

THE
ASTRONOMICAL
SOCIETY
OF
SOUTH AFRICA

HANDBOOK FOR

1954

ASTRONOMICAL SOCIETY OF SOUTH AFRICA

1953—1954

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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. The declared objects of the Society are:—

- (1) The encouragement and stimulation of the study of Astronomy in South Africa;
- (2) The association of observers and their organisation in the work of astronomical observation and research;
- (3) The dissemination throughout South 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 a series of duplicated notes monthly and distributes to each member a copy of *Sky and Telescope*, an illustrated monthly astronomical magazine published in America. There are also a number of autonomous local centres which hold regular meetings. Details of these will be found on inside back cover.

All communications about the Society should be addressed to The Hon. Secretary, c/o The Royal Observatory, Observatory, Cape.

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PREFACE

The arrangement of the Handbook follows closely that of the past few years. A few minor omissions have been made to avoid the needless repetition of data. This handbook is meant to cater for the naked eye observer, rather than for the possessor of a telescope. It is felt that the latter should make every effort to acquire access to such excellent handbooks as those published by the British Astronomical Association and the Royal Astronomical Society of Canada.

Mr. S. C. Venter has contributed the Meteor Calendar and Mr. R. P. de Kock has calculated the data from which Dr. D. S. Evans drew the planetary diagram.

TIME

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.

To get the local mean time at other places in the Union the longitude difference 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 "

Conversely, to get 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., 12 h. 00 m. local mean time) at Port Elizabeth is 12 h. 18 m.

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 noon, that is, of the Sun's transit over the meridian.

Example: Find the S.A.S.T. of apparent noon at Port Elizabeth on November 1.

	hr. min.
S.A.S.T. of noon at 30° E.	11 44
Correction for longitude	18
	12 02
S.A.S.T. of noon at Port Elizabeth	12 02

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 day. This correction is given below.

For times between S.A.S.T.:—

03.00 and 09.00	add 1 minutes
09.00 " 15.00	" 2 "
15.00 " 21.00	" 3 "
21.00 " 23.59	" 4 "

Example: Find the sidereal time at 8.15 p.m. on October 4 at Port Elizabeth.

				hr. min.
Sid. time at 00.00 S.A.S.T. on October 4	..	..	..	00 48
S.A.S. Time	..	..	..	20 15
				21 03
Correction for longitude	..	..	..	- 18
Interval Correction	..	..	..	+ 3
				20 48

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 is 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 so 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	Julian Date at 14 hours	S.A.S.T. of Sun's Transit	Sidereal Time			
			at 0 hrs.		at 18 hrs.	
January	1	2,434,744.0	12 03 26	06 40	00 43	
"	11	754	12 07 51	07 20	01 23	
"	21	764	12 11 17	07 59	02 02	
February	1	775	12 13 37	08 42	02 45	
"	11	785	12 14 20	09 22	03 25	
"	21	795	12 13 45	10 01	04 04	
March	1	803	12 12 30	10 33	04 36	
"	11	813	12 10 13	11 12	05 15	
"	21	823	12 07 22	11 52	05 55	
April	1	2,434,834.0	12 04 02	12 35	06 38	
"	11	844	12 01 11	13 14	07 17	
"	21	854	11 58 46	13 54	07 57	
May	1	864	11 57 05	14 33	08 36	
"	11	874	11 56 18	15 13	09 16	
"	21	884	11 56 25	15 52	09 55	
June	1	895	11 57 37	16 35	10 38	
"	11	905	11 59 23	17 15	11 18	
"	21	915	12 01 30	17 54	11 57	
July	1	2,434,925.0	12 03 36	18 34	12 37	
"	11	935	12 05 18	19 13	13 16	
"	21	945	12 06 15	19 53	13 56	
August	1	956	12 06 15	20 36	14 39	
"	11	966	12 05 12	21 15	15 18	
"	21	976	12 03 12	21 55	15 58	
September	1	987	12 00 07	22 38	16 41	
"	11	997	11 56 47	23 18	17 21	
"	21	2,435,007.0	11 53 14	23 57	18 00	
October	1	2,435,017.0	11 49 51	00 36	18 39	
"	11	027	11 46 54	01 16	19 19	
"	21	037	11 44 44	01 55	19 58	
November	1	048	11 43 39	02 39	20 42	
"	11	058	11 44 01	03 18	21 21	
"	21	068	11 45 48	03 58	22 01	
December	1	078	11 48 55	04 37	22 40	
"	11	088	11 53 05	05 16	23 19	
"	21	2,435,098.0	11 57 54	05 56	23 59	

ECLIPSES

There will be five eclipses during 1954, three being of the Sun and two of the Moon. These are as follows:

- I January 5 .. Annular eclipse of the Sun, visible in the Antarctic, but not in South Africa.
- II January 19 .. Total eclipse of the Moon, visible in South Africa.
- III June 30 .. Total eclipse of the Sun, visible in North America, Europe and Asia, but not in South Africa.
- IV July 15-16 .. Partial eclipse of the Moon, visible in South Africa.
- V December 25 .. Annular eclipse of the Sun, visible in South Africa.

The circumstances of the lunar eclipses are as follows:—

	d.	h.	m.		d.	h.	m.
Moon enters penumbra	Jan. 19	01	39.6	July 15	23	47.7	
Moon enters umbra ..		19	02 50.0		16	01 09.4	
Total eclipse begins ..		19	04 16.6				
Middle of the eclipse..		19	04 31.8		16	02 20.3	
Total eclipse ends ...		19	04 46.9				
Moon leaves umbra ..		19	06 13.5		16	03 31.3	
Moon leaves penumbra		19	07 24.1		16	04 52.9	
Magnitude of eclipse..			1.037			0.411	
(Moon's diameter=1.0)							
P.A. of First Contact..			81°			126°	
P.A. of Last Contact..			314°			214°	

The annular eclipse of December 25 will be visible as an annular eclipse from a narrow belt of country stretching between Port Nolloth and Port Elizabeth. From the rest of South Africa only a partial eclipse will be seen. The circumstances of this eclipse as seen from Johannesburg and Cape Town are as follows:—

	d.	h.	m.		d.	h.	m.
Eclipse begins	Dec. 25	06	48	Dec. 25	06	41	
Greatest Phase ..		08	00		08	00	
Eclipse ends		09	23		09	30	
Magnitude			0.88			0.76	
P.A. of First Contact..			278°			261°	
P.A. of Last Contact..			87°			104°	

OCCULTATIONS VISIBLE AT CAPE TOWN AND JOHANNESBURG

Date	N.Z.C.	Mag.	Phase	Cape Town			Johannesburg		
				h.	m.	P.A.	h.	m.	P.A.
January 18	1070	5.2	D	01	43.6	128	01	59.4	93
29	2270	5.4	R	04	21.7	342	No Occn.		
29	2269	5.4	R	No Occn.			04	53.7	252
February 14	1030	3.2	D	00	47.3	70	No Occn.		
April 21	2270	5.4	R	03	10.6	262	03	36.1	292
May 19	2371	4.9	R	No Occn.			01	30.5	224
19	2500	3.4	D	22	04.9	88	22	20.4	43
19	2500	3.4	R	23	18.5	290	23	06.1	335
29	221	3.7	D	05	25.4	73	05	29.6	61
29	221	3.7	R	06	25.4	227	Sun		
June 15	2347	4.8	D	04	44.5	343	No Occn.		
17	2747	5.0	R	21	36.7	299	No Occn.		
17	2749	5.0	R	22	00.2	316	No Occn.		
July 3	1409	5.1	D	No Occn.			19	30.1	149
7	1800	5.4	D	No Occn.			18	56.5	170
11	2270	5.4	D	23	06.8	115	23	28.7	92
25	560	3.8	R	Low			03	42.2	189
25	561	5.2	R	Low			03	56.8	213
August 9	2500	3.4	D	22	50.2	73	23	19.0	59
10	2500	3.4	R	00	11.9	269	00	30.2	278
19	221	3.7	D	00	04.9	66	00	10.3	54
19	221	3.7	R	01	07.7	234	01	18.8	241
23	852	5.0	R	05	01.9	293	05	07.3	302
Sept. 8	2886	5.1	D	23	15.9	64	23	41.9	61
October 14	560	3.8	D	Low			23	05.2	35
14	561	5.2	R	23	51.6	300	23	57.2	308
14	560	3.8	R	23	55.1	279	24	03.5	285
20	1336	5.2	R	05	08.8	317	Sun		
30	2490	5.4	D	20	05.6	95	20	17.7	87
31	2630	5.1	D	No Occn.			21	04.6	150
Nov. 1	2779	3.9	D	21	04.0	144	21	14.3	133
Dec. 8	545	4.2	D	20	12.8	44	20	24.4	38
8	552	3.0	D	20	55.6	28	21	13.0	21
8	560	3.8	D	21	30.5	66	21	48.6	61
8	561	5.2	D	21	37.3	50	21	57.2	44
8	552	3.0	R	21	47.8	297	22	02.7	305

THE PLANETS

The chart shows the S.A.S.T. of the rising and setting of the Sun and Planets at a place whose latitude and longitude are 30° S, 30° E. 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 to the times given by the chart, for Durban subtract 4 minutes. The correction for latitude will in general be sufficiently small to be ignored and in no case will it exceed 15 minutes.

Mercury will be most easily seen just after sunset near the times of the evening elongations in June and October and just before sunrise near the morning elongation in March. Its magnitude on these occasions will be ± 0.8 , ± 0.2 and ± 0.4 .

Venus will be visible as a conspicuous evening star from March to November and as a morning star in December. Its maximum brightness of magnitude -4.3 is reached in mid-October and again in December.

Mars, which is in Opposition in June, will be a conspicuous object throughout most of the year. Its magnitude at the beginning of the year, when it rises soon after midnight, is only ± 1.6 but it gets steadily brighter until the time of Opposition when it has a magnitude of -2.3 , that is, it will be as bright as Jupiter. The distance from the Earth varies from 170,200,000 miles on January 1 to 39,700,000 miles on July 2 to 132,000,000 miles on December 31.

Jupiter, which was in Opposition in December, 1953, is a conspicuous golden object (magnitude -2.3) in the evening sky at the beginning of the year. It leaves the evening sky in June and remains a morning object until November.

Saturn will be a fairly conspicuous object in the evening sky from March to July. At Opposition in April its magnitude is ± 0.4 . The northern face of the ring system is presented towards the Earth, the angle of presentation varying between a minimum of 17° in June to 22° in December.

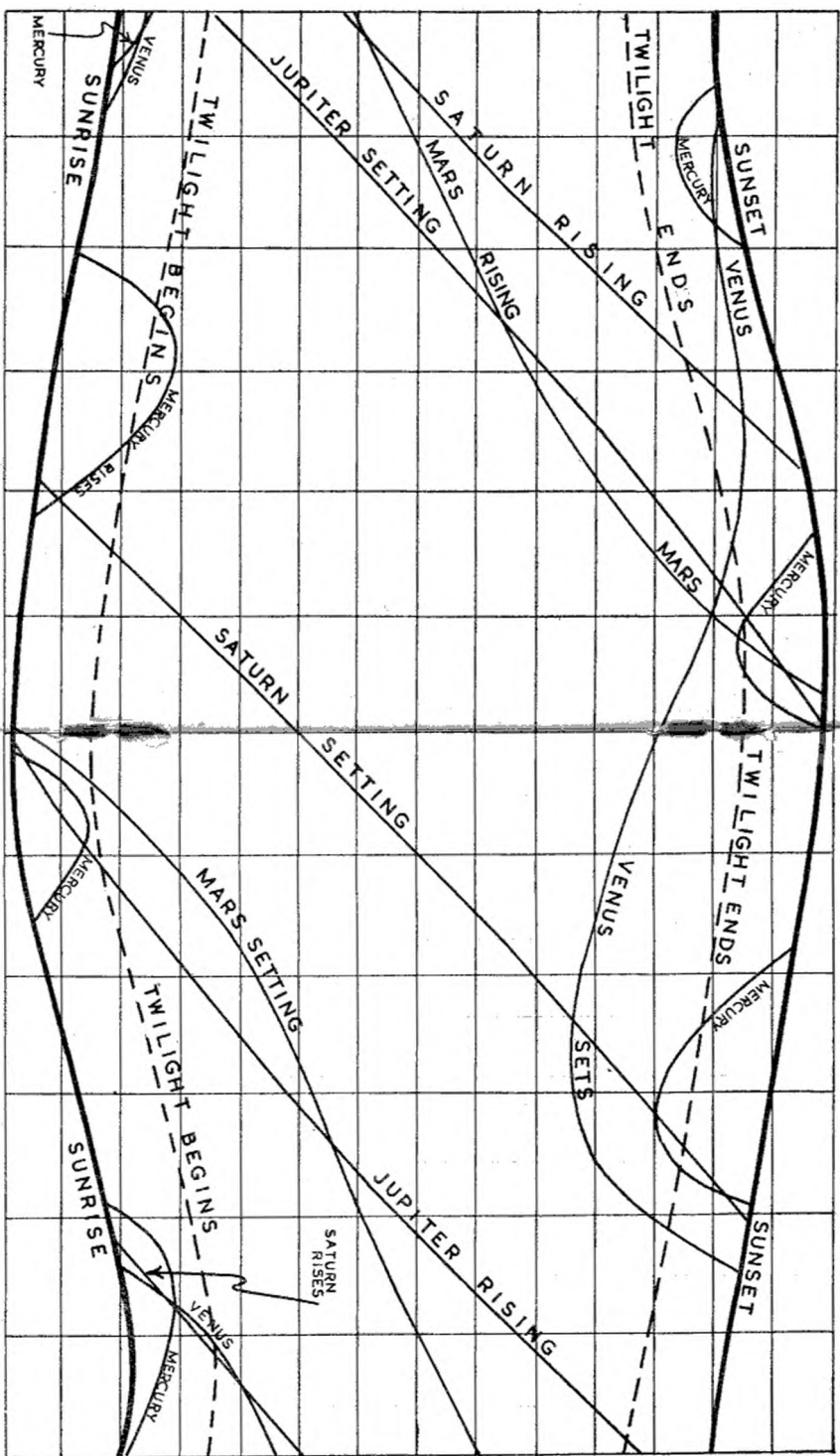
Neither **Uranus** (magnitude 5.8) nor **Neptune** (magnitude 7.7) are readily visible to the naked eye, but both are easy telescopic objects. Uranus is in Gemini and most easily observed at the beginning of the year. Neptune is in Virgo and is in Opposition on April 15.

THE PLANETS AS SEEN FROM SOUTH AFRICA

SAST 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7

JAN FEB MAR APR MAY JUN 1954 JUL AUG SEP OCT NOV DEC

SAST 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7



LATITUDE 30° SOUTH LONGITUDE 30° EAST

METEOR CALENDAR, 1954

Date	Shower	Radiant		Maximum			Nature of Current
		R. A.	Dec.	Date	Rate per hour	Transit of Radiant	
Jan. 3	Quadrantids	227°	+ 46°	Jan. 3	40	h. 08.5	Unknown.
Mar. 12— April 25	Hydrads	184°	- 27°	Mar. 25	?	00.0	Unknown.
March 1 May 10	Virginids	200°	- 6°	April 3	?	00.0	Ecliptical.
April 12-24	Lyrids	273°	+ 35°	April 2	12	04.0	Cometary: Comet 1861 I
April 29— May 21	Eta Aquarids	338°	- 1°	May 5	10	07.6	Cometary: Halley.
April 20— July 30	Sco-Sgr. System	270°	- 30°	June 14	?	00.5	Ecliptical.
July 25— Aug. 10	Delta Aquarids	343°	- 17°	July 28	20	02.0	Ecliptical.
July 20— Aug. 19	Perseids	43°	+ 56°	Aug. 11	50	05.6	Cometary: Comet 1862 III
July 25— Sept. 8	Cygnids	324°	+ 51°	Aug. 16	?	00.0	Unknown.
Aug. 16— Oct. 8	Piscids	0°	+ 4°	Sept. 12	?	00.5	Ecliptical.
Oct. 11-30	Orionids*	94°	+ 16°	Oct. 22	20	04.4	Cometary: Halley.
Sept. 24— Dec. 10	Taurids	58°	+ 21°	Nov. 13	6	00.6	Ecliptical.
Nov. 16	Leonids	151°	+ 21°	Nov. 16	6	06.5	Cometary: Comet 1866 I
Dec. 5-12	Geminids	113°	+ 30°	Dec. 12	30	02.0	Ecliptical.
Dec. 5— Jan. 7	Veluids	149°	- 51°	Dec. 29	?	03.5	Unknown.

* According to Prentice (Director of the Meteor Section of the B.A.A.), this shower has a probable period of 16 years with an expected return during 1951-1955.

Much of the above information is derived from Hoffmeister's "Meteorströme" (Meteoritic Streams) published in 1948. The orbits of the Cometary Currents are closely related to the orbits of the comets indicated, and those of the Ecliptical Currents to the orbits of certain minor planets.

For the moon during the above periods see the Astronomical Diary.

ASTRONOMICAL DIARY

JANUARY, 1954

New Moon 5d 04h 21m

First Quarter 12d 02h 22m

Full Moon 19d 04h 37m

Last Quarter 27d. 05h. 28m.

Jupiter is conspicuous in the evening sky; Mars and Saturn are close together at the beginning of the month and rise just after midnight.

	d.	h.	
Jan.	2	10	Earth at Perihelion, distance 0.983 astronomical units.
„	2	23	Mars and Saturn in conjunction, Mars $1^{\circ}.3$ S.
„	5		Annular eclipse of the Sun (not visible in South Africa).
„	11	21	Uranus at Opposition.
„	14	20	Mercury in Superior Conjunction.
„	16	03	Jupiter in conjunction with the Moon, Jupiter 4° S.
„	19		Total eclipse of the Moon.
„	27	15	Saturn in conjunction with the Moon, Saturn 8° N.
„	28	07	Neptune at a Stationary Point.
„	28	17	Mars in conjunction with the Moon, Mars 6° N.
„	30	02	Venus in Superior Conjunction.

FEBRUARY, 1954

New Moon 3d. 17h. 55m.

First Quarter 10d. 10h. 29m.

Full moon 17d. 21h. 17m.

Last Quarter 26d. 01h. 29m.

Jupiter is conspicuous in the evening sky; Saturn and Mars rise in the late evening.

	d.	h.	
Feb.	4	23	Mercury in conjunction with the Moon, Mercury 4° S.
„	10	14	Jupiter at a Stationary Point.
„	12	07	Jupiter in conjunction with the Moon, Jupiter 4° S.
„	13	22	Mercury at Greatest Elongation, $18''$ E.
„	18	03	Saturn at a Stationary Point.
„	19	19	Mercury at a Stationary Point.
„	24	00	Saturn in conjunction with the Moon, Saturn 8° N.
„	25	02	Mars and Antares in conjunction, Mars $5^{\circ}.4$ N.
„	26	07	Mars in conjunction with the Moon, Mars 4° N.

MARCH, 1954

New Moon 5d. 05h. 11m.

First Quarter 11d. 19h. 51m.

Full Moon 19d. 14h. 42m.

Last Quarter 27d. 18h. 14m.

Mercury is visible as a morning star towards the end of the month; Venus is an evening star setting soon after the Sun; Jupiter is conspicuous in the evening sky; Mars and Saturn rise in the late evening.

	d.	h.	
Mar.	1	12	Mercury in Inferior Conjunction.
"	11	15	Jupiter in conjunction with the Moon, Jupiter 3° S.
"	13	20	Mercury at a Stationary Point.
"	21	06	Equinox.
"	23	04	Saturn in conjunction with the Moon, Saturn 8° N.
"	26	17	Mars in conjunction with the Moon, Mars 3° N.
"	27	21	Uranus at a Stationary Point.
"	28	17	Mercury at Greatest Elongation, 28° W.

APRIL, 1954

New Moon 3d. 14h. 25m. **First Quarter 10d. 07h. 05m.**
Full Moon 18d. 07h. 48m. **Last Quarter 26d. 06h. 57m.**

Mercury is visible as a morning star at the beginning of the month; Venus is an evening star setting soon after the Sun. Jupiter and Saturn are both visible in the evening, Jupiter in the West, Saturn in the East. Mars rises as Jupiter sets.

	d.	h.	
Apr.	1	20	Mercury in conjunction with the Moon, Mercury 7° S.
"	4	20	Venus in conjunction with the Moon, Venus 6° S.
"	8	05	Jupiter in conjunction with the Moon, Jupiter 3° S.
"	15	07	Neptune at Opposition.
"	19	07	Saturn in conjunction with the Moon, Saturn 8° N.
"	23	19	Mars in conjunction with the Moon, Mars 1° N.
"	26	22	Saturn at Opposition.

MAY, 1954

New Moon 2d. 22h. 22m. **First Quarter 9d. 20h. 17m.**
Full Moon 17d. 23h. 47m. **Last Quarter 25d. 15h. 49m.**

Venus and Jupiter are both evening stars and near the end of the month will be close enough to each other to form a conspicuous pair. Saturn is visible throughout the night, while Mars rises fairly early in the evening.

	d.	h.	
May	4	15	Venus in conjunction with the Moon, Venus 3° S.
"	5	22	Jupiter in conjunction with the Moon, Jupiter 2° S.
"	7	06	Venus and Aldebaran in conjunction, Venus 6°.3 N.
"	9	01	Mercury in Superior Conjunction.
"	16	09	Saturn in conjunction with the Moon, Saturn 8° N.
"	19	13	Mercury and Aldebaran in conjunction, Mercury 7°.2 N.
"	21	10	Mars in conjunction with the Moon, Mars 1° S.
"	23	14	Venus and Jupiter in conjunction, Venus 1°.5 N.
"	23	23	Mars at a Stationary Point.
"	31	21	Mercury and Jupiter in conjunction, Mercury 2°.2 N.

JUNE, 1954

New Moon 1d. 06h. 03m. First Quarter 8d. 11h. 13m.
Full Moon 16d. 14h. 06m. Last Quarter 23d. 21h. 46m.
New Moon 30d. 14h. 26m.

Mercury may be visible as an evening star at the beginning of the month. Venus is conspicuous and does not set until two hours after the Sun. Both Mars and Saturn are visible throughout the night.

	d.	h.	
June	2	18	Jupiter in conjunction with the Moon, Jupiter 1° S.
"	2	22	Mercury in conjunction with the Moon, Mercury 1° N.
"	3	13	Venus in conjunction with the Moon, Venus 2° N.
"	9	09	Mercury at Greatest Elongation, 24° E.
"	10	06	Venus and Uranus in conjunction, Venus 1° 4' N.
"	12	06	Venus and Pollux in conjunction, Venus 4° 9' S.
"	12	13	Saturn in conjunction with the Moon, Saturn 8° N.
"	17	10	Mars in conjunction with the Moon, Mars 3° S.
"	22	01	Solstice.
"	22	16	Mercury at a Stationary Point.
"	24	19	Mars at Opposition.
"	30		Total Eclipse of the Sun (Not visible in South Africa).
"	30	20	Jupiter in conjunction.

JULY, 1954

First Quarter 8d. 03h. 33m. Full Moon 16d. 02h. 29m.
Last Quarter 23d. 02h. 14m. New Moon 30d. 00h. 20m.

Venus, Mars and Saturn are all conspicuous in the evening sky.

	d.	h.	
July	2	10	Mars nearest to the Earth.
"	3	17	Venus in conjunction with the Moon, Venus 5° N.
"	3	22	Earth at Aphelion, distance 1.017 astronomical units.
"	6	01	Neptune at a Stationary Point.
"	6	07	Mercury in Inferior Conjunction.
"	7	17	Saturn at a Stationary Point.
"	9	20	Saturn in conjunction with the Moon, Saturn 8° N.
"	12	10	Venus and Regulus in conjunction, Venus 1° 1' N.
"	14	02	Mars in conjunction with the Moon, Mars 3° S.
"	15		Partial eclipse of the Moon.
"	16	13	Uranus in conjunction.
"	17	06	Mercury at a Stationary Point.
"	27	05	Mercury at Greatest Elongation, 20° W.
"	28	02	Mercury, Jupiter and the Moon in conjunction, Mercury 1° 9' S.
"	29	17	Mars at a Stationary Point.

AUGUST, 1954

First Quarter 6d. 20h. 50m. Full Moon 14d. 13h. 03m.
Last Quarter 21d. 06h. 51m. New Moon 28d. 12h. 21m.

Venus, Mars and Saturn are all conspicuous evening objects. Jupiter is visible just before sunrise.

	d.	h.	
Aug.	2	20	Venus in conjunction with the Moon, Venus 6° N.
„	4	01	Mercury and Pollux in conjunction, Mercury 7°.0 S.
„	4	14	Mercury and Uranus in conjunction, Mercury 0°.6 S.
„	6	05	Saturn in conjunction with the Moon, Saturn 8° N.
„	10	10	Mars in conjunction with the Moon, Mars 3° S.
„	21	22	Mercury in Superior Conjunction.
„	25	03	Jupiter in conjunction with the Moon, Jupiter 1° N.
„	31	03	Venus and Spica in conjunction, Venus 0°.1 N.

SEPTEMBER, 1954

First Quarter 5d. 14h. 28m. Full Moon 12d. 22h. 19m.

Last Quarter 19d. 13h. 11m. New Moon 27d. 02h. 50m.

Mercury is visible as an evening star towards the end of the month. Venus, Mars and Saturn are conspicuous in the evening sky. Jupiter is a morning object, visible for over two hours before sunrise.

	d.	h.	
Sept.	1	17	Venus in conjunction with the Moon, Venus 3° N.
„	2	16	Venus and Neptune in conjunction, Venus 4°.2 S.
„	2	16	Saturn in conjunction with the Moon, Saturn 7° N.
„	6	08	Venus at Greatest Elongation, 46° E.
„	7	12	Mars in conjunction with the Moon, Mars 3° S.
„	12	16	Jupiter and Pollux in conjunction, Jupiter 6°.7 S.
„	16	05	Venus and Saturn in conjunction, Venus 6°.1 S.
„	21	18	Jupiter in conjunction with the Moon, Jupiter 1° N.
„	23	16	Equinox.
„	23	19	Mercury and Spica in conjunction, Mercury 0°.6 N.
„	26	07	Mercury and Neptune in conjunction, Mercury 3°.7 S.
„	29	10	Mercury in conjunction with the Moon, Mercury 3° N.
„	30	04	Saturn in conjunction with the Moon, Saturn 7° N.
„	31	00	Venus in conjunction with the Moon, Venus 1° S.

OCTOBER, 1954

First Quarter 5d. 07h. 31m. Full Moon 12d. 07h. 10m.

Last Quarter 18d. 22h. 30m. New Moon 26d. 19h. 47m.

Mercury is visible as an evening star at the beginning of the month. Venus is conspicuous in the evening sky. Mars does not set till after midnight and at about the same time as Jupiter is rising.

	d.	h.	
Oct.	6	02	Mars in conjunction with the Moon, Mars 4° S.
„	6	06	Mercury at Greatest Elongation, 25° E.
„	8	06	Jupiter and Uranus in conjunction, Jupiter 0°.4 S.
„	9	13	Mercury and Saturn in conjunction, Mercury 5°.6 S.
„	11	10	Venus at greatest brilliancy; magnitude -4.3.
„	18	14	Mercury at a Stationary Point.

	d.	h.	
Oct.	19	06	Jupiter in conjunction with the Moon, Jupiter 2° N.
"	19	20	Neptune in conjunction.
"	24	13	Mercury and Saturn in conjunction, Mercury 4°.7 S.
"	25	21	Venus at a Stationary Point.
"	29	01	Venus in conjunction with the Moon, Venus 3° S.
"	29	23	Mercury in Inferior Conjunction.

NOVEMBER, 1954

First Quarter 03d. 22h. 55m. Full Moon 10d. 16h. 29m.

Last Quarter 17d. 11h. 32m. New Moon 25d. 14h. 30m.

Venus disappears rapidly from the evening sky. Mars is visible throughout the evening but is too far away to be conspicuous. Jupiter rises before midnight.

	d.	h.	
Nov.	3	16	Uranus at a Stationary Point.
"	3	21	Mars in conjunction with the Moon, Mars 5° S.
"	5	03	Saturn in conjunction.
"	7	15	Mercury at a Stationary Point.
"	15	02	Mercury at Greatest Elongation, 19° W.
"	15	09	Venus in Inferior Conjunction.
"	15	16	Jupiter in conjunction with the Moon, Jupiter 2° N.
"	17	10	Jupiter at a Stationary Point.
"	24	05	Mercury, Saturn and the Moon in conjunction, Moon 6° N.
"	24	09	Venus in conjunction with the Moon, Venus 2° N.
"	25	07	Mercury and Venus in conjunction, Mercury 3° N.
"	29	02	Venus and Saturn in conjunction, Venus 2°.5 S.

DECEMBER, 1954

First Quarter 03d. 11h. 56m. Full Moon 10d. 02h. 56m.

Last Quarter 17d. 04h. 21m. New Moon 25d. 09h. 33m.

Venus and Saturn are together in the morning sky rising about two hours before the Sun. Jupiter rises in the early evening while Mars sets just before midnight.

	d.	h.	
Dec.	2	18	Mars in conjunction with the Moon, Mars 6° S.
"	4	12	Venus at a Stationary Point.
"	9	19	Mercury and Antares in conjunction, Mercury 4°.6 N.
"	13	00	Jupiter in conjunction with the Moon, Jupiter 3° N.
"	16	02	Venus and Saturn in conjunction, Venus 0°.7 N.
"	21	11	Venus at greatest brilliancy; magnitude -4.4.
"	21	17	Saturn in conjunction with the Moon, Saturn 6° N.
"	21	22	Venus in conjunction with the Moon, Venus 7° N.
"	22	11	Solstice.
"	25		Annular Eclipse of the Sun.
"	25	14	Mercury in Superior Conjunction.
"	31	14	Mars in conjunction with the Moon, Mars 6° S.

SPECIAL ARTICLES IN PREVIOUS HANDBOOKS

1949, page 11	Celestial Objects of Interest to the Owners of Small Telescopes.
1949, page 16	Principal Elements of the Solar System.
1950, page 13	Jupiter's Satellites.
1950, page 15	Saturn's Satellites.
1950, page 17	Eclipses.
1951, page 12	The Constellations.
1951, page 14	The Stars in Summer, Autumn, Winter and Spring.
1951, page 16	The South African Observatories.
1952, page 18	The Calendar.
1953, page 19	Transits of Mercury and Venus.

THE SATELLITES OF THE SOLAR SYSTEM

Satellite	Discoverer	Sidereal Period	Diameter	Mass	d	m
		(days)	(miles)		"	m
EARTH						
Moon		27·3217	2160	367·40		-12·5
MARS						
I Phobos	Hall	0·3189			24·7	11
II Deimos	Hall	1·2624			61·8	11
JUPITER						
V	Barnard	0·4982			59·2	
I Io	Galileo	1·7691	2109	429·4	138·4	5
II Europa	Galileo	3·5512	1865	242·1	220·2	6
III Ganymede	Galileo	7·1546	3273	762·7	351·2	5
IV Callisto	Galileo	16·6890	3142	430·0	617·7	6
VI	Perrine	250·62			3760	15
X	Nicholson	254·21			3796	19
VII	Perrine	260·07			3853	18
XII	Nicholson	620			6900	
XI	Nicholson	692·5			7404	19
VIII	Melotte	738·9			7715	17
IX	Nicholson	758	(14)		7740	19
SATURN						
I Mimas	Herschel	0·9424	370	0·175	30·0	12
II Enceladus	Herschel	1·3702	460	0·714	38·4	12
III Tethys	Cassini	1·8878	750	3·099	47·6	11
IV Dione	Cassini	2·7369	900	5·328	60·9	11
V Rhea	Cassini	4·5175	1150	11·42	85·1	10
VI Titan	Huyghens	15·9455	3550	607·6	197·3	8
VII Hyperion	Bond	21·2767			239·0	15
VIII Iapetus	Cassini	79·3308			574·9	11
IX Phoebe	Pickering	550·45			2092	14
URANUS						
V Miranda	Kuiper	1·414			9·34	
I Ariel	Lassell	2·5204			14·2	16
II Umbriel	Lassell	4·1442			20·2	16
III Titania	Herschel	8·7059			33·2	14
IV Oberon	Herschel	13·4633			44·4	14
NEPTUNE						
I Triton	Lassell	5·8768		1800	16·8	13
II Nereid	Kuiper	359·4				

d is the angular distance from the primary at opposition expressed in seconds of arc.
m is the mean magnitude at opposition.

The unit of mass used for this table is 0·000,000,000,1 that of the Sun.

OBSERVING SECTIONS

A number of observing sections has been formed to encourage amateurs to undertake useful research. Enquiries about these observing sections should be addressed to the Directors whose names and addresses are given below:—

Variable Stars

Mr. R. P. DE KOCK, The Royal Observatory, Observatory, Cape.

Meteor Section

Mr. S. C. VENTER, P.O. Box 1416, Pretoria, Transvaal.

Computing and Occultation Section

Mr. W. P. HIRST, "Water's Edge," Greenbanks Road, Rondebosch, Cape.

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NATAL CENTRE

For details apply to Mr. D. D. Robertson, No. 35, 45th Avenue, Sherwood, Durban.

CALENDAR FOR 1954

JANUARY							FEBRUARY							MARCH						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
31	-	-	-	-	1	2	-	1	2	3	4	5	6	-	1	2	3	4	5	6
3	4	5	6	7	8	9	7	8	9	10	11	12	13	7	8	9	10	11	12	13
10	11	12	13	14	15	16	14	15	16	17	18	19	20	14	15	16	17	18	19	20
17	18	19	20	21	22	23	21	22	23	24	25	26	27	21	22	23	24	25	26	27
24	25	26	27	28	29	30	28	-	-	-	-	-	-	28	29	30	31	-	-	-
APRIL							MAY							JUNE						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
-	-	-	-	1	2	3	30	31	-	-	-	-	1	-	-	1	2	3	4	5
4	5	6	7	8	9	10	2	3	4	5	6	7	8	6	7	8	9	10	11	12
11	12	13	14	15	16	17	9	10	11	12	13	14	15	13	14	15	16	17	18	19
18	19	20	21	22	23	24	16	17	18	19	20	21	22	20	21	22	23	24	25	26
25	26	27	28	29	30	-	23	24	25	26	27	28	29	27	28	29	30	-	-	-
JULY							AUGUST							SEPTEMBER						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
-	-	-	-	1	2	3	1	2	3	4	5	6	7	-	-	-	1	2	3	4
4	5	6	7	8	9	10	8	9	10	11	12	13	14	5	6	7	8	9	10	11
11	12	13	14	15	16	17	15	16	17	18	19	20	21	12	13	14	15	16	17	18
18	19	20	21	22	23	24	22	23	24	25	26	27	28	19	20	21	22	23	24	25
25	26	27	28	29	30	31	29	30	31	-	-	-	-	26	27	28	29	30	-	-
OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
31	-	-	-	-	1	2	-	1	2	3	4	5	6	-	-	-	1	2	3	4
3	4	5	6	7	8	9	7	8	9	10	11	12	13	5	6	7	8	9	10	11
10	11	12	13	14	15	16	14	15	16	17	18	19	20	12	13	14	15	16	17	18
17	18	19	20	21	22	23	21	22	23	24	25	26	27	19	20	21	22	23	24	25
24	25	26	27	28	29	30	28	29	30	-	-	-	-	26	27	28	29	30	31	-