The

Astronomical Society

of

South Africa

Handbook for

1951

ASTRONOMICAL SOCIETY OF SOUTH AFRICA
1950—1951

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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 the 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 this Handbook follows closely that of the past few years. A few minor alterations in the explanations have been made as a result of letters received and the emphasis of the handbook has been slightly altered 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.

The chief credit for the Handbook is again due to the Editor of the Monthly Notes, Dr. R. H. Stoy, but Messrs. R. P. de Kock, A. J. Moran and S. C. Venter have helped in its preparation.

Additional copies of this Handbook may be obtained from the Royal Observatory, Observatory, Cape. Members 1/-; Non-members 1/6.

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
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	minute
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 a 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
Required Sidereal Time		20	40

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° equal 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.		Sidereal Time at 18 hrs.	
			h.	m.	s.	h.	m.	h.	m.
January	1	2,433,648.0	12	03	04	06	39	00	42
,,	11	658	12	07	32	07	18	01	21
,,	21	668	12	11	04	07	58	02	01
February	1	679	12	13	30	08	41	02	44
,,	11	689	12	14	19	09	21	03	24
,,	21	699	12	13	51	10	00	04	03
March	1	707	12	12	39	10	32	04	35
,,	11	717	12	10	25	11	11	05	14
,,	21	727	12	07	37	11	50	05	53
April	1	2,433,738.0	12	04	16	12	34	06	37
,,	11	748	12	01	24	13	13	07	16
,,	21	758	11	58	57	13	53	07	56
May	1	768	11	57	12	14	32	08	35
,,	11	778	11	56	21	15	12	09	15
,,	21	788	11	56	25	15	51	09	54
June	1	799	11	57	31	16	34	10	37
,,	11	809	11	59	15	17	14	11	17
,,	21	819	12	01	21	17	53	11	56
July	1	2,433,829.0	12	03	28	18	33	12	36
,,	11	839	12	05	12	19	12	13	15
,,	21	849	12	06	13	19	51	13	54
August	1	860	12	06	18	20	35	14	38
,,	11	870	12	05	19	21	14	15	17
,,	21	880	12	03	22	21	54	15	57
September	1	891	12	00	21	22	37	16	40
,,	11	901	11	57	03	23	17	17	20
,,	21	911	11	53	30	23	56	17	59
October	1	2,433,921.0	11	50	04	00	35	18	38
,,	11	931	11	47	05	01	15	19	18
,,	21	941	11	44	52	01	54	19	57
November	1	952	11	43	40	02	38	20	41
,,	11	962	11	43	57	03	17	21	20
,,	21	972	11	45	37	03	56	21	59
December	1	982	11	48	38	04	36	22	39
,,	11	992	11	52	45	05	15	23	18
,,	21	2,434,002.0	11	57	32	05	55	23	58

THE SUN, MOON AND PLANETS

The Sun enters the Sign of

Aries (Equinox)	...	March 21 d. 12 h.
Cancer (Solstice)	...	June 22 d. 02 h.
Libra (Equinox)	...	Sept. 23 d. 17 h.
Capricorn (Solstice)	...	Dec. 22 d. 12 h.

The Earth is at Perihelion on January 2 and at Aphelion on July 4.

There will be only two eclipses during 1951, the smallest possible number in any one year. As always in such cases, both are of the Sun and this year both are annular.

The annular eclipse of the Sun on March 7 takes place over the South Pacific and will be completely invisible from South Africa.

The annular eclipse of September 1 will be visible in Southern Africa. The path of the annular phase begins in the eastern United States, crosses the Atlantic Ocean, Africa and ends in Madagascar. The path across Africa includes Angola, Northern Rhodesia and Mocambique. Broken Hill lies almost on the central line. From South Africa only the partial phases of this eclipse will be visible. At Johannesburg, the magnitude of the partial eclipse will be 0.64 and the greatest phase will occur at 16 h. 45 m.

PHASES OF THE MOON

Last Quarter				New Moon				First Quarter				Full Moon			
	d.	h.	m.		d.	h.	m.		d.	h.	m.		d.	h.	m.
Jan.	1	07	11	Jan.	7	22	10	Jan.	15	02	23	Jan.	23	06	47
Jan.	30	17	13	Feb.	6	09	54	Feb.	13	22	55	Feb.	21	23	12
Mar.	1	00	59	Mar.	7	22	50	Mar.	15	19	40	Mar.	23	12	50
Mar.	30	07	35	April	6	12	52	April	14	14	55	April	21	23	30
April	28	14	17	May	6	03	35	May	14	07	32	May	21	07	45
May	27	22	17	June	4	18	40	June	12	20	52	June	19	14	36
June	26	08	21	July	4	09	48	July	12	06	56	July	18	21	17
July	25	20	59	Aug.	3	00	39	Aug.	10	14	22	Aug.	17	04	59
Aug.	24	12	20	Sept.	1	14	49	Sept.	8	20	16	Sept.	15	14	38
Sept.	23	06	13	Oct.	1	03	57	Oct.	8	02	00	Oct.	15	02	51
Oct.	23	01	55	Oct.	30	15	54	Nov.	6	08	59	Nov.	13	17	52
Nov.	21	22	01	Nov.	29	03	00	Dec.	5	18	20	Dec.	13	11	30
Dec.	21	16	37	Dec.	28	13	43								

PERIGEE						APOGEE					
	d.	h.		d.	h.		d.	h.		d.	h.
Jan.	6	15	July	18	01	Jan.	18	16	July	3	06
Feb.	3	17	Aug.	15	06	Feb.	15	12	July	30	14
March	2	09	Sept.	11	22	March	15	08	Aug.	27	05
March	27	11	Oct.	7	09	April	12	03	Sept.	23	23
April	24	01	Nov.	2	15	May	9	19	Oct.	21	19
May	22	06	Nov.	30	15	June	6	03	Nov.	18	15
June	19	16	Dec.	29	01				Dec.	16	05

During its monthly journey round the earth, the Moon passes close to each of the planets in turn, and thus serves as a ready method of identifying them. The table shows when these conjunctions will take place.

Mercury			Venus			Mars			Jupiter			Saturn		
	d.	h.		d.	h.		d.	h.		d.	h.		d.	h.
						Jan.	10	04	Jan.	11	10	Jan.	28	01
Feb.	4	17	Feb.	8	00	Feb.	8	08	Feb.	8	07	Feb.	24	05
			Mar.	10	08	Mar.	9	12				Mar.	23	10
Apr.	8	04	Apr.	9	15	Apr.	7	14	Apr.	5	02	Apr.	19	16
May	5	00	May	9	19				May	2	20	May	17	00
									May	30	12			
June	2	23	June	8	20				June	27	03	June	13	09
July	5	10	July	8	10				July	24	14	July	10	18
Aug.	5	09	Aug.	5	23	July	3	10	Aug.	20	23	Aug.	7	04
						Aug.	1	06						
						Aug.	30	02						
			Sept.	28	07	Sept.	27	23	Sept.	17	04	Sept.	3	15
			Oct.	27	01	Oct.	26	19	Oct.	14	06	Oct.	28	20
Nov.	30	16	Nov.	25	20	Nov.	24	13	Nov.	10	08	Nov.	25	12
Dec.	27	08	Dec.	25	16	Dec.	23	05	Dec.	7	12	Dec.	23	01

OCCULTATIONS VISIBLE AT CAPE TOWN & JOHANNESBURG

Date	N.Z.C.	Mag.	Phase	Cape Town		Johannesburg	
				Time	P.A.	Time	P.A.
				h. m.		h. m.	
May 21	2366	1.2	D	21 38.2	96°	27 53.9	46°
May 21	2366	1.2	R	22 42.3	305	22 23.6	357
June 12	1663	5.2	D	21 31.5	160	21 32.2	119
June 17	2268	4.8	D	No Occn.		19 57.3	165
June 17	2298	5.1	D	24 52.0	143	25 02.4	113
July 15	2366	1.2	D	18 42.7	43	No Occn.	
July 15	2366	1.2	R	19 10.2	357	No Occn.	
July 17	2721	3.3	D	18 40.2	28	No Occn.	
Aug. 5	1600	5.1	D	19 11.6	131	Low	
Sept. 4	1884	5.3	D	19 19.3	118	19 30.0	89
Sept. 7	2263	4.8	D	No Occn.		19 52.2	169
Sept. 7	2268	4.8	D	20 29.1	64	21 00.3	35
Sept. 13	3126	4.3	D	04 10.2	85	Low	
Oct. 6	2554	5.2	D	21 45.5	28	22 03.9	18
Oct. 10	3206	5.2	D	24 44.0	72	25 03.1	72
Nov. 4	2864	4.7	D	20 16.0	63	20 36.3	61
Dec. 1	2809	4.9	D	20 38.5	19	Low	
Dec. 19	1487	1.3	D	07 21.2	191	07 07.2	139
Dec. 19	1487	1.3	R	07 58.0	247	08 20.3	298

Note.—N.Z.C. 1487 is Regulus and N.Z.C. 2366 is Antares.

GRAZING OCCULTATIONS VISIBLE FROM CAPE TOWN

Date	N.Z.C.	Mag.	Disappearance		Reappearance	
			Time	P.A.	Time	P.A.
			h. m.		h. m.	
April 13 ...	1081	6.2	20 22	37°	20 49	1°
Aug. 28 ...	1093	6.2	05 47	162	06 07	190
Sept. 7 ...	2273	5.9	21 21	21	21 40	350
Dec. 26 ...	2269	5.4	04 33	27	04 41	11

THE PLANETS

Mercury is most easily seen near the time of an elongation. In 1951 these are as follows:—

Eastern (Evening Star)			Western (Morning Star)		
Date.	*Elong.*	*Mag.*	*Date.*	*Elong.*	*Mag.*
April 5 ...	19°	+0.1	January 23 ...	25°	0.0
August 3 ...	27	+0.6	May 22 ...	25	+0.7
November 28 ...	22	−0.1	September 16	18	0.0

Mercury will be at Superior Conjunction on March 11, June 25 and October 13; at Inferior Conjunction on January 1, April 25, August 31 and December 17; at Stationary Points on January 12, April 14, May 7, August 16, September 9, December 7 and December 27.

Mercury will be in Conjunction with Venus on September 12d. 15h; with Mars on March 26d. 11h. and April 19d. 10h.

Venus will be an evening star gradually getting higher and higher in the evening sky from the beginning of the year until June 25, the time of its greatest elongation of 45° east of the Sun. From then on, Venus will get lower in the evening sky until by September 3, the time of Inferior Conjunction, it will pass out of the evening sky and become a morning star, remaining as such till after the end of the year. Its greatest elongation west of the Sun is 47° on November 14

Venus will be at Stationary Points on August 11 and September 23 and will attain its greatest brilliance of about −4.3 on July 29 and October 10. It will be in Conjunction with Jupiter on February 11, with Mars on February 16, with Regulus on July 7 and with Saturn on November 21. All these conjunctions are close with the two objects less than a degree apart.

The most interesting time to examine Venus with a small telescope is for some weeks before and after Inferior Conjunction when the planet's apparent diameter is at its maximum and the cusps of the bright portion most distinct.

Mars. The next opposition of Mars is not until April, 1952, so that at no time during 1951 will the planet be a really conspicuous object. For the first few months of the year it is an evening star and will be found close to Venus and Jupiter. After Conjunction with the Sun on May 22, Mars becomes a morning star in Gemini and moves through Leo into Virgo passing less than 1° north of Regulus on the morning of October 3. The brightness of Mars gradually increases from magnitude +1.9 at the beginning of January to +1.3 at the end of the year.

Mars will be in Conjunction with Jupiter on February 7d. 21h. and with Saturn on December 19d. 15h. Both conjunctions are close, particularly the one with Jupiter, when the two objects approach to within 10′ of each other.

Jupiter at the beginning of the year is an evening star in Aquarius and has, during February, a number of interesting conjunctions with the Moon, Venus and Mars. After Conjunction with the Sun on March 11, Jupiter will be a morning star and will be found in Pisces, south of the Great Square of Pegasus. The planet passes north of the equator in May for the first time for six years, so that conditions for observation from South Africa will not be as favourable as they have been. Jupiter will move slowly eastwards amongst the stars except between August 4 and November 30 (the two Stationary Points) when it will be retrograding. It will be in Opposition on October 3 and will be a conspicuous evening object during the later months of the year.

The brightness of Jupiter at the beginning of the year is −1.8, but this fades to −1.6 at the time of Conjunction and then brightens to −2.5 at the time of Opposition after which it fades again to −2.0 at the end of the year.

Saturn, which is in Opposition on March 20, will be visible as an evening star in Virgo throughout the first part of the year. After Conjunction on September 29, it will be a morning star but not easily visible as such until November. The Stationary Points, between which Saturn will be retrograding, are on January 13 and May 30.

The rings to which Saturn owes most of its glory now present their northern face towards the Earth but are still very narrow. Their apparent elevation in January is only 4°.3 and this decreases to 1°.0 at the end of May. From then on the rings gradually widen out and by the end of the year their apparent inclination is 9°.6. The total brightness of Saturn plus rings increases from magnitude +1.1 at at the beginning of the year to +0.9 at the time of Opposition and then decreases again to +1.3 at the end of July. By December he brightness has increased once more to +0.9.

Uranus (magnitude 5.8) is in Gemini and was in Opposition on December 29, 1950. It will be in Conjunction with the Sun on July 2 and at its Stationary Points on March 14 and October 20.

It will be most suitably placed for observation at the beginning of the year when its position will be as follows:—

January 1	...	06h.	32.1m.	+23°	34′
February 1	...	06	26.8	+23	38
March 1	...	06	24.0	+23	40

Neptune (magnitude 7.7) is in Virgo and will be in Opposition on April 8 and in Conjunction on October 13. The Stationary Points are on January 21 and June 29. The best months for observing Neptune are April, May and June. Its position will be:—

April 1	...	13h.	10.4m.	−05°	39′
May 1 ...	...	13	07.4	−05	21
June 1 ...	...	13	05.1	−05	07

GEOCENTRIC LONGITUDES OF THE SUN AND PLANETS FOR 1951

	Sun	Mercury	Venus	Mars	Jupiter	Saturn
Jan. 1	280°	282°	291°	313°	335°	182°
Jan. 31	310	287	343	337	342	182
Mar. 2	341	333	006	000	348	181
April 1	010	028	043	023	355	178
May 1	039	030	078	045	002	176
May 31	069	045	112	064	008	176
June 30	097	103	143	087	012	176
July 30	126	153	165	107	014	178
Aug. 29	155	159	164	127	014	182
Sept. 28	184	172	152	146	010	186
Oct. 28	214	227	168	164	006	189
Nov. 27	244	265	198	182	004	192
Dec. 27	274	254	232	194	005	194

METEOR CALENDER, 1951

Date	Shower	Radiant	Date of Max.	Rate of Max.	Time of Transit	Physical Characteristics
				per hr.	h.	
Jan. 2-3	Quadrantids	230° −52°	Jan. 3	40	08.5	Medium speed.
April 20-22	Lyrids	271° +33°	April 21	12	04.0	Swift and leaving streaks.
April 28-May 16	Eta Aquarids*	336° −1°	May 5	10	51.0	Very swift.
July 22-Aug. 9	Delta Aquarids	340° −17°	July 28	20	02.0	Slow with long paths.
Aug. 4-16	Perseids	44° +52°	Aug. 12	50	05.6	Very swift.
Oct. 15-25	Orionids†	96° +15°	Oct. 19-20	20	04.4	Swift, leaving streaks.
Oct. 26-Nov. 22	Taurids	55° +15°	Nov. 3-10	6	00.6	Slow and bright.
Nov. 15-20	Leonids§	152° +22°	Nov. 16	6	06.5	Very swift.
Dec. 9-14	Geminids	113° +32°	Dec. 12	30	02.0	Medium speed white.

NOTES

*Moving in practically same orbit as Halley's Comet.

†According to J. P. M. Prentice this shower has a probable period of 16 years with an expected return during 1951-1955.

§Period of 33 years. Next return 1965, but every year a couple of meteors are seen. Brilliant displays of thousands of meteors were seen in 1799, 1833 and 1866, but returns of 1899 and 1932 were disappointing.

During December 4-12 a promising southern radiant (115°—46°) near Sigma Puppis should be watched.

The Moon at the time of the showers:—

Last Quarter ...	... Jan. 1	Last Quarter ...	Oct. 22
Full Moon ...	... April 21	First Quarter ...	Nov. 6
New Moon ...	... May 6	Full Moon ...	Nov. 13
Last Quarter ...	... July 25	First Quarter ...	Dec. 5
New Moon ...	... Aug. 2	Full Moon ...	Dec. 13
First Quarter ...	... Aug. 10		

THE CONSTELLATIONS

If you want to find a house in a large town you first find the street in which it is and then look for the particular number. In the same way if you want to find a star in the sky you first find the constellation to which it belongs and then the star number or letter. Streets rarely look like what their name suggests (who has ever seen a street looking like Queen Victoria or like Oom Paul Kruger?) The same is true of the constellations which are arbitrary groupings of stars arranged to enable us to specify easily the star or stars about which we are talking. Many of the constellations are of very ancient origin, though most of those near the South Pole are of comparatively recent origin, being arranged either by Bayer when compiling his atlas in 1603, or by La Caille when he was reducing the observations he made at the Cape in 1751 and 1752. The Southern Cross was formed into a separate constellation by Royer in 1679. In the nineteen-twenties, the International Astronomical Union appointed a special commission to rationalise the whole system of constellations. The result was 88 constellations with rectilinear boundaries covering the whole sky. Of these 88, 48 have come down from Ptolemy, or before. (Ptolemy's Almagest, compiled about 137 A.D. is the oldest star catalogue we possess, the still older one of Hipparchus compiled about 129 B.C. having been lost.)

The following notes describe four of the best known and most easily recognisable star groups. Once these are familiar, they can be used to locate most of the other constellations.

Orion, the Hunter, is the brightest, best-loved and best-known constellation in the sky. Lying athwart the celestial equator it is visible all over the world and dominates the evening sky from November to May. It will be recognised by the four bright stars that mark the shoulders and knees of the giant and by the three evenly spaced bright stars that form his belt. The dagger is marked by three or four feinter stars just south of the belt which form a line pointing south. About half way along the dagger is Theta, a rather diffuse star which even a small telescope shows as surrounded by a glowing cloud of gas—the much photographed Orion Nebula. The bright blue star in the south-west corner (or knee) is Rigel, the orange star in the north-east corner (or shoulder) is Betelgeuse, a giant star of slightly varying brightness. The belt is almost exactly on the equator and so rises due east and sets due west. When rising or setting, Orion lies on his side, but as he crosses the meridian, he stands erect, though on his head as seen from South Africa.

As Orion sinks in the west, Scorpio, the Scorpion, rises in the east. According to the ancient fables, the giant Orion was slain by the Scorpion and still flies the sky at its appearance. Scorpio is another large bright constellation and, what is more, actually bears some

resemblance to the creature after which it is named. In ancient times Scorpio was even larger, as its claws were formed from the brighter stars of the rather inconspicuous neighbouring constellation of Libra, the Balance or Scales. The sign of Libra, the seventh of the constellations of the Zodiac, is used as the sign of the September Equinox, the name Libra being supposed to signify the equality of the day and night when the Sun enters this sign.

The brightest star in Scorpio is called Antares and is similar in appearance to Mars when that planet is at an average distance from the Earth. Its name is, in fact, derived from two words, the first of which means "similar to" or "rival of" and the second is Ares, the Greek name for Mars. The tail of the Scorpion is in one of the richest parts of the Milky Way and contains several clusters of stars, two or three of which are just visible to the naked eye. They can, of course, be much better seen with a pair of binoculars or a low-power telescope.

The Southern Cross is the most famous of the southern constellations, being to the South what the Great Bear is to the North. It is not, however, an ancient constellation. The stars forming it are visible in Egypt and were assigned to the Centaur. It was not till the beginning of the sixteenth century that these stars came to be associated together in the form of a cross. The Cross is visible from Cape Town throughout the year, but it is most conspicuous on winter evenings when it will be found high up in the south. It is quite a small constellation and bears a greater resemblance to a badly made kite than to a cross. It owes much of its charm to the brilliancy of the surrounding Milky Way, a brilliancy best appreciated on a dark moonless night when the Cross is high in the sky. On such a night the "Coal Sack"—an intensely black gap in the Milky Way just south of the Cross—is a conspicuous feature.

The Two Pointers, Alpha and Beta Centauri, are usually associated with the Cross. Alpha Centauri is the Sun's nearest stellar neighbour It is a double star. The brighter component of the pair is almost identical to our own Sun as regards size, surface temperature, etc.

The South Celestial Pole can be found from this group of stars. It is located approximately at the intersection of the line drawn along the length of the Cross with the perpendicular bisector of the line joining the Two Pointers.

Leo, the Lion, is another constellation that is easy to recognise and can be seen any evening between March and July. Its front part is formed of six fairly bright stars arranged in the shape of a sickle while its back part is formed of three brightish stars forming a right-angled triangle. As viewed from South Africa, the Lion is upside down. The bright star at the base of the sickle is Regulus and marks the heart of the Lion, while the star at the further end of the triangle is Denebola, which means the Tail Star.

THE STARS IN SUMMER
(February 1 10 p.m.)

Orion will be found high up in the sky a little west of north. Following the line of his belt to the south-east we come to Sirius, the brightest star in the sky. Following the line of the belt in the opposite direction to about the same distance as Sirius, we come to a group of faint stars forming a V with a bright star at the end of one of the arms, This group is known as the Hyades and forms the head of Taurus. the Bull. The bright star is Aldebaran, and marks the fiery eye of the Bull. Continuing in the same direction and for about an equal distance beyond the Hyades, we come to another more famous cluster, the Pleiades or Seven Sisters. Tennyson describes them as "like a swarm of fire-flies tangled in a silver braid." To the naked eye they look like a smally misty patch, but a pair of binoculars or a small telescope will show scores of separate stars.

Canopus, the second brightest star in the sky, will be found about halfway between Sirius and the South Pole. High in the south-west is another bright star, Achernar. This star marks the mouth of the River Eridanus, whose long winding course across the sky will be easily traced back to its source close to Rigel in Orion.

Starting once more from Orion, a line from Rigel through Betelgeuse prolonged about one-and-a-half times its own length leads to two bright stars fairly close together. These two stars mark the heads of Gemini, the Heavenly Twins; Castor is the lower one, Pollux the upper. About half-way between Betelgeuse and the Twins and considerably above the line joining them is another pair of stars which is sometimes mistaken for Castor and Pollux. The upper and brighter of the two is Procyon or Alpha Canis Minoris. Its companion is Beta Canis Minoris. The ancients used to call this pair "The Little Cubit" in contrast to Castor and Pollux which they called "The Big Cubit."

Capella is the bright star low down in the north, which makes an equilateral triangle with Betelgeuse and Castor.

THE STARS IN AUTUMN
(May 1 10 p.m.)

Orion and most of the summer stars have now passed out of the evening sky. though Sirius, Canopus, Procyon, Castor and Pollux are still to be seen in the west. Leo will be found fairly high up in the north, a little to the west of the meridian and the Southern Cross high in the south a little to the east of the meridian. Scorpio is still fairly low in the south-east.

Halfway between Leo and the Southern Cross lies the small compact constellation of Corvus, the Crow, and below it is a bright star. This is Spica or Alpha Virginis. Making an equatorial triangle with Denebola and Spica is an even brighter star. This is Arcturus.

THE STARS IN WINTER

(August 1 10 p.m.)

On a moonless night the most conspicuous object is the bright arch of the Milky Way spanning the whole sky from Cygnus in the north-east to the Southern Cross in the south-east. Cygnus, the Swan, the constellation at the north-east end of the Milky Way, is sometimes called the Northern Cross and it is certainly far more like a cross than is its more famous southern counterpart. As viewed from the southern hemisphere, the cross is upside down, its longer member lies along the Milky Way, its cross arm at right angles to the Milky Ways The bright star at the top of the cross, that is lowest in the sky as seen from South Africa, is Deneb, the Tail Star of the Swan.

Fairly low in the north, slightly above and to the west of Cygnus is a very bright blue star. This is Vega, the fourth brightest star in the sky. Making an almost equilateral triangle with Deneb and Vega is another first magnitude star—Altair or Alpha Aquilae. Altair is right in the Milky Way and is flanked on either side by two fainter companions. The three stars together bear a certain resemblance to the Belt of Orion, or to Antares and its two flanking stars.

THE STARS IN SPRING

(November 1 10 p.m.)

Scorpio is setting in the west, while Orion and the other stars of summer are rising in the west. Due north and about halfway up to the zenith, the Great Square of Pegasus is sprawled across the meridian. The bright star almost immediately overhead is Fomalhaut or Alpha Piscus Australis. Canopus is visible fairly low down in the south-east, while Achernar is just about halfway between Fomalhaut and Canopus. On moonless nights two cloud-like objects, looking like detached portions of the Milky Way, will be seen in the triangle formed by Achernar, Canopus and the South Pole. These are the two Magellanic Clouds. The larger cloud lies in Mensa, a faint and inconspicuous constellation. The full title of this constellation is Mons Mensa. It was so named by La Caille in 1752 in honour of the famous mountain at the Cape. The Magellanic Cloud suggested to him the "Table Cloth" that forms over Table Mountain in summer.

SOUTH AFRICAN OBSERVATORIES

Name.	Place.	Long. (E)	Lat. (W)	Alt.	Director
		h. m. s.		ft.	
Union	Johannesburg	1 52 17.9	26° 10′ 52.1″	5,858	W. H. van den Bos.
Cape	Cape Town	1 13 54.6	33 56 02.5	26	R. H. Stoy.
Radcliffe	Pretoria	1 52 54.9	25 47 18	5,057	A. D. Thackeray
Harvard	Bloemfontein	1 45 57	29 12	4,523	J. S. Paraskevopoulos.
Michigan	Bloemfontein	1 44 57	29 05 45	4,887	R. A. Rossiter.
Leiden	Johannesburg	1 52 18	26 10 52	5,858	T. Walraven.
Yale	Johannesburg	1 52 07	26 11 14	5,710	C. Jackson.

Formerly known as the Transvaal Observatory, the Union Observatory was founded as a meteorological institution in 1903, but from the first a certain amount of astronomy was done. It became primarily an astronomical observatory when it was renamed in 1912. The principal instruments are the 26T-inch refractor (focal length 35 feet), the twin 10-inch Franklin-Adams Star Camera (focal length 45 inches) and the Reunert 9-inch visual refractor. Plans for the improvement of the observing equipment are being made and it is hoped to move the photographic instruments to a new site sufficiently far from Johannesburg to be from the interference of the lights and smoke of that city.

The Cape Observatory, or, to give it its more usual name, the Royal Observatory, Cape of Good Hope, was established in 1820 and has been maintained continuously ever since by the British Admiralty. The principal instruments are the 6-inch Reversible Transit Circle, the Victoria Twin Refractor (photographic lens 24-inch aperture, visual lens 18-inch aperture, both 22 feet 6 inches focal length), the Astrographic Refractor (13-inch photographic lens with 10-inch visual lens for guiding, both 11 feet 3 inches focal length), the 7-inch visual refractor and the 6-inch visual refractor.

The Radcliffe Observatory was first established in Oxford, England, in 1771 and was transferred to its present site in 1937. The principal instrument, which is the largest and most modern telescope in the Southern Hemisphere, is the 74-inch reflector (focal length 30 feet).

The Boyden Station of the Harvard Observatory was first established in 1889 in Arequipa, Peru, on the western slopes of the Andes. In 1927 it was decided to transfer the station to its present site at Mazelspoort, 15 miles E.N.E. of Bloemfontein on Harvard Kopjie which

rises about 200 feet above the surrounding veld. The station is equipped with a wide range of telescopes and star cameras of which the two principal are the 60-inch reflector (focal length 26 feet 3 inches) and the Armagh-Dunsink-Harvard Baker-Schmidt telescope. This latter, which was installed in 1950, is of novel design and was rendered possible by the co-operation between Harvard and the two Irish observatories at Armagh and Dunsink.

The Lamont-Hussey Observatory of the University of Michigan which is situated on Naval Hill, Bloemfontein, was opened in 1928 and for a long time consisted of a single instrument, a 27-inch visual refractor of focal length 40 feet 6 inches. Now, alongside the big dome is a smaller building housing a ten-inch camera of 45 inches focal length which is on loan from the Mount Wilson Observatory. This instrument is fitted with an objective prism and is being used in a systematic search of the southern skies for stars with red emission lines in their spectra.

The Leiden Southern Station is situated at present in the grounds of the Union Observatory, but it will probably soon be moved together with the photographic instruments of the Union Observatory to a site outside Johannesburg. The principal instrument is the Rockefeller twin photographic refractor, each lens of which has an aperture of 16 inches and a local length of 90 inches.

The Yale Southern Station is on the grounds of the University of the Witwatersrand at Milner Park and was opened in 1925. Its principal instrument is a 26-inch photographic refractor of focal length 36 feet, which was designed especially for parallax observations. After World War II this observatory became the Yale-Columbia Station and, owing to the continual increase in the lights and smoke of Johannesburg, it was decided to look for a new site. It has recently been announced that this new site is in Australia at the Commonwealth Observatory at Canberra.

ASTRONOMICAL SOCIETY OF SOUTH AFRICA

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Meetings are normally held at the Royal Observatory at 8 p.m. on the second Wednesday of each month except in January and December. All communications should be addressed to the Hon. Secretary, the Cape Centre, c/o The Royal Observatory, Observatory, C.P.

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Unless otherwise announced, meetings are held at 8.15 p.m. in Room 142, Central Block, University of the Witwatersrand. Members will be notified of the subjects of lectures and of the dates of the observing meetings to be held at the Union Observatory in March, May and July. The following meetings are already arranged:—

1951.

February 14	...	Film Evening.
April 11	...	Speaker: Dr. P. R. Skoberla.
June 13 ...	...	Speaker: Dr. A. D. Thackeray.
August 8	...	Annual General Meeting. Speaker: Dr. A. E. H. Bleksley.

All communications should be addressed to the Hon. Secretary, 24, Tenth Avenue, Parktown North, Johannesburg.

NATAL CENTRE

For details apply to Mr. A. H. Finnis, 913, Killarney, Brickhill Road, Durban.

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