



THE ROYAL ASTRONOMICAL SOCIETY OF CANADA
OBSERVER'S CALENDAR

2014





JANUARY

AURORA BOREALIS lights up the sky in Yellowknife, Northwest Territories, the spectacular result of a coronal mass ejection as it encountered the Earth's atmosphere. Our Sun, Sol is beginning the downward phase of its current solar cycle, the weakest on record in the past 100 years. Excited oxygen and nitrogen atoms over 100 km in altitude produce the green colour. | PHOTO BY CHRISTOPHER GATTO

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

THE PLANETS THIS MONTH

Mercury	low in WSW after mid-month
Venus	very low in SE, observed with difficulty at end of month
Mars	rises near midnight in E, transits high in south near dawn
Jupiter	low in E in evening twilight, transits near midnight, low in WNW at dawn
Saturn	rises in SE after 3 am, in S near sunrise

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



40°N 50°N
Rise 7:10 7:40
Set 17:28 16:59

1

New Moon
6:14

NEW YEAR'S DAY
International Year of the Quiet Sun throughout 1964, 50 years ago
Comet ISON's broad fan quickly becomes edge-on in two weeks



40°N 50°N
Rise 8:02 8:26
Set 18:41 18:18


2



40°N 50°N
Rise 8:47 9:05
Set 19:54 19:38

3

Quadrantid meteors (ZHR=120) 3 pm
Moon occults double star Beta Cap SE of graze from S Vancouver Island to central SK this evening
Mars Rover Spirit landed on Mars 10 years ago




40°N 50°N
Rise 9:26 9:38
Set 21:05 20:57

4

Sunrise 7:22 7:58
Sunset 16:48 16:12


Earth at perihelion (147,104,781 km)



40°N 50°N
Rise 10:03 10:07
Set 22:14 22:13

5

Jupiter at opposition (m=-2.7)



40°N 50°N
Rise 10:37 10:34
Set 23:21 23:27

6



40°N 50°N
Rise 11:10 11:01
Set — —

7

First Quarter
22:39


3 Juno 40' NE Neptune early this evening
D.F.J. Arago presented daguerreotype for use in astronomy, 175 years ago



40°N 50°N
Rise 0:25 0:38
Set 11:43 11:28

8

19 Fortuna at opposition (m=9.7)
3 Juno 30' N Neptune early this evening



40°N 50°N
Rise 1:27 1:46
Set 12:19 11:58

9


Lunar Straight Wall this evening
3 Juno 40' NW Neptune early this evening
Thomas Henderson measured distance to Alpha Centauri, 175 years ago



40°N 50°N
Rise 2:26 2:51
Set 12:56 12:31

10

Possible ISON meteor shower and noctilucent clouds (NLC) next few nights



40°N 50°N
Rise 3:23 3:52
Set 13:37 13:08

11

Sunrise 7:22 7:56
Sunset 16:55 16:21

Venus at inferior conjunction
11 Parthenope at opposition (m=9.9)



40°N 50°N
Rise 4:17 4:48
Set 14:22 13:51

12



40°N 50°N
Rise 5:07 5:39
Set 15:10 14:39

13


Wilhelm Wien, known for blackbody radiation laws, was born 150 years ago



40°N 50°N
Rise 5:53 6:24
Set 16:01 15:32

14


Moon 6° to lower right of Jupiter this evening



40°N 50°N
Rise 6:35 7:02
Set 16:55 16:29


15

Full Moon 23:52
ISON has dust anti-tail and gas-lined spike due plane crossing
Moon occults Lambda Gem visible NW of graze from central B.C. NE-ward in the wee hours
Today's full Moon is the Wolf Moon




40°N 50°N
Rise 7:12 7:36
Set 17:50 17:28

16



40°N 50°N
Rise 7:46 8:05
Set 18:46 18:30

17




40°N 50°N
Rise 8:18 8:31
Set 19:43 19:32

18

Sunrise 7:19 7:50
Sunset 17:03 16:31

ISON slowly appears less edge-on next two weeks



40°N 50°N
Rise 8:48 8:55
Set 20:40 20:35

19


8th mag ISON within 1° of spiral galaxy IC 342 in Cam



40°N 50°N
Rise 9:17 9:18
Set 21:38 21:39


20

MARTIN LUTHER KING JR. DAY (USA)



40°N 50°N
Rise 9:46 9:42
Set 22:37 22:44


21



40°N 50°N
Rise 10:16 10:06
Set 23:37 23:51


22

Moon within 1.5° N of Spica late tonight, Mars nearby



40°N 50°N
Rise 10:50 10:33
Set — —


23



40°N 50°N
Rise 0:39 0:59
Set 11:26 11:05

24

Last Quarter 0:19
Lunar Curtiss X visible in Alaska 1 pm
ISON sweeps through Kemble's Cascade and star cluster NGC 1502
David Gill, pioneer of stellar mapping by photography, died 100 years ago
Mars rover Opportunity landed on Mars 10 years ago




40°N 50°N
Rise 1:43 2:09
Set 12:09 11:42

25

Sunrise 7:15 7:43
Sunset 17:11 16:42

Moon 1.6° to lower right of Saturn before dawn



40°N 50°N
Rise 2:48 3:17
Set 12:58 12:28


26

ISON's narrow tail briefly occults planetary nebula NGC 1501



40°N 50°N
Rise 3:51 4:23
Set 13:56 13:24


27



40°N 50°N
Rise 4:51 5:22
Set 15:01 14:30

28


18 Melpomene at opposition (m=9.3)



40°N 50°N
Rise 5:45 6:13
Set 16:12 15:45

29


Crescent Moon 6° to lower left of Venus in bright morning twilight



40°N 50°N
Rise 6:34 6:57
Set 17:25 17:05

30

New Moon 16:38



40°N 50°N
Rise 7:18 7:33
Set 18:39 18:27

31

CHINESE NEW YEAR (SNAKE)
Mercury at greatest elongation (18° E) this evening (m=-0.9)
Crescent Moon 5° right of Mercury in bright evening twilight

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Detailed instructions on adjusting times for location are given in the back pages.

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FEBRUARY

OUR MILKY WAY GALAXY contains some 200 globular star clusters arranged about its outer perimeter. Omega Centauri is the largest (4 million solar masses) and brightest (+4 magnitude). Omega Centauri is 18 000 light-years distant in the constellation Centaurus and has a diameter of 150 light-years. With stars 12 billion years old, it predates our Sun and Solar System by at least 7 billion years. Visually it is the size of the full Moon and a must-see for all astronomers. | PHOTO BY DEBRA AND PETER CERAVOLO

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

THE PLANETS THIS MONTH

- Mercury** very low in WSW in evening twilight early in month, by end of month emerges very low in ESE in morning twilight
- Venus** low in SE in morning twilight
- Mars** rises in ESE near 11 pm, transits in S near 4 am
- Jupiter** high in SE after dark, transits near 9 pm, sets in NW near 5 am
- Saturn** rises in SE after 1 am, in S near dawn

JAN	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	

MAR	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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40°N 50°N
Rise 7:57 8:05
Set 19:52 19:47
Sunrise 7:09 7:34
Sunset 17:19 16:54

1




40°N 50°N
Rise 8:34 8:35
Set 21:02 21:05

2



40°N 50°N
Rise 9:08 9:03
Set 22:10 22:19

3



40°N 50°N
Rise 9:43 9:31
Set 23:15 23:31


4

Neptune 2.5° left of Mercury next few evenings, very low in twilight, telescopic challenge



40°N 50°N
Rise 10:19 10:00
Set — —

5




40°N 50°N
Rise 0:17 0:39
Set 10:56 10:33

6

First Quarter 14:22

Lunar X near crater Werner visible in N. America except Newfoundland 11:50 pm

Two shadows on Jupiter visible in N. America except east coast, best in W 5:23 am



40°N 50°N
Set 1:16 1:42
Rise 11:37 11:09

7

Lunar Straight Wall this evening

First untethered space walk from Space Shuttle, 30 years ago




40°N 50°N
Set 2:11 2:41
Rise 12:20 11:50
Sunrise 7:01 7:23
Sunset 17:28 17:06

8



40°N 50°N
Set 3:03 3:34
Rise 13:07 12:36

9



40°N 50°N
Set 3:50 4:21
Rise 13:57 13:27

10

FAMILY DAY (BC)
Moon 6° to lower right of Jupiter this evening



40°N 50°N
Set 4:33 5:02
Rise 14:50 14:22

11




40°N 50°N
Set 5:12 5:37
Rise 15:44 15:21

12



40°N 50°N
Set 5:48 6:08
Rise 16:40 16:22

13




40°N 50°N
Set 6:20 6:36
Rise 17:37 17:24

14

Full Moon 18:53

VALENTINE'S DAY
Today's full Moon is the Snow Moon




40°N 50°N
Set 6:51 7:01
Rise 18:34 18:27
Sunrise 6:53 7:11
Sunset 17:36 17:18

15

Venus at greatest illuminated extent (m=-4.9) this morning

Galileo was born 450 years ago



40°N 50°N
Set 7:21 7:25
Rise 19:32 19:31

16

Rhaeticus, author of a book supporting the heliocentric system, was born 500 years ago



40°N 50°N
Set 7:50 7:48
Rise 20:31 20:36


17

FAMILY DAY (AB, ON, SK)
LOUIS RIEL DAY (MB)
WASHINGTON'S BIRTHDAY (USA)



40°N 50°N
Set 8:21 8:12
Rise 21:31 21:42

18



40°N 50°N
Set 8:53 8:39
Rise 22:32 22:49


19

Moon 1.5° right of Spica before dawn, Mars nearby



40°N 50°N
Set 9:28 9:08
Rise 23:34 23:57

20




40°N 50°N
Set 10:07 9:43
Rise — —

21

Moon occults double star Alpha Lib visible in E of Newfoundland in the wee hours

Moon 6° right of Saturn before dawn




40°N 50°N
Rise 0:36 1:04
Set 10:53 10:24
Sunrise 6:44 6:57
Sunset 17:44 17:30

22

Last Quarter 12:15


Zodiacal light readily visible from a dark site in W after evening twilight for next two weeks



40°N 50°N
Rise 1:38 2:08
Set 11:45 11:14


23

Lunar Curtiss X visible in E of N. America 3 am




40°N 50°N
Rise 2:37 3:08
Set 12:44 12:13

24



40°N 50°N
Rise 3:32 4:01
Set 13:49 13:21


25



40°N 50°N
Rise 4:22 4:47
Set 14:59 14:36

26


2 Pallas at opposition (m=7.0)
Crescent Moon 2.5° to lower left of Venus at dawn



40°N 50°N
Rise 5:07 5:26
Set 16:12 15:55

27

Moon 5.5° to upper right of Mercury in bright morning twilight



40°N 50°N
Rise 5:48 6:00
Set 17:25 17:15

28



MARCH

SINUS IRIDIUM (Bay of Rainbows) is located in the Moon's north-western region. It is the remnant of an ancient impact basin formed 3.8 billion years ago. Crater Bianchini and its less-pronounced neighbour crater Sharp lie in the Montes Jura. The smaller craters Helicon and le Verrier lie side by side and to the south-east in Mare Imbrium. | PHOTO BY MICHAEL WIRTHS

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY


FRIDAY

SATURDAY

THE PLANETS THIS MONTH

- Mercury** very low in ESE in morning twilight with increasing difficulty toward the end of month
- Venus** in SE in morning twilight
- Mars** rises in ESE near 10 pm, transits in S near 3 am
- Jupiter** high in S after dark, sets in NW near 4 am
- Saturn** rises in SE after 11 pm, transits in S near 4 am

1


 40°N 50°N
Rise 6:26 6:31
Set 18:36 18:35
Sunrise 6:34 6:43
Sunset 17:52 17:42

New Moon 3:00

Mars stationary


Young crescent Moon, 15 hours after new in E, 19 hours after new in W a difficult challenge soon after sunset

2


 40°N 50°N
Rise 7:03 7:00
Set 19:47 19:52

Saturn stationary


3

 40°N 50°N
Rise 7:38 7:29
Set 20:55 21:07


4

 40°N 50°N
Rise 8:15 7:59
Set 22:00 22:19

5


 40°N 50°N
Rise 8:53 8:32
Set 23:02 23:27

6

 40°N 50°N
Rise 9:33 9:07
Set — —


Jupiter stationary

7

 40°N 50°N
Set 0:01 0:29
Rise 10:16 9:47


Moon 1.7° above Aldebaran this evening

8

 40°N 50°N
Set 0:55 1:26
Rise 11:03 10:32
Sunrise 6:23 6:29
Sunset 17:59 17:54


First Quarter 8:27

9

 40°N 50°N
Set 1:45 3:16
Rise 12:52 12:21

Daylight Saving Time begins 2 am
Lunar Straight Wall this evening
David Fabricius, colleague of Brahe and Kepler, was born 450 years ago

10

 40°N 50°N
Set 3:30 3:59
Rise 13:44 13:15

Moon occults double star Lambda Gem visible in N. America except far S this evening

11

 40°N 50°N
Set 4:10 4:36
Rise 14:37 14:12


12

 40°N 50°N
Set 4:47 5:09
Rise 15:32 15:12

13


 40°N 50°N
Set 5:21 5:38
Rise 16:29 16:14

14


 40°N 50°N
Set 5:52 6:04
Rise 17:26 17:17

Mercury at greatest elongation (28° W) this morning (m=0.1)

15


 40°N 50°N
Set 6:23 6:29
Rise 18:24 18:21
Sunrise 7:12 7:14
Sunset 19:07 19:05

16

 40°N 50°N
Set 6:53 6:53
Rise 19:23 19:26


Full Moon 13:09
Two shadows on Jupiter visible in N. America in daylight, except Atlantic Canada in darkness 6:21 pm
Ernst Tempel, discoverer of comets and asteroids, died 125 years ago

17

 40°N 50°N
Set 7:23 7:17
Rise 20:23 20:33


ST. PATRICK'S DAY

18

 40°N 50°N
Set 7:55 7:43
Rise 21:25 21:40


Moon-Mars-Spica loose group this evening

19

 40°N 50°N
Set 8:30 8:12
Rise 22:27 22:48


163 Erigone occults Regulus later tonight

20


 40°N 50°N
Set 9:08 8:45
Rise 23:29 23:56

Spring Equinox 12:57 pm
Moon occults double star Alpha Lib visible N of graze Prince George to Edmonton before dawn
163 Erigone occults REGULUS! NYC-Kingston-NWward in 108km wide path 2 am
Moon 1.1° to lower left of Saturn

21


 40°N 50°N
Set 9:52 9:24
Rise — —

22

 40°N 50°N
Rise 0:31 1:01
Set 10:41 10:11
Sunrise 7:00 6:59
Sunset 19:14 19:16


Zodiacal light readily visible from a dark site in W after evening twilight for next two weeks
Venus at greatest elongation (47° W) this morning

23

 40°N 50°N
Rise 1:30 2:01
Set 11:37 11:06


Last Quarter 21:46
Two shadows on Jupiter visible in N. America, but W coast in daylight 10:08 pm

24

 40°N 50°N
Rise 2:25 2:55
Set 12:39 12:09

Winter Star Party, Florida Keys www.scas.org/wsp.html (through Mar 2)


25

 40°N 50°N
Rise 3:15 3:42
Set 13:45 13:20

26


 40°N 50°N
Rise 4:01 4:22
Set 14:53 14:34

27

 40°N 50°N
Rise 4:42 4:57
Set 16:04 15:51


Crescent Moon 2.6° to upper left of Venus at dawn

28

 40°N 50°N
Rise 5:20 5:29
Set 17:14 17:09


4 Vesta unaided next few nights, a challenge (m=6.0)

29

 40°N 50°N
Rise 5:57 5:58
Set 18:24 18:26
Sunrise 6:49 6:43
Sunset 19:21 19:27


Earth Hour (8:30–9:30 pm local) www.earthhour.org

30

 40°N 50°N
Rise 6:32 6:27
Set 19:32 19:42

New Moon 14:45

31

 40°N 50°N
Rise 7:08 6:56
Set 20:39 20:55

FEB	S	M	T	W	T	F	S
							1
	2	3	4	5	6	7	8
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	16	17	18	19	20	21	22
	23	24	25	26	27	28	

APR	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			

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APRIL

COMET PAN-STARRS (9c/2011 L4) is non-periodic, meaning it is making its first visit to our Sun. The comet appears to compete for the viewer's attention with a day-old Moon that is bathed in Earthshine (sunlight reflected from Earth to the unlit side of the Moon and back to Earth again) and clearly shows the major Maria as well as the Ocean of Storms. | PHOTO BY ALAN DYER

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

THE PLANETS THIS MONTH

- Mercury** visible with difficulty early in the month
- Venus** low in ESE in morning twilight
- Mars** in SE after dark transits high in S near 1 am
- Jupiter** in W after dark sets in NW near 2 am
- Saturn** rises after dark in SE, transits in S near 3 am




40°N 50°N
Rise 7:46 7:28
Set 21:44 22:06

1



40°N 50°N
Rise 8:26 8:02
Set 22:46 23:12


2



40°N 50°N
Rise 9:09 8:41
Set 23:43 —

3

Moon occults double star Delta 1 Tau visible in N. America except S USA this evening
Moon 2.0° to right of Aldebaran in the evening




40°N 50°N
Set — 0:13
Rise 9:55 9:25

4



40°N 50°N
Set 0:36 1:07
Rise 10:44 10:13
Sunrise 6:38 6:28
Sunset 19:28 19:38

5



40°N 50°N
Set 1:24 1:53
Rise 11:35 11:06

6

Jupiter visible in daylight 7° north of Moon, a challenge just before sunset
First in-orbit repair of satellite (Solar Max), 30 years ago




40°N 50°N
Set 2:06 2:34
Rise 12:28 12:02

7

First Quarter
4:31

Lunar Straight Wall tonight


Lunar X near crater Werner visible in W of N. America 4 am



40°N 50°N
Set 2:45 3:08
Rise 13:23 13:01


8

Mars at opposition (m=-1.5)



40°N 50°N
Set 3:20 3:38
Rise 14:19 14:02

9



40°N 50°N
Set 3:52 4:05
Rise 15:15 15:04

10



40°N 50°N
Set 4:23 4:31
Rise 16:13 16:07


11



40°N 50°N
Set 4:53 4:55
Rise 17:11 17:12
Sunrise 6:27 6:14
Sunset 19:35 19:49

12


Neptune 45' S of Venus, very low in morning twilight, telescopic challenge



40°N 50°N
Set 5:23 5:19
Rise 18:12 18:19

13

4 Vesta at opposition (m=5.7)




40°N 50°N
Set 5:55 5:45
Rise 19:13 19:27

14

Total lunar eclipse after midnight

Moon 1.5° above Spica, Mars nearby this evening



40°N 50°N
Set 6:29 6:13
Rise 20:17 20:36

15


Full Moon
3:42

FIRST DAY OF PASSOVER

Total lunar eclipse visible in all N. America, sets during totality for Atlantic Canada

1 Ceres at opposition (m=7.0)


Today's full Moon is the Pink Moon



40°N 50°N
Set 7:07 6:45
Rise 21:20 21:45

16

Moon 1.5° below Saturn later this evening



40°N 50°N
Set 7:49 7:23
Rise 22:24 22:53

17




40°N 50°N
Set 8:38 8:08
Rise 23:25 23:56

18

GOOD FRIDAY

4 Vesta unaided next two weeks, a challenge (m=5.8)




40°N 50°N
Set 9:32 9:01
Rise — —
Sunrise 6:17 5:59
Sunset 19:42 20:00

19

43 Ariadne at opposition (m=9.9)

Warren de la Rue, creator of the photoheliograph, died 125 years ago



40°N 50°N
Rise 0:21 0:52
Set 10:33 10:03

20

EASTER SUNDAY



40°N 50°N
Rise 1:13 1:41
Set 11:37 11:11

21

Moon occults double star Rho Sgr visible in W of N. America before dawn



40°N 50°N
Rise 1:59 2:22
Set 12:44 12:23

22

Last Quarter
3:52

Lyrid meteors (ZHR=20) 1 pm

Moon occults double star Beta Cap W of N. America, graze S of Edmonton, before dawn



40°N 50°N
Rise 2:41 2:58
Set 13:52 13:38

23

Lunar Curtiss X visible in W of N. America except N 6 am



40°N 50°N
Rise 3:19 3:30
Set 15:00 14:53

24



40°N 50°N
Rise 3:55 3:59
Set 16:08 16:08


25



40°N 50°N
Rise 4:30 4:27
Set 17:16 17:22
Sunrise 6:07 5:46
Sunset 19:50 20:11


26

Crescent Moon 7° left of Venus at dawn




40°N 50°N
Rise 5:05 4:55
Set 18:22 18:35

27



40°N 50°N
Rise 5:41 5:25
Set 19:27 19:47

28




40°N 50°N
Rise 6:19 5:58
Set 20:30 20:55

29

New Moon
2:14

Annular solar eclipse visible Antarctica-E Australia

Young crescent Moon, 18 hours after new in E, 22 hours after new in W a difficult challenge soon after sunset



40°N 50°N
Rise 7:01 6:35
Set 21:30 21:58

30

MAR	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					

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

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MAY

THE LARGE MAGELLANIC CLOUD is a companion galaxy to our Milky Way. It is a rare irregular galaxy and referred to by some as a dwarf spiral galaxy. While structure is not observable visually, the bar and spiral structure has been captured in this photo. In 1987, a supernova occurred in the Large Magellanic Cloud, which was the closest observed supernova in the past 4 centuries. It is 163 000 light-years from our Milky Way Galaxy. | PHOTO BY ALAN DYER

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

THE PLANETS THIS MONTH

Mercury	becoming best evening apparition before end of month
Venus	very low in E in morning twilight
Mars	high in S after dark, sets in W near 4 am
Jupiter	in W during twilight, sets in NW near midnight
Saturn	in SE at dusk, transits in S near 1 am, sets in SW near dawn

APR	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			

JUN	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					

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Times for events involving planetary satellites refer to the start time.

Detailed instructions on adjusting times for location are given in the back pages.


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Rise	40°N 50°N	1
Set	7:46 7:17 22:25 22:56	



Rise	40°N 50°N	2
Set	8:34 8:03 23:16 23:46	




Rise	40°N 50°N	3
Set	9:25 8:55 — —	

Sunrise 5:58 5:33
Sunset 19:57 20:22

4 Vesta unaided next few nights, a challenge (m=6.0)

Moon 9° below Jupiter this evening



Set	40°N 50°N	4
Rise	0:01 0:30 10:18 9:51	



Set	40°N 50°N	5
Rise	0:42 1:07 11:13 10:49	




Set	40°N 50°N	6
Rise	1:18 1:39 12:08 11:49	



Set	40°N 50°N	7
Rise	1:51 2:07 13:04 12:50	



Set	40°N 50°N	8
Rise	2:22 2:33 14:00 13:52	



Set	40°N 50°N	9
Rise	2:52 2:57 14:58 14:56	



Set	40°N 50°N	10
Rise	3:22 3:21 15:57 16:01	

Sunrise 5:50 5:22
Sunset 20:04 20:32

Moon 8° left of Jupiter this evening


International Astronomy Week (through May 10)

Eta-Aquariid meteors (ZHR=60) 4 am
Mercury 3.0° below the Pleiades in bright evening twilight

Lunar Straight Wall this evening
Mercury 2.5° lower left of Pleiades in bright evening twilight

Robert Hooke discovered Jupiter's Great Red Spot 350 years ago

International Astronomy Day
www.rasc.ca/astroday
www.astroleague.org/al/astroday/astrodayform.html
Saturn at opposition (m=0.1)
Moon 5° to lower right of Mars this evening



Set	40°N 50°N	11
Rise	3:53 3:46 16:58 17:08	



Set	40°N 50°N	12
Rise	4:25 4:12 18:01 18:17	



Set	40°N 50°N	13
Rise	5:02 4:43 19:05 19:28	



Set	40°N 50°N	14
Rise	5:43 5:18 20:10 20:38	



Set	40°N 50°N	15
Rise	6:30 6:01 21:14 21:44	



Set	40°N 50°N	16
Rise	7:23 6:52 22:14 22:45	



Set	40°N 50°N	17
Rise	8:23 7:52 23:09 23:38	

Sunrise 5:43 5:12
Sunset 20:10 20:42

MOTHER'S DAY


Two shadows on Jupiter visible in Alaska and Yukon 5:24 am
Moon approaching Saturn later this evening

The Orgueil chondrite fell in France 150 years ago
Today's full Moon is the Flower Moon

Uranus 1.5° N of Venus, very low in morning twilight, telescopic challenge
9 Metis at opposition (m=9.6)



Set	40°N 50°N	18
Rise	9:28 9:00 23:58 —	



Rise	40°N 50°N	19
Set	— 0:23 10:36 10:13	



Rise	40°N 50°N	20
Set	0:42 1:01 11:44 11:27	



Rise	40°N 50°N	21
Set	1:21 1:34 12:53 12:43	



Rise	40°N 50°N	22
Set	1:57 2:03 14:00 13:57	



Rise	40°N 50°N	23
Set	2:32 2:31 15:06 15:10	



Rise	40°N 50°N	24
Set	3:06 2:58 16:12 16:22	

Sunrise 5:38 5:03
Sunset 20:16 20:51


VICTORIA DAY (CANADA)

Mars stationary

RTMC Astronomy Expo, Big Bear, CA
www.rtmcastronomyexpo.org (through May 26)

Jupiter with only one satellite visible in E of N. America 8:57 pm
209P (LINEAR) Meteor outburst tonight
Johannes Zupo observed phases of Mercury 375 years ago


209P (LINEAR) Meteor outburst, radiant in Camelopardalis 3 am



Rise	40°N 50°N	25
Set	3:40 3:27 17:16 17:33	




Rise	40°N 50°N	26
Set	4:17 3:58 18:18 18:41	




Rise	40°N 50°N	27
Set	4:56 4:32 19:19 19:46	




Rise	40°N 50°N	28
Set	5:39 5:11 20:16 20:46	



Rise	40°N 50°N	29
Set	6:26 5:56 21:08 21:39	



Rise	40°N 50°N	30
Set	7:16 6:45 21:56 22:25	



Rise	40°N 50°N	31
Set	8:08 7:39 22:39 23:05	

Sunrise 5:34 4:57
Sunset 20:22 20:59

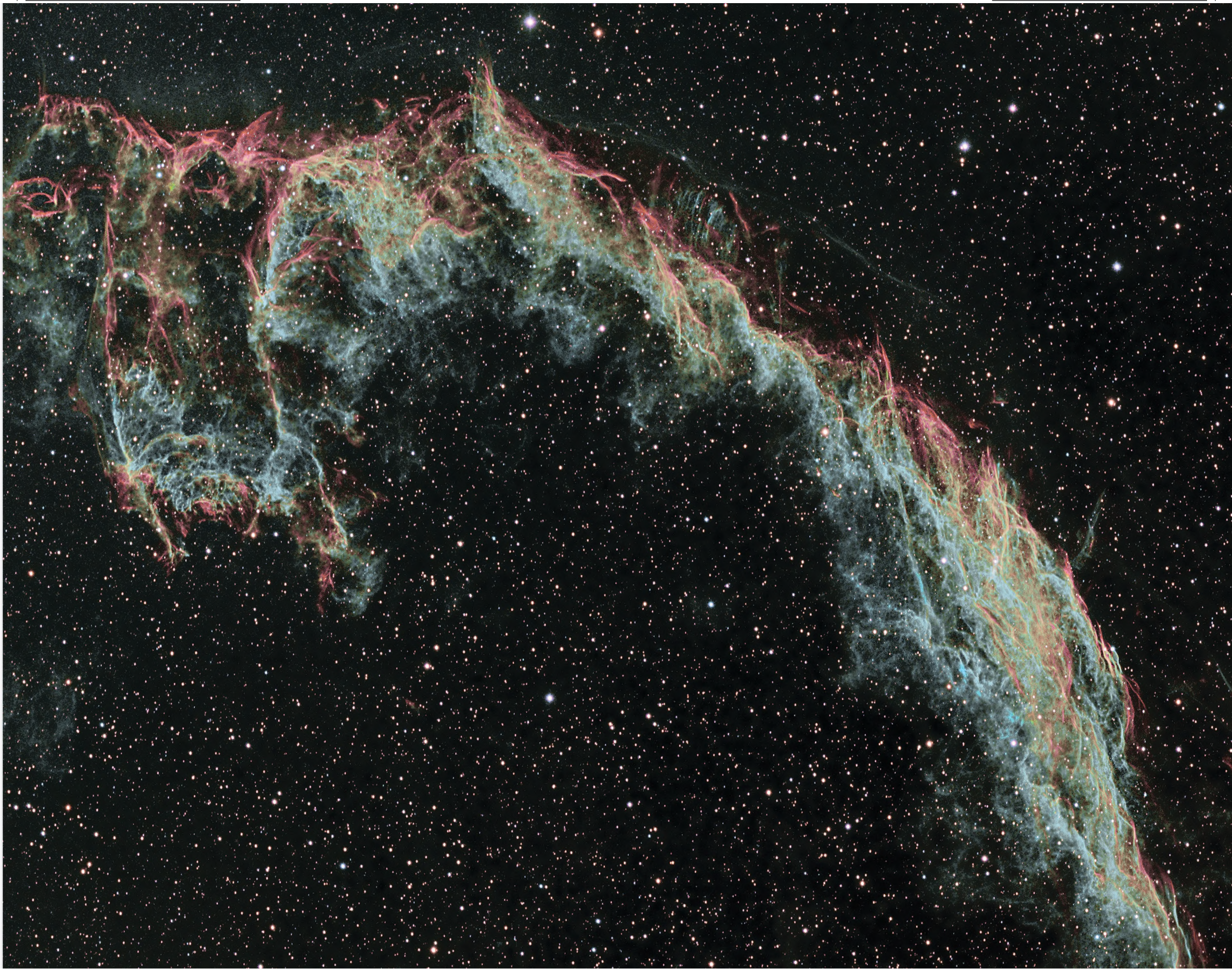
Texas Star Party, Fort Davis, TX
texasstarparty.org (through June 1)
Mercury at greatest elongation (23° E), best evening apparition of the year (m=0.3)
Moon 2.4° above Venus in morning twilight

MEMORIAL DAY (USA)

New Moon 14:40

Jupiter with only one satellite visible in E of N. America except Newfoundland 10:57 pm
Crescent Moon 7° left of Mercury in bright evening twilight


Jupiter with only one satellite visible in W of N. America except NW 12:04 am
Moon occults double star Lambda Gem visible in W of N. America this evening



JUNE

THE EASTERN HALF of the Veil Nebula is part of a supernova remnant that formed in a cataclysmic explosion some 30 000 years ago. It is located in the left wing of the constellation Cygnus between stars Epsilon Cygni and Zeta Cygni. The red is produced by hydrogen, the greens by oxygen, and a mix of yellows and oranges in between are the results of the former star's elements spreading across the interstellar medium. | PHOTO BY LYNN HILBORN

SUNDAY


 **1**
40°N 50°N
Rise 9:02 8:37
Set 23:17 23:40

Watch for noctilucent clouds in N sky during twilight this month. Best N of 50° latitude

Mercury within 0.1° of star cluster M35 this evening, visible in binoculars from the S USA


15 Eunomia at opposition (m=9.5)
Crescent Moon 10° left of Jupiter this evening

MONDAY

 **2**
40°N 50°N
Rise 9:58 9:36
Set 23:51 —

Mercury within 0.5° of star cluster M35 this evening, visible in binoculars from the S USA


TUESDAY

 **3**
40°N 50°N
Set — 0:09
Rise 10:53 10:37

WEDNESDAY

 **4**
40°N 50°N
Set 0:23 0:36
Rise 11:49 11:39

THURSDAY

 **5**
40°N 50°N
Set 0:53 1:00
Rise 12:46 12:41

First Quarter
16:39

Lunar Straight Wall tonight
Lunar X near crater Werner visible in far W of N. America 3 am

FRIDAY


 **6**
40°N 50°N
Set 1:22 1:24
Rise 13:43 13:44

SATURDAY

 **7**
40°N 50°N
Set 1:52 1:47
Rise 14:42 14:50
Sunrise 5:32 4:53
Sunset 20:27 21:06


Jupiter with only one satellite visible in W of N. America except NW 1:03 am


Moon 2.5° below Mars this evening

 **8**
40°N 50°N
Set 2:23 2:13
Rise 15:43 15:57

CASCA, Québec City, Québec (through June 11)

Moon 1.5° left of Spica and separating this evening


 **9**
40°N 50°N
Set 2:57 2:41
Rise 16:46 17:06

 **10**
40°N 50°N
Set 3:35 3:13
Rise 17:51 18:16

Moon separating from Saturn this evening

 **11**
40°N 50°N
Set 4:18 3:52
Rise 18:56 19:25


 **12**
40°N 50°N
Set 5:09 4:39
Rise 19:59 20:30

 **13**
40°N 50°N
Set 6:07 5:36
Rise 20:58 21:29


Full Moon
0:11


Today's full Moon is the Strawberry Moon

 **14**
40°N 50°N
Set 7:12 6:42
Rise 21:52 22:19
Sunrise 5:31 4:51
Sunset 20:30 21:10

 **15**
40°N 50°N
Set 8:21 7:55
Rise 22:39 23:01

FATHER'S DAY

 **16**
40°N 50°N
Set 9:31 9:12
Rise 23:21 23:37

 **17**
40°N 50°N
Set 10:42 10:29
Rise 23:59 —

 **18**
40°N 50°N
Rise — 0:08
Set 11:51 11:46

 **19**
40°N 50°N
Rise 0:35 0:36
Set 12:59 13:00

Last Quarter
14:39


 **20**
40°N 50°N
Rise 1:09 1:04
Set 14:04 14:13

 **21**
40°N 50°N
Rise 1:43 1:32
Set 15:09 15:24
Sunrise 5:32 4:51
Sunset 20:32 21:13

Summer Solstice 6:51 am

Lunar Curtiss X visible in N. America except N and E 5 am

 **22**
40°N 50°N
Rise 2:19 2:01
Set 16:11 16:32

 **23**
40°N 50°N
Rise 2:56 2:34
Set 17:12 17:37

 **24**
40°N 50°N
Rise 3:37 3:11
Set 18:09 18:38

 **25**
40°N 50°N
Rise 4:22 3:52
Set 19:03 19:33

 **26**
40°N 50°N
Rise 5:10 4:39
Set 19:52 20:22


New Moon in June Star Party
www.toronto.rasc.ca (through June 29)
RASC General Assembly hosted by the Victoria Centre www.rasc.ca/ga2014 (through Jun 29)

 **27**
40°N 50°N
Rise 6:01 5:31
Set 20:36 21:04


New Moon
4:09

 **28**
40°N 50°N
Rise 6:55 6:27
Set 21:16 21:41
Sunrise 5:34 4:54
Sunset 20:33 21:13

1 Ceres 30' from 4 Vesta and closing
Maria Mitchell, prominent U.S. astronomer and educator, died 125 years ago

 **29**
40°N 50°N
Rise 7:49 7:26
Set 21:52 22:12

FIRST DAY OF RAMADAN

 **30**
40°N 50°N
Rise 8:45 8:26
Set 22:25 22:40

39 Laetitia at opposition (m=9.9)

THE PLANETS THIS MONTH

Mercury low in WNW in evening twilight first week of month, lost by mid-month

Venus very low in ENE in morning twilight

Mars in SW after dark, sets in W near 2 am

Jupiter low in W soon after sunset, lost in twilight late this month

Saturn in S at dusk, sets in SW near dawn

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	

JUL	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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JULY

THE LAGOON NEBULA (M8) is one of our few naked-eye birthplaces of stars. Above the Teapot's Spout and to the right of its Lid, this stellar nursery is located in the Sagittarius Arm of our Milky Way Galaxy, next door to the Orion Arm, home to our Sun. The pink glow is the excited hydrogen of the cloud surrounding the young hot cluster of stars at the centre of the Lagoon. | PHOTO BY DEBRA AND PETER CERAVOLO

SUNDAY

JUN	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						

AUG	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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MONDAY


TUESDAY

WEDNESDAY


THURSDAY

FRIDAY


SATURDAY

 40°N 50°N
Set 0:55 0:42
Rise 14:29 14:46 **6**

Mars approaches Spica this week in the evening


 40°N 50°N
Set 1:30 1:11
Rise 15:32 15:54 **7**

Moon 1.3° below Saturn this evening


 40°N 50°N
Set 2:09 1:45
Rise 16:35 17:03 **8**

CANADA DAY

Watch for noctilucent clouds in N sky during twilight this month. Best N of 50° latitude

 40°N 50°N
Set 2:56 2:27
Rise 17:39 18:10 **9**

 40°N 50°N
Set 3:49 3:18
Rise 18:41 19:12 **10**


 40°N 50°N
Set 4:50 4:19
Rise 19:38 20:07 **11**

INDEPENDENCE DAY (USA)


Earth at aphelion (152,093,404 km)
Pluto at opposition (m=14.1)

 40°N 50°N
Set 5:58 5:30
Rise 20:30 20:54
Sunrise 5:42 5:05
Sunset 20:29 21:06 **12**


Lunar Straight Wall this evening
Moon 0.7° separating from Mars and approaching Spica this evening
1 Ceres within 10' of 4 Vesta

 40°N 50°N
Set 7:10 6:47
Rise 21:16 21:34 **13**

Moon occults double star Beta Cap visible in SW of USA before dawn
Mars 1.3° above Spica

 40°N 50°N
Set 8:23 8:07
Rise 21:57 22:09 **14**


A patent was awarded for Goddard's liquid-fueled rocket 100 years ago

 40°N 50°N
Set 9:35 9:27
Rise 22:35 22:39 **15**

Mercury and Venus 6° apart low in morning twilight
Mars recedes from Spica

 40°N 50°N
Set 10:46 10:45
Rise 23:11 23:08 **16**


Comet Shoemaker-Levy 9 crashed into Jupiter 20 years ago

 40°N 50°N
Set 11:54 12:00
Rise 23:46 23:37 **17**

 40°N 50°N
Set 13:00 13:13
Rise — — **18**

Last Quarter 22:08

Venus approaching star cluster M35 within 2.8° at dawn, visible in S USA with binoculars

 40°N 50°N
Set 0:21 0:06
Rise 14:04 14:23
Sunrise 5:47 5:12
Sunset 20:25 21:00 **19**

Mercury at greatest elongation (21° W) this morning (m=0.4)
Mars 1.4° above Spica this evening
Today's full Moon is the Buck Moon

 40°N 50°N
Rise 0:58 0:38
Set 15:06 15:30 **20**

Venus 1.6° S of star cluster M35 at dawn, visible in S USA with binoculars

 40°N 50°N
Rise 1:38 1:13
Set 16:04 16:32 **21**

Saturn stationary


 40°N 50°N
Rise 2:21 1:53
Set 16:59 17:29 **22**

Moon 1.6° left of Aldebaran at dawn

 40°N 50°N
Rise 3:08 2:37
Set 17:49 18:19 **23**

 40°N 50°N
Rise 3:57 3:27
Set 18:35 19:04 **24**

Moon 6° right of Venus in morning twilight

 40°N 50°N
Rise 4:49 4:21
Set 19:16 19:42 **25**


Alberta Star-B-Q, Eccles Ranch, AB calgary.rasc.ca/starbq.htm (through July 27)


Stellafane Convention, Springfield, VT www.stellafane.org (through July 27)

 40°N 50°N
Rise 5:44 5:19
Set 19:53 20:15
Sunrise 5:53 5:21
Sunset 20:20 20:51 **26**

New Moon 18:42

Mt. Kobay Star Party, Osoyoos, BC www.mksp.ca (through Aug 3)

 40°N 50°N
Rise 6:39 6:18
Set 20:27 20:44 **27**

 40°N 50°N
Rise 7:34 7:19
Set 20:58 21:10 **28**

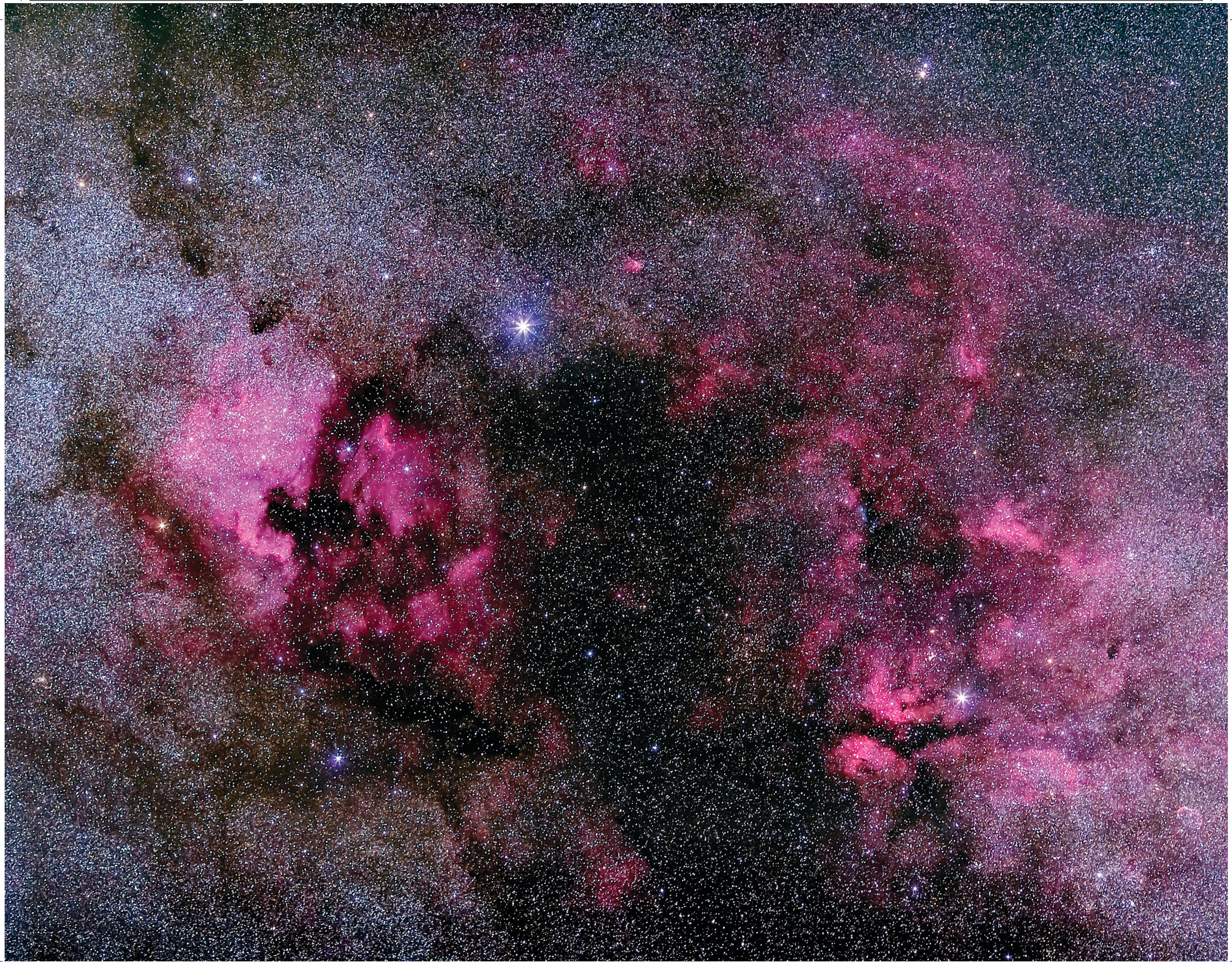
 40°N 50°N
Rise 8:30 8:21
Set 21:28 21:34 **29**

 40°N 50°N
Rise 9:26 9:22
Set 21:57 21:58 **30**

 40°N 50°N
Rise 10:22 10:25
Set 22:26 22:21 **31**

THE PLANETS THIS MONTH

- Mercury** visible after mid-month very low in ENE
- Venus** very low in ENE in morning twilight
- Mars** in SW at sunset, sets in W near midnight
- Jupiter** not easily observable this month
- Saturn** in SW at dusk, sets in W near 2 am



AUGUST

CENTRAL CYGNUS contains many nebulae. The North America Nebula (NGC 7000), Pelican Nebula (IC 5070) and Gamma Cygni region are all part of the same complex of interstellar ionized hydrogen. Many dark nebulae are found in this region making it a visual and photographic treat for observers. William Herschel discovered the North America Nebula on October 24, 1786. | PHOTO BY ALAN DYER

SUNDAY

MONDAY

TUESDAY

WEDNESDAY


THURSDAY


FRIDAY


SATURDAY


THE PLANETS THIS MONTH


- Mercury** very low in W in evening twilight after mid-month but not easily observed
- Venus** very low in ENE in morning twilight
- Mars** in SW at dusk, sets in W near 11 pm
- Jupiter** very low in ENE in morning twilight
- Saturn** low in SW at dusk, sets in WSW near midnight

 **3**
 40°N 50°N
 Rise 13:18 13:38
 Set — 23:44
 First Quarter
 20:50
 Lunar Straight Wall tonight
 Lunar X near crater Werner visible in W of N. America except Alaska 1 am
 Saturn – Moon – Mars form a line this evening


 **4**
 40°N 50°N
 Set 0:06 —
 Rise 14:20 14:45
CIVIC HOLIDAY (BC, AB, MB, ON, SK, NT, NU, NB, NS)
 Saturn – Moon – Mars form a line this evening
 80 Sappho at opposition (m=9.9)


 **5**
 40°N 50°N
 Set 0:48 0:21
 Rise 15:22 15:50
G.B. Donati first observed a comet spectrum 150 years ago


 **6**
 40°N 50°N
 Set 1:36 1:06
 Rise 16:23 16:53
 16 Psyche at opposition (m=9.3)


 **7**
 40°N 50°N
 Set 2:32 2:01
 Rise 17:21 17:51
 16 Psyche at opposition (m=9.3)

 **8**
 40°N 50°N
 Set 3:35 3:05
 Rise 18:15 18:42
 Comet C/2012 K1 enters SOHO C2 (red) field

 **9**
 40°N 50°N
 Set 4:44 4:18
 Rise 19:04 19:26
 Sunrise 6:06 5:41
 Sunset 20:04 20:29
 Comet C/2012 K1 occulted by the Sun this afternoon, watch SOHO C2 (red) field


 **10**
 40°N 50°N
 Set 5:57 5:37
 Rise 19:49 20:04
 Full Moon
 4:09
 Comet C/2012 K1 edge-on spike, and exits SOHO C2 (red) field
 Today's full Moon is the Sturgeon Moon


 **11**
 40°N 50°N
 Set 7:11 6:58
 Rise 20:29 20:37
 Perseid meteors (ZHR=90) 10 pm

 **12**
 40°N 50°N
 Set 8:24 8:19
 Rise 21:07 21:08
Birth of Anders Ångström, pioneer of spectroscopy, 200 years ago


 **13**
 40°N 50°N
 Set 9:36 9:38
 Rise 21:44 21:38
 Birth of Anders Ångström, pioneer of spectroscopy, 200 years ago


 **14**
 40°N 50°N
 Set 10:45 10:55
 Rise 22:21 22:08
 Venus 2.7° to upper right of Jupiter in bright morning twilight
Hulse & Taylor discovered first binary pulsar, 40 years ago, later winning Nobel Prize


 **15**
 40°N 50°N
 Set 11:52 12:09
 Rise 22:58 22:40
 Comet C/2012 K1 exiting SOHO C3 (blue) field
 Venus 2.7° to upper right of Jupiter in bright morning twilight
Hulse & Taylor discovered first binary pulsar, 40 years ago, later winning Nobel Prize

 **16**
 40°N 50°N
 Set 12:56 13:18
 Rise 23:38 23:15
 Sunrise 6:13 5:51
 Sunset 19:55 20:16
 Venus 1.8° to upper right of Jupiter in bright morning twilight

 **17**
 40°N 50°N
 Set 13:57 14:23
 Rise — 23:53
 Last Quarter
 8:26
 Venus 0.9° above Jupiter in bright morning twilight


 **18**
 40°N 50°N
 Rise 0:20 —
 Set 14:53 15:23
 Moon occults double star Delta 1 Tau visible in W of USA before dawn
 Venus-Jupiter 15' apart in bright morning twilight. M44 nearby
 Moon 4° above Aldebaran in the wee hours


 **19**
 40°N 50°N
 Rise 1:06 0:36
 Set 15:46 16:16
 Lunar Curtiss X visible in N. America except W 3 am
 Venus 1.1° to lower right of Jupiter in morning twilight
Launch of Syncom3, first geosynchronous satellite, 50 years ago

 **20**
 40°N 50°N
 Rise 1:55 1:25
 Set 16:33 17:02
 Venus 2.1° to lower right of Jupiter in morning twilight


 **21**
 40°N 50°N
 Rise 2:46 2:17
 Set 17:15 17:42
 Saskatchewan Summer Star Party www.usask.ca/rasc/starparty.html (through Aug 24)
Benjamin Thompson, who endowed Rumford Medal, died 200 years ago


 **22**
 40°N 50°N
 Rise 3:39 3:13
 Set 17:54 18:17
 Nova East, Smileys Provincial Park, NS halifax.rasc.ca/ne (through Aug 24)


 **23**
 40°N 50°N
 Rise 4:34 4:12
 Set 18:29 18:48
 Sunrise 6:19 6:02
 Sunset 19:45 20:02
 Jupiter 1.2° S of M44 Beehive cluster at dawn; Venus, crescent Moon nearby


 **24**
 40°N 50°N
 Rise 5:29 5:12
 Set 19:01 19:15
 63 Aunonia at opposition (m=9.7)


 **25**
 40°N 50°N
 Rise 6:25 6:13
 Set 19:32 19:40
 New Moon
 10:13
 Jupiter dropping below M44 Beehive cluster this week at dawn

 **26**
 40°N 50°N
 Rise 7:21 7:15
 Set 20:01 20:04
 Mars in conjunction with Saturn

 **27**
 40°N 50°N
 Rise 8:17 8:17
 Set 20:30 20:27
 Mars in conjunction with Saturn

 **28**
 40°N 50°N
 Rise 9:14 9:20
 Set 21:00 20:52
 Neptune at opposition (m=7.8)
 Moon 1.7° above Spica early this evening
William Huggins found bright lines in a planetary nebula's spectrum 150 years ago

 **29**
 40°N 50°N
 Rise 10:12 10:24
 Set 21:32 21:18
 Neptune at opposition (m=7.8)
 Moon 1.7° above Spica early this evening
William Huggins found bright lines in a planetary nebula's spectrum 150 years ago

 **30**
 40°N 50°N
 Rise 11:11 11:28
 Set 22:07 21:47
 Sunrise 6:26 6:12
 Sunset 19:35 19:48
Fred Whipple, known for "dirty snowball" comet theory, died 10 years ago

 **31**
 40°N 50°N
 Rise 12:11 12:33
 Set 22:46 22:22
 Moon occults Saturn S of line Thunder Bay – Boston mid-day, challenging
 Moon – Mars – Saturn within 5° this evening

JUL	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		

SEP	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			

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SEPTEMBER

REFLECTION NEBULA IC 348 is a star-forming region in the vicinity of the constellation Perseus and 1 000 light-years from our Solar System. Infrared observations made with the *Spitzer Space Telescope* have discovered four brown dwarf stars in a star cluster believed to be 2 million years old. The brown dwarf stars are estimated to be 1/10 the size of planet Jupiter. | PHOTO BY LYNN HILBORN

SUNDAY

MONDAY


TUESDAY

WEDNESDAY

THURSDAY

FRIDAY


SATURDAY



40°N 50°N
Rise 13:11 13:38
Set 23:30 23:02

1


LABOUR DAY
Venus approaching Regulus this week in bright morning twilight
40 Harmonia at opposition (m=9.4)



40°N 50°N
Rise 13:11 13:38
Set 23:30 23:02

1

LABOUR DAY
Venus approaching Regulus this week in bright morning twilight
40 Harmonia at opposition (m=9.4)




40°N 50°N
Rise 14:10 14:40
Set — 23:51

2

First Quarter
7:11

Lunar Straight Wall this evening




40°N 50°N
Set 0:21 —
Rise 15:08 15:38

3



40°N 50°N
Set 1:19 0:49
Rise 16:02 16:30

4



40°N 50°N
Set 2:23 1:55
Rise 16:52 17:16

5


Moon occults double star Rho Sgr visible in NW of N. America in the wee hours
Venus 0.9° to upper left of Regulus in bright morning twilight



40°N 50°N
Set 3:32 3:09
Rise 17:38 17:56
Sunrise 6:33 6:23
Sunset 19:23 19:33

6


Moon occults double star Beta Cap visible in W of USA and S Manitoba in the wee hours
93 Minerva occults mag 10.0 star El Paso, TX – Kenora, ON 230-km-wide path. www.asteroidoccultation.com 4 am



40°N 50°N
Set 4:44 4:28
Rise 18:20 18:32

7

Venus dropping below Regulus this week in bright morning twilight




40°N 50°N
Set 5:57 5:48
Rise 18:59 19:04

8

Full Moon
21:38

Today's full Moon is the Harvest Moon



40°N 50°N
Set 7:10 7:09
Rise 19:37 19:35

9

12 Victoria at opposition (m=9.0)
33 Polyhymnia at opposition (m=9.8)
William Bond, first Director of Harvard Observatory, was born 225 years ago



40°N 50°N
Set 8:22 8:28
Rise 20:15 20:06

10

Dark limb reappearance of Uranus visible east of line James Bay – New York City in the evening



40°N 50°N
Set 9:32 9:45
Rise 20:53 20:38


11



40°N 50°N
Set 10:40 10:59
Rise 21:34 21:12


12

4 Vesta 1.2° N of Saturn this evening



40°N 50°N
Set 11:44 12:08
Rise 22:16 21:51
Sunrise 6:39 6:33
Sunset 19:12 19:18

13



40°N 50°N
Set 12:44 13:12
Rise 23:02 22:33

14


Moon 2.0° above Aldebaran later tonight
William Herschel measured Saturn's polar and equatorial diameters 225 years ago



40°N 50°N
Set 13:39 14:08
Rise 23:50 23:20


15

Last Quarter
22:05



40°N 50°N
Set 14:29 14:58
Rise — —

16



40°N 50°N
Rise 0:41 0:12
Set 15:13 15:41

17

Mercury approaching Spica from the lower right, visible with difficulty from S of USA after sunset
John Goodricke, who discovered variability of Algol at age 18, was born 250 years ago



40°N 50°N
Rise 1:34 1:07
Set 15:53 16:18

18


Northern Prairie Star Party, near Tofield, AB edmontonrasc.com/nps.html (through Sep 21)
Annual Algonquin Adventure, Algonquin Park, ON www.toronto.rasc.ca (through Sep 21)



40°N 50°N
Rise 2:28 2:05
Set 16:29 16:50

19


Alberta Star Party, Starland, AB calgary.rasc.ca/asp.htm (through Sep 21)



40°N 50°N
Rise 3:23 3:04
Set 17:03 17:18
Sunrise 6:46 6:44
Sunset 19:00 19:02

20

Crescent Moon 6° to lower right of Jupiter this morning
Mercury 0.6° left of Spica, visible with difficulty from S of USA after sunset



40°N 50°N
Rise 4:18 4:05
Set 17:34 17:44

21


Mercury at greatest elongation (26° E) this evening. Poor apparition (m=0.0)



40°N 50°N
Rise 5:14 5:07
Set 18:04 18:08

22


Fall Equinox 10:29 pm



40°N 50°N
Rise 6:11 6:09
Set 18:33 18:32

23

Zodiacal light readily visible from a dark site in E before morning twilight for next two weeks
Old crescent Moon, 20 hours before new in E, 16 hours before new in W a challenge just before sunrise



40°N 50°N
Rise 7:08 7:12
Set 19:03 18:56

24


New Moon
2:14

ROSH HASHANAH BEGINS
25 Crescent Moon 7° right of Mercury, low in bright evening twilight, best in S USA



40°N 50°N
Rise 8:06 8:16
Set 19:35 19:22

25



40°N 50°N
Rise 9:05 9:21
Set 20:09 19:51

26


Try to spot Uranus (m=5.7) unaided this weekend



40°N 50°N
Rise 10:05 10:26
Set 20:47 20:24
Sunrise 6:53 6:54
Sunset 18:49 18:47

27

Crescent Moon 1.5° to the right of Saturn, with 1 Ceres 1° above Moon this evening
Mars and Antares in conjunction
Birth of Daniel Kirkwood, asteroid orbit investigator, 200 years ago



40°N 50°N
Rise 11:05 11:30
Set 21:29 21:02

28


Saturn – Moon – Mars form a crooked line this evening



40°N 50°N
Rise 12:04 12:33
Set 22:17 21:48

29

Moon 5° above Mars this evening



40°N 50°N
Rise 13:01 13:31
Set 23:11 22:41

30

Lunar X near crater Werner visible in W of N. America 11:50 pm
Moon occults star cluster M23 visible in W USA and W Canada this evening

THE PLANETS THIS MONTH

- Mercury** very low in W after sunset but not easily observed
- Venus** very low in ENE in morning twilight, observed with difficulty at month-end
- Mars** low in SW at dusk, sets in WSW near 10 pm
- Jupiter** in E in morning twilight
- Saturn** very low in WSW after sunset, sets after dusk

AUG

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						

OCT

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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OCTOBER

THE CORONA AUSTRALIS Complex includes NGC 6723 (photo centre) and globular star cluster NGC 6727 (upper-right corner). The Complex is located 500 light-years from our Solar System and is sandwiched between the constellations Corona Australis and Sagittarius. | PHOTO BY DEBRA AND PETER CERAVOLO

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY


SATURDAY


THE PLANETS THIS MONTH

- Mercury** with difficulty, very low in W first week of month, lost in twilight after mid-month
- Venus** not observable this month
- Mars** low in SW at dusk, sets in SW by 9 pm
- Jupiter** rises by 1 am in ENE, high in E by sunrise
- Saturn** very low in WSW after sunset, lost in twilight late this month


SEP	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				


NOV	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						


 **1**
 40°N 50°N
 Rise 13:55 14:24
 Set — 23:43
 First Quarter 15:33
 Lunar Straight Wall tonight


 **2**
 40°N 50°N
 Set 0:11 —
 Rise 14:45 15:11


 **3**
 40°N 50°N
 Set 1:16 0:51
 Rise 15:30 15:51

 **4**
 40°N 50°N
 Set 2:24 2:05
 Rise 16:13 16:28
 Sunrise 6:59 7:05
 Sunset 18:37 18:32
YOM KIPPUR
 1 Ceres 30° N of Saturn early this evening

 **5**
 40°N 50°N
 Set 3:34 3:22
 Rise 16:52 17:00
 Marc Garneau was first Canadian in space 30 years ago


 **6**
 40°N 50°N
 Set 4:46 4:41
 Rise 17:30 17:31

 **7**
 40°N 50°N
 Set 5:57 5:59
 Rise 18:07 18:02
 Uranus at opposition (m=5.7)
 Jupiter with only one satellite visible in N. America except W 4:28 am
 Total lunar eclipse after midnight


 **8**
 40°N 50°N
 Set 7:08 7:17
 Rise 18:45 18:33
 Full Moon 6:51
 Total lunar eclipse visible in all N. America after midnight, sets at start of totality for Atlantic Canada
 Today's full Moon is the Hunter's Moon

 **9**
 40°N 50°N
 Set 8:18 8:34
 Rise 19:25 19:07
 37 Fides at opposition (m=9.8)

 **10**
 40°N 50°N
 Set 9:25 9:46
 Rise 20:08 19:44

 **11**
 40°N 50°N
 Set 10:28 10:54
 Rise 20:53 20:26
 Sunrise 7:07 7:16
 Sunset 18:26 18:17
 Moon 1.7° above Aldebaran this evening


 **12**
 40°N 50°N
 Set 11:27 11:56
 Rise 21:41 21:12

 **13**
 40°N 50°N
 Set 12:20 12:50
 Rise 22:32 22:03
THANKSGIVING DAY (CANADA)
COLUMBUS DAY (USA)


 **14**
 40°N 50°N
 Set 13:08 13:36
 Rise 23:25 22:58


 **15**
 40°N 50°N
 Set 13:50 14:16
 Rise — 23:55
 Last Quarter 15:12
 Moon occults double star Lambda Gem visible in N. America except E before dawn


 **16**
 40°N 50°N
 Rise 0:20 —
 Set 14:28 14:50


 **17**
 40°N 50°N
 Rise 1:14 0:54
 Set 15:03 15:20
 Try to spot Uranus (m=5.7) unaided this weekend
 Lunar Curtiss X visible in N. America except W 3 am
 Moon 9° right of Jupiter this morning, partially occulting star cluster M67
 Mars, globular NGC 6401, comet C/2013 A1 within 2° this evening

 **18**
 40°N 50°N
 Rise 2:10 1:55
 Set 15:34 15:46
 Sunrise 7:14 7:27
 Sunset 18:16 18:03


 **19**
 40°N 50°N
 Rise 3:05 2:56
 Set 16:05 16:11
 Mars, globular NGC 6401, comet C/2013 A1 within 1° this evening

 **20**
 40°N 50°N
 Rise 4:02 3:58
 Set 16:34 16:35
 Mars, globular NGC 6401, comet C/2013 A1 within 2° this evening


 **21**
 40°N 50°N
 Rise 4:59 5:01
 Set 17:04 17:00
 Orionid meteors (ZHR=20) 2 pm


 **22**
 40°N 50°N
 Rise 5:57 6:05
 Set 17:35 17:25
 Crescent Moon 5° above Mercury, low in bright morning twilight


 **23**
 40°N 50°N
 Rise 6:56 7:10
 Set 18:09 17:53
 New Moon 17:57
 Partial solar eclipse visible in all N. America except Atlantic Canada and New England
 Mars approaching M8 Lagoon Nebula, within 3.0° this evening


 **24**
 40°N 50°N
 Rise 7:57 8:16
 Set 18:46 18:25
 Zodiacal light readily visible from a dark site in E before morning twilight for next two weeks

 **25**
 40°N 50°N
 Rise 8:58 9:22
 Set 19:28 19:02
 Sunrise 7:21 7:38
 Sunset 18:06 17:49
ISLAMIC NEW YEAR
 Moon occults Saturn visible in Atlantic Canada in daylight mid-morning, very challenging
H.S. Schwabe, who discovered 11-year sunspot cycle, was born 225 years ago


 **26**
 40°N 50°N
 Rise 9:58 10:26
 Set 20:14 19:46

 **27**
 40°N 50°N
 Rise 10:57 11:27
 Set 21:07 20:37
 Mars 0.6° S of M8 (Lagoon Nebula) this evening

 **28**
 40°N 50°N
 Rise 11:52 12:22
 Set 22:05 21:36
 Crescent Moon 7° above Mars this evening

 **29**
 40°N 50°N
 Rise 12:43 13:10
 Set 23:08 22:42
 Moon occults double star Rho Sgr visible in E of Newfoundland early this evening

 **30**
 40°N 50°N
 Rise 13:29 13:52
 Set — 23:53
 First Quarter 22:48
 Mars 2.3° E of M8 (Lagoon Nebula) this evening

 **31**
 40°N 50°N
 Set 0:14 —
 Rise 14:11 14:28
HALLOWE'EN
 Lunar Straight Wall this evening

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NOVEMBER

UNLIKE ASTROPHOTOGRAPHERS who use cameras, many astronomers prefer to draw what they see through their telescope or binoculars. Our Moon is a remarkably good model, allowing those with patience to sketch many lunar features, particularly along its terminator where black and white contrast best. These four sketches show crater rims lit brightly while many of the deep crater floors remain shadowed. | SKETCHES BY ALEXANDER MASSEY

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

THE PLANETS THIS MONTH


Mercury low in E at first of month, very low by mid-month and lost in twilight by month-end

Venus not observable this month

Mars low in SW at dusk, sets in SW near 8 pm

Jupiter rises near 10 pm in ENE, transits high in S by sunrise


Saturn not observable this month



40°N 50°N
Set 1:21 1:07
Rise 14:50 15:01
Sunrise 7:29 7:50
Sunset 17:58 17:37

1


Mercury at greatest elongation (19° W). Best morning apparition of the year (m=-0.5)



40°N 50°N
Set 1:30 1:22
Rise 14:27 14:31

2


Daylight Saving Time ends 2 am
Mars on edge of globular M28 this evening



40°N 50°N
Set 2:39 2:38
Rise 15:03 15:00

3

Mars approaching globular M22, 2.4° W this evening



40°N 50°N
Set 3:48 3:54
Rise 15:39 15:30


4



40°N 50°N
Set 4:57 5:10
Rise 16:18 16:02

5

S Taurid meteors (ZHR=10) 2 pm



40°N 50°N
Set 6:04 6:23
Rise 16:58 16:37


6

Full Moon 17:23
Mercury 5° left of Spica in morning twilight
Mars 0.8° S of globular M22 this evening
Today's full Moon is the Beaver Moon



40°N 50°N
Set 7:09 7:34
Rise 17:42 17:16


7



40°N 50°N
Set 8:11 8:39
Rise 18:30 18:01
Sunrise 6:37 7:02
Sunset 16:50 16:25

8

Moon 1.9° left of Aldebaran this evening



40°N 50°N
Set 9:08 9:38
Rise 19:20 18:50


9

Birth of Carl Sagan, astronomer and science popularizer, 80 years ago



40°N 50°N
Set 9:59 10:29
Rise 20:13 19:45

10



40°N 50°N
Set 10:45 11:12
Rise 21:08 20:42

11

REMEMBRANCE DAY (CANADA)
VETERAN'S DAY (USA)
Sidney van den Bergh discovered first "Canadian" comet 40 years ago



40°N 50°N
Set 11:25 11:49
Rise 22:04 21:41

12

N Taurid meteors (ZHR=15) 2 pm



40°N 50°N
Set 12:02 12:21
Rise 22:59 22:42

13



40°N 50°N
Set 12:34 12:49
Rise 23:55 23:43


14

Last Quarter 10:16
Jupiter visible in daylight 6° north of Moon, a challenge just after sunrise



40°N 50°N
Set 13:05 13:14
Rise — —
Sunrise 6:45 7:13
Sunset 16:44 16:16


15



40°N 50°N
Rise 0:51 0:44
Set 13:35 13:38

16


6 Hebe at opposition (m=8.1)



40°N 50°N
Rise 1:47 1:46
Set 14:04 14:02


17

Leonid meteors (ZHR=20) 6 pm




40°N 50°N
Rise 2:44 2:50
Set 14:34 14:26

18



40°N 50°N
Rise 3:43 3:54
Set 15:07 14:53

19



40°N 50°N
Rise 4:43 5:00
Set 15:42 15:23

20

3 Juno occults mag 7.0 star Calgary-Sudbury-Montreal-SSE 310-km-wide wide path www.asteroidoccultation.com 2 am
Edwin Hubble, known for scale of Universe contributions, was born 125 years ago



40°N 50°N
Rise 5:45 6:07
Set 16:22 15:58

21


Old crescent Moon, 25 hours before new in E, 21 hours before new in W just before sunrise, Mercury 2° below Moon 2° above Mercury, best in binoculars, just before sunrise



40°N 50°N
Rise 6:47 7:14
Set 17:08 16:40
Sunrise 6:53 7:24
Sunset 16:39 16:08

22


New Moon 7:32



40°N 50°N
Rise 7:48 8:18
Set 17:59 17:29

23

F.G.W. von Struve, founder of double-star astronomy, died 150 years ago



40°N 50°N
Rise 8:46 9:16
Set 18:57 18:27

24

Saturn 2.8° to lower left of Mercury visible with difficulty from S of USA just before sunrise



40°N 50°N
Rise 9:40 10:08
Set 20:00 19:32

25

Moon occults double star Rho Sgr visible in NW of N. America
Saturn 1.8° to lower left of Mercury visible with difficulty from S of USA just before sunrise
Crescent Moon 8° to the right of Mars



40°N 50°N
Rise 10:28 10:53
Set 21:06 20:43

26

Jupiter with only one satellite visible in W of Canada and Alaska 10:16 am



40°N 50°N
Rise 11:12 11:31
Set 22:13 21:56

27

THANKSGIVING DAY (USA)
Moon occults double star Beta Cap visible in W of USA this evening



40°N 50°N
Rise 11:52 12:05
Set 23:21 23:11


28



40°N 50°N
Rise 12:29 12:35
Set — —
Sunrise 7:01 7:34
Sunset 16:36 16:02

29

First Quarter 5:06
Lunar Straight Wall tonight
Lunar X near crater Werner visible from Alaska 3 am



40°N 50°N
Set 0:29 0:26
Rise 13:04 13:04

30

OCT	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	

DEC	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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DECEMBER

A SOLAR ECLIPSE occurs when our Moon passes between planet Earth and the Sun, essentially creating a shadow path. Solar eclipses allow us to view the Sun's corona (the outer layer of the Sun's atmosphere). In the southern and eastern regions of the photograph, prominences, some larger than our planet, are shown as pinkish filaments partially screened by the Moon's shadowed edge. | PHOTO BY ANDREAS GADA

SUNDAY

NOV	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						
JAN	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


MONDAY

 **1**
 40°N 50°N
 Set 1:37 1:40
 Rise 13:39 13:33
 Moon occults Uranus visible in Yukon, NWT, N AB, N SK this evening

TUESDAY

 **2**
 40°N 50°N
 Set 2:43 2:54
 Rise 14:15 14:02

WEDNESDAY

 **3**
 40°N 50°N
 Set 3:50 4:06
 Rise 14:54 14:35
 Mars 15' N of globular M75
 23 Thalia at opposition (m=9.2)


THURSDAY

 **4**
 40°N 50°N
 Set 4:54 5:17
 Rise 15:35 15:11


FRIDAY


 **5**
 40°N 50°N
 Set 5:57 6:24
 Rise 16:20 15:52
 Moon within 1.0° of Aldebaran this evening

SATURDAY


 **6**
 40°N 50°N
 Set 6:56 7:25
 Rise 17:09 16:39
 Sunrise 7:08 7:43
 Sunset 16:35 15:59
 Full Moon 7:27
 Today's full Moon is the Cold Moon

 **7**
 40°N 50°N
 Set 7:50 8:20
 Rise 18:01 17:31
 Two shadows on Jupiter visible in N. America except W, best in E 11:20 pm
 Moon occults double star Lambda Gem visible in N. America except SE this evening


 **8**
 40°N 50°N
 Set 8:38 9:07
 Rise 18:56 18:28
 Jupiter stationary

 **9**
 40°N 50°N
 Set 9:21 9:47
 Rise 19:51 19:27
 A meteorite hit a mailbox in Claxton, Georgia, 30 years ago

 **10**
 40°N 50°N
 Set 10:00 10:21
 Rise 20:47 20:28
 Moon - Jupiter - Regulus in loose group


 **11**
 40°N 50°N
 Set 10:34 10:51
 Rise 21:43 21:29
 Two shadows on Jupiter visible in W of N. America in daylight except Alaska-Yukon in darkness 12:16 pm
 Georges Rayet, known for Wolf-Rayet stars with G.T.E. Wolf, was born 175 years ago


 **12**
 40°N 50°N
 Set 11:06 11:17
 Rise 22:39 22:30
 Last Quarter 7:51
 Geminid meteors (ZHR=120) 8 am
 Jupiter with only one satellite visible in N. America except E coast 7:48 am

 **13**
 40°N 50°N
 Set 11:36 11:42
 Rise 23:35 23:31
 Sunrise 7:13 7:51
 Sunset 16:35 15:58
 Lunar Curtiss X visible in N. America except Atlantic Canada 6 am

 **14**
 40°N 50°N
 Set 12:05 12:05
 Rise — —
 Last Quarter 7:51
 Geminid meteors (ZHR=120) 8 am
 Jupiter with only one satellite visible in N. America except E coast 7:48 am

 **15**
 40°N 50°N
 Rise 0:31 0:33
 Set 12:34 12:29
 Two shadows on Jupiter 1:12 am


 **16**
 40°N 50°N
 Rise 1:28 1:37
 Set 13:05 12:54
 Jupiter with only one satellite visible in N. America except Atlantic Canada 8:42 pm


 **17**
 40°N 50°N
 Rise 2:27 2:41
 Set 13:38 13:22
 Jupiter with only one satellite visible in N. America except W 10:29 pm
 Crescent Moon 7° to the right of Mars this evening


 **18**
 40°N 50°N
 Rise 3:27 3:47
 Set 14:15 13:54
 Christmas Day


 **19**
 40°N 50°N
 Rise 4:29 4:54
 Set 14:58 14:31
 Crescent Moon approaching Saturn this morning


 **20**
 40°N 50°N
 Rise 5:31 6:00
 Set 15:47 15:17
 Sunrise 7:18 7:56
 Sunset 16:37 16:00
 Winter Solstice 6:03 pm
 Jupiter with only one satellite visible in W of N. America 9:36 am


 **21**
 40°N 50°N
 Rise 6:32 7:03
 Set 16:42 16:12
 New Moon 20:36
 Winter Solstice 6:03 pm
 Jupiter with only one satellite visible in W of N. America 9:36 am


 **22**
 40°N 50°N
 Rise 7:30 7:59
 Set 17:45 17:15
 Ursid meteors (ZHR=10) 4 pm
 Young crescent Moon, 19 hours after new in E, 23 hours after new in W, a challenge soon after sunset
 Moon 6° right of Venus


 **23**
 40°N 50°N
 Rise 8:22 8:49
 Set 18:52 18:26
 Jupiter with only one satellite visible in N. America except W 10:29 pm
 Crescent Moon 7° to the right of Mars this evening


 **24**
 40°N 50°N
 Rise 9:10 9:31
 Set 20:01 19:41
 Christmas Day


 **25**
 40°N 50°N
 Rise 9:52 10:08
 Set 21:11 20:58
 Boxing Day (Canada)

 **26**
 40°N 50°N
 Rise 10:31 10:40
 Set 22:21 22:15
 Christmas Day

 **27**
 40°N 50°N
 Rise 11:07 11:10
 Set 23:29 23:30
 Sunrise 7:21 7:58
 Sunset 16:41 16:04
 Lunar X near crater Werner visible in E of N. America 5 pm
 Jupiter with only one satellite visible in Alaska and Yukon 11:54 am
 Moon occults Uranus visible in N of N. America this evening

 **28**
 40°N 50°N
 Rise 11:42 11:38
 Set — —
 First Quarter 13:31
 Lunar X near crater Werner visible in E of N. America 5 pm
 Jupiter with only one satellite visible in Alaska and Yukon 11:54 am
 Moon occults Uranus visible in N of N. America this evening

 **29**
 40°N 50°N
 Set 0:36 0:44
 Rise 12:18 12:07
 Lunar Straight Wall this evening

 **30**
 40°N 50°N
 Set 1:41 1:56
 Rise 12:55 12:38
 Jupiter with only one satellite 6:05 am
 Deep Impact probe was launched to Comet Tempel 1, 10 years ago

 **31**
 40°N 50°N
 Set 2:46 3:06
 Rise 13:34 13:12
 NEW YEAR'S EVE
 Mercury 3° to lower right of Venus, low in bright evening twilight
 George Ritchey, known for reflecting telescope optics, was born 150 years ago

THE PLANETS THIS MONTH

Mercury very low in SW after mid-month

Venus very low in SW in evening twilight at month-end

Mars low in SW at dusk, sets in SW near 8 pm

Jupiter rises near 8 pm in ENE, transits high in S near 4 am

Saturn very low in ESE in morning twilight

Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.

Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time.

Times for events involving planetary satellites refer to the start time.

Detailed instructions on adjusting times for location are given in the back pages.

Please see back pages for photo details and additional information about this Calendar.



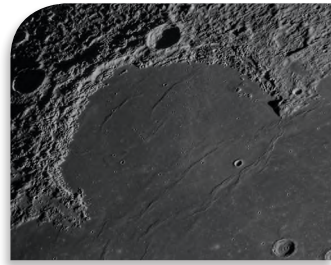
January (*Fork in the Road*)

A single image 10-second exposure taken with a Canon EOS 7D, ISO 500 with an 11mm lens at $f/2.8$. Image taken from outside Yellowknife, NWT, by Christopher Gatto.



February (*Colossal Globular*)

A composite image made from 26min L, 10min R, 7min G, 9min B for a total exposure of 52 minutes. Images taken from Space Atacama Lodge, Chile, with a Ceravolo 300 Astrograph at $f/4.9$ on a Paramount ME mount with a Apogee U16M with Astrodon filters. Processed with MaxIm DL, Registar, Photoshop CS2. Data acquisition by Peter Ceravolo and processing by Debra Ceravolo.



March (*Bay of Rainbows*)

A composite image from a stack of 380 frames out of 3000 taken with an ASI120MM camera, R/IR filter, Tele Vue 2.5× Powermate Barlow on a 18" Starmaster Dob (Zambuto primary). Captured with Firecapture and processed with Photoshop CS2 and Topaz filters. Image by Michael Wirths.



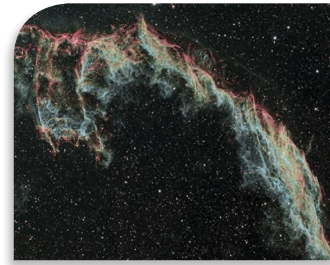
April (*Lonesome Wanderer and Young Moon*)

Comet PANSTARRS C/2011 L4 and the thin waxing Moon, 2013 March 12, over the Chiricahua Mountains, in Arizona, but seen from New Mexico, from a site on Highway 80 north of the Painted Pony Resort. A 0.3s exposure at $f/2.8$ and ISO 640 with the Canon 60Da and 135mm telephoto + 1.4× Extender. Image by Alan Dyer.



May (*Irregular, Barred or Spiral?*)

The Large Magellanic Cloud, taken with a 135mm telephoto lens for a field of view similar to binoculars. Taken from Timor Cottage, Coonabarabran, NSW, Australia, 2012 December 5. This is a stack of 10×5 minute exposures, median combined (to eliminate some satellite trails) at $f/2.8$ with Canon L-series 135mm lens and the modified Canon 5D Mark II camera at ISO 800. Tracked on an AP 400 equatorial mount. Image by Alan Dyer.



June (*Supernova Aftermath*)

A composite image made from 4 hours each OIII, H α , SII, and RGB for total of 12 hours with a FLI ML8300 camera binned 1×1 on a TEC140 at $f/7$. Image by Lynn Hilborn.



July (*Stellar Nursery*)

A composite image made from 65min L, 65min R, 60min G, 70min B, 65 H α , 60 OIII for a total exposure of 6.4 hours. Images taken from Space Atacama Lodge, Chile, with a Ceravolo 300 Astrograph at $f/4.9$ on a Paramount ME mount with a Apogee U16M with Astrodon filters. Processed with MaxIm DL, Registar, Photoshop CS2. Data acquisition by Peter Ceravolo and processing by Debra Ceravolo.



August (*Cygnus Complex*)

A composite image made from 5×4 minute exposures at ISO 1600 with the Canon 135mm lens at $f/2.8$ and Canon 5D MkII (modified). Image by Alan Dyer.



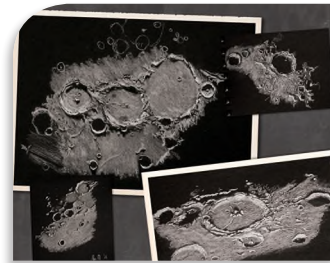
September (*Reflections*)

A cropped portion of a 2-panel image, LRGB and H α for a total exposure of 18 hours. Images taken with a Tele Vue NP101 at $f/4.3$ and a FLI ML8300 camera. Photo by Lynn Hilborn.



October (*Reflections in the void*)

A composite image made from 285min L, 50min R, 30min G, 35min B, for a total exposure of 7.2 hours. Images taken from Space Atacama Lodge, Chile, with a Ceravolo 300 Astrograph at $f/4.9$ on a Paramount ME mount with a Apogee U16M with Astrodon filters. Processed with MaxIm DL, Registar, Photoshop CS2. Data acquisition by Peter Ceravolo and processing by Debra Ceravolo.



November (*Shadows and Charcoal*)

Sketches of the Moon with a Celestron C8 and 8mm Ultima LX eyepiece giving $250 \times$. Sketched with soft pastel, charcoal, and white ink on A4 size black paper. Sketch of craters Ptolemaeus, Alphonsus, and Arzachel (top left) was done in approximately 2.5 hours. Sketches by Alexander Massey.



December (*Totality*)

A single image, 1/250s exposure taken at ISO 200 with a Canon EOS 60D on a SkyWatcher ED80, 600 mm $f/7.5$ telescope. The photograph was taken at 6:38:29 am local time from the beach in front of the Paradise On the Beach Hotel in Palm Cove. Image by Andreas Gada.

Most of the data appearing in the monthly grids was generated using custom software written by Dave Lane, Alister Ling, and Larry McNish. The Moon images were created using custom software written by Alister Ling.

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The Royal Astronomical Society of Canada

Since it was founded in 1890, the RASC has filled a special role in both amateur and professional astronomy. Today, it has nearly 4000 members worldwide who share a passion for the night sky and make contributions to astronomy in many ways.

The RASC has a long tradition of high-quality, volunteer-produced publications. *The Observer's Handbook* has been published since 1907 and is recognized worldwide as the leading

handbook of its type. The *Journal*, also published since 1907, contains articles of interest to amateur astronomers. *The Beginner's Observing Guide* is an introduction to the night sky for the novice observer, the *Observer's Calendar* is a forum for astro-photography by amateur astronomers, and *Skyways* (available in French as "*Explorons l'Astronomie*") is an astronomy teacher's guide.

For information on joining the Society, or to order an RASC publication, visit www.rasc.ca or contact the National Office at:

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How to Use this Calendar

A graphical representation of the Moon's appearance in the late evening is given in each daily box. In addition to the varying phase, the depicted size of the Moon varies, reflecting the change in the apparent size of the Moon in the sky as it moves closer to or farther from Earth. The depicted face of the Moon also changes slightly to reflect lunar libration, the rocking motion of the Moon, which means that over time approximately 59% of the lunar surface can be seen from Earth. A small dot of size proportional to the amount of libration appears near the lunar limb that is librated. These daily lunar graphics were prepared using images provided by Roger Fell.

Daily Moon and weekly Sun rise and set times, and the times of Moon phases, are shown in the top portion of the boxes. If no Moon rise or set time is given, this event occurs the next day.

A summary of the naked-eye visibility and position of the planets is given each month. Descriptions are for approximate latitude 45° and, unless otherwise stated, apply to midmonth; rise and set times at the beginning or end of the month may vary by an hour or more from those given. Times and compass directions may also differ somewhat from the given ones at other latitudes.

Special astronomical events are given at the bottom of the daily boxes. Events observable in some part of Canada or the continental United States are listed. Days on which particularly interesting phenomena or events occur are highlighted with a green bar under the date. Detailed information on all events, including their visibility from particular locations, may be determined by consulting the *Observer's Handbook*, which is published annually by the RASC.

Adjustments for Actual Location

When it is in effect, times are adjusted for Daylight Saving Time. Moon phases and special events are given in Eastern time. The user's local time for events other than Moon and Sun rise and set may be determined by converting the given time to the user's time zone (e.g. Pacific time is Eastern time minus 3 hours). For occultations, a further adjustment of an hour or more may be needed for any particular geographical location because of parallax effects. Parallax also means that actual angular separations for events involving the Moon may vary by close to 1° from

those given. Also, the Moon's rapid movement of approximately 0.5° per hour means that separations may be considerably larger at a time that is even a few hours away from the given time.

Two sets of rise and set times are given to accommodate North American observers in midnorthern latitudes. Times are displayed for locations 40°N latitude and 75°W longitude and for 50°N, 75°W. The actual times for a given location must be calculated using the tables at the right.

The tables give (longitude) corrections in minutes to the tabulated rise and set times for selected Canadian and U.S. cities. In the column labelled **Correction**, an entry such as 50°N + 25 means add 25 minutes to the displayed 50°N time. This computed time is an approximation. In the column labelled **Accuracy**, the approximate maximum error in minutes for Moon rise and set using this method is indicated. The error for Sun rise and set is less. These errors can be substantially reduced by interpolating according to latitude, as explained in the following section. Note that the rise and set times calculated using the above method will be local times. It is not necessary to adjust them for time zone.

Other Locations, and Improving Accuracy

For locations not listed in the tables at right, the user should calculate a correction factor. This amount is +4 minutes for each degree that the user's location is west of the central meridian of the user's time zone or -4 minutes for each degree that it is east. This correction factor should be added to the displayed 50°N or 40°N time for the location whose latitude is nearest that of the user's site. The accuracy in minutes for Moon rise and set can be calculated by multiplying the difference between the user's latitude and 50°N/40°N respectively by 4.5, and then adding 0.2 times the difference between the user's longitude and 75°W.

Improvement in accuracy may be obtained for many sites by interpolating or extrapolating the 50°N and 40°N times depending on the user's latitude. For example, the latitude of Ottawa is approximately midway between 50°N and 40°N. An observer in Ottawa can improve accuracy to better than 5 minutes by averaging the given 50°N and 40°N times and then adding the correction factor for Ottawa, which is 3 minutes. Western observers may gain additional accuracy by adding about 10% of the difference between the listed time and the next day's time.

Canadian Locations

City	Correction	Accuracy	Latitude
Calgary	50°N + 36	15	51
Charlottetown	40°N + 12	20	46
Edmonton	50°N + 34	25	54
Halifax	40°N + 14	25	45
Hamilton	40°N + 20	15	43
Kingston	40°N + 6	20	44
Kitchener	40°N + 22	15	43
London	40°N + 25	15	43
Moncton	40°N + 19	20	46
Montréal	50°N - 6	20	46
Niagara	40°N + 16	15	43
Kelowna	50°N - 3	10	50
Ottawa	50°N + 3	20	45
Prince George	50°N + 11	25	54
Québec	50°N - 15	15	47
Regina	50°N + 58*	10	50
St. John's	50°N + 1	20	48
Sarnia	40°N + 30	15	43
Saskatoon	50°N + 67*	15	52
Thunder Bay	50°N + 57	10	48
Toronto	40°N + 18	20	44
Vancouver	50°N + 12	15	49
Victoria	50°N + 13	20	49
Windsor	40°N + 32	15	42
Winnipeg	50°N + 29	5	50

U.S. Locations

City	Correction	Accuracy	Latitude
Atlanta	40°N + 37	30	34
Boston	40°N - 16	10	42
Chicago	40°N - 10	15	42
Cincinnati	40°N + 38	10	39
Denver	40°N + 0	10	40
Flagstaff	40°N + 27*	30	35
Kansas City	40°N + 18	10	39
Los Angeles	40°N - 7	35	34
Minneapolis	40°N + 13	25	45
New York	40°N - 4	5	41
San Francisco	40°N + 10	20	38
Seattle	50°N + 9	20	48
Tucson	40°N + 24*	40	32
Washington	40°N + 8	5	39

*Subtract 60 minutes in the summer.

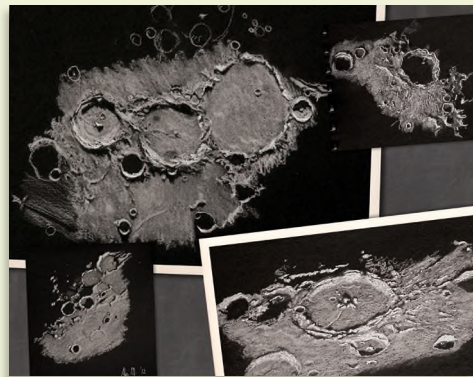
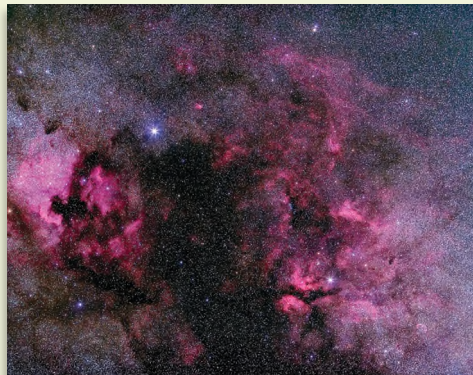
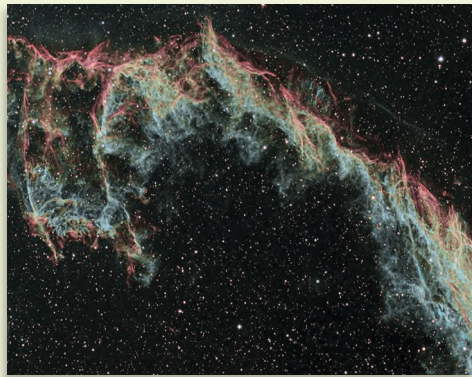
2014

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2015

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	23	24	25	26	27	28	29
	30	31					

New Moon dates (UT) are displayed in blue.



40°N 50°N **22**

Rise	7:30	7:59
Set	17:45	17:15

Ursid meteors (ZHR=10) 4 pm
 Young crescent Moon, 19 hours after new in E, 23 hours after new in W, a challenge soon after sunset
 Moon 6° right of Venus

40°N 50°N **23**

Rise	8:22	8:49
Set	18:52	18:26

40°N 50°N **29**

Set	0:36	0:44
Rise	12:18	12:07

Lunar Straight Wall this evening

40°N 50°N **30**

Set	1:41	1:56
Rise	12:55	12:38

Jupiter with only one satellite 6:05 am
Deep Impact probe was launched to Comet Tempel 1, 10 years ago

The Royal Astronomical Society of Canada Observer's Calendar 2014

All photos in this unique Calendar were taken by members of The Royal Astronomical Society of Canada (RASC) who are astronomy enthusiasts. It was produced by volunteer members of The Royal Astronomical Society of Canada.

This Calendar includes comprehensive listings of astronomical data such as lunar and planetary conjunctions, Sun and Moon rise and set times, eclipses, meteor showers, and Moon phases.

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