
THE ROYAL ASTRONOMICAL SOCIETY OF CANADA
LA SOCIÉTÉ ROYALE D'ASTRONOMIE DU CANADA
CAVO DVCE VRANIA
THE ROYAL ASTRONOMICAL SOCIETY OF CANADA
OBSERVER'S CALENDAR
2012

JANUARY

Star Factory at Work

The Great Orion Nebula is the brightest, most spectacular nebula in the northern sky. This richly detailed photo shows the complex structure of the nebula, creating a strong sensation of three-dimensional depth in a two-dimensional image. At about 1,600 light years distant, it is visible to the unaided eye and stunning even in small telescopes.

Photo by Kevin Black

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 40°N 50°N Set 0:14 0:27 Rise 11:32 11:17 *First Quarter 1:14* *New Year's Day* ***Lunar X near crater Werner visible in far W of N. America 2 am*** ***Comet Levy T1 plane crossing produces an anti-tail (double spike)***	**2** 40°N 50°N Set 1:12 1:31 Rise 12:01 11:40 ***Lunar Straight Wall visible in W of N. America 2 am*** ***Moon is near Jupiter*** ***Comet Levy T1 anti-tail becoming diffuse***	**3** 40°N 50°N Set 2:10 2:36 Rise 12:33 12:05	**4** 40°N 50°N Set 3:08 3:39 Rise 13:09 12:36 ***Two shadows on Jupiter visible in all of N. America except Atlantic Canada, best in W 1:27 am*** ***Quadrantid meteors (ZHR=120) 2 am*** ***Earth at perihelion (147,097,202 km) 7 pm***	**5** 40°N 50°N Set 4:05 4:40 Rise 13:50 13:14 *NASA announced Space Shuttle program 40 years ago*	**6** 40°N 50°N Set 5:00 5:38 Rise 14:38 14:00	**7** 40°N 50°N Set 5:51 6:29 Rise 15:33 14:56 Sunrise 7:22 7:57 Sunset 16:50 16:15
8 40°N 50°N Set 6:38 7:13 Rise 16:33 15:59 *Physicist Stephen Hawking born 70 years ago* *Johannes Fabricius, discoverer of sunspots, born 425 years ago*	**9** 40°N 50°N Set 7:20 7:50 Rise 17:36 17:09 *Full Moon 2:30* ***Today's full Moon is the Wolf Moon***	**10** 40°N 50°N Set 7:58 8:21 Rise 18:43 18:22 *Sir William Herschel discovered two moons of Uranus, Oberon and Titania, 225 years ago*	**11** 40°N 50°N Set 8:32 8:48 Rise 19:50 19:37 ***Two shadows on Jupiter visible in all of N. America except E, best in W 1:25 am*** ***Two shadows on Jupiter visible in Alaska, Yukon 5:10 am***	**12** 40°N 50°N Set 9:04 9:12 Rise 20:58 20:53	**13** 40°N 50°N Set 9:34 9:34 Rise 22:06 22:10 ***Venus 1° SE of Neptune this evening***	**14** 40°N 50°N Set 10:04 9:57 Rise 23:15 23:27 Sunrise 7:21 7:54 Sunset 16:58 16:25
15 40°N 50°N Set 10:36 10:21 Rise -- --	**16** 40°N 50°N Rise 0:25 0:45 Set 11:12 10:49 *Last Quarter 4:08* *Martin Luther King Jr. Day (USA)*	**17** 40°N 50°N Rise 1:36 2:04 Set 11:52 11:22	**18** 40°N 50°N Rise 2:46 3:20 Set 12:39 12:03 ***Two shadows on Jupiter visible NW of line from W Oregon central AB to high Arctic 3:59 am***	**19** 40°N 50°N Rise 3:52 4:30 Set 13:32 12:54 ***911 Agamemnon occults 7.8-mag star 200-km-wide path Lake Huron-NYC www.asteroidoccultation.com 6 am***	**20** 40°N 50°N Rise 4:53 5:31 Set 14:33 13:55	**21** 40°N 50°N Rise 5:46 6:21 Set 15:39 15:04 Sunrise 7:17 7:48 Sunset 17:05 16:35
22 40°N 50°N Rise 6:32 7:01 Set 16:46 16:18 *Roberta Bondar was first Canadian woman in space, 20 years ago* ***Old crescent Moon, 19 hours before new in E, 15 hours before new in W, extreme challenge before sunrise***	**23** 40°N 50°N Rise 7:10 7:33 Set 17:53 17:32 *New Moon 2:39* *Chinese New Year* ***Young crescent Moon, 14 hours after new in E, 18 hours after new in W, tough challenge soon after sunset***	**24** 40°N 50°N Rise 7:44 8:00 Set 18:58 18:45 ***Mars stationary***	**25** 40°N 50°N Rise 8:13 8:22 Set 20:01 19:55	**26** 40°N 50°N Rise 8:41 8:42 Set 21:02 21:04 *Magellan spacecraft began mapping Venus 20 years ago*	**27** 40°N 50°N Rise 9:07 9:02 Set 22:01 22:10	**28** 40°N 50°N Rise 9:34 9:22 Set 23:00 23:16 Sunrise 7:12 7:40 Sunset 17:14 16:47 *Johannes Hevelius, author of first comet book, died 325 years ago*
29 40°N 50°N Rise 10:02 9:43 Set 23:58 -- ***Spot Jupiter unaided before sunset 8° to left of the Moon***	**30** 40°N 50°N Set -- 0:20 Rise 10:32 10:08 *First Quarter 23:10* ***Spot Jupiter unaided before sunset 6° to lower right of the Moon*** ***Lunar X near crater Werner visible in E of N. America best in NE 5 pm*** ***Near Earth Object 433 Eros within 0.18 AU at mag 8.5 in Sextans***	**31** 40°N 50°N Set 0:56 1:24 Rise 11:06 10:36 *Alvan Clark and son discovered white dwarf Sirius B, 150 years ago* ***Lunar Straight Wall visible in all of N. America***				

The planets this month

Mercury: low in ESE in morning twilight difficult after mid-month

Venus: in SW in evening twilight sets in W near 8 pm

Mars: rises in E after 10 pm high in SW at dawn

Jupiter: high in SE after dark transits high in S near 6 pm sets in NW near midnight

Saturn: rises in E after 1 am in S at sunrise

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.

DECEMBER

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

FEBRUARY

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

FEBRUARY

Trailing into the Depths

This curving procession of galaxies 70 million light years away in the Virgo galaxy cluster is named Markarian's Chain. Observations indicate several of the galaxies are gravitationally linked and move through space as a group. Others are moving independently. They appear to be part of the chain by chance optical alignment.

Photo by Lynn Hilborn

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: observed with difficulty after mid-month in evening twilight but easier at month end* *Venus: in SW in evening twilight sets in W near 9 pm* *Mars: rises in E near 8 pm transits high in S at 3 am* *Jupiter: high in SW after dark sets in NW near 11 pm* *Saturn: rises in E after 11 pm in S at dawn*	*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 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 MARCH S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	40°N 50°N Set 1:52 2:26 Rise 11:45 11:10 **1**	40°N 50°N Set 2:48 3:25 Rise 12:29 11:52 **2** ***Comet Garradd 0.6° S of glob. cl. M92 best from N half of N. America***	40°N 50°N Set 3:40 4:18 Rise 13:20 12:43 **3** ***Comet Garradd 0.5° W of glob. cl. M92 best from N half of N. America***	40°N 50°N Set 4:29 5:06 Rise 14:17 13:42 **4** Sunrise 7:06 7:30 Sunset 17:22 16:59
40°N 50°N Set 5:14 5:46 Rise 15:20 14:49 **5**	40°N 50°N Set 5:54 6:20 Rise 16:26 16:02 **6**	40°N 50°N Set 6:30 6:49 Rise 17:34 17:18 *Full Moon* 16:54 **7** ***Today's full Moon is the Snow Moon***	40°N 50°N Set 7:04 7:15 Rise 18:43 18:35 **8** *Ulysses spacecraft flew past Jupiter 20 years ago* ***Saturn stationary***	40°N 50°N Set 7:35 7:39 Rise 19:53 19:54 **9** ***Venus 0.3° N of Uranus this evening***	40°N 50°N Set 8:07 8:02 Rise 21:04 21:13 **10** ***Zodiacal light readily visible from a dark site in W after evening twilight for next two weeks***	40°N 50°N Set 8:39 8:27 Rise 22:15 22:33 **11** Sunrise 6:58 7:18 Sunset 17:31 17:11 ***433 Eros at opposition (m=8.6)***
40°N 50°N Set 9:14 8:54 Rise 23:27 23:52 **12** *Family Day (some prov.)* *J.L.E. Dreyer, compiler of NGC catalogue, born in Denmark 160 years ago* *Clavius, contributor to Gregorian Calendar reform, died 400 years ago* ***Moon is near Saturn***	40°N 50°N Set 9:53 9:26 Rise -- -- **13** ***Comet Garradd P1 plane crossing potential double-spike tail best from N half of N. America***	40°N 50°N Rise 0:37 1:09 Set 10:38 10:04 *Last Quarter* 12:04 **14** *Valentine's Day* ***Comet Garradd P1 plane crossing potential double-spike tail best from N half of N. America***	40°N 50°N Rise 1:44 2:21 Set 11:29 10:51 **15** ***Comet Garradd P1 plane crossing potential double-spike tail best from N half of N. America***	40°N 50°N Rise 2:46 3:24 Set 12:26 11:48 **16**	40°N 50°N Rise 3:40 4:17 Set 13:28 12:53 **17**	40°N 50°N Rise 4:27 4:59 Set 14:33 14:03 **18** Sunrise 6:50 7:06 Sunset 17:39 17:23
40°N 50°N Rise 5:08 5:34 Set 15:39 15:15 **19**	40°N 50°N Rise 5:43 6:02 Set 16:43 16:27 **20** *Presidents' Day (USA)* *Winter Star Party, Florida Keys www.scas.org/wsp.html (through Feb. 26)* *John Glenn piloted first U.S. manned orbital spacecraft, Friendship 7, 50 years ago*	40°N 50°N Rise 6:13 6:25 Set 17:47 17:38 *New Moon* 17:35 **21**	40°N 50°N Rise 6:42 6:47 Set 18:48 18:47 **22** *Johann Schroter began first survey of lunar surface 225 years ago*	40°N 50°N Rise 7:09 7:07 Set 19:48 19:54 **23**	40°N 50°N Rise 7:36 7:27 Set 20:47 21:00 **24** *Canadian Ian Shelton discovered Supernova 1987a, 25 years ago*	40°N 50°N Rise 8:03 7:48 Set 21:46 22:05 **25** Sunrise 6:40 6:52 Sunset 17:47 17:35 ***Moon 2.8° N of Venus in evening twilight***
40°N 50°N Rise 8:33 8:11 Set 22:44 23:09 **26** ***Moon is near Jupiter***	40°N 50°N Rise 9:05 8:38 Set 23:41 -- **27** ***6 Hebe at opposition (m=9.4)***	40°N 50°N Set -- 0:12 Rise 9:42 9:09 **28**	40°N 50°N Set 0:36 1:11 Rise 10:23 9:48 *First Quarter* 20:21 **29**			

MARCH

Infamous Super Moon

At 356,575 km distant, the 2011 March 19 full moon at perigee was the closest approach of Moon to Earth in eighteen years. The Moon's orbit is not a perfect circle so its distance from Earth is not constant. Nor does its closest approach always coincide with its full phase. Dubbed "Super Moon" by media hype, most Canadians could not observe it because of cloudy skies.

Photo by Doug George

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: easy in evening twilight becoming difficult after mid-month* *Venus: in W in evening twilight sets in WNW near 10 pm* *Mars: rises in E near 6 pm transits high in S near midnight sets in NW near dawn* *Jupiter: in SW in evening twilight sets in NW near 10 pm* *Saturn: rises in E after 10 pm transits in S at 3 am*	*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.*	FEBRUARY S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 APRIL S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30		*40°N 50°N* Set 1:29 2:07 Rise 11:11 10:33 **1** ***Moon occults zeta Tauri N of graze Carolinas-central AB-NW 11 pm***	*40°N 50°N* Set 2:19 2:56 Rise 12:04 11:28 **2**	*40°N 50°N* Set 3:05 3:39 Rise 13:02 12:30 **3** Sunrise 6:30 6:38 Sunset 17:55 17:46 ***Mars at opposition (m= -1.2)***
40°N 50°N Set 3:46 4:15 Rise 14:06 13:39 **4**	*40°N 50°N* Set 4:24 4:47 Rise 15:12 14:52 **5** *Mapmaker Gerardus Mercator, born in Flanders 500 years ago* ***Mercury at greatest elongation E (18°) best evening view in 2012***	*40°N 50°N* Set 4:59 5:14 Rise 16:21 16:09 **6** *Valentina Tereshkova, first woman in space born 75 years ago* *J. von Fraunhofer, noted for solar spectra studies, born 225 years ago*	*40°N 50°N* Set 5:32 5:39 Rise 17:32 17:28 **7** *Orbiting Solar Observatory was launched 50 years ago* *Sir John Herschel, son of Sir William, born 220 years ago*	*40°N 50°N* Set 6:04 6:04 Rise 18:44 18:49 *Full Moon 4:39* **8** ***Today's full Moon is the Worm Moon***	*40°N 50°N* Set 6:37 6:29 Rise 19:57 20:11 **9**	*40°N 50°N* Set 7:13 6:56 Rise 21:11 21:33 **10** Sunrise 6:19 6:23 Sunset 18:02 17:58
40°N 50°N Set 8:52 8:27 Rise 23:24 23:54 **11** ***Daylight Saving Time begins 2 am*** ***Zodiacal light readily visible from a dark site in W after evening twilight for next two weeks***	*40°N 50°N* Set 9:36 9:04 Rise -- -- **12** ***5 Astraea at opposition (m=9.1)*** ***Venus near Jupiter this evening***	*40°N 50°N* Rise 0:35 1:10 Set 10:26 9:50 **13** ***Venus 3° N of Jupiter this evening***	*40°N 50°N* Rise 1:39 2:17 Set 11:22 10:44 *Last Quarter 21:25* **14** ***Venus near Jupiter this evening***	*40°N 50°N* Rise 2:37 3:13 Set 12:23 11:47 **15** ***M21 reappears on dark limb of third quarter Moon W of Great Lakes before sunrise*** ***Two shadows on Jupiter visible in E of N. America 7:26 pm*** ***Venus near Jupiter this evening***	*40°N 50°N* Rise 3:26 3:59 Set 13:27 12:55 **16**	*40°N 50°N* Rise 4:08 4:35 Set 14:31 14:06 **17** Sunrise 7:08 7:08 Sunset 19:09 19:09
40°N 50°N Rise 4:44 5:05 Set 15:35 15:17 **18**	*40°N 50°N* Rise 5:15 5:29 Set 16:38 16:26 **19**	*40°N 50°N* Rise 5:44 5:51 Set 17:39 17:34 **20** ***Spring Equinox 1:15 am*** ***8 Flora at opposition (m=9.6)***	*40°N 50°N* Rise 6:11 6:12 Set 18:38 18:41 **21**	*40°N 50°N* Rise 6:38 6:32 Set 19:37 19:47 *New Moon 10:37* **22** ***Two shadows on Jupiter visible in E of N. America E of line Texas-Manitoba 8:31 pm*** ***Two shadows on Jupiter visible in N. America except NW, SE, and E 10:35 pm***	*40°N 50°N* Rise 7:06 6:53 Set 20:36 20:53 **23** *Wernher von Braun was born in Wirsitz, Germany 100 years ago*	*40°N 50°N* Rise 7:35 7:15 Set 21:34 21:57 **24** Sunrise 6:56 6:53 Sunset 19:17 19:20
40°N 50°N Rise 8:06 7:41 Set 22:31 23:00 **25** ***Moon 2.7° N of Jupiter in evening twilight. Venus nearby***	*40°N 50°N* Rise 8:41 8:11 Set 23:27 -- **26** ***Moon within 3° S of Venus all evening***	*40°N 50°N* Set -- 0:01 Rise 9:21 8:46 **27** ***Venus at greatest elongation E (46°) sets after midnight***	*40°N 50°N* Set 0:21 0:57 Rise 10:05 9:29 **28**	*40°N 50°N* Set 1:11 1:48 Rise 10:55 10:19 **29** ***Lunar X near crater Werner visible in all of N. America except W, best in E 9 pm*** ***Two shadows on Jupiter visible in W of N. America except NW 11:25 pm***	*40°N 50°N* Set 1:58 2:32 Rise 11:50 11:16 *First Quarter 15:41* **30** ***Lunar Straight Wall visible in all of N. America***	*40°N 50°N* Set 2:40 3:11 Rise 12:50 12:21 **31** Sunrise 6:45 6:38 Sunset 19:24 19:31 *Earth Hour (8-9 pm local) www.earthhour.org*

APRIL

Black Slash Through the Stars

Looking like a rent in star-spangled fabric, this sinuous 1-degree-long dark nebula is Barnard 150, the Seahorse Nebula, in the constellation Cepheus that lies partly in the plane of the Milky Way. The cloud's cold, dark gas and dust block the light from background stars, revealing its presence in a sharply striking silhouette.

Photo by Lynn Hilborn

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 40°N 50°N Set 3:18 3:43 Rise 13:53 13:30	**2** 40°N 50°N Set 3:53 4:12 Rise 14:59 14:43 ***Venus 0.7° S of the Pleiades this evening***	**3** 40°N 50°N Set 4:27 4:38 Rise 16:07 15:59 ***Venus 0.4° SE of the Pleiades this evening***	**4** 40°N 50°N Set 4:59 5:02 Rise 17:18 17:18 ***Spot Sirius unaided before sunset polarizing sunglasses may help best for a few days near the 4th Venus 1° E of the Pleiades this evening***	**5** 40°N 50°N Set 5:32 5:27 Rise 18:31 18:40 ***Follow Vega unaided into daylight, very challenging but can be done***	**6** 40°N 50°N Set 6:06 5:54 Rise 19:46 20:04 *Full Moon* 15:19 *Good Friday* ***Moon 2° S of Spica*** ***Saturn 5° to N. Visible all night in near straight line 10:45 pm*** ***Today's full Moon is the Pink Moon***	**7** 40°N 50°N Set 6:44 6:24 Rise 21:02 21:27 Sunrise 6:34 6:23 Sunset 19:31 19:42 *First Day of Passover*
8 40°N 50°N Set 7:27 6:59 Rise 22:16 22:48 *Easter Sunday*	**9** 40°N 50°N Set 8:17 7:43 Rise 23:26 --	**10** 40°N 50°N Rise -- 0:02 Set 9:13 8:36	**11** 40°N 50°N Rise 0:28 1:05 Set 10:14 9:38	**12** 40°N 50°N Rise 1:22 1:56 Set 11:19 10:46	**13** 40°N 50°N Rise 2:07 2:36 Set 12:25 11:57 *Last Quarter* 6:50	**14** 40°N 50°N Rise 2:45 3:08 Set 13:29 13:09 Sunrise 6:23 6:08 Sunset 19:38 19:53
15 40°N 50°N Rise 3:18 3:34 Set 14:32 14:19 *Texas Star Party, Fort Davis, TX www.texasstarparty.org (through Apr. 22)* ***Mars stationary*** ***Saturn at opposition (m=0.8)***	**16** 40°N 50°N Rise 3:48 3:57 Set 15:33 15:27	**17** 40°N 50°N Rise 4:15 4:17 Set 16:32 16:33	**18** 40°N 50°N Rise 4:42 4:38 Set 17:31 17:39 ***Mercury at greatest elongation W (27°)***	**19** 40°N 50°N Rise 5:09 4:58 Set 18:29 18:44	**20** 40°N 50°N Rise 5:37 5:20 Set 19:27 19:48 ***Old crescent Moon, 22 hours before new in E, 18 hours before new in W, tough challenge before sunrise***	**21** 40°N 50°N Rise 6:08 5:45 Set 20:24 20:51 *New Moon* 3:18 Sunrise 6:13 5:54 Sunset 19:45 20:04 ***Young crescent Moon, 17 hours after new in E, 21 hours after new in W, tough challenge soon after sunset***
22 40°N 50°N Rise 6:42 6:13 Set 21:21 21:52 *International Astronomy Week (through April 29)* ***Lyrid meteors (ZHR=20) 1 am*** ***Moon 2.8° N of Jupiter in evening twilight***	**23** 40°N 50°N Rise 7:20 6:47 Set 22:15 22:50	**24** 40°N 50°N Rise 8:03 7:27 Set 23:06 23:43 ***Moon is near Venus in evening twilight***	**25** 40°N 50°N Rise 8:51 8:14 Set 23:54 -- *Johann Encke discovered the Encke Gap, largest gap in Saturn's A ring, 175 years ago*	**26** 40°N 50°N Set -- 0:29 Rise 9:43 9:09 *First British satellite, Ariel 1, launched from Cape Canaveral 50 years ago*	**27** 40°N 50°N Set 0:37 1:09 Rise 10:40 10:10	**28** 40°N 50°N Set 1:16 1:43 Rise 11:41 11:15 Sunrise 6:03 5:41 Sunset 19:52 20:15 ***International Astronomy Day*** *www.rasc.ca/astroday* *www.astroleague.org/al/astroday/astroday.html*
29 40°N 50°N Set 1:51 2:12 Rise 12:44 12:25 *First Quarter* 5:57 ***Lunar Straight Wall visible in all of N. America***	**30** 40°N 50°N Set 2:24 2:38 Rise 13:49 13:37 ***Venus at greatest illuminated extent (m= -4.3)***			**The planets this month** *Mercury: difficult in morning twilight very low in E* *Venus: in W in evening twilight sets in WNW near midnight* *Mars: transits high in S near 10 pm sets in NW near 4 am* *Jupiter: low in W soon after sunset lost in twilight late this month* *Saturn: rises in E at sunset transits in S at 1 am sets in W near dawn*	*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.*	MARCH S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 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

MAY

Brilliant Galactic Blossom

About 7,600 light years away, M20, the Trifid Nebula in Sagittarius, is one of the sky's most well known objects. Glowing red hydrogen gas appears cloven into three "petals" by filigreed veins of dark nebulosity. Enveloping the "flower" is a smoky blue reflection nebula composed of very fine dust particles.

Photo by Stefano Cancelli and Paul Mortfield

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: difficult in morning twilight very low in E and lost by mid-month* *Venus: in WNW in evening twilight sets in NW near 11 pm becoming difficult at end-month* *Mars: transits high in S at sunset sets in W near 3 am* *Jupiter: not observable this month* *Saturn: in SE at dusk transits in S at 11 pm sets in W before dawn*		40°N 50°N Set 2:55 3:02 Rise 14:56 14:52 **1**	40°N 50°N Set 3:27 3:26 Rise 16:06 16:10 **2**	40°N 50°N Set 3:59 3:51 Rise 17:18 17:31 **3**	40°N 50°N Set 4:35 4:19 Rise 18:33 18:54 **4** *Galileo wrote first of three letters to Welser on sunspots 400 years ago* ***7 Iris at opposition (m=9.5)***	40°N 50°N Set 5:15 4:51 Rise 19:49 20:18 *Full Moon* 23:35 Sunrise 5:55 5:29 Sunset 19:59 20:26 **5** ***Eta-Aquarid meteors (ZHR=60) 3 pm*** ***Largest full Moon of 2012*** ***Closest perigee of 2012 - 357,000 km*** ***Large ocean tides expected*** ***Today's full Moon is the Flower Moon***
40°N 50°N Set 6:02 5:31 Rise 21:02 21:37 **6**	40°N 50°N Set 6:56 6:20 Rise 22:11 22:48 **7**	40°N 50°N Set 7:57 7:20 Rise 23:10 23:46 **8**	40°N 50°N Set 9:03 8:29 Rise -- -- **9**	40°N 50°N Rise 0:01 0:32 Set 10:11 9:42 **10**	40°N 50°N Rise 0:43 1:08 Set 11:18 10:56 **11**	40°N 50°N Rise 1:19 1:37 Set 12:23 12:08 *Last Quarter* 17:47 Sunrise 5:47 5:18 Sunset 20:06 20:36 **12**
40°N 50°N Rise 1:50 2:01 Set 13:26 13:18 **13** *Mother's Day*	40°N 50°N Rise 2:19 2:23 Set 14:26 14:25 **14**	40°N 50°N Rise 2:46 2:43 Set 15:25 15:31 **15** ***Venus stationary***	40°N 50°N Rise 3:12 3:04 Set 16:23 16:36 **16**	40°N 50°N Rise 3:40 3:25 Set 17:21 17:40 **17**	40°N 50°N Rise 4:10 3:49 Set 18:18 18:43 **18**	40°N 50°N Rise 4:43 4:16 Set 19:15 19:45 Sunrise 5:41 5:08 Sunset 20:13 20:46 **19** ***Farthest lunar apogee of 2012 (401,167 km)***
40°N 50°N Rise 5:19 4:48 Set 20:10 20:44 *New Moon* 19:47 **20** ***3 Juno at opposition (m=10.2)*** ***Annular solar eclipse visible from eastern Asia to central U.S. No eclipse visible along Atlantic coast***	40°N 50°N Rise 6:01 5:26 Set 21:03 21:39 **21** *Victoria Day (Canada)*	40°N 50°N Rise 6:47 6:11 Set 21:52 22:27 **22** ***Moon is near Venus in evening twilight*** ***Crescent Moon occults zeta Tauri visible in midwest U.S. with graze Missouri-Montana 10 pm***	40°N 50°N Rise 7:39 7:04 Set 22:36 23:09 **23**	40°N 50°N Rise 8:35 8:03 Set 23:16 23:45 **24**	40°N 50°N Rise 9:34 9:07 Set 23:52 -- **25**	40°N 50°N Set -- 0:15 Rise 10:35 10:14 Sunrise 5:36 5:01 Sunset 20:19 20:54 **26** *RTMC Astronomy Expo, Big Bear, CA* *www.rtmcastronomyexpo.org (through May 28)*
40°N 50°N Set 0:25 0:42 Rise 11:38 11:24 **27** ***Lunar X near crater Werner visible in N. America except W, best in far E 9 pm***	40°N 50°N Set 0:56 1:06 Rise 12:42 12:36 *First Quarter* 16:16 **28** *Memorial Day (USA)* ***Lunar Straight Wall visible in all of N. America***	40°N 50°N Set 1:26 1:29 Rise 13:49 13:50 **29**	40°N 50°N Set 1:57 1:52 Rise 14:57 15:07 **30**	40°N 50°N Set 2:30 2:17 Rise 16:08 16:26 **31**	*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.*	

APRIL

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

JUNE

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

JUNE

It's all Relative

On the left is M46, a large and bright star cluster in Puppis some 5,500 light years distant. Its age is estimated at several hundred million years. At its upper edge is a small blue-green bubble: the unrelated planetary nebula NGC 2438. At right is M47, a more sparsely populated star cluster, and both younger and closer with an age of about 78 million years and a distance of about 1,600 light years. ***Photo by Alan Dyer***

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: low in WNW in evening twilight* *Venus: low in NE in morning twilight after mid-month* *Mars: in SW at sunset sets in W near 1 am* *Jupiter: very low in NE in morning twilight* *Saturn: in SSW at dusk sets in W near 2 am*	*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.*	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 JULY S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31			40°N 50°N Set 3:07 2:46 Rise 17:22 17:48 **1** ***Watch for noctilucent clouds in N sky during twilight this month best N of 50° latitude***	40°N 50°N Set 3:49 3:21 Rise 18:36 19:08 **2** Sunrise 5:33 4:55 Sunset 20:24 21:02
40°N 50°N Set 4:38 4:05 Rise 19:47 20:24 **3**	40°N 50°N Set 5:36 4:59 Rise 20:52 21:29 *Full Moon* 7:12 **4** ***Partial lunar eclipse visible before sunrise in N. America except NE and Arctic*** ***Today's full Moon is the Honey Moon***	40°N 50°N Set 6:41 6:04 Rise 21:49 22:22 **5** *Nicholas Copernicus observed opposition of Mars 500 years ago* ***Transit of Venus in progress at sunset for N. America Not visible from NW B.C. and Arctic***	40°N 50°N Set 7:50 7:18 Rise 22:36 23:04 **6**	40°N 50°N Set 9:00 8:34 Rise 23:16 23:37 **7**	40°N 50°N Set 10:08 9:49 Rise 23:50 -- **8**	40°N 50°N Rise -- 0:04 Set 11:13 11:02 **9** Sunrise 5:31 4:51 Sunset 20:28 21:08 *Johann Galle, the first to knowingly observe Neptune, born 200 years ago*
40°N 50°N Rise 0:20 0:27 Set 12:16 12:12 **10**	40°N 50°N Rise 0:48 0:48 Set 13:17 13:20 *Last Quarter* 6:41 **11**	40°N 50°N Rise 1:16 1:09 Set 14:16 14:26 **12**	40°N 50°N Rise 1:43 1:30 Set 15:14 15:31 **13**	40°N 50°N Rise 2:12 1:53 Set 16:12 16:35 **14**	40°N 50°N Rise 2:44 2:19 Set 17:09 17:37 **15**	40°N 50°N Rise 3:19 2:49 Set 18:04 18:37 **16** Sunrise 5:31 4:50 Sunset 20:31 21:12
40°N 50°N Rise 3:59 3:25 Set 18:58 19:34 **17** *Father's Day* ***Moon 0.5° N of Jupiter, Pleiades above, Venus nearby, in morning twilight*** ***Moon occults Jupiter in daylight visible in W Arctic 3 am***	40°N 50°N Rise 4:44 4:08 Set 19:48 20:25 **18**	40°N 50°N Rise 5:34 4:58 Set 20:35 21:09 *New Moon* 11:02 **19**	40°N 50°N Rise 6:29 5:55 Set 21:17 21:47 **20** ***Summer Solstice 7:09 pm***	40°N 50°N Rise 7:27 6:59 Set 21:54 22:19 **21**	40°N 50°N Rise 8:28 8:06 Set 22:28 22:47 **22**	40°N 50°N Rise 9:31 9:15 Set 23:00 23:12 **23** Sunrise 5:32 4:51 Sunset 20:33 21:13
40°N 50°N Rise 10:35 10:26 Set 23:30 23:35 **24** ***18 Melpomene at opposition (m=9.4)***	40°N 50°N Rise 11:39 11:38 Set -- 23:57 **25**	40°N 50°N Set 0:00 -- Rise 12:46 12:52 *First Quarter* 23:30 **26** ***Saturn stationary***	40°N 50°N Set 0:31 0:21 Rise 13:54 14:08 **27** ***Lunar Straight Wall visible in all of N. America*** ***Venus stationary***	40°N 50°N Set 1:05 0:47 Rise 15:04 15:26 **28** *RASC General Assembly hosted by the Edmonton Centre www.rasc.ca/ga2012 (through Jul. 2)* ***Gibbous Moon occults asteroid 7 Iris disappearance on dark limb visible in SW U.S. overnight***	40°N 50°N Set 1:43 1:18 Rise 16:15 16:45 **29** ***Pluto at opposition (m=14.0)***	40°N 50°N Set 2:27 1:56 Rise 17:26 18:01 **30** Sunrise 5:35 4:55 Sunset 20:33 21:13 ***Mercury at greatest elongation E (26°)***

JULY

Rivers of Light and Dark

This is a wonderfully detailed view of the heart of our own Milky Way galaxy. The central dark rift slices from lower left to upper right, blocking much of the brilliance of the glowing galactic core. A complex mesh of dark nebulae laces through the stars. Embedded within are many glowing pink hydrogen clouds that are birthing new stars.

Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 40°N 50°N Set 3:19 2:44 Rise 18:33 19:10 *Canada Day* ***Watch for noctilucent clouds in N sky during twilight this month best N of 50° latitude***	**2** 40°N 50°N Set 4:20 3:43 Rise 19:33 20:09	**3** 40°N 50°N Set 5:26 4:51 Rise 20:25 20:56 *Full Moon* 14:52 ***Today's full Moon is the Thunder Moon***	**4** 40°N 50°N Set 6:36 6:07 Rise 21:09 21:34 *Independence Day (USA)* ***Earth at aphelion (152,092,400 km) 11 pm***	**5** 40°N 50°N Set 7:46 7:24 Rise 21:46 22:04	**6** 40°N 50°N Set 8:55 8:40 Rise 22:19 22:30 *Sir Isaac Newton's Principia was published 325 years ago* ***20 Massalia at opposition (m=10.0)***	**7** 40°N 50°N Set 10:00 9:53 Rise 22:49 22:52 Sunrise 5:39 5:00 Sunset 20:31 21:09 *Comet Shoemaker-Levy 9 broke into 21 pieces 20 years ago*
8 40°N 50°N Set 11:03 11:04 Rise 23:17 23:14	**9** 40°N 50°N Set 12:04 12:12 Rise 23:45 23:35 ***Venus 1° N of Aldebaran Jupiter nearby, visible before sunrise***	**10** 40°N 50°N Set 13:04 13:18 Rise -- 23:57 *Last Quarter* 21:48	**11** 40°N 50°N Rise 0:14 -- Set 14:02 14:23	**12** 40°N 50°N Rise 0:45 0:22 Set 15:00 15:26 ***Venus at greatest illuminated extent (m= -4.7)***	**13** 40°N 50°N Rise 1:18 0:50 Set 15:56 16:28 ***Spot Arcturus unaided before sunset polarizing sunglasses may help, very challenging but can be done***	**14** 40°N 50°N Rise 1:56 1:24 Set 16:51 17:26 Sunrise 5:43 5:07 Sunset 20:28 21:04 ***Venus-Jupiter-Aldebaran-Crescent Moon Pleiades group in morning twilight*** ***Two shadows on Jupiter visible in all of N. America except W, best in E 4:54 am***
15 40°N 50°N Rise 2:39 2:04 Set 17:43 18:19 ***Venus-Jupiter-Aldebaran-Crescent Moon group in morning twilight***	**16** 40°N 50°N Rise 3:28 2:51 Set 18:31 19:06	**17** 40°N 50°N Rise 4:21 3:46 Set 19:15 19:47	**18** 40°N 50°N Rise 5:19 4:48 Set 19:54 20:21 ***Old crescent Moon, 20 hours before new in E, 16 hours before new in W, extreme challenge before sunrise***	**19** 40°N 50°N Rise 6:20 5:55 Set 20:30 20:51 *New Moon* 0:24 *Gateway to the Universe, North Bay ON www.gatewaytotheuniverse.org (through Jul. 22)* *Thousands of meteoric fragments fell in Holbrook, AZ 100 years ago*	**20** 40°N 50°N Rise 7:23 7:04 Set 21:03 21:17 *First day of Ramadan* *Stargazing Manitoulin www.gordonspark.com (through Jul. 23)*	**21** 40°N 50°N Rise 8:27 8:15 Set 21:34 21:41 Sunrise 5:49 5:15 Sunset 20:23 20:57 *Star-B-Q, Eccles Ranch, AB calgary.rasc.ca (through Jul. 22)* ***Two shadows on Jupiter visible in all of N. America except NE best in central parts 5:51 am*** ***Two shadows on Jupiter visible in centre and W of N. America 6:53 am***
22 40°N 50°N Rise 9:32 9:28 Set 22:04 22:04 *Mariner 1 was launched to Venus 50 years ago*	**23** 40°N 50°N Rise 10:38 10:42 Set 22:35 22:27	**24** 40°N 50°N Rise 11:45 11:57 Set 23:07 22:53	**25** 40°N 50°N Rise 12:54 13:13 Set 23:43 23:21 ***Lunar X near crater Werner visible in Atlantic Canada 7 pm***	**26** 40°N 50°N Rise 14:03 14:30 Set -- 23:56 *First Quarter* 4:56 ***Lunar Straight Wall visible in all of N. America***	**27** 40°N 50°N Set 0:24 -- Rise 15:12 15:45	**28** 40°N 50°N Set 1:12 0:38 Rise 16:19 16:55 Sunrise 5:55 5:25 Sunset 20:17 20:48 ***Two shadows on Jupiter visible in W of N. America best along W coast 7:45 am*** ***S Delta-Aquarid meteors (ZHR=20) 5 pm***
29 40°N 50°N Set 2:07 1:30 Rise 17:20 17:57	**30** 40°N 50°N Set 3:09 2:33 Rise 18:15 18:48 ***Two shadows on Jupiter visible in all of N. America except W, best in SE 3:26 am***	**31** 40°N 50°N Set 4:16 3:44 Rise 19:01 19:29		**The planets this month** *Mercury: very low in WNW in evening twilight and lost by mid-month* *Venus: in NE in morning twilight* *Mars: low in SW at dusk sets in W near midnight* *Jupiter: low in E in morning twilight* *Saturn: in SW at dusk sets in W near 1 am*	*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.*	JUNE S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 AUGUST S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

AUGUST

Cosmic Continent

Rich star fields in Cygnus frame the famous emission nebula named for its resemblance to a continent. To the right of the North American Nebula, and separated by a dark dust cloud, is the less brilliant but equally famous Pelican Nebula. The gas complex is about 1,500 light years away and is visible in binoculars from a dark location.

Photo by Paul Zelichowski

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: low in ENE in morning twilight* *Venus: in ENE in morning twilight* *Mars: low in SW at dusk sets in SW at 10 pm* *Jupiter: rises by 1 am in ENE high in SE by sunrise* *Saturn: low in SW at dusk sets in SW at 10 pm*	*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.*	JULY S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 SEPTEMBER S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	*40°N 50°N* Set 5:25 5:00 Rise 19:42 20:03 *Full Moon* 23:27 **1** ***Today's full Moon is the Sturgeon Moon***	*40°N 50°N* Set 6:34 6:16 Rise 20:17 20:31 **2**	*40°N 50°N* Set 7:42 7:31 Rise 20:48 20:55 **3** ***Jupiter 4.6° N of Aldebaran visible before sunrise first of 3 in triple conjunction***	*40°N 50°N* Set 8:46 8:43 Rise 21:17 21:17 **4** Sunrise 6:02 5:34 Sunset 20:10 20:37
40°N 50°N Set 9:49 9:53 Rise 21:46 21:39 **5**	*40°N 50°N* Set 10:50 11:01 Rise 22:15 22:01 **6** *Civic Holiday (Canada)* ***Two shadows on Jupiter visible in all of N. America except W, best in SE 4:07 am***	*40°N 50°N* Set 11:50 12:08 Rise 22:45 22:25 **7** *Nobel laureate Victor Hess discovered cosmic rays 100 years ago*	*40°N 50°N* Set 12:48 13:12 Rise 23:18 22:52 **8** ***Two shadows on Jupiter visible in NE of N. America best in Atlantic Canada 12:37 am***	*40°N 50°N* Set 13:45 14:15 Rise 23:54 23:24 *Last Quarter* 14:55 **9**	*40°N 50°N* Set 14:41 15:14 Rise -- -- **10**	*40°N 50°N* Rise 0:35 0:01 Set 15:34 16:09 **11** Sunrise 6:08 5:45 Sunset 20:01 20:25 *Mount Kobau Star Party, Osoyoos, BC www.mksp.ca (through Aug. 19)*
40°N 50°N Rise 1:21 0:45 Set 16:23 16:59 **12** ***Perseid meteors (ZHR=90) 8 am***	*40°N 50°N* Rise 2:12 1:36 Set 17:09 17:42 **13** ***Crescent Moon 5° above Venus in morning twilight*** ***Two shadows on Jupiter visible in all of N. America except E, best in W 6:47 am*** ***Moon occults Venus in daylight visible in N. America except E 4 pm***	*40°N 50°N* Rise 3:07 2:35 Set 17:50 18:20 **14**	*40°N 50°N* Rise 4:07 3:40 Set 18:28 18:52 **15** ***Two shadows on Jupiter visible in N and NE of N. America, best in NE 12:43 am*** ***Two shadows on Jupiter visible in all of N. America except W, best in E 3:21 am*** ***Venus at greatest elongation W (46°)***	*40°N 50°N* Rise 5:10 4:49 Set 19:03 19:20 **16** *Starfest, Mount Forest, ON www.nyaa.ca (through Aug. 19)* *Saskatchewan Summer Star Party homepage.usask.ca/~ges125/rasc/starparty.html (through Aug. 19)* ***Mercury at greatest elongation W (19°)***	*40°N 50°N* Rise 6:14 6:00 Set 19:35 19:45 *New Moon* 11:54 **17** *Nova East, Smileys Provincial Park, NS halifax.rasc.ca/ne (through Aug. 19)* *Manitoulin Star Party www.gordonspark.com (through Aug. 20)* *Stellafane Convention, Springfield, VT www.stellafane.org (through Aug. 19)*	*40°N 50°N* Rise 7:20 7:14 Set 20:06 20:09 **18** Sunrise 6:15 5:55 Sunset 19:52 20:11 *Sunshine Coast 6th Annual Star Party Porpoise Provincial Park, BC www.coastastronomy.ca (through Aug 21)*
40°N 50°N Rise 8:27 8:29 Set 20:38 20:33 **19**	*40°N 50°N* Rise 9:36 9:45 Set 21:10 20:58 **20** *Leslie Peltier made the 2,000,000th AAVSO observation 50 years ago*	*40°N 50°N* Rise 10:45 11:02 Set 21:46 21:26 **21** ***Crescent Moon 2° S of Spica in bright evening twilight. Mars and Saturn above. Better in S of N. America***	*40°N 50°N* Rise 11:55 12:19 Set 22:25 21:59 **22** ***Two shadows on Jupiter visible in all of N. America except extreme W, best in E 3:20 am*** ***10 Hygiea at opposition (m=9.7)***	*40°N 50°N* Rise 13:04 13:34 Set 23:11 22:39 **23** *Sun was reportedly obscured by an interplanetary dust cloud 250 years ago*	*40°N 50°N* Rise 14:11 14:46 Set -- 23:27 *First Quarter* 9:54 **24** ***Neptune at opposition (m=7.8)***	*40°N 50°N* Set 0:03 -- Rise 15:13 15:49 **25** Sunrise 6:22 6:05 Sunset 19:42 19:57 ***Lunar Straight Wall visible in all of N. America***
40°N 50°N Set 1:01 0:25 Rise 16:08 16:42 **26**	*40°N 50°N* Set 2:05 1:31 Rise 16:56 17:26 **27**	*40°N 50°N* Set 3:11 2:43 Rise 17:38 18:02 **28**	*40°N 50°N* Set 4:19 3:57 Rise 18:14 18:31 **29** ***Two shadows on Jupiter visible in all of N. America except NE, best in W 5:57 am***	*40°N 50°N* Set 5:25 5:11 Rise 18:47 18:57 **30** *First Kuiper Belt object, 1992 QB1, was discovered 20 years ago*	*40°N 50°N* Set 6:31 6:24 Rise 19:17 19:20 *Full Moon* 9:58 **31** ***Today's full Moon is a Blue Moon*** ***Today's full Moon is the Grain Moon***	

SEPTEMBER

Night Passes Over Castle Mountain

This time exposure records Earth's rotation on its axis over two hours of the night. Star trails arc around the sky, clearly showing the North Celestial Pole: the point on the sky under which Earth's rotational axis lies. Polaris is the short, bright trail near the centre. Castle Mountain, in Banff National Park, is lit by the Moon, provides scale to this dramatic composition.

Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: not observable this month* *Venus: in E in morning twilight* *Mars: low in SW at dusk sets in SW by 9 pm* *Jupiter: rises near 10 pm in ENE transits high in S by sunrise* *Saturn: low in SSW at dusk sets in SW at 8 pm*	*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.*	AUGUST S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 OCTOBER S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31				40°N 50°N Set 7:34 7:35 Rise 19:46 19:42 **1** Sunrise 6:28 6:16 Sunset 19:31 19:43
40°N 50°N Set 8:36 8:44 Rise 20:15 20:05 **2**	40°N 50°N Set 9:36 9:51 Rise 20:45 20:28 **3** *Labour Day* ***11 Parthenope at opposition (m=9.0)***	40°N 50°N Set 10:36 10:57 Rise 21:17 20:54 **4**	40°N 50°N Set 11:34 12:01 Rise 21:52 21:24 **5**	40°N 50°N Set 12:30 13:01 Rise 22:31 21:59 **6**	40°N 50°N Set 13:24 13:58 Rise 23:15 22:40 **7** ***Moon within 3.0° of Jupiter late evening and overnight***	40°N 50°N Set 14:14 14:50 Rise -- 23:28 *Last Quarter* 9:15 Sunrise 6:35 6:26 Sunset 19:19 19:28 **8** ***Spot Jupiter unaided after sunrise 3° to upper right of the Moon*** ***LQ Moon occults asteroid 1 Ceres reapp. on dark limb after midnight visible in N. America except SE***
40°N 50°N Rise 0:03 -- Set 15:01 15:35 **9** *E.E. Barnard discovered Amalthea, 5th moon of Jupiter, 120 years ago*	40°N 50°N Rise 0:56 0:23 Set 15:44 16:15 **10**	40°N 50°N Rise 1:53 1:24 Set 16:23 16:49 **11** *Northern Prairie Star Party, near Tofield, AB edmontonrasc.com/nps.html (through Sep. 16)*	40°N 50°N Rise 2:54 2:30 Set 16:59 17:19 **12** *Mark Lee and Jan Davis were first astronaut couple in space 20 years ago* ***Crescent Moon to right of Venus in morning twilight***	40°N 50°N Rise 3:57 3:40 Set 17:32 17:45 **13**	40°N 50°N Rise 5:03 4:53 Set 18:05 18:10 **14** *Alberta Star Party, Starland, AB calgary.rasc.ca (through Sep. 16)* *Giovanni Cassini, discoverer of four moons of Saturn, died 300 years ago*	40°N 50°N Rise 6:10 6:08 Set 18:37 18:35 *New Moon* 22:11 Sunrise 6:41 6:37 Sunset 19:08 19:12 **15** *Annual Algonquin Adventure Algonquin Park, ON www.toronto.rasc.ca (through Sep. 16)* *Great Britain and colonies adopted Gregorian Calendar 260 years ago*
40°N 50°N Rise 7:19 7:25 Set 19:10 19:01 **16** ***Zodiacal light readily visible from a dark site in E before morning twilight for next two weeks***	40°N 50°N Rise 8:30 8:43 Set 19:45 19:28 **17** *Rosh Hashanah Begins* ***Follow Capella unaided into daylight best for a few days near the 17th***	40°N 50°N Rise 9:42 10:03 Set 20:24 20:01 **18**	40°N 50°N Rise 10:53 11:21 Set 21:09 20:39 **19** ***Crescent Moon 1.2° S of Mars in evening twilight***	40°N 50°N Rise 12:02 12:35 Set 22:00 21:25 **20**	40°N 50°N Rise 13:06 13:42 Set 22:57 22:21 **21** *First student-built rocket payload was launched 20 years ago*	40°N 50°N Rise 14:04 14:39 Set 23:59 23:25 *First Quarter* 15:41 Sunrise 6:48 6:47 Sunset 18:56 18:57 **22** ***Fall Equinox 10:49 am*** ***Lunar X near crater Werner visible in E of N. America best in S 6 pm*** ***FQ Moon occults mu Sagittarii visible in N. America S of graze Montana-S. Manitoba-N.Quebec 9 pm***
40°N 50°N Rise 14:54 15:25 Set -- -- **23** ***Lunar Straight Wall visible in all of N. America***	40°N 50°N Set 1:04 0:34 Rise 15:37 16:03 **24**	40°N 50°N Set 2:10 1:47 Rise 16:15 16:34 **25** *Mars Observer mapped the surface from orbit, was launched 20 years ago* ***Moon occults beta Capricorni visible in extreme SW U.S. 4 am*** ***2 Pallas at opposition (m=8.3)***	40°N 50°N Set 3:15 2:59 Rise 16:48 17:00 **26** *Yom Kippur* ***79 Eurynome at opposition (m=9.7)***	40°N 50°N Set 4:20 4:10 Rise 17:18 17:24 **27**	40°N 50°N Set 5:23 5:20 Rise 17:47 17:46 **28** *NASA launched Alouette 1, Canada's first artificial satellite, 50 years ago*	40°N 50°N Set 6:24 6:29 Rise 18:16 18:08 *Full Moon* 23:19 Sunrise 6:55 6:58 Sunset 18:45 18:42 **29** ***Uranus at opposition (m=5.7)*** ***Today's full Moon is the Harvest Moon***
40°N 50°N Set 7:25 7:37 Rise 18:46 18:31 **30**						

OCTOBER

What Home Looks Like

Thirty million light years away in the constellation Andromeda is the strikingly beautiful edge-on spiral galaxy NGC 891. It has a warmly glowing central bulge and lumpy dark dust lanes marking its central plane. At about 100,000 light years in diameter, it looks a lot like our Milky Way would, if we could travel away from it and look back over our shoulders.

Photo by Lynn Hilborn

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: observed with difficulty at month end in evening twilight* *Venus: in E in morning twilight* *Mars: very low in SW at dusk sets in SW by 8 pm* *Jupiter: rises near 9 pm in ENE transits high in S near 4 am* *Saturn: very low in SW after sunset lost in twilight by mid-month*	40°N 50°N Set 8:24 8:43 Rise 19:17 18:57 **1**	40°N 50°N Set 9:23 9:47 Rise 19:51 19:25 **2**	40°N 50°N Set 10:20 10:49 Rise 20:29 19:58 **3** *A Mars meteorite landed near a farmer in a Nigerian corn field 50 years ago* ***Venus within 0.5° of Regulus in morning twilight***	40°N 50°N Set 11:15 11:48 Rise 21:10 20:37 **4** ***Jupiter stationary***	40°N 50°N Set 12:06 12:41 Rise 21:56 21:22 **5** ***Moon separating from Jupiter mid-evening and overnight***	40°N 50°N Set 12:54 13:29 Rise 22:47 22:13 **6** Sunrise 7:02 7:08 Sunset 18:34 18:26 ***Follow Sirius unaided into daylight best for a few days near the 6th***
40°N 50°N Set 13:38 14:10 Rise 23:42 23:11 **7**	40°N 50°N Set 14:18 14:46 Rise -- -- *Last Quarter* 3:33 **8** *Thanksgiving Day (Canada)* *Columbus Day (USA)* *Pioneer Venus 1 burned up, ending 14 years in orbit 20 years ago*	40°N 50°N Rise 0:40 0:13 Set 14:54 15:17 **9** *A 26-lb meteorite struk a 1980 Chevy Malibu in Peekskill NY 20 years ago* *Voyager 1 passed 50 AU mark from the Sun 20 years ago*	40°N 50°N Rise 1:40 1:20 Set 15:28 15:44 **10** *Mariner 2 data revealed presence of solar wind 50 years ago*	40°N 50°N Rise 2:44 2:30 Set 16:00 16:10 **11**	40°N 50°N Rise 3:49 3:43 Set 16:32 16:34 **12** *E.E. Barnard was first to photographically discover a comet 120 years ago* ***Crescent Moon occults 15 Eunomia reappearance on dark limb near dawn visible in W of N. America***	40°N 50°N Rise 4:57 4:58 Set 17:05 16:59 **13** Sunrise 7:09 7:19 Sunset 18:23 18:12
40°N 50°N Rise 6:07 6:17 Set 17:39 17:26 **14** ***Old crescent Moon, 25 hours before new in E, 21 hours before new in W, modest challenge before sunrise Zodiacal light readily visible from a dark site in E before morning twilight for next two weeks***	40°N 50°N Rise 7:19 7:37 Set 18:18 17:57 *New Moon* 8:02 **15**	40°N 50°N Rise 8:33 8:58 Set 19:01 18:34 **16** ***Crescent Moon 3° to right of Mercury difficult after sunset best in S of N. America***	40°N 50°N Rise 9:46 10:17 Set 19:51 19:19 **17**	40°N 50°N Rise 10:54 11:29 Set 20:48 20:13 **18**	40°N 50°N Rise 11:56 12:31 Set 21:51 21:16 **19**	40°N 50°N Rise 12:50 13:22 Set 22:56 22:26 **20** Sunrise 7:16 7:31 Sunset 18:13 17:58 *Fall Astronomy Day* *www.astroleague.org/al/astroday/astroday.html* *William R. Brooks discovered the last of his 20 comets 100 years ago* ***Orionids peak tonight in N. America***
40°N 50°N Rise 13:36 14:03 Set -- 23:38 *First Quarter* 23:32 **21** ***Orionid meteors (ZHR=20) 12 am***	40°N 50°N Set 0:03 -- Rise 14:16 14:36 **22**	40°N 50°N Set 1:09 0:51 Rise 14:50 15:04 **23** ***Lunar Straight Wall visible in all of N. America***	40°N 50°N Set 2:13 2:02 Rise 15:21 15:28 **24**	40°N 50°N Set 3:16 3:11 Rise 15:50 15:51 **25**	40°N 50°N Set 4:17 4:19 Rise 16:19 16:13 **26** ***Mercury at greatest elongation E (24°)***	40°N 50°N Set 5:17 5:26 Rise 16:48 16:36 **27** Sunrise 7:24 7:42 Sunset 18:03 17:45
40°N 50°N Set 6:16 6:32 Rise 17:18 17:00 **28**	40°N 50°N Set 7:14 7:37 Rise 17:51 17:27 *Full Moon* 15:49 **29** ***Today's full Moon is the Hunter's Moon***	40°N 50°N Set 8:12 8:39 Rise 18:27 17:58 **30**	40°N 50°N Set 9:07 9:39 Rise 19:08 18:35 **31** *Hallowe'en* *The Vatican absolved Galileo of all heresy charges 20 years ago*		*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.*	SEPTEMBER S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 NOVEMBER S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

NOVEMBER

2.4 Million Years Ago…

… photons of light that were focused to create this image left their source in M31, the Andromeda Galaxy. Hundreds of billions of stars throw swirling dust lanes into beautiful silhouette. The yellow glow of old, reddish stars in the galactic centre transitions to hot blue young stars in the surrounding spiral arms. Two small companion galaxies are held in orbit by the inescapable gravitational grip of their massive neighbour. ***Photo by Stuart Heggie***

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: low in SE in morning twilight by end-month* *Venus: in SE in morning twilight* *Mars: very low in SW at dusk sets in SW after 6 pm* *Jupiter: rises after sunset in ENE transits high in S near 1 am sets in NW after sunrise* *Saturn: not observable this month*	*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.*	OCTOBER S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DECEMBER S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31		40°N 50°N Set 10:00 10:34 Rise 19:52 19:18 **1** ***Moon 1.5° S of Jupiter visible after moonrise***	40°N 50°N Set 10:49 11:24 Rise 20:41 20:07 **2**	40°N 50°N Set 11:34 12:07 Rise 21:34 21:02 **3** Sunrise 7:32 7:54 Sunset 17:55 17:33
40°N 50°N Set 11:15 11:44 Rise 21:30 21:02 **4** ***Daylight Saving Time ends*** ***2 am***	40°N 50°N Set 11:52 12:16 Rise 22:28 22:06 **5** ***S Taurid meteors (ZHR=10)*** ***12 am***	40°N 50°N Set 12:26 12:45 Rise 23:28 23:12 *Last Quarter* 19:36 **6**	40°N 50°N Set 12:58 13:10 Rise -- -- **7**	40°N 50°N Rise 0:31 0:21 Set 13:29 13:34 **8**	40°N 50°N Rise 1:35 1:33 Set 14:00 13:58 **9**	40°N 50°N Rise 2:42 2:48 Set 14:32 14:23 **10** Sunrise 6:40 7:05 Sunset 16:48 16:22
40°N 50°N Rise 3:52 4:06 Set 15:08 14:52 **11** *Remembrance Day (Canada)* *Veterans Day (USA)* ***N Taurid meteors (ZHR=15)*** ***11 pm***	40°N 50°N Rise 5:05 5:26 Set 15:49 15:25 **12**	40°N 50°N Rise 6:19 6:48 Set 16:36 16:06 *New Moon* 17:08 **13** ***Total solar eclipse from N Australia across S. Pacific***	40°N 50°N Rise 7:32 8:05 Set 17:31 16:57 **14** *Islamic New Year*	40°N 50°N Rise 8:40 9:15 Set 18:33 17:58 **15**	40°N 50°N Rise 9:40 10:13 Set 19:41 19:08 **16** ***704 Interamnia at opposition (m=8.6)***	40°N 50°N Rise 10:31 11:00 Set 20:50 20:22 **17** Sunrise 6:48 7:17 Sunset 16:42 16:13 ***Leonid meteors (ZHR=15)*** ***5 am***
40°N 50°N Rise 11:14 11:37 Set 21:58 21:38 **18**	40°N 50°N Rise 11:51 12:07 Set 23:05 22:51 **19** *Marquis de Laplace explained Moon's mean motion increase 225 years ago*	40°N 50°N Rise 12:24 12:33 Set -- -- *First Quarter* 9:31 **20** ***Lunar X near crater Werner visible in all of N. America*** ***8 pm***	40°N 50°N Set 0:09 0:02 Rise 12:54 12:56 **21** ***Lunar Straight Wall visible in all of N. America***	40°N 50°N Set 1:10 1:11 Rise 13:22 13:18 **22** *Thanksgiving Day (USA)*	40°N 50°N Set 2:11 2:18 Rise 13:51 13:41 **23**	40°N 50°N Set 3:10 3:24 Rise 14:21 14:04 **24** Sunrise 6:56 7:28 Sunset 16:38 16:06
40°N 50°N Set 4:08 4:28 Rise 14:52 14:30 **25**	40°N 50°N Set 5:06 5:31 Rise 15:27 15:00 **26**	40°N 50°N Set 6:02 6:32 Rise 16:06 15:34 **27** ***Venus-Saturn 40' apart and separating slowly in morning twilight***	40°N 50°N Set 6:55 7:29 Rise 16:49 16:15 *Full Moon* 9:46 **28** ***Penumbral lunar eclipse visible in W of N. America*** ***Moon 1.9° S of Jupiter visible all night*** ***Smallest full Moon of 2012*** ***Today's full Moon is the Beaver Moon***	40°N 50°N Set 7:46 8:21 Rise 17:37 17:02 **29**	40°N 50°N Set 8:33 9:06 Rise 18:28 17:55 **30**	

DECEMBER

Deservedly Famous

The Pleiades star cluster (M45) in Taurus is the nearest and most famous of the open star clusters in Earth's sky. Also called the Seven Sisters, it is readily visible even from light-polluted areas, although long exposure photography is needed to capture the delicate wisps of blue nebulosity that wreath the cluster's brightest members. M45 lies about 400 light-years away and contains over 3,000 stars.

Photo by Lynn Hilborn

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: low in SE in morning twilight becoming difficult by month-end* *Venus: in SE in morning twilight becoming very low at month-end* *Mars: very low in SW at dusk sets in SW after 6 pm* *Jupiter: low in ENE in evening twilight transits high in S near 11 pm sets in NW in morning twilight* *Saturn: 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.*	NOVEMBER S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 JANUARY S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31				40°N 50°N Set 9:15 9:45 Rise 19:23 18:54 **1** Sunrise 7:03 7:37 Sunset 16:35 16:01 ***349 Dembowska at opposition (m=9.6)***
40°N 50°N Set 9:53 10:19 Rise 20:21 19:56 **2** ***Jupiter at opposition (m= -2.8)***	40°N 50°N Set 10:27 10:48 Rise 21:20 21:01 **3** ***Mercury-Venus-Saturn form even line 15° long in morning twilight***	40°N 50°N Set 10:59 11:14 Rise 22:20 22:08 **4** ***Mercury at greatest elongation W (21°) best morning view in 2012***	40°N 50°N Set 11:29 11:37 Rise 23:22 23:17 **5**	40°N 50°N Set 11:59 12:00 Rise -- -- *Last Quarter* 10:31 **6**	40°N 50°N Rise 0:25 0:27 Set 12:30 12:24 **7**	40°N 50°N Rise 1:31 1:41 Set 13:03 12:50 **8** Sunrise 7:10 7:46 Sunset 16:35 15:58
40°N 50°N Rise 2:40 2:57 Set 13:39 13:19 **9** ***Moon 2° S of Spica, rises near 3 am visible into morning twilight*** ***4 Vesta at opposition (m=7.6)***	40°N 50°N Rise 3:51 4:16 Set 14:22 13:55 **10** *A meteorite fell through a house in Mihonoseki, Japan 20 years ago*	40°N 50°N Rise 5:04 5:35 Set 15:11 14:39 **11** ***Moon 2.8° S of Venus. Mercury mag -0.5 6° to lower left in morning twilight*** ***Asteroid 4179 Toutatis, Earth-crosser brighter than mag 11 for next two weeks***	40°N 50°N Rise 6:14 6:49 Set 16:10 15:35 **12** ***Old crescent Moon, below Venus and Mercury, 20 hours before new in E, 16 hours before new in W, tough challenge before sunrise*** ***Jupiter 4.6° north of Aldebaran, second of 3 in triple conjunction***	40°N 50°N Rise 7:20 7:55 Set 17:15 16:41 *New Moon* 3:42 **13** ***Geminid meteors (ZHR=120)*** ***7 pm***	40°N 50°N Rise 8:17 8:49 Set 18:26 17:55 **14** *Eugene Cernan was last man to walk on Moon and Apollo 17 left Moon, 40 years ago*	40°N 50°N Rise 9:06 9:32 Set 19:38 19:14 **15** Sunrise 7:15 7:52 Sunset 16:36 15:58 *Simon Marius' studies drew attention to Andromeda Galaxy 400 years ago* ***Earth-crosser 4179 Toutatis within 1° of Aldebaran this evening***
40°N 50°N Rise 9:47 10:07 Set 20:48 20:31 **16** *Sir John Herschel observed an outburst of Eta Argus, 175 years ago*	40°N 50°N Rise 10:23 10:36 Set 21:55 21:46 **17**	40°N 50°N Rise 10:55 11:01 Set 23:00 22:58 **18** ***1 Ceres at opposition (m=6.7)***	40°N 50°N Rise 11:25 11:24 Set -- -- **19**	40°N 50°N Set 0:02 0:07 Rise 11:54 11:46 *First Quarter* 0:19 **20**	40°N 50°N Set 1:02 1:14 Rise 12:24 12:09 **21** ***Winter Solstice*** ***6:12 am*** ***Lunar Straight Wall visible in all of N. America*** ***Earth-crosser 4179 Toutatis within 1° of chi-1 Orionis this evening***	40°N 50°N Set 2:01 2:19 Rise 12:55 12:34 **22** Sunrise 7:19 7:57 Sunset 16:39 16:01 ***Ursid meteors (ZHR=10)*** ***3 am***
40°N 50°N Set 2:59 3:23 Rise 13:28 13:02 **23**	40°N 50°N Set 3:56 4:25 Rise 14:05 13:35 **24**	40°N 50°N Set 4:50 5:23 Rise 14:47 14:13 **25** *Christmas Day* ***Moon passes within 1° S of Jupiter tonight, sets before dawn***	40°N 50°N Set 5:42 6:16 Rise 15:33 14:58 **26** *Boxing Day (Canada)*	40°N 50°N Set 6:30 7:04 Rise 16:23 15:50 **27** ***Two shadows on Jupiter visible in Alaska and the high Arctic*** ***11:33 am***	40°N 50°N Set 7:14 7:46 Rise 17:17 16:47 *Full Moon* 5:21 **28** ***This full Moon is the Long Night's Moon***	40°N 50°N Set 7:54 8:22 Rise 18:14 17:48 **29** Sunrise 7:21 7:58 Sunset 16:43 16:06
40°N 50°N Set 8:30 8:52 Rise 19:13 18:53 **30**	40°N 50°N Set 9:03 9:19 Rise 20:13 19:59 **31** ***9 Metis at opposition (m=8.5)***					

The Royal Astronomical Society of Canada - Observer's Calendar

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 light-green shading. 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 labeled **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 labeled **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.

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
Montreal	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
Quebec	50°N – 15	15	47
Regina	50°N + 58 [1]	10	50
St. John's	50°N + 1	20	48
Sarnia	40°N + 30	15	43
Saskatoon	50°N + 67 [1]	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 [1]	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 [1]	40	32
Washington	40°N + 8	5	39

[1] Subtract 60 minutes in the summer.

Other Locations, and Improving Accuracy

For locations not listed in the tables to the left, 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.

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 over 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 astrophotography by amateur astronomers, and Skyways (available in French as "Explorons l'Astronomie") is a 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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www.rasc.ca

The Photos and the Calendar

Details on the photos are given below and to the right. Monthly grids were mostly generated using custom software written in the Fortran and PostScript programming languages and kindly provided to the editor by **Dr. Rajiv Gupta**. Some minor modifications to this software were made by the editor. Additional software written by both editors was also used.

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Bruce McCurdy

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Cover/May (Brilliant Galactic Blossom): A colour composite image made from 10.5 hours of total exposure time through Astrodon luminance and RGB filters with an RCOS 16-inch f/8.9 telescope using an Apogee U16M CCD camera; processed with CCDAP, MaxIm DL, PixelInsight Core and Photoshop CS4 software; taken on multiple nights in 2009 August from the Sierra Remote Observatories, California (Stefano Cancelli and Paul Mortfield).

January (Star Factory at Work): A composite image made from 3 hours total exposure with a William Optics FLT 132 telescope@ f/6 using a Canon 20Da DSLR camera at various ISO settings from 400 to 1600; processed with Images Plus, Photoshop CS5, and Noise ninja software; taken on 2010 March 24 and 25 and 2011 November 5 from Arizona and Manitoba (Kevin Black).

February (Trailing into the Depths): A composite image made from 9 hours total exposure (270 minutes of luminence and 90 minutes in each of RGB filters) with a Tele-Vue NP101is telescope at f/4.3 using a FLI ML8300 CCD camera; taken over 3 nights 201 March/April from Grafton, Ontario (Lynn Hilborn).

March (Infamous Super Moon): A single exposure of 0.06 seconds (with a hydrogen alpha filter, simply to reduce the light level) captured with a Ceravolo 300 Astrograph operating at f/4.9 using an Apogee AP9E CCD camera; processed in Maxim DL software; taken on 2011 March 20 from Ottawa, Ontario (Doug George).

April (Black Slash Through the Stars): A composite image made from 4.5 hours total exposure (140 minutes of luminence and 45 minutes in each of RGB filters) with a TEC 140 telescope at f/7 using an FLI ML8300 CCD camera; taken on 2010 November 8 from Grafton, Ontario (Lynn Hilborn).

June (It's all Relative): A composite image made from a stack of 5 x 6-minute exposures at ISO 1600 on a filter-modified Canon 5D MkII DSLR camera using a 105mm Astro-Physics Traveler APO refractor at f/5.8 with 6x7 field flattener; taken on 2010 December 12 from Coonabarabran, NSW, Australia (Alan Dyer).

July (Rivers of Light and Dark): A composite image made from a stack of 6 x 3-minute exposures at ISO 800 on a filter-modified Canon 5D MkII DSLR camera using a 35-mm lens at f/2.8; four images were taken through a Kenko Softon filter and two exposures taken without filter; taken on 2011 May 6 from San Pedro de Atacama, Chile (Alan Dyer).

August (Cosmic Continent): A composite image made from 2 hours in a Baader hydrogen alpha filter and one hour in each of Baader RGB filters with a Takahashi FSQ106ED telescope (with 0.73x reducer) using an SBIG STL11000M CCD camera; processed with MaxIm DL and Photoshop; taken in 2009 September from Kincardine, Ontario (Paul Zelichowski).

September (Night Passes Over Castle Mountain): A composite image made from a stack of 160 25-second exposures at ISO 640 on a Canon 7D DSLR camera using a 15-mm lens at f/4; taken on 2010 July 23 from the Castle Cliffs viewpoint on Bow Valley Parkway, Alberta (Alan Dyer)

October (What Home Looks Like): A composite image made from 4.5 hours total exposure (140 minutes of luminence and 45 minutes in each of RGB filters) with a TEC 140 telescope at f/7 using a FLI ML8300 CCD camera; taken on 2010 November 8 from Grafton, Ontario (Lynn Hilborn).

November (2.4 Million Years Ago…): A composite image made from 50 minutes of exposure in each of RGB filters with an Astro-Physics AP155EDF telescope using an SBIG STL11000M CCD camera; processed with MaxIm DL and Photoshop; taken in 2009 September from Flesherton, Ontario (Stuart Heggie).

December (Deservedly Famous): A composite image made from 2.3 hours total exposure (one hour of luminence and 25 minutes in each of RGB filters) with a Tele-Vue NP101is telescope at f/5.4 using an FLI ML8300 CCD camera; processed with CCDSoft and Photoshop; taken on 2009 December 21 from Grafton, Ontario (Lynn Hilborn).

2012

January

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

February

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

March

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

April

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

May

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

June

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

July

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

August

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

September

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

October

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

November

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

December

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

2013

January

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

February

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

March

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

April

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

May

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

June

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

July

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

August

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

September

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

October

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

November

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

December

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

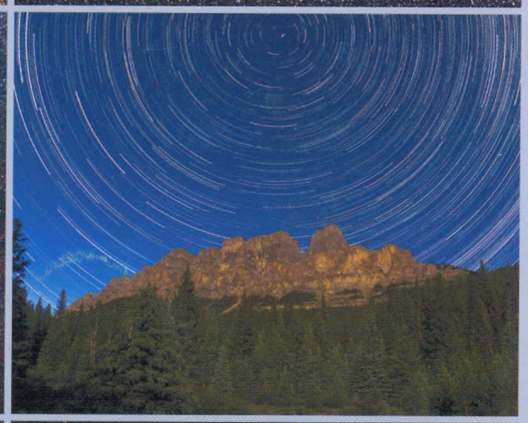
New Moon dates (UT) are displayed in ***bold****.*





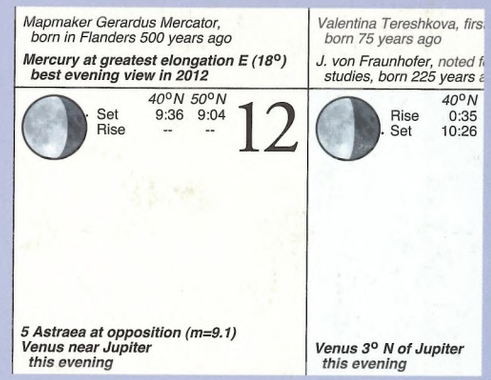







All photos in this unique Calendar were taken by members of the Royal Astronomical Society of Canada (RASC) who are amateur astronomers. It was produced by volunteer members of the Royal Astronomical Society of Canada.

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.



Edited by

Dave Lane and Alister Ling

ISBN 978-0-9813292-7-7

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$16.95 Can. / U.S.