	A5	5.6	-15 31	D	-	-	-	-	
30	2802	KO	6.4	-21 45	D	14	20 42.2			
30	2802	KO	6.4	-21 45	R	343	21 07.0			Graze
30	2806	A0	6.9	-22 09	D	128	21 26.6	-2.6	-2.4	
Sep										
7	401	A0	6.3	+10 32	R	-	-	-	-	
8	523	A3	6.5	+15 16	R	-	-	-	-	
13	1167	KO	6.3	+22 31	R	-	-	-	-	
21	2089	G5	6.8	-10 20	D	-	-	-	-	
22	2208	K2	7.4	-14 47	D	-	-	-	-	
24	2456	B3	6.2	-20 26	D	-	-	-	-	
25	2580	A0	6.6	-21 57	D	-	-	-	-	
26	2736	F0	6.2	-22 13	D	80	20 11.3	-2.4	+0.9	
26	2739	A2	6.7	-21 59	D	18	21 35.0	-	-	
29	3035	F5	6.8	-19 27	D	70	00 36.1	-0.9	+1.6	
29	3171	F0P	3.8	-16 53	D	76	22 01.0	-2.2	+0.7	
30	3190	A5	3.0	-16 21	D	162	02 41			Graze*
30	3190	A5	3.0	-16 21	R	-	-	-	-	
Oct										
7	639	F0	6.0	+18 37	R	256	01 00.2	-1.1	-0.5	
7	654	F0	6.0	+18 56	R	225	03 27.4	-1.5	+1.0	
7	668	KO	3.6	+19 04	D	-	-	-	-	
8	817	B3	4.8	+21 54	R	254	04 32.1	-2.1	+0.2	
9	976	MO	3.2	+22 32	R	-	-	-	-	
22	2535	G0	6.7	-21 53	D	-	-	-	-	
25	2964	F0	6.6	-21 07	D	-	-	-	-	
26	3113	B8	5.4	-18 12	D	53	22 18.4	-1.1	+2.1	
27	3256	F0	6.2	-14 26	D	12	22 56.2	-0.1	+3.6	
28	3392	A2	7.1	-10 42	D	-	-	-	-	

* Between 2"-3" of tabular limb.

Date	Z.C.	Johannesburg					Luanshya				
		P.A.	h. m.	a	b	P.A.	h. m.	a	b		
Aug											
1	2436	119°	00 14.8	-1.5	-0.3	72°	00 21.7	-1.1	+1.3		
1	2556	-	-	-	-	-	-	-	-		
1	2556	-	-	-	-	-	-	-	-		
7	3425	246	21 35.0	-0.6	0.0	299	21 25.0	-0.5	-2.0		
9	49	-	-	-	-	-	-	-	-		
11	322	-	-	-	-	-	-	-	-		
11	327	-	-	-	-	-	-	-	-		
12	454	-	-	-	-	-	-	-	-		
13	590	-	-	-	-	-	-	-	-		
15	911	-	-	-	-	-	-	-	-		
25	2128	178	19 07.8	-	-	121	18 32.5	-2.5	-1.4		
26	2247	148	20 50.2	-1.7	-2.2	96	20 39.5	-2.0	+0.2		
30	2802	-	-	-	-	-	-	-	-		
30	2802	-	-	-	-	-	-	-	-		
30	2806	101	21 43.9	-2.8	-0.2	53	21 57.6	-2.4	+2.3		
Sep											
8	401	-	-	-	-	223	00 12.7	-0.7	+1.3		
8	523	-	-	-	-	300	23 35.7	-1.1	-2.1		
13	1167	280	04 43.2	-1.3	-1.2	332	04 16.5	-	-		
21	2089	110	18 38.4	-1.2	+0.1	53	18 54.8	-1.2	+3.4		
22	2208	-	-	-	-	178	20 54.1	-	-		
24	2456	-	-	-	-	131	20 18.9	-2.2	-1.7		
25	2580	153	20 21.4	-	-	95	20 04.7	-2.5	+0.1		
26	2736	59	20 44.5	-1.8	+2.2	-	-	-	-		
26	2739	-	-	-	-	-	-	-	-		
29	3035	64	00 54.7	-0.4	+1.6	24	01 20.2	+0.5	+2.6		
29	3171	66	22 30.4	-2.0	+1.4	25	22 59.8	-0.9	+3.2		
30	3190	130	02 38.5	-1.1	-0.9	84	02 40.1	-0.3	+0.6		
30	3190	186	03 04.9	+0.9	+3.5	-	-	-	-		
Oct											
7	639	262	01 10.7	-1.8	-0.4	-	-	-	-		
7	654	231	03 54.2	-2.1	+1.4	265	04 07.1	-2.9	+0.3		
7	668	129	05 05.0	-2.7	-1.5	87	05 00.5	-2.7	+0.4		
8	817	264	04 56.9	-2.6	+0.3	303	04 51.9	-3.4	-1.8		
9	976	-	-	-	-	227	01 08.0	-0.2	+1.1		
22	2535	-	-	-	-	145	19 36.0	-2.5	-3.1		
25	2964	70	19 47.9	-2.1	+1.5	24	20 20.7	-0.6	+3.9		
26	3113	48	22 42.8	-0.6	+2.1	0	23 20.4	-	-		
27	3256	6	23 23.0	+0.5	+3.9	-	-	-	-		
28	3392	-	-	-	-	103	22 26.7	-3.4	-0.5		

Date	Z.C.	Sp	Mag	(1950.0) Dec.	Ph	Cape Town				
						P.A.	h.	m.	a	b
Nov										
4	752	A5	4.7	+21° 31'	R	320°	04 21.3	-	-	
5	916	G5	4.3	+23 16	D	43	01 51.5	-1.1	+0.7	
5	916	G5	4.3	+23 16	R	294	02 56.4	-2.4	-1.1	
7	1221	M3	6.2	+22 47	R	329	01 59.6	-2.0	-3.5	
11	1689	M3	5.5	+ 8 25	R	246	04 36.4	-0.8	-0.5	
18	2509	K0	6.0	-21 24	D	-	-	-	-	
20	2806	A0	6.9	-22 09	D	16	21 46.1	+1.2	+3.8	
21	2929	G5	7.1	-21 27	D	48	20 19.7	-0.6	+2.4	
22	3069	AOp	6.2	-19 14	D	27	21 25.2	0.0	+3.0	
24	3327	K2	6.8	-12 29	D	-	-	-	-	
25	3478	K0	6.5	- 7 44	D	-	-	-	-	
26	.66	A0	6.8	- 2 04	D	146	22 47		Graze *	
29	362	G0	6.5	+ 9 59	D	-	-	-	-	
Dec										
4	1161	K5	6.2	+23 08	R	-	-	-	-	
4	1161	K5	6.2	+23 08	D	206	01 27.4	-	-	
5	1308	A0	4.7	+21 39	R	302	02 30.5	-2.0	-1.6	
7	1544	M0	5.7	+14 24	R	-	-	-	-	
20	3171	F0p	3.8	-16 53	D	22	21 56.4	+0.5	+2.6	
22	3425	B5	4.6	- 9 27	D	-	-	-	-	
22	3434	A2	7.4	- 8 57	D	50	21 02.1	-0.9	+2.0	
22	3446	K0	7.2	- 8 44	D	77	22 28.1	-0.7	+1.5	
24	150	F0	6.2	+ 1 06	D	-	-	-	-	
25	165	G5	6.7	+ 1 44	D	-	-	-	-	
26	298	F2	7.2	+ 7 37	D	88	00 15.2	-1.1	+1.2	
27	577	F0	6.0	+17 11	D	89	22 10.3	-2.3	0.0	
29	752	A5	4.7	+21 31	D	33	02 45.6	-1.7	+2.7	

* Between 1"-2" of tabular limb.

Date	Z.C.	Johannesburg				Luanshya			
		P.A.	h. m.	a	b	P.A.	h. m.	a	b
Nov									
4	752	-	- -	-	-	-	- -	-	-
5	916	33°	02 13.3	-1.5	+1.9	-	- -	-	-
5	916	308	03 12.4	-2.9	-1.6	-	- -	-	-
7	1221	-	- -	-	-	-	- -	-	-
11	1689	-	- -	-	-	303°	04 24.8	-1.2	-1.7
18	2509	-	- -	-	-	117	19 05.4	-0.7	-0.5
20	2806	-	- -	-	-	-	- -	-	-
21	2929	40	20 41.0	0.0	+2.4	-	- -	-	-
22	3069	19	21 46.1	+0.5	+3.1	-	- -	-	-
24	3327	349	20 05.4	-	-	-	- -	-	-
25	3478	61	20 33.2	-2.0	+1.5	26	21 01.5	-1.0	+2.8
26	66	130	23 04.6	-	-	81	23 03.5	-1.9	+0.8
29	362	129	02 16.0	-1.0	-1.0	84	02 17.4	-1.0	+0.7
Dec									
4	1161	-	- -	-	-	-	- -	-	-
4	1161	229	01 56.2	-2.3	+1.3	268	02 04.9	-2.8	-0.1
5	1308	322	02 36.8	-2.3	-2.4	-	- -	-	-
7	1544	-	- -	-	-	257	02 05.5	-1.6	+0.1
20	3171	-	- -	-	-	-	- -	-	-
22	3425	-	- -	-	-	8	19 46.3	0.0	+3.8
22	3434	46	21 25.0	-0.5	+2.0	6	21 58.1	+0.4	+3.6
22	3446	69	22 43.2	-0.2	+1.4	-	- -	-	-
24	150	-	- -	-	-	116	21 43.1	-3.1	-1.4
25	-	-	- -	-	-	98	00 10.6	-0.5	+0.2
26	298	73	00 33.3	-0.7	+1.3	37	00 54.6	-0.6	+2.1
27	577	83	22 35.5	-2.4	+0.6	50	22 50.8	-2.2	+1.8
29	752	-	- -	-	-	-	- -	-	-

THE PLANETS

The chart (frontispiece) shows the S.A.S.T. of the rising and setting of the Sun and the planets for position 30° E, 30° S. The approximate times for other places can be found by applying the longitude differences shown in Table I with the sign reversed, e.g. for Cape Town add 46 minutes, for Durban subtract 4 minutes. The correction in latitude will, in general, be sufficiently small to be ignored, and in no case will it exceed 15 minutes.

Mercury will be best seen in the evening near the time of greatest eastern elongation on August 24 and possibly be glimpsed at the greatest elongations at the beginning of January, in April/May, and in December. Morning visibility will be best near the time of greatest western elongation on February 13 and it may possibly be glimpsed near the greatest western elongations of June and October.

Venus is a prominent object in the morning sky for the first half of the year, reaching greatest western elongation on January 23. Greatest brilliancy, (magnitude -4), is at the beginning of the year. After conjunction on August 30 Venus appears in the evening sky.

Mars in opposition on February 4 is then visible all night, but thereafter sets steadily later throughout the year. Greatest brightness, (magnitude -1), occurs near the beginning of February. During the second half of the year it is a fairly faint evening object.

Jupiter is an evening object during January and February, and after conjunction on March 16, rises steadily later until opposition on October 8. At this time it reaches greatest brightness, (magnitude -2.5), and thereafter fades slightly, setting at midnight at the end of the year.

Saturn precedes Jupiter throughout the year and is in opposition on August 13 near which time it attains its greatest brightness at magnitude +0.5. It becomes an evening object during December.

Uranus, (in opposition February 22), and Neptune, (in opposition May 5), are not readily visible to the naked eye but are easy telescopic objects, and can be found by means of the accompanying ephemeris.

EPHEMERIS FOR URANUS AND NEPTUNE 1963

	Uranus			Neptune		
	R.A.		Dec.	R.A.		Dec.
Jan 1	10 ^h 28 ^m .9		+ 10° 22'	14 ^h 52 ^m .5		- 14° 42'
21	10 26.9		+ 10 34	14 54.1		- 14 48
Feb 10	10 24.0		+ 10 52	14 54.9		- 14 50
Mar 2	10 20.7		+ 11 11	14 54.7		- 14 48
22	10 17.6		+ 11 28	14 53.8		- 14 42
Apr 11	10 15.2		+ 11 41	14 52.1		- 14 35
May 1	10 14.0		+ 11 47	14 50.1		- 14 25
21	10 14.1		+ 11 46	14 47.9		- 14 16
Jun 10	10 15.5		+ 11 37	14 46.1		- 14 08
30	10 18.2		+ 11 21	14 44.7		- 14 02
Jul 20	10 21.8		+ 11 00	14 44.0		- 14 00
Aug 9	10 26.1		+ 10 35	14 44.2		- 14 02
29	10 30.8		+ 10 08	14 45.2		- 14 08
Sep 18	10 35.5		+ 9 40	14 46.9		- 14 17
Oct 8	10 39.8		+ 9 15	14 49.3		- 14 29
28	10 43.4		+ 8 54	14 52.1		- 14 41
Nov 17	10 46.1		+ 8 39	14 55.0		- 14 54
Dec 7	10 47.4		+ 8 31	14 57.9		- 15 06
27	10 47.4		+ 8 33	15 00.4		- 15 16

The coordinates are apparent geocentric positions for the equinox of date.

METEOR CALENDAR 1963

Date	Shower	Radiant R.A. Dec	Maximum		
			Date	Hourly Rate	Transit of Radiant
Jan 3	Quadrantids	227° + 46°	Jan 3	40	08 ^h 30 ^m
Mar 12 -Apr 25	Hydraids	184 - 27	Mar 25	?	00 00
Mar 1 -May 10	Virginids	200 - 6	Apr 3	?	00 00
Apr 2 -Apr 24	Lyrids	273 + 35	Apr 21	12	04 00
Apr 29 -May 21	Eta Aquarids	338 - 1	May 6	10	07 36
Apr 20 -Jul 30	Sco - Sgr System	270 - 30	Jun 14	?	00 30
Jul 25 -Aug 10	Delta Aquarids	343 - 17	Jul 28	20	02 00
Jul 18 -Jul 30	Alpha Capricornids	304 - 12	?	?	-- --
Jul 20 -Aug 19	Perseids	43 + 56	Aug 12	50	05 36
Aug 16 -Oct 8	Piscids	0 + 14	Sep 12	?	00 30
Oct 11 -Oct 30	Orionids	94 + 16	Oct 22	20	04 24
Sep 24 -Dec 10	Taurids	58 + 21	Nov 13	6	00 36
Nov 16	Leonids	151 + 21	Nov 16	6	06 32
Dec 5 -Dec 12	Geminids	113 + 30	Dec 12	30	02 00
Dec 5 -Jan 7	Velaids	149 - 51	Dec 29	?	03 30

The hourly rates would apply if the radiants were in the observer's zenith. The orbits of the cometary currents are closely related to the orbits of the comets named; the orbits of ecliptical currents to those of certain minor planets.

METEOR CALENDAR 1963

Recommended SAST of watch	Conditions at Maximum	Nature of current	Appearance
Difficult in SA.			
22h - 24h	Favourable	Unknown	
22h - 24h	Favourable	Ecliptical	
02h - 04h	Favourable	Cometary: Comet 1861 I	Swift with streaks
03h - dawn	Unfavourable	Cometary: Halley	Very swift, long paths
20h - 24h	Favourable	Ecliptical	
23h - 02h	Favourable	Ecliptical	Slow, long paths
22h - 02h	-	Cometary: Comet 1881 IV	Very slow, bright
03h - dawn	Unfavourable	Cometary: Comet 1862 III	
22h - 24h	Favourable	Ecliptical	
02h30m - 04h30m	Favourable	Cometary: Halley	Swift, with streaks
22h - 24h	Favourable	Ecliptical	
03h - dawn	Favourable	Cometary: Comet 1866 I	
23h - 02h	Favourable	Ecliptical	Medium speed, white
23h - 03h30m	Unfavourable	Unknown	

ASTRONOMICAL DIARY

JANUARY 1963

	d. h.	
Jan	4 10	Mercury at greatest elongation, 19° E.
	5 03	Pallas at opposition.
	9 10	Penumbral eclipse of the Moon.
	20 13	Mercury in inferior conjunction.
	23 05	Venus at greatest elongation, 47° W.
	25 00	Annular eclipse of the Sun. (See Eclipse section of Handbook for predicted circumstances in southern Africa).

FEBRUARY 1963

	d. h.	
Feb	3 11	Saturn in conjunction with Sun.
	4 14	Mars at opposition.
	13 17	Mercury at greatest elongation, 26° W.
	22 17	Uranus at opposition.

MARCH 1963

	d. h.	
Mar	2 06	Pluto at opposition.
	2 14	Ceres at opposition.
	7 00	Mars 3° N of Moon.
	10 10	Juno at opposition.
	15 07	Vesta at opposition.
	17 00	Jupiter in conjunction with Sun.
	21 01	Venus $0^{\circ}.9$ N of Saturn.
	21 10	Equinox.
	31 00	Mercury in superior conjunction.

APRIL - 1963

d. h.
Apr 26 04 Mercury at greatest elongation, 20° E.

MAY 1963

d. h.
May 5 15 Neptune at opposition.
18 05 Mercury in inferior conjunction.
21 07 Venus 4° N of Moon.

JUNE 1963

d. h.
Jun 1 07 Mars 1° N of Regulus.
5 21 Mars $0^{\circ}.6$ N of Uranus.
13 08 Mercury at greatest elongation, 23° W.
22 05 Solstice.
26 02 Uranus 3° S of Moon.
26 21 Mars 3° S of Moon.
28 03 Mercury $0^{\circ}.6$ S of Venus.

JULY 1963

d. h.
Jul 6 07 Eclipse of the Moon.
9 21 Saturn 2° N of Moon.
14 00 Mercury in superior conjunction.
20 00 Total solar eclipse invisible in Africa.

AUGUST 1963

d. h.

Aug	2 22	Mercury $0^{\circ}.6$ N of Regulus.
	6 01	Saturn 1° N of Moon.
	13 08	Saturn at opposition.
	24 12	Mercury at greatest elongation, 27° E.
	29 20	Uranus in conjunction with Sun.
	30 03	Venus in superior conjunction.

SEPTEMBER 1963

d. h.

Sep	5 07	Pluto in conjunction with Sun.
	20 07	Mercury in inferior conjunction.
	23 20	Equinox.

OCTOBER 1963

d. h.

Oct	5 22	Mercury at greatest elongation, 18° W.
	8 13	Jupiter at opposition.
	26 22	Saturn 2° N of Moon.

NOVEMBER 1963

d. h.

Nov	5 03	Mercury in superior conjunction.
	8 15	Neptune in conjunction with the Sun.
	21 00	Venus $0^{\circ}.05$ S of Mars.

DECEMBER 1963

d. h.

Dec 18 14 Mercurу at greatest elongation, 20° E.
 22 16 Solstice.
 30 00 Eclipse of the Moon invisible in Africa.

BRIGHT VARIABLE STARS

Name	Position (1950)		Range	Period Days	Expected Maxima 1963
	R.A.	Dec.			
o Ceti (Mira)	02 ^h 16 ^m .8	- 3° 12'	2.6-9.4	331	Apr 10
R Doradus	04 36.2	-60 11	5.3-6.4	Irr.	Apr 8
R Pictoris	04 44.8	-49 20	6.9-9.2	172?	Feb 19, Aug 10
L ₂ Puppis	07 12.0	-44 33	3.1-6.3	140?	Feb 6, Jun 26, Nov 13
R Carinae	09 31.0	-62 34	4.5-9.4	309	Aug 25
S Carinae	10 07.8	-61 18	5.7-8.3	149	Feb 12, Jul 11, Dec 7
R Hydrael	13 27.0	-23 01	4.7-9.6	386	Apr 25
T Centauri	13 38.9	-33 21	6.0-8.2	90	Mar 20, Jun 19, Sep 18, Dec 18
R Centauri	14 12.9	-59 41	5.7-12.0	547	.....
R Aquarii	23 41.2	-15 34	6.7-11.6	387	Mar 31

SOUTH AFRICAN OBSERVATORIES

Name	Place	E. Long.	S. Lat.	Alt.	Director
Republic	Johannesburg	1h+		ft	
Republic Annexe	Hartebeespoort	52m 18s.0	26°10'55":3	5925	W. S. Finsen
Royal Observatory	Cape Town	51m 30s	25°46'22"	4002	R. H. Stoy
Radcliffe	Pretoria	13m 54s.6	25°47'18"	26	A. D. Thackeray
Boyden	Bloemfontein	52m 54s.9	45m 37s.4	5059	E. Geyer
Leiden	Hartebeespoort	29°02'20"	51m 30s	4550	P. Th. Walraven
People's	Port Elizabeth	25°46'22"	42m 19s.2	330	P. E. Centre
Lamont-Hussey	Bloemfontein	33°57'14":5	44m 56s.8	4825	No resident director
Smithsonian Satellite-Tracking Station	Olifantsfontein	29°05'46":1	52m 59s.6	5066	R. Citron
Radio Space Research Station	Krugersdorp	25°57'33":9	48m 16s.3	4515	D. Hogg
E.S.O. Station	Zeekoeagat	25°53'14":5	29m 52s	3200	A. Florsch
W. Bell	Johannesburg	33°04'	52m 05s.8	5210	
J. H. Botham	Johannesburg	26°08'10":6	52m 17s.3	5605	
N. M. Hoogenhout	Pretoria	26°11'23":3	52m 58s.6	4725	
J. L. Jooste	Pretoria	25°45'14"	52m 47s.2	4359	
G. F. G. Knipe	Johannesburg	26°11'18":3	52m 11s.6	5915	
M. D. Overbeek	Germiston	26°11'42"	52m 33s.7	5605	
S. C. Venter	Pretoria	25°40'14":8	52m 46s.9	4050	
C. N. Williams	Johannesburg	26°12'00"	52m 28s.4	5590	
L. L. van Zyl	Boksburg	26°12'05"	52m 58s.9	5429	

PAST PRESIDENTS

1922 - 23	S. S. Hough	1942 - 43	A. F. I. Forbes
1923 - 24	R. T. A. Innes	1943 - 44	W. H. van den Bos
1924 - 25	J. K. E. Halm	1944 - 45	A. W. J. Cousins
1925 - 26	W. Reid	1945 - 46	R. H. Stoy
1926 - 27	H. Spencer Jones	1946 - 47	W. P. Hirst
1927 - 28	A. W. Roberts	1947 - 48	J. Jackson
1928 - 29	A. W. Long	1948 - 49	A. E. H. Bleksley
1929 - 30	H. E. Wood	1949 - 50	W. S. Finsen
1930 - 31	D. Cameron-Swan	1950 - 51	H. E. Krumm
1931 - 32	H. L. Alden	1951 - 52	A. D. Thackeray
1932 - 33	H. Spencer Jones	1952 - 53	J. C. Bentley
1933 - 34	D. G. McIntyre	1953 - 54	David S. Evans
1934 - 35	J. K. E. Halm	1954 - 55	P. Kirchhoff
1935 - 36	J. Jackson	1955 - 56	W. H. van den Bos
1936 - 37	H. E. Houghton	1956 - 57	S. C. Venter
1937 - 38	J. S. Paraskevopoulos	1957 - 58	M. W. Feast
1938 - 39	T. MacKenzie	1958 - 59	H. Haffner
1939 - 40	R. A. Rossiter	1959 - 60	P. Smits
1940 - 41	E. B. Ford	1960 - 61	G. G. Cillie
1941 - 42	H. Knox Shaw	1961 - 62	M. D. Overbeek

HONORARY MEMBERS

Dr. R. O. Redman	Dr. W. H. van den Bos	Dr. J. H. Oort
Dr. R. v. d. R. Woolley	Dr. J. Sohilt	Dr. H. Shapley
Dr. H. Haffner	Dr. H. Knox Shaw	Mr. D. G. McIntyre

HONORARY SECRETARIES

1922	H. W. Schonegevel
1922	T. MacKenzie
August	C. L. O'Brien Dutton
1923	H. E. Houghton
October	S. Skewes
1923	H. Horrocks
November	H. W. Schonegevel
1931	A. Menzies
1935	

OBSERVING SECTIONS

The Observing Sections exist to encourage amateurs in carrying out useful research. Enquiries about their activities should be addressed to the Directors of the Observing Sections, whose names and addresses are given below:—

Comets and Meteors:

Mr. S. C. Venter, P.O. Box 1416, Pretoria.

Variable Stars:

Mr. R. P. de Kock, The Royal Observatory, Observatory, Cape.

Nova Search Section:

The Rev. L. L. Dawson, 75, Fifth Avenue, Mayfair, Johannesburg.

A number of autonomous local Centres of the Society exists, which hold regular meetings. Information on local activity in fields such as "Moonwatch" (observation of artificial satellites), and telescope construction can be obtained through Centre Secretaries. Details of Centre organisation are as follows:—

CAPE CENTRE:

Chairman:	Mr. J. Simenhoff.
Vice-Chairman:	Dr. A. W. J. Cousins.
Hon. Secretary:	Mr. N. Saville.
Hon. Treasurer:	Mr. H. E. Krumm.
Hon. Auditor:	Mr. A. Menzies.
Council Representative:	Mr. W. C. Bentley.
Members of Committee:	Messrs. G. R. Arkins, J. Bondietti, P. Smits, I. Weinberg and G. B. Wellgate.

Meetings in winter on 2nd Wednesday of month at the Royal Observatory.

Secretarial address, c/o The Royal Observatory, Cape.

TRANSVAAL CENTRE:

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Hon. Secretary:	Mr. W. Bell.
Hon. Treasurer:	Dr. P. Kirchhoff.
Curator of Instruments:	Dr. P. Kirchhoff.
Pretoria Representative:	Mr. C. Mullink.
Council Representative:	Mr. H. C. Lagerweij.
Centre Representative at Republic Observatory:	Mr. G. F. C. Knipe.
Members of Committee:	Messrs. J. H. Botham, N. Malan and B. J. C. Maurick.

Observing and lecture meetings in alternate months.

Secretarial address, c/o Republic Observatory, Gill Street, Observatory, Johannesburg.

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Hon. Curator:	Mr. E. Blignaut.
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Secretarial address, 8, Seventh Avenue, Newton Park, Port Elizabeth.

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Secretarial address, Bloemfontein Club, P.O. Box 83, Bloemfontein.

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Secretarial address, Ansell May Hall, Howard College, University of Natal, Durban.