THE OBSERVER'S HANDBOOK FOR 1925

PUBLISHED BY

The Royal Astronomical Society of Canada

EDITED BY C. A. CHANT

SEVENTEENTH YEAR OF PUBLICATION

TORONTO
198 COLLEGE STREET
PRINTED FOR THE SOCIETY
1925

1925 CALENDAR 1925

JANUARY						
Sun.	. .	4	11	18	25	
Mon.	. .	5	12	19	26	
Tues.	. .	6	13	20	27	
Wed.	. .	7	14	21	28	
Thur.	.	1	8	15	22	29
Fri.	. .	2	9	16	23	30
Sat.	.	3	10	17	24	31

FEBRUARY						
Sun.	. .	1	8	15	22	
Mon.	. .	2	9	16	23	
Tues.	. .	3	10	17	24	
Wed.	. .	4	11	18	25	
Thur.	. .	5	12	19	26	
Fri.	. . .	6	13	20	27	
Sat.	. .	7	14	21	28	

MARCH						
Sun.	.	1	8	15	22	29
Mon.	.	2	9	16	23	30
Tues.	.	3	10	17	24	31
Wed.	.	4	11	18	25	..
Thur.	.	5	12	19	26	..
Fri.	. .	6	13	20	27	..
Sat.	.	7	14	21	28	..

APRIL						
Sun.	. .	5	12	19	26	
Mon.	. .	6	13	20	27	
Tues.	. .	7	14	21	28	
Wed.	.	1	8	15	22	29
Thur.	.	2	9	16	23	30
Fri.	. .	3	10	17	24	..
Sat.	.	4	11	18	25	..

MAY						
Sun.	.	3	10	17	24	31
Mon.	.	4	11	18	25	..
Tues.	.	5	12	19	26	..
Wed.	.	6	13	20	27	..
Thur.	.	7	14	21	28	..
Fri.	.	1	8	15	22	29 ..
Sat.	2	9	16	23	30	..

JUNE						
Sun.	. .	7	14	21	28	
Mon.	.	1	8	15	22	29
Tues.	.	2	9	16	23	30
Wed.	.	3	10	17	24	..
Thur.	.	4	11	18	25	..
Fri.	. .	5	12	19	26	..
Sat.	.	6	13	20	27	..

JULY						
Sun.	. .	5	12	19	26	
Mon.	. .	6	13	20	27	
Tues.	. .	7	14	21	28	
Wed.	.	1	8	15	22	29
Thur.	.	2	9	16	23	30
Fri.	. .	3	10	17	24	31
Sat.	.	4	11	18	25	..

AUGUST						
Sun.	.	2	9	16	23	30
Mon.	.	3	10	17	24	31
Tues.	.	4	11	18	25	..
Wed.	.	5	12	19	26	..
Thur.	.	6	13	20	27	..
Fri.	. .	7	14	21	28	..
Sat.	1	8	15	22	29	..

SEPTEMBER						
Sun.	. .	6	13	20	27	
Mon.	. .	7	14	21	28	
Tues.	.	1	8	15	22	29
Wed.	.	2	9	16	23	30
Thur.	.	3	10	17	24	..
Fri.	. .	4	11	18	25	..
Sat.	.	5	12	19	26	..

OCTOBER						
Sun.	. .	4	11	18	25	
Mon.	. .	5	12	19	26	
Tues.	. .	6	13	20	27	
Wed.	. .	7	14	21	28	
Thur.	.	1	8	15	22	29
Fri.	. .	2	9	16	23	30
Sat.	.	3	10	17	24	31

NOVEMBER						
Sun.	.	1	8	15	22	29
Mon.	.	2	9	16	23	30
Tues.	.	3	10	17	24	..
Wed.	.	4	11	18	25	..
Thur.	.	5	12	19	26	..
Fri.	. .	6	13	20	27	..
Sat.	.	7	14	21	28	..

DECEMBER						
Sun.	. .	6	13	20	27	
Mon.	. .	7	14	21	28	
Tues.	.	1	8	15	22	29
Wed.	.	2	9	16	23	30
Thur.	.	3	10	17	24	31
Fri.	. .	4	11	18	25	..
Sat.	.	5	12	19	26	..

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CONTENTS

PREFACE

The HANDBOOK for 1925 is somewhat larger than those issued in the last few years, a table containing the most important information regarding some 260 of the brighter stars being added. This was prepared by Mr. W. E. Harper, of the Dominion Astrophysical Observatory, Victoria, B.C. There is also an account of the total eclipse of the sun of January 24, 1925, by Mr. R. M. Motherwell of the Dominion Observatory, Ottawa.

Descriptions of the constellations and also star maps are not included, since fuller information is available in a better form and at a reasonable price in many publications, such as: Young's *Uranography* (72 c.), Norton's *Star Atlas and Telescopic Handbook* (10*s.* 6*d.*), Olcott's *A Field-book of the Stars* ($1.50), or McKready's *A Beginner's Star Book* ($5.00).

In the preparation of this HANDBOOK the Editor has been assisted by the two gentlemen named above, by Mr. J. P. Henderson, M.A., of the Dominion Observatory; Mr. J. H. Horning, M.A., of Toronto; and his colleague Dr. R. K. Young, of the University of Toronto.

THE EDITOR.

TORONTO, December, 1924.

ANNIVERSARIES AND FESTIVALS, 1925

New Year's Day	Thur., Jan. 1	Pentecost (Whit Sunday)	May 31
Epiphany	Tues., Jan. 6	Trinity Sunday	June 7
Septuagesima Sunday	Feb. 8	Corpus Christi	Thur., June 11
Quinquagesima Sunday	Feb. 22	St. John Baptist	Wed., June 24
Ash Wednesday	Feb. 25	Dominion Day	Wed., July 1
St. David	Sun., Mar. 1	Labor Day	Mon., Sept. 7
St. Patrick	Tues., Mar. 17	St. Michael (Michaelmas Day)	Tues., Sept. 29
Palm Sunday	Apr. 5	All Saints Day	Sun., Nov. 1
Good Friday	Apr. 10	First Sunday in Advent	Nov. 29
Easter Sunday	Apr. 12	Saint Andrew	Mon., Nov. 30
St. George	Thur., Apr. 23	Conception Day	Tues., Dec. 8
Rogation Sunday	May 17	St. Thomas	Mon., Dec. 21
Ascension Day	Thur., May 21	Christmas Day	Fri., Dec. 25
Victoria Day	Sun., May 24		

King George V., born June 3, 1865; began to reign May 6, 1910.
Queen Mary, born May 26, 1867.
Prince of Wales, born June 23, 1894.

SYMBOLS AND ABBREVIATIONS

SIGNS OF THE ZODIAC

♈ Aries..... 0°	♌ Leo.....120°	♐ Sagittarius...240°
♉ Taurus .....30°	♍ Virgo.....150°	♑ Capricornus..270°
♊ Gemini .....60°	♎ Libra.....180°	♒ Aquarius....300°
♋ Cancer.....90°	♏ Scorpio ....210°	♓ Pisces.....330°

SUN, MOON AND PLANETS

☉ The Sun.	☾ The Moon generally.	♃ Jupiter.
● New Moon.	☿ Mercury.	♄ Saturn.
○ Full Moon.	♀ Venus.	♅ or ♗ Uranus
☽ First Quarter	⊕ Earth.	♆ Neptune.
☾ Last Quarter.	♂ Mars.	

ASPECTS AND ABBREVIATIONS

☌ Conjunction, or having the same Longitude or Right Ascension
☍ Opposition, or differing 180° in Longitude or Right Ascension.
□ Quadrature, or differing 90° in Longitude or Right Ascension.
☊ Ascending Node; ☋ Descending Node.
α or A.R., Right Ascension; δ Declination.
h, m, s, Hours, Minutes, Seconds of Time.
° ′ ″, Degrees, Minutes, Seconds of Arc.

THE GREEK ALPHABET

A, α, Alpha.	I, ι, Iota.	P, ρ, Rho.
B, β, Beta.	K, κ, Kappa.	Σ, σ, ς, Sigma.
Γ, γ, Gamma.	Λ, λ, Lambda.	T, τ, Tau.
Δ, δ, Delta.	M, μ, Mu.	Υ, υ, Upsilon.
E, ε, Epsilon.	N, ν, Nu.	Φ, ϕ, Phi.
Z, ζ, Zeta.	Ξ, ξ, Xi.	X, χ, Chi.
H, η, Eta.	O, o, Omicron.	Ψ, ψ, Psi.
Θ, θ, ϑ, Theta.	Π, π, Pi.	Ω, ω, Omega

In the Configurations of Jupiter's Satellites (pages 29, 31, etc.), O represents the disc of the planet, d signifes that the satellite is on the disc, * signifes that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

SOLAR AND SIDEREAL TIME

In practical astronomy three different kinds of time are used, while in ordinary life we use a fourth.

1. *Apparent Time*—By apparent noon is meant the moment when the sun is on the meridian, and apparent time is measured by the distance in degrees that the sun is east or west of the meridian. Apparent time is given by the sun-dial.

2. *Mean Time*—The interval between apparent noon on two successive days is not constant, and a clock cannot be constructed to keep apparent time. For this reason *mean time* is used. The length of a mean day is the average of all the apparent days throughout the year. The *real sun* moves about the ecliptic in one year; an imaginary *mean sun* is considered as moving uniformly around the celestial equator in one year. The difference between the times that the real sun and the mean sun cross the meridian (*i. e.* between apparent noon and mean noon) is the *equation of time.* (See next page).

3. *Sidereal Time*—This is time as determined from the stars. It is sidereal noon when the Vernal Equinox or First of Aries is on the meridian. In accurate time-keeping the moment when a star is on the meridian is observed and the corresponding mean time is then computed with the assistance of the Nautical Almanac. When a telescope is mounted equatorially the position of a body in the sky is located by means of the sidereal time.

4. *Standard Time*—In everyday life we use still another kind of time. A moment's thought will show that in general two places will not have the same mean time; indeed, difference in longitude between two places is determined from their difference in time. But in travelling it is very inconvenient to have the time varying from station to station. For the purpose of facilitating transportation the system of *Standard Time* was introduced in 1883. Within a certain belt approximately 15° wide, all the clocks show the same time, and in passing from one belt to the next the hands of the clock are moved forward or backward one hour.

In Canada we have six standard time belts, as follows;—60th meridian or Atlantic Time, 4h. slower than Greenwich; 75th meridian or Eastern Time, 5h.; 90th meridian or Central Time, 6h.; 105th meridian or Mountain Time, 7h.; 120th meridian or Pacific Time, 8h.; and 135th meridian or Yukon Time, 9h. slower than Greenwich.

1925 EPHEMERIS OF SUN AT 0h GREENWICH CIVIL TIME

Date	R.A.	Equation of Time	Declination	Date	R.A.	Equation of Time	Declination
	h m s	m s	° ′ ″		h m s	m s	° ′ ″
Jan. 1	18 43 51	+ 3 20.9	−23 3 52	Apr. 3	0 46 50	+ 3 36.4	+ 5 1 47
" 4	18 57 5	+ 4 45.2	−22 47 55	" 6	0 57 46	+ 2 43.2	+ 6 10 29
" 7	19 10 16	+ 6 5.8	−22 27 54	" 9	1 8 44	+ 1 51.6	7 18 9
" 10	19 23 21	+ 7 22.0	−22 3 54	" 12	1 19 44	+ 1 2.1	8 24 44
" 13	19 36 22	+ 8 33.3	−21 36 1	" 15	1 30 47	+ 0 15.4	9 30 0
" 16	19 49 18	+ 9 39.0	−21 4 22	" 18	1 41 54	− 0 28.0	10 34
" 19	20 2 7	+10 38.8	−20 29 5	" 21	1 53 3	− 1 7.9	11 36 23
" 22	20 14 50	+11 32.3	−19 50 20	" 24	2 4 17	− 1 43.8	12 37 3
" 25	20 27 27	+12 18.9	−19 8 15	" 27	2 15 35	− 2 15.6	13 35 51
" 28	20 39 56	+12 58.4	−18 23 0	" 30	2 26 57	− 2 43.0	14 32 39
" 31	20 52 18	+13 30.5	−17 34 46				
Feb. 3	21 4 32	+13 55.0	−16 43 45	May 3	2 38 24	− 3 5.9	15 27 16
" 6	21 16 38	+14 12.0	−15 50 6	" 6	2 49 56	− 3 24.0	16 19 35
" 9	21 28 38	+14 21.7	−14 54 1	" 9	3 1 32	− 3 37.2	17 9 27
" 12	21 40 30	+14 24.2	13 55 41	" 12	3 13 14	− 3 45.2	17 56 45
" 15	21 52 15	+14 19.9	12 55 17	" 15	3 25 1	− 3 47.9	18 41 21
" 18	22 3 54	+14 9.2	11 52 59	" 18	3 36 53	− 3 45.2	19 23 7
" 21	22 15 27	+13 52.4	10 49 0	" 21	3 48 51	− 3 37.5	20 1 57
" 24	22 26 54	+13 29.8	9 43 29	" 24	4 0 53	− 3 24.8	20 37 43
" 27	22 38 16	+13 1.7	8 36 39	" 27	4 13 0	− 3 7.5	21 10 17
				" 30	4 25 11	− 2 45.9	21 39 35
Mar. 1	22 45 47	+12 40.1	7 51 27	June 2	4 37 26	− 2 20.6	22 5 29
" 4	22 57 0	+12 3.6	6 42 50	" 5	4 49 44	− 1 51.8	22 27 55
" 7	23 8 9	+11 22.8	5 33 22	" 8	5 2 6	− 1 20.1	22 46 49
" 10	23 19 14	+10 38.3	4 23 16	" 11	5 14 30	− 0 45.7	23 2 7
" 13	23 30 16	+ 9 50.5	3 12 39	" 14	5 26 56	− 0 9.1	23 13 47
" 16	23 41 16	+ 9 0.3	2 1 42	" 17	5 39 24	+ 0 29.0	23 21 46
" 19	23 52 13	+ 8 8.1	− 0 50 36	" 20	5 51 53	+ 1 8.1	23 26 3
" 22	0 3 9	+ 7 14.6	+ 0 20 32	" 23	6 4 22	+ 1 47.4	23 26 37
" 25	0 14 5	+ 6 20.2	+ 1 31 30	" 26	6 16 50	+ 2 26.1	23 23 28
" 28	0 24 59	+ 5 25.4	+ 2 42 9	" 29	6 29 17	+ 3 3.6	23 16 37
" 31	0 35 54	+ 4 30.6	+ 3 52 17				

1925, EPHEMERIS OF SUN AT 0h GREENWICH CIVIL TIME

Date	R.A.	Equation of Time	Declination	Date	R.A.	Equation of Time	Declination
	h m s	m s	° ′ ″		h m s	m s	° ′ ″
July 2	6 41 43	+ 3 39.2	+23 6 5	Oct. 3	12 34 1	−10 42.1	− 3 40 12
" 5	6 54 5	+ 4 12.4	+22 51 55	" 6	12 44 55	−11 37.4	− 4 49 42
" 8	7 6 25	+ 4 42.5	+22 34 10	" 9	12 55 53	−12 29.2	− 5 58 41
" 11	7 18 42	+ 5 9.4	+22 12 55	" 12	13 6 55	−13 16.9	− 7 6 59
" 14	7 30 55	+ 5 32.6	+21 48 13	" 15	13 18 1	−14 0.1	− 8 14 26
" 17	7 43 3	+ 5 51.6	+21 20 9	" 18	13 29 13	−14 38.4	− 9 20 50
" 20	7 55 8	+ 6 6.2	+20 48 50	" 21	13 40 30	−15 11.2	−10 26 3
" 23	8 7 7	+ 6 15.8	+20 14 21	" 24	13 51 52	−15 38.3	−11 29 51
" 26	8 19 1	+ 6 20.2	+19 36 49	" 27	14 3 21	−15 59.4	−12 32 5
" 29	8 30 50	+ 6 19.2	+18 56 22	" 30	14 14 56	−16 14.0	−13 32 33
Aug. 1	8 42 33	+ 6 12.5	+18 13 7	Nov. 2	14 26 38	−16 21.7	−14 31 5
" 4	8 54 10	+ 6 0.3	+17 27 10	" 5	14 38 27	−16 22.2	−15 27 31
" 7	9 5 42	+ 5 42.7	+16 38 42	" 8	14 50 24	−16 15.1	−16 21 39
" 10	9 17 9	+ 5 19.8	+15 47 47	" 11	15 2 28	−16 0.4	−17 13 20
" 13	9 28 31	+ 4 51.9	+14 54 36	" 14	15 14 40	−15 37.8	−18 2 23
" 16	9 39 47	+ 4 19.1	+13 59 15	" 17	15 27 0	−15 7.5	−18 48 35
" 19	9 51 0	+ 3 41.7	+13 1 54	" 20	15 39 28	−14 29.8	−19 31 48
" 22	10 2 8	+ 2 59.8	+12 2 41	" 23	15 52 2	−13 44.8	−20 11 49
" 25	10 13 11	+ 2 13.8	+11 1 45	" 26	16 4 44	−12 52.9	−20 48 29
" 28	10 24 11	+ 1 23.8	+ 9 59 15	" 29	16 17 32	−11 54.4	−21 21 38
" 31	10 35 7	+ 0 30.3	+ 8 55 20				
Sept. 3	10 46 0	− 0 26.3	+ 7 50 9	Dec. 2	16 30 27	−10 49.6	−21 51 9
" 6	10 56 51	− 1 25.4	+ 6 43 50	" 5	16 43 27	− 9 39.1	−22 16 54
" 9	11 7 39	− 2 26.3	+ 5 36 30	" 8	16 56 32	− 8 23.3	−22 38 46
" 12	11 18 27	− 3 28.6	+ 4 28 19	" 11	17 9 42	− 7 2.9	−22 56 39
" 15	11 29 13	− 4 31.7	+ 3 19 25	" 14	17 22 56	− 5 38.8	−23 10 27
" 18	11 39 59	− 5 35.2	+ 2 9 58	" 17	17 36 13	− 4 11.8	−23 20 6
" 21	11 50 46	− 6 38.7	+ 1 0 6	" 20	17 49 31	− 2 42.8	−23 25 34
" 24	12 1 32	− 7 41.6	− 0 10 0	" 23	18 2 51	− 1 13.1	−23 26 47
" 27	12 12 20	− 8 43.5	− 1 20 12	" 26	18 16 10	+ 0 16.5	−23 23 45
" 30	12 23 9	− 9 43.9	− 2 30 19	" 29	18 29 28	+ 1 45.2	−23 16 30
				" 31	18 38 20	+ 2 43.4	−23 9 19

To obtain the Sidereal Time or R.A. of Mean Sun, subtract the Equation of Time from the Right Ascension.

In the Equation of Time the Sign + means the watch is faster than the Sun, −that it is slower. To obtain the Local Mean Time, in the former case add the Equation of Time to, and in the latter case subtract it from, apparent or sun-dial time.

OCCULTATIONS OF STARS BY THE MOON, 1925

Computed for Ottawa by R. M. Motherwell

Date	Star	Mag.	Immersion*	Emersion*	Position Angle	
					Immer.	Emer.
1925			h m	h m	°	°
Jan. 3	ξ^2 Ceti	4.3	18 47.1	19 46.8	105	205
Feb. 2	θ' Tauri	4.2	.....	13 42.7	...	222
Feb. 2	α Tauri	1.1	16 55.9	18 01.4	107	215
Feb. 19	ξ Sagittarii	3.7	8 00.6	9 03.1	124	236
Feb. 27	ξ^2 Ceti	4.3	.....	10 39.1	...	288
Feb. 27	μ Ceti	4.4	20 23.5	21 21.3	57	270
Mar. 15	γ Librae	4.0	3 49.8	4 54.3	77	326
Apr. 14	μ Sagittarii	4.0	1 59.2	3 10.7	88	289
Apr. 17	ι Capricorni	4.3	6 34.8	7 52.3	64	260
May 1	Neptune	7.7	16 04.4	16 41.7	165	222
July 6	o Sagittarii	3.9	0 13.6	1 25.1	100	256
July 10	ψ Aquarii	4.5	3 41.5	4 31.7	13	292
July 10	ψ^2 Aquarii	4.6	4 28.6	5 35.6	88	218
July 14	μ Ceti	4.4	7 42.7	8 50.2	30	282
Aug. 4	γ Capricorni	3.8	20 42.2	21 36.7	112	225
Aug. 5	δ Capricorni	3.0	0 15.4	1 24.3	90	231
Aug. 10	ξ^2 Ceti	4.3	6 28.9	7 36.2	85	215
Aug. 29	o Sagittarii	3.9	20 03.6	21 19.6	93	262
Sept. 2-3	ψ Aquarii	4.5	23 40.6	00 40.6	27	293
Sept. 11	ν Geminorum	4.1	9 38.3	10 27.5	144	222
Sept. 22	γ Librae	4.0	11 03.1	11 45.9	62	339
Sept. 28	γ Capricorni	3.8	.....	16 52.2	...	242
Sept. 28	δ Capricorni	3.0	19 25.6	20 40.1	66	258
Oct. 4	ξ^2 Ceti	4.3	0 19.9	0 58.2	121	182
Oct. 9	ζ Geminorum	3.7	10 04.7	11 09.8	90	286
Oct. 11	δ Cancri	4.2	9 45.8	10 58.0	91	306
Nov. 27	ξ^2 Ceti	4.3	16 11.5	17 09.4	66	248
Nov. 28	μ Ceti	4.4	2 42.4	3 12.9	133	190

*Eastern Standard Time, the hours numbering from midnight

TIMES OF SUNRISE AND SUNSET

In the tables on pages 10 to 21 are given the times of sunrise and sunset for places in latitudes 44°, 46°, 48°, 50° and 52°, which cover pretty well the populated parts of Canada. The times are given in Mean Solar Time, and in the table on page following this, are given corrections to change these times to the Standard or Railroad times of the cities and towns named, or for places near them.

How the Tables are Constructed

The time of sunrise and sunset at a given place, in mean solar time, varies from day to day, and depends principally upon the declination of the sun. Variations in the equation of time, the apparent diameter of the sun and atmospheric refraction at the points of sunrise and sunset also affect the final result. These quantities, as well as the solar declination, do not have precisely the same values on corresponding days from year to year, and so it is impossible to give in any general table the exact time of sunrise and sunset day by day.

With this explanation the following general table has been computed, giving the rising and setting of the upper limb of the sun, corrected for refraction, using the values of the solar declination and equation of time given in the Nautical Almanac for 1899; these are very close average values and may be accepted as approximately correct for years. It must also be remembered that these times are computed for the sea horizon, which is only approximately realised on land surfaces, and is generally widely departed from in hilly and mountainous localities. The greater or less elevation of the point of view above the ground must also be considered, to get exact results.

The Times for Any Station

In order to find the time of sunrise and sunset for any place on any day, first from the list below find the approximate latitude of the place and the correction, in minutes, which follows the name. Then find in the monthly table the time of sunrise and sunset for the proper latitude, on the desired day, and apply the correction.

44°		46°		48°		50°		52°	
	mins.		mins.		mins.		mins.		mins.
Barrie	+ 17	Charlotte-town	+ 13	Port Arthur	+ 57	Brandon	+ 40	Calgary	+ 36
Brantford	+ 21	Fredericton	+ 26	Victoria	+ 13	Indian Head	- 5	Edmon-ton	+ 34
Chatham	+ 29	Montreal	- 6			Kamloops	+ 2	Prince Albert	+ 4
Goderich	+ 27	Ottawa	+ 3			Kenora	+ 18	Saska-toon	+ 6
Guelph	+ 21	Parry Sound	+ 20			Medicine Hat	+ 22		
Halifax	+ 14	Quebec	- 15			Moosejaw	+ 2		
Hamilton	+ 20	Sherbrooke	- 12			Moosomin	+ 40		
Kingston	+ 6	St. John, N.B.	+ 24			Nelson	- 11		
London	+ 25	Sydney	+ 1			Portage La Prairie	+ 33		
Orillia	+ 18	Three Rivers	- 10			Regina	- 2		
Owen Sound	+ 24					Vancouver	+ 12		
Peterboro	+ 13					Winnipeg	+ 28		
Port Hope	+ 14								
Stratford	+ 24								
Toronto	+ 18								
Windsor	+ 32								
Woodstock	+ 23								
Yarmouth	+ 24								

Example.—Find the time of sunrise at Owen Sound, also at Regina, on February 11.

In the above list Owen Sound is under "44°", and the correction is + 24 min. On page 11 the time of sunrise on February 11 for latitude 44° is 7.05; add 24 min. and we get 7.29 (Eastern Standard Time). Regina is under "50°", and the correction is - 2 min. From the table the time is 7.18, and subtracting 2 min. we get the time of sunrise 7.16 (Central Standard Time).

JANUARY

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	7 35	4 33	7 42	4 26	7 50	4 18	7 59	4 9	8 9	3 59
2	7 35	4 34	7 42	4 26	7 50	4 19	7 59	4 10	8 8	4 0
3	7 35	4 35	7 42	4 27	7 50	4 20	7 59	4 11	8 8	4 2
4	7 35	4 36	7 42	4 28	7 50	4 21	7 58	4 12	8 7	4 3
5	7 35	4 37	7 42	4 29	7 50	4 22	7 58	4 13	8 7	4 4
6	7 35	4 38	7 42	4 30	7 49	4 23	7 58	4 14	8 6	4 6
7	7 35	4 39	7 42	4 32	7 49	4 24	7 58	4 16	8 6	4 7
8	7 34	4 40	7 41	4 33	7 49	4 25	7 57	4 17	8 5	4 8
9	7 34	4 41	7 41	4 34	7 49	4 26	7 57	4 18	8 5	4 9
10	7 34	4 42	7 41	4 35	7 48	4 27	7 56	4 19	8 4	4 11
11	7 34	4 43	7 40	4 36	7 48	4 29	7 56	4 21	8 4	4 12
12	7 33	4 44	7 40	4 38	7 47	4 30	7 55	4 22	8 3	4 14
13	7 33	4 45	7 39	4 39	7 47	4 31	7 55	4 23	8 2	4 15
14	7 32	4 46	7 39	4 40	7 46	4 33	7 54	4 25	8 1	4 17
15	7 32	4 48	7 38	4 41	7 45	4 34	7 53	4 26	8 0	4 19
16	7 31	4 49	7 38	4 42	7 45	4 36	7 52	4 28	8 0	4 21
17	7 30	4 50	7 37	4 44	7 44	4 37	7 52	4 29	7 59	4 22
18	7 30	4 52	7 36	4 45	7 43	4 38	7 51	4 31	7 58	4 24
19	7 29	4 53	7 35	4 47	7 42	4 40	7 50	4 32	7 57	4 26
20	7 28	4 54	7 34	4 48	7 41	4 41	7 49	4 34	7 56	4 27
21	7 28	4 55	7 34	4 49	7 40	4 43	7 48	4 36	7 55	4 29
22	7 27	4 57	7 33	4 51	7 40	4 44	7 46	4 37	7 54	4 31
23	7 26	4 58	7 32	4 52	7 39	4 46	7 45	4 39	7 52	4 32
24	7 25	4 59	7 31	4 54	7 38	4 47	7 44	4 41	7 51	4 34
25	7 25	5 1	7 30	4 55	7 36	4 49	7 43	4 42	7 50	4 36
26	7 24	5 2	7 29	4 56	7 35	4 50	7 42	4 44	7 49	4 38
27	7 23	5 3	7 28	4 58	7 34	4 52	7 40	4 46	7 47	4 39
28	7 22	5 5	7 27	4 59	7 33	4 54	7 39	4 47	7 46	4 41
29	7 21	5 6	7 26	5 1	7 32	4 55	7 38	4 49	7 45	4 43
30	7 20	5 8	7 25	5 3	7 30	4 57	7 36	4 51	7 43	4 44
31	7 18	5 9	7 23	5 4	7 29	4 58	7 35	4 52	7 42	4 46

For an explanation of this table and its use at various places, see pages 8 and 9.

FEBRUARY

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	7 17	5 10	7 22	5 5	7 28	5 0	7 33	4 54	7 40	4 48
2	7 16	5 12	7 21	5 7	7 26	5 1	7 32	4 56	7 38	4 50
3	7 15	5 13	7 20	5 8	7 25	5 3	7 30	4 58	7 36	4 52
4	7 14	5 14	7 19	5 10	7 24	5 5	7 29	4 59	7 34	4 54
5	7 13	5 15	7 18	5 11	7 22	5 6	7 27	5 1	7 33	4 56
6	7 12	5 17	7 17	5 12	7 21	5 8	7 26	5 3	7 31	4 57
7	7 10	5 18	7 15	5 14	7 19	5 9	7 24	5 5	7 29	4 59
8	7 9	5 20	7 13	5 15	7 18	5 11	7 23	5 6	7 27	5 1
9	7 8	5 21	7 12	5 17	7 16	5 13	7 21	5 8	7 25	5 3
10	7 6	5 23	7 11	5 18	7 15	5 14	7 19	5 10	7 23	5 5
11	7 5	5 24	7 10	5 19	7 13	5 16	7 18	5 11	7 21	5 7
12	7 3	5 25	7 8	5 21	7 12	5 17	7 16	5 13	7 19	5 9
13	7 2	5 27	7 6	5 23	7 10	5 19	7 14	5 15	7 18	5 10
14	7 1	5 28	7 4	5 24	7 8	5 21	7 12	5 17	7 16	5 12
15	6 59	5 29	7 3	5 26	7 6	5 22	7 10	5 18	7 14	5 14
16	6 58	5 31	7 1	5 27	7 5	5 24	7 9	5 20	7 12	5 16
17	6 56	5 32	7 0	5 29	7 3	5 26	7 7	5 22	7 10	5 18
18	6 55	5 34	6 58	5 30	7 1	5 27	7 5	5 23	7 9	5 19
19	6 53	5 35	6 56	5 32	6 59	5 29	7 3	5 25	7 7	5 21
20	6 52	5 36	6 54	5 33	6 58	5 30	7 1	5 27	7 5	5 23
21	6 50	5 38	6 53	5 35	6 56	5 32	6 59	5 29	7 3	5 25
22	6 48	5 39	6 51	5 36	6 54	5 33	6 57	5 30	7 0	5 27
23	6 47	5 40	6 49	5 38	6 52	5 35	6 55	5 32	6 58	5 29
24	6 45	5 42	6 47	5 39	6 50	5 36	6 53	5 34	6 56	5 31
25	6 44	5 43	6 46	5 41	6 49	5 38	6 51	5 35	6 54	5 33
26	6 42	5 44	6 44	5 42	6 47	5 39	6 49	5 37	6 51	5 34
27	6 40	5 45	6 42	5 43	6 45	5 41	6 48	5 38	6 49	5 36
28	6 38	5 47	6 41	5 45	6 43	5 42	6 45	5 40	6 47	5 38

For an explanation of this table and its use at various places, see pages 8 and 9.

MARCH

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	6 37	5 48	6 39	5 46	6 41	5 44	6 43	5 42	6 43	5 41
2	6 35	5 49	6 37	5 47	6 39	5 45	6 41	5 44	6 42	5 42
3	6 34	5 50	6 35	5 49	6 37	5 47	6 39	5 45	6 40	5 44
4	6 32	5 52	6 33	5 50	6 35	5 48	6 37	5 47	6 38	5 45
5	6 30	5 53	6 31	5 52	6 33	5 50	6 35	5 48	6 36	5 47
6	6 28	5 55	6 30	5 53	6 31	5 51	6 33	5 50	6 34	5 49
7	6 26	5 56	6 28	5 54	6 29	5 53	6 31	5 52	6 32	5 51
8	6 25	5 57	6 26	5 56	6 27	5 54	6 28	5 53	6 29	5 52
9	6 23	5 58	6 24	5 57	6 25	5 56	6 26	5 55	6 27	5 54
10	6 21	6 0	6 22	5 59	6 23	5 57	6 24	5 56	6 25	5 56
11	6 19	6 1	6 20	6 0	6 21	5 59	6 22	5 58	6 23	5 57
12	6 18	6 2	6 18	6 1	6 19	6 0	6 20	6 0	6 21	5 59
13	6 16	6 4	6 16	6 3	6 17	6 2	6 18	6 2	6 19	6 1
14	6 14	6 5	6 15	6 4	6 15	6 3	6 15	6 3	6 16	6 3
15	6 12	6 6	6 13	6 5	6 13	6 5	6 13	6 5	6 14	6 4
16	6 10	6 7	6 11	6 7	6 11	6 6	6 11	6 6	6 11	6 6
17	6 8	6 8	6 9	6 8	6 9	6 8	6 9	6 8	6 9	6 8
18	6 7	6 10	6 7	6 9	6 7	6 9	6 7	6 9	6 7	6 10
19	6 5	6 11	6 5	6 11	6 5	6 11	6 5	6 11	6 4	6 12
20	6 3	6 12	6 3	6 12	6 3	6 12	6 3	6 13	6 2	6 13
21	6 1	6 13	6 1	6 14	6 1	6 14	6 0	6 14	5 59	6 15
22	5 59	6 14	5 59	6 15	5 59	6 15	5 58	6 16	5 57	6 17
23	5 58	6 16	5 57	6 16	5 56	6 17	5 56	6 17	5 55	6 19
24	5 56	6 17	5 55	6 17	5 54	6 18	5 54	6 19	5 52	6 20
25	5 54	6 18	5 53	6 19	5 52	6 20	5 52	6 20	5 50	6 22
26	5 52	6 19	5 51	6 20	5 50	6 21	5 50	6 22	5 48	6 24
27	5 50	6 21	5 49	6 22	5 48	6 23	5 47	6 24	5 46	6 26
28	5 48	6 22	5 47	6 23	5 46	6 24	5 45	6 25	5 43	6 27
29	5 47	6 23	5 46	6 24	5 44	6 26	5 43	6 27	5 41	6 29
30	5 45	6 24	5 44	6 25	5 42	6 27	5 41	6 28	5 39	6 31
31	5 43	6 25	5 42	6 27	5 40	6 28	5 38	6 30	5 36	6 32

For an explanation of this table and its use at various places, see pages 8 and 9.

APRIL

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	5 41	6 27	5 40	6 28	5 38	6 30	5 36	6 31	5 34	6 34
2	5 39	6 28	5 38	6 30	5 36	6 31	5 34	6 33	5 32	6 36
3	5 38	6 29	5 36	6 31	5 34	6 33	5 32	6 35	5 30	6 37
4	5 36	6 30	5 34	6 32	5 32	6 34	5 30	6 36	5 27	6 39
5	5 34	6 32	5 32	6 33	5 30	6 36	5 28	6 38	5 25	6 41
6	5 32	6 33	5 30	6 34	5 28	6 37	5 26	6 39	5 23	6 43
7	5 30	6 34	5 28	6 36	5 26	6 38	5 24	6 41	5 21	6 44
8	5 29	6 35	5 26	6 37	5 24	6 40	5 21	6 42	5 19	6 46
9	5 27	6 36	5 24	6 39	5 22	6 41	5 19	6 44	5 16	6 48
10	5 25	6 37	5 23	6 40	5 20	6 43	5 17	6 46	5 14	6 49
11	5 24	6 38	5 21	6 41	5 18	6 44	5 15	6 47	5 11	6 51
12	5 22	6 40	5 19	6 43	5 16	6 45	5 13	6 49	5 9	6 53
13	5 20	6 41	5 17	6 44	5 14	6 47	5 11	6 50	5 7	6 54
14	5 18	6 42	5 15	6 45	5 12	6 48	5 9	6 52	5 5	6 56
15	5 17	6 43	5 14	6 46	5 10	6 50	5 7	6 53	5 3	6 58
16	5 15	6 45	5 12	6 48	5 8	6 51	5 5	6 55	5 1	7 0
17	5 13	6 46	5 10	6 49	5 6	6 53	5 2	6 56	4 58	7 1
18	5 11	6 47	5 8	6 50	5 5	6 54	5 1	6 58	4 56	7 3
19	5 10	6 48	5 6	6 52	5 3	6 55	4 59	6 59	4 54	7 5
20	5 8	6 49	5 5	6 53	5 1	6 57	4 57	7 1	4 52	7 6
21	5 7	6 50	5 3	6 54	4 59	6 58	4 55	7 2	4 50	7 8
22	5 5	6 52	5 1	6 56	4 57	7 0	4 53	7 4	4 48	7 10
23	5 3	6 53	4 59	6 57	4 55	7 1	4 50	7 6	4 46	7 11
24	5 2	6 54	4 58	6 58	4 54	7 3	4 49	7 7	4 44	7 13
25	5 0	6 56	4 56	7 0	4 52	7 4	4 47	7 9	4 42	7 14
26	4 59	6 57	4 54	7 1	4 50	7 5	4 45	7 10	4 40	7 16
27	4 57	6 58	4 53	7 2	4 48	7 7	4 43	7 12	4 38	7 18
28	4 56	6 59	4 51	7 3	4 47	7 8	4 41	7 13	4 36	7 19
29	4 54	7 0	4 50	7 5	4 45	7 10	4 39	7 15	4 34	7 21
30	4 53	7 1	4 48	7 6	4 43	7 12	4 38	7 16	4 32	7 22

For an explanation of this table and its use at various places, see pages 8 and 9.

MAY

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	4 51	7 3	4 47	7 7	4 42	7 12	4 36	7 18	4 30	7 24
2	4 50	7 4	4 45	7 9	4 40	7 14	4 34	7 20	4 28	7 26
3	4 48	7 5	4 43	7 10	4 38	7 15	4 32	7 21	4 26	7 27
4	4 47	7 6	4 42	7 11	4 37	7 17	4 31	7 23	4 24	7 29
5	4 46	7 8	4 41	7 13	4 35	7 18	4 29	7 24	4 22	7 31
6	4 44	7 9	4 39	7 14	4 34	7 19	4 27	7 26	4 21	7 33
7	4 43	7 10	4 38	7 15	4 32	7 21	4 26	7 27	4 19	7 34
8	4 42	7 11	4 36	7 16	4 31	7 22	4 24	7 29	4 17	7 36
9	4 40	7 12	4 35	7 17	4 29	7 23	4 22	7 30	4 15	7 38
10	4 39	7 13	4 34	7 19	4 28	7 25	4 21	7 32	4 13	7 39
11	4 38	7 14	4 32	7 20	4 26	7 26	4 20	7 33	4 11	7 41
12	4 37	7 16	4 31	7 21	4 25	7 28	4 18	7 34	4 10	7 42
13	4 36	7 17	4 30	7 23	4 24	7 29	4 16	7 36	4 8	7 44
14	4 35	7 18	4 49	7 24	4 22	7 30	4 15	7 37	4 7	7 45
15	4 34	7 19	4 28	7 25	4 21	7 31	4 14	7 39	4 5	7 47
16	4 32	7 20	4 26	7 26	4 20	7 33	4 12	7 40	4 4	7 48
17	4 31	7 21	4 25	7 27	4 18	7 34	4 11	7 42	4 3	7 50
18	4 30	7 22	4 24	7 28	4 17	7 35	4 10	7 43	4 1	7 51
19	4 30	7 23	4 23	7 30	4 16	7 36	4 8	7 44	4 0	7 52
20	4 29	7 24	4 22	7 31	4 15	7 38	4 7	7 46	3 58	7 54
21	4 28	7 25	4 21	7 32	4 14	7 39	4 6	7 47	3 57	7 55
22	4 27	7 26	4 20	7 33	4 13	7 40	4 5	7 48	3 56	7 56
23	4 26	7 27	4 19	7 34	4 12	7 41	4 4	7 49	3 55	7 58
24	4 25	7 28	4 18	7 35	4 11	7 43	4 3	7 51	3 53	7 59
25	4 24	7 29	4 17	7 36	4 10	7 44	4 2	7 52	3 52	8 1
26	4 24	7 30	4 16	7 37	4 9	7 45	4 0	7 53	3 51	8 2
27	4 23	7 31	4 16	7 38	4 8	7 46	3 59	7 54	3 50	8 3
28	4 22	7 32	4 15	7 39	4 7	7 47	3 58	7 56	3 49	8 5
29	4 22	7 33	4 14	7 40	4 6	7 48	3 58	7 57	3 47	8 6
30	4 21	7 34	4 14	7 41	4 5	7 49	3 57	7 58	3 46	8 8
31	4 21	7 34	4 13	7 42	4 5	7 50	3 56	7 59	3 45	8 9

For an explanation of this table and its use at various places, see pages 8 and 9.

JUNE

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	4 20	7 35	4 12	7 43	4 4	7 51	3 56	8 0	3 45	8 10
2	4 19	7 36	4 12	7 44	4 4	7 52	3 55	8 1	3 44	8 11
3	4 19	7 37	4 11	7 44	4 3	7 52	3 54	8 2	3 44	8 11
4	4 18	7 38	4 11	7 45	4 3	7 53	3 54	8 3	3 43	8 12
5	4 18	7 39	4 10	7 46	4 2	7 54	3 53	8 4	3 43	8 13
6	4 17	7 39	4 10	7 47	4 2	7 55	3 52	8 4	3 43	8 14
7	4 17	7 40	4 10	7 48	4 1	7 56	3 52	8 5	3 42	8 15
8	4 17	7 41	4 9	7 48	4 1	7 57	3 52	8 6	3 42	8 15
9	4 17	7 41	4 9	7 49	4 1	7 57	3 51	8 7	3 41	8 16
10	4 16	7 42	4 9	7 49	4 0	7 58	3 51	8 8	3 41	8 17
11	4 16	7 42	4 9	7 50	4 0	7 59	3 50	8 8	3 41	8 18
12	4 16	7 43	4 9	7 51	4 0	7 59	3 50	8 9	3 41	8 18
13	4 16	7 43	4 8	7 51	4 0	8 0	3 50	8 10	3 40	8 19
14	4 16	7 44	4 8	7 52	4 0	8 0	3 50	8 10	3 40	8 19
15	4 16	7 44	4 8	7 52	4 0	8 1	3 50	8 11	3 40	8 20
16	4 16	7 45	4 8	7 53	4 0	8 1	3 50	8 11	3 40	8 21
17	4 17	7 45	4 8	7 53	4 0	8 2	3 50	8 12	3 40	8 21
18	4 17	7 45	4 8	7 54	4 0	8 2	3 50	8 12	3 39	8 22
19	4 17	7 46	4 8	7 54	4 0	8 2	3 50	8 12	3 39	8 23
20	4 17	7 46	4 8	7 54	4 0	8 3	3 50	8 13	3 39	8 23
21	4 17	7 46	4 8	7 54	4 0	8 3	3 50	8 13	3 39	8 23
22	4 18	7 46	4 9	7 55	4 0	8 3	3 50	8 13	3 39	8 23
23	4 18	7 46	4 9	7 55	4 1	8 3	3 51	8 13	3 40	8 23
24	4 18	7 47	4 10	7 55	4 1	8 3	3 51	8 13	3 40	8 23
25	4 18	7 47	4 10	7 55	4 1	8 3	3 51	8 13	3 40	8 23
26	4 19	7 47	4 10	7 55	4 2	8 3	3 52	8 13	3 41	8 23
27	4 19	7 47	4 11	7 55	4 2	8 3	3 52	8 13	3 41	8 23
28	4 19	7 47	4 11	7 55	4 3	8 3	3 53	8 13	3 42	8 23
29	4 20	7 47	4 12	7 55	4 3	8 3	3 53	8 13	3 42	8 23
30	4 20	7 47	4 12	7 54	4 4	8 3	3 54	8 13	3 43	8 23

For an explanation of this table and its use at various places, see pages 8 and 9.

JULY

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	4 21	7 47	4 13	7 54	4 4	8 3	3 55	8 12	3 44	8 23
2	4 21	7 46	4 14	7 54	4 5	8 2	3 56	8 12	3 45	8 22
3	4 22	7 46	4 14	7 54	4 6	8 2	3 56	8 12	3 46	8 22
4	4 22	7 46	4 15	7 54	4 6	8 2	3 57	8 11	3 47	8 21
5	4 23	7 46	4 15	7 53	4 7	8 2	3 58	8 11	3 48	8 21
6	4 24	7 45	4 16	7 53	4 8	8 1	3 59	8 10	3 48	8 20
7	4 24	7 45	4 17	7 53	4 9	8 1	4 0	8 10	3 49	8 20
8	4 25	7 45	4 18	7 52	4 10	8 0	4 0	8 9	3 50	8 19
9	4 26	7 44	4 18	7 52	4 10	8 0	4 1	8 9	3 51	8 19
10	4 27	7 43	4 19	7 51	4 11	7 59	4 2	8 8	3 52	8 18
11	4 28	7 43	4 20	7 50	4 12	7 59	4 3	8 7	3 53	8 17
12	4 29	7 42	4 21	7 50	4 13	7 58	4 4	8 7	3 54	8 16
13	4 29	7 42	4 22	7 49	4 14	7 57	4 5	8 6	3 56	8 15
14	4 30	7 41	4 23	7 48	4 15	7 56	4 6	8 5	3 57	8 14
15	4 31	7 40	4 24	7 48	4 16	7 56	4 7	8 4	3 58	8 13
16	4 32	7 40	4 25	7 47	4 17	7 55	4 8	8 3	3 59	8 12
17	4 33	7 39	4 26	7 46	4 18	7 54	4 10	8 2	4 0	8 11
18	4 34	7 38	4 27	7 45	4 19	7 53	4 11	8 1	4 2	8 10
19	4 34	7 38	4 28	7 44	4 20	7 52	4 12	8 0	4 3	8 9
20	4 36	7 37	4 29	7 43	4 21	7 51	4 13	7 59	4 4	8 8
21	4 37	7 36	4 30	7 42	4 23	7 50	4 15	7 58	4 5	8 7
22	4 38	7 35	4 31	7 41	4 24	7 49	4 16	7 57	4 7	8 5
23	4 39	7 34	4 32	7 40	4 25	7 48	4 17	7 56	4 8	8 4
24	4 40	7 33	4 33	7 39	4 26	7 47	4 18	7 54	4 10	8 2
25	4 40	7 32	4 34	7 38	4 27	7 46	4 20	7 53	4 11	8 1
26	4 41	7 31	4 35	7 37	4 28	7 44	4 21	7 52	4 12	8 0
27	4 42	7 30	4 36	7 36	4 30	7 43	4 22	7 50	4 14	7 58
28	4 44	7 29	4 38	7 35	4 31	7 42	4 24	7 49	4 15	7 57
29	4 45	7 28	4 39	7 34	4 32	7 40	4 25	7 47	4 17	7 55
30	4 46	7 27	4 40	7 33	4 33	7 39	4 26	7 46	4 18	7 54
31	4 47	7 26	4 41	7 32	4 35	7 38	4 28	7 44	4 20	7 52

For an explanation of this table and its use at various places, see pages 8 and 9.

AUGUST

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	4 48	7 24	4 42	7 30	4 36	7 36	4 29	7 43	4 21	7 50
2	4 49	7 23	4 44	7 29	4 37	7 35	4 31	7 41	4 23	7 49
3	4 50	7 22	4 45	7 27	4 39	7 33	4 32	7 40	4 24	7 47
4	4 51	7 21	4 46	7 26	4 40	7 32	4 33	7 38	4 26	7 45
5	4 52	7 19	4 47	7 24	4 41	7 30	4 35	7 37	4 28	7 43
6	4 53	7 18	4 48	7 23	4 43	7 29	4 36	7 35	4 29	7 41
7	4 54	7 17	4 49	7 22	4 44	7 27	4 38	7 33	4 31	7 40
8	4 56	7 15	4 51	7 20	4 45	7 26	4 39	7 32	4 32	7 38
9	4 57	7 14	4 52	7 19	4 46	7 24	4 40	7 30	4 34	7 36
10	4 58	7 12	4 53	7 17	4 48	7 22	4 42	7 28	4 36	7 34
11	4 59	7 11	4 54	7 16	4 49	7 21	4 44	7 26	4 37	7 32
12	5 0	7 9	4 56	7 14	4 51	7 19	4 45	7 25	4 39	7 30
13	5 2	7 8	4 57	7 12	4 52	7 17	4 47	7 23	4 40	7 28
14	5 3	7 6	4 58	7 11	4 53	7 16	4 48	7 21	4 42	7 26
15	5 4	7 5	4 59	7 9	4 55	7 14	4 50	7 19	4 44	7 24
16	5 5	7 3	5 1	7 8	4 56	7 12	4 51	7 17	4 45	7 22
17	5 6	7 2	5 2	7 6	4 57	7 10	4 53	7 15	4 47	7 20
18	5 7	7 0	5 3	7 4	4 59	7 9	4 54	7 13	4 48	7 18
19	5 8	6 59	5 4	7 3	5 0	7 7	4 55	7 12	4 50	7 16
20	5 10	6 57	5 6	7 1	5 2	7 5	4 57	7 9	4 52	7 14
21	5 11	6 55	5 7	6 59	5 3	7 3	4 59	7 7	4 53	7 12
22	5 12	6 54	5 8	6 57	5 4	7 1	5 0	7 5	4 55	7 10
23	5 13	6 52	5 9	6 56	5 6	6 59	5 2	7 3	4 56	7 8
24	5 14	6 50	5 11	6 54	5 7	6 57	5 3	7 1	4 58	7 6
25	5 15	6 49	5 12	6 52	5 8	6 56	5 4	7 0	5 0	7 4
26	5 16	6 47	5 13	6 50	5 10	6 54	5 6	6 57	5 1	7 2
27	5 18	6 45	5 14	6 48	5 11	6 52	5 8	6 55	5 3	7 0
28	5 19	6 44	5 16	6 46	5 12	6 50	5 9	6 53	5 4	6 58
29	5 20	6 42	5 17	6 45	5 14	6 48	5 10	6 51	5 6	6 56
30	5 21	6 40	5 18	6 43	5 15	6 46	5 12	6 49	5 8	6 54
31	5 22	6 38	5 19	6 41	5 17	6 44	5 14	6 47	5 10	6 51

For an explanation of this table and its use at various places, see pages 8 and 9.

SEPTEMBER

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	5 23	6 36	5 20	6 39	5 18	6 42	5 15	6 45	5 11	6 49
2	5 24	6 35	5 22	6 37	5 19	6 40	5 16	6 43	5 13	6 46
3	5 25	6 33	5 23	6 35	5 21	6 38	5 18	6 40	5 15	6 44
4	5 27	6 31	5 24	6 33	5 22	6 36	5 20	6 38	5 17	6 42
5	5 28	6 29	5 26	6 31	5 23	6 34	5 21	6 36	5 19	6 39
6	5 29	6 28	5 27	6 29	5 25	6 32	5 23	6 34	5 20	6 37
7	5 30	6 26	5 28	6 27	5 26	6 30	5 24	6 32	5 22	6 34
8	5 31	6 24	5 30	6 26	5 27	6 28	5 25	6 30	5 24	6 32
9	5 32	6 22	5 31	6 24	5 29	6 26	5 27	6 28	5 26	6 30
10	5 33	6 20	5 32	6 22	5 30	6 24	5 28	6 25	5 27	6 27
11	5 34	6 19	5 33	6 20	5 31	6 22	5 30	6 23	5 29	6 25
12	5 36	6 17	5 34	6 18	5 33	6 20	5 31	6 21	5 30	6 23
13	5 37	6 15	5 36	6 16	5 34	6 17	5 33	6 19	5 32	6 21
14	5 38	6 13	5 37	6 14	5 36	6 15	5 34	6 17	5 33	6 18
15	5 39	6 11	5 38	6 12	5 37	6 13	5 36	6 14	5 35	6 16
16	5 40	6 9	5 39	6 10	5 38	6 11	5 38	6 12	5 36	6 14
17	5 41	6 8	5 41	6 8	5 40	6 9	5 39	6 10	5 38	6 11
18	5 42	6 6	5 42	6 6	5 41	6 7	5 41	6 8	5 39	6 9
19	5 44	6 4	5 44	6 4	5 42	6 5	5 42	6 5	5 41	6 7
20	5 45	6 2	5 45	6 2	5 44	6 3	5 43	6 3	5 42	6 4
21	5 46	6 0	5 46	6 0	5 45	6 1	5 45	6 1	5 44	6 2
22	5 47	5 58	5 47	5 58	5 47	5 59	5 46	5 59	5 46	6 0
23	5 48	5 56	5 48	5 56	5 48	5 56	5 48	5 56	5 48	5 58
24	5 49	5 55	5 50	5 54	5 50	5 54	5 50	5 54	5 49	5 55
25	5 50	5 53	5 51	5 52	5 51	5 52	5 51	5 52	5 51	5 53
26	5 52	5 51	5 52	5 50	5 52	5 50	5 52	5 50	5 53	5 51
27	5 53	5 49	5 54	5 48	5 54	5 48	5 54	5 48	5 54	5 48
28	5 54	5 47	5 55	5 46	5 55	5 46	5 55	5 46	5 56	5 46
29	5 55	5 45	5 56	5 44	5 57	5 44	5 57	5 44	5 58	5 44
30	5 56	5 43	5 57	5 43	5 58	5 42	5 58	5 41	5 59	5 41

For an explanation of this table and its use at various places, see pages 8 and 9.

OCTOBER

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	5 58	5 41	5 58	5 41	5 59	5 40	6 0	5 39	6 1	5 39
2	5 59	5 40	6 0	5 39	6 1	5 38	6 2	5 37	6 3	5 37
3	6 0	5 38	6 1	5 37	6 2	5 36	6 3	5 35	6 5	5 35
4	6 1	5 36	6 2	5 35	6 4	5 34	6 5	5 33	6 6	5 32
5	6 2	5 34	6 4	5 33	6 5	5 32	6 6	5 31	6 8	5 30
6	6 4	5 32	6 5	5 31	6 7	5 30	6 8	5 28	6 10	5 28
7	6 5	5 31	6 6	5 30	6 8	5 28	6 10	5 26	6 11	5 25
8	6 6	5 29	6 8	5 28	6 9	5 26	6 11	5 24	6 13	5 23
9	6 8	5 27	6 9	5 26	6 11	5 24	6 12	5 22	6 15	5 21
10	6 9	5 25	6 10	5 24	6 12	5 22	6 14	5 20	6 16	5 19
11	6 10	5 24	6 12	5 22	6 14	5 20	6 16	5 18	6 18	5 17
12	6 11	5 22	6 13	5 20	6 15	5 18	6 17	5 16	6 19	5 15
13	6 12	5 20	6 14	5 18	6 17	5 16	6 19	5 14	6 21	5 13
14	6 13	5 19	6 16	5 16	6 18	5 14	6 21	5 12	6 23	5 10
15	6 15	5 17	6 17	5 14	6 20	5 12	6 22	5 10	6 24	5 8
16	6 16	5 15	6 18	5 13	6 21	5 10	6 24	5 7	6 26	5 6
17	6 17	5 13	6 20	5 11	6 22	5 8	6 26	5 5	6 27	5 4
18	6 19	5 12	6 21	5 9	6 24	5 6	6 27	5 3	6 29	5 1
19	6 20	5 10	6 22	5 8	6 25	5 5	6 28	5 2	6 31	4 59
20	6 21	5 9	6 24	5 6	6 27	5 3	6 30	5 0	6 33	4 57
21	6 22	5 7	6 25	5 4	6 28	5 1	6 32	4 57	6 35	4 55
22	6 24	5 6	6 27	5 2	6 30	4 59	6 34	4 56	6 37	4 53
23	6 25	5 4	6 28	5 1	6 31	4 58	6 35	4 54	6 39	4 51
24	6 26	5 2	6 30	4 59	6 33	4 56	6 37	4 52	6 40	4 48
25	6 28	5 1	6 31	4 57	6 34	4 54	6 38	4 50	6 42	4 46
26	6 29	4 59	6 32	4 56	6 36	4 52	6 40	4 48	6 44	4 44
27	6 30	4 57	6 34	4 54	6 38	4 50	6 42	4 46	6 46	4 42
28	6 32	4 56	6 35	4 52	6 39	4 48	6 43	4 44	6 48	4 40
29	6 33	4 55	6 37	4 51	6 41	4 47	6 45	4 42	6 50	4 38
30	6 34	4 54	6 38	4 49	6 42	4 45	6 47	4 41	6 52	4 36
31	6 35	4 52	6 40	4 48	6 44	4 44	6 48	4 39	6 53	4 35

For an explanation of this table and its use at various places, see pages 8 and 9.

NOVEMBER

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	6 37	4 51	6 41	4 46	6 45	4 42	6 50	4 37	6 55	4 33
2	6 38	4 49	6 42	4 45	6 47	4 41	6 52	4 36	6 57	4 31
3	6 40	4 48	6 44	4 44	6 48	4 39	6 53	4 34	6 59	4 29
4	6 41	4 47	6 45	4 42	6 50	4 38	6 55	4 32	7 1	4 27
5	6 42	4 45	6 47	4 41	6 51	4 36	6 57	4 31	7 2	4 26
6	6 43	4 44	6 48	4 39	6 53	4 35	6 58	4 29	7 4	4 24
7	6 44	4 43	6 49	4 38	6 54	4 33	7 0	4 28	7 6	4 22
8	6 46	4 42	6 51	4 37	6 56	4 32	7 2	4 26	7 8	4 21
9	6 47	4 41	6 52	4 36	6 58	4 30	7 3	4 25	7 9	4 19
10	6 49	4 40	6 54	4 35	6 59	4 29	7 5	4 23	7 11	4 18
11	6 50	4 38	6 55	4 33	7 1	4 28	7 7	4 22	7 13	4 16
12	6 51	4 37	6 56	4 32	7 2	4 26	7 8	4 20	7 15	4 15
13	6 53	4 36	6 58	4 31	7 4	4 25	7 10	4 19	7 16	4 13
14	6 54	4 35	6 59	4 30	7 5	4 24	7 11	4 18	7 18	4 12
15	6 55	4 34	7 1	4 29	7 7	4 23	7 13	4 16	7 20	4 10
16	6 57	4 33	7 2	4 28	7 8	4 21	7 15	4 15	7 21	4 9
17	6 58	4 32	7 4	4 27	7 10	4 20	7 16	4 14	7 23	4 7
18	6 59	4 32	7 5	4 26	7 12	4 19	7 18	4 13	7 25	4 6
19	7 0	4 31	7 6	4 25	7 13	4 18	7 20	4 11	7 26	4 5
20	7 2	4 30	7 8	4 24	7 14	4 17	7 21	4 10	7 28	4 4
21	7 3	4 29	7 9	4 23	7 15	4 17	7 23	4 9	7 30	4 3
22	7 4	4 28	7 10	4 22	7 17	4 16	7 24	4 8	7 32	4 2
23	7 6	4 28	7 12	4 22	7 19	4 15	7 26	4 7	7 33	4 0
24	7 7	4 27	7 13	4 21	7 20	4 14	7 28	4 6	7 35	3 59
25	7 8	4 26	7 14	4 20	7 21	4 13	7 29	4 5	7 37	3 58
26	7 9	4 26	7 16	4 19	7 23	4 12	7 31	4 4	7 38	3 57
27	7 10	4 25	7 17	4 19	7 24	4 12	7 32	4 4	7 40	3 56
28	7 12	4 25	7 18	4 18	7 25	4 11	7 33	4 3	7 41	3 55
29	7 13	4 24	7 19	4 18	7 27	4 10	7 35	4 2	7 43	3 55
30	7 14	4 24	7 21	4 17	7 28	4 10	7 36	4 2	7 44	3 54

For an explanation of this table and its use at various places, see pages 8 and 9.

DECEMBER

Day of Month	Latitude 44°		Latitude 46°		Latitude 48°		Latitude 50°		Latitude 52°	
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	7 15	4 23	7 22	4 16	7 29	4 9	7 37	4 1	7 46	3 54
2	7 16	4 23	7 23	4 16	7 31	4 9	7 39	4 1	7 47	3 53
3	7 17	4 23	7 24	4 16	7 32	4 8	7 40	4 0	7 48	3 52
4	7 18	4 23	7 25	4 16	7 33	4 8	7 41	4 0	7 50	3 52
5	7 19	4 22	7 26	4 15	7 34	4 8	7 42	3 59	7 51	3 51
6	7 20	4 22	7 27	4 15	7 35	4 8	7 43	3 59	7 53	3 51
7	7 21	4 22	7 29	4 15	7 36	4 7	7 45	3 59	7 54	3 50
8	7 22	4 22	7 30	4 15	7 37	4 7	7 46	3 59	7 55	3 50
9	7 23	4 22	7 30	4 15	7 37	4 7	7 47	3 58	7 56	3 50
10	7 24	4 22	7 31	4 15	7 38	4 7	7 48	3 58	7 57	3 50
11	7 25	4 22	7 32	4 15	7 40	4 7	7 49	3 58	7 58	3 50
12	7 26	4 22	7 33	4 15	7 41	4 7	7 50	3 58	7 59	3 50
13	7 26	4 22	7 34	4 15	7 42	4 7	7 51	3 58	7 59	3 49
14	7 27	4 22	7 35	4 15	7 43	4 7	7 52	3 58	8 0	3 49
15	7 28	4 23	7 36	4 15	7 44	4 7	7 53	3 58	8 1	3 49
16	7 29	4 23	7 36	4 15	7 44	4 7	7 53	3 58	8 2	3 49
17	7 30	4 23	7 37	4 16	7 45	4 8	7 54	3 59	8 3	3 49
18	7 30	4 24	7 38	4 16	7 46	4 8	7 55	3 59	8 4	3 50
19	7 31	4 24	7 38	4 16	7 46	4 8	7 55	3 59	8 4	3 50
20	7 31	4 24	7 39	4 17	7 47	4 9	7 56	4 0	8 5	3 51
21	7 32	4 25	7 39	4 17	7 47	4 9	7 56	4 0	8 5	3 51
22	7 32	4 25	7 40	4 18	7 48	4 10	7 57	4 1	8 6	3 52
23	7 33	4 26	7 40	4 18	7 48	4 10	7 57	4 1	8 6	3 52
24	7 33	4 27	7 41	4 19	7 49	4 11	7 58	4 2	8 7	3 53
25	7 34	4 27	7 41	4 20	7 49	4 12	7 58	4 3	8 7	3 53
26	7 34	4 28	7 42	4 20	7 50	4 12	7 58	4 3	8 8	3 54
27	7 34	4 28	7 42	4 21	7 50	4 13	7 59	4 4	8 8	3 54
28	7 34	4 29	7 42	4 22	7 50	4 14	7 59	4 5	8 8	3 55
29	7 35	4 30	7 42	4 22	7 50	4 15	7 59	4 6	8 8	3 56
30	7 35	4 31	7 42	4 23	7 50	4 16	7 59	4 7	8 8	3 57
31	7 35	4 32	7 42	4 24	7 50	4 17	7 59	4 8	8 8	3 58

For an explanation of this table and its use at various places, see pages 8 and 9.

THE PLANETS DURING 1925

In the following notes on the planets a general account of the phenomena in connection with their motions is given. Fuller details will be found on the pages headed *The Sky for the Month* (pages 28, 30, ...).

MERCURY

Mercury's apparent separation from the sun is never very great, and consequently the planet is comparatively seldom seen with the naked eye; but when near its greatest elongation, or angular distance from the sun, it is easily visible as a star of the first magnitude. It can often be seen for about a fortnight, or even longer, at such a time, but some of these occasions are much more favourable than others. In general, the planet can best be seen at an eastern elongation (that is, as an evening star) in the spring; at a western elongation (that is, as a morning star) in the autumn. Similar elongations recur, on the average, every 116 days, or a little less than four months.

The eastern elongations are as follows:—March 31, 18° 58′; July 28, 27° 11′; November 22, 22° 3′.

The western elongations:—January 17, 24° 4′; May 16, 25° 50′; September 11, 17° 57′; December 31, 22° 36′.

The March elongation is the best for evening observations. At those in July and November the planet is much farther from the sun, but is not so high above the horizon. The September elongation is the best for morning observations, for a similar reason. But with a clear sky Mercury should be visible at practically every elongation, though a field glass may be required sometimes to locate it.

Further details are given on the pages devoted to *The Sky for the Month.*

VENUS

At the beginning of the year Venus is a morning star rising almost two hours before the sun. It gradually moves in towards the sun and reaches superior conjunction with it on April 24. For some time before and after this date the planet is lost in the sun's rays. By the end of May it sets about 45 minutes after the sun and should easily be detected in the evening sky. It is an evening star all the rest of the year. On November 28 Venus attains its greatest elongation east of the sun, 47° 17′, at which time its phase as revealed by the telescope is that of the moon at first quarter. It continues to increase in brilliancy during the rest of the year and reaches its maximum on January 2, 1926. Further details of the planet's brightness are given in the monthly pages.

MARS

During 1924 Mars made an exceptionally close approach to the earth, opposition occurring on August 23, and of course there will be no opposition in 1925. The next is on November 4, 1926.

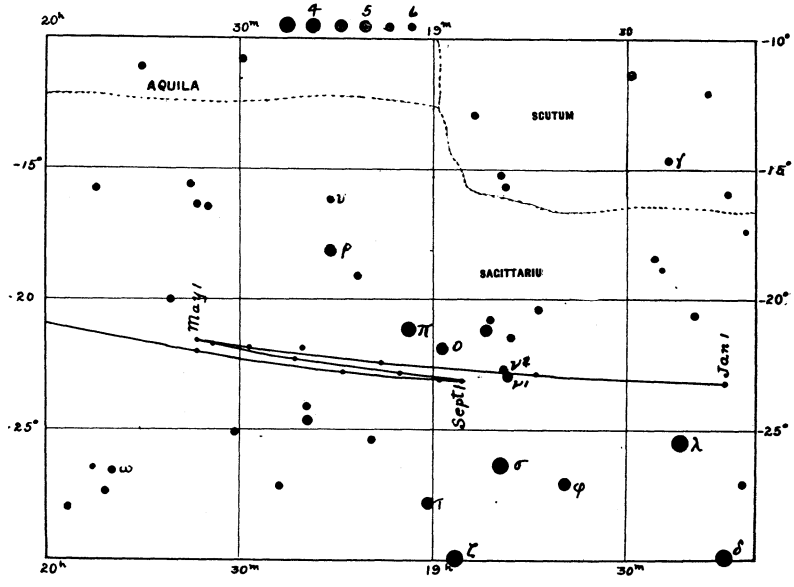
At the beginning of the year it is an evening star in the constellation Pisces, being near the equinoctial point. Its stellar magnitude is 0.4, a little fainter than Arcturus. Its brightness steadily diminishes until in June its magnitude is 2.0, almost that of Polaris. At the same time it gradually draws in towards the sun, coming to conjunction on September 13. After this the planet becomes a morning star, slowly separating from the sun. By December 1 it rises about two hours before the sun, and on December 31 it transits at 9.24 and is becoming brighter. At this time it is in Scorpio, not far from Antares, having passed through 16 hours of R.A. during the year.

A map showing the path of Mars amongst the stars during 1925 is on the third page of the cover.

JUPITER

Jupiter is the greatest of all the planets. Its brightness exceeds that of any of the fixed stars and though at times Mars rivals it Venus only distinctly outshines it.

On December 2, 1924, Jupiter was in conjunction with the sun, and so at the beginning of the year it is too close to the sun for convenient observation. By February 1 it rises about 1¾ hours before the sun and so can be well observed as a morning star. Its stellar magnitude then is −1.5, almost the same as that of Sirius. It continues to improve its position for observation and comes to



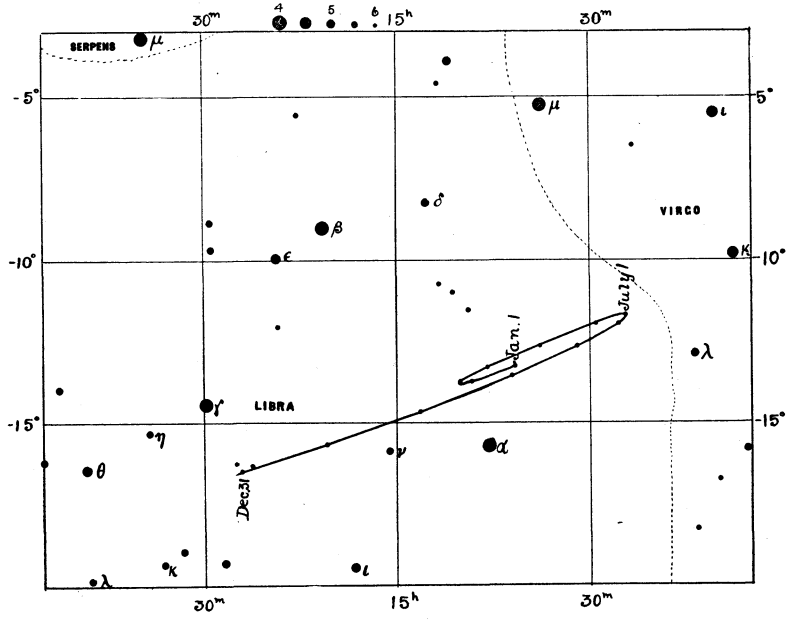
Path of Jupiter among the Stars during 1925. The round dots on the path represent the position of the planet on the first of each month.

opposition with the sun on July 10. After that it apparently drifts steadily westward in the sky and it is a brilliant evening star all the rest of the year, though by December 31 it has become rather too near the sun for convenient observation. It reaches conjunction with the sun on January 25, 1926.

Jupiter is a fine object for a small telescope. Even a field glass will reveal its disc and also its four large moons. They were discovered by Galileo in 1610, but since then five more have been discovered, all very faint objects (see page 56). The path of Jupiter amongst the stars in 1925 is given in the accompanying diagram.

Saturn

At the beginning of the year Saturn is a good morning star, crossing the meridian at 8 a.m. It slowly moves eastward amongst the stars until February 22, when it becomes stationary and begins to retrograde which it continues to do until July 12. Midway between these dates, namely on May 1, it is in opposition to the sun. At this time the planet rises as the sun sets and so is visible all night long. After this it drifts to the western sky and is an evening star. During October it becomes lost in the sun's rays and on November 9 it comes into conjunction with the sun. For the rest of the year it is a morning star.

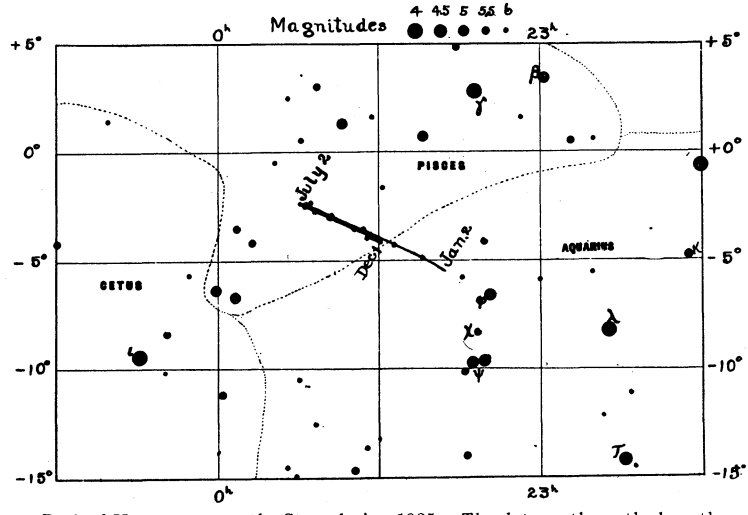


Path of Saturn among the Stars during 1925. The dots on the path represent the position of the planet on the first of each month.

By many observers Saturn, with its unique ring system and its numerous satellites, is considered the finest object in the sky. During some months in 1921 the rings were invisible (as explained in the HANDBOOK for 1921) and we now see their north face. During this year the formation of the rings can be well seen, though they will continue to open out until 1928, and then for seven years they will continue to close in again. The accompanying diagram shows the path of Saturn amongst the stars in 1925.

URANUS

This planet was discovered by Sir William Herschel in 1781 and it appears to the naked eye on a dark night as a star of the sixth magnitude. It is in the constellation Pisces most of the year and will remain there for several years to come as it moves forward in its orbit only a little over 4° per year. It moves forward until July 1, when it begins to retrograde which it continues to do until December 1. Midway between these dates, namely on September 16, it is in opposition with the sun, when it will be visible all night. It is then about 5° south of Lambda Piscium. For some weeks before and after this date the planet can best be observed, and its position and motion can be followed with a field glass. See the accompanying map of the planet's path amongst the stars.



Path of Uranus among the Stars during 1925. The dots on the path show the position of the planet on the first of each month.

NEPTUNE

The planet Neptune is the most distant member of the solar system, being 2,800 millions of miles from the sun and requiring 165 years to complete a revolu-

tion. During the year it moves in the constellation Leo. On January 1 its R.A. is 9h 39m. It retrogrades until May 1 when its R.A. is 9h 29m. The motion then becomes direct and on December 31 the planet is in R.A. 9h 48m, Decl. 13° 44′ S, about 4° west of Regulus. The planet appears as a star of the eighth magnitude and so cannot be seen with the naked eye.

ECLIPSES, 1925

There will be four eclipses in 1925, two of the sun and two of the moon.

1. A total eclipse of the sun, January 24, 1925. The path of totality will begin at sunrise just southeast of Lake of the Woods and crossing the southwestern part of Lake Superior, the north part of Lake Michigan, Lake Huron, southwestern Ontario and New York State, will sweep across the Atlantic Ocean, leaving the earth at sunset between the Shetland and Orkney Islands. Total eclipse will begin in Ontario a few minutes after nine o'clock and will last between one and two minutes. At Goderich it will last about 100 seconds while at St. Catharines it will last 105 seconds. For points nearer the edge of the path the duration of totality will, of course, be less. Sarnia and St. Thomas are just south of the path of the total eclipse, Owen Sound and Whitby are just north and Goderich, Hamilton, St. Catharines and Buffalo are close to the centre of the path.

The eclipse is visible as a partial eclipse in the eastern half of North America and Mexico, Central America, the north end of South America and the Atlantic Ocean, ending at sunset on a line passing through Iceland, Ireland, Spain and northern Africa. In southwestern Ontario the partial eclipse begins just after sunrise, in the Maritime Provinces about twenty minutes after eight (eastern standard time). At Windsor about ninety-eight hundredths of the sun's diameter is covered by the moon, at Ottawa and North Bay about ninety-six hundredths and at Quebec, St. John and Halifax about ninety-two hundredths.

Circumstances of the Eclipse

		Greenwich Civil Time			Long. from Greenwich		Latitude	
		d	h	m	°	′	°	′
Eclipse begins	January	24	12	41.4	+88	02	+24	43
Central eclipse begins	"	24	14	02.0	+94	24	+48	18
Central eclipse at local apparent noon	"	24	15	06.4	+43	33	+42	09
Central eclipse ends	"	24	15	45.0	+ 3	05	+61	28
Eclipse ends	"	24	17	05.8	+ 0	11	+39	41

2. A partial eclipse of the moon, February 8-9, 1925. The beginning is visible in Europe, Asia, Africa and the eastern part of the Atlantic Ocean. The ending is visible in Asia, Europe, Africa, the Atlantic Ocean, South America and the eastern part of North America.

CIRCUMSTANCES OF THE ECLIPSE

		d	h	m	
Moon enters penumbra	February	8	18	48.1	Greenwich Civil Time
Moon enters umbra	"	8	20	8.6	
Middle of the eclipse	"	8	21	42.0	
Moon leaves umbra	"	8	23	15.4	
Moon leaves penumbra	"	9	00	35.2	

Magnitude of the eclipse = 0.735 (Moon's diameter = 1.00)

A map showing the path of totality in United States and Canada will be found at the back of this book.

3. An annular eclipse of the sun, July 20-21, 1925. This eclipse is visible only in the Southern Pacific Ocean, ending at sunrise on the eastern coast of Australia. The path of annulus begins between Australia and New Zealand and ends west of the south part of South America.

4. A partial eclipse of the moon, August 4, 1925. The beginning will be visible generally in western North America, western South America, the Pacific Ocean, Australia and the northeastern part of Asia. The ending will be visible generally in the Pacific Ocean, Australia, eastern Asia and the Indian Ocean.

CIRCUMSTANCES OF THE ECLIPSE

		d	h	m
Moon enters penumbra	G.C.T. Aug.	4	9	24.8
Moon enters umbra	"	4	10	27.4
Middle of the eclipse	"	4	11	52.6
Moon leaves umbra	"	4	13	17.6
Moon leaves penumbra	"	4	14	19.9

Magnitude of the eclipse = 0.751 (moon's diameter = 1.0)

The Sun.—During January the sun's R.A. increases from 18h 44m to 20h 56m and its Decl. from 23° 4′ S to 17° 18′ S. The equation of time (see page 6) increases from 3m 35s to 13m 44s. On account of this rapid rise in value the time of mean noon appears to remain, for the first ten days of the month, at the same distance from the time of sunrise, that is, the forenoons as indicated by our clocks are of the same length. On the 20th the sun enters the sign of Aquarius, the second of the winter signs of the zodiac. On January 3 the earth is in perihelion, at a distance of 91,338,000 miles. On January 24 there is a total eclipse of the sun visible in Ontario and the eastern United States (see page 26).

The Moon.—For its phases and conjunctions with the planets, see opposite page. On January 3 the moon occults a star in Cetus (see page 8).

Mercury on the 15th is in R.A. 18h 4m, Decl. 21° 40′ S, and transits at 10.27 (L.M.T.). On the 17th it attains its greatest elongation, at which time it is 24° 4′ west of the sun, and it should be easily observed as a morning star. On the date given at sunrise the planet is about 12° above the horizon and 45° south of the east point. Use a field-glass in searching for the planet before sunrise. (See page 22).

Venus on the 15th is in R.A. 18h 0m, Decl. 22° 53′ S, and transits at 10.25 (L.M.T.). Thus it is a morning star and rises about 1½ hrs. before the sun. It is still a prominent object and has a stellar magnitude of −3.4 all the month. It is slowly approaching the sun but does not reach conjunction with it until April 24.

Mars on the 15th is in R.A. 1h 0m, Decl. 6° 43′ N and transits at 17.23 (L.M.T.). Its stellar magnitude is now only +0.7 and its brightness about one twenty-fifth that at the time of opposition in August last. It is in the constellation Pisces and can easily be observed as an evening star.

Jupiter on the 15th is in R.A. 18h 28m, Decl. 23° 10′ S, and transits at 10.50 (L.M.T.). It was in conjunction with the sun on December 22, and is a morning star rising in the south-east at about 6.30 or about one hour before the sun. Consequently it is not very well placed for observation. For the configuration of its satellites, see next page; and for their eclipses, etc., see page 52.

Saturn on the 15th is in R.A. 14h 45m, Decl. 13° 32′ S, and transits at 7.08 (L.M.T.). It is a very good morning star. It is in Libra, not far from Alpha and about 15° east of Spica. At sunrise it is 30° above the horizon and 10° west of south. Stellar magnitude 0.8. At the beginning of the year the earth is 20° N of the plane of Saturn's rings; at the end, 23°.

Uranus on the 15th is in R.A. 23h 19m, Decl. 5° 12′ S, and transits at 15.41 (L.M.T.). It is thus an evening star in Pisces.

Neptune on the 15th is in R.A. 9h 38m, Decl. 14° 31′ N, and transits at 2.18 (L.M.T.). It is in Leo about 5° west of Regulus from which it is separating.

For further information regarding the planets, especially *Uranus* and *Neptune* with maps of their paths, see pages 22 to 26. Local Mean Time (L.M.T.) counts from midnight. To change to Standard Time, see page 9.

JANUARY

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol	Configurations of Jupiter's Satellites
			h m	
☽ Thur.	1	9h 22m ☌☍☾, ☍4° 30′ N.; 18h 26m Moon F.Q....		
Fri.	2	.....		
Sat.	3	9h ☿ Greatest Hel. Lat. N.; 12h ⊕ in Perihelion....	2 10	
Sun.	4	.....		
Mon.	5	.....	23 00	
Tues.	6	19h ☿ Stationary.....		
Wed.	7	.....		
Thur.	8	.....	19 50	
♋ Fri.	9	21h 47m F.M.....		
Sat.	10	.....		
Sun.	11	.....	16 40	
Mon.	12	14h 49m ☌♆☾, ♆0° 27′ S.....		
Tues.	13	.....		
Wed	14	.....	13 30	
Thur.	15	.....		
Fri.	16	2h ☌☿ ♀, ☿ 1° 9′ N.....		
☾ Sat.	17	17h ☿ Greatest Elong. W., 24° 4′; 18h 33m Moon L.Q.....	10 20	
Sun.	18	20h 49m ☌♄ ☾, ♄ 3° 4′ S.....		
Mon.	19	.....		
Tues.	20	22h ☌♀ ♃, ♀ 0° 10′ N.....	7 10	
Wed.	21	23h ☌☿ ♃, ☿ 0° 36′ N.....		
Thur.	22	16h 34m ☌♃☾, ♃2° 58′ S.; 17h 49m ☌☿ ☾, ☿ 2° 25′ S.; 19h 49m ☌☿ ☾, ♀ 2° 44′ S.....		
Fri.	23	.....	4 0	
♀ Sat.	24	9h 45m N.M.; ☉ Total Eclipse visible in Central Ontario (see p. 26).....		
Sun.	25	.....		
Mon.	26	20h ☿ in ♉.....	0 50	
Tues.	27	6h ♀ in ♉; 10h 21m ☌♁☾, ♁ 2° 28′ N.....		
Wed.	28	.....	21 30	
Thur.	29	.....		
Fri.	30	2h 30m ☌☍☾, ☍5° 57′ N.....		
☽ Sat.	31	11h 43m Moon F.Q.....	18 20	

Invisible on account of proximity to Sun.

Explanation of symbols and abbreviations on page 4.

THE SKY FOR FEBRUARY, 1925

The Sun.—During February the sun's R.A. increases from 20h 56m to 22h 46m, and its Decl. changes from 17° 18′ S to 7° 51′ S. The equation of time reaches a maximum value of 14m 24s on the 12th (see page 6). For the change in the length of the day, see page 11. On the 20th the sun enters the third winter sign of the zodiac, Pisces.

The Moon.—For its phases and conjunctions with the planets, see opposite page. On February 2 it occults two stars in Taurus, one of them being Aldebaran; on the 19th, one in Sagittarius; and on the 27th, two in Cetus (see page 8). There is a partial eclipse of the moon on the 8-9th (see page 26).

Mercury on the 15th is in R.A. 21h 3m, Decl. 18° 51′ S, and transits at 11.23 (L.M.T.). It is approaching the sun with which it comes into conjunction early next month, and so it is not well placed for observation.

Venus on the 15th is in R.A. 20h 48m, Decl. 18° 39′ S, and crosses the meridian at 11.08 (L.M.T.). It is still a morning star but only about 15° from the sun, and so not well situated for observation.

Mars on the 15th is in R.A. 2h 16m, Decl. 14° 24′ N, and transits at 16.35 (L.M.T.). It is now in the constellation Aries, its stellar magnitude is 1.1 which is the same as that of Aldebaran, and it can easily be observed as an evening star.

Jupiter on the 15th is in R.A. 18h 57m, Decl. 22° 44′ S, and it transits the meridian at 9.17 (L.M.T.). It is in Sagittarius and is easily observed as a morning star, of stellar magnitude −1.5 or approximately equal in brightness to Sirius. On the 7th the planet passes very near the naked-eye pair of stars Nu_1 and Nu_2.

Saturn on the 15th is in R.A. 14h 46m, Decl. 13° 33′ S, and it crosses the meridian at 7.09 (L.M.T.). It is about 2° north of the third magnitude white star Alpha Librae. The planet is increasing in brightness, its stellar magnitude being 0.7, as compared with 0.8 a month ago, which is equivalent to an increase of 11 per cent. It reaches a stationary point on the 22nd, when it begins to retrograde, or move westward amongst the stars.

Uranus on the 15th is in R.A. 23h 24m, Decl. 4° 37′ S, and it transits at 13.44 (L.M.T.). It is an evening star in Pisces.

Neptune on the 15th is in R.A. 9h 34m, Decl. 14° 47′ N, and transits at 23.52 (L.M.T.). It is in opposition to the sun on the 10th.

For further information regarding the planets, especially *Uranus* and *Neptune*, with maps of their paths, see pages 22 to 26.

FEBRUARY

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol	Configurations of Jupiter's Satellites at 5h 45m
			h m	
Sun.	1			42103
Mon.	2			d4302
Tues.	3	3h ☌☿♀, ☿ 0° 38′ S.; 3h □♄☉	15 10	30142
Wed.	4			32104
Thur.	5			23014
Fri.	6	2h ☿ in Aphelion	12 00	10234
Sat.	7			02134
♋Sun.	8	16h 49m F.M.; ☾, Partial Eclipse, Ending visible in Eastern Canada (see p. 26); 19h 44m ☌♆☾, ♆ 0° 22′ S.		21034
Mon.	9		8 50	3014*
Tues.	10	6h ☍♆☉		3042*
Wed.	11			32140
Thur.	12		5 40	42301
Fri.	13			41023
Sat.	14			40213
Sun.	15	4h 40m ☌♄☾, ♄ 2° 57′ S	2 30	42103
☾ Mon.	16	4h 41m Moon L.Q.		42031
Tues.	17		23 20	4302*
Wed.	18			34120
Thur.	19	11h 19m ☌♃☾, ♃ 2° 33′ S		23401
Fri.	20		20 00	10324
Sat.	21	18h 17m ☌♀☾, ♀ 0° 39′ S		01234
♍Sun.	22	5h 52m ☌☿☾, ☿ 1° 11′ S.; 16h ♄ Stationary; 21h 12m N.M.		21034
Mon.	23	23h 22m ☌♁☾, ♁ 2° 33′ N	16 50	20314
Tues.	24			31024
Wed.	25			dd304
Thur.	26	11h ☿ Greatest Hel. Lat. S.	13 40	32014
Fri.	27	22h 57m ☌♂☾, ☌ 6° 25′ N		10324
Sat.	28			40123

Explanation of symbols and abbreviations on page 4.

THE SKY FOR MARCH, 1925

The Sun.—During March the sun's R.A. increases from 22h 46m to 0h 40m, and its Decl. changes from 7° 51′ S to 4° 16′ N. The equation of time decreases from 12m 34s to 4m 12s (see page 6). For changes in the length of the day, see page 12. On the 20th at 10.13 p.m. E.S.T. the sun enters the first spring sign of the zodiac, Aries (see opp. page).

The Moon.—For its phases and its conjunctions with the planets, see opposite page. On March 15 it occults a star in Libra (see page 8).

Mercury on the 15th is in R.A. 0h 15m, Decl. 1° 10′ N, and transits at 12.45 (L.M.T.). The planet is in superior conjunction with the sun on the 5th. It then separates from the sun and on the 31st reaches greatest elongation east, being then 18° 58′ from the sun. This is an excellent time to see the planet. Just after sunset, almost directly in the west, Mercury will appear as a brilliant first magnitude star. It should be visible for about two weeks before and a week after greatest elongation. A field-glass will help to locate the planet at first. (See page 22).

Venus on the 15th is in R.A. 23h 4m, Decl. 7° 29′ S, and transits at 11.34 (L.M.T.). It is slowly approaching superior conjunction with the sun, and is not well situated for observation.

Mars on the 15th is in R.A. 3h 28m, Decl. 19° 53′ N, and it transits the meridian at 15.57 (L.M.T.) and it sets about 7h 25m later (to an observer in 45° north latitude). On the date given it is in Taurus about 5° south-west of the Pleiades, and its stellar magnitude is 1.4.

Jupiter on the 15th is in R.A. 19h 18m, Decl. 22° 12′ S, and transits the meridian at 7.48 (L.M.T.). It rises (to a person in N latitude 45°) 4h 24m before this and so is a bright morning star. Its stellar magnitude is −1.6, the same as that of Sirius.

Saturn on the 15th is in R.A. 14h 49m, Decl. 13° 45′ and it crosses the meridian at 3.20 (L.M.T.). Its position is very little different from that a month ago, but it is now moving westward more rapidly than then. Its stellar magnitude is 0.6 and consequently its brightness 11 per cent. greater than a month ago.

Uranus on the 15th is in R.A. 23h 30m, Decl. 4° 1′ S, and it transits at 12.04 (L.M.T.). It is in conjunction with the sun on the 12th and hence cannot be observed during the month.

Neptune on the 15th is in R.A. 9h 31m, Decl. 15° 1′ N, and transits at 22.00 (L.M.T.). It is still retrograding, that is, moving westward amongst the stars.

For further information regarding the planets, especially *Uranus* and *Neptune*, with maps of their paths, see pages 22 to 26.

MARCH

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol h m	Configurations of Jupiter's Satellites at 4h 45m
	Sun.	1	10 30	41203
☽	Mon.	2 7h 7m Moon F.Q.; 21h ♀ in Aphelion		42013
	Tues.	3		43102
	Wed.	4	7 20	43012
	Thur.	5 8h ☌☿ ☉ Superior		4320*
	Fri.	6		4130*
	Sat.	7	4 10	40123
	Sun.	8 1h 50m ☌♆☾, ♆ 0° 19′ S.; 17h ☌☿ ♁, ☿ 0° 42′ S.		12403
	Mon.	9		20143
♋	Tues.	10 9h 21m F.M.	1 00	31024
	Wed.	11		30124
	Thur.	12 8h ☌♁☉	21 50	32104
	Fri.	13		d04**
	Sat.	14 9h 41m ☌♄☾, ♄ 2° 44′ S.		01324
	Sun.	15	18 40	12043
	Mon.	16		20143
☾	Tues.	17 10h ☿ in ♌; 12h 22m Moon L.Q.		14302
	Wed.	18	15 30	43012
	Thur.	19 1h 56m ☌♃☾, ♃ 2° 6′ S.		4321 0
	Fri.	20 22h 13m ☉ enters ♈, Spring commences		43201
	Sat.	21 5h ☌♀♁, ♀ 0° 47′ S.	12 10	4032*
	Sun.	22 2h ☿ in Perihelion		d4103
	Mon.	23 11h 32m ☌♁☾, ♁ 2° 40′ N.; 16h 29m ☌♀☾, ♀ 2° 6′ N.		42013
♍	Tues.	24 9h 3m N.M.	9 00	d4102
	Wed.	25 3h ♀ Greatest Hel. Lat. S.; 13h 40m ☌☿☾, ☿ 6° 51′ N.		3012*
	Thur.	26		32104
	Fri.	27	5 50	32014
	Sat.	28 21h 12m ☌♂☾, ♂ 6° 0′ N.		0324*
	Sun.	29		10234
	Mon.	30 19h ☿ Greatest Elong. E., 18° 58′	2 40	20134
	Tues.	31		10234

Explanation of symbols and abbreviations on page 4.

THE SKY FOR APRIL, 1925

The Sun.—During April the sun's R.A. increases from 0h 40m to 2h 31m and its Decl. from 4° 16′ N to 14° 51′ N. The equation of time changes from +4m 12s to −2m 51s (see page 6). For the length of daylight in various latitudes, consult page 13. On the 20th the sun enters the second spring sign, Taurus.

The Moon.—For its phases and its conjunctions with the planets, see opposite page. On April 14 it occults a star in Sagittarius and on the 17th one in Capricornus (see page 8).

Mercury on the 15th is in R.A. 1 h 49m, Decl. 13° 52′ N, and transits at 12.17 (L.M.T.). For the first few days of the month the planet should be easily seen in the west just after sunset (see last month's notes), but it will not be visible during the rest of the month as it comes into inferior conjunction with the sun on the 18th (see opposite page).

Venus on the 15th is in R.A. 1h 31m, Decl. 8° 14′ N, and transits at 11.54 (L.M.T.). It reaches superior conjunction with the sun on the 24th, after which it is an evening star, but altogether too close to the sun to be observed.

Mars on the 15th is in R.A. 4h 52m, Decl. 23° 41′ N, and it passes the meridian at 15.19 (L.M.T.). Its stellar magnitude is 1.7 and it is still in Taurus. On the 7th it is 4° north of Aldebaran, whose magnitude is 1.1, or about 1¾ times as bright. These two bodies resemble each other in general appearance, though one is a small planet comparatively near to us and the other is a great sun far in the depths of space.

Jupiter on the 15th is in R.A. 19h 33m, Decl. 21° 44′ S, and crosses the meridian at 6.01 (L.M.T.). On the 11th it is in quadrature with the sun, being 90° west of that body. It is a bright morning star, in the constellation Sagittarius.

Saturn on the 15th is in R.A. 14h 42m, Decl. 13° 0′ S, and it transits the meridian at 1.12 (L.M.T.). It is approaching opposition to the sun which occurs early in May. Its stellar magnitude is 0.4 and consequently its brightness is 12 per cent. greater than a month ago.

Uranus on the 15th is in R.A. 23h 37m, Decl. 3° 19′ S, and it transits at 10.04 (L.M.T.). It is a morning star, rising about two hours before the sun.

Neptune on the 15th is in R.A. 9h 30m, Decl. 15° 11′ N, and transits at 19.56 (L.M.T.). It retrogrades all month.

For further information regarding the planets, especially *Uranus* and *Neptune*, with maps of their paths, see pages 22 to 26.

APRIL

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol		Configurations of Jupiter's Satellites at 3h 30m
			h	m	
☽	Wed.	1 3h 12m Moon F.Q.; 8h ☿ Greatest Hel. Lat. N.; 19h ♁ in Aphelion	23	30	3O124
	Thur.	2			312O4
	Fri.	3			324O1
	Sat.	4 9h 9m ☌♆☾, ♆ 0° 24′ S	20	20	41O32
	Sun.	5			4O123
	Mon.	6 5h ☌ in ♉			42O3*
	Tues.	7	17	10	41O3*
☿	Wed.	8 7h ☿ Stationary; 22h 33m F.M.			43O12
	Thur.	9			4312O
	Fri.	10 14h 16m ☌♄☾, ♄ 2° 32′ S	14	00	342O1
	Sat.	11 10h □☌☉			1O42*
	Sun.	12			O1243
	Mon.	13	10	50	2O34*
	Tues.	14			1O34*
☾	Wed.	15 12h 27m ☌☌☾, ☌ 1° 40′ S.; 18h 40m Moon L.Q.			3O124
	Thur.	16	7	30	312O4
	Fri.	17			32O14
	Sat.	18 12h ☌☿☉ Inferior; 16h ☌☿♀, ☿ 3° 0′ N			1O24*
	Sun.	19 21h 18m ☌♁☾, ♁ 2° 52′ N	4	20	O4123
	Mon.	20			421O3
	Tues.	21			d42O3
☽	Wed.	22 4h 52m ☌☿☾, ☿ 5° 57′ N.; 18h 0m ☌♀☾, ♀ 4° 12′ N.; 21h 28m N.M.	1	10	43O12
	Thur.	23 20h ☌♀☉ Superior			d431O
	Fri.	24 20h ☿ in ♉	22	00	432O1
	Sat.	25			413O2
	Sun.	26 19h 40m ☌♂☾, ♂ 4° 56′ N			4O123
	Mon.	27	18	50	241O3
	Tues.	28			2O143
	Wed.	29			3O24*
☽	Thur.	30 19h ♆ Stationary; 20h ☿ Stationary; 22h 20m Moon F.Q.	15	40	31O24

Explanation of symbols and abbreviations on page 4.

THE SKY FOR MAY, 1925

The Sun.—During May the sun's R.A. increases from 2h 31m to 4h 33m and its Decl. from 14° 51′ N to 21° 57′ N. The equation of time increases from 2m 51s to a maximum of 3m 48s on the 14th, and then falls to 2m 30s on the 31st (see page 6). For change in the length of the day, see page 14. On the 21st the sun enters Gemini, the third sign of the zodiac.

The Moon.—For its phases and its conjunctions with the planets, see opposite page. On May 1 it occults the planet Neptune (see page 8).

Mercury on the 15th is in R.A. 1h 51m, Decl. 7° 51′ N, and transits at 10.20 (L.M.T.). During the first part of the month the planet is separating from the sun and it reaches greatest elongation west on the 16th. At that time its distance from the sun is 25° 50′, which is much greater than at the easterly elongation on March 31. But it cannot be seen as a morning star so well as on the previous elongation when it was an evening star. This is due to the small inclination of the ecliptic to the horizon in the east at sunrise and the consequent small altitude of the planet. But it should be visible under favourable atmospheric conditions. (See page 22).

Venus on the 15th is in R.A. 3h 51m, Decl. 19° 55′ N, and transits at 12.20 (L.M.T.). It is an evening star and improving its position for observation, but still too close to the sun to be seen, except towards the end of the month. Its stellar magnitude is −3.4 on May 31.

Mars on the 15th is in R.A. 6h 16m, Decl. 24° 37′ N, and it crosses the meridian at 14.45 (L.M.T.), setting about 7¾ hours later. It is thus easily visible still as an evening star, but as its stellar magnitude is now only 1.9 it is not a prominent object. It is in the constellation Gemini.

Jupiter on the 15th is in R.A. 19h 37m, Decl. 21° 39′ S, and it transits the meridian at 4.08 (L.M.T.). On the 10th it reaches a stationary point and begins to move westward amongst the stars, *i.e.*, to retrograde, which it continues to do until September 9th. Stellar magnitude −2.0; a bright morning star.

Saturn on the 15th is in R.A. 14h 34m, Decl. 12° 20′ S, and it crosses the meridian at 23.01 (L.M.T.). It reaches opposition to the sun on the 1st, at which time it rises in the east as the sun sets in the west, and so is visible all night. Being nearest to us now its brightness is greatest, its stellar magnitude being 0.3, the same as that of Rigel.

Uranus on the 15th is in R.A. 23h 41m, Decl. 2° 49′ S, and it transits at 8.04 (L.M.T.). It is favourably placed for observation as a morning star.

Neptune on the 15th is in R.A. 9h 29m, Decl. 15° 11′ N, and transits at 17.58 (L.M.T.). It comes to a stationary point on tne 1st and from that date is moving eastward amongst the stars.

For further information regarding the planets, especially *Uranus* and *Neptune*, with maps of their paths, see pages 22 to 26.

MAY

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol	Configurations of Jupiter's Satellites at 2h 15m
			h m	
	Fri.	1 17h ☌♄ ☉; 17h 5m ☌♆☾, ♆ 0° 38′ S.		32O14
	Sat.	2		31O4*
	Sun.	3	12 30	O1324
	Mon.	4		12O34
	Tues.	5 2h ☿ in Aphelion		2O143
	Wed.	6	9 20	dO32*
	Thur.	7 19h 55m ☌♄☾, ♄ 2° 30′ S.		d34O2
♋	Fri.	8 8h 43m F.M.		432O1
	Sat.	9	6 10	431O*
	Sun.	10 13h ♃ Stationary; 20h □♆☉		4O312
	Mon.	11		412O3
	Tues.	12 20h 0m ☌♃☾, ♃ 1° 24′ S.	3 00	42O13
	Wed.	13		41O32
	Thur.	14	23 40	d34O2
☾	Fri.	15 0h 46m Moon L.Q.		32O14
	Sat.	16 6h ☿ Greatest Elong. W., 25° 50′		31O4*
	Sun.	17 4h 48m ☌♁☾, ♁ 3° 8′ N.	20 30	O3124
	Mon.	18		12O34
	Tues.	19		2O134
	Wed.	20 5h 19m ☌☿☾, ☿ 1° 52′ N.; 10h ☿ in ♌	17 20	1O234
	Thur.	21		3O124
♍	Fri.	22 10h 48m N.M.		32O4*
	Sat.	23 1h 48m ☌♀☾, ♀ 4° 27′ N.	14 10	3421O
	Sun.	24		4O12*
	Mon.	25 10h ☿ Greatest Hel. Lat. S.; 17h 7m ☌♂☾, ♂ 3° 29′ N.		d41O3
	Tues.	26	11 00	42O13
	Wed.	27		41O23
	Thur.	28		43O12
	Fri.	29 1h 1m ☌♆☾, ♆ 0° 54′ S.	7 50	432O*
♎	Sat.	30 15h 4m Moon F.Q.		d342O
	Sun.	31		O12**

Explanation of symbols and abbreviations on page 4.

THE SKY FOR JUNE, 1925

The Sun.—During June the sun's R.A. increases from 4h 33m to 6h 38m, and its Decl. rises from 21° 57′ N on the 1st to its maximum 23° 27′ on the 21st. On that date the sun reaches the summer solstice and enters the first summer sign of the zodiac, Cancer. The duration of daylight is then the longest, but it does not change appreciably for several days before and after this date (see page 15). The Decl. falls to 23° 10′ on the 30th. The increase in the equation of time, taken with the decreasing length of daylight, causes the local mean time of sunset to appear constant for several days at the end of June and the beginning of July.

The Moon.—For its phases and its conjunctions with the planets, see opposite page.

Mercury on the 15th is in R.A. 5h 8m, Decl. 23° 14′ N, and transits the meridian at 11.35 (L.M.T.). It reaches superior conjunction with the sun on the 20th and so is not well situated for observation during the month.

Venus on the 15th is in R.A. 6h 34m, Decl. 24° 12′ N, and transits the meridian at 13.02 (L.M.T.). The planet now sets one hour after the sun, to an observer in latitude 45° N, and so is a fine evening star.

Mars on the 15th is in R.A. 7h 41m, Decl. 22° 40′ N, and it crosses the meridian at 14.08 (L.M.T.). At that time it is 5½° south of Pollux. Magnitude of Pollux, 1.2; of Mars, 2.0 or only one-half as bright as Pollux.

Jupiter on the 15th is in R.A. 19h 29m, Decl. 22° 2′ S, and transits the meridian at 1.58 (L.M.T.). Its position now is 8m of time or 2° of angle west of its position one month ago, and it is somewhat brighter, having a magnitude of −2.2.

Saturn on the 15th is in R.A. 14h 27m, Decl. 11° 50′ S, and it crosses the meridian at 20.52 (L.M.T.). It is still retrograding and its brightness is slowly diminishing, being now back to 0.6. It is a good evening star and is well situated for observation.

Uranus on the 15th is in R.A. 23h 44m, Decl. 2° 32′ S, and it transits at 6.16 (L.M.T.). It is in quadrature with the sun on the 17th—that is, it is 90° from the sun then. It is well placed for observation as a morning star.

Neptune on the 15th is in R.A. 9h 31m, Decl. 15° 2′ N, and transits at 15.58 (L.M.T.).

For further information regarding the planets, especially *Uranus* and *Neptune*, with maps of their paths, see pages 22 to 26.

JUNE

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol	Configurations of Jupiter's Satellites at 1h 0m
			h m	
Mon.	1		4 40	1O243
Tues.	2			2O134
Wed.	3			1O34*
Thur.	4	2h 49m ☌♄☾, ♄ 2° 41′ S.	1 30	3O124
Fri.	5			321O4
♋ Sat.	6	16h 48m F.M.	22 20	32O14
Sun.	7			3O24*
Mon.	8			1O423
Tues.	9	1h 59m ☌♃☾, ♃ 1° 26′ S.	19 00	24O13
Wed.	10			41O3*
Thur.	11			43O12
Fri.	12		15 50	4312O
☾ Sat.	13	7h 44m Moon L.Q.; 10h ☿ in ♌; 11h 21m ☌♁☾, ♁ 3° 23′ N.		432O1
Sun.	14			43O2*
Mon.	15		12 40	41O23
Tues.	16	22h □♁☉		24O13
Wed.	17			12O43
Thur.	18	1h ☿ in Perihelion.	9 30	dO124
Fri.	19			312O4
Sat.	20	0h ☌☿☉ Superior.		32O14
♍ Sun.	21	1h 17m N.M.; 4h 36m ☌☿☾, ☿ 4° 8′ N.; 17h 50m ☉ enters ♋, Summer commences.	6 20	31O24
Mon.	22	13h 13m ☌♀☾, ♀ 2° 49′ N.		dO324
Tues.	23	3h ♀ in Perihelion; 12h 53m ☌♂☾, ♂ 1° 49′ N.		2O134
Wed.	24		3 10	12O43
Thur.	25	8h 41m ☌♆☾, ♆ 1° 7′ S.		dO312
Fri.	26			d431O
Sat.	27		0 00	432O1
Sun.	28	8h ☿ Greatest Hel. Lat. N.		431O2
☽ Mon.	29	4h 43m Moon F.Q.	20 50	4O132
Tues.	30	22h ♁ Stationary.		42O3*

Explanation of symbols and abbreviations on page 4.

THE SKY FOR JULY, 1925

The Sun.—During July the sun's R.A. increases from 6h 38m to 8h 43m, and its Decl. decreases from 23° 10′ N to 18° 13′ N. The equation of time increases from 3m 28s on the first to 6m 20s on the 26th and then falls to 6m 12s on the 31st (see page 7). On the 23rd the sun enters Leo, the second summer sign of the zodiac. For changes in the length of the day, see page 16. The earth is in aphelion on the 3rd, being then 94,452,000 miles distant from the sun. There is an annular eclipse of the sun July 20-21, visible in the South Pacific Ocean.

The Moon.—For its phases and its conjunctions with the planets, see opposite page. On the 6th it occults a star in Sagittarius, on the 10th two in Aquarius and on the 14th one in Cetus (see page 8).

Mercury on the 15th is in R.A. 9h 15m, Decl. 16° 58′ N, and transits the meridian at 13.44 (L.M.T.). It steadily separates eastward from the sun until the 28th when it reaches its greatest elongation, 27° 11′. This is a favourable time to observe the planet, though not so good as at the elongation in March (see page 22). For ten days before greatest elongation until about a week after it the planet should be visible in the western sky just after sunset. On the 11th and again on the 30th Mercury and Venus are in conjunction, while on the former date Mars is also in conjunction with these planets (see opposite page).

Venus on the 15th is in R.A. 9h 10m, Decl. 17° 59′ N, and transits at 13.37 (L.M.T.). It is a fine evening star and, to a person in latitude 45° N, sets at 8.53 (L.M.T.). Its stellar magnitude is −3.3 and it is steadily increasing in brightness.

Mars on the 15th is in R.A. 8h 59m, Decl. 18° 19′ N, and it crosses the meridian at 13.28 (L.M.T.), setting 7h 18m later. Its stellar magnitude is now 2.0 or only a little brighter than Polaris. It is in the constellation Cancer.

Jupiter on the 15th is in R.A. 19h 14m, Decl. 22° 36′ S, and it transits the meridian at 23.40 (L.M.T.). On the 10th it is in opposition to the sun, under which circumstances it rises in the east as the sun sets in the west and so is visible all night long. At this time its brightness is greatest, its stellar magnitude being −2.3 and so it is 1.9 times as bright as Sirius or 9 times as bright as Vega, which is seen in the sky at the same time as Jupiter.

Saturn on the 15th is in R.A. 14h 24m, Decl. 11° 47′ S, and it crosses the meridian at 18.52 (L.M.T.). It reaches a stationary point on the 12th, when it begins to move eastward amongst the stars again. Its stellar magnitude is now 0.7, a little fainter than Procyon. It is still favourably situated for observation.

Uranus on the 15th is in R.A. 23h 44m, Decl. 2° 33′ S, and it transits at 4.14 (L.M.T.). It is retrograding slowly and is favourably situated for observation as a morning star.

Neptune on the 15th is in R.A. 9h 34m, Decl. 14° 45′ N, and transits at 14.03 (L.M.T.).

For further information regarding the planets, especially *Uranus* and *Neptune*, and maps of their paths, see pages 22 to 26.

JULY

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol	Configurations of Jupiter's Satellites at 0h 0m
			h m	
Wed.	1	10h 27m ☌♄☾, ♄ 2° 56′ S.		42103
Thur.	2		17 40	40132
Fri.	3	1h ⊕in Aphelion		31402
Sat.	4	1h ♂Greatest Hel. Lat. N.		32014
♋Sun.	5	23h 54m F.M.	14 20	31024
Mon.	6	7h 25m ☌♌☾, ♌1° 43′ S.		0124*
Tues.	7			21034
Wed.	8		11 10	d2034
Thur.	9			01324
Fri.	10	5h ☍♌☉; 18h 32m ☌♁☾, ♁ 3° 31′ N.; 21h ☌☿♀, ☿ 0° 6′ S.; 22h ☌☿♂, ☿ 0° 15′ N.; 23h ☌♀♂, ♀ 0° 22′ N.		31024
Sat.	11		8 00	32014
☾ Sun.	12	15h ♄ Stationary; 16h 34m Moon L.Q.		3140*
Mon.	13			4012*
Tues.	14	22h ♀ Greatest Hel. Lat. N.	4 50	42103
Wed.	15			d4203
Thur.	16			40123
Fri.	17		1 40	43102
Sat.	18			43201
Sun.	19	1h ☌☿♆, ☿ 0° 6′ N.	22 30	34120
♍Mon.	20	14h ☌♀♆, ♀ 1° 19′ N.; 16h 40m N.M.; ☉Annular Eclipse invisible in Canada		3012*
Tues.	21	19h ☿ in♍		12034
Wed.	22	7h 4m ☌♂☾, ♂0° 5′ N.; 16h 17m ☌♆☾, ♆1° 14′ S.; 21h 40m ☌♀☾, ♀ 0° 10′ S.	19 20	20134
Thur.	23	1h 30m ☌☿☾, ☿ 2° 15′ S.		0234*
Fri.	24			31024
Sat.	25		16 10	32014
Sun.	26			31204
Mon.	27			30124
♎ Tues.	28	11h ☿ Greatest Elong. E. 27° 11′; 18h 22m ☌♄☾, ♄ 3° 7′ S.; 15h 23m Moon F.Q.	13 00	d1043
Wed.	29			24013
Thur.	30	1h ☌☿♀, ☿ 3° 14′ S.; 3h ☌♂♆, ♂0° 52′ N.		41023
Fri.	31	12h □♄☉	9 50	41302

Explanation of symbols and abbreviations on page 4.

THE SKY FOR AUGUST, 1925

The Sun.—During August the sun's R.A. increases from 8h 43m to 10h 39m, and its Decl. decreases from 18° 13′ N to 8° 34′ N. The equation of time falls from 6m 12s to 0m 12s (see page 7). For changes in the length of daylight, see page 17. On the 23rd the sun enters the third summer sign of the zodiac, Virgo.

The Moon.—For its phases and its conjunctions with the planets, see opposite page. On the 4th it occults a star in Capricornus, on the 5th another star in Capricornus, on the 10th a star in Cetus and on the 29th a star in Sagittarius (see page 8). On August 4 there is a partial eclipse of the moon, visible in the Pacific Ocean and the countries bordering on it (see page 26).

Mercury on the 15th is in R.A. 10h 35m, Decl. 4° 10′ N, and transits the meridian at 13.01 (L.M.T.). For a few days at the beginning of the month it is visible as an evening star (see last month's notes), and then it moves in towards the sun, reaching inferior conjunction on the 25th.

Venus on the 15th is in R.A. 11h 33m, Decl. 4° 9′ N, and it crosses the merician at 13.59 (L.M.T.) and sets about 6h 17m later (to an observer in latitude 45° N). It is a beautiful evening star, of stellar magnitude −3.4.

Mars on the 15th is in R.A. 10h 16m, Decl. 11° 55′ N, and it crosses the meridian at 12.43 (L.M.T.). On the 10th it passes Regulus being only 43′ north. On the 13th it is in conjunction with the sun, after which it becomes a morning star. During this month the planet is not suitably placed for observation.

Jupiter on the 15th is in R.A. 18h 59m, Decl. 23° 3′ S, and it transits the meridian at 21.24 (L.M.T.). It is still retrograding, but is moving westward more slowly than a month ago. It is a beautiful evening star, of magnitude −2.2, just north of the "inverted sauce-pan" in Sagittarius.

Saturn on the 15th is in R.A. 14h 28m, Decl. 12° 13′ S, and it crosses the meridian at 16.54 (L.M.T.) and sets, to an observer in latitude 45° N, about 5h 10m later. It is thus in a favourable position for observation still. Stellar magnitude 0.8; slightly fainter than a month ago.

Uranus on the 15th is in R.A. 23h 42m, Decl. 2° 50′ S, and it transits at 2.10 (L.M.T.). It is well placed for observation as a morning star.

Neptune on the 15th is in R.A. 9h 39m, Decl. 14° 24′ N, and transits at 12.05 (L.M.T.).

For further information regarding the planets, especially *Uranus* and *Neptune*, and maps of their paths, see pages 22 to 26.

AUGUST

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol	Configurations of Jupiter's Satellites at 22h 45m
			h m	
Sat.	1	1h ☿ in Aphelion		43210
Sun.	2	12h 55m ☌☾, ♃ 2° 4′ S		43012
Mon.	3		6 30	41023
♉ Tues.	4	☾, Partial Eclipse, Beginning only visible in Western Canada (see p. 26); 6h 59m F.M.		24013
Wed.	5			1043*
Thur.	6		3 20	03124
Fri.	7	2h 56m ☌♁☾, ♁ 3° 29′ N		3204*
Sat.	8			32104
Sun.	9	1h ♂ in Aphelion	0 10	30124
Mon.	10	14h ☿ Stationary		10234
☾ Tues.	11	4h 11m Moon L.Q.	21 00	20134
Wed.	12			1043*
Thur.	13			40132
Fri.	14		17 50	4320*
Sat.	15	12h ☌♆☉		43210
Sun.	16			43012
Mon.	17		14 40	4102*
Tues.	18			42013
♍ Wed.	19	0h 15m ☌♆☾, ♆ 1° 18′ S.; 8h 15m N.M.; 9h ☌☿♂, ☿ 6° 13′ S.; 22h 46m ☌☿☾, ☿ 7° 46′ S.		41203
Thur.	20	0h 19m ☌♂☾, ♂ 1° 37′ S	11 30	40132
Fri.	21	10h ☿ Greatest Hel. Lat. S		31240
Sat.	22	0° 46m ☌♀☾, ♀ 3° 42′ S		d3204
Sun.	23		8 20	30124
Mon.	24			1024*
Tues.	25	2h 46m ☌♄☾, ♄ 3° 9′ S.; 4h ☌☿☉ Inferior		20134
♑ Wed.	26	23h 46m Moon F.Q.	5 10	12034
Thur.	27			01324
Fri.	28			d3104
Sat.	29	19h 2m ☌♃☾, ♃ 2° 14′ S	1 50	32014
Sun.	30			3402*
Mon.	31		22 40	43102

Explanation of symbols and abbreviations on page 4.

THE SKY FOR SEPTEMBER, 1925

The Sun.—During September the sun's R.A. increases from 10h 39m to 12h 27m, and its Decl. changes from 8° 34′ N to 2° 54′ S. The equation of time becomes zero on the 1st and then increases to 10m 4s. For the change in the length of daylight, see page 18. On the 23rd the sun crosses the equator going southward and enters the first autumn sign of the zodiac, Libra.

The Moon.—For its phases and its conjunctions with the planets, see opposite page. On the 2nd-3rd it occults a star in Aquarius, on the 11th a star in Gemini, on the 22nd a star in Libra, and on the 28th two stars in Capricornus (see page 8).

Mercury on the 15th is in R.A. 10h 30m, Decl. 10° 42′ N, and transits the meridian at 10.54 (L.M.T.). The planet was in inferior conjunction with the sun on August 25, and from that date gradually separates from the sun, reaching greatest elongation, 17° 57′ west, on the 11th. It should be easily seen as a morning star. At sunrise the planet, to a person in northern middle latitudes, is about 16° above the horizon in a direction slightly north of the east point of the horizon. If a field-glass is convenient, use it to locate the planet, though it should be easy to find it with the naked eye. (See page 22).

Venus on the 15th is in R.A. 13h 48m, Decl. 11° 34′ S, and transits at 14.13 (L.M.T.). It is a beautiful evening star and is increasing in brightness. Stellar magnitude −3.5.

Mars on the 15th is in R.A. 11h 30m, Decl. 4° 18′ N, and it crosses the meridian at 11.54 (L.M.T.). It is thus a morning star still near the sun and not suitably placed for observation.

Jupiter on the 15th is in R.A. 18h 56m, Decl. 23° 10′ S, and crosses the meridian at 19.19 (L.M.T.). It ceased to retrograde on the 9th and now is slowly advancing eastward amongst the stars in Sagittarius. A fine evening star, of magnitude −2.0.

Saturn on the 15th is in R.A. 14h 37m, Decl. 13° 2′ S, and it crosses the meridian at 15.00 (L.M.T.). It sets 5 hours later to an observer in latitude 45° N, or about 2 hours after sunset. Stellar magnitude, 0.9.

Uranus on the 15th is in R.A. 23h 37m, Decl. 3° 18′ S, and transits at 0.04 (L.M.T.). It is in opposition with the sun on the 16th, and so is visible all night.

Neptune on the 15th is in R.A. 9h 43m, Decl. 14° 3′ N, and transits at 10.15 (L.M.T.).

For further information regarding the planets, especially *Uranus* and *Neptune*, and maps of their paths, see pages 22 to 26.

SEPTEMBER

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol		Configurations of Jupiter's Satellites at 12h 15m
			h	m	
Tues.	1	.....			42013
♍ Wed.	2	14h 53m F.M.			42103
Thur.	3	0h ☿ Stationary; 11h 55m ☌♁☾, ♁ 3° 22′ N.	19	30	40123
Fri.	4	.....			41302
Sat.	5	.....			43201
Sun.	6	.....	16	20	3410*
Mon.	7	.....			d3042
Tues.	8	23h ♀ in ♉			20134
☾ Wed.	9	2h ♃ Stationary; 10h ☿ in ♌; 19h 12m Moon L.Q. ..	13	10	21034
Thur.	10	19h ☿ Greatest Elong. W., 17° 57′			01234
Fri.	11	.....			13024
Sat.	12	.....	10	00	32014
Sun.	13	7h ☌☍☉			3104*
Mon.	14	0h ☿ in Perihelion			30124
Tues.	15	8h 54m ☌♆☾, ♆ 1° 25′ S.	6	50	2043*
Wed.	16	11h 50m ☌☿☾, ☿ 1° 30′ S.; 17h ☍♁☉			24103
♎ Thur.	17	17h 32m ☌☍☾, ☍ 3° 6′ S.; 23h 12m N.M.			40123
Fri.	18	.....	3	40	d4102
Sat.	19	.....			43201
Sun.	20	.....			43120
Mon.	21	0h 44m ☌♀☾, ♀ 6° 8′ S.; 12h 29m ☌♄☾, ♄ 3° 3′ S. .	0	30	43012
Tues.	22	.....			4203*
Wed.	23	8h 44m ☉ enters ♎, Autumn commences.	21	10	24103
Thur.	24	7h ☿ Greatest Hel. Lat. N.			04123
☽ Fri.	25	6h 51m Moon F.Q.			10324
Sat.	26	2h 25m ☌♃☾, ♃ 2° 4′ S.; 21h ☌♀♄, ♀ 3° 20′ S. ..	18	0	32014
Sun.	27	.....			31204
Mon.	28	.....			30124
Tues.	29	19h ☌ ☿ ☍, ☿ 0° 52′ N.	14	50	104*
Wed.	30	20h 8m ☌♁☾, ♁ 3° 18′ N.			d2034

Explanation of symbols and abbreviations on page 4.

THE SKY FOR OCTOBER, 1925

The Sun.—During October the sun's R.A. increases from 12h 27m to 14h 23m, and its Decl. increases from 2° 54′ S to 14° 12′ S. On the 23rd the sun enters the second autumnal sign of the zodiac, Scorpio. The equation of time rises from 10m 4s to 16m 20s, to be subtracted from apparent or sun-dial time (see page 7). For the change in the length of daylight, see page 19.

The Moon.—For its phases and its conjunctions with the planets, see opposite page. On the 4th it occults a star in Cetus, on the 9th a star in Gemini and on the 11th a star in Cancer (see page 8).

Mercury on the 15th is in R.A. 13h 42m, Decl. 10° 15′ S, and transits at 12.08 (L.M.T.). The planet comes into superior conjunction with the sun on the 7th and so is too near the sun for observation during the month.

Venus on the 15th is in R.A. 16h 9m, Decl. 23° 7′ S, and transits at 14.35 (L.M.T.) and sets about 4h 20m later (to a person in latitude 45° N). It is a splendid evening star and in a telescope shows a phase about like the moon eight days old. Its stellar magnitude is −3.6.

Mars on the 15th is in R.A. 12h 41m, Decl. 3° 33′ S and it crosses the meridian at 11.07 (L.M.T.). It is still rather near the sun for observation as a morning star, rising only about 40 minutes before sunrise.

Jupiter on the 15th is in R.A. 19h 4m, Decl. 23° 0′ S, and crosses the meridian at 17.29 (L.M.T.). Still a fine evening star, of magnitude −1.8.

Saturn on the 15th is in R.A. 14h 49m, Decl. 14° 3′ S, and it transits the meridian at 13.15 (L.M.T.). It sets one hour after the sun and is too close to the sun for satisfactory observation.

Uranus on the 15th is in R.A. 23h 33m, Decl. 3° 45′ S, and it transits at 21.58 (L.M.T.). It is well placed for observation.

Neptune on the 15th is in R.A. 9h 46m, Decl. 13° 46′ N, and transits at 8.13 (L.M.T.).

For further information regarding the planets, especially *Uranus* and *Neptune*, and maps of their paths, see pages 22 to 26.

OCTOBER

ASTRONOMICAL PHENOMENA

(75 Meridian Time, Hours Numbering from Midnight)

			Minima of Algol		Configurations of Jupiter's Satellites at 20h 0m
			h	m	
Thur.	1				O243*
♋ Fri.	2	0h 23m F.M.	11	40	d1O32
Sat.	3				432O1
Sun.	4				4321O
Mon.	5		8	30	43O12
Tues.	6				41O2*
Wed.	7	3h ☌☿⊙ Superior; 14h □♃⊙			42O13
Thur.	8		5	20	4O3**
☾ Fri.	9	13h 34m Moon L.Q.			41O32
Sat.	10				324O1
Sun.	11		2	10	321O4
Mon.	12	18h 5m ☌♆☾, ♆ 1° 39′ S.			3O124
Tues.	13	13h ♀ in Aphelion	23	00	13O24
Wed.	14				2O134
Thur.	15				1O34*
Fri.	16	11h 39m ☌♂☾, ♂ 4° 12′ S.	19	50	dO234
♍ Sat.	17	13h 6m N.M.; 18h ☿ in ♍; 23h 53m ☌☿☾, ☿ 5° 22′ S.			23O14
Sun.	18				321O4
Mon.	19	0h 25m ☌♄☾, ♄ 2° 55′ S.	16	40	34O12
Tues.	20	22h 48m ☌♀☾, ♀ 6° 18′ S.			413O2
Wed.	21				42O13
Thur.	22		13	30	412O3
Fri.	23	12h 7m ☌♃☾, ♃ 1° 37′ S.			d4O23
☽ Sat.	24	13h 38m Moon F.Q.			d42O*
Sun.	25		10	20	4321O
Mon.	26				34O21
Tues.	27	9h ☌☿♄, ☿ 3° 17′ S.			314O2
Wed.	28	0h ☿ in Aphelion; 2h 28m ☌♁☾, ♁ 3° 23′	7	10	2O134
Thur.	29				21O34
Fri.	30				O1234
⊙ Sat.	31	12h 17m F.M.	4	00	dO34*

Explanation of symbols and abbreviations on page 4.

THE SKY FOR NOVEMBER, 1925

The Sun.—During November the sun's R.A. increases from 14h 23m to 16h 26m, and its Decl. changes from 14° 12′ S to 21° 42′ S. On the 23rd the sun enters Sagittarius, the third autumnal sign of the zodiac. The equation of time on the 3rd rises to a maximum of 16m 23s, to be subtracted from apparent time—that is, the sun dial is that amount ahead of the mean time clock (see page 7). For the changes in the length of daylight see page 20.

The Moon.—For its phases and its conjunctions with the planets, see opposite page. On the 27th it occults a star in Cetus and on the 28th another star in the same constellation (see page 8).

Mercury on the 15th is in R.A. 16h 46m, Decl. 24° 55′ S, and transits at 13.10 (L.M.T.). On the 22nd the planet reaches greatest elongation, being then 22° 3′ east of the sun. This is not a very favourable time to observe Mercury as an evening star, as at sunset the planet is about 42° south of west and about 12° above the horizon. (See page 22).

Venus on the 15th is in R.A. 18h 42m, Decl. 26° 12′ S, and transits at 15.06 (L.M.T.). On the 28th it attains its greatest easterly elongation from the sun, namely 47° 17′. At this time its phase is like a half-moon. It is a fine evening star, of magnitude −4.0.

Mars on the 15th is in R.A. 13h 57m, Decl. 11° 21′ S, and it crosses the meridian at 10.21 (L.M.T.). It is in Virgo, about 10° east of Spica, which star it passed on the 1st at a distance of 3° north.

Jupiter on the 15th is in R.A. 19h 23m, Decl. 22° 27′ S, and it transits the meridian at 15.47 (L.M.T.). It is now moving steadily eastward in the constellation Sagittarius and is a good evening star but setting at 20.10 (L.M.T.) to a person in latitude 45° N. Stellar magnitude, −1.6, the same as that of Sirius.

Saturn on the 15th is in R.A. 15h 3m, Decl. 15° 8′ S, and it transits the meridian at 11.27 (L.M.T.). It is in conjunction with the sun on the 9th, after which it is a morning star; but it is too close to the sun during the month for observation.

Uranus on the 15th is in R.A. 23h 30m, Decl. 4° 1′ S, and transits at 19.53 (L.M.T.). It is well placed for observation.

Neptune on the 15th is in R.A. 9h 48m, Decl. 13° 37′ N, and transits at 6.13 (L.M.T.).

For further information regarding the planets, especially *Uranus* and *Neptune*, and maps of their paths, see pages 22 to 26.

NOVEMBER

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

			Minima of Algol	Configuration of Jupiter's Satellites at 18h 45m
			h m	
Sun.	1			32104
Mon.	2			3014*
Tues.	3		0 50	31024
Wed.	4	20h ♀ Greatest Hel. Lat. S.		2014*
Thur.	5		21 30	21403
Fri.	6			40123
Sat.	7			41023
☾ Sun.	8	10h 13m Moon L.Q.	18 20	d4230
Mon.	9	3h 8m ☌♆☾, ♆ 1° 56′ S.; 18h ☌♄☉		430**
Tues.	10			43102
Wed.	11		15 10	42014*
Thur.	12			42103
Fri.	13			0123*
Sat.	14	7h 14m ☌♂☾, ♂ 4° 43′ S.	12 00	10234
Sun.	15	14h 49m ☌♄☾, ♄ 2° 49′ S.		23014
● Mon.	16	1h 58m N.M.		3204*
Tues.	17	9h ☿ Greatest Hel. Lat. S.; 10h □♆☉; 15h 45m ☌☿☾, ☿ 5° 59′ S.	8 50	31024
Wed.	18			32014
Thur.	19	15h 49m ☌♀☾, ♀ 4° 15′ S.		21034
Fri.	20	1h 22m ☌♃☾, ♃ 1° 2′ S.	5 40	02143
Sat.	21			10423
☽ Sun.	22	8h ☿ Greatest Elong. E. 22° 3′; 21h 6m Moon F.Q.		24301
Mon.	23		2 30	43210
Tues.	24	7h 21m ☌♁☾, ♁ 3° 36′ N.		d4302
Wed.	25		23 20	d4301
Thur.	26	3h ☌♀♃, ♀ 2° 39′ S.		42103
Fri.	27	14h ♆ Stationary; 19h ♀ Greatest Elong. E. 47° 17′		40213
Sat.	28		20 00	41023
Sun.	29			43201
♋ Mon.	30	3h 11m F.M.		32104

Explanation of symbols and abbreviations on page 4.

THE SKY FOR DECEMBER, 1925

The Sun.—During December the sun's R.A. increases from 16h 26m to 18h 43m, and its Decl. reaches a maximum value of 23° 27′ S on the 22nd. This is the time of the winter solstice and the sun enters the first of the winter signs of the zodiac, Capricornus. It is then vertical to points on the tropic of Capricorn on the earth. From this time it slowly moves northward, the daylight period being the shortest and changing very little for several days before and after the solstice (see page 21). The equation of time changes from 11m 12s watch slow to 3m 12s watch fast (see page 7).

The Moon.—For its phases and its conjunctions with the planets, see opposite page.

Mercury on the 15th is in R.A. 16h 53m, Decl. 19° 57′ S, and crosses the meridian at 12.57 (L.M.T.). On the 11th the planet comes to inferior conjunction with the sun. It then separates from the sun and reaches greatest elongation, 22° 36′ west, on the last day of the year. At sunrise the planet is about 14° above the horizon in a direction 45° south of east, and it should be visible without difficulty. A field glass will be useful to locate it. (See page 22).

Venus on the 15th is in R.A. 20h 48m, Decl. 10° 54′ S, and transits at 15.13 (L.M.T.) and sets about 4h 35m later (to a person in latitude 45° N). It is gradually assuming the crescent shape and is becoming brighter. On December 31 its stellar magnitude is −4.4.

Mars on the 15th is in R.A. 15h 16m, Decl. 17° 47′ S, and crosses the meridian at 9.42 (L.M.T.). It is in the constellation Libra and about as bright as Polaris.

Jupiter on the 15th is in R.A. 19h 49m, Decl. 21° 31′ S, and transits the meridian at 14.14 (L.M.T.). It sets about 4½ hours later or 2h 20m after the sun, as seen by a person in latitude 45° N. Its stellar magnitude is −1.5, and at the end of the year it is just entering the constellation Capricornus.

Saturn on the 15th is in R.A. 15h 17m, Decl. 16° 2′ S, and it crosses the meridian at 9.43 (L.M.T.). It is now about 6° east of Alpha Librae, rises about 5 o'clock a.m., and can easily be observed as a morning star. Its stellar magnitude is 0.8.

Uranus on the 15th is in R.A. 23h 30m, Decl. 4° 1′ S, and it transits at 17.55 (L.M.T.). It is well placed for observation as an evening star.

Neptune on the 15th is in R.A. 9h 48m, Decl. 13° 39′ N, and transits at 4.15 (L.M.T.).

For further information regarding the planets, especially *Uranus* and *Neptune*, and maps of their paths see pages 22 to 26.

DECEMBER

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight).

			Minima of Algol	Configurations of Jupiter's Satellites at 18h 0m
			h m	
Tues.	1	12h ♁ Stationary; 17h ☿ Stationary	16 50	3O124
Wed.	2			3O24*
Thur.	3			21O34
Fri.	4		13 40	O134*
Sat.	5			1O234
Sun.	6	9h ☿ in ♌; 11h 8m ☌ ♆☾, ♆ 2° 11′ S.		2O314
Mon.	7		10 30	321O4
☾ Tues.	8	7h 11m Moon L.Q.		3O142
Wed.	9			341O2
Thur.	10		7 20	421O3
Fri.	11	0h ☿ in Perihelion; 11h ☌ ☿ ☉ Inferior		4O13*
Sat.	12			41O23
Sun.	13	4h 14m ☌ ♂☾, ♂ 4° 35′ S.; 6h 40m ☌ ♄☾, ♄ 2° 45′ S.; 22h □ ♁ ☉	4 10	42O31
Mon.	14	23h 33m ☌ ☿☾, ☿ 0° 5′ S.		4321O
● Tues.	15	13h ☌ ♂♄, ♂ 1° 47′ S.; 14h 5m N.M.		43O12
Wed.	16		1 00	341O2
Thur.	17	18h 44m ☌ ♃☾, ♃ 0° 25′ S.		d2O**
Fri.	18	21h 9m ☌ ♀☾, ♀ 0° 9′ S.	21 50	2O143
Sat.	19			1O234
Sun.	20			2O134
Mon.	21	7h ☿ Greatest Hel. Lat. N.; 11h ☿ Stationary; 13h 3m ☌ ♁☾, ♁ 3° 50′ N.	18 40	231O4
☽ Tues.	22	3h 37m ☉ enters ♑, Winter commences; 6h 8m Moon F.Q.		3O214
Wed.	23			31O24
Thur.	24		15 30	23O14
Fri.	25			2O43*
Sat.	26			41O23
Sun.	27		12 10	d4O13
Mon.	28			4213O
♋ Tues.	29	21h 1m F.M.		43O21
Wed.	30		9 00	431O2
Thur.	31	3h ♀ in ♌; 4h ☿ Greatest Elong. W. 22° 36′		423O1

Explanation of symbols and abbreviations on page 4.

PHENOMENA OF JUPITER'S SATELLITES, 1925

E—Eclipse, O—occultation, T—transit, S—shadow, D—disappearance, R—reappearance, I—ingress, e—egress. The Roman numerals denote the satellites.
Eastern Standard Time, hours numbering from Midnight.

FEBRUARY

d	h	m	Sat.	Phen.	d	h	m	Sat.	Phen.
2	6	29	I	Se	18	5	17	II	Te
9	6	9	I	SI		5	38	I	Te
10	6	24	I	OR	19	5	31	IV	ER
16	5	36	III	Se	25	5	23	I	TI
	6	5	III	TI		5	24	II	TI
	6	16	II	ED		6	0	II	Se
17	5	14	I	ED	26	4	53	I	OR

MARCH

4	5	59	II	SI	20	4	32	I	SI
6	5	1	III	OD		5	43	I	TI
	5	28	II	OR	21	5	16	I	OR
12	5	24	I	ED	24	3	21	III	TI
13	4	35	III	ED	25	3	26	IV	OD
	4	52	I	Se	28	3	40	I	ED
					29	3	7	II	SI
						3	7	I	Se
						4	22	I	Te

APRIL

5	2	47	I	SI	21	2	17	I	TI
	4	2	I	TI		3	15	I	Se
	5	0	I	Se		4	31	I	Te
6	3	37	I	OR	22	1	52	I	OR
11	5	3	III	OR	23	2	46	II	TI
12	4	40	I	SI		2	51	II	Se
14	2	39	I	Te	25	4	25	III	ED
	2	41	II	ED	27	3	56	IV	ED
16	2	56	II	Te	28	2	54	I	SI
18	3	40	III	ER		4	8	I	TI
20	3	49	I	ED	29	2	35	III	Te
						3	44	I	OR
					30	2	48	II	SI

MAY

2	2	15	II	OR	21	3	2	I	SI
6	1	25	III	Se		4	4	I	TI
	2	5	I	ED	22	0	21	I	ED
	2	44	IV	Te		3	40	I	OR
	3	1	III	TI		23	45	I	Se
7	1	30	I	Se	23	0	46	I	Te
	2	41	I	Te		23	36	III	ER
13	2	9	III	SI	24	9	21	III	OD
	3	59	I	ED		3	45	III	OR
14	0	24	IV	ER		23	52	II	SI
	1	9	I	SI	25	1	50	II	TI
	2	15	I	TI		2	33	II	Se
	3	23	I	Se	29	2	15	I	ED
15	1	52	I	OR		23	24	I	SI
16	2	12	II	ED	30	0	17	I	TI
17	0	9	III	OR		1	39	I	Se
1	23	58	II	Se		2	33	I	Te
18	2	11	II	Te		23	54	I	OR
	23	54	IV	OD					
					31	0	17	III	ED
						3	8	IV	OR
						3	36	III	ER
						3	52	III	OD

JUNE

d	h	m	Sat.	Phen.	d	h	m	Sat.	Phen.
1	2	27	II	SI	18	1	21	III	Se
	4	12	II	TI		3	32	III	Te
3	1	2	II	OR		21	57	II	TI
5	4	9	I	ED		23	38	II	Se
6	1	17	I	SI	19	0	41	II	Te
	2	3	I	TI	21	2	25	I	ED
	3	32	I	Se		23	33	I	SI
	22	37	I	ED		23	59	I	TI
7	1	40	I	OR	22	1	49	I	Se
	22	46	I	Te		2	15	I	Te
8	0	20	IV	SI		23	35	I	OR
	3	5	IV	Se	24	21	17	IV	Se
9	23	12	II	ED		21	48	IV	TI
10	3	21	II	OR	25	1	1	IV	Te
11	0	10	III	Te		2	0	III	SI
	22	24	II	Te		3	29	III	TI
13	3	11	I	SI		23	31	II	SI
	3	49	I	TI	26	0	12	II	TI
14	0	31	I	ED		2	14	II	Se
	3	25	I	OR		2	56	II	Te
	22	15	I	TI	27	21	1	II	OR
	23	55	I	Se	29	1	27	I	SI
15	0	31	I	Te		1	43	I	TI
	21	51	I	OR		3	43	I	Se
17	1	47	II	ED		4	0	I	Te
	22	2	III	SI		22	48	I	ED
18	0	10	III	TI	30	1	19	I	OR
	22	12	I	Se					
	22	26	I	Te					

JULY

3	2	6	II	SI	20	0	59	IV	ER
	2	27	II	TI		3	11	III	OD
	3	43	IV	ED		20	3	II	TI
4	23	16	II	OR		20	34	II	SI
6	0	1	III	OR		22	46	II	Te
	3	21	I	SI		23	18	II	Se
	3	27	I	TI	22	1	21	I	TI
7	0	42	I	ED		1	39	I	SI
	3	3	I	OR		22	41	I	OD
	21	50	I	SI	3	1	16	I	ER
	21	53	I	TI		20	8	I	SI
8	0	6	I	Se		21	21	III	Se
	0	9	I	Te		22	4	I	Te
	21	29	I	OR		22	24	I	Se
11	22	46	II	OD	27	22	18	II	TI
12	1	36	II	ER		23	9	II	SI
	23	54	III	OD	28	1	1	II	Te
13	3	34	III	ER		1	53	II	Se
	20	32	II	Te		2	13	IV	TI
	20	43	II	Se	29	20	8	II	ER
14	2	31	I	OD	30	0	25	I	OD
	23	37	I	TI		19	57	III	TI
	23	44	I	SI		21	32	I	TI
15	1	53	I	Te		21	58	III	SI
	2	1	I	Se		22	2	I	SI
	20	57	I						
	20	57	I	OD		23	18	III	Te
	23	21	I	ER		23	48	I	Te
16	20	19	I	Te	31	0	19	I	Se
	20	29	I	Se		1	21	III	Se
19	1	1	II	OD		21	39	I	ER

AUGUST

d	h	m	Sat.	Phen.	d	h	m	Sat.	Phen.
4	0	34	II	TI	21	20	13	II	SI
	1	45	II	SI		21	4	II	Te
5	22	45	II	ER		22	57	II	Se
6	2	10	I	OD	22	0	11	I	OD
	23	18	I	TI		1	4	IV	OD
	23	19	III	TI		21	19	I	TI
	23	57	I	SI		22	17	I	SI
7	1	33	I	Te		23	35	I	Te
	1	58	III	SI	23	0	33	I	Se
	2	14	I	Se		21	52	I	ER
	20	37	I	OD	24	20	11	III	OD
	23	34	I	ER		23	34	III	OR
8	20	1	I	Te	25	0	10	III	ED
	20	43	I	Se	28	20	45	II	TI
12	21	1	II	OD		22	48	II	SI
13	1	22	II	ER		23	27	II	Te
	20	7	IV	Te	29	23	9	I	TI
14	0	27	IV	SI	30	0	12	I	SI
	1	5	I	TI		19	58	II	ER
	20	22	II	Se		20	26	I	OD
	22	23	I	OD		22	7	IV	Se
15	1	28	I	ER		23	47	I	ER
	20	21	I	SI	31	19	52	I	Te
	21	47	I	Te		20	57	I	Se
	22	38	I	Se		23	47	III	OD
16	19	57	I	ER					
17	20	3	III	OR					
	20	10	III	ED					
	23	36	III	ER					
19	23	23	II	OD					

SEPTEMBER

4	21	24	III	Se	18	20	56	III	TI
	23	10	II	TI	20	22	29	II	OD
6	22	16	I	OD	21	23	11	I	TI
	22	36	II	ER	22	19	40	III	ER
7	19	27	I	TI		19	51	II	SI
	20	22	IV	OR		20	3	II	Te
	20	36	I	SI		20	28	I	OD
	21	42	I	Te		22	36	II	Se
	22	52	I	Se	23	18	56	I	SI
8	20	10	I	ER		19	55	I	Te
11	20	30	III	Te		21	12	I	Se
	21	59	III	SI	24	21	52	IV	ED
13	19	57	II	OD	29	19	54	II	TI
14	21	18	I	TI		20	10	III	ED
	22	32	I	SI		22	21	I	OD
	23	34	I	Te		22	27	II	SI

SEPTEMBER—*Continued*

d	h	m	Sat.	Phen.	d	h	m	Sat.	Phen.
15	20	0	II	Se		22	36	II	Te
	22	6	I	ER	30	19	34	I	TI
16	19	17	I	Se		20	52	I	SI
						21	50	I	Te

OCTOBER

1	19	50	II	ER	16	19	12	I	SI
	20	24	I	ER		20	11	I	Te
2	18	21	IV	TI		21	29	I	Se
	21	42	IV	Te	17	18	2	III	SI
6	18	54	III	OD		18	43	I	ER
	22	18	III	OR		19	40	II	Se
7	21	29	I	TI		21	31	III	Se
8	18	45	I	OD	23	19	52	I	TI
9	18	14	I	Te		21	8	I	SI
	19	33	I	Se	24	19	29	II	SI
11	19	52	IV	ER		19	45	II	Te
15	19	39	II	OD		20	23	III	Te
	20	40	I	OD		20	38	I	ER
					25	17	53	I	Se
					31	19	4	I	OD
						19	43	II	TI

NOVEMBER

1	18	36	I	Te	16	17	31	I	OD
	19	49	I	Se	17	18	10	I	Se
2	19	44	II	ER	18	19	20	II	Se
4	19	45	III	ER	22	17	39	III	Se
5	18	59	IV	SI	23	19	31	I	OD
8	18	19	I	TI	24	17	48	I	SI
	19	28	I	SI		19	6	I	Te
9	18	57	I	ER	25	19	9	II	SI
11	19	10	III	OR	29	17	55	III	Te
	20	13	III	ED		18	6	III	SI
13	18	0	IV	OD	30	17	49	IV	OR

DECEMBER

1	18	51	I	TI	17	17	24	I	TI
2	19	11	I	ER		18	3	I	SI
6	18	51	III	TI	18	17	29	I	ER
9	18	2	I	OD	20	17	49	II	Te
10	17	39	I	Te	24	18	5	III	OD
	18	25	I	Se	28	17	50	II	TI
11	17	52	II	OD					

METEORS AND SHOOTING STARS

On almost any clear night any one observing the sky for a few minutes will see one or more shooting stars. They are particularly numerous during the autumn months, and on account of the rotation of the earth are better seen during the early morning hours than in the evening.

At certain times there are striking displays, located in particular portions of the sky. These are considered to be due to *meteor swarms*. The principal ones are given in the following table.

Name of Shower	Duration	Greatest Display	Radiant Point R.A.		Decl.	
			h	m	°	
Quadrantids	Dec. 28-Jan. 9	Jan. 3	15	20	+	53
Aurigids	Feb. 7-23	Feb. 10	5	0	+	41
Lyrids	April 16-22	April 21	18	4	+	33
η Aquarids	April 29-May 8	May 4-6	22	32	−	2
Herculids	May 13-29	May 24	16	36	+	30
Scorpiids	May-June-July	June 4	16	48	−	21
Sagittids	June-July	July 28	20	12	+	24
Capricornids	July-Aug.	July 22	20	20	−	12
δ Aquarids	July 18-Aug. 12	July 28-31	22	36	−	11
α β Perseids	July-Aug.-Sept.	Aug. 16	3	12	+	43
Perseids	July 8-Aug. 25	Aug. 11-12	3	4	+	57
Draconis	Aug. 18-25	Aug. 23	19	24	+	61
ϵ Perseids	Aug.-Sept.	Sept. 15	4	8	+	35
Arietids	Aug.-Sept.-Oct.	Sept. 21	2	4	+	19
	Sept.-Oct.	Oct. 15	2	4	+	9
Orionids	Oct. 9-29	Oct. 19	6	8	+	15
μ Ursids Maj.	Oct.-Nov.-Dec.	Nov. 16-25	10	16	+	41
Taurids	November	Nov. 21	4	12	+	23
Leonids	Nov. 9 20	Nov. 14-15	10	0	+	23
Andromedes	Nov. 20-30	Nov. 20-23	1	40	+	43
Geminids	Dec. 1-14	Dec. 11	7	12	+	33

Of these the chief ones are the Perseids, the Leonids and the Andromedes.

The Perseids furnish an annual display of considerable strength, and are perhaps the best known of all. The swarm appears to have an orbit identical with that of the great Comet 1862 III., the period of which is 120 years.

The Leonids follow in the orbit of Tempel's Comet of 1866, of period 33 years.

The Andromedes are thought to be remnants of Biela's Comet. They were especially numerous in 1872, 1885, 1898, but in recent years have not been so prominent.

The above table was prepared for the HANDBOOK by Mr. W. F. Denning, F.R.A.S., of Bristol, England; and for further interesting information regarding this subject (and almost any other subject in which the amateur is interested) reference may be made to his *Telescopic Work for Starlight Evenings.*

PRINCIPAL ELEMENTS OF THE SOLAR SYSTEM

Name	Mean Distance from Sun		Sidereal Period		Mean Diameter Miles	Mass	Density	Volume	Axial Rotation
	⊕ =1	Millions of Miles	Mean Solar Days	Years		⊕ =1	Water =1	⊕ =1	
☿ Mercury	0.387	36.0	87.97	0.24	3009	0.0556	4.7(?)	0.055	88d
♀ Venus	0.723	67.2	224.70	0.62	7575	0.817	4.94	0.88	225d
⊕ Earth	1.000	92.9	365.26	1.00	7917.8	1.000	5.55	1.000	23h 56m 4s
♂ Mars	1.524	141.5	686.97	1.88	4216	0.108	3.92	0.151	24h 37m 23s
♃ Jupiter	5.203	483.3	4332.58	11.86	86728	318.4	1.32	1314	9h 55m ±
♄ Saturn	9.539	886.1	10759.2	29.46	72430	95.2	0.72	765	10h 14m ±
♅ Uranus	19.191	1782.8	30685.9	84.02	30878	14.6	1.22	59	10h 45m ±
♆ Neptune	30.071	2973.4	60187.6	164.79	32932	16.9	1.11	72	?
☉ Sun	....	....	....	....	864392	333400	1.39	1301100	25d 7h 48m±
☾ Moon	From ⊕238,857 mls.		27.32	0.075	2160	0.0123	3.39	0.020	27d 7h 43m 11.5s

SATELLITES OF THE SOLAR SYSTEM

Name	Stellar Magnitude.	Mean Distance in Miles	Sidereal Period d. h. m. s.	Discoverer	Date
THE EARTH					
The Moon..	..	238,840	27 7 43 11		
MARS					
1. Phobos.....	14	5,850	7 39 15	Asaph Hall....	Aug. 17, 1877
2. Deimos....	13	14,650	1 6 17 54	Asaph Hall....	Aug. 11, 1877
JUPITER					
5. (Nameless).	13	112,500	11 57 23	Barnard.....	Sept. 9, 1892
1. Io.....	6½	261,000	1 18 27 33	Galileo.....	Jan. 7, 1610
2. Europa....	6½	415,000	3 13 13 42	Galileo.....	Jan. 8, 1610
3. Ganymede.	6	664,000	7 3 42 33	Galileo.....	Jan. 7, 1610
4. Callisto....	7	1,167,000	16 16 32 11	Galileo.....	Jan. 7, 1610
6. (Nameless).	14	7,372,000	266·00 d.	Perrine	Dec. 1904
7. (Nameless).	16	7,567,900	276·67 d.	Perrine	Jan. 1905
8. (Nameless).	17	15,600,000	789 d.	Melotte.....	Jan. 1908
9. (Nameless).	19	18,900,000	3 years	Nicholson.....	July 1914
SATURN					
1. Mimas.....	15	117,000	22 37 6	W. Herschel...	July 18, 1789
2. Enceladus..	14	157,000	1 8 53 7	W. Herschel...	Aug. 29, 1789
3. Tethys.....	11	186,000	1 21 18 26	J. D. Cassini...	Mar. 21, 1684
4. Dione.....	11	238,000	2 17 41 9	J. D. Cassini...	Mar. 21, 1684
5. Rhea.....	10	332,000	4 12 25 12	J. D. Cassini...	Dec. 23, 1672
6. Titan.....	9	771,000	15 22 41 23	Huygens.....	Mar. 25, 1655
7. Hyperion...	16	934,000	21 6 39 27	G. P. Bond....	Sept. 16, 1848
8. Iapetus....	11	2,225,000	79 7 54 17	J. D. Cassini...	Oct. 25, 1671
9. Phoebe.....	17	8,000,000	546.5 d.	W.H.Pickering	1898
10. Themis.....	17	906,000	20 20 24 0	W.H.Pickering	1905
URANUS					
1. Ariel.....	15	120,000	2 12 29 21	Lassell.....	Oct. 24, 1851
2. Umbriel....	16	167,000	4 3 27 37	Lassell.....	Oct. 24, 1851
3. Titania.....	13	273,000	8 16 56 29	W. Herschel...	Jan 11, 1787
4. Oberon.....	14	365,000	13 11 7 6	W. Herschel...	Jan. 11, 1787
NEPTUNE					
1. (Nameless).	13	221,500	5 21 2 44	Lassell.....	Oct. 10, 1846

DOUBLE STARS

Close scrutiny of the sky reveals the fact that many of the stars are composed of two or more components, that is, they are *double* or *multiple* stars. Over 15,000 such objects have been discovered.

A star may appear double in two ways. First, one may just happen to be nearly in line with the other as seen from the earth. Second, the two bodies may be physically connected, each revolving about their common centre of gravity. The former are called *optical doubles*, the latter *binary stars*. In the course of time the binaries exhibit a change in the distance between the components and also in the direction of the line joining them, that is, in the position angle.

While the close pairs require a large instrument for their detection, there are many within the range of small instruments. Such observations also allow one to determine the quality of the instrument employed. It has been found that a telescope having an objective 1 inch in diameter should be able to distinguish two stars 4″.56 apart, and the resolving power is inversely proportional to the diameter of the objective. Thus a telescope of 3-inch aperture should separate stars 1/3 of 4″.56, or 1″.52 apart; for one of aperture 10 inches, stars 1/10 of 4″.56, or 0″.45 apart should be seen separate; and so on. With the Yerkes refractor, of aperture 40 inches, a double star with distance 0″.11 can be detected.

In choosing a double star for testing a telescope care should be taken not to select a binary, with varying distance between its components.

The stars in the following short lists can be identified from almost any star atlas, and observation of them will prove of great interest to the amateur.

I. THE MOST LUMINOUS PAIRS

Star	Mags.	Dist. ″	Star	Mags.	Dist. ″
Mizar....	2.4, 4.0	14.5	γ Leonis....	2.5, 4.0	3.0
Castor...	2.5, 3.0	5.6	β Scorpii...	2.5, 5.5	13.0
γ Virginis .	3.0, 3.2	5.0	θ Serpentis.	4.4, 6.0	21.0
γ Arietis...	4.2, 4.5	8.9	44*i* Boötis....	5.0, 6.0	4.8
ζ Aquarii..	3.5, 4.4	3.5	π Boötis....	4.3, 6.0	6.0

II. THE FINEST COLORED PAIRS

Star	Magnitudes	Distance ″	Colors
γ Andromedæ..	2.2, 5.5	10	Orange, Green.
α CanumVenat.	3.2, 5.7	20	Golden, Lilac.
β Cygni.....	3.3, 5.5	34	Golden, Sapphire.
ϵ Boötis.....	2.4, 6.5	2.9	Golden, Sapphire.
95 Herculis.....	5.5, 5.8	6	Golden, Azure.
α Herculis.....	4, 5.5	4.7	Ruby, Emerald.
γ Delphini.....	3.4, 5	11	Golden, Bluish Green.
32 Eridani.....	4.7, 7	6.7	Topaz, Bright Green.
ϵ Hydræ.....	3.5, 7.5	3.5	Yellow, Blue.
ζ Lyræ.....	4.5, 5.5	44	Yellow, Green.
ι Cancri.....	4.5, 5	30	Pale Orange, Blue.
o Cygni.....	4.3, 7.5, 5.5	337.8, 106.8	Yellow, Blue.
24 Coma Beren..	5.6, 7	21	Orange, Lilac.
o Cephei.....	5.4, 8	2.5	Golden, Azure.
94 Aquarii.....	5.5, 7.5	11	Rose, Greenish.
39 Ophiuchi.....	5.7, 7.5	12	Yellow, Blue.
41 Aquarii.....	5.8, 8.5	4.8	Yellow Topaz, Blue.
2 Canum Venat	6, 9	11	Golden, Azure
52 Cygni.....	4.6, 9	7	Orange, Blue.
55 Piscium.....	6, 9	6	Orange, Blue.
κ Geminorum..	3.8, 9	9	Orange, Blue.
ρ Orionis.....	5.1, 9	6.8	Orange, Blue.
54 Hydræ.....	5.2, 8	9	Yellow, Violet.
η Persei.....	4.2, 8.5	28	Yellow, Blue.
ϕ Draconis.....	4.8, 6	31	Yellow, Lilac.
o Draconis.....	4.7, 8.5	32	Golden, Lilac.
η Cassiopeiæ...	4.7, 7	5.7	Golden, Purple.
23 Orionis.....	5.4, 7	32	White, Blue.
δ Herculis.....	3.6, 8	18	White, Violet.
o Capricorni...	6.3, 7	22	Bluish.
17 Virginis.....	6.5, 7	20	Rose.
ξ Boötis.....	4.5, 6.5	4.2	Reddish Yellow.

The colors given above are according to Flammarion. For slight variations and also for a much longer list consult Webb's "Celestial Objects."

VARIABLE STARS

The study of variable stars is especially suited to amateur observers. In it they can make observations of permanent scientific value, since all the brighter and more interesting objects are within the range of modest instruments. An ordinary field glass or a small telescope is all that is required.

In recent years there has been organized the American Association of Variable Star Observers, with a working membership of about 70, and reports of observations are published monthly in *Popular Astronomy*. The recording secretary is Howard O. Eaton, 428 Lake St., Madison, Wis., and additional observers are desired.

The *novae* or "new" stars comprise one class of variables, and all the recent brighter objects of this sort have been discovered by amateurs. The long-period variable Omicron Ceti, or *Mira*, was discovered by Fabricius in 1596, while Algol, the best-known variable of short-period, was discovered by Goodricke, a deaf mute, in 1783.

Several attempts have been made to classify the variable stars; but a scientific system of classification, in harmony with the chief deductions of theory as well as the facts of observation, is still wanting. The best known system is that formulated by Professor E. C. Pickering in 1880, and reproduced (with slight additions) in his "Provisional Catalogue of Variable Stars" (1903). This includes five classes, two of which are subdivided, as follows:—

	EXAMPLES
I. New or temporary stars	Nova, 1572
II. Variables of long period:	
a. Ordinary stars of this class ..... *o*	Ceti
b. Stars subject to "occasional sudden and irregular outbursts of light which gradually diminishes"	U Geminorum
III. "Variables of small range or irregular variation, according to laws as yet unknown" ..... *a*	Orionis
IV. Variables of short period:	
a. "Ordinary" cases ..... *δ*	Cephei
b. Stars with "minima successively bright and faint" ... *β*	Lyræ
V. Stars of the Algol type ..... *β*	Persei

Name	Limiting Mags.	Period	Class	Discoverer
		d. h. m.		
U Cephei	7.0– 9.2	2 11 49.6	V.	W. Ceraski....1880
o Ceti	1.7– 9.5	331.7	II.	Fabricius....1596
ρ Persei	3.4– 4.2	Irr.	III.	Schmidt....1854
6.1904 Cephei	8.6– 9.1	32.3	V.	Blajko....1904
β Persei (Algol)	2.1– 3.2	2 20 48.9	V.	Montanari....1669
λ Tauri	3.3– 4.2	3 22 52.2	V.	Baxendell....1848
W Eridani	8.1–<12.5	369	II.	Fleming....1898
RW Tauri	8–11	2 18 27.2	V.	Fleming....1905
R Leporis	6–8?	436.1	II.	Schmidt....1855
a Orionis	1– 1.4	Irr.	III.	J. Herschel....1840
U Orionis	5.8–12.3	375	II.	Gore....1885
η Geminorum	3.2– 4.2	231.4	III.	Schmidt....1865
T Monocerotis	5.7– 6.8	27.0	IV.	Gould....1871
ζ Geminorum	3.8– 4.3	10 3 41.5	IV.	Schmidt....1847
R Geminorum	6.6–13.3	370.2	II.	Hind....1848
R Canis Maj	5.7– 6.3	1 3 15.8	V.	Sawyer....1887
S Cancri	8.0–10.2	9 11 37.8	V.	Hind....1848
S Antliæ	6.3– 6.8	0 7 46.8	IV.	Paul....1888
W Ursæ Maj	7.9– 8.6	0 4 0.2	V.?	Müller & Kempf..1903
R Leonis	4.6–10.5	312.8	II.	Koch....1782
R Hydræ	3.5– 9.7	425.1	II.	Montanari....1670
δ Libræ	5.0– 6.2	2 7 51.4	V.	Schmidt....1859
a Herculis	3.1– 3.9	Irr.	III.	W. Herschel....1795
U Ophiuchi	6.0– 6.7	0 20 7.7	V.	Gould....1871
X Sagittarii	4.4– 5.4	7 0 17.1	IV.	Schmidt....1866
R Scuti	4.8– 7.8	Irr.	III.	Pigott....1795
β Lyræ	3.4– 4.1	12 21 59.2	IV.	Goodricke....1784
χ Cygni	4.5–13.5	406.0	II.	Kirch....1686
η Aquilæ	3.7– 4.5	7 4 14.0	IV.	Pigott....1784
S Sagittæ	5.5– 6.1	8 9 11.8	IV.	Gore....1885
14.1904 Cygni	10.7–11.6	0 3 14.2	IV.	Ceraski....1904
Y Cygni	7.1– 7.9	1 11 57.5	V.	Chandler....1886
δ Cephei	3.7– 4.6	5 8 47.7	IV.	Goodricke....1784
U Pegasi	9.3– 9.9	0 8 59.7	IV.	Chandler....1894

THE DISTANCES OF THE STARS

The measurement of the distances of the stars is one of the most important problems in astronomy. Without such information it is impossible to form any idea as to the magnitude of our universe or the distribution of the various bodies in it.

The parallax of a star is the apparent change of position in the sky which the star would exhibit as one would pass from the sun to the earth at a time when the line joining earth to sun is at right angles to the line drawn to the star; or, more accurately, it is the angle subtended by the semi-major axis of the earth's orbit when viewed perpendicularly from the star. Knowing the parallax, the distance can be deduced at once.

For many years attempts were made to measure stellar parallaxes, but without success. The angle to be measured is so exceedingly small that it was lost in the unavoidable instrumental and other errors of observation. The first satisfactory results were obtained by Bessel, who in 1838, by means of a heliometer, succeeded in determining the parallax of 61 Cygni, a 6th magnitude star with a proper motion of 5″ a year. On account of this large motion the star was thought to be comparatively near to us, and such proved to be the case. At about the same time Henderson, at the Cape of Good Hope, from meridian-circle observations, deduced the parallax of Alpha Centauri to be 0″.75. For a long time this was considered to be the nearest of all the stars in the sky, but in 1913 Innes, director of the Union Observatory, Johannesburg, South Africa, discovered a small 11th mag. star, 2° 13′ from Alpha Centauri, with a large proper motion, and which proved to have a parallax of 0″.78. Its brightness is only 1/20,000 that of Alpha Centauri and the mass of the body is the least known. In 1916 Barnard discovered an 11th mag. star in Ophiuchus with a proper motion of 10″ per year, the greatest on record, and its parallax is about 0″.6. It is believed to be next to Alpha Centauri in distance from us.

The distances of the stars are so enormous that a very large unit has to be chosen to express them. The one generally used is the light-year, that is, the distance travelled by light in a year, or 186,000x60x60x24x365¼ miles. A star whose parallax is 1″ is distant 3.26 light years; if the parallax is 0″.1, the distance is 32.6 l.-y.; if the parallax is 0″.27 the distance is 3.26÷.27 = 12 l.-y. In other words, the distance is inversely proportional to the parallax. In recent years the word *parsec* has been introduced to express the distances of the stars. A star whose distance is 1 parsec is such that its *par*-allax is 1 *sec*-ond. Thus 1 parsec is equivalent to 3.26 l.-y., 10 parsecs = 32.6 l.-y., etc.

In later times much attention has been given to the determination of parallaxes, chiefly by means of photography, and now several hundred are known with tolerable accuracy.

The following list, prepared by Mr. J. A. Pearce, gives some of the latest values obtained.

Name	R.A. (1900) h	m	Decl. (1900) ′	″	Vis. Mag. Harvard	Parallax ″	Distance Light Years
Prox. Cen	14	22.9	−62	15	10.5	0.802	4.06
* αCentauri	14	32.8	−60	25	0.33	.759	4.30
Barnard	17	52.9	+ 4	28	9.67	.533	6.12
Lal. 21185	10	57.9	+36	38	7.60	.403	8.09
* αCan. Maj	6	40.7	−16	35	−1.58	.376	8.67
Innes	11	12.0	−57	2	(12)	.339	9.62
C.Z. 5h 243	5	7.7	−44	59	8.3	.319	10.22
τCeti	1	39.4	−16	28	3.65	.318	10.25
* αCan. Min	7	34.1	+ 5	29	0.48	.312	10.45
ϵErid	3	28.2	− 9	48	3.81	.311	10.48
*61 Cygni	21	2.4	+38	15	5.57	.306	10.65
Lac. 9352	22	59.4	−36	26	7.44	.292	11.16
* Σ2398	18	41.8	+59	29	9.33	.287	11.36
ϵIndi	21	55.7	−57	12	4.74	.284	11.48
* Groom. 34	0	12.5	+43	27	7.98	.281	11.60
* Krüger 60	22	24.5	+57	12	9.64	.262	12.44
Lac. 8760	21	11.4	−39	15	6.65	.251	12.99
Oe. Arg. 17415-6	17	37.0	+68	26	9.2	.247	13.20
Van Maanen	0	43.9	+ 4	55	12.3	.246	13.25
Gould 32416	23	59.5	−37	51	8.5	.203	15.87
αAquilae	19	45.9	+ 8	36	0.89	.200	16.30
O^2 Erid	4	10.7	− 7	49	4.48	.198	16.5
*70 Oph	18	10.4	+ 2	31	4.28	.192	17.0
Cordoba 32416	23	59.5	−37	51	8.3	.191	17.1
+HR 7703	20	4.6	−36	21	5.34	.190	17.2
* ηCassiop	0	43.0	+57	17	3.64	.184	17.7
Alb. 8164	23	44.0	+ 1	52	8.7	.183	17.8
σDrac	19	32.6	+69	29	4.78	.182	17.9
HR 8832	23	8.5	+56	37	5.65	.177	18.4
* HR 6416	17	11.5	−46	32	5.58	.175	18.6
* A Oph	17	9.2	−26	27	5.29	.174	18.7
* HR 6426	17	12.1	−34	53	5.89	.170	19.2
eErid	3	15.9	−43	27	4.30	.152	21.5
* ξUrs. Maj	11	12.9	+32	6	4.41	.150	21.7
δErid	3	38.5	−10	6	3.72	.142	23.0
* αLyrae	18	33.6	+38	41	0.14	.134	24.3
βHydri	0	20.5	−77	49	2.90	.133	24.5
αPis. Aus	22	52.1	−30	9	1.29	.128	25.5
χDrac	18	22.9	+72	41	3.69	.127	25.7
* ζHerc	16	37.5	+31	47	3.00	.116	28.1
* μHerc	17	42.5	+27	47	3.48	.116	28.1
βLeonis	11	44.0	+15	8	2.23	.109	29.9
αBootis	14	11.1	+19	42	0.24	.105	31.1
βVirg	11	45.5	+ 2	20	3.80	.105	31.1
βCan. Ven	12	29.0	+41	54	4.32	.104	31.4
* 85 Peg	23	56.8	+26	34	5.85	.101	32.3
βGemin	7	39.2	+28	16	1.21	.095	34.3
αTauri	4	30.2	+16	18	1.06	.064	ℰ0.9
* αAurigae	5	9.3	+45	54	0.21	.063	51.8
αLeonis	10	3.0	+12	27	1.34	.045	72.5
αErid	1	34.0	−57	45	0.60	.041	79.5
* Urs. Min	1	22.6	+88	46	2.12	.041	79.5
αCentauri	13	56.8	−59	53	0.86	.027	120.7
αOrionis	5	49.8	+ 7	23	0.92	.022	148.2
αScorp	16	23.3	−26	13	1.22	.019	171.6
αCygni	20	38.0	+44	35	1.33	.012	271.7
αCarinae	6	21.7	−52	38	−0.86	.007	465.7

*Double or multiple star; magnitude of brighter component given.

THE BRIGHTEST STARS

Their Magnitudes, Types, Proper Motions, Distances and Radial Velocities

Prepared by W. E. HARPER

The accompanying table contains the chief known facts regarding 260 stars brighter than apparent magnitude 3.51 as listed in *Harvard Annals*, Volume 50. The position of the star for 1900 is given in the second and third columns. The fourth and fifth columns give the apparent visual magnitude and type taken from the same publication. In a few cases the type is changed to conform with a later determination.

The parallaxes are taken from Schlesinger's Advance Copy of Catalogue of Parallaxes, 1924 Edition, and for such stars the proper motions are copied from the same source. The remaining proper motions were computed using the abbreviated μ_α and μ_δ as they appeared in the HANDBOOK for 1915, wbere this table first appeared, and are not necessarily correct to the third decimal place. Three or four spectroscopic parallaxes have been added to those given in Schlesinger's catalogue. The small letter *s* following the parallax indicates a spectroscopic determination has also been made. The distance is also given in light years in the eighth column as to the lay mind that seems a fitting unit. The absolute magnitude or the magnitude the star would appear to have if it were at a distance of 32.6 light years is given in the ninth column. At that distance the sun would appear as a star of magnitude 5.5. The radial velocities taken from Voûte's list supplemented from our observatory card catalogue is given in the last column. Those starred indicate that the star is a spectroscopic binary for which the velocity of the system is given. Where only the whole number appears the velocity may be regarded as approximate. There are 74 starred out of 235 radial velocities set down or one in three of the bright stars is a spectroscopic binary.

Star	R.A. 1900	Decl. 1900	Mag.	Type	Proper Motion	Parallax	Distance in Light Years	M	Rad. Vel.
	h m	° ′							
α Andromedae	0 3	+28 32	2.2	Aop	.207	.....	.....	.....	−13.0*
β Cassiopeiae	4	+58 36	2.4	F5	.561	.071 s	46	1.7	+12.8
γ Pegasi	8	+14 38	2.9	B2	.010	.....	.....	.....	+ 7. *
β Hydri	20	−77 49	2.9	G0	2.243	.141	23	3.6	+22.2
α Phoenicis	21	−42 51	2.4	K0	.446	.....	.....	.....	+75.8*
δ Andromedae	34	+30 19	3.5	K2	.167	.026 s	125	0.6	− 5. *
α Cassiopeiae	35	+55 59	2.2–2.8	K0	.062	.016 s	204	−1.8	− 3.0
β Ceti	39	−18 32	2.2	K0	.230	.042 s	78	0.3	+13.5
‖γ Cassiopeiae	51	+60 11	2.2	B0p	.031	.036	91	0.0	− 4.7
β Phoenicis	1 2	−47 15	3.4	K0	.042	.....	.....	.....	− 0.6
β Andromedae	4	+35 5	2.4	M0	.219	.045 s	72	0.7	− 2.
δ Cassiopeiae	19	+59 43	2.8	A5	.306	.....	.....	.....	+ 9.
‖α Ursae Minoris	23	+88 46	2.1	F8	.043	.007 s	466	−3.7	−14.8*
γ Phoenicis	24	−43 50	3.4	K5	.222	.....	.....	.....	+26. *
α Eridani	34	−57 44	0.6	B5	.093	.049 s	67	−1.0	
ϵ Cassiopeiae	47	+63 11	3.4	B3	.043	.001 s	3260	−6.6	− 7.4
β Arietis	49	+20 19	2.7	A5	.150	.064 s	51	1.7	− 0.6*
α Hydri	56	−62 3	3.0	F0	.256	.....	.....	.....	− 5.
‖γ Andromedae	58	+41 51	2.3	K0	.073	.007 s	466	−3.5	−10.9
α Arietis	2 2	+22 59	2.2	K2	.242	.033 s	99	−0.2	−14.3
β Trianguli	4	+34 31	3.1	A5	.161	.014	262	−1.2	.....*
o Ceti	14	− 3 26	1.7–9.6	M6e	.239	.062	53	0.7	+63.9
‖θ Eridani	54	−40 42	3.4	A2	.071	.....	.....	.....	+20.
α Ceti	57	+ 3 42	2.8	M1	.080	.011 s	296	−2.0	−25.8
γ Persei	58	+53 7	3.1	Gp	.012	.012 s	272	−1.5	+ 2. *
ρ Persei	59	+38 27	3.4–4.2	M6	.176	.038 s	86	1.3	+28.6
β Persei	3 2	+40 34	0.1–3.2	B8	.011	.....	.....	.....	+ 5. *
α Persei	17	+49 30	1.9	F5	.041	.015 s	217	−2.2	− 2.4
δ Persei	36	+47 28	3.1	B5	.047	.005 s	652	−3.4	+ 0.7
‖η Tauri	41	+23 48	3.0	B5p	.053	.007 s	466	−2.8	+15.
ζ Persei	48	+31 55	2.9	B1	.023	− .003 s	3260 :	−7.1	+21.2
γ Hydri	49	−74 33	3.2	Ma	.128	.....	.....	.....	+16.8
‖ϵ Persei	51	+39 43	3.0	B1	.041	− .012 s	3260 :	−7.0	.....*
γ Eridani	53	−13 47	3.2	K5	.133	.018 s	181	−0.5	+62.2
λ Tauri	55	+12 12	3.3–4.2	B3	.015	− .008	3260 :	−6.7	+13.6*
α Reticuli	4 13	−62 43	3.4	G5	.069	.....	.....	.....	+35.4

Star	R.A. 1900	Decl. 1900	Mag.	Type	Proper Motion	Parallax	Distance in Light Years	M	Rad. Vel.
	h m	° ′							
α Tauri	4 30	+16 18	1.1	K5	.205	.057 s	57	−0.1	+54.5
α Doradus	32	−55 15	3.5	A0p	.003	.....	.....	.....	+26.
π^3 Orionis	44	+ 6 47	3.3	F8	.474	.136 s	24	4.0	+24.7
ι Aurigae	50	+33 0	2.9	K2	.030	.018 s	181	−0.8	+18.5
ε Aurigae	55	+43 41	3.4–4.1	F5p	.015	.002 s	1630	−5.0	− 9. *
η Aurigae	5 0	+41 6	3.3	B3	.082	.014 s	233	−1.0	+ 3.0
ε Leporis	1	−22 30	3.3	K5	.074	.022 s	148	0.0	+ 1.1
β Eridani	3	− 5 13	2.9	A3	.117	.052 s	63	1.5	− 8.
μ Leporis	8	−16 19	3.3	A0p	.053	.....	.....	.....	+28.0
‖α Aurigae	9	+45 54	0.2	G0	.439	.075 s	43	−0.4	+30.2*
‖β Orionis	10	− 8 19	0.3	B8p	.005	.006	543	−5.8	+22.6*
‖η Orionis	19	− 2 29	3.4	B1	.000	.....	.....	.....	+35.5*
γ Orionis	20	+ 6 16	1.7	B2	.019	.019 s	172	−1.9	+19.
β Tauri	20	+28 31	1.8	B8	.180	.024 s	136	−1.3	+11.
β Leporis	24	−20 50	3.0	G0	.095	.004 s	815	−4.0	−13.7
‖δ Orionis	27	− 0 22	2.4	B0	.006	.009 s	362	−2.8	+17.6*
α Leporis	28	−17 54	2.7	F0	.006	.014 s	233	−1.6	+24.6
‖ι Orionis	31	− 5 59	2.9	Oe5	.000	.....	.....	.....	+21.3*
ε Orionis	31	− 1 16	1.8	B0	.004	.005 s	652	−3.7	+26.3
ζ Tauri	32	+21 5	3.0	B3p	.028	− .001 s	3260 :	−7.2	+16.4*
‖ζ Orionis	36	− 2 0	1.8	B0	.012	− .019 s	3260 :	−8.2	+17.9
α Columbae	36	−34 8	2.8	B5p	.040	.....	.....	.....	.....
κ Orionis	43	− 9 42	2.2	B0	.009	.029 s	112	2.5	+19.
β Columbae	47	−35 48	3.2	K0	.397	.....	.....	.....	+89.2
α Orionis	50	+ 7 23	1.0–1.4	M1	.032	.017 s	192	−2.8	+21.3*
β Aurigae	52	+44 56	2.1	A0p	.046	.034 s	96	−0.2	−19. *
‖θ Aurigae	53	+37 12	2.7	A0p	.106	.016 s	204	−1.3	+28.5
η Geminorum	6 9	+22 32	3.2–4.2	M2	.062	.014 s	233	−1.1	+20. *
μ Geminorum	17	+22 34	3.2	M3	.129	.016 s	204	−0.8	+55.2
β Can. Majoris	18	−17 54	2.0	B1	.003	.012 s	272	−2.6	+33. *
α Carinae	22	−52 38	−0.9	F0	.022	.005 s	652	−7.4	+20.2
γ Geminorum	32	+16 29	1.9	A0	.066	.043 s	76	0.1	−12.3*
ν Puppis	35	−43 6	3.2	B8	.020	.....	.....	.....	+26.0*
ε Geminorum	38	+25 14	3.2	G5	.020	.007 s	466	−2.6	+ 9.5
ξ Geminorum	40	+13 0	3.4	F5	.230	.048 s	68	1.8	+26.7
‖α Can. Majoris	41	−16 35	−1.6	A0	1.315	.371 s	9	1.2	− 7.4*
α Pictoris	47	−61 50	3.3	A5	.271	.....	.....	.....	.....
τ Puppis	47	−50 30	2.8	K0	.094	.....	.....	.....	+37. *

Star	R.A. 1900	Decl. 1900	Mag.	Type	Proper Motion	Parallax	Distance in Light Years	M	Rad. Vel.
	h m	° ′							
||ϵ Can. Majoris	6 55	−28 50	1.6	B1	.000	.....	.....	.....	+28.2
ζ Geminorum	58	20 43	3.7–4.3	G0p	.007	.005 s	652	−2.8	+ 6.8*
o^2 Can. Majoris	59	−23 41	3.1	B5p	.000	.....	.....	.....	.....
δ Can. Majoris	7 4	−26 14	2.0	G2p	.005	.010	326	−2.9	+34. *
L ^{2}Puppis	10	−44 29	3.4–6.2	Md	.334	.....	.....	.....	+52.6
π Puppis	14	−36 55	2.7	K5	.012	.....	.....	.....	+16.3
β Can. Minoris	22	+ 8 29	3.1	B8	.063	.020 s	163	−0.4	.....
σ Puppis	26	−43 6	3.3	K5	.192	.....	.....	.....	+87.3
||α_2 Geminorum	28	+32 6	2.0	A0	.201	.077 s	42	1.4	+ 6.2*
α_1 Geminorum	28	+32 6	2.8	A0	.209	.....	.....	.....	− 1.0*
α Can. Minoris	34	+ 5 29	0.5	F5	1.242	.312 s	10	3.0	− 4.3
β Geminorum	39	+28 16	1.2	K0	.623	.101 s	32	1.2	+ 3.6
ξ Puppis	45	−24 37	3.5	G6p	.007	.003 s	1087	−4.2	+ 4.2
ζ Puppis	8 0	−39 43	2.3	Od	.036	.....	.....	.....	.....
ρ Puppis	3	−24 1	2.9	F5	.097	.028 s	116	0.1	+46.
||γ Velorum	6	−47 3	2.2	Oap	.000	.....	.....	.....	.....
||ϵ Carinae	8 20	−59 11	1.7	K0	.032	.....	.....	.....	+11.7
o Urs. Majoris	22	+61 3	3.5	G0	.166	− .004 s	3260 :	−6.5	+20.3
||ϵ Hydrae	41	+ 6 47	3.5	F8	.193	.015 s	217	−0.6	+37.2*
δ Velorum	42	−54 20	2.0	A0	.093	.....	.....	.....	.....
ζ Hydrae	50	+ 6 20	3.3	K0	.101	.014 s	233	−1.0	+23.0
ι Urs. Majoris	52	+48 26	3.1	A5	.500	.070 s	47	2.3	+ 8.
λ Velorum	9 4	−43 2	2.2	K5	.022	.....	.....	.....	+18.8
β Carinae	12	−69 18	1.8	A0	.192	.....	.....	.....	−16.0
ι Carinae	14	−58 51	2.2	F0	.023	.....	.....	.....	+13.1
α Lyncis	15	+34 49	3.3	K5	.214	.002 s	1630	−5.1	+38.5
κ Velorum	19	−54 35	2.6	B3	.017	.....	.....	.....	+21.9*
α Hydrae	23	− 8 14	2.2	K2	.036	.006 s	543	−3.9	− 4.0
θ Urs. Majoris	26	+52 8	3.3	F8p	1.096	.056 s	58	2.0	+15.8
N Velorum	28	−56 36	3.0	K5	.041	.....	.....	.....	−13.9
ϵ Leonis	40	+24 14	3.1	G0p	.045	− .001 s	3260 :	−6.9	+ 5.1
||υ Carinae	45	−64 36	3.1	F0	.062	.....	.....	.....	+13.2
α Leonis	10 3	+12 27	1.3	B8	.244	.058 s	56	0.1	.....
q Carinae	14	−60 50	3.4	K5	.045	.....	.....	.....	+ 9.2
||γ Leonis	14	+20 21	2.3	K0	.347	.004 s	815	−4.7	−36.
μ Urs. Majoris	16	+42 0	3.2	K5	.082	.034 s	96	0.9	−22.

Star	R.A. 1900	Decl. 1900	Type	Mag.	Proper Motion	Parallax	Distance in Light Years	M	Rad. Vel.
	h m	° ′							
θ Carinae	10 39	−63 52	3.0	B0	.063	.....	.....	.....	+16.
η Carinae	41	−59 10	1.0–7.4	Pec	.000	.....	.....	.....	.....
μ Velorum	42	−48 54	2.8	G5	.084	.....	.....	.....	+ 7.1
ν Hydrae	45	−15 40	3.3	K0	.214	.035 s	93	1.0	− 0.7
β Urs. Majoris	56	+56 55	2.4	A0	.089	.047 s	69	0.8	−10.9*
α Urs. Majoris	58	+62 17	2.0	G5	.137	.074 s	44	1.4	− 8.
ψ Urs. Majoris	11 4	+45 2	3.2	K0	.067	.049 s	67	1.6	− 3.4
δ Leonis	9	+21 4	2.6	A3	.208	.078 s	42	2.1	−18.
θ Leonis	9	+15 59	3.4	A0	.103	.019 s	172	−0.2	+ 6.8
λ Centauri	31	−62 28	3.3	B9	.046	.....	.....	.....	+11.
β Leonis	44	+15 8	2.2	A2	.507	.101 s	32	2.2	+ 1.3
γ Urs. Majoris	49	+54 15	2.5	A0	.095	.004 s	815	−4.5	−10.0
δ Centauri	12 3	−50 10	2.9	B3p	.044	.....	.....	.....	.....
ϵ Corvi	5	−22 4	3.2	K0	.063	.025 s	130	0.2	+ 5.2
δ Crucis	10	−58 12	3.1	B3	.051	.....	.....	.....	+25.
δ Urs. Majoris	10	+57 35	3.4	A2	.113	.045 s	72	1.7	−10.7
γ Corvi	11	−16 59	2.8	B8	.159	.....	.....	.....	− 7. *
α Crucis	21	−62 33	1.0	B1	.048	.030	109	−1.6	+19.
$\|\|\delta$ Corvi	25	−15 58	3.1	A0	.249	.010 s	326	−1.9	−53.5
γ Crucis	26	−56 33	1.5	M6	.270	.....	.....	.....	+21.5
β Corvi	29	−22 51	2.8	G5	.061	.028	116	0.0	− 7.4
α Muscae	31	−68 35	2.9	B3	.038	.....	.....	.....	+13.5
γ Centauri	36	−48 24	2.4	A0	.200	.....	.....	.....	− 9.
γ Virginis	36	− 0 54	2.9	F0	.561	.073 s	45	2.2	−20.0
β Muscae	40	−67 34	3.3	B3	.041	.....	.....	.....	+35. *
β Crucis	42	−59 9	1.5	B1	.054	.008 s	408	−4.0	+13.
ϵ Urs. Majoris	50	+56 30	1.7	A0p	.117	.042	78	−0.2	−11.9*
$\|\|\alpha$ Can. Venat.	51	+38 51	2.8	A0p	.233	.015 s	217	−1.3	+ 1.0*
ϵ Virginis	57	+11 30	3.0	K0	.270	.048 s	68	1.4	−13.6
γ Hydrae	13 13	−22 39	3.3	G5	.085	.017 s	192	−0.5	− 5.1
ι Centauri	15	−36 11	2.9	A2	.111	.....	.....	.....	+ 2.0
$\|\|\zeta$ Urs. Majoris	20	+55 27	2.4	A2p	.131	.038 s	86	0.3	− 9.6*
α Virginis	20	−10 38	1.2	B2	.051	.009 s	362	−4.0	+ 1.6*
ζ Virginis	30	− 0 5	3.4	A2	.285	.038	86	1.3	.....
ϵ Centauri	34	−52 57	2.6	B1	.091	.....	.....	.....	+ 6.
η Urs. Majoris	44	+49 49	1.9	B3	.116	− .004 s	3260 :	−8.1	− 6.
μ Centauri	44	−41 59	3.3	B2p	.030	.....	.....	.....	+12.6

Star	R.A. 1900	Decl. 1900	Mag.	Type	Proper Motion	Parallax	Distance in Light Years	M	Rad. Vel.
	h m	° ′							
ζ Centauri	13 49	-46 48	3.1	B2p	.079	.....	.....	.....	.....
η Boötis	50	+18 54	2.8	G0	.370	.098 s	33	2.8	− 0.2*
β Centauri	57	−59 53	0.9	B1	.039	.036	91	−1.3	+12.0*
π Hydrae	14 1	−26 12	3.5	K0	.165	.....	.....	.....	+27.6
θ Centauri	1	−35 53	2.3	K0	.748	.....	.....	.....	+ 1.8
α Boötis	11	+19 42	0.2	K0	2.287	.080 s	41	−0.3	−5 .0
γ Boötis	28	+38 45	3.0	F0	.182	.058 s	56	1.8	−35.
η Centauri	29	−41 43	2.6	B3p	.052	.....	.....	.....	0.
||α Centauri	33	−60 25	0.3	G0	3.682	.758	4	4.7	+22.2
α Circini	34	−64 32	3.4	F0	.312	.....	.....	.....	+ 7.3
α Lupi	35	−46 58	2.9	B2	.036	.....	.....	.....	+ 8. *
||ε Boötis	41	+27 30	2.7	K0	.045	.016 s	204	−1.3	−16.4
||α² Librae	45	−15 38	2.9	K2	.129	.....	.....	.....	−17. *
β Urs. Minoris	51	+74 34	2.2	K5	.028	.011 s	296	−2.6	+17.0
β Lupi	52	−42 44	2.8	B2p	.066	.....	.....	.....	0. *
κ Centauri	53	−41 42	3.4	B3	.037	.....	.....	.....	+10. *
σ Librae	58	−24 53	3.4	M6	.094	.029 s	112	0.7	− 4.2
ζ Lupi	15 5	−51 43	3.5	K0	.132	.....	.....	.....	− 9.2
γT Australis	10	−68 19	3.1	A0	.064	.....	.....	.....	.....
β Librae	12	− 9 1	2.7	B8	.108	.....	.....	.....	−38. *
δ Lupi	15	−40 17	3.4	B2	.032	.....	.....	.....	.....
γ Urs. Minoris	21	+72 11	3.1	A2	.017	.....	.....	.....	− 8.
ι Draconis	23	+59 19	3.5	K0	.010	.034 s	96	1.2	−10.2
γ Lupi	28	−40 50	3.0	B3	.042	.....	.....	.....	.....
α Cor. Borealis	30	+27 3	2.3	A0	.160	.053 s	62	0.9	+ 0.4*
α Serpentis	39	+ 6 44	2.8	K0	.142	.046 s	71	1.1	+ 3.3
βT Australis	46	−63 7	3.0	F0	.440	.....	.....	.....	.....
π Scorpii	53	−25 50	3.0	B2p	.042	.....	.....	.....	*
δ Scorpii	54	−22 20	2.5	B0	.042	.....	.....	.....	*
||β Scorpii	16 0	−19 32	2.8	B1	.041	.....	.....	.....	− 9.5*
δ Ophiuchi	9	− 3 26	3.0	K8	.159	.040 s	82	1.0	−19.0
ε Ophiuchi	13	− 4 27	3.3	K0	.088	.046 s	71	1.6	− 9.2
||σ Scorpii	15	−25 21	3.1	B1	.033	.....	.....	.....	+ 2.0*
||η Draconis	23	+61 44	2.9	G5	.062	.042 s	78	1.0	−13.9
||α Scorpii	23	−26 12	1.2	M2p	.032	.026 s	126	−1.7	− 3.1*
β Herculis	26	+21 42	2.8	K0	.104	.030 s	109	0.2	−25.5*
τ Scorpii	30	−28 1	2.9	B0	.042	.....	.....	.....	+ 1.5

Star	R.A. 1900	Decl. 1900	Mag.	Type	Proper Motion	Parallax	Distance in Light Years	M	Rad. Vel.
	h m	° ′							
ζ Ophiuchi	16 32	−10 22	2.7	B0	.024	.....	.....	.....	−15.0
‖ζ Herculis	38	+31 47	3.0	G0	.601	.111 s	29	3.2	−70. *
α T Australis	38	−68 51	1.9	K2	.034	.....	.....	.....	− 3.7
ε Scorpii	44	−34 7	2.4	K0	.668	.....	.....	.....	− 2.0
μ^1 Scorpii	45	−37 53	3.1	B3p	.032	.....	.....	.....	.....
ζ Arae	50	−55 50	3.1	Ma	.047	.....	.....	.....	− 6.1
κ Ophiuchi	53	+ 9 32	3.4	K0	.296	.208 s	116	0.6	−55.3
‖η Ophiuchi	17 5	−15 36	2.6	A0	.094	.....	.....	.....	− 1.1
η Scorpii	5	−43 6	3.4	F2	.291	.....	.....	.....	−28.
ζ Draconis	8	+65 50	3.2	B5	.023	.019 s	172	−0.4	−14.6
‖α Herculis	10	+14 30	3.1–3.9	M7	.030	− .002 s	3260 :	−6.9	−32.4
δ Herculis	11	+24 57	3.2	A2	.164	.029 s	112	0.5	−42. *
π Herculis	12	+36 55	3.4	K2	.021	.019 s	172	−0.2	−25.1
θ Ophiuchi	16	−24 54	3.4	B3	.030	.....	.....	.....	− 0.9
β Arae	17	−55 26	2.8	K2	.035	.....	.....	.....	− 1.0
υ Scorpii	24	−37 13	2.8	B3	.040	.....	.....	.....	.....
α Arae	24	−49 48	3.0	B3p	.085	.....	.....	.....	.....
λ Scorpii	27	−37 2	1.7	B2	.040	.....	.....	.....	− 1. *
β Draconis	28	+52 23	3.0	G0	.012	.004 s	815	−4.0	−19.7
θ Scorpii	30	−42 56	2.0	F0	.010	.....	.....	.....	+ 5.
α Ophiuchi	30	+12 38	2.1	A5	.264	.049 s	67	0.5	.....
κ Scorpii	36	−38 58	2.5	B2	.032	.....	.....	.....	.....
β Ophiucni	39	+ 4 37	2.9	K0	.157	.024 s	136	−0.2	−11.5
ι^1 Scorpii	41	−40 5	3.1	F5p	.000	.....	.....	.....	−27.8
‖μ Herculis	43	+27 47	3.5	G5	.817	.111 s	29	3.7	−15.7
G Scorpii	43	−37 1	3.2	K2	.062	.....	.....	.....	+24.7
ν Ophiuchi	54	− 9 46	3.5	K0	.118	.026 s	126	0.6	+12.6
γ Draconis	54	+51 30	2.4	K5	.026	.017 s	192	−1.4	−27.0
γ Sagittarii	59	−30 26	3.1	K0	.206	.....	.....	.....	+22. *
η Sagittarii	18 11	−36 48	3.2	M6	.223	.....	.....	.....	0.0
δ Sagittarii	15	−29 52	2.8	K0	.042	.....	.....	.....	−20.2
η Serpentis	16	− 2 55	3.4	K0	.898	.065 s	50	2.5	+ 9.5
ε Sagittarii	18	−34 26	2.0	A0	.139	.....	.....	.....	−11.0
λ Sagittarii	22	−25 29	2.9	K0	.197	.....	.....	.....	−43.2
‖α Lyrae	34	+38 41	0.1	A0	.348	.124 s	26	0.6	−13.8
φ Sagittarii	39	−27 6	3.3	B8	.053	.....	.....	.....	+26. *
‖β Lyrae	46	+33 15	3.4–4.1	B2p	.011	− .014 s	3260 :	−6.6	*
σ Sagittarii	49	−26 25	2.1	B3	.081	.....	.....	.....	− 1.

Star	R.A. 1900	Decl. 1900	Mag.	Type	Proper Motion	Parallax	Distance in Light Years	M	Rad. Vel.
	h m	° ′							
γ Lyrae	18 55	+32 33	3.3	A0	.010	.....	.....	.....	−20. *
||ζ Sagittarii	56	−30 1	2.7	A2	.026	.....	.....	.....	+22.
τ Sagittarii	19 1	−27 49	3.4	K0	.265	.....	.....	.....	+42. *
ζ Aquilae	1	+13 43	3.0	A0	.103	.040 s	82	1.0	−38.6
π Sagittarii	4	−21 11	3.0	F2	.041	.016 s	204	−1.0	−10.3
δ Draconis	13	+67 29	3.2	K0	.135	.038 s	86	1.1	+25.1
δ Aquilae	21	+ 2 55	3.4	F0	.267	.057 s	57	2.2	−32. *
||β Cygni	27	+27 45	3.2	K0p	.010	.003 s	1087	−4.4	−23. *
γ Aquilae	42	+10 22	2.8	K2	.018	.018 s	181	−0.9	− 2.1
||δ Cygni	42	+44 53	3.0	A0	.067	.038 s	86	0.9	−37.
α Aquilae	46	+ 8 36	0.9	A5	.659	.204 s	16	2.4	−33.
θ Aquilae	20 6	− 1 7	3.4	A0	.035	.015 s	217	−0.7	−29.2*
||β Capricorni	15	−15 6	3.2	G0p	.042	.005 s	652	−3.3	−18.8*
α Pavonis	18	−57 3	2.1	B3	.090	.....	.....	.....	+ 2.0*
γ Cygni	19	+39 56	2.3	F8p	.006	− .002 s	3260 :	−7.7	− 5.6
α Indi	31	−47 38	3.2	K0	.072	.....	.....	.....	− 0.8
α Cygni	38	+44 55	1.3	A2p	.004	.005	652	−5.2	− 4.
ε Cygni	42	+33 36	2.6	K0	.485	.041 s	80	0.7	−10. *
ζ Cygni	21 9	+29 49	3.4	K0	.061	.024 s	136	0.3	+17. *
α Cephei	16	+62 10	2.6	A5	.163	.083 s	39	2.2	−30.7
α Aquarii	26	− 6 1	3.1	G0	.020	− .003 s	3260 :	−6.9	+ 6.4
β Cephei	27	+70 7	3.3	B1	.013	.007 s	466	−2.5	−14.1*
ε Pegasi	39	+ 9 25	2.5	K0	.028	.002 s	1630	−5.9	+ 5.3
δ Capricorni	42	−16 35	3.0	A5	.395	.114 s	29	3.3	*
γ Gruis	48	−37 50	3.2	A0	.108	.....	.....	.....	− 3.
α Aquarii	22 1	− 0 48	3.2	G0	.009	.009 s	362	−2.0	+ 7.1
α Gruis	2	−47 27	2.2	B5	.200				
α Tucanae	12	−60 45	2.9	K2	.085	.....	.....	.....	+41.
β Gruis	37	−47 24	2.2	M6	.122	.....	.....	.....	+ 1.2
η Pegasi	38	+29 42	3.1	G0	.039	− .001 s	3260 :	−6.9	+ 4.3*
αP Australis	52	−30 9	1.3	A3	.367	.137	24	2.0	+ 6.7
β Pegasi	59	+27 32	2.6	M3	.235	.016 s	204	−1.4	+ 8.6
α Pegasi	59	+14 40	2.6	A0	.077	.038 s	86	0.5	+ 4. *
γ Cephei	23 35	+77 4	3.4	K1	.167	.069 s	47	2.6	−41.6

GEOGRAPHICAL POSITIONS OF SOME POINTS IN CANADA

Name	Latitude N.			Longitude W.			Feet above Sea Level
	°	′	″	°	′	″	
Banff, Alta	51	10		115	35		4542
Barrie, Ont	44	23		79	41		839
Battleford, Sask	52	41		108	20		1620
Brandon, Man	49	51		99	57		1176
Calgary, Alta	51	02	39.21	7	36	15.1	3428
Charlottetown, P.E.I	46	14		63	10		38
Collingwood, Ont	44	30		80	15		595
Edmonton, Alta	53	31	58.81	113	30	27.0	2188
Father Point, Que	48	31		68	19		20
Fort Churchill	58	51		94	11		....
Fort Simpson	61	52		121	43		....
Fredericton, N.B	45	57		66	36		164
Golden, B.C	51	16		116	55		2550
Gravenhurst, Ont	44	54		79	20		770
Guelph, Ont	43	32	43.7	80	15	09.0	1063
Halifax, N.S	44	39		63	36		97
Hamilton, Ont	43	16		79	54		303
Herschel Is	69	30		139	15		....
Kingston, Ont	44	13		76	29		285
London, Ont	42	59		81	13		808
Medicine Hat	50	1		110	37		2161
Moncton, N.B	46	9		64	45		50
Montreal Que	45	30	17.0	73	34	39.45	187
New Westminster, B.C	49	13		122	54		330
No. West River, Ungava	53	31	31.45	60	10	17.85	....
Ottawa, Ont	45	23	38	75	42	58.20	273.4
Owen Sound, Ont	44	33	56.42	80	56	40.5	585
Peterborough, Ont	44	17		78	19		722
Portage la Prairie, Man	49	58		98	17		830
Port Simpson, B.C	54	34		130	26		26
Prince Albert, Sask	53	10		106	0		1432
Quebec, Que	46	48		71	13		296
Regina, Sask	50	27		104	37		1885
Revelstoke, B.C	51	00	11.25	7	52	49.8	1503
Rose Point, Ont	45	19	00.73	80	02	28.5	602
St. Catharines, Ont	43	10		79	17		347
St. John, N.B	45	17		66	4		70
St. Johns, Nfd	47	34		52	42		125
Stratford, Ont	43	23		81	00		1191
Toronto, Ont	43	39	35.9	79	23	39.75	350
Vancouver, B.C	49	17	48.0	123	07	05.52	11
Victoria, B.C	48	25	31.38	123	21	42.0	55
Windsor, Ont	42	20		83	4		625
Winnipeg, Man	49	53	51.53	97	08	28.53	751
York Factory	57	00		92	28		55

In above table the longitudes of Calgary and Revelstoke are in h. m. s. In arc the values are 105° 12′ 46″.5 and 105° 25′ 27″ respectively.

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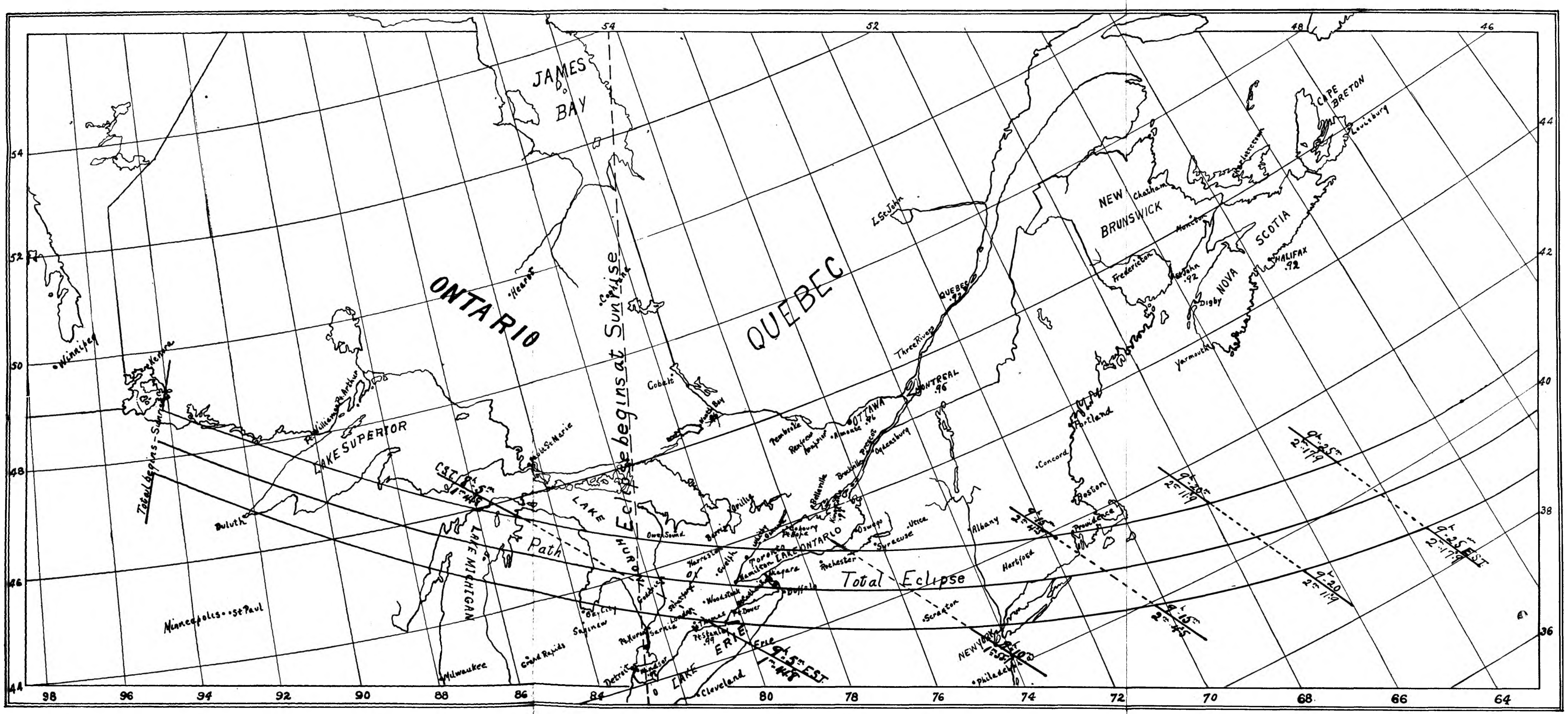
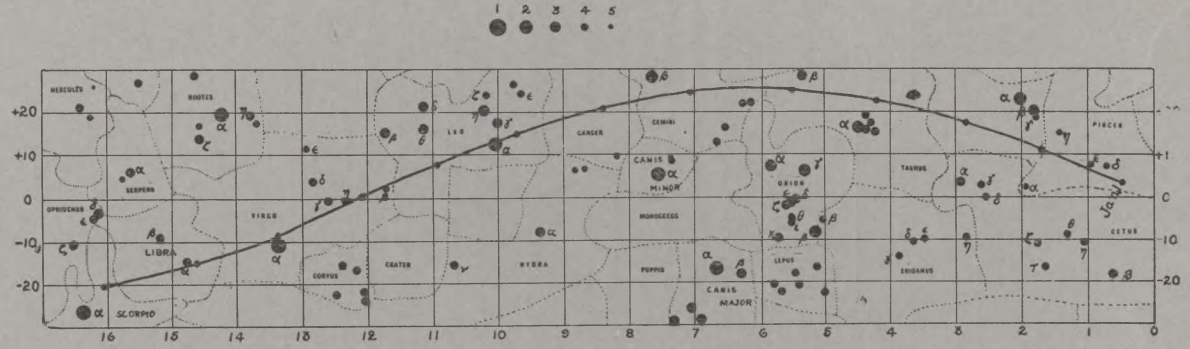


Map showing that portion of the path of totality of the total eclipse of the sun of January 24, 1925, which is on the continent of North America—(*By R. M. Motherwell*)



Path of Mars among the Stars during 1925. The black dots on the path of the planet show the planet's position at the beginning of each month.

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

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