

THE
OBSERVER'S HANDBOOK
FOR 1918

Published By

The Royal Astronomical
Society of Canada

EDITED BY C. A. CHANT



TENTH YEAR OF PUBLICATION

TORONTO
198 COLLEGE STREET
PRINTED FOR THE SOCIETY
1918

CALENDAR 1918

JANUARY

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

FEBRUARY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

MARCH

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

APRIL

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MAY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

JUNE

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

JULY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

AUGUST

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

OCTOBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

NOVEMBER

S	M	T	W	T	F	S
				1	2	
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

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PREFACE

In order to lower the expense of publication the HANDBOOK for this year has been reduced to its present size. This reduction has been accomplished by omitting those portions which are not much altered from year to year. They include the following :—

- Symbols and abbreviations.
- Explanation of Solar and Sidereal Time.
- Times of Sunrise and Sunset.
- Meteors and Shooting Stars.
- Elements and Satellites of the Solar System.
- List of Double and Variable Stars.
- The Stars, their magnitude, velocity, etc.
- Maps and descriptions of the constellations.

These have been given in volumes for the past years and any new member desiring a copy containing them may obtain one by addressing the Librarian, 198 College St., Toronto.

The table for Physical Observations of the sun may be consulted in the *British Nautical Almanac* or the *American Ephemeris*.

The four star maps inserted are similar to those used in elementary classes at the University of Toronto.

The Editor owes his best thanks to Mr. J. P. Henderson, his assistant in astronomy at the University of Toronto, for relieving him of the preparation of the major part of the volume.

THE EDITOR.

TORONTO, December, 1917.

ANNIVERSARIES AND FESTIVALS, 1918

New Year's Day Tues., Jan. 1	Victoria Day Fri., May 24
Epiphany Sun., Jan. 6	Trinity Sunday May 26
Septuagesima Sunday Jan. 27	Corpus Christi. Thur., May 30
Quinquagesima (Shrove Sunday) Feb. 10	St. John Baptist Mon., June 24
Ash Wednesday Feb. 13	Dominion Day Mon., July 1
St. David. Fri., Mch. 1	Labor Day. Mon., Sept. 2
St. Patrick Sun., Mch. 17	St. Michael (Michaelmas Day)
Palm Sunday Mch. 24	Sun., Sept. 29
Good Friday Mch. 29	All Saints Day. Fri., Nov. 1
Easter Sunday Mch. 31	St. Andrew. Sat., Nov. 30
St. George Tues., Apr. 23	First Sunday in Advent. Dec. 1
Rogation Sunday May 5	Conception Day Sun., Dec. 8
Ascension Day (Holy Thursday) May 9	St. Thomas Day Sat., Dec. 21
Pentecost (Whit Sunday) May 19	Christmas Day Wed., Dec. 25

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.

OCCULTATION OF STARS BY THE MOON, 1918

PREPARED BY R. M. MOTHERWELL

The following predictions were prepared for Ottawa by the graphic method of W. F. Rigge and include all stars down to magnitude 4.5. Observers should bear in mind that the predictions were made only for Ottawa and that the times will vary according to the latitude and longitude of the observer.

It will be noticed that some occultations occurring in the day-time are given, the observation of which may prove interesting. Attention is also directed to the fact that the hours are numbered astronomically, that is, beginning at noon.

Date	Star	Mag.	*Immersion		*Emersion		Position Angle	
			h	m	h	m	Immer.	Emer.
1918			h	m	h	m	°	′
January	9-10 θ Ophiuchi	3.4	23	18.3	0	28.5	68	280
January	23 ι Geminorum	4.3	12	10.2	13	22.7	73	286
March	17 υ Tauri	4.2	7	25.2	8	20.2	130	231
March	19 η Geminorum	3.2	2	44.9	3	59.4	96	268
March	19 μ Geminorum	3.2	7	53.8	8	26.3	37	350
March	20 ζ Geminorum	3.7			1	18.6		259
April	13 α Tauri	4.5	8	27.8			97	
May	26 β Ophiuchi	4.3	13	49.1	15	9.6	82	267
July	20 β Ophiuchi	4.3			6	8.0		249
August	18 π Sagittarii	3.0	11	53.9	13	2.9	68	252
November	8 ξ Sagittarii	3.7	5	42.5	6	43.0	109	218
December	20 α Cancri	4.3	11	24.0	12	20.0	148	252

*Eastern Standard Astronomical Time (Hours numbered from noon).

1918, EPHEMERIS OF SUN. AT GREENWICH MEAN NOON.

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 44 45	+ 3 26.2	S 23 3 5	May	1 2 31 30	- 2 55.3	N 14 54 43
"	4 18 57 58	4 50.2	22 46 52	"	4 2 42 58	3 16.2	15 48 27
"	7 19 11 8	6 10.6	22 26 34	"	7 2 54 32	3 31.9	16 39 50
"	10 19 24 14	7 27.0	22 2 17	"	10 3 6 12	3 42.5	17 28 44
"	13 19 37 15	8 38.4	21 34 7	"	13 3 17 56	3 47.8	18 15 0
"	16 19 50 11	9 44.1	21 2 12	"	16 3 29 45	3 48.1	18 58 30
"	19 20 3 0	10 43.5	20 26 41	"	19 3 41 40	3 43.5	19 39 7
"	22 20 15 42	11 36.1	19 47 42	"	22 3 53 39	3 34.0	20 16 44
"	25 20 28 18	12 21.7	19 5 26	"	25 4 5 42	3 19.8	20 51 13
"	28 20 40 46	13 0.1	18 20 0	"	28 4 17 51	3 1.2	21 22 29
"	31 20 53 6	13 31.2	17 31 37	"	31 4 30 3	2 38.2	21 50 25
Feb.	3 21 5 20	13 55.1	16 40 24	June	3 4 42 20	2 11.3	22 14 58
"	6 21 17 26	14 11.7	15 46 35	"	6 4 54 40	1 40.8	22 36 0
"	9 21 29 25	14 21.2	14 50 18	"	9 5 7 3	1 7.2	22 53 29
"	12 21 41 18	14 23.7	13 51 47	"	12 5 19 29	- 0 31.4	23 7 21
"	15 21 53 3	14 19.3	12 51 13	"	15 5 31 56	+ 0 6.1	23 17 33
"	18 22 4 41	14 8.2	11 48 49	"	18 5 44 24	0 44.6	23 24 3
"	21 22 16 13	13 50.6	10 44 44	"	21 5 56 53	1 23.6	23 26 50
"	24 22 27 40	13 27.1	9 39 10	"	24 6 9 21	2 2.3	23 25 55
"	27 22 39 0	12 58.0	8 32 18	"	27 6 21 49	2 40.2	23 21 17
				"	30 6 34 15	3 17.0	23 12 57
Mar.	2 22 50 16	12 24.1	7 24 18	July	3 6 46 40	3 52.0	23 0 57
"	5 23 1 27	11 45.7	6 15 19	"	6 6 59 2	4 24.5	22 45 20
"	8 23 12 35	11 3.5	5 5 33	"	9 7 11 21	4 54.1	22 26 9
"	11 23 23 39	10 18.0	3 55 11	"	12 7 23 37	5 20.0	22 3 29
"	14 23 34 40	9 29.6	2 44 22	"	15 7 35 48	5 41.7	21 37 25
"	17 23 45 39	8 38.8	1 33 18	"	18 7 47 55	5 58.9	21 8 2
"	20 23 56 36	7 46.0	0 22 10	"	21 7 59 57	6 11.1	20 35 27
"	23 0 7 31	6 51.7	N 0 48 54	"	24 8 11 54	6 18.3	19 59 45
"	26 0 18 26	5 56.6	1 59 43	"	27 8 23 46	6 20.2	19 21 3
"	29 0 29 20	5 1.3	3 10 8	"	30 8 35 32	6 16.9	18 39 27
Apr.	1 0 40 15	4 6.4	4 20 1	Aug.	2 8 47 13	6 8.3	17 55 5
"	4 0 51 10	3 12.4	5 29 12	"	5 8 58 49	5 54.5	17 8 4
"	7 1 2 8	2 20.1	6 37 32	"	8 9 10 19	5 35.3	16 18 33
"	10 1 13 7	1 29.8	7 44 52	"	11 9 21 44	5 10.7	15 26 40
"	13 1 24 9	0 41.8	8 51 2	"	14 9 33 4	4 40.9	14 32 35
"	16 1 35 13	0 3.4	9 55 51	"	17 9 44 19	4 6.1	13 36 26
"	19 1 46 21	0 45.5	10 59 11	"	20 9 55 29	3 26.5	12 38 20
"	22 1 57 32	1 24.2	12 0 52	"	23 10 6 35	2 42.4	11 38 26
"	25 2 8 47	1 58.9	13 0 47	"	26 10 17 37	1 54.5	10 36 53
"	28 2 20 6	2 29.4	N 13 58 47	"	29 10 28 35	+ 1 3.0	N 9 33 47

1918, EPHEMERIS OF SUN. AT GREENWICH MEAN NOON.

Date	R.A.	Equation of Time	Declination	Date	R.A.	Equation of Time	Declination
Sept.	h m s	m s	° ' "	Nov.	h m s	m s	° ' "
"	1 10 39 30	+ 0 8.6	N 8 29 18	"	3 14 31 23	- 16 21.1	S 14 54 10
"	4 10 50 22	- 0 48.5	7 23 35	"	6 14 43 16	16 18.1	15 49 44
"	7 11 1 13	1 47.9	6 16 47	"	9 14 55 16	16 7.8	15 42 55
"	10 11 12 1	2 49.2	5 9 4	"	12 15 7 23	15 49.9	17 33 33
"	13 11 22 48	3 51.8	4 0 34	"	15 15 19 38	15 24.7	18 21 27
"	16 11 33 34	4 55.4	2 51 27	"	18 15 32 1	14 51.9	19 6 26
"	19 11 44 20	5 59.4	1 41 51	"	21 15 44 40	14 11.7	19 48 21
"	22 11 55 6	7 3.2	0 31 54	"	24 15 57 8	13 24.1	20 27 2
"	25 12 5 53	8 6.0	S 0 38 14	"	27 16 9 52	12 29.4	21 2 19
"	28 12 16 41	9 7.3	1 48 25	"	30 16 22 43	11 27.9	21 34 2
Oct.	h m s	m s	° ' "	Dec.	h m s	m s	° ' "
"	1 12 27 31	10 6.5	2 58 30	"	3 16 35 41	10 20.3	22 2 4
"	4 12 38 25	11 3.1	4 8 19	"	6 16 48 43	9 7.1	22 26 16
"	7 12 49 21	11 56.6	5 17 41	"	9 17 1 51	7 49.2	22 46 33
"	10 13 0 20	12 46.6	6 26 26	"	12 17 15 2	6 27.4	23 2 47
"	13 13 11 24	13 32.6	7 34 24	"	15 17 28 17	5 2.5	23 14 55
"	16 13 22 32	14 14.2	8 41 26	"	18 17 41 34	3 35.2	23 22 53
"	19 13 33 45	14 50.8	9 47 20	"	21 17 54 53	2 6.4	23 26 38
"	22 13 45 4	15 21.9	10 51 57	"	24 18 8 12	0 36.8	23 26 9
"	25 13 56 28	15 46.8	11 55 8	"	27 18 21 31	+ 0 52.7	23 21 25
"	28 14 8 0	16 5.2	12 56 41	"	30 18 34 49	+ 2 21.2	S 23 12 27
"	31 14 19 38	- 16 16.7	S 13 56 26				

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 that the watch is faster than the sun, - that it is slower; to obtain Local Mean Time, in the former case add the equation of time to, in the latter case subtract it from, apparent or sun-dial time.

THE SKY FOR JANUARY

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	18h 15m	21h 57m	12h 8m	3h 59m	9h 0m	21h 39m	8h 33m
Decl.	20° 36' S.	9° 35' S.	2° 24' N.	19° 48' N.	17° 54' N.	14° 49' S.	18° 37' N.
Transit	10:38	14:20	4:33	20:21	1:26	14:02	0:59

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—During January the Sun's R.A. increases from 18h 45m to 20h 53m and its Decl. changes from 23° 3' to 17° 32' S. The equation of time (see page 4) increases from 3m 26s to 13m 31s, and on account of this rapid rise in value the time of mean moon appears to remain, for the first ten days, at the same distance from the time of sunrise, i.e., the forenoons as indicated by our clocks are of the same length (see page 4). The earth is nearest the sun on the 1st at 11 a.m. E.S.T.

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

On the 10th the moon occults θ Ophiuchi, and on the 24th ι Geminorum, (see p. 3).

Mercury is in inferior conjunction with the sun on the 3rd and therefore will be moving westward in the sky from the sun and will become a morning star. Its greatest distance from the sun will occur on the 25th, when it will be 25° west. It is not high in the sky and is about 20° south of the sunrise point. At this elongation one can hardly expect to see it except with field glasses over a clear horizon.

Venus is well placed for observation as an evening star during the first half of the month. It is at greatest brilliancy on the 5th, when its stellar magnitude is -4.4 or 13 times as bright as Sirius, our brightest fixed star. In a small telescope it should be easily seen to be crescent shaped. Toward the middle of the month it starts approaching the sun in the sky very rapidly.

Mars on the 15th is 93 million miles from the earth. It is in the constellation Virgo and rises a little before midnight and is visible the rest of the night. Stellar magnitude $+3$ or about as bright as Arcturus.

Jupiter is about 45° up from the eastern horizon at sunset on the 15th and is a bright object nearly all night, stellar magnitude -2.2 . It is far north of the equator and is very suitable for observation in our latitude at this time. For the configuration of its satellites, see next page; for their eclipses, etc., see page 30.

Saturn on the 15th rises about 1½ hours after sunset and is visible the rest of the night. It is in opposition on the 31st (see opposite page). Its stellar magnitude is 0 and increasing slightly on this date. The rings appear at considerable inclination and we are looking at their southern surface. Almost any telescope should show the saucer-shaped appearance of the planet, or even the rings quite plainly.

The positions of *Uranus* and *Neptune* are given in the above table and their location with reference to the stars can be found by referring to a star map. Neptune is in opposition to the sun on the 26th and also in conjunction with the full moon (see opposite page).

For the minima of Algol, see next page.

JANUARY
ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

		Minima of Algol	Configuration of Jupiter's Satellites at 22h 30m
		h m	
Tues.	1 0h ♀ in ☉; 11h ⊕ in Perihelion.		20413
Wed.	2	11 59	41302
Thur.	3 4h ♂ ♀ ☿ Inferior.		43012
Fri.	4 5h 12m ♂ ♂ ☾, ♂ 8° 46' N.		43210
☾Sat.	5 2h ♀ Greatest Brilliancy; 6h 49m·6 Moon's Last	8 48	43201
Sun.	6		41032
Mon.	7		40123
Tues.	8	5 37	4203●
Wed.	9 7h ♀ Greatest Hel. Lat. N.		21041●
Thur.	10		30412
Fri.	11 11h 8m ♂ ♀ ☾, ♀ 3° 0' N.	2 26	31204
☿Sat.	12 17h 35m·8 New Moon.		32014
Sun.	13	23 15	10324
Mon.	14 1h ♀ Stationary; 21h 42m ♂ ♂ ☾, ♂ 5° 7' S.		01234
Tues.	15 5h 42m ♂ ♀ ☾, ♀ 1° 47' S.		2034●
Wed.	16	20 3	1034●
Thur.	17		30142
Fri.	18 0h ♀ Stationary.		31240
☾Sat.	19 9h 37m·9 Moon's First Quarter.	16 52	43201
Sun.	20		41032
Mon.	21 20h 49m ♂ ♃ ☾, ♃ 3° 19' S.		40123
Tues.	22	13 41	42103
Wed.	23		214203
Thur.	24		43012
Fri.	25 13h ♀ Greatest Elong. W. 24° 42'.	10 30	34120
☿Sat.	26 6h ♂ ♃ ☿; 14h ♃ Stationary; 22h 14m·2 Full Moon; 22h 18m ♂ ♃ ☾, ♃ 2° 55' N.		32401
Sun.	27 10h 36m ♂ ♃ ☾, ♃ 4° 28' N.		10324
Mon.	28	7 19	01234
Tues.	29 22h ♂ in Aphelion.		21034
Wed.	30		20134
Thur.	31 13h ♂ ♃ ☿; 23h 3m ♂ ♂ ☾, ♂ 9° 19' N.	4 8	3024●

Key to Symbols.—♄ Conjunction; ♀ Opposition; ☐ Quadrature; ☉ Ascending Node; ☊ Descending Node; ☼ Sun; ☿ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♄ Saturn; ♅ Uranus; ♆ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR FEBRUARY

POSITION OF PLANETS ON THE 15TH.

	♿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	20h 41m	21h 9m	12h 14m	4h 1m	8h 50m	21h 46m	8h 30m
Decl.	19° 54' S.	7° 37' S.	2° 32' N.	20° 0' N.	18° 38' N.	14° 14' S.	18° 50' N.
Transit	11·03	11·30	2·37	18·21	23·10	12·07	22·49

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—During February the sun's R.A. increases from 20h 57m to 22h 43m and its Decl. changes from 17° 15' to 8° 10' S. The equation of time reaches a maximum value 14m 24s on the 12th (see page 4).

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

Mercury after the first few days of the month is too close to the sun for convenient observation. It is in aphelion on the 12th, see next page.

Venus reaches inferior conjunction on the 9th and is not well placed for observation till the latter part of the month, when it becomes a morning star, but quite low in the sky.

Mars on the 15th is 71 million miles from the earth. It is stationary on the 4th and after that starts to retrograde or move from E to W in the sky. It is a prominent object from about 9 o'clock (sun time) on for the rest of the night.

Jupiter is 90° E. of the sun on the 21st. It is visible a little more than the first half of the night and is quite high in the sky. The configurations of its satellites are given on the page opposite and their eclipses, etc., on page 30.

Saturn is visible all night, rising about 1½ hours before sunset on the 15th and setting just before sunrise. It is well situated in the sky and with its wonderful ring system presents a beautiful sight.

The positions of *Uranus* and *Neptune* are given in the above table and can be located among the stars by reference to a star map. Uranus is in conjunction with the sun on the 13th.

The minima of Algol are given on the next page.

FEBRUARY
ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

		Minima of Algol	Configuration of Jupiter's Satel- lites at 2 h 45m	
		h	m	
Fri.	1	0h	♂ ♀ ☽, ♀ 7° 48' N.; 18h ♀ in ☿.	243104
Sat.	2			32014
Sun.	3	15h	♀ in Perihelion.	0 57 13024
☾ Mon.	4	2h 52m	☾ Moon's Last Quarter; 13h ♂ Stationary.	40123
Tues.	5			21 46 42103
Wed.	6			42013
Thur.	7			43102
Fri.	8			18 35 43102
Sat.	9	18h 1m	♂ ♀ ☾ ☿, ♀ 3° 39' S.; 21h ♂ ♀ ☾ Inferior	43201
Sun.	10	23h 32m	♂ ♀ ☾, ♀ 4° 38' N.	4130●
☾ Mon.	11	5h 4m	☾ New Moon; 10h 32m ♂ ☽ ☿, ☽ 5° 10' S.	15 24 40123
Tues.	12	0h	♀ in Aphelion.	12043
Wed.	13	0h	♂ ☽ ☾.	20134
Thur.	14			12 13 13024
Fri.	15			243024
Sat.	16			3204●
☾ Sun.	17	19h 56m	☾ Moon's First Quarter.	9 23104●
Mon.	18	3h 44m	♂ ♀ ☾ ☿, ♀ 10° 40' S.	01324
Tues.	19			12043
Wed.	20			5 51 20413
Thur.	21	21h	♂ ☽ ☾.	244102
Fri.	22			43012
Sat.	23	3h 5m	♂ ♀ ☾ ☿, ♀ 2° 55' N.; 12h 36m ♂ ♀ ☾ ☿, ♀ 4° 22' N.	2 40 4320●
Sun.	24			43120
☾ Mon.	25	12h	♀ Greatest Hel. Lat. N.; 13h ♂ ♀ ☽, ♀ 1° [31' S.; 16h 34m	23 29 40132
Tues.	26		☾ Full Moon.	41203
Wed.	27	22h 28m	♂ ☽ ☾, ♂ 9° 41' N.	42013
Thur.	28			20 17 41032

Key to Symbols.—♂ Conjunction; ♀ Opposition; □ Quadrature; ☿ Ascending Node; ☾ Descending Node; ☾ Sun; ♀ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♀ Jupiter; ♀ Saturn; ☽ Uranus; ♀ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♀ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR MARCH

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	23h 49m	21h 7m	11h 43m	4h 13m	8h 43m	21h 52m	8h 27m
Decl.	2° 36' S.	11° 7' S.	5° 57' N.	20° 39' N.	19° 7' N.	13° 43' S.	18° 59' N.
Transit	12:20	9:38	0:17	16:43	21:13	10:23	20:57

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—On March 1st the sun's R.A. is 22h 47m and its Decl. is 7° 47' S. It reaches the equator on the 21st (see opposite page), and on the 31st its R.A. is 0h 37m, its Decl. 3° 57' N. During the month the equation of time decreases from 12m 36s to 4m 25s (see page 4).

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

On the 17th the moon occults ν Tauri, on the 19th η and μ Geminorum, and on the 20th ζ Geminorum (see p. 3).

Mercury is in conjunction with the sun on the 15th and is unsuitably placed for observation during the month.

Venus improves in both position and magnitude for observation as a morning star and attains greatest brilliancy on the 16th, when its stellar magnitude is -4.3 . It is rather far south while the sun is crossing the equator going northward, and hence is not very high above the horizon in our latitude. Its crescent moon-like shape should be easily observed with a small telescope.

Mars on the 15th is 62 million miles from the earth, or about two-thirds as far as we are from the sun. Although in opposition on that date, it is not nearest the earth till the 18th, because of the direction toward each other at this time of the elliptical orbits of the earth and Mars which bring them closer together even after opposition. Its stellar magnitude is, of course, at its greatest, -1.1 at this time. It is visible all night.

Jupiter is still high in the sky and a prominent star, setting about midnight. Stellar magnitude -1.8 on the 15th, a little brighter than Sirius. For the configuration of its satellites, see next page; for their eclipses, etc., page 30.

Saturn is about $3\frac{1}{2}$ hours E. of the meridian at sunset on the 15th. It is still retrograding and is still well placed for observation most of the night.

The positions of *Uranus* and *Neptune* are given in the above table. See note for January.

The minima of Algol are given on the next page.

MARCH		Minima of Algol	Configuration of Jupiter's Satellites 21h 15m
ASTRONOMICAL PHENOMENA			
(75th Meridian Time, Hours Numbering from Midnight)			
		h	m
Fri.	1 11h ♀ Stationary.		30412
Sat.	2		32104
Sun.	3	17	6 243204
Mon.	4 8h ♀ Greatest Hel. Lat. S.		0124●
☾Tues.	5 19h 43m·6 Moon's Last Quarter.		241034
Wed.	6	13	55 20134
Thur.	7		10234
Fri.	8		30124
Sat.	9	10	44 32104
Sun.	10 2h 5m ♂ ♀ ☾, ♀ 2° 38' N.		34201
Mon.	11 0h 23m ♂ ♄ ☾, ♄ 5° 19' S.		402●●
☉Tues.	12 14h 52m·4 New Moon; 19h 27m ♂ ♃ ☾, ♃ 7° 8' S.;	7	33 41023
Wed.	13 [21h ♂ ♃ ☉ Superior.		42013
Thur.	14		4103●
Fri.	15 2h ♂♂ ☉.	4	22 43012
Sat.	16 12h ♀ Greatest Brilliancy.		34120
Sun.	17 16h 9m ♂ ♃ ☾, ♃ 2° 21' S.		32401
Mon.	18 7h ♂ nearest ☉.	1	11 3042●
☽Tues.	19 8h 30m·4 Moon's First Quarter.		10234
Wed.	20	22	02 0134
Thur.	21 5h 26m ☉ enters Aries, Spring commences.		1034●
Fri.	22 7h 53m ♂ ♃ ☾, ♃ 3° 4' N.; 15h 32m ♂ ♄ ☾, ♄ 4°		30124
Sat.	23 9h ♀ in ☉.	18	49 31204
Sun.	24		32014
Mon.	25		31024
Tues.	26 8h 26m ♂ ♃ ☾, ♃ 9° 15' N.	15	38 24023
☉Wed.	27 10h 32m·8 Full Moon; 23h ♀ in Perihelion.		42013
Thur.	28		41203
Fri.	29	12	27 43012
Sat.	30		43120
Sun.	31		43201

Key to Symbols.—♄ Conjunction; ♀ Opposition; ☾ Quadrature; ☉ Ascending Node; ☽ Descending Node; ☉ Sun; ♃ Mercury; ♀ Venus; ☉ Earth; ♂ Mars; ♃ Jupiter; ♄ Saturn; ♄ Uranus; ♃ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR APRIL

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	2h 28m	22h 40m	11h 7m	4h 35m	8h 41m	21h 57m	8h 26m
Decl.	17° 49' N.	7° 38' S.	8° 35' N.	21° 36' N.	19° 15' N.	13° 15' S.	19° 3' N.
Transit	12 ^h 56	9 ^h 08	21 ^h 34	15 ^h 03	19 ^h 09	8 ^h 22	18 ^h 54

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—During April the sun continues its rapid rise above the equator and the days fast increase in length. The sun's R.A. increases from 0h 40m on the 1st to 2h 28m on the 30th, and its Decl. from 4° 20' to 14° 36' N. For equation of time, see page 4.

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

On the 13th the moon occults *A Tauri* (see p. 3).

Mercury reaches an eastern elongation on the 7th, and because it is far northward of the sun it is a particularly favorable time of the year to observe it as an evening star for some days before and after that date. It is not so far from the sun (only about 19°) as it was in January, yet it is much higher in the sky at sunset. It should be easily seen with or without field glasses directly in the west. It is again in conjunction with the sun on the 26th.

Venus is a conspicuous morning star all this month. The area of the disc that we see illuminated is increasing, but the planet is receding from us, so that its brightness gradually decreases.

Mars is 69 million miles from the earth on the 15th. It continues to retrograde till the 26th and is well situated for observation during most of the night, setting a few hours before sunrise.

Jupiter is a fine bright evening star all month. It is quite near Aldebaran. The configurations of its satellites are given on the next page, and their eclipses, etc., on page 30.

Saturn crosses the meridian about half an hour after sunset and is visible for the first half of the night. It is 90° from the sun on the 28th. It is in the constellation Cancer and starts to advance again on the 9th (see next page).

The positions of *Uranus* and *Neptune* are given in the above table. See note for January.

The minima of Algol are given on the next page.

APRIL
ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

		Minima of Algol		Configuration of Jupiter's Satellites at 20h 30m
		h	m	
Mon.	1			43102
Tues.	2	11h		40132
Wed.	3			2403●
☾Thur.	4	8h 33m	1	21043
Fri.	5			03124
Sat.	6			31024
Sun.	7	6h	8	32014
		[19° 18'; 12h 46m ☉ ☽ ☾, ☽ 5° 34' S.; 20h 19m ☉ ♀ ☾, ♀ 3° 14' S.]		
Mon.	8			31024
Tues.	9	8h	h	01324
☉Wed.	10	23h 34m	3	21034
Thur.	11			21043
Fri.	12	6h 11m		40132
Sat.	13			43102
Sun.	14	9h 19m		43201
Mon.	15	6h	ψ	43100●
Tues.	16	16h	8	4012●
☾Wed.	17	23h 7m	7	42103
Thur.	18	14h 15m		014203
Fri.	19			4032●
Sat.	20			31402
Sun.	21	1h	♀	32014
Mon.	22	2h 14m		31204
Tues.	23			30124
Wed.	24			12034
Thur.	25	4h	□ ψ	20134
☉Fri.	26	3h 5m	4	0234●
Sat.	27			31024
Sun.	28	21h	□ h	32014
Mon.	29			31420
Tues.	30	17h	8	43012

Key to Symbols.—☉ Conjunction; ☽ Opposition; □ Quadrature; ☉ Ascending Node; ♁ Descending Node; ☉ Sun; ☿ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♄ Saturn; ♅ Uranus; ♆ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR MAY

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	2h 1m	0h 37m	11h 11m	5h 2m	8h 46m	22h 0m	8h 27m
Decl.	9° 2' N.	2° 9' N.	6° 51' N.	22° 26' N.	18° 57' N.	13° 0' S.	19° 0' N.
Transit	10:31	9:07	19:40	13:32	17:15	6:31	16:57

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—On the 1st the sun's R.A. is 2h 31m, Decl. 14° 55' N.; on the 31st its R.A. is 4h 30m, Decl. 21° 50'. The equation of time is 2m 55s on the 1st, rises to a maximum 3m 49s on the 15th and then falls to 2m 38s on the 31st. See page 4.

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

On the 27th the moon occults *b* Ophiuchi (see p. 3).

Mercury reaches a western elongation on the 24th, but is south of the ecliptic and quite low in the sky at sunrise in our latitude. It will be visible over a clear horizon about that date nearly 20° southward of the sunrise point. Use field glasses at first to locate it.

Venus is a prominent morning star during the month. It is slightly higher in the sky at sunrise than it was last month.

Mars is 86 million miles from the earth on the 15th. It is receding from us and its stellar magnitude has decreased to +.4, or nearly as bright as Arcturus, by the end of the month. It is visible a little more than the first half of the night.

Jupiter is getting quite low in the sky now above the sun, and is only visible immediately after sunset. It has a fairly close conjunction with the New Moon on the 12th (see opposite page), when it is less than twice the moon's diameter to the south. Beginning with the 21st, the phenomena of the satellites are not given because of the planet's nearness to the sun.

Saturn is well placed for observation as an evening star for about 5 hours after sunset. Its stellar magnitude is +.6 and decreasing.

The positions of *Uranus* and *Neptune* are given in the above table. See note for January.

The minima of Algol are given on the next page.

MAY		Minima of Algol	Configuration of Jupiter's Satellites at 20h 15m
ASTRONOMICAL PHENOMENA			
(75th Meridian Time, Hours Numbering from Midnight)			
		h	m
Wed.	1		24 41 C ₃
Thur.	2	22	14 42 O ₁₃
☾ Fri.	3		41 O ₂₃
Sat.	4		24 43 O ₂
Sun.	5	19	3 43 O ₁
Mon.	6		34 21 O
Tues.	7		34 O ₁₂
Wed.	8	15	52 1 O ₂₃₄
Thur.	9		2 O ₁₃₄
☿ Fri.	10		1 O ₂₃₄
Sat.	11	12	41 21 O ₁₂₄
Sun.	12		32 O ₄ ●
Mon.	13		32 1 O ₄
Tues.	14	9	30 3 O ₁₂₄
Wed.	15		1 O ₂₃₄
Thur.	16		24 O ₁₃
☽ Fri.	17	6	18 41 O ₃ ●
Sat.	18		4 O ₃₁₂
Sun.	19		43 2 ●
Mon.	20	3	7 43 21 O
Tues.	21		
Wed.	22	23	56
Thur.	23		Invisible on account of proximity to sun.
Fri.	24		
♁ Sat.	25	20	45
Sun.	26		
Mon.	27		
Tues.	28	17	34
Wed.	29		
Thur.	30		
Fri.	31	14	23

Key to Symbols.—♄ Conjunction; ♀ Opposition; ◻ Quadrature; ☊ Ascending Node; ☋ Descending Node; ☉ Sun; ☿ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♄ Saturn; ♅ Uranus; ♆ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR JUNE

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	4h 34m	2h 49m	11h 47m	5h 33m	8h 56m	22h 0m	8h 30m
Decl.	21° 13' N.	13° 56' N.	1° 58' N.	23° 0' N.	18° 16' N.	13° 0' S.	18° 50' N.
Transit	11:03	9:17	18:15	12:01	15:24	4:30	14:58

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—The sun's R.A. on the 1st is 4h 34m, and on the 30th it is 6h 34m. During the month its declination slowly rises from 22° 0' N. on the 1st to 23° 27' on the 22nd, the summer solstice, when our days are longest. It then falls to 23° 13' by the 30th. The equation of time reaches zero on the 14th, and rises to 3m 17s on the 30th (see page 4). The increase in the equation of time, taken with the decreasing length of the day, causes the time of sunset, stated in mean time, to appear constant for several days at the end of June and the beginning of July. On the 8th there is a total eclipse of the sun which will be visible as a partial eclipse all over Canada, but will appear nearly total in the southern portion of British Columbia (see page 32).

The Moon.—For its phases and conjunctions with the planets, see opposite page. On the 24th there is a partial eclipse of the moon visible in southern and western Canada only, because elsewhere the moon has set (see page 32).

Mercury after the first few days of the month is too close to the sun for observation. Its conjunction with the sun is on the 26th.

Venus is much higher in the sky this month than it was in April and on the 15th rises about 2 hours before the sun. Nearly $\frac{3}{4}$ of the disc as we see it is now illuminated, but it is much farther away than it was in March. Through a telescope it appears like our moon $\frac{3}{4}$ full.

Mars on the 15th is 108 million miles away, and is well seen as a + .6 magnitude star for the first half of the night.

Jupiter is in conjunction with the sun on the 15th and invisible all month.

Saturn is now an evening star, visible for only about 3 hours after sunset. It is slowly moving toward Regulus and about 1.6 times as bright as it.

The positions of *Uranus* and *Neptune* are given in the above table. See note for January.

The minima of Algol are given on the opposite page.

JUNE		Minima of Algol	Configuration of Jupiter's Satel- lites
ASTRONOMICAL PHENOMENA			
(75th Meridian Time, Hours Numbering from Midnight)			
☉ Sat.	1 4h 32m ☉ ☿ ☿, ☿ 5° 59' S.; 23h 20m ☾ Moon's Last	h m	Invisible on account of proximity to sun.
☼ Sun.	2 15h ☿ Stationary. [Quarter.		
☾ Mon.	3	11 12	
☿ Tues.	4		
♀ Wed.	5 18h 18m ☉ ♀ ♀, ♀ 6° 28' S.		
♃ Thur.	6	8 01	
♁ Fri.	7 6h 4m ☉ ☿ ☿, ☿ 4° 34' S.		
♁ Sat.	8 ☉ Total Eclipse visible in Canada as Partial Eclipse, (see p. 32); 17h 2m ☾ New Moon.		
☼ Sun.	9 1h 43m ☉ ♃ ☿, ♃ 0° 18' S.	4 50	
☾ Mon.	10		
☿ Tues.	11		
♃ Wed.	12 8h 59m ☉ ♃ ☿, ♃ 3° 39' N.; 21h 11m ☉ ♃ ☿, ♃	1 39	
♃ Thur.	13 [5° 11' N.		
♁ Fri.	14	22 28	
♁ Sat.	15 11h ☉ ♃ ☉.		
☾ Sun.	16 8h 11m ☾ Moon's First Quarter; 18h 2m ☉ ☿ ☿, ☿	19 17	
☾ Mon.	17 [6° 16' N.		
♀ Tues.	18 10h ♀ Greatest Hel. Lat. S.		
♃ Wed.	19 8h ♃ in ☉.		
♃ Thur.	20 15h ☐ ☿ ☉.	16 6	
♁ Fri.	21		
♁ Sat.	22 1h 0m ☉ enters Cancer, Summer commences; 16h ☉		
☼ Sun.	23 22h ♃ in Perihelion. [♃ ♃, ♃ 0° 52' N.	12 55	
☾ Mon.	24 ☿ Partial Eclipse visible in Canada, (see p. 32); [5h 38m ☾ Full Moon.		
☿ Tues.	25		
♁ Wed.	26 21h ☉ ♃ ☉ Superior.	9 43	
♃ Thur.	27		
♁ Fri.	28 9h 37m ☉ ☿ ☿, ☿ 5° 59' S.		
♁ Sat.	29	6 32	
☼ Sun.	30		

Key to Symbols.—☉ Conjunction; ☿ Opposition; ☐ Quadrature; ☉ Ascending Node; ☽ Descending Node; ☉ Sun; ☿ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♃ Saturn; ☿ Uranus; ♃ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR JULY

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	8h 56m	5h 13m	12h 40m	6h 2m	9h 10m	21h 58m	8h 34m
Decl.	18° 56' N.	21° 37' N.	4° 24' S.	23° 12' N.	17° 20' N.	13° 14' S.	18° 36' N.
Transit	13' 27	9' 42	17' 10	10' 32	13' 39	2' 30	13' 04

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—During the month the sun's R.A. changes from 6h 38m to 8h 39m, and its Decl. from 23° 9' to 18° 25' N. The earth is farthest from the sun on the 5th (see opposite page).

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

On the 20th the moon occults *b* Ophiuchi (see p. 3).

Mercury is in conjunction with Saturn on the 17th and a little less than a moon's diameter northward of it. They are not high in the sky and about 15° south of the sunset point, but should be seen easily with field glasses over a clear horizon. Toward the end of the month Mercury will be better situated, although not high in the sky.

Venus rises about 2½ hours before the sun this month and is quite high in the sky at sunrise. Its stellar magnitude is — 3.4, or slightly more than 5 times as bright as Sirius, our brightest fixed star.

Mars on the 15th is 128 million miles from us and is well seen for the first four hours of the night.

Jupiter is now ahead of the sun and becomes a morning star, although not yet high in the sky. The configurations of the satellites from the 11th on are given on the next page and their eclipses, etc., on page 30.

Saturn sets an hour after the sun by the 15th and is getting too close for observation.

The positions of *Uranus* and *Neptune* are given in the above table. See note for January.

The minima of Algol are given on the next page.

JULY		Minima of Algol	Configuration of Jupiter's Satel- lites at 4h
ASTRONOMICAL PHENOMENA			
(75th Meridian Time, Hours Numbering from Midnight)			
		h	m
☾ Mon.	1 3h 42m·9 Moon's Last Quarter.		
Tues.	2	3	21
Wed.	3		
Thur.	4 5h ♀ Greatest Hel. Lat. N.		
Fri.	5 3h ⊕ in Aphelion; 8h 35m ♂ ♀ ☾, ♀ 3° 6' S.	0	10
Sat.	6 21h 15m ♂ ♃ ☾, ♃ 0° 19' N.		
Sun.	7	20	59
☾ Mon.	8 3h 22m·1 New Moon.		
Tues.	9 9h 20m ♂ ♀ ☾, ♀ 5° 18' N.; 19h 25m ♂ ♃ ☾, ♃ 3° 41' N.		
Wed.	10 11h 50m ♂ ♃ ☾, ♃ 5° 21' N.; 22h ♂ in ☿.	17	48
Thur.	11		
Fri.	12 5h ♂ ♀ ♃, ♀ 1° 55' N.		
Sat.	13	14	37
Sun.	14		
Mon.	15 5h 16m ♂ ♂ ☾, ♂ 5° 12' N.		
☾ Tues.	16 1h 24m·7 Moon's First Quarter.	11	26
Wed.	17 12h ♂ ♀ ♃, ♀ 0° 26' N.		
Thur.	18		
Fri.	19	8	15
Sat.	20		
Sun.	21		
Mon.	22	5	04
☾ Tues.	23 15h 34m·8 Full Moon.		
Wed.	24		
Thur.	25 15h 23m ♂ ♂ ☾, ♂ 5° 53' S.	1	53
Fri.	26		
Sat.	27 4h ♂ ♀ ♃, ♀ 0° 36' S.; 16h ♀ in ☿.	22	42
Sun.	28		
Mon.	29		
☾ Tues.	30 8h 13m·9 Moon's Last Quarter; 15h ♂ ♃ ☾.	19	31
Wed.	31		

Key to Symbols.—♂ Conjunction; ♀ Opposition; ☾ Quadrature; ☿ Ascending Node; ☾ Descending Node; ☼ Sun; ☿ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♃ Saturn; ♂ Uranus; ♃ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR AUGUST

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	11h 4m	7h 52m	13h 47m	6h 30m	9h 25m	21h 54m	8h 39m
Decl.	2° 19' N.	21° 1' N.	11° 38' S.	23° 3' N.	16° 10' N.	13° 37' S.	18° 19' N.
Transit	13·31	10·20	16·14	8·58	11·53	0·23	11·07

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—During August the sun's R.A. increases from 8h 43m to 10h 36m, and the Decl. changes from 18° 10' to 8° 51' N. The equation of time falls from 6m 12s on the 1st to 0m 27s on the 31st. For fuller details, see page 4.

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

On the 18th the moon occults π Sagittarii (see p. 3).

Mercury is at its greatest distance east of the sun on the 5th. It should be possible to see it as an evening star for some days before and after this date, although a clear horizon and possibly field glasses at first will be necessary to locate it; afterwards it should be picked up easily with the naked eye. By the end of the month it has almost reached the sun.

Venus is still a bright morning star, although not so high as last month. It rises about 2 hours ahead of the sun. It is still quite nearly vertical over the sun at sunrise, so that its elongation or apparent distance from the sun counts most in apparent height.

Mars is 146 million miles from the earth on the 15th and is a prominent evening star, although rather far south all month.

Jupiter is now a prominent morning star rising on the 15th about 4 hours before the sun. For the configurations of its satellites, see opposite page; for their eclipses, etc., see page 30.

Saturn is in conjunction with the sun on the 11th and not suitably placed for observation till after the end of the month.

The positions of *Uranus* and *Neptune* are given in the above table. See note for January.

For the minima of Algol, see next page.

AUGUST

ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

		Minima of Algol	Configuration of Jupiter's Satellites at 3h 30m
		h m	
Thur.	1		3○124
Fri.	2	16 19	31○24
Sat.	3	14h 51m	♃ ♃, ♃ 0° 58' N.
Sun.	4	5h 0m	♃ ♀, ♀ 1° 27' N.
Mon.	5	8h ♀	Greatest Elong. E. 27° 21'.
☾ Tues.	6	4h 59m	♃ ♃, ♃ 3° 44' N.; 15h 29m·6 New Moon; 22h ♀ in Aphelion.
Wed.	7	2h 25m	♃ ♃, ♃ 5° 32' N.
Thur.	8		
Fri.	9	2h 47m	♃ ♀, ♀ 3° 2' N.
Sat.	10		
Sun.	11	9h	♃ ♃
Mon.	12	21h 2m	♃ ♀, ♀ 3° 42' N.
Tues.	13	17h ♀	in ☾.
☾ Wed.	14	18h 16m·4	Moon's First Quarter.
Thur.	15		
Fri.	16		
Sat.	17		
Sun.	18	11h ♀	Stationary.
Mon.	19	8h ♀	♃ ♃.
Tues.	20		
Wed.	21	22h 54m	♃ ♃, ♃ 5° 47' S.
☾ Thur.	22	0h 2m·3	Full Moon.
Fri.	23		
Sat.	24	18h	♃ ♀ ♃, ♀ 0° 37' N.
Sun.	25		
Mon.	26		
Tues.	27	7h ♀	Greatest Hel. Lat. S.
☾ Wed.	28	14h 27m·1	Moon's Last Quarter.
Thur.	29		
Fri.	30		
Sat.	31	6h 11m	♃ ♃, ♃ 1° 37' N.

Key to Symbols.—♃ Conjunction; ♀ Opposition; ☐ Quadrature; ☊ Ascending Node; ☋ Descending Node; ☉ Sun; ☿ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♄ Saturn; ♅ Uranus; ♆ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR SEPTEMBER

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	10h 25m	10h 26m	15h 5m	6h 53m	9h 40m	21h 49m	8h 43m
Decl.	9° 53' N.	11° 9' N.	18° 22' S.	22° 43' N.	15° 0' N.	14° 1' S.	18° 3' N.
Transit	10·51	10·51	15·31	7·19	10·06	22·13	9·09

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—The sun's R.A. increases during the month from 10h 39m to 12h 24m. On the 1st its Decl. is 8° 29' N. The sun reaches the equator on the 23rd (the autumn equinox), and on the 30th its Decl. is 2° 35' S. The equation of time is given on page 5.

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

Mercury on the 1st is in inferior conjunction with the sun, from which it rapidly separates, reaching greatest elongation west on the 18th, but this time less than 18° distant. However, it is north of the ecliptic, which latter rises most vertically at this time of the year at sunrise in our latitude, hence the planet is fairly favorably situated as a morning star almost directly above the rising sun. It has a very close conjunction with Venus on the 25th, when it is only 20' or about two-thirds our own moon's apparent diameter to the north (see opposite page).

Venus is approaching the sun and by the end of the month will rise less than an hour before it. It is on the farther side of its orbit from us. On the 4th it is in close conjunction with Saturn (see opposite page).

Mars is 162 million miles from us on the 15th. It is still an evening star, but quite far south of the sunset point and low in the sky.

Jupiter rises about 6 hours before the sun on the 15th and is of stellar magnitude — 1.7. For the configurations of its satellites see next page; for their eclipses, etc., see page 30.

Saturn is now a morning star, rising about 2½ hours before the sun on the 15th, and almost directly above it. It is quite close to Regulus.

The positions of *Uranus* and *Neptune* are given above. See note for January.

For the minima of Algol, see next page.

SEPTEMBER			Minima of Algol	Configuration of Jupiter's Satel- lites at 3h
ASTRONOMICAL PHENOMENA				
(75th Meridian Time, Hours Numbering from Midnight)				
			h	m
Sun.	1	20h ♂ ♀ ☉ Inferior.		42103
Mon.	2	13h 12m ♂ ♀ ☉, ♀ 3° 52' N.		40123
Tues.	3	13h 0m ♂ ♀ ☉, ♀ 5° 36' N.; 16h 1m ♂ ♀ ☉, ♀ 5° 48' N.	5	180423●
Wed.	4	19h 21m ♂ ♀ ☉, ♀ 1° 48' N.; 21h ♂ ♀ ♄, ♀ 0° 5' S.		23104
☾Thur.	5	5h 43m 7 New Moon.		3014●
Fri.	6		2	0731024
Sat.	7			32014
Sun.	8		22	5621034
Mon.	9			01234
Tues.	10	12h ♀ Stationary; 15h 44m ♂ ♂ ☉, ♂ 1° 49' N.		0234●
Wed.	11		19	44212304
Thur.	12			3401●
☽Fri.	13	10h 2m 3 Moon's First Quarter.		43102
Sat.	14		16	3343201
Sun.	15	4h ♂ ♀ ♀, ♀ 1° 20' S.; 7h ♀ in ☉.		42103
Mon.	16	2h ♀ in Perihelion.		40123
Tues.	17		13	2241023
Wed.	18	2h ♀ Greatest Elong. W. 17° 52'; 7h 51m ♂ ♂ ☉, ♂ 5° 48' S.		42031
Thur.	19	22h ♀ in Perihelion.		34201
☽Fri.	20	8h 0m 9 Full Moon.	10	1131042
Sat.	21			213014
Sun.	22			21034
Mon.	23	15h 46m ☉ enters Libra, Autumn commences.	7	002134
Tues.	24			10234
Wed.	25	2h ♂ ♀ ♀, ♀ 0° 20' N.		20134
☾Thur.	26	23h 33m 6 Moon's Last Quarter.	3	493204●
Fri.	27	19h 14m ♂ ♀ ☉, ♀ 2° 13' N.		31024
Sat.	28			213021
Sun.	29	20h 25m ♂ ♀ ☉, ♀ 4° 7' N.	0	3842103
Mon.	30	5h ♀ Greatest Hel. Lat. N.		40213

Key to Symbols.—♂ Conjunction; ♀ Opposition; □ Quadrature; ☉ Ascending Node; ☽ Descending Node; ☉ Sun; ♀ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♄ Saturn; ♅ Uranus; ♆ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR OCTOBER

POSITION OF PLANETS ON THE 15TH.

	♁ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	13h 20m	12h 44m	16h 33m	7h 6m	9h 53m	21h 46	8h 46m
Decl.	7° 28' S.	3° 11' S.	23° 5' S.	22° 27' N.	14° 1' N.	14° 16' S.	17° 53' N.
Transit	11.48	11.11	15.00	5.34	8.21	20.12	7.14

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—The sun's R.A. increases during October from 12h 28m to 14h 20m, and its Decl. changes from 2° 59' to 13° 56' S. The equation of time rises from 10m 6s to 16m 17s, to be subtracted from apparent time. For fuller details see page 5.

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

Mercury is in superior conjunction with the sun on the 15th and is not conveniently visible this month.

Venus is now less than an hour ahead of the sun and getting too close for observation.

Mars is 174 million miles from the earth on the 15th and can still be seen as an evening star rather low in the sky. It has a very close conjunction with the moon on the 9th, being immediately to the south of it (see next page).

Jupiter is 90° ahead of the sun on the 8th, and is visible for the latter half of the night. It is on the meridian about one-half hour before sunrise. For the configurations of its satellites, see next page; for their eclipses, etc., see page 30.

Saturn is high in the eastern sky at sunrise and still approaching Regulus. Its stellar magnitude is + .8, or about 1½ times as bright as that star. Its rings are now inclined from our line of sight only about 11° and we are still looking at their under or southern face.

The position of *Uranus* and *Neptune* are given in the above table. See note for January.

The minima of Algol are given on the opposite page.

OCTOBER
ASTRONOMICAL PHENOMENA

(75th Meridian Time, Hours Numbering from Midnight)

		Minima of Algol		Configuration of Jupiter's Satel- lites 2h 15m		
		h	m			
Tues.	1	4h 22m	♂ ♃ ♄	♃ 6° 9' N.	21 27	41○23
Wed.	2					42○13
Thur.	3	23h 42m	♂ ♀ ♃	♀ 6° 54' N.		4231○
☾ Fri.	4	9h 57m	♂ ♀ ♃	♀ 7° 7' N.; 22h 5m·2 New Moon.	18 16	2143○2
Sat.	5					43○12
Sun.	6					241○●
Mon.	7				15 05	○143●
Tues.	8	5h ♀		Greatest Hel. Lat. S.; 15h □ ♃ ♄		1○243
Wed.	9	12h 54m	♂ ♂ ♃	♂ 0° 19' S.		2○134
Thur.	10				11 54	231○4
Fri.	11					3○124
Sat.	12					3○24●
☽ Sun.	13	0h 0m·0		Moon's First Quarter.	8 43	21○4●
Mon.	14					2○143
Tues.	15	7h ♂ ♀	♄	Superior; 16h 52m ♂ ♂ ♃		14○23
Wed.	16				5 32	42○13
Thur.	17					4213○
Fri.	18					43○12
☾ Sat.	19	16h 34m·8		Full Moon.	2 20	43○2●
Sun.	20					4231○
Mon.	21				23 09	42○13
Tues.	22					41○23
Wed.	23	16h ♀		in ☿.		214○13
Thur.	24				19 58	2121○4
Fri.	25	6h 7m	♂ ♃ ♄	♃ 2° 40' N.		3○214
☾ Sat.	26	12h 35m·4		Moon's Last Quarter.		31○24
Sun.	27	3h 37m	♂ ♃ ♄	♃ 4° 22' N.	16 47	2132○4
Mon.	28	15h 32m	♂ ♃ ♄	♃ 6° 31' N.		2○134
Tues.	29					1○234
Wed.	30				13 37	○2134
Thur.	31					21○34

Key to Symbols.—♂ Conjunction; ♀ Opposition; □ Quadrature; ☽ Ascending Node; ☿ Descending Node; ☼ Sun; ♀ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♄ Saturn; ♂ Uranus; ♃ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR NOVEMBER

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	16h 30m	15h 12m	18h 14m	7h 8m	10h 1m	21h 46m	8h 47m
Decl.	24° 4' S.	17° 8' S.	24° 39' S.	22° 28' N.	13° 23' N.	14° 17' S.	17° 50' N.
Transit	12:56	11:37	14:38	3:34	6:27	18:10	5:13

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—The sun's R.A. during the month increases from 14h 24m to 16h 23m, and the Decl. changes from 14° 16' to 21° 34' S. The equation of time rises to a maximum on the 3rd, at which time it is 16m 21s. The true sun crosses the meridian this much earlier than the mean sun (see page 5).

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

On the 8th the moon occults ξ Sagittarii (see p. 3).

Mercury is at greatest elongation on the 29th. It is far south of the equator and will be very low in the sky. It should be quite easily picked up, however, with field glasses over a clear horizon about 18° south of the point where the sun has set for several days before and after that date.

Venus is in superior conjunction with the sun on the 23rd and too close all month for observation.

Mars is 185 million miles from us on the 15th and is perhaps slightly higher in the sky at sunset than last month, due to the inclination of the ecliptic being slightly greater at sunset this month.

Jupiter rises about 8 p.m. local sun time and travels across high in the sky. Its stellar magnitude is — 2.1, or half as bright again as Sirius, our brightest fixed star. The configurations of its satellites are given on the opposite page; their eclipses, etc., on page 30.

Saturn crosses the meridian about ½ hour before sunrise on the 15th. It is 90° ahead of the sun on the 20th and close to Regulus.

The positions of *Uranus* and *Neptune* are given in the above table. See note for January.

The minima of Algol are given on the page opposite.

NOVEMBER		Minima of Algol	Configuration of Jupiter's Satel- lites at 1h 30m
ASTRONOMICAL PHENOMENA			
(75th Meridian Time, Hours Numbering from Midnight)			
		h	m
Fri.	1		34○1●
Sat.	2	8h	341○2
☉Sun.	3	3h 0m	432○1
			[16h 1m 6 New Moon; 19h 6 Stationary.
Mon.	4	19h 20m	42○3●
Tues.	5		7 14 41○23
Wed.	6		4○123
Thur.	7	12h 20m	421○3
Fri.	8		4 03 34○1●
Sat.	9		31○42
Sun.	10		32○14
☾Mon.	11	11h 46m	0 52 21○34
Tues.	12	0h 40m	21○234
Wed.	13		21 41 ○1234
Thur.	14		21○34
Fri.	15		32○14
Sat.	16	20h	18 30 31○24
Sun.	17		32○41
☉Mon.	18	2h 33m	241○●
Tues.	19		15 19 4○123
Wed.	20	20h	4○123
Thur.	21	14h 39m	421○3
Fri.	22		12 08 432○1
Sat.	23	6h 8	431○2
			Greatest Hel. Lat. S.; 11h 42m ☉ Ψ C, Ψ 4° 31' N.; 19h ☉ ♀ Superior.
Sun.	24		2143○1
☾Mon.	25	1h 39m	8 57 241○●
Tues.	26		○1243
Wed.	27		○243●
Thur.	28		5 45 21○34
Fri.	29	23h 8	23○14
Sat.	30		31○24

Key to Symbols.—☉ Conjunction; ☌ Opposition; □ Quadrature; ☊ Ascending Node; ☋ Descending Node; ☀ Sun; ☿ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♄ Saturn; ♅ Uranus; ♆ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

THE SKY FOR DECEMBER

POSITION OF PLANETS ON THE 15TH.

	☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
R. A.	18h 0m	17h 51m	19h 54m	6h 57m	10h 3m	21h 48m	8h 46m
Decl.	22° 27' S.	23° 54' S.	22° 7' S.	22° 48' N.	13° 19' N.	14° 1' S.	17° 54' N.
Transit	12·25	12·18	14·20	1·26	4·31	16·14	3·14

The position is given for Greenwich Mean Noon. The time of transit is in Local Mean Time, hours numbering from midnight.

The Sun.—During December the sun's R.A. increases from 16h 27m to 18h 39m. On the 1st the Decl. is 21° 44' S.; this slowly changes and it becomes 23° 27' on the 22nd (the winter solstice, see next page), and by the 31st it has come back to 23° 9'. On the 3rd there is an annular eclipse of the sun invisible in Canada but visible in South America (see page 32). For equation of time see page 5.

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

On the 20th the moon occults α Cancri (see p. 3).

Mercury is in inferior conjunction with the sun on the 18th and with the possible exception of the first few days as a low down evening star and the last few days of the month as a morning star it is quite unsuitably located for observation.

Venus is receding from the sun, but is scarcely yet suitable for observation as an evening star.

Mars is 195 million miles from the earth on the 15th and is in about the same position in the western horizon when the sun sets as it was last month.

Jupiter rises a little over an hour after sunset on the 15th and is very bright all the rest of the night. Stellar magnitude — 2.2. For the configurations of its satellites, see next page; for their eclipses, etc., see page 30.

Saturn by the 10th has done its best to reach Regulus and is a little less than a degree to the north; it then starts to retrograde. On the 15th it rises a little after 9 p.m., apparent solar time, and is visible the rest of the night. Stellar magnitude is .6 or 1.7 times as bright as Regulus.

The positions of *Uranus* and *Neptune* are given above. See note for January.

The minima of Algol are given on the opposite page.

DECEMBER		Minima of Algol	Configuration of Jupiter's Satel- lites on 15m
ASTRONOMICAL PHENOMENA			
(75th Meridian Time, Hours Numbering from Midnight)			
		h	m
Sun.	1	2	34
Mon.	2		30214
☉ Tues.	3	23	23
Wed.	4		14023
Thur.	5		24203
Fri.	6	20	12
Sat.	7		43102
Sun.	8		43021
Mon.	9	17	01
☾ Tues.	10		42130
Wed.	11		40130
Thur.	12	13	50
Fri.	13		24204
Sat.	14		31024
Sun.	15	10	39
Mon.	16		30124
☉ Tues.	17		23104
Wed.	18	7	28
Thur.	19		10234
Fri.	20		20134
Sat.	21	4	17
Sun.	22		34102
Mon.	23		34012
Tues.	24		43210
☾ Wed.	25	1	06
Thur.	26		42031
Fri.	27	21	55
Sat.	28		41023
Sun.	29		24013
Mon.	30	18	44
Tues.	31		30142
			32104
			20314

Key to Symbols.—♄ Conjunction; ♀ Opposition; ◻ Quadrature; ♁ Ascending Node; ♁ Descending Node; ☉ Sun; ☿ Mercury; ♀ Venus; ⊕ Earth; ♂ Mars; ♃ Jupiter; ♄ Saturn; ♅ Uranus; ♆ Neptune. For Jupiter's satellites the circle ○ represents the disc of the planet; ♃ signifies that the satellite is on the disc; ● signifies that the satellite is behind the disc or in the shadow. Configurations are for an inverting telescope.

PHENOMENA OF JUPITER'S SATELLITES

E=eclipse, O=occultation, T=transit, S=shadow, D=disappearance, R=re-appearance,
I=ingress, e=egress. The numbers in the fifth column denote the satellites.
Eastern Standard Time, Hours numbering from Midnight.

JANUARY										MARCH														
d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s						
1	0	0		I	SE	16	1	8	29	I	ER	2	22	10	I	OD	14	22	31	19	II	ER		
	0	20		II	TE		19	6		I	TI	3	19	20	I	TI	17	23	15		I	TI		
	1	59		II	SE		20	9		I	SI		20	38	I	SI	18	20	35		I	OD		
	18	16		I	OD		21	2		II	OD		21	31	I	TE		23	11		III	OD		
	21	17	10	I	ER		21	15		I	TE		22	48	I	SE	19	18	57		I	SI		
	2	17	39	I	TE		22	19		I	SE		4	20	9	21	III	ED		19	55	I	TE	
	18	29		I	SE	17	1	40	16	II	ER		20	9	50	I	ER		21	8		I	SE	
	18	54		III	TI		1	55		III	TI		22	30	28	III	ER		21	20	9	II	OD	
	20	29		1	II	ER	19	37	23	I	ER		5	20	34	II	TI	22	20	40		III	SE	
	20	50		III	TE	18	18	3		II	SI		23	6		II	TE	23	20	17		II	SE	
	22	11		III	SI		18	20		II	TE		23	12		II	SI	25	22	34		I	OD	
	3	0	20	III	SE		20	34		II	SE		7	19	54	27	II	ER	26	19	43		I	TI
	7	1	37	I	OD	20	20	4	13	III	ED		10	21	17	I	TI		20	53		I	SI	
	22	50		I	TI		22	17	32	III	ER		22	33		I	SI		21	54		I	TE	
	23	45		I	SI		22	2	28		I	TI		23	28		I	TE	27	20	25	30	I	ER
	8	0	13	II	TI		23	43		I	OD		11	19	0	III	OD	29	20	4		III	TE	
	1	0		I	TE	23	20	55		I	TI		21	21		III	OR		22	18		III	SI	
	1	55		I	SE		22	4		I	SI		22	5	30	I	ER	30	20	23		II	SI	
	2	6		II	SI		23	5		I	TE		12	19	12	I	SE		20	40		II	TE	
	2	43		II	TE		23	27		II	OD		23	15		II	TI							
	20	4		I	OD	24	0	14		I	SE													
	23	12	48	I	ER		18	10		I	OD													
	9	18	14	I	SI		21	33	8	I	ER		2	21	43	I	TI	11	21	23		I	SE	
	18	40		II	OD	25	18	17		II	TI		3	19	3	I	OD	16	20	12	41	III	ED	
	19	26		I	TE		18	43		I	SE		22	20	56	I	ER	18	20	13		I	TI	
	20	24		I	SE		20	41		II	SI		4	19	28	I	SE		21	7		I	SI	
	22	22		III	TI		20	49		II	TE		5	22	0	III	TI	19	20	40	15	I	ER	
	23	4	32	II	ER		23	13		II	SE		6	20	52	II	TI	22	20	38		II	OD	
	10	0	21	III	TE	27	19	15		III	OD		8	19	41	15	II	ER	23	20	49		III	OD
	17	41	41	I	SI		21	22		III	OR		10	21	3	I	OD	24	20	4		II	SE	
	11	17	56	II	SE	30	1	34		I	ED		11	19	12	I	SI	26	19	35		I	OD	
	13	18	15	14	III	ER	22	46		I	OD		20	24		I	TE	27	19	43		I	SE	
	15	0	38	I	TI		23	59		I	TI													
	1	39		I	SI	31	0	56		I	TE		1	20	7	II	SI	11	20	0		III	TI	
	2	36		II	TI		1	54		II	OD		4	20	51	III	SE	19	20	9		I	OD	
	2	48		I	TE		20	2		I	OD		20	58		I	TE							
	21	53		I	OD	23	28	55		I	ER													
FEBRUARY										JULY														
1	18	28		I	SI	15	0	30		III	SE	11	4	18	I	TE	26	4	6	34	III	ED		
	19	25		I	TE		21	1		I	TI	18	4	5	I	TI		4	23		II	TI		
	20	38		I	SE		22	18		I	SI	19	4	12	II	TE								
	20	48		II	TI		23	11		I	TE													
	23	19		II	TE	16	0	28		I	SE													
	23	20		II	SI		18	18		I	OD													
	2	1	51	II	SE		21	49	30	I	ER		2	4	34	30	I	ED	20	4	39		II	TE
	3	20	10	15	II	ER	17	18	57	I	ER		3	4	4	I	SE	24	3	12		III	OR	
	23	0		III	OD		20	13		II	OD		4	4	38	II	OR	25	4	43	30	I	ED	
	4	1	10	III	OR		22	46		II	OR		6	4	28	III	TE	26	2	2		I	TI	
	7	0	39	I	TI		22	51	8	II	ED		10	3	44	I	SI		3	5		I	SI	
	18	14		III	SI	19	20	27		II	SE		4	4	37	I	TI		4	15		I	SE	
	20	28		III	SE	21	20	55		III	TE		11	2	58	41	II	ED	27	2	30		I	OR
	21	55		I	OD		23	8		III	TI		18	4	3	I	OR		2	38		II	SI	
	8	1	24	2	ER	22	22	55		I	TI		19	2	21	I	SE	29	2	25		II	OR	
	19	7		I	TI	23	0	13		I	SI		20	3	20	I	TE	31	2	51	56	III	ER	
	20	23		I	SI		20	14		I	OD		20	2	2	II	TI		4	27		III	OD	
	21	17		I	TE	23	45	15		I	ER													
	22	33		I	SE	24	18	42		I	SI													
	23	21		II	TI		19	34		I	TE													
	9	19	53	43	I	ER	20	52		I	SE		2	3	56	I	SI	11	2	5		III	TE	
	10	20	12		II	OR	22	49		II	OD		3	5	3	I	TI		2	31		I	SE	
	20	14	58	II	ED	25	18	28	17	III	ER		3	4	28	I	OR		3	44		I	TE	
	22	46	32	II	ER	26	20	26		II	TE		4	1	47	I	TE	12	0	54		I	OR	
	14	19	9	III	TE		20	34		II	SI		7	3	57	41	III	ED		2	43	13	II	ED
	22	15		III	SI		23	5		II	SE		10	2	58	41	I	ED	14	2	6		II	TE
	23	49		I	OD						SE		11	1	30	I	TI	17	4	52	2	I	ED	

SEPTEMBER—(Continued)									
d	h	m	s		d	h	m	s	
18	1	5		III SE	25	5	23		I TI
	2	12		I SI	26	1	13	46	I I
	3	12		III TI		4	46		I I
	3	27		I TI	27	0	48		I SE
	4	25		I SE		2	5		I TE
19	2	51		I OR	28	1	43		IV IV
	5	19	13	II ED		2	11		II TI
21	2	7		II TI		3	14		IV IV
	2	13		II SE		4	45		II TI
	4	45		III TE		4	47		II SE
25	2	10		III SI	29	0	14		III OR
	4	6		I SI	30	2	32		II OR
	5	4		III SE					

OCTOBER									
d	h	m	s		d	h	m	s	
3	3	7	7	I ED	19	22	44		I SI
4	0	28		I SI	20	0	0		I TI
	1	46		I TI		0	57		I SE
	2	42		I SE		2	14		I TE
	4	0		I TE		3	48	6	III I
5	1	9		I OR		23	23		I OR
	4	45		II SI	21	4	59	10	II ED
6	1	7		III OD	22	23	11		II SI
	4	16		III OR	23	1	42		II TI
	23	48	20	II ED		1	49		II SE
	7	5	9	II OR		4	7		IV IV
8	23	17		II TE		4	22		II TE
10	5	0	30	I ED	23	7			III TI
11	2	22		I SI	24	2	15		III TI
	3	39		I TI		23	30		II OR
	4	35		I SE		3	15	41	I ED
	23	28	49	I ED	27	0	38		I SI
12	3	2		I OR		1	51		I TI
	23	4		I SE		2	51		I SE
	23	49	35	III ED		4	5		I TE
13	0	22		I TE	28	1	14		I OR
	2	49	22	III ER		22	33		I TE
	5	4		III OD	30	1	45		II SI
14	2	23	48	II ED		4	11		II TI
15	23	11		II TI		4	23		II SE
	23	14		II SE		22	3		III SI
16	1	50		II TE	31	1	3		III SE
18	4	16		I SI		2	3		IV SI
	5	32		I TI		2	49		IV SE
19	1	22	14	I ED		2	53		III TI
	4	55		I OR		6	2		III TE

NOVEMBER									
d	h	m	s		d	h	m	s	
1	1	59		II OR	11	1	31	13	I ED
2	5	9	12	I ED		4	53		I OR
3	2	31		I SI		22	53		I SI
	3	41		I TI		23	57		I TI
	4	45		I SE	12	1	7		I SE
	5	55		I TE		2	11		I TE
	23	37	37	I ED		23	20		I OR
4	3	4		I OR	14	5	59		III SI
	22	8		I TI	15	2	2	0	II ED
	23	13		I SE	16	21	9		IV SE
5	0	23		I TE		22	14		II TI
	21	31		I OR		22	51		II SE
	6	4	20	II SI	17	0	54		II TE
	7	2	1	III SI		4	53		IV IV
	5	2		III SE		6	18		I SI
	23	27	4	III ED		22	48	16	III ER
8	4	25		II OR	18	23	43		III OD
	22	42		IV OR		2	55		III OR
	9	22	31	II TE		3	24	55	I ED
10	4	25		I SI	19	0	47		I SI
	5	30		I TI		1	44		I TI
	23	21		III OR		3	1		I SE

NOVEMBER—(Continued)									
d	h	m	s		d	h	m	s	
19	3	59		I ED	25	5	40	14	IV ER
	21	53	19	I TI		6	24		III OR
20	1	7		I OR		22	19		II OR
	21	29		I SE	26	2	40		I SI
	22	25		I TE		3	31		I TI
22	4	36	46	II ED		4	54		I SE
23	22	47		II SI		5	46		I TE
24	0	35		II TI		23	47	9	I ED
	1	27		II SE	27	2	53		I OR
	3	16		II TE		21	9		I SI
	23	41	11	III ED		21	57		I TI
25	2	47	29	III ER		23	23		I SE
	3	12		III OD	28	0	12		I TE
	4	16	16	IV ED		20	20		III TE
	5	18	44	I ED		21	20		I OR

DECEMBER									
d	h	m	s		d	h	m	s	
1	1	23		II SI	15	6	34		II SI
	2	54		II TI	17	1	38	3	II ED
	4	3		II SE		5	7		II OR
	5	36		II ED	18	5	29	26	I ED
2	3	39	32	III ED		19	52		II SI
	20	28	43	III ED		20	36		II TI
3	0	36		II OR		22	34		II SE
	4	34		I SI		23	18		II TE
	5	16		I TI	19	2	50		I SI
	20	4	IV	TI		3	11		I TI
	22	13	IV	TE		5	4		I SE
4	1	41	7	I ED		5	25		I TE
	4	39		I OR		23	58	5	I ED
	23	2		I SI	20	1	52		III SI
	23	42		I TI		2	34		I OR
5	1	17		I SE		3	11		III TI
	1	57		I TE		5	1		III SE
	20	9	41	I ED		6	21		III TE
	20	33		III TI		21	18		I SI
	21	1		III SE		21	36		I TI
	23	5		I OR		23	33		I SE
	23	44	III	TE		23	51		I TE
6	19	45		I SE	21	18	26	39	I ED
	20	23		I TE		21	0		I OR
8	3	58		II SI	22	18	17		I TE
	5	12		II TI	23	19	47		III OR
	6	39		II SE	24	4	12	40	II ED
9	23	3	25	II ED	25	22	29		II SI
10	2	52		II OR		22	51		II TI
	6	27		I SI	26	1	11		II SE
11	3	35	12	I ED		1	33		II TE
	6	24		I OR		4	44		I SI
	19	58		II SE		4	54		I TI
	21	2		II TE	27	1	52	31	I ED
	22	11	22	IV ED		4	18		I OR
	23	57	47	IV ER		5	51		III SI
12	0	56		I SI		6	26		III TI
	1	27		I TI		20	27		III OR
	3	1		IV OD		23	12		I SI
	3	10		I SE		23	20		I TI
	3	41		I TE	28	1	27		I SE
	5	10		IV OR		1	35		I TE
	21	53		III SI		19	19		IV OR
	22	3	48	I ED		20	21	7	I ED
	23	53		III TI		22	43		I OR
13	0	50		I OR	29	17	41		I SI
	1	1		III SE		17	46		I TI
	3	4		III TE		19	56		I SE
	19	24		I SI		20	0		I TE
	19	53		I TI	30	19	37	0	III ED
	21	39		I SE		23	2		III OR
	22	8		I TE	31	6	47	19	II ED
14	19	16		I OR					

ECLIPSES IN 1918

PREPARED BY R. M. MOTHERWELL.

There will be three eclipses in 1918, two of the Sun and one of the Moon.

I. A Total Eclipse of the Sun, June 8, 1918, the path of totality extending from a point south of Japan across the Pacific Ocean and the United States, ending in the Atlantic Ocean east of the Bahama Islands.

The shadow first touches the United States in the south-western part of the State of Washington, crossing Oregon, Idaho, Wyoming, Colorado, Kansas, Oklahoma, Arkansas, Louisiana, Mississippi, Alabama, Florida. Denver, Colorado, lies almost on the centre of the path, the magnitude of the eclipse there being 1.01.

It is visible in all of Canada as a partial eclipse, ending at sunset in the maritime provinces and beginning at 5 o'clock p.m. in central western Canada.

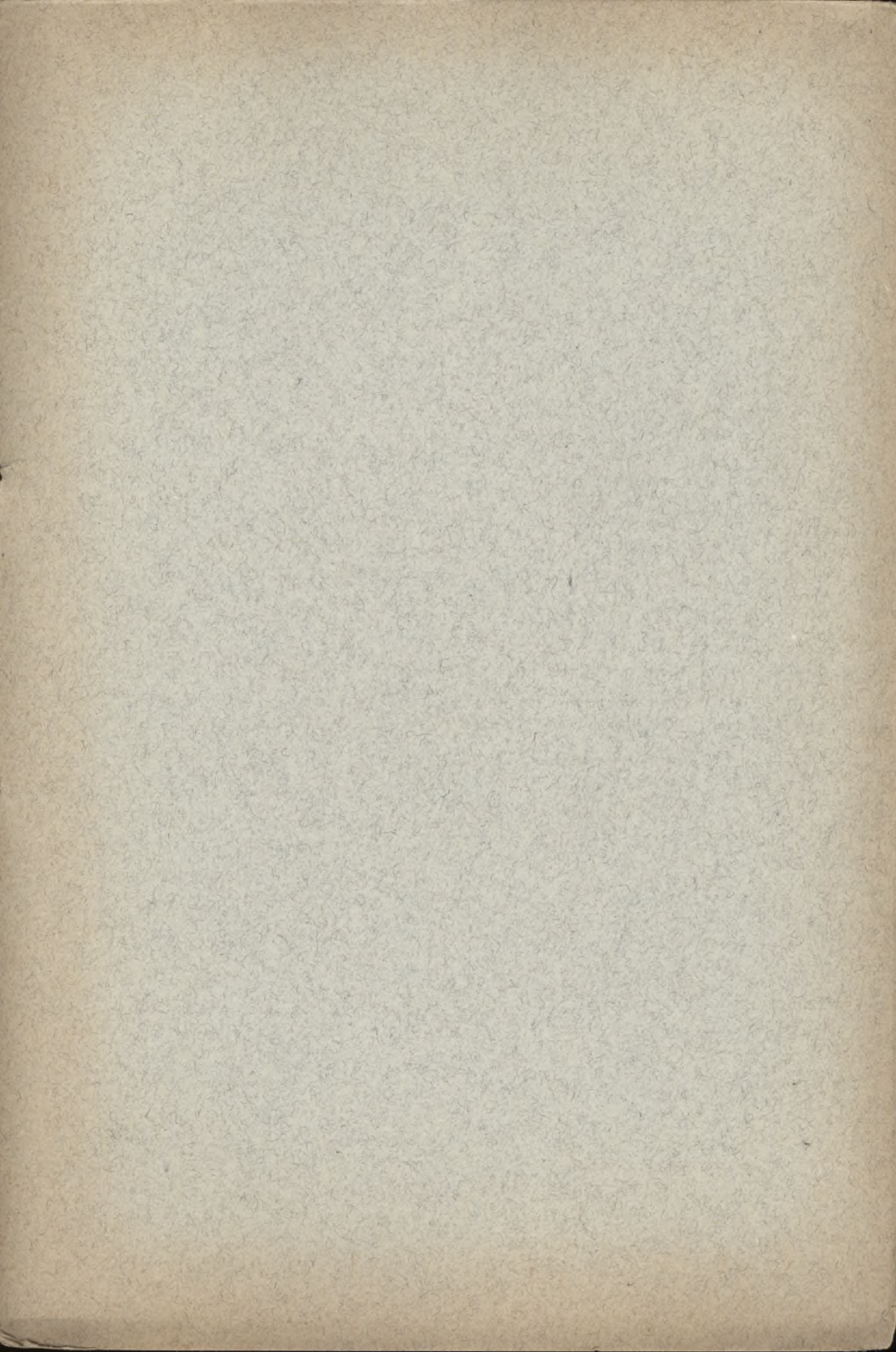
II. A Partial Eclipse of the Moon, June 23-24, 1918; the beginning visible generally in South America, except the eastern portion, North America, except the northern portion, throughout the Pacific Ocean and Australia; the ending visible generally in southwestern North America, western and southern South America, throughout the Pacific Ocean and Australia.

Circumstances of the Eclipse:—

Moon enters penumbra	June 23d 15h 8.7m (= June 24, 3h 8.7m a.m. E.S.T.)
Moon enters umbra	" 23 16 46.4
Middle of the eclipse	" 23 17 28.0
Moon leaves umbra	" 23 18 9.8
Moon leaves penumbra	" 23 19 47.1

(Eastern Standard Astronomical Time.)

III. An Annular Eclipse of the Sun, December 3, 1918, invisible in Canada but visible as a partial eclipse in South America, except the northern part, and also on the southwestern coast of Africa. The line of annulus crosses South America, touching Santiago and Buenos Ayres.



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For further information, address J. R. Collins, Secretary, at the same address.