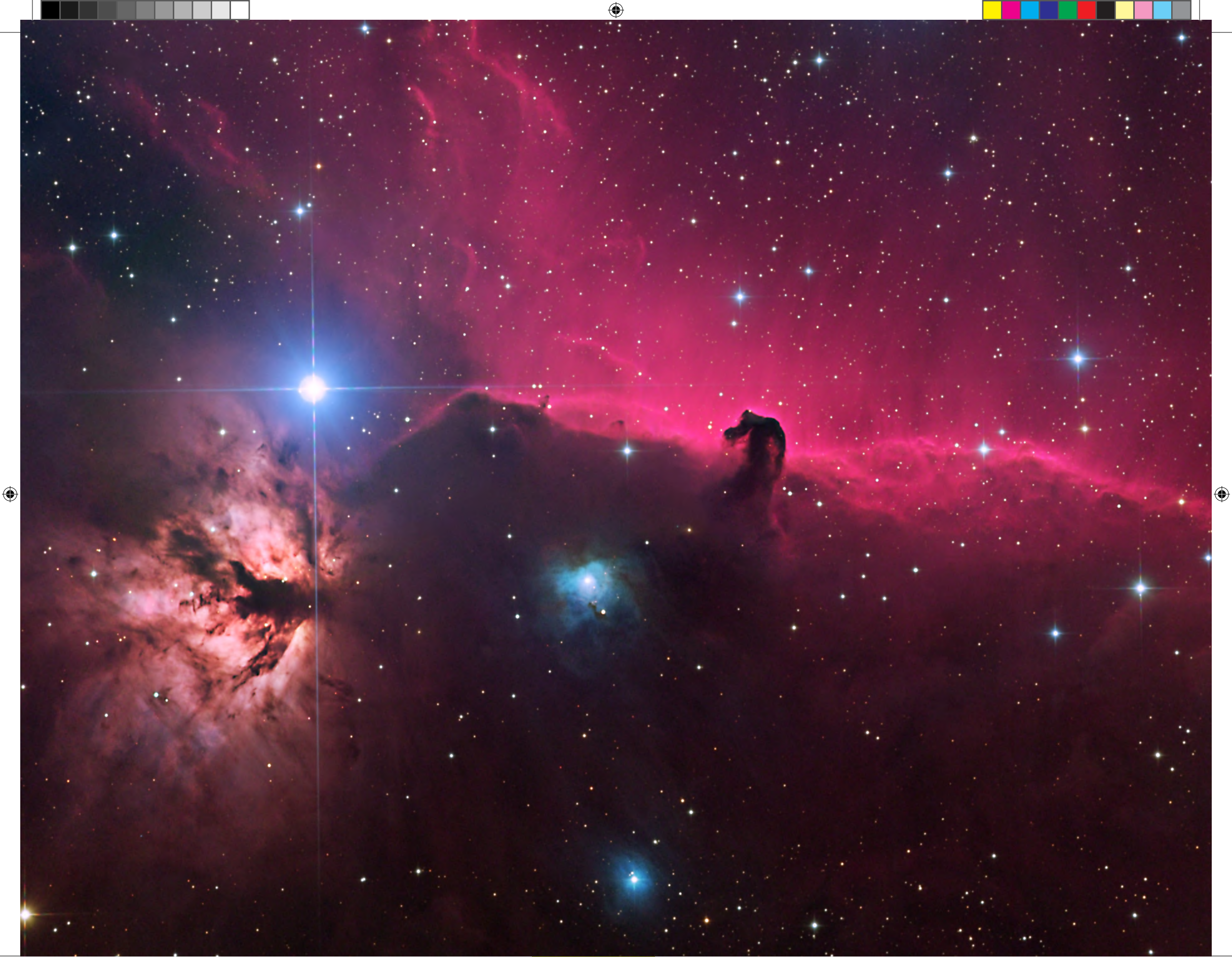


THE ROYAL ASTRONOMICAL SOCIETY OF CANADA  
OBSERVER'S CALENDAR

2013





# JANUARY

## THE DARK KNIGHT

Roughly 1500 light-years from Earth, the Horsehead Nebula (Barnard 33) appears to gaze at Sigma Orionis, a magnitude 3.7 multiple star in the constellation Orion. The dark dust cloud forming the horse's head is a stellar nursery where new stars are forming.

DATA ACQUISITION BY PETER CERAVOLO AND PROCESSING BY DEBRA CERAVOLO

### SUNDAY

#### THE PLANETS THIS MONTH

**Mercury** not observable this month

**Venus** very low in SE observed with difficulty at end of month

**Mars** very low in WSW at dusk, sets in WSW after 6 pm

**Jupiter** high in SE after dark, transits near 8 pm, sets in NW near 4 am

**Saturn** rises in E after 1 am in S near sunrise

### MONDAY

### TUESDAY

### WEDNESDAY


### THURSDAY


### FRIDAY


### SATURDAY

 **1**  
 40°N 50°N  
 Set 9:33 9:44  
 Rise 21:14 21:07

 **2**  
 40°N 50°N  
 Set 10:03 10:07  
 Rise 22:16 22:16

 **3**  
 40°N 50°N  
 Set 10:32 10:29  
 Rise 23:20 23:27

 **4**  
 40°N 50°N  
 Set 11:03 10:53  
 Rise — —  
 Last Quarter  
 22:58


 **5**  
 40°N 50°N  
 Rise 0:25 0:40  
 Set 11:37 11:20  
 Sunrise 7:22 7:58  
 Sunset 16:49 16:14


**NEW YEAR'S DAY**  
 9 Metis at opposition (m=8.5)

Earth at perihelion (147,098,159 km)


Quadrantid meteors  
 (ZHR=120) 8 am


Moon approaching Spica near dawn


 **6**  
 40°N 50°N  
 Rise 1:33 1:54  
 Set 12:15 11:51


 **7**  
 40°N 50°N  
 Rise 2:42 3:10  
 Set 12:59 12:30

 **8**  
 40°N 50°N  
 Rise 3:52 4:25  
 Set 13:51 13:17

 **9**  
 40°N 50°N  
 Rise 4:58 5:33  
 Set 14:51 14:16

 **10**  
 40°N 50°N  
 Rise 5:59 6:33  
 Set 15:59 15:25


 **11**  
 40°N 50°N  
 Rise 6:52 7:22  
 Set 17:10 16:42  
 New Moon  
 14:44


 **12**  
 40°N 50°N  
 Rise 7:38 8:02  
 Set 18:22 18:01  
 Sunrise 7:21 7:51  
 Sunset 16:56 16:23

Moon right of Saturn before dawn

Moon occults Omega 1&2 Scorpii,  
 visible in W of N. America 8 am


Crescent Moon 1.9° left of Venus at  
 dawn, low


 **13**  
 40°N 50°N  
 Rise 8:18 8:34  
 Set 19:33 19:20


 **14**  
 40°N 50°N  
 Rise 8:53 9:02  
 Set 20:41 20:36

 **15**  
 40°N 50°N  
 Rise 9:25 9:27  
 Set 21:47 21:48

 **16**  
 40°N 50°N  
 Rise 9:55 9:50  
 Set 22:50 22:58

 **17**  
 40°N 50°N  
 Rise 10:25 10:14  
 Set 23:50 —


 **18**  
 40°N 50°N  
 Set — 0:06  
 Rise 10:56 10:38  
 First Quarter  
 18:45

 **19**  
 40°N 50°N  
 Set 0:50 1:11  
 Rise 11:29 11:06  
 Sunrise 7:18 7:49  
 Sunset 17:04 16:33

William H. Pickering, who predicted  
 location of Pluto, died 75 years ago

Bushfires destroyed Mount Stromlo  
 Observatory, Australia, 10 years ago


Lunar X near crater Werner  
 visible in all of N. America  
 except E, best in W 1 am


 **20**  
 40°N 50°N  
 Set 1:47 2:14  
 Rise 12:05 11:37


 **21**  
 40°N 50°N  
 Set 2:43 3:14  
 Rise 12:45 12:13

 **22**  
 40°N 50°N  
 Set 3:36 4:09  
 Rise 13:29 12:55

 **23**  
 40°N 50°N  
 Set 4:25 4:59  
 Rise 14:17 13:43

 **24**  
 40°N 50°N  
 Set 5:11 5:44  
 Rise 15:10 14:38

 **25**  
 40°N 50°N  
 Set 5:52 6:22  
 Rise 16:06 15:38

 **26**  
 40°N 50°N  
 Set 6:30 6:55  
 Rise 17:05 16:42  
 Sunrise 7:14 7:41  
 Sunset 17:12 16:45  
 Full Moon  
 23:38


Lunar Straight Wall this evening


#### MARTIN LUTHER KING JR. DAY (USA)

Moon within 2° S of Jupiter tonight,  
 Hyades nearby

Pioneer 10 sent its last signal to  
 Earth, 10 years ago


Today's full Moon is the Wolf Moon

 **27**  
 40°N 50°N  
 Set 7:05 7:23  
 Rise 18:06 17:49

 **28**  
 40°N 50°N  
 Set 7:37 7:49  
 Rise 19:07 18:57

 **29**  
 40°N 50°N  
 Set 8:07 8:13  
 Rise 20:09 20:07

 **30**  
 40°N 50°N  
 Set 8:37 8:36  
 Rise 21:13 21:17

 **31**  
 40°N 50°N  
 Set 9:08 9:00  
 Rise 22:18 22:29

Jupiter stationary  
 A.A. Common photographed Orion  
 Nebula, 130 years ago

James C. Watson, versatile Canadian  
 astronomer, was born 175 years ago

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					
FEB	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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 refer to the start time.

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 location are given in the back pages.

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 additional information about this Calendar.



# FEBRUARY

## SAPPHIRES WITH A FEW RUBIES

Also known as Caldwell 14, the Double Cluster is located between Perseus and Cassiopeia and is a frequent target for amateur astronomers. The dimmer NGC 884 contains red stars, proving that it is older than the brighter NGC 869, which contains no red stars.

PHOTO BY TIM DOUCETTE

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

### THE PLANETS THIS MONTH

**Mercury** easy in evening twilight, becoming difficult near month end

**Venus** very low in SE, not observable after mid-month

**Mars** very low in W at dusk, sets in W after 6 pm

**Jupiter** high in S after dark, sets in NW near 2 am

**Saturn** rises in E after 11 pm in SW near dawn

40°N 50°N  
Rise 0:31 0:56  
Set 10:57 10:30

**3**

Last Quarter  
8:56

Moon below Saturn 4 am  
Neptune within 1° of Mars until the 5th but too faint in evening twilight  
Mercury approaching Mars this week

40°N 50°N  
Rise 1:38 2:09  
Set 11:44 11:12

**4**

Winter Star Party, Florida Keys  
[www.scas.org/wsp.html](http://www.scas.org/wsp.html)  
(through Feb 10)  
Lunar Curtiss X, visible in all of N. America except NW, best in SE 4 am

40°N 50°N  
Rise 2:43 3:18  
Set 12:39 12:04

**5**

40°N 50°N  
Rise 3:44 4:19  
Set 13:40 13:06

**6**

40°N 50°N  
Rise 4:40 5:11  
Set 14:48 14:17

**7**

40°N 50°N  
Rise 5:28 5:55  
Set 15:58 15:33

**8**

Mercury 0.3° from Mars very low in W after sunset

40°N 50°N  
Rise 6:10 6:30  
Set 17:09 16:51  
Sunrise 7:00 7:21  
Sunset 17:29 17:09

**9**

Old crescent Moon, 19 hours before new in E, from SE of N. America, tough challenge just before sunrise  
Mars separating from Mercury this week, very low in W after sunset  
15-100 meteors in formation were seen in south-central Canada, 100 years ago

40°N 50°N  
Rise 6:47 7:00  
Set 18:18 18:08

**10**

New Moon  
2:20

CHINESE NEW YEAR (SNAKE)  
Young crescent Moon, 15 hours after new in E, 19 hours after new in W, tough challenge soon after sunset

40°N 50°N  
Rise 7:21 7:27  
Set 19:26 19:24

**11**

Mars 2.8° below Mercury very low in W after sunset

40°N 50°N  
Rise 7:53 7:52  
Set 20:31 20:36

**12**

40°N 50°N  
Rise 8:24 8:16  
Set 21:34 21:46

**13**

40°N 50°N  
Rise 8:55 8:41  
Set 22:36 22:54

**14**

VALENTINE'S DAY

40°N 50°N  
Rise 9:28 9:07  
Set 23:35 23:59

**15**

40°N 50°N  
Rise 10:03 9:37  
Set — —  
Sunrise 6:51 7:08  
Sunset 17:37 17:21

**16**

Mercury at greatest elongation E (18°) in evening twilight

40°N 50°N  
Set 0:32 1:01  
Rise 10:42 10:12

**17**

First Quarter  
15:31

Moon approaching Jupiter tonight

40°N 50°N  
Set 1:26 1:59  
Rise 11:24 10:51

**18**

FAMILY DAY (AB, ON, SK)  
LOUIS RIEL DAY (MB)  
WASHINGTON'S BIRTHDAY (USA)  
Lunar Straight Wall this evening

40°N 50°N  
Set 2:17 2:51  
Rise 12:11 11:37

**19**

Saturn stationary

40°N 50°N  
Set 3:05 3:38  
Rise 13:02 12:29

**20**

40°N 50°N  
Set 3:48 4:18  
Rise 13:56 13:27

**21**

469 Argentina occults mag 6.6 HIP 25363 from Thunder Bay – N/S Carolina border  
[www.occultation.com](http://www.occultation.com) 9 pm  
George Ellery Hale, Director of Mount Wilson Observatory, died 75 years ago

40°N 50°N  
Set 4:27 4:53  
Rise 14:54 14:29

**22**

40°N 50°N  
Set 5:03 5:24  
Rise 15:54 15:35  
Sunrise 6:42 6:55  
Sunset 17:45 17:33

**23**

40°N 50°N  
Set 5:36 5:52  
Rise 16:55 16:43

**24**

40°N 50°N  
Set 6:08 6:17  
Rise 17:58 17:53

**25**

Full Moon  
15:26

Today's full Moon is the Snow Moon

40°N 50°N  
Set 6:39 6:41  
Rise 19:03 19:04

**26**

40°N 50°N  
Set 7:10 7:05  
Rise 20:08 20:17

**27**

40°N 50°N  
Set 7:43 7:31  
Rise 21:15 21:31

**28**

Moon 1° S of Spica late this evening

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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# MARCH

## ELUSIVE DUST

Planets Jupiter and Venus join the zodiacal light, which is caused by sunlight reflecting off and scattered by interplanetary dust particles orbiting our Sun in the same plane as the planets (the ecliptic). It is best after sunset in the west during March and before sunrise in the east during October. The dust particles originate from asteroids or comets, particularly a group of dormant comets known as Jupiter Family Comets. | PHOTO BY BRUCE HAMILTON

SUNDAY

MONDAY

TUESDAY

WEDNESDAY


THURSDAY

FRIDAY

SATURDAY


### THE PLANETS THIS MONTH

- Mercury** very low in ESE after mid-month
- Venus** not observable this month
- Mars** not observable this month
- Jupiter** in W after dark sets, in NW near midnight
- Saturn** rises in E after 9 pm, transits in S near 3 am



40°N 50°N  
Set 8:18 8:00  
Rise 22:23 22:46

# 1



40°N 50°N  
Set 8:58 8:33  
Rise 23:30 23:59  
Sunrise 6:32 6:41  
Sunset 17:53 17:44

# 2


Moon near Saturn 5 am



40°N 50°N  
Set 9:43 9:13

# 3


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



40°N 50°N  
Rise 0:36 1:08  
Set 10:35 10:01


# 4

Last Quarter 16:53




40°N 50°N  
Rise 1:37 2:11  
Set 11:33 10:59

# 5



40°N 50°N  
Rise 2:33 3:05  
Set 12:36 12:05

# 6



40°N 50°N  
Rise 3:22 3:50  
Set 13:43 13:17

# 7



40°N 50°N  
Rise 4:05 4:28  
Set 14:52 14:32


# 8



40°N 50°N  
Rise 4:44 5:00  
Set 16:00 15:47  
Sunrise 6:21 6:26  
Sunset 18:01 17:56

# 9


Two shadows on Jupiter visible in NW of N. America 3:14 am



40°N 50°N  
Rise 6:18 6:27  
Set 18:07 18:01

# 10


Daylight Saving Time begins 2 am



40°N 50°N  
Rise 6:51 6:53  
Set 19:13 19:14

# 11


New Moon 15:51



40°N 50°N  
Rise 7:22 7:17  
Set 20:17 20:26


# 12

29 Amphitrite at opposition (m=9.1)



40°N 50°N  
Rise 7:53 7:42  
Set 21:20 21:35

# 13



40°N 50°N  
Rise 8:26 8:08  
Set 22:20 22:42


# 14



40°N 50°N  
Rise 9:01 8:37  
Set 23:19 23:46

# 15

de la Caille, who calculated positions of 10,000 stars, was born 300 years ago



40°N 50°N  
Rise 9:38 9:10  
Set — —  
Sunrise 7:10 7:11  
Sunset 19:08 19:07

# 16


Two shadows on Jupiter, visible in Alaska and high Arctic 6:50 am  
15 Eunomia at opposition (m=9.6)



40°N 50°N  
Set 0:15 0:46  
Rise 10:19 9:48

# 17


**ST. PATRICK'S DAY**  
Moon occults Epsilon Tauri, visible in Newfoundland and N Quebec  
Moon within 3° S of Jupiter tonight, Hyades nearby



40°N 50°N  
Set 1:08 1:41  
Rise 11:04 10:31

# 18


Third of Jupiter-Aldebaran triple conjunction  
Comet PanSTARRS possibly 0th mag in evening sky this week



40°N 50°N  
Set 1:57 2:30  
Rise 11:53 11:20

# 19


First Quarter 13:27  
Lunar X near crater Werner, visible in NWT and Alaska 5 am  
14 Irene at opposition (m=9.0)



40°N 50°N  
Set 2:41 3:13  
Rise 12:46 12:15


# 20

Spring Equinox 7:02 am  
Lunar Straight Wall this evening



40°N 50°N  
Set 3:22 3:50  
Rise 13:42 13:15

# 21



40°N 50°N  
Set 3:59 4:22  
Rise 14:40 14:18


# 22



40°N 50°N  
Set 4:33 4:51  
Rise 15:40 15:25  
Sunrise 6:58 6:56  
Sunset 19:15 19:18

# 23

Jupiter with only one satellite, visible in Alaska and NW Arctic 07:42 am




40°N 50°N  
Set 5:06 5:17  
Rise 16:42 16:34

# 24



40°N 50°N  
Set 5:37 5:42  
Rise 17:46 17:45

# 25



40°N 50°N  
Set 6:09 6:07  
Rise 18:52 18:58

# 26

**FIRST DAY OF PASSOVER**  
Jupiter with only one satellite, visible in E of N. America 08:41 pm



40°N 50°N  
Set 6:41 6:32  
Rise 20:00 20:13

# 27


Full Moon 5:27  
Today's full Moon is the Worm Moon



40°N 50°N  
Set 7:17 7:01  
Rise 21:09 21:29

# 28


Moon within 3° of Spica near dawn  
Moon near Saturn late tonight



40°N 50°N  
Set 7:56 7:33  
Rise 22:19 22:45

# 29


**GOOD FRIDAY**



40°N 50°N  
Set 8:40 8:12  
Rise 23:27 23:58  
Sunrise 6:47 6:41  
Sunset 19:22 19:29

# 30

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



40°N 50°N  
Set 9:31 8:59

# 31

**EASTER SUNDAY**  
Moon occults double star Beta Scorpii visible S of graze Oregon-Louisiana-S Florida 3 am  
Mercury at greatest elongation W (28°) in morning twilight  
40 Harmonia at opposition (m=9.9)

FEB	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		

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				

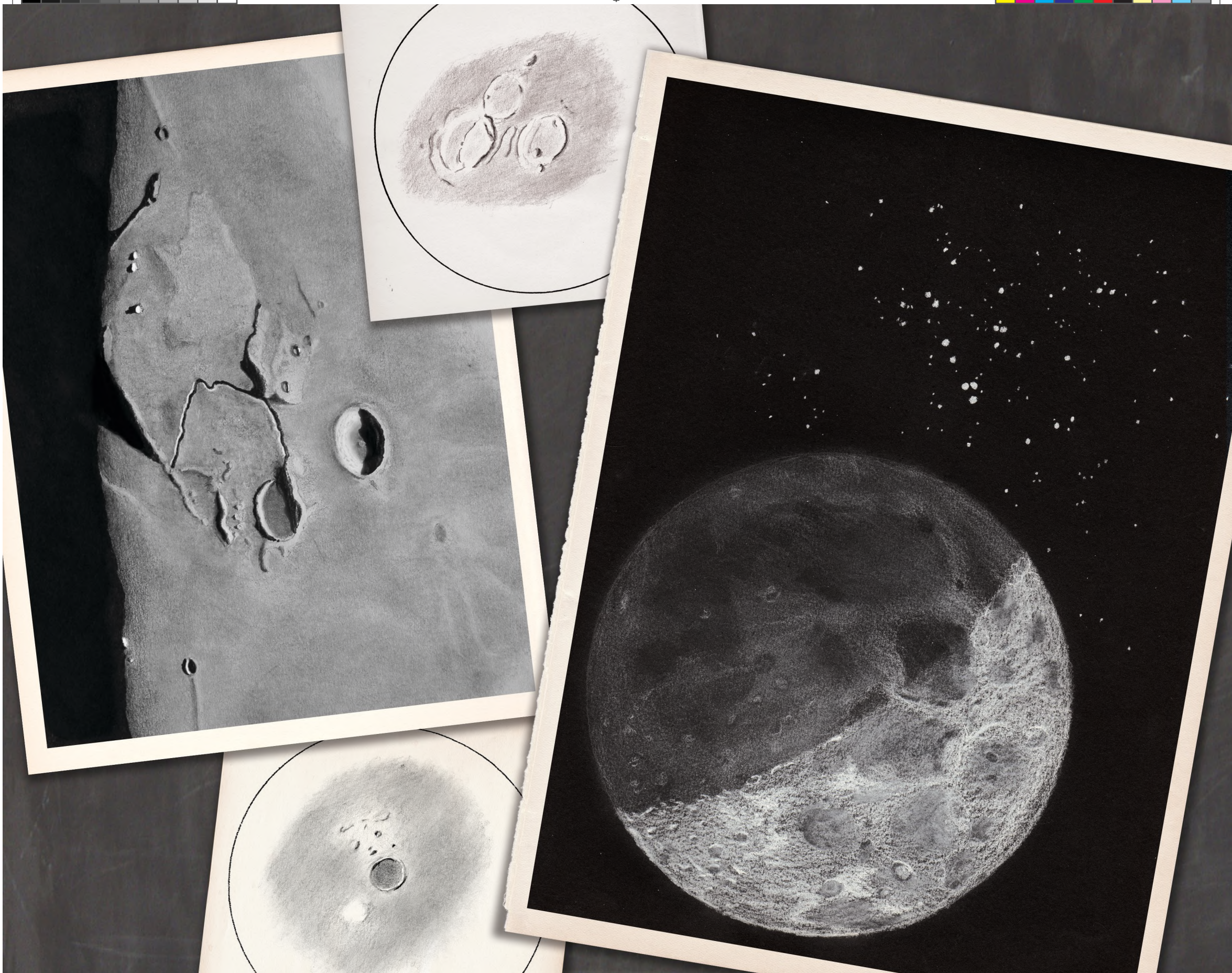
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# APRIL

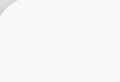
## DRAWING DISTANT LANDSCAPES

In 2006 the Royal Astronomical Society of Canada created the Isabel K. Williamson Lunar Observing Program.

While its primary mandate is lunar observing, several other optional activities are encouraged, one being the sketching of lunar features as seen here.

SKETCH AT LEFT BY GERRY SMERCHANSKI, IMAGE AT TOP, RIGHT AND BOTTOM BY GORDON WEBSTER


### SUNDAY



Rise 0:31 1:04  
Set 10:28 9:54

**1**

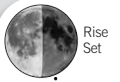
### MONDAY



Rise 0:31 1:04  
Set 10:28 9:54

**1**


### TUESDAY



Rise 1:29 2:02  
Set 11:31 10:58

**2**

### WEDNESDAY




Rise 2:20 2:49  
Set 12:36 12:08

**3**

Last Quarter  
0:37

Jupiter with only one satellite, visible in all of N. America except E 12:03 am

### THURSDAY




Rise 3:04 3:28  
Set 13:43 13:21

**4**

Lunar Curtiss X,  
visible in W of N. America 8 am

Comet PanSTARRS 3<sup>o</sup>  
from Andromeda Galaxy

### FRIDAY



Rise 3:43 4:01  
Set 14:50 14:35

**5**

Thomas Hobbes, who described light rays, was born 425 years ago

### SATURDAY




Rise 4:18 4:30  
Set 15:56 15:48

Sunrise 6:36 6:26  
Sunset 19:30 19:40


**6**

Otto Struve, known for studies of interstellar medium, died 50 years ago




Rise 4:51 4:55  
Set 17:00 16:59

**7**



Rise 5:22 5:20  
Set 18:04 18:10

**8**



Rise 5:53 5:44  
Set 19:06 19:19

**9**



Rise 6:25 6:10  
Set 20:07 20:26


**10**

New Moon  
5:35

Young crescent Moon, 18 hours after new in W, tough challenge soon after sunset


27 Euterpe at opposition (m=9.8)

Compte de Lagrange, astronomer and mathematician, died 200 years ago



Rise 6:58 6:37  
Set 21:07 21:32


**11**



Rise 7:35 7:09  
Set 22:04 22:33

**12**


Pluto stationary



Rise 8:15 7:45  
Set 22:59 23:31

Sunrise 6:25 6:11  
Sunset 19:37 19:51


**13**



Rise 8:58 8:26  
Set 23:49 —

**14**


Moon near Jupiter this evening.  
Aldebaran below



Set — 0:22  
Rise 9:46 9:13

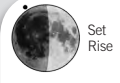
**15**

International Astronomy Week  
(through April 21)



Set 0:35 1:08  
Rise 10:37 10:06


**16**



Set 1:17 1:47  
Rise 11:31 11:03

**17**

Lunar X near crater Werner,  
visible in E of N. America,  
best in Atlantic Canada 6 pm




Set 1:55 2:21  
Rise 12:27 12:04

**18**


First Quarter  
8:31

Lunar Straight Wall this evening



Set 2:30 2:50  
Rise 13:26 13:08

**19**




Set 3:03 3:17  
Rise 14:26 14:14

Sunrise 6:15 5:57  
Sunset 19:44 20:02


**20**

International Astronomy Day  
[www.rasc.ca/education/astronomy-day](http://www.rasc.ca/education/astronomy-day)  
[www.astroleague.org/al/astroday/astrodayform.html](http://www.astroleague.org/al/astroday/astrodayform.html)



Set 3:34 3:42  
Rise 15:28 15:23

**21**



Set 4:05 4:06  
Rise 16:32 16:34

**22**


Lyrid meteors (ZHR=18) 2 am



Set 4:37 4:31  
Rise 17:39 17:48

**23**


ST. GEORGE'S DAY (NL)



Set 5:11 4:58  
Rise 18:48 19:05

**24**

Moon separating from Spica this evening




Set 5:49 5:29  
Rise 19:59 20:23

**25**

Full Moon  
15:57


Today's full Moon is the Pink Moon



Set 6:32 6:06  
Rise 21:10 21:39

**26**


80th birthday of Arno Penzias, Nobel prize for discovering Big Bang radiation



Set 7:21 6:50  
Rise 22:18 22:51

Sunrise 6:05 5:43  
Sunset 19:51 20:13


**27**



Set 8:18 7:44  
Rise 23:20 23:54


**28**

Saturn at opposition (m=0.8)



Set 9:21 8:48  
Rise — —

**29**



Set 0:15 0:46  
Rise 10:27 9:58

**30**

### THE PLANETS THIS MONTH

- Mercury** very low in ESE in morning twilight with increasing difficulty towards the end of month
- Venus** not observable this month
- Mars** not observable this month
- Jupiter** in W during twilight, sets in NW near 11 pm
- Saturn** rises after dark in E, transits in S near 2 am, sets in W near dawn

### 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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SWARMING STARS

# MAY

## SWARMING STARS

The Great Globular Cluster in Hercules (M13) contains 300,000 stars that are believed to be 12 billion years old, an age approaching that of the Universe itself. Viewed through binoculars or a small telescope, M13 resembles a snowball in the night sky. Despite its solid looking core, stars located there are thought to be separated from one another by about one light-year. | PHOTO BY STUART HEGGIE

### SUNDAY

#### THE PLANETS THIS MONTH

<b>Mercury</b>	low in NW after mid-month
<b>Venus</b>	very low in WNW in evening twilight at month end
<b>Mars</b>	not observable this month
<b>Jupiter</b>	low in W soon after sunset, lost in twilight late this month
<b>Saturn</b>	in SE at dusk, transits in S near midnight, sets in W near dawn

### MONDAY

### TUESDAY

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						

### WEDNESDAY

### THURSDAY


### FRIDAY

### SATURDAY



Rise 4:03 5:29  
Set 11:35 11:11


## 1



Rise 1:44 2:04  
Set 12:43 12:26


## 2

Last Quarter  
7:14



Rise 2:21 2:34  
Set 13:49 13:39

## 3



Rise 2:53 3:00  
Set 14:53 14:50

## 4


Sunrise 5:56 5:31  
Sunset 19:58 20:24



Rise 3:25 3:24  
Set 15:56 16:00


## 5

Eta-Aquarid meteors (ZHR=70) 9 pm  
Texas Star Party, Fort Davis, TX  
[www.texasstarparty.org](http://www.texasstarparty.org)  
(through May 12)




Rise 3:55 3:48  
Set 16:58 17:08

## 6




Rise 4:26 4:13  
Set 17:58 18:15

## 7



Rise 4:58 4:39  
Set 18:58 19:21

## 8




Rise 5:34 5:09  
Set 19:56 20:23

## 9

New Moon  
20:28


Annular solar eclipse May 9-10,  
visible W Australia NE-ward crosses  
dateline. Not visible in N. America



Rise 6:12 5:43  
Set 20:51 21:22

## 10

Thin crescent Moon 2° left of Venus,  
low in bright evening twilight



Rise 6:54 6:22  
Set 21:43 22:16

## 11

Sunrise 5:49 5:20  
Sunset 20:05 20:34


Crescent Moon between Jupiter and  
Hyades in evening twilight



Rise 7:40 7:07  
Set 22:31 23:04


## 12

MOTHER'S DAY  
Crescent Moon left of Jupiter in  
evening twilight



Rise 8:30 7:58  
Set 23:15 23:45


## 13



Rise 9:23 8:53  
Set 23:54 —


## 14

Moon occults Lambda Geminorum  
visible in Newfoundland and N  
Quebec this evening




Set — 0:21  
Rise 10:18 9:53

## 15




Set 0:29 0:51  
Rise 11:15 10:55

## 16



Set 1:02 1:19  
Rise 12:13 11:59

## 17




Set 1:33 1:44  
Rise 13:13 13:05

## 18

Sunrise 5:42 5:10  
Sunset 20:11 20:44

First Quarter  
0:35

Lunar Straight Wall this evening



Set 2:03 2:07  
Rise 14:14 14:13

## 19


Mercury approaching Venus and  
Jupiter this week in evening twilight



Set 2:34 2:31  
Rise 15:18 15:24


## 20

VICTORIA DAY (CANADA)



Set 3:06 2:57  
Rise 16:25 16:38


## 21



Set 3:41 3:25  
Rise 17:34 17:54

## 22


RTMC Astronomy Expo, Big Bear, CA  
[www.rtmcastronomyexpo.org](http://www.rtmcastronomyexpo.org)  
(through May 27)  
Moon within 3° of Spica before dawn  
Moon lower right of Saturn tonight



Set 4:21 3:58  
Rise 18:45 19:12

## 23


Mercury 1.4° right of Venus low in W  
after sunset  
6 Hebe at opposition (m=9.6)



Set 5:07 4:38  
Rise 19:56 20:28

## 24

Mercury 1.4° upper right of  
Venus low in W after sunset  
Penumbral lunar eclipse too  
shallow to notice, from SW  
B.C. NE-ward 11:55 pm




Set 6:01 5:28  
Rise 21:03 21:37

## 25

Sunrise 5:37 5:02  
Sunset 20:18 20:53

Full Moon  
0:25


Compact group Mercury-Venus-Jupiter  
low in W after sunset  
Today's full Moon is the Flower Moon



Set 7:02 6:29  
Rise 22:04 22:36

## 26


Triple conjunction  
Mercury - Venus - Jupiter form  
close triangle low in W after sunset



Set 8:10 7:38  
Rise 22:57 23:25

## 27


MEMORIAL DAY (USA)  
Triple conjunction Mercury 2.3° above  
Venus, Jupiter close at left. Low in W  
after sunset  
Comet PanSTARRS edge-on



Set 9:20 8:54  
Rise 23:42 —


## 28

Venus 1.0° upper right of Jupiter low  
in W after sunset. Mercury separating




Set — 0:04  
Rise 10:31 10:11

## 29



Set 0:21 0:37  
Rise 11:39 11:27

## 30



Set 0:56 1:05  
Rise 12:46 12:40

## 31

Last Quarter  
14:58

Mercury 1.4° right of M35 very low in  
W after sunset. S N. America only

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# JUNE

## TRANSIT OF VENUS

Few astronomical events have created more excitement than last year's Transit of Venus. Sol, nearing its solar maximum, offered a display of sunspots and flame-like prominences as the disk of Venus slowly glided its way across the Sun, a sight not to occur again until 2117.

PHOTO BY ROGER HILL

SUNDAY

MONDAY

TUESDAY

WEDNESDAY


THURSDAY

FRIDAY

SATURDAY

### THE PLANETS THIS MONTH


- Mercury** low in WNW in evening twilight, becoming difficult near month end
- Venus** very low in WNW in evening twilight
- Mars** very low in ENE in morning twilight
- Jupiter** not observable this month
- Saturn** in S at dusk, sets in W near dawn



40°N 50°N  
Rise 1:28 1:30  
Set 13:50 13:51  
Sunrise 5:33 4:56  
Sunset 20:23 21:01


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

Lick Observatory begins operations, 125 years ago




40°N 50°N  
Rise 1:59 1:54  
Set 14:52 15:00

First night Schiaparelli sketched Mars map with "canelli," 125 years ago




40°N 50°N  
Rise 2:29 2:18  
Set 15:52 16:07

Two shadows on Jupiter, visible in S Yukon with difficulty 2:52 am




40°N 50°N  
Rise 3:01 2:44  
Set 16:52 17:13

Venus 0.3° from M35 low in W early evening. S N. America only




40°N 50°N  
Rise 3:35 3:12  
Set 17:50 18:16

Venus occults 5 Geminorum in N Alaska YT and NWT. Possible to see? 4:25 am




40°N 50°N  
Rise 4:12 3:44  
Set 18:46 19:16

New Moon in June Star Party www.toronto.rasc.ca (through June 9)




40°N 50°N  
Rise 4:52 4:21  
Set 19:39 20:11

Neptune stationary



40°N 50°N  
Rise 5:37 5:04  
Set 20:28 21:01  
Sunrise 5:31 4:52  
Sunset 20:27 21:07

New Moon 11:57



40°N 50°N  
Rise 6:25 5:53  
Set 21:13 21:45

Butterpot Star Party, St. John's NL www.stjohnsrasc.ca/ (through Aug 11)




40°N 50°N  
Rise 7:17 6:46  
Set 21:54 22:22

Venus-Mercury-crescent Moon loose group low in W early evening




40°N 50°N  
Rise 8:12 7:44  
Set 22:31 22:55




40°N 50°N  
Rise 9:08 8:45  
Set 23:04 23:23


Mercury at greatest elongation E (24°) in evening twilight




40°N 50°N  
Rise 10:05 9:48  
Set 23:35 23:48



40°N 50°N  
Rise 11:03 10:53




40°N 50°N  
Set 0:05 0:12  
Rise 12:03 11:59  
Sunrise 5:31 4:50  
Sunset 20:31 21:11




40°N 50°N  
Set 0:34 0:35  
Rise 13:04 13:07

First Quarter 13:24

**FATHER'S DAY**  
Lunar Straight Wall this evening  
Valentina Tereshkova was first woman in space, 50 years ago




40°N 50°N  
Set 1:05 0:59  
Rise 14:07 14:17



40°N 50°N  
Set 1:37 1:24  
Rise 15:13 15:30

Moon between Saturn and Spica tonight  
Sally Ride was first American woman in space, 30 years ago




40°N 50°N  
Set 2:13 1:54  
Rise 16:21 16:45

Mercury 1.9° left of Venus low in W after sunset




40°N 50°N  
Set 2:55 2:29  
Rise 17:31 18:01



40°N 50°N  
Set 3:44 3:13  
Rise 18:40 19:13

**NATIONAL ABORIGINAL DAY (NT)**  
Summer Solstice 12:04 am



40°N 50°N  
Set 4:41 4:07  
Rise 19:45 20:18  
Sunrise 5:32 4:51  
Sunset 20:32 21:13



40°N 50°N  
Set 5:46 5:13  
Rise 20:43 21:14


Full Moon 7:32

Today's full Moon is the Strawberry/Honey Moon  
Closest Lunar Perigee of the year ~356,989 km




40°N 50°N  
Set 6:57 6:27  
Rise 21:33 21:59


**NATIONAL DAY (QC)**  
**DISCOVERY DAY (NL)**




40°N 50°N  
Set 8:09 7:46  
Rise 22:17 22:36



40°N 50°N  
Set 9:21 9:05  
Rise 22:55 23:07




40°N 50°N  
Set 10:31 10:23  
Rise 23:29 23:34




40°N 50°N  
Set 11:38 11:37  
Rise — 23:59

RASC General Assembly hosted by the Thunder Bay Centre www.rasc.ca/ga2013 (through Jul 01)



40°N 50°N  
Rise 0:01 —  
Set 12:43 12:49  
Sunrise 5:34 4:54  
Sunset 20:33 21:13



40°N 50°N  
Rise 0:32 0:23  
Set 13:45 13:58

Last Quarter 0:54

Canada's first space observatory, MOST, was launched from Russia, 10 years ago

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		

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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SPECTACULAR STELLAR BUBBLE

# JULY

## SPECTACULAR STELLAR BUBBLE

The Dumbbell Nebula is the first planetary nebula to be discovered. Charles Messier, a French comet hunter, observed it in the constellation Vulpecula in 1764. He catalogued it as his 27th "non-comet." The Dumbbell is a planetary nebula that results when a solar-mass star runs out of nuclear fuel and puffs its outer layers away into space, creating multi-coloured shells of gas. | PHOTO BY RÉMI LACASSE


### 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	

### MONDAY

 Rise 4:04 5:04  
Set 14:45 15:04 **1**


**CANADA DAY**  
**MEMORIAL DAY (NL)**  
Watch for noctilucent clouds in N sky during twilight this month, best N of 50° latitude  
Pluto at opposition (m=14.0)

### TUESDAY

 Rise 4:09 5:09  
Set 15:44 16:08 **2**

*Seth B. Nicholson, who found 3 moons of Jupiter, died 50 years ago*

### WEDNESDAY

 Rise 4:13 5:13  
Set 16:41 17:09 **3**

Venus 0.5° from M44 in the W at dusk. Best in S N. America

### THURSDAY

 Rise 4:17 5:17  
Set 17:35 18:06 **4**


**INDEPENDENCE DAY (USA)**  
Gateway to the Universe, North Bay, ON [www.gatewaytotheuniverse.org](http://www.gatewaytotheuniverse.org) (through Jul 08)

### FRIDAY


 Rise 4:21 5:21  
Set 18:25 18:58 **5**


Stargazing Manitoulin  
[www.gordonspark.com](http://www.gordonspark.com) (through Jul 08)  
Earth at aphelion (152,097,427 km)

### SATURDAY


 Rise 4:25 5:25  
Set 19:12 19:44 **6**

Alberta Star-B-Q, Eccles Ranch, AB [calgary.rasc.ca/starbq.htm](http://calgary.rasc.ca/starbq.htm) (through Jul 7)  
Furthest lunar apogee of the year ~406,491 km


 Rise 4:29 5:29  
Set 19:54 20:24 **7**


 Rise 6:06 5:38  
Set 20:32 20:58 **8**


New Moon 3:14  
Saturn stationary

 Rise 7:02 6:38  
Set 21:07 21:28 **9**


**NUNAVUT DAY**  
**FIRST DAY OF RAMADAN**

 Rise 7:59 7:41  
Set 21:39 21:54 **10**


 Rise 8:57 8:45  
Set 22:09 22:18 **11**

 Rise 9:56 9:50  
Set 22:38 22:41 **12**


**ORANGEMEN'S DAY (NL)**  
387 Aquitania at opposition (m=9.7)

 Rise 10:56 10:56  
Set 23:08 23:04 **13**


Sunrise 5:43 5:06  
Sunset 20:29 21:05

 Rise 11:57 12:04  
Set 23:39 23:29 **14**


Jupiter approaching Mars this week, low at dawn

 Rise 13:00 13:14  
Set — 23:56 **15**

First Quarter 23:18  
Moon within 1° S of Spica this evening, Saturn nearby

 Set 0:12 —  
Rise 14:05 14:26 **16**

Mars 0.4° from M35 very low E at dawn. S N. America only  
Moon lower left of Saturn this evening  
Lunar Straight Wall this evening

 Set 0:50 0:27  
Rise 15:12 15:39 **17**

Uranus stationary


 Set 1:34 1:06  
Rise 16:20 16:51 **18**

 Set 2:25 1:53  
Rise 17:25 17:58 **19**


8 Flora at opposition (m=8.7)

 Set 3:25 2:51  
Rise 18:26 18:58 **20**


Sunrise 5:48 5:14  
Sunset 20:24 20:58

 Set 4:31 4:00  
Rise 19:20 19:48 **21**


Venus 1.2° from Regulus low in W at dusk. Best in S N. America  
Mars 0.9° above Jupiter low in E at dawn

 Set 5:43 5:16  
Rise 20:07 20:30 **22**

Full Moon 14:16  
Mars 0.8° from Jupiter low in E at dawn  
Today's full Moon is the Thunder Moon


 Set 6:56 6:36  
Rise 20:49 21:04 **23**

Mars 0.9° left of Jupiter low in E at dawn


 Set 8:09 7:56  
Rise 21:26 21:34 **24**

 Set 9:19 9:14  
Rise 22:00 22:01 **25**

 Set 10:27 10:29  
Rise 22:32 22:27 **26**

 Set 11:32 11:42  
Rise 23:05 22:53 **27**


Sunrise 5:54 5:23  
Sunset 20:18 20:49

 Set 12:35 12:51  
Rise 23:38 23:20 **28**


Mercury – Mars – Jupiter line up at dawn this week

 Set 13:35 13:57  
Rise — 23:50 **29**

Last Quarter 13:43

 Set 0:14 —  
Rise 14:33 15:00 **30**

Mercury at greatest elongation W (20°) in morning twilight

 Set 0:52 0:23  
Rise 15:29 15:59 **31**

Lunar Curtiss X, visible in W of N. America 5 am

#### THE PLANETS THIS MONTH

- Mercury** visible after mid-month very low in ENE
- Venus** very low in W in evening twilight
- Mars** low in ENE in morning twilight
- Jupiter** very low in ENE in morning twilight
- Saturn** in SW at dusk, sets in W near 1 am

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# AUGUST

## COSMIC PAINTER'S PALETTE

Barnard's Dark Nebulae B44 extends like dark brushstrokes to the east (left), blotting out background starlight at the Ophiuchus-Scorpius constellation boundary. Red-giant Antares illuminates some of the dusty region to create the uncommon yellow reflection nebula, while nearby young stars give a typical blue lustre to their regions. Nearby magnitude 5.4 globular cluster M4 sits to the right of Antares. | PHOTO BY ALAN DYER

### SUNDAY

### MONDAY

### TUESDAY

### WEDNESDAY

### THURSDAY

### FRIDAY

### SATURDAY

#### THE PLANETS THIS MONTH

- Mercury** low in ENE, becoming difficult near mid-month
- Venus** very low in W in evening twilight
- Mars** low in ENE in morning twilight
- Jupiter** in E in morning twilight
- Saturn** low in SW at dusk, sets in WSW near 11 pm

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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Rise 40°N 50°N  
1:33 1:02  
Set 16:20 16:53


## 1

Moon occults Epsilon Tauri, visible in E and SE of N. America 4 am  
Mercury – Mars – Jupiter line up at dawn this week



Rise 40°N 50°N  
2:19 1:46  
Set 17:08 17:41


## 2



Rise 40°N 50°N  
3:08 2:36  
Set 17:52 18:23  
Sunrise 6:01 5:33  
Sunset 20:11 20:39

## 3

Mt. Kobau Star Party, Osoyoos, BC  
www.mksp.ca (through Aug 11)



Rise 40°N 50°N  
4:01 3:31  
Set 18:32 18:59

## 4

Crescent Moon joins Mercury – Mars – Jupiter lineup at dawn  
3 Juno at opposition (m=9.0)



Rise 40°N 50°N  
4:56 4:30  
Set 19:08 19:31

## 5

**CIVIC HOLIDAY (CANADA)**  
Crescent Moon lower right of Mercury at dawn



Rise 40°N 50°N  
5:53 5:32  
Set 19:42 19:59

## 6

New Moon  
17:51



Rise 40°N 50°N  
6:51 6:36  
Set 20:13 20:24


## 7



Rise 40°N 50°N  
7:50 7:42  
Set 20:43 20:48

## 8

Stellafane Convention, Springfield, VT  
www.stellafane.org (through Aug 11)  
Starfest, Mount Forest, ON  
www.nyaa.ca (through Aug 11)  
Saskatchewan Summer Star Party  
www.usask.ca/rasc/starparty.html (through Aug 11)



Rise 40°N 50°N  
8:50 8:48  
Set 21:12 21:11

## 9

Manitoulin Star Party  
www.gordonspark.com (through Aug 12)  
Crescent Moon below Venus at dusk, low



Rise 40°N 50°N  
9:51 9:56  
Set 21:43 21:35  
Sunrise 6:07 5:43  
Sunset 20:03 20:27

## 10



Rise 40°N 50°N  
10:53 11:04  
Set 22:15 22:01

## 11



Rise 40°N 50°N  
11:57 12:15  
Set 22:51 22:31

## 12

Perseid meteors (ZHR=100) 9 am  
Moon between Saturn and Spica tonight



Rise 40°N 50°N  
13:01 13:26  
Set 23:32 23:06

## 13




Rise 40°N 50°N  
14:07 14:36  
Set — 23:48

## 14


First Quarter  
6:56

Lunar Straight Wall this evening



Set 40°N 50°N  
0:18 —  
Rise 15:11 15:43


## 15



Set 40°N 50°N  
1:12 0:39  
Rise 16:11 16:44

## 16

7 Iris at opposition (m=7.9)



Set 40°N 50°N  
2:14 1:41  
Rise 17:07 17:37  
Sunrise 6:14 5:53  
Sunset 19:54 20:14


## 17

Sunshine Coast Star Party  
Porpoise Bay Provincial Park, BC  
www.coastastronomy.ca



Set 40°N 50°N  
3:21 2:52  
Rise 17:57 18:22

## 18



Set 40°N 50°N  
4:32 4:09  
Rise 18:40 18:59

## 19

**DISCOVERY DAY (YT)**



Set 40°N 50°N  
5:44 5:28  
Rise 19:20 19:32

## 20

Full Moon  
21:45

Today's full Moon is the Sturgeon Moon



Set 40°N 50°N  
6:56 6:47  
Rise 19:56 20:00

## 21




Set 40°N 50°N  
8:05 8:04  
Rise 20:30 20:27

## 22



Set 40°N 50°N  
9:13 9:19  
Rise 21:03 20:54


## 23



Set 40°N 50°N  
10:18 10:31  
Rise 21:37 21:21  
Sunrise 6:21 6:04  
Sunset 19:43 20:00

## 24

Francesco Fontana first observed Mars's gibbous phase, 375 years ago



Set 40°N 50°N  
11:21 11:41  
Rise 22:12 21:51

## 25



Set 40°N 50°N  
12:22 12:46  
Rise 22:50 22:24

## 26

Neptune at opposition (m=7.8)



Set 40°N 50°N  
13:19 13:48  
Rise 23:31 23:01

## 27

Mars was closer to Earth than at any time since 57,617 BC, 10 years ago



Set 40°N 50°N  
14:13 14:44  
Rise — 23:43

## 28

Last Quarter  
5:35

Galileo probe made first images of a satellite of an asteroid, 20 years ago




Set 40°N 50°N  
0:15 —  
Rise 15:03 15:35

## 29



Set 40°N 50°N  
1:03 0:31  
Rise 15:48 16:19

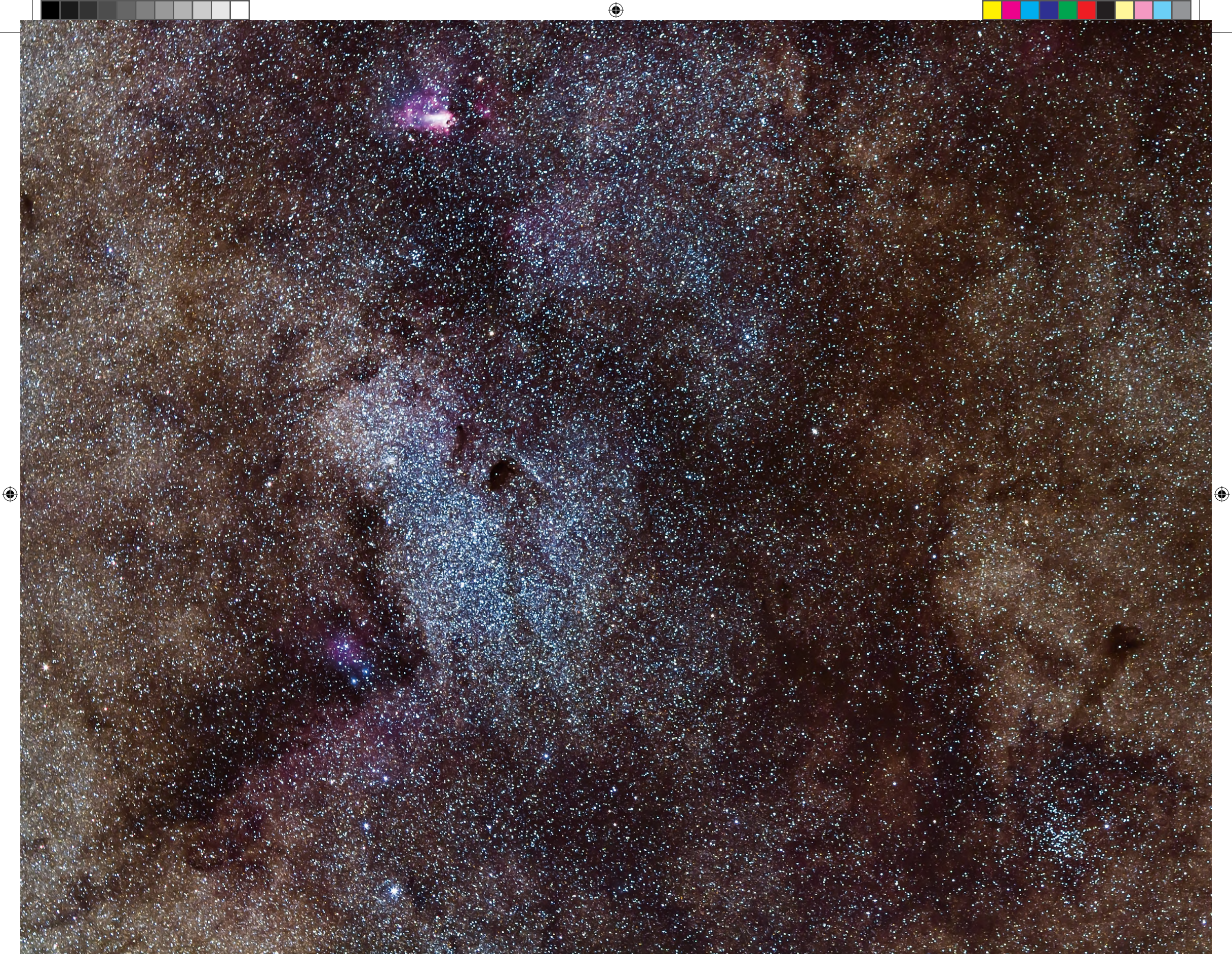
## 30



Set 40°N 50°N  
1:54 1:24  
Rise 16:30 16:58  
Sunrise 6:27 6:14  
Sunset 19:33 19:45

## 31

Moon right of Jupiter early this morning




# SEPTEMBER


## DEEP DRIFTS OF STARS

Wedged between Ophiuchus and its namesake, the Small Sagittarius Star Cloud (M24) presents one of the richest star displays in the heavens. In binoculars an observer can see about 1,000 stars in a single field of view! While many accept Charles Messier's explanation that he was describing the Small Sagittarius Star Cloud, there are those who believe he was referring to the open star cluster located southwest (below and to the right) of the larger assembly of stars. | PHOTO BY ALAN DYER

### SUNDAY


 Rise 4:48 5:21  
Set 17:07 17:31 **1**

### MONDAY

 Rise 3:44 3:22  
Set 17:42 18:01 **2**


**LABOUR DAY**  
Crescent Moon lower right of Mars near dawn

### TUESDAY

 Rise 4:42 4:25  
Set 18:14 18:27 **3**

Northern Prairie Star Party, near Tofield, AB  
[edmontonrasc.com/nps.html](http://edmontonrasc.com/nps.html) (through Sep 8)

### WEDNESDAY

 Rise 5:41 5:31  
Set 18:45 18:52 **4**


### THURSDAY

 Rise 6:41 6:37  
Set 19:15 19:16 **5**

New Moon  
7:36


**ROSH HASHANAH BEGINS**  
Annual Algonquin Adventure, Algonquin Park, ON  
[www.toronto.rasc.ca](http://www.toronto.rasc.ca) (through Sep 09)  
Venus 1.6° above Spica very low in W at dusk

### FRIDAY

 Rise 7:43 7:45  
Set 19:46 19:40 **6**


Nova East, Smileys Provincial Park, NS  
[halifax.rasc.ca/ne](http://halifax.rasc.ca/ne) (through Sep 8)

### SATURDAY


 Rise 8:45 8:55  
Set 20:18 20:06 **7**

Sunrise 6:34 6:25  
Sunset 19:21 19:30


Alberta Star Party, Starland, AB  
[Calgary.rasc.ca/asp.htm](http://Calgary.rasc.ca/asp.htm) (through Sep 8)


 Rise 9:49 10:05  
Set 20:54 20:35 **8**


Mars in M44 Beehive Cl. low in E before dawn  
Venus – Spica – crescent Moon group low in bright evening twilight. Saturn nearby

 Rise 10:54 11:16  
Set 21:33 21:09 **9**

Venus – Spica – crescent Moon – Saturn loose line low in bright evening twilight


 Rise 11:59 12:27  
Set 22:17 21:48 **10**

 Rise 13:03 13:34  
Set 23:08 22:36 **11**


 Rise 14:04 14:36  
Set — 23:33 **12**

First Quarter  
13:08

324 Bamberga at opposition (m=8.2)


 Set 0:06 —  
Rise 14:59 15:30 **13**

Lunar Straight Wall this evening

 Set 1:09 0:39  
Rise 15:50 16:17 **14**


Sunrise 6:40 6:35  
Sunset 19:10 19:15

**YOM KIPPUR**


 Set 2:16 1:51  
Rise 16:34 16:56 **15**

Venus passes below Saturn this week, low in bright evening twilight

 Set 3:26 3:06  
Rise 17:14 17:29 **16**

 Set 4:36 4:23  
Rise 17:51 17:59 **17**

Jupiter with only one satellite, visible in all of N. America except E  
7:07 am

 Set 5:45 5:40  
Rise 18:25 18:27 **18**

 Set 6:53 6:55  
Rise 18:59 18:53 **19**

Full Moon  
7:13

Today's full Moon is the Fruit/Harvest Moon  
*Christian Peters, discoverer of 48 asteroids, was born 200 years ago*


 Set 7:59 8:09  
Rise 19:33 19:21 **20**

Pluto stationary


 Set 9:04 9:20  
Rise 20:08 19:50 **21**

Sunrise 6:47 6:45  
Sunset 18:58 19:00


Galileo probe was destroyed in Jupiter's atmosphere, 10 years ago

 Set 10:06 10:28  
Rise 20:45 20:22 **22**


Fall Equinox  
4:44 pm


 Set 11:06 11:33  
Rise 21:26 20:58 **23**

89 Julia at opposition (m=9.1)


 Set 12:02 12:32  
Rise 22:09 21:38 **24**

Mercury 0.7° above Spica very low in W after sunset this evening. S N. America only  
Moon 3° left of Aldebaran and separating tonight

 Set 12:54 13:26  
Rise 22:56 22:24 **25**

 Set 13:42 14:13  
Rise 23:46 23:15 **26**

Last Quarter  
23:56

 Set 14:25 14:54  
Rise — — **27**


Two shadows on Jupiter visible in high Arctic  
8:45 pm

 Rise 0:39 0:11  
Set 15:04 15:30 **28**

Sunrise 6:54 6:56  
Sunset 18:47 18:44

Moon occults Lambda Geminorum N of graze N California–Thunder Bay, Jupiter nearby  
4 am  
Lunar Curtiss X, visible in all of N. America except Atlantic Canada 5 am  
Ariane 5, Europe's first Moon mission, was launched, 10 years ago

 Rise 1:34 1:10  
Set 15:40 16:00 **29**

 Rise 2:31 2:12  
Set 16:13 16:28 **30**

Moon upper right of Mars early this morning

### THE PLANETS THIS MONTH

<b>Mercury</b>	observed with difficulty very low in WSW after mid-month
<b>Venus</b>	very low in WSW in evening twilight
<b>Mars</b>	rises in ENE near 3 am, in E near dawn
<b>Jupiter</b>	rises by 1 am in ENE, high in E by sunrise
<b>Saturn</b>	very low in WSW after sunset, lost in twilight late this month

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

## DESOLATE NEIGHBOUR

Spectacularly beautiful yet unimaginably desolate, our Moon has been admired by life forms on our planet throughout civilization. This waxing gibbous phase reveals a wealth of detail. Prominent craters Plato near the north (left), Copernicus in the central region and Clavius near the south (right) stand out. Subtle features like the Straight Wall, a Great Rift Valley-like fault escarpment, can be found in Mare Nubium, about one-third of the way from the right. | PHOTO BY ROLF MEIER

### SUNDAY

#### THE PLANETS THIS MONTH

- Mercury** observed with difficulty very low in WSE early in month – lost in twilight after mid-month
- Venus** very low in SW in evening twilight
- Mars** rises in E near 1 am, high in E near dawn
- Jupiter** rises near 10 pm in ENE, transits high in S by sunrise
- Saturn** not observable this month

### MONDAY


### TUESDAY

### WEDNESDAY

### THURSDAY


### FRIDAY

### SATURDAY



40°N 50°N  
Rise 8:43 9:03  
Set 19:32 19:10 **6**


Mercury – Saturn – crescent Moon group low in bright evening twilight. S N. America only



40°N 50°N  
Set 1:16 0:54  
Rise 15:13 15:30 **13**


Fall Astronomy Day  
[www.astroleague.org/al/astroday/astrodayform.html](http://www.astroleague.org/al/astroday/astrodayform.html)

Mars approaches Regulus this week, before dawn  
Jupiter with only one satellite, visible in high Arctic with difficulty 9:40 pm



40°N 50°N  
Rise 9:50 10:16  
Set 20:15 19:48 **7**


Crescent Moon far right of Venus low in evening twilight



40°N 50°N  
Set 2:23 2:09  
Rise 15:50 16:00 **14**


**THANKSGIVING DAY (CANADA)**  
**COLUMBUS DAY (USA)**

Venus 2.1° N of M4 very low in SW this evening. S N. America only.



40°N 50°N  
Rise 10:56 11:26  
Set 21:05 20:34 **8**

Two shadows on Jupiter visible in Alaska 11:38 am  
Crescent Moon above Venus low in evening twilight




40°N 50°N  
Set 3:31 3:23  
Rise 16:24 16:28 **15**

Mars 0.9° N of Regulus E before dawn  
*China became third country to launch a man into space, 10 years ago*



40°N 50°N  
Rise 11:58 12:30  
Set 22:01 21:29 **9**

Mercury at greatest elongation E (25°) in evening twilight




40°N 50°N  
Set 4:37 4:37  
Rise 16:57 16:54 **16**

Venus 1.5° above Antares very low W this evening. Best in S N. America



40°N 50°N  
Rise 12:55 13:27  
Set 23:03 22:32 **10**

Jupiter with only one satellite, visible in all of N. America except E 7:44 am



40°N 50°N  
Set 5:43 5:50  
Rise 17:30 17:21 **17**

Two shadows on Jupiter visible in all of N. America except E 7:57 am



40°N 50°N  
Rise 13:47 14:15  
Set — 23:41 **11**

First Quarter 19:02


Moon occults Rho Sagittarii, visible in all of N. America, except W this evening  
Two shadows on Jupiter, visible in NE and N of N. America 11:24 pm



40°N 50°N  
Set 6:48 7:01  
Rise 18:05 17:49 **18**


Full Moon 19:38

Penumbral lunar eclipse at moonrise, not visible in E of N. America 7:50 pm  
Today's full Moon is the Hunter's Moon




40°N 50°N  
Set 0:08 —  
Rise 14:32 14:56  
Sunrise 7:08 7:18  
Sunset 18:25 18:14 **12**

Moon occults Beta Capricorni, visible in all of N. America except W and NW this evening  
Three shadows on Jupiter, visible in E and N of N. America 12:31 am  
Lunar Straight Wall this evening




40°N 50°N  
Set 7:51 8:10  
Rise 18:41 18:19  
Sunrise 7:15 7:29  
Sunset 18:14 18:00 **19**

Two shadows on Jupiter, visible in all of N. America except SW, best in E 2:25 am




40°N 50°N  
Set 8:52 9:17  
Rise 19:20 18:54 **20**

Jupiter with only one satellite, visible in NE of N. America 10:09 pm  
42 Isis at opposition (m=9.9)



40°N 50°N  
Set 9:50 10:19  
Rise 20:02 19:33 **21**

Orionid meteors (ZHR=25) 7 am




40°N 50°N  
Set 10:44 11:16  
Rise 20:48 20:17 **22**

Moon 3° right of Aldebaran near dawn




40°N 50°N  
Set 11:34 12:06  
Rise 21:38 21:06 **23**

*F.W. Bessel revealed stellar parallax solution, 175 years ago*



40°N 50°N  
Set 12:20 12:50  
Rise 22:29 22:00 **24**

Two shadows on Jupiter, visible in NW of N. America 10:29 am



40°N 50°N  
Set 13:00 13:27  
Rise 23:23 22:58 **25**

Moon below Jupiter tonight



40°N 50°N  
Set 13:37 14:00  
Rise — 23:58  
Sunrise 7:23 7:40  
Sunset 18:05 17:47 **26**

Last Quarter 19:41

Two shadows on Jupiter, visible in all of N. America 4:37 am



40°N 50°N  
Rise 0:19 —  
Set 14:11 14:28 **27**

Eskimo Nebula 1° SE of Jupiter this week



40°N 50°N  
Rise 1:16 1:00  
Set 14:42 14:54 **28**


Jupiter with only one satellite, visible in E and N of N. America 12:20 am  
Mars – Regulus – Moon loose group rising late tonight



40°N 50°N  
Rise 2:14 2:05  
Set 15:13 15:19 **29**



40°N 50°N  
Rise 3:14 3:11  
Set 15:43 15:43 **30**



40°N 50°N  
Rise 4:15 4:19  
Set 16:15 16:08 **31**

**HALLOWE'EN**

20 Massalia at opposition (m=8.7)

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

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# NOVEMBER

## ADRIFT IN THE VOID

The Triangulum Galaxy (M33, NGC 598) is the third-largest member of our Local Group of Galaxies. Only the Andromeda and Milky Way Galaxies are larger. Pink HII star-forming regions are abundant in its spiral arms, highlighted by the enormous NGC 604 located below and to the left of the galactic core. | PHOTO BY RÉMI LACASSE

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

### THE PLANETS THIS MONTH

- Mercury** low in ESE at mid-month, easy in ESE after mid-month
- Venus** low in SW in evening twilight
- Mars** rises in E near 1 am, high in SE near dawn
- Jupiter** rises near 8 pm in ENE, transits high in S near 4 am
- Saturn** very low in ESE in morning twilight

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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40°N 50°N  
Rise 5:19 5:29  
Set 16:48 16:35

**1**

Venus at greatest elongation E (47°) in the evening



40°N 50°N  
Rise 6:25 6:42  
Set 17:26 17:06  
Sunrise 7:31 7:52  
Sunset 17:56 17:35

**2**

Old crescent Moon, 26 hours before new in E, 22 hours before new in W, just before sunrise

Two shadows on Jupiter, visible in all of N. America except Atlantic Canada 7:13 am




40°N 50°N  
Rise 6:33 6:57  
Set 17:08 16:43

**3**

New Moon  
7:50

Daylight Saving Time ends 2 am


Total solar eclipse visible W Atlantic – equatorial Africa. Last minutes of partial phase visible at sunrise in E of N. America



40°N 50°N  
Rise 7:41 8:10  
Set 17:57 17:27

**4**

ISLAMIC NEW YEAR



40°N 50°N  
Rise 8:47 9:19  
Set 18:52 18:20

**5**

S Taurid meteors (ZHR=5) 6 am

Venus 2.8° south of M8, low in W this evening. S N. America only

Two shadows on Jupiter, visible with difficulty in high Arctic 7:31 pm



40°N 50°N  
Rise 9:48 10:20  
Set 19:54 19:22

**6**

Venus 2.8° south of M8 low in W this evening. crescent Moon nearby. S N. America only



40°N 50°N  
Rise 10:43 11:13  
Set 21:00 20:31


**7**

Jupiter stationary



40°N 50°N  
Rise 11:32 11:57  
Set 22:08 21:45

**8**



40°N 50°N  
Rise 12:14 12:33  
Set 23:16 22:59  
Sunrise 6:39 7:04  
Sunset 16:49 16:24

**9**

Two shadows on Jupiter, visible in W and NW of N. America 8:49 am


Jupiter at ascending node



40°N 50°N  
Rise 12:51 13:04  
Set — —

**10**

First Quarter  
0:57




40°N 50°N  
Rise 0:23 0:13  
Set 13:26 13:32

**11**

REMEMBRANCE DAY (CANADA)  
VETERAN'S DAY (USA)

Lunar Straight Wall this evening



40°N 50°N  
Rise 1:29 1:26  
Set 13:59 13:58

**12**

N Taurid meteors (ZHR=5) 5 am

Two shadows on Jupiter, visible in E and N of N. America 10:08 pm



40°N 50°N  
Rise 2:34 2:38  
Set 14:31 14:24


**13**

Neptune stationary



40°N 50°N  
Rise 3:37 3:48  
Set 15:04 14:50

**14**



40°N 50°N  
Rise 4:39 4:57  
Set 15:39 15:19


**15**

216 Kleopatra at opposition (m=9.5)

National Radio Astronomical Observatory, Green Bank, WV, collapsed 25 years ago


Frederick William Herschel, discoverer of Uranus, was born 275 years ago

USSR launched their first space shuttle, unmanned, 25 years ago



40°N 50°N  
Rise 5:40 6:03  
Set 16:16 15:52  
Sunrise 6:47 7:15  
Sunset 16:43 16:14

**16**




40°N 50°N  
Rise 6:39 7:07  
Set 16:57 16:29

**17**

Full Moon  
10:16

Leonid meteors (ZHR=15) 11 am

Today's full Moon is the Beaver Moon



40°N 50°N  
Rise 7:35 8:06  
Set 17:42 17:11

**18**

Mercury at greatest elongation W (19°), best morning view in 2013

Moon 3° and separating from Aldebaran this evening




40°N 50°N  
Rise 8:27 8:59  
Set 18:30 17:58

**19**



40°N 50°N  
Rise 9:14 9:45  
Set 19:21 18:50


**20**



40°N 50°N  
Rise 9:57 10:25  
Set 20:14 19:47

**21**

Moon below Jupiter tonight




40°N 50°N  
Rise 10:35 11:00  
Set 21:09 20:46

**22**




40°N 50°N  
Rise 11:10 11:30  
Set 22:05 21:47  
Sunrise 6:55 7:26  
Sunset 16:38 16:07

**23**



40°N 50°N  
Rise 11:42 11:56  
Set 23:01 22:49

**24**




40°N 50°N  
Rise 12:12 12:21  
Set 23:59 23:53

**25**

Last Quarter  
14:28


Mercury 0.6° above Saturn very low in E predawn sky this morning, best in S N. America



40°N 50°N  
Rise 12:42 12:45  
Set — —

**26**

Lunar Curtiss X, visible in all of N. America except E 7 am



40°N 50°N  
Rise 0:59 0:59  
Set 13:12 13:08

**27**

Moon lower right of Mars before dawn




40°N 50°N  
Rise 2:00 2:07  
Set 13:43 13:34

**28**

THANKSGIVING DAY (USA)


Cape Canaveral is renamed Kennedy Space Centre, 50 years ago



40°N 50°N  
Rise 3:04 3:17  
Set 14:18 14:02

**29**

Moon occults Spica, visible in NW of N. America before sunrise



40°N 50°N  
Rise 4:10 4:30  
Set 14:57 14:35  
Sunrise 7:02 7:36  
Sunset 16:35 16:01

**30**





# DECEMBER

## BRILLIANT CELESTIAL BLOOM

The Rosette Nebula (Caldwell 49) is an HII region located 1,500 light-years away from Earth in the constellation Monoceros. The cluster of young stars in its centre formed out of some the cloud's mass, yet the cloud is believed to have 10,000 solar masses remaining. The dark stringers and globules in the surrounding dust cloud have condensed and star formation is ongoing. | PHOTO BY STUART HEGGIE

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																									
 <p>40°N 50°N Rise 5:18 5:44 Set 15:43 15:15</p> <p><b>1</b></p> <p>Moon 2° below Saturn near dawn. Mercury at lower left 511 Davida at opposition (m=9.8)</p>	 <p>40°N 50°N Rise 6:26 6:57 Set 16:36 16:04</p> <p><b>2</b></p> <p>New Moon 19:23</p>	 <p>40°N 50°N Rise 7:32 8:04 Set 17:36 17:04</p> <p><b>3</b></p> <p>Young crescent Moon, 20 hours after new in E, 25 hours after new in W, shortly after sunset</p>	 <p>40°N 50°N Rise 8:32 9:03 Set 18:43 18:12</p> <p><b>4</b></p>	 <p>40°N 50°N Rise 9:25 9:53 Set 19:53 19:27</p> <p><b>5</b></p> <p>Crescent Moon upper right of Venus this evening</p>	 <p>40°N 50°N Rise 10:12 10:33 Set 21:04 20:44</p> <p><b>6</b></p>	 <p>40°N 50°N Rise 10:52 11:07 Set 22:13 22:01 Sunrise 7:09 7:45 Sunset 16:34 15:58</p> <p><b>7</b></p>																																																									
 <p>40°N 50°N Rise 11:28 11:37 Set 23:43 23:16</p> <p><b>8</b></p>	 <p>40°N 50°N Rise 12:02 12:03 Set — —</p> <p><b>9</b></p> <p>First Quarter 10:12</p> <p>Lunar X near crater Werner visible in all of N. America except W, best in E 6 pm</p>	 <p>40°N 50°N Set 0:27 0:29 Rise 12:34 12:29</p> <p><b>10</b></p> <p>Lunar Straight Wall this evening</p>	 <p>40°N 50°N Set 1:30 1:39 Rise 13:07 12:55</p> <p><b>11</b></p> <p>Annie Jump Cannon, stellar spectra cataloguer, was born 150 years ago</p>	 <p>40°N 50°N Set 2:33 2:48 Rise 13:40 13:23</p> <p><b>12</b></p>	 <p>40°N 50°N Set 3:33 3:54 Rise 14:16 13:54</p> <p><b>13</b></p> <p>Geminid meteors (ZHR=120) 8 pm</p>	 <p>40°N 50°N Set 4:32 4:58 Rise 14:55 14:28 Sunrise 7:14 7:52 Sunset 16:35 15:58</p> <p><b>14</b></p>																																																									
 <p>40°N 50°N Set 5:29 5:58 Rise 15:38 15:08</p> <p><b>15</b></p> <p>Nearly full Moon in Hyades this evening</p>	 <p>40°N 50°N Set 6:22 6:53 Rise 16:24 15:53</p> <p><b>16</b></p>	 <p>40°N 50°N Set 7:11 7:42 Rise 17:14 16:43</p> <p><b>17</b></p> <p>Full Moon 4:28</p> <p>Uranus stationary Today's full Moon is the Cold/Long Night's Moon</p>	 <p>40°N 50°N Set 7:55 8:25 Rise 18:07 17:38</p> <p><b>18</b></p> <p>Moon below Jupiter tonight</p>	 <p>40°N 50°N Set 8:35 9:01 Rise 19:01 18:36</p> <p><b>19</b></p>	 <p>40°N 50°N Set 9:11 9:33 Rise 19:56 19:36</p> <p><b>20</b></p>	 <p>40°N 50°N Set 9:44 10:01 Rise 20:53 20:38 Sunrise 7:19 7:56 Sunset 16:38 16:00</p> <p><b>21</b></p> <p>Winter Solstice 12:11 pm</p>																																																									
 <p>40°N 50°N Set 10:14 10:26 Rise 21:49 21:41</p> <p><b>22</b></p> <p>Ursid meteors (ZHR=10) 9 am</p>	 <p>40°N 50°N Set 10:44 10:49 Rise 22:47 22:44</p> <p><b>23</b></p>	 <p>40°N 50°N Set 11:13 11:12 Rise 23:46 23:50</p> <p><b>24</b></p> <p>532 Herculina at opposition (m=9.4)</p>	 <p>40°N 50°N Set 11:43 11:36 Rise — —</p> <p><b>25</b></p> <p>Last Quarter 8:48</p> <p>CHRISTMAS DAY Moon below Mars rising late tonight</p>	 <p>40°N 50°N Rise 0:46 0:57 Set 12:15 12:02</p> <p><b>26</b></p> <p>BOXING DAY (CANADA) 733 Mucia occults mag 7.2 HIP 17548 from Baja – Toronto – Nova Scotia (www.occultation.com) 12:15 am</p>	 <p>40°N 50°N Rise 1:49 2:06 Set 12:50 12:31</p> <p><b>27</b></p>	 <p>40°N 50°N Rise 2:55 3:18 Set 13:31 13:06 Sunrise 7:21 7:59 Sunset 16:42 16:05</p> <p><b>28</b></p> <p>Moon below Saturn near dawn</p>																																																									
 <p>40°N 50°N Rise 4:02 4:30 Set 14:19 13:49</p> <p><b>29</b></p>	 <p>40°N 50°N Rise 5:08 5:40 Set 15:14 14:42</p> <p><b>30</b></p>	 <p>40°N 50°N Rise 6:12 6:44 Set 16:18 15:46</p> <p><b>31</b></p> <p>NEW YEAR'S EVE Old crescent Moon, 23 hours before new in E, 19 hours before new in W, a challenge just before sunrise John Herschel calculated solar constant, 175 years ago</p>	<h3>THE PLANETS THIS MONTH</h3> <p><b>Mercury</b> very low in ESE, lost after mid-month</p> <p><b>Venus</b> low in SW in evening twilight</p> <p><b>Mars</b> rises in E near midnight, high in S near dawn</p> <p><b>Jupiter</b> rises after dark in NE, transits high in S near 2 am</p> <p><b>Saturn</b> in SE in morning twilight</p>			<table border="1"> <thead> <tr> <th>NOV</th> <th>S</th> <th>M</th> <th>T</th> <th>W</th> <th>T</th> <th>F</th> <th>S</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td>2</td> </tr> <tr> <td></td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> </tr> <tr> <td></td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> <td>15</td> <td>16</td> </tr> <tr> <td></td> <td>17</td> <td>18</td> <td>19</td> <td>20</td> <td>21</td> <td>22</td> <td>23</td> </tr> <tr> <td></td> <td>24</td> <td>25</td> <td>26</td> <td>27</td> <td>28</td> <td>29</td> <td>30</td> </tr> </tbody> </table>	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	<p>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.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time.</p> <p>Times for events involving planetary satellites refer to the start time.</p> <p>Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>								
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### January (*The Dark Knight*)

A composite image made from 19 min L, 19 min R, 17 min G, 17 min B, 23 min H $\alpha$ , 23 min OIII, and 20 min SII for a total exposure of 2.3 hours. Images taken from Sunglow Ranch, Arizona, with a Ceravolo 300 Astrograph at f/4.9 on a Astrophysics 900 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.



### February (*Sapphires with a few Rubies*)

A composite image made from 32x30 sec at ISO 1600 for total exposure of 16 minutes. Images taken from Indian Mountain, New Brunswick, with a Orion 80ED at f/6.3 on a Celestron AS-GT mount and a Canon Rebel 300D. Image by Tim Doucette.



### March (*Elusive Dust*)

A single exposure of 30 seconds at ISO 3200 with a Canon Rebel using a EF-S 10-22mm f/3.5-4.5 USM Lens at 10mm and f/3.5 on a still tripod. Taken March 9th, 2012 from Litchfield, Nova Scotia, by Bruce Hamilton.



### April (*Drawing Distant Landscapes*)

Sketch at left by Gerry Smerchanski. Graphite pencils, ink pens and some digital scrubbing on highlights to get brightness adjusted.

Sketch at top, right and bottom by Gordon Webster. "Crater Billy" (top) graphite on white paper. "Moon & M44" (right) white pastel on black Artagain paper, re-created from eyepiece sketch and reference photo from point-and-shoot camera at eyepiece. "Atlas & Hercules" (bottom) graphite on white paper, sketch done at the eyepiece.



### May (*Swarming Stars*)

A composite image of 5x10 min Luminance, 9x5 min each of RG, 4x5 min B for total exposure of 1 h 55 min. Image was taken from Flesherton, Ontario, with a AP155 f/7 and a Apogee U16M camera and Astrodon Gen II LRGB filters. Image by Stuart Heggie.



### June (*Transit of Venus*)

A single image taken with an unmodified Canon T1i, 1/1000th second at ISO 100 through a Astro-Tech AT6RC, 6" f/9 Ritchey-Chrétien telescope, which were mounted on a modified EQ4 mount. The image was taken at Municipal Beach Park, on the western edge of the promontory where the Welland Canal meets Lake Ontario. Image by Roger Hill.



### July (*Spectacular Stellar Bubble*)

A composite image taken in R 5x30 min, R(H $\alpha$ ) 16x30 min, G 5x30 min and B 5x30 min totalling 15.5 hours of exposure. Images taken from Mont-Tremblant with 318mm Ritchey-Chrétien telescope mounted on a Paramount Me with a SBIG st-10 XME Camera. Image by Rémi Lacasse.



### August (*Cosmic Painter's Palette*)

A composite image made from stacking 8x2 min exposures. Taken from San Pedro de Atacama, Chile, May 2011, with Canon 7D (unmodified) and Canon 135mm telephoto lens at f/2.8 and ISO 1250. Image by Alan Dyer.



### September (*Deep Drifts of Stars*)

A composite image made from stacking 6x2 min exposures. Taken from San Pedro de Atacama, Chile, May 2011, using Canon 7D (unmodified) and Canon 135mm lens at f/2.8 for stack of 6x2 min exposures (unguided on Kenko Sky Memo tracking platform) at ISO 1250. Image by Alan Dyer.



### October (*Desolate Neighbour*)

Image was taken on 2012 April 01. A single exposure of 1/50 second at ISO 160 with a Canon EOS 40D on a 150mm f/12 Astro-Physics Super Planetary telescope under average seeing conditions 30km west of Ottawa, Ontario. Image by Rolf Meier.



### November (*Adrift in the Void*)

Composite image taken in 24x10 min Luminance and 12x10 min in each RGB for a total of 10 hours exposure. Images taken from Mont-Tremblant with 318mm f/9 Ritchey-Chrétien telescope mounted on a Paramount Me with a SBIG st-10 XME Camera. Image by Rémi Lacasse.



### December (*Brilliant Celestial Bloom*)

A composite image of 7x15 min H $\alpha$ , 4x10 min each of RGB for total exposure of 3.75 hours. Image was taken from Flesherton, Ontario, with an AP155 f/7 and an Apogee U16M camera and Astrodon Gen II H $\alpha$  (5nm) and RGB filters. Image by Stuart Heggie.

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.

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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.

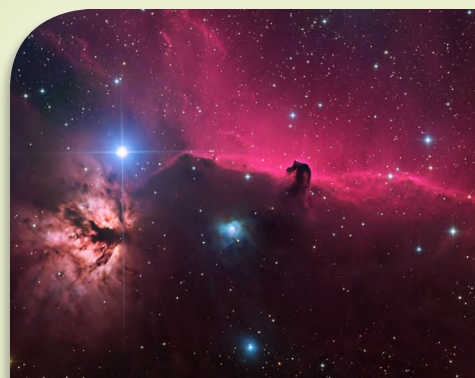
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**4**

	40°N	50°N
Rise	6:33	6:39
Set	18:18	18:09

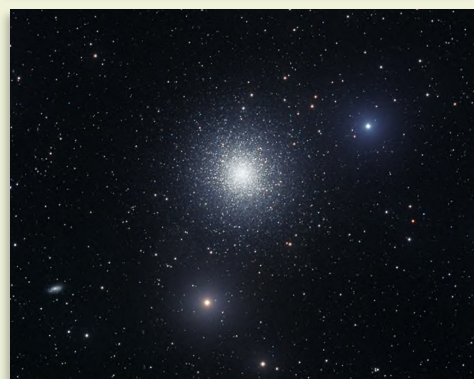
New Moon  
20:35

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

**5**

	40°N	50°N
Rise	7:37	7:51
Set	18:53	18:37
Sunrise	7:01	7:07
Sunset	18:35	18:29

*Edwin Hubble discovered M31 is outside Milky Way, 90 years ago*



**11**

	40°N	50°N
Rise	13:47	14:15
Set	—	23:41

First Quarter  
19:02

Moon occults Rho Sagittarii, visible in all of N. America, except W this evening

Two shadows on Jupiter, visible in NE and N of N. America 11:24 pm

**12**

	40°N	50°N
Set	0:08	—
Rise	14:32	14:56
Sunrise	7:08	7:18
Sunset	18:25	18:14

Moon occults Beta Capricorni, visible in all of N. America except W and NW this evening

Three shadows on Jupiter, visible in E and N of N. America 12:31 am

Lunar Straight Wall this evening

## The Royal Astronomical Society of Canada Observer's Calendar 2013

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

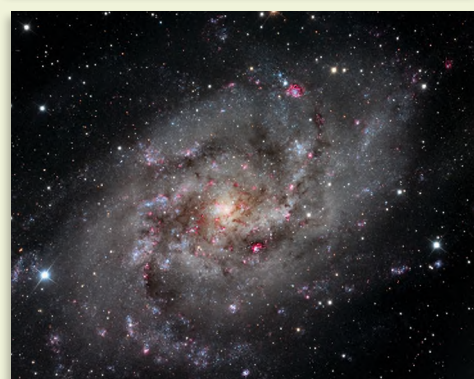
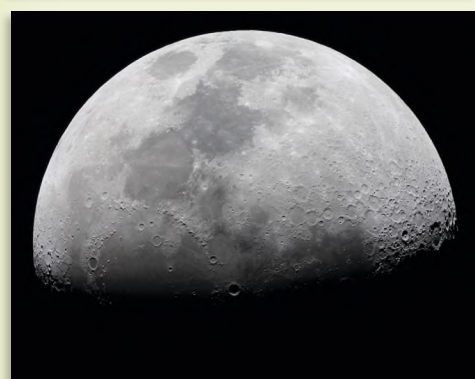
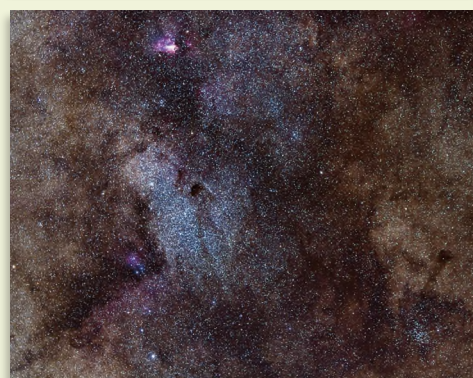
This Calendar includes comprehensive listings of astronomical data such as lunar and planetary conjunctions, Sun and Moon rise and set times, eclipses, meteor showers, and Moon phases.

### Editor

Paul Gray

### Assistant Editor

Alister Ling



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