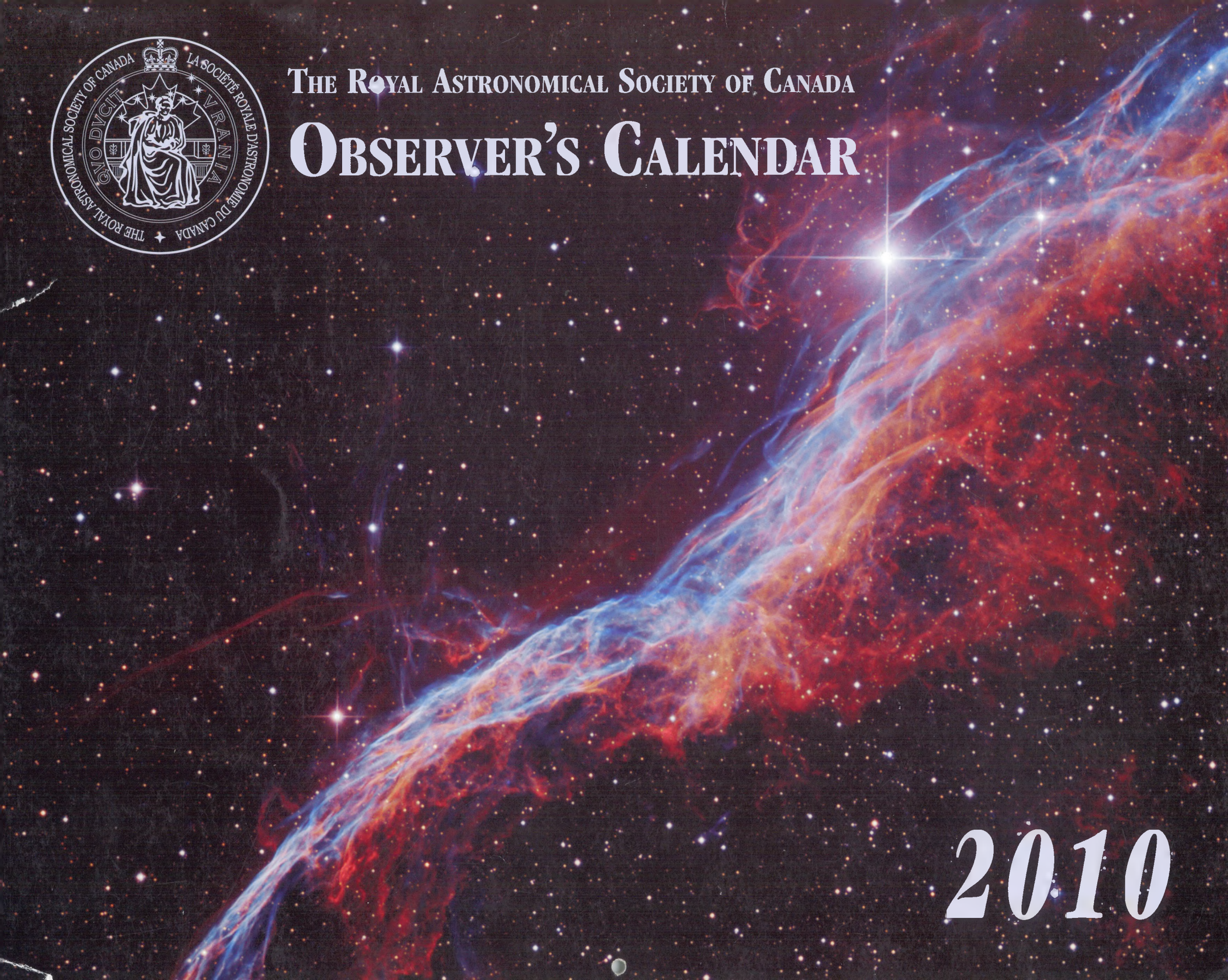
THE ROYAL ASTRONOMICAL SOCIETY OF CANADA
LA SOCIÉTÉ ROYALE D'ASTRONOMIE DU CANADA
QVO DVCIT VRANIA
THE ROYAL ASTRONOMICAL SOCIETY OF CANADA
OBSERVER'S CALENDAR
2010

JANUARY

Dark Horse

About 1,500 light-years away is Barnard 33, the famous Horsehead Nebula, silhouetted by glowing hydrogen gas in emission nebula IC 434. The bright star, Sigma Orionis, provides the ionizing energy to the pink nebula. At lower left is the Flame Nebula. All three are part of a huge star-forming complex in the constellation Orion.

Photo by Pierre Tremblay

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: after mid-month very low in SE in morning twilight* *Venus: not easily observed* *Mars: rises in ENE in evening twilight transits high in S after 1 am and is low in W in morning twilight* *Jupiter: in SW at dark sets in WSW after 7 pm* *Saturn: rises in E before 11 pm transits in S before 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.*	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			40°N 50°N Set 8:05 8:41 Rise 18:03 17:29 **1** *New Year's Day* *Ephemeris time was adopted 50 years ago*	40°N 50°N Set 8:46 9:13 Rise 19:21 18:58 **2** Sunrise 7:22 7:58 Sunset 16:46 16:10 ***Earth at perihelion (149,597,900 km)***
40°N 50°N Set 9:21 9:38 Rise 20:38 20:25 **3** ***Quadrantids meteors (ZHR=120) 2 pm*** ***Io covers very small part of Europa visible in N. America except E 7:51 pm***	40°N 50°N Set 9:51 9:58 Rise 21:52 21:49 **4**	40°N 50°N Set 10:18 10:17 Rise 23:03 23:09 **5**	40°N 50°N Set 10:45 10:35 Rise -- -- **6**	40°N 50°N Rise 0:12 0:28 Set 11:13 10:54 *Last Quarter* 5:39 **7** *Galileo discovered first 3 moons of Jupiter 400 years ago*	40°N 50°N Rise 1:20 1:46 Set 11:43 11:16 **8**	40°N 50°N Rise 2:27 3:01 Set 12:18 11:42 **9** Sunrise 7:22 7:56 Sunset 16:53 16:18
40°N 50°N Rise 3:32 4:13 Set 12:57 12:15 **10**	40°N 50°N Rise 4:33 5:18 Set 13:43 12:57 **11** ***Moon less than 1° above Antares in morning twilight, occultation NE of line Ottawa-Cape Cod***	40°N 50°N Rise 5:28 6:15 Set 14:35 13:48 **12**	40°N 50°N Rise 6:16 7:00 Set 15:31 14:48 **13** *Galileo discovers Callisto 400 years ago*	40°N 50°N Rise 6:56 7:36 Set 16:31 15:53 **14** ***Saturn stationary***	40°N 50°N Rise 7:31 8:03 Set 17:31 17:01 *New Moon* 2:11 **15** ***Annular solar eclipse visible only in E hemisphere*** ***Young crescent Moon, 14 hours after new in E, 18 hours after new in W, a tough challenge soon after sunset***	40°N 50°N Rise 8:00 8:25 Set 18:32 18:09 **16** Sunrise 7:20 7:52 Sunset 17:00 16:28
40°N 50°N Rise 8:26 8:43 Set 19:31 19:17 **17**	40°N 50°N Rise 8:49 8:59 Set 20:30 20:23 **18** *Martin Luther King Jr. Day (USA)*	40°N 50°N Rise 9:11 9:14 Set 21:28 21:30 **19**	40°N 50°N Rise 9:34 9:28 Set 22:28 22:37 **20**	40°N 50°N Rise 9:57 9:44 Set 23:29 23:47 **21**	40°N 50°N Rise 10:22 10:02 Set -- -- **22**	40°N 50°N Set 0:33 0:59 Rise 10:52 10:23 *First Quarter* 5:53 **23** Sunrise 7:16 7:45 Sunset 17:08 16:39 ***Lunar Straight Wall visible from all of N. America 6 pm***
40°N 50°N Set 1:39 2:14 Rise 11:28 10:52 **24**	40°N 50°N Set 2:47 3:29 Rise 12:13 11:30 **25** ***Moon passes 1° S of Pleiades before dawn, visible in W of N. America*** ***354 Eleonora at opposition (m=9.6)***	40°N 50°N Set 3:54 4:40 Rise 13:08 12:22 **26** *Charles Messier discovered his first comet 250 years ago*	40°N 50°N Set 4:56 5:42 Rise 14:15 13:30 **27** ***Mercury at greatest elongation W (25°)*** ***Mars closest approach (99.33 Mkm)***	40°N 50°N Set 5:51 6:31 Rise 15:30 14:52 **28**	40°N 50°N Set 6:36 7:08 Rise 16:50 16:21 **29** ***Mars at opposition (m= -1.2)***	40°N 50°N Set 7:15 7:37 Rise 18:10 17:51 *Full Moon* 1:18 **30** Sunrise 7:10 7:36 Sunset 17:17 16:51 ***Closest lunar perigee of 2010*** ***Largest full Moon of 2010*** ***Today's full Moon is the Wolf Moon***
40°N 50°N Set 7:48 8:00 Rise 19:27 19:19 **31**						

FEBRUARY

"Magnificent Desolation"

Apollo 11 astronaut Buzz Aldrin eloquently described the lunar surface in those two words. This close-up view gives us a detailed look at the crater Posidonius and its system of rilles. Posidonius is located on the northern edge of Mare Serenetatis, one of the eyes of the "Man in the Moon."

Photo by Mike Wirths

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: very low in SE in morning twilight, difficult at month end* *Venus: not easily observed* *Mars: in E after dark transits high in S near 11 pm and is very low in WNW at dawn* *Jupiter: very low in WSW soon after sunset early in month, lost in twilight after mid-month* *Saturn: rises in E mid-evening transits high in S after midnight*	40°N 50°N Set 8:17 8:20 Rise 20:43 20:45 **1**	40°N 50°N Set 8:46 8:39 Rise 21:56 22:08 **2** ***14 Tau occulted by 1248 Jugurtha from Chicago to Bruce Peninsula, ON www.asteroidoccultation.com 7:38 pm***	40°N 50°N Set 9:14 8:58 Rise 23:07 23:29 **3**	40°N 50°N Set 9:45 9:20 Rise -- -- **4**	40°N 50°N Rise 0:17 0:47 Set 10:18 9:45 *Last Quarter* 18:48 **5**	40°N 50°N Rise 1:24 2:02 Set 10:57 10:17 Sunrise 7:03 7:26 Sunset 17:25 17:03 **6**
40°N 50°N Rise 2:26 3:11 Set 11:41 10:56 **7** ***10 Hygiea at opposition (m=9.8)***	40°N 50°N Rise 3:24 4:10 Set 12:31 11:44 **8** *Winter Star Party, Florida Keys www.scas.org/wsp.html (through Feb. 13)*	40°N 50°N Rise 4:14 4:59 Set 13:26 12:41 **9**	40°N 50°N Rise 4:56 5:37 Set 14:24 13:44 **10**	40°N 50°N Rise 5:33 6:07 Set 15:24 14:51 **11**	40°N 50°N Rise 6:03 6:31 Set 16:24 15:59 **12** ***Farthest lunar apogee of 2010***	40°N 50°N Rise 6:30 6:50 Set 17:24 17:07 *New Moon* 21:51 Sunrise 6:55 7:14 Sunset 17:34 17:15 **13**
40°N 50°N Rise 6:54 7:07 Set 18:23 18:14 **14** *Chinese New Year* *Valentine's Day* ***Young crescent Moon, 19 hours after new in E, 23 hours after new in W a challenge soon after sunset***	40°N 50°N Rise 7:17 7:22 Set 19:22 19:21 **15** *Family Day (some prov.)* *Presidents' Day (USA)* ***Jupiter 1.3° above Venus, very low in bright evening twilight, a challenge***	40°N 50°N Rise 7:39 7:37 Set 20:21 20:28 **16** ***Jupiter 0.5° to right of Venus, very low in bright twilight, a challenge***	40°N 50°N Rise 8:02 7:52 Set 21:22 21:37 **17** ***Jupiter 1° to lower right of Venus, very low in bright twilight, a challenge***	40°N 50°N Rise 8:27 8:09 Set 22:24 22:47 **18** *Clyde Tombaugh discovered Pluto 80 years ago* ***4 Vesta at opposition (m=6.1)*** ***Jupiter 2° to lower right of Venus, very low in bright twilight, a challenge***	40°N 50°N Rise 8:55 8:29 Set 23:28 -- **19** ***Jupiter 3° to lower right of Venus, very low in bright twilight, a challenge***	40°N 50°N Set -- 0:00 Rise 9:28 8:54 Sunrise 6:46 7:01 Sunset 17:42 17:27 **20** ***Lunar X near crater Werner best in W of N. America 11 pm***
40°N 50°N Set 0:34 1:13 Rise 10:08 9:27 *First Quarter* 19:42 **21** ***Lunar Straight Wall Moon to the left of Pleiades during the evening visible from all of N. America 6 pm***	40°N 50°N Set 1:39 2:23 Rise 10:57 10:11 **22**	40°N 50°N Set 2:41 3:27 Rise 11:56 11:10 **23**	40°N 50°N Set 3:37 4:20 Rise 13:04 12:23 **24**	40°N 50°N Set 4:25 5:01 Rise 14:20 13:46 **25**	40°N 50°N Set 5:06 5:34 Rise 15:38 15:14 **26**	40°N 50°N Set 5:42 5:59 Rise 16:56 16:42 Sunrise 6:36 6:47 Sunset 17:50 17:39 **27**
40°N 50°N Set 6:13 6:21 Rise 18:13 18:10 *Full Moon* 11:38 **28** ***Today's full Moon is the Snow Moon***					*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

MARCH

Stellar Symphony

A grand-design spiral galaxy, M81 is relatively close at 11.6 million light-years, and is visible in binoculars from a dark-sky site. Similar to our own Milky Way, M81 shows old, golden stars in its central bulge, bright-pink emission nebulae, dark dust clouds, and brilliant young, hot, blue stars in its symmetrical spiral arms.

Photo by Debra and Peter Ceravolo

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: not easily observed until month end, low in W in evening twilight* *Venus: very low in W after sunset* *Mars: high in ESE in evening twilight transits high in S near 9 pm and sets in NW before dawn* *Jupiter: not easily observed until month end when very low in ESE in morning twilight* *Saturn: rises in E near sunset transits high in S near midnight*	40°N 50°N Set 6:43 6:41 Rise 19:29 19:36 **1**	40°N 50°N Set 7:12 7:01 Rise 20:44 21:00 **2**	40°N 50°N Set 7:42 7:22 Rise 21:57 22:23 **3** ***Zodiacal light readily visible in W after evening twilight for next two weeks***	40°N 50°N Set 8:16 7:47 Rise 23:07 23:43 **4**	40°N 50°N Set 8:53 8:16 Rise -- -- **5**	40°N 50°N Rise 0:14 0:56 Set 9:36 8:53 **6** Sunrise 6:26 6:33 Sunset 17:57 17:50
40°N 50°N Rise 1:15 2:01 Set 10:25 9:39 *Last Quarter* 10:42 **7**	40°N 50°N Rise 2:09 2:54 Set 11:19 10:34 **8**	40°N 50°N Rise 2:54 3:37 Set 12:17 11:36 **9**	40°N 50°N Rise 3:33 4:10 Set 13:17 12:42 **10**	40°N 50°N Rise 4:06 4:35 Set 14:17 13:49 **11** ***Mars stationary***	40°N 50°N Rise 4:34 4:56 Set 15:16 14:57 **12** *Simon Newcomb, 1st president of American Astronomical Society born in Nova Scotia 175 years ago*	40°N 50°N Rise 4:59 5:14 Set 16:16 16:04 **13** Sunrise 6:15 6:18 Sunset 18:05 18:02 ***532 Herculina at opposition (m=8.8)***
40°N 50°N Rise 6:22 6:30 Set 18:15 18:11 **14** *Giovanni Schiaparelli, known for study of Martian "canali", born 175 years ago* ***Daylight Saving Time begins 2 am***	40°N 50°N Rise 6:45 6:45 Set 19:14 19:18 *New Moon* 17:01 **15**	40°N 50°N Rise 7:08 7:00 Set 20:15 20:27 **16** ***Crescent Moon 7° right of Venus in evening twilight***	40°N 50°N Rise 7:32 7:17 Set 21:17 21:37 **17**	40°N 50°N Rise 7:59 7:36 Set 22:21 22:49 **18**	40°N 50°N Rise 8:31 8:00 Set 23:26 -- **19** ***Jupiter with only one satellite visible in SW of N. America 9:07 am***	40°N 50°N Set -- 0:02 Rise 9:08 8:30 **20** Sunrise 7:04 7:03 Sunset 19:12 19:13 ***Spring Equinox 1:32 pm*** ***Crescent Moon 0.5° S of Pleiades during the evening***
40°N 50°N Set 0:31 1:13 Rise 9:54 9:10 **21** ***Europa covers most of Io visible in Atlantic Canada 5:50 am*** ***Europa casts shadow on Io visible in path from Georgian Bay, ON to Miami, FL 7:02 am*** ***Saturn at opposition (m=0.7)***	40°N 50°N Set 1:33 2:18 Rise 10:48 10:03 **22**	40°N 50°N Set 2:29 3:13 Rise 11:51 11:08 *First Quarter* 7:00 **23** ***Lunar Straight Wall visible from all of N. America 7 pm*** ***Mercury rapidly climbs towards Venus this week in evening twilight***	40°N 50°N Set 3:19 3:57 Rise 13:02 12:25 **24**	40°N 50°N Set 4:01 4:32 Rise 14:16 13:47 **25**	40°N 50°N Set 4:37 4:59 Rise 15:31 15:13 **26** ***Jupiter with only one satellite visible from S Alaska 11:08 am***	40°N 50°N Set 5:09 5:22 Rise 16:47 16:38 **27** Sunrise 6:52 6:48 Sunset 19:19 19:24 *Earth Hour (8-9 pm local) www.earthhourus.org*
40°N 50°N Set 5:39 5:42 Rise 18:02 18:03 **28** ***Two shadows on Jupiter visible with difficulty in E of Atlantic Canada 5:10 am***	40°N 50°N Set 6:08 6:02 Rise 19:16 19:28 *Full Moon* 22:25 **29** ***Today's full Moon is the Worm Moon***	40°N 50°N Set 6:38 6:23 Rise 20:30 20:52 **30** *First Day of Passover* ***Mercury and Venus this week in evening twilight best planet pair this year***	40°N 50°N Set 7:11 6:46 Rise 21:44 22:14 **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.*	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 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

APRIL

Earth's Greatest Tidal Range

The "Man in the Moon" peers over the horizon at the exposed floor of Nova Scotia's Minas Basin at low tide. The tide that evening had a 14.5-metre vertical range. Over the next 6 hours, 15 billion tonnes of sea water flowed into Minas Basin, and central Nova Scotia tilted slightly under the load.

Photo by Roy Bishop

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: low in W in evening twilight best mid-month, not observable at end* *Venus: low in WNW after sunset* *Mars: high in S in evening twilight sets in WNW near 3 am* *Jupiter: rises near 5 am in E very low in ESE in morning twilight* *Saturn: transits high in S late-evening sets in W 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.*	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		40°N 50°N Set 7:47 7:14 Rise 22:54 23:33 **1** ***Spot Sirius unaided before sunset best between Apr. 1-7 polarizing sunglasses may help*** ***Mercury 3.1° to right of Venus next few evenings in twilight***	40°N 50°N Set 8:29 7:49 Rise -- -- **2** *Good Friday* ***Zodiacal light readily visible in W after evening twilight for next two weeks***	40°N 50°N Rise 0:00 0:44 Set 9:17 8:32 **3** Sunrise 6:41 6:32 Sunset 19:26 19:35 ***Moon 1.5° N of Antares closest before dawn***
40°N 50°N Rise 0:58 1:44 Set 10:10 9:24 **4** *Easter Sunday* ***Europa casts large shadow on Io visible in Atlantic Canada 5:07 am*** ***Two shadows on Jupiter visible in centre of N. America 7:27 am***	40°N 50°N Rise 1:48 2:32 Set 11:07 10:25 **5** ***Follow Vega unaided into daylight, very challenging but can be done*** ***Mercury 3° right of Venus slowly fading next few evenings***	40°N 50°N Rise 2:30 3:09 Set 12:07 11:30 *Last Quarter* 5:37 **6** ***Zeta Oph occulted by 824 Anastasia from S California to Edmonton - NNE www.asteroidoccultation.com 6:21 am***	40°N 50°N Rise 3:05 3:37 Set 13:08 12:38 **7**	40°N 50°N Rise 3:35 4:00 Set 14:07 13:45 **8** ***Mercury at greatest elongation E (19°) best evening view in 2010*** ***Mars 3° NW of Beehive (M44) slowly approaching next 8 nights***	40°N 50°N Rise 4:01 4:19 Set 15:07 14:52 **9**	40°N 50°N Rise 4:25 4:35 Set 16:05 15:59 **10** Sunrise 6:30 6:18 Sunset 19:33 19:46
40°N 50°N Rise 4:48 4:51 Set 17:05 17:06 **11** *Frank Drake started Search for Extra-terrestrial Intelligence 50 years ago* ***9 Metis at opposition (m=9.5)***	40°N 50°N Rise 5:11 5:06 Set 18:05 18:14 **12**	40°N 50°N Rise 5:35 5:23 Set 19:07 19:24 **13**	40°N 50°N Rise 6:02 5:42 Set 20:11 20:37 *New Moon* 8:29 **14** ***Young crescent Moon, 12 hours after new in E, 16 hours after new in W great challenge soon after sunset***	40°N 50°N Rise 6:33 6:04 Set 21:17 21:50 **15** ***Cr. Moon 2° to upper right of Mercury in evening twilight, Venus nearby***	40°N 50°N Rise 7:09 6:33 Set 22:23 23:03 **16** ***Moon close to Pleiades in evening twilight with Venus and Mercury below*** ***Mars 1° N of Beehive (M44)***	40°N 50°N Rise 7:52 7:11 Set 23:26 -- **17** Sunrise 6:19 6:03 Sunset 19:40 19:57
40°N 50°N Set -- 0:10 Rise 8:45 8:00 **18**	40°N 50°N Set 0:25 1:09 Rise 9:45 9:02 **19** *International Astronomy Week (through Apr. 25)* ***Mars 1.3° NE of Beehive (M44) slowly separating next 5 nights***	40°N 50°N Set 1:16 1:56 Rise 10:53 10:14 **20**	40°N 50°N Set 2:00 2:33 Rise 12:04 11:34 *First Quarter* 14:20 **21** ***Lunar X near crater Werner best in W of N. America 4 am***	40°N 50°N Set 2:37 3:01 Rise 13:17 12:56 **22** ***Lyrid meteors (ZHR=20) 12 pm*** ***Lunar Straight Wall visible from all of N. America 7 pm***	40°N 50°N Set 3:09 3:25 Rise 14:30 14:18 **23**	40°N 50°N Set 3:39 3:46 Rise 15:43 15:40 **24** Sunrise 6:09 5:49 Sunset 19:48 20:08 ***International Astronomy Day*** *www.rasc.ca/astroday* *www.astroleague.org/al/astroday/astroday.html*
40°N 50°N Set 4:07 4:05 Rise 16:55 17:02 **25** *Hubble Space Telescope deployed 20 years ago* ***Venus 3.5° to left of Pleiades for next 3 evenings***	40°N 50°N Set 4:36 4:25 Rise 18:08 18:24 **26**	40°N 50°N Set 5:07 4:47 Rise 19:20 19:47 **27**	40°N 50°N Set 5:41 5:12 Rise 20:32 21:07 *Full Moon* 8:18 **28** ***Today's full Moon is the Pink Moon***	40°N 50°N Set 6:20 5:44 Rise 21:41 22:22 **29**	40°N 50°N Set 7:06 6:23 Rise 22:43 23:28 **30**	

MAY

Dazzling Star Swirl

An abundance of brilliant blue stars and crimson emission nebulae attest to active star formation in M106, a Seyfert galaxy. Such galaxies host an active core that is thought to be powered by a massive central black hole. M106 lies about 21 million light-years away in the northern constellation of Canes Venatici.

Photo by Stefano Cancelli and Kerry-Ann Lecky Hepburn

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: very low in ENE in morning twilight, after mid-month* *Venus: low in WNW in evening twilight sets in NW near 11 pm* *Mars: high in WSW in evening twilight sets in WNW near 2 am* *Jupiter: rises before 3 am in E very low in ESE in morning twilight* *Saturn: high in S at dark sets in W at start of 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.*	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				 *40°N 50°N* Set 7:58 7:13 Rise 23:38 -- **1** Sunrise 6:00 5:36 Sunset 19:55 20:19
 *40°N 50°N* Rise -- 0:22 Set 8:55 8:11 **2**	 *40°N 50°N* Rise 0:24 1:04 Set 9:55 9:16 **3**	 *40°N 50°N* Rise 1:02 1:37 Set 10:56 10:23 **4** ***2 Pallas at opposition (m=8.7)***	 *40°N 50°N* Rise 1:35 2:02 Set 11:56 11:31 **5**	 *40°N 50°N* Rise 2:02 2:22 Set 12:56 12:39 *Last Quarter* 0:15 **6** ***Eta Aquarid meteors (ZHR=60) brief observing window before dawn*** ***3 am***	 *40°N 50°N* Rise 2:27 2:40 Set 13:55 13:45 **7**	 *40°N 50°N* Rise 2:50 2:56 Set 14:53 14:52 **8** Sunrise 5:52 5:25 Sunset 20:02 20:29
 *40°N 50°N* Rise 3:13 3:11 Set 15:53 15:59 **9** *Mother's Day* *Texas Star Party, Fort Davis, TX www.texasstarparty.org (through May 16)*	 *40°N 50°N* Rise 3:37 3:27 Set 16:54 17:08 **10**	 *40°N 50°N* Rise 4:03 3:45 Set 17:57 18:19 **11** ***12 Victoria at opposition (m=9.1)***	 *40°N 50°N* Rise 4:32 4:07 Set 19:03 19:33 **12**	 *40°N 50°N* Rise 5:06 4:33 Set 20:10 20:48 *New Moon* 21:04 **13**	 *40°N 50°N* Rise 5:48 5:08 Set 21:15 21:59 **14**	 *40°N 50°N* Rise 6:38 5:54 Set 22:17 23:02 **15** Sunrise 5:45 5:14 Sunset 20:08 20:39 ***Crescent Moon below Venus in evening twilight***
 *40°N 50°N* Rise 7:38 6:53 Set 23:12 23:53 **16** ***Crescent Moon above Venus in evening twilight***	 *40°N 50°N* Rise 8:44 8:04 Set 23:59 -- **17**	 *40°N 50°N* Set -- 0:34 Rise 9:56 9:23 **18**	 *40°N 50°N* Set 0:38 1:05 Rise 11:09 10:45 **19** ***Venus 2.3° to lower right of star cl. M35 quickly approaching next 2 evenings***	 *40°N 50°N* Set 1:12 1:30 Rise 12:21 12:07 *First Quarter* 19:43 **20**	 *40°N 50°N* Set 1:42 1:51 Rise 13:33 13:27 **21** ***Lunar Straight Wall visible from all of N. America*** ***7 pm*** ***Venus 45' W of star cluster M35 for N Canada in twilight, a challenge***	 *40°N 50°N* Set 2:10 2:10 Rise 14:43 14:47 **22** Sunrise 5:39 5:05 Sunset 20:15 20:49
 *40°N 50°N* Set 2:38 2:29 Rise 15:54 16:07 **23** ***Venus 2.7° to upper left of star cl. M35***	 *40°N 50°N* Set 3:07 2:50 Rise 17:04 17:27 **24** *Victoria Day (Canada)*	 *40°N 50°N* Set 3:39 3:13 Rise 18:15 18:46 **25** ***Mercury at greatest elongation W (25°)***	 *40°N 50°N* Set 4:15 3:42 Rise 19:24 20:03 **26**	 *40°N 50°N* Set 4:58 4:17 Rise 20:28 21:12 *Full Moon* 19:07 **27** ***Today's full Moon is the Flower Moon***	 *40°N 50°N* Set 5:47 5:02 Rise 21:26 22:11 **28** *RMTC Astronomy Expo, Big Bear, CA www.rtmcastronomyexpo.org (through May 31)* ***Moon 1.3° SE of Antares best soon after dark*** ***40 Harmonia at opposition (m=9.6)***	 *40°N 50°N* Set 6:42 5:57 Rise 22:16 22:58 **29** Sunrise 5:35 4:58 Sunset 20:21 20:57
 *40°N 50°N* Set 7:41 7:00 Rise 22:58 23:35 **30**	 *40°N 50°N* Set 8:42 8:07 Rise 23:33 -- **31** *Memorial Day (USA)* *David Dunlap Observatory opens 75 years ago* ***Saturn stationary***					

JUNE

Glittering Galactic Fossils

The Great Cluster in Hercules, M13, is one of the grand sights of the sky. Containing hundreds of thousands of stars and lying 25,000 light-years away, its age approaches that of the universe itself. A favourite target for amateur astronomers' telescopes, M13 is readily visible in binoculars from a dark-sky site.

Photo by Stefano Cancelli

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: observed with difficulty early in month in evening twilight* *Venus: low in WNW in evening twilight sets in WNW near 11 pm* *Mars: in WSW in evening twilight sets in WNW after midnight* *Jupiter: rises after 1 am in E low in SE in morning twilight* *Saturn: in SW in evening twilight sets in W after midnight*		40°N 50°N Set 9:44 9:16 Rise -- -- **1** ***Watch for noctilucent clouds in N sky during twilight this month best N of 50° latitude*** ***Mars 3° to right of Regulus approaching next few evenings for N Canada in twilight, a challenge***	40°N 50°N Rise 0:03 0:25 Set 10:44 10:24 **2** ***129 Antigone at opposition (m=9.8)***	40°N 50°N Rise 0:29 0:44 Set 11:43 11:31 **3**	40°N 50°N Rise 0:52 1:01 Set 12:42 12:37 *Last Quarter* 18:13 **4**	40°N 50°N Rise 1:15 1:16 Set 13:40 13:43 **5** Sunrise 5:32 4:53 Sunset 20:25 21:04
40°N 50°N Rise 1:38 1:32 Set 14:40 14:51 **6** ***Uranus 26' north of Jupiter first of three in triple conjunction*** ***Mars 1° N of Regulus, moving to E of Regulus next few evenings***	40°N 50°N Rise 2:03 1:49 Set 15:41 16:00 **7**	40°N 50°N Rise 2:30 2:08 Set 16:45 17:13 **8** ***Mars 1.3° E of Regulus***	40°N 50°N Rise 3:02 2:32 Set 17:52 18:27 **9**	40°N 50°N Rise 3:40 3:03 Set 18:59 19:40 **10** *James Short, builder of Gregorian telecopes born 300 years ago*	40°N 50°N Rise 4:27 3:44 Set 20:03 20:48 **11** ***Old crescent Moon, 28 hours before new in E, 24 hours before new in W visible in morning twilight***	40°N 50°N Rise 5:23 4:39 Set 21:02 21:45 *New Moon* 7:15 **12** Sunrise 5:31 4:51 Sunset 20:29 21:09
40°N 50°N Rise 6:29 5:47 Set 21:53 22:31 **13**	40°N 50°N Rise 7:41 7:06 Set 22:36 23:06 **14** ***Crescent Moon below Venus in evening twilight***	40°N 50°N Rise 8:56 8:29 Set 23:13 23:34 **15**	40°N 50°N Rise 10:11 9:53 Set 23:44 23:56 **16**	40°N 50°N Rise 11:24 11:16 Set -- -- **17**	40°N 50°N Set 0:13 0:16 Rise 12:35 12:36 **18** ***1 Ceres at opposition (m=7.0)*** ***Venus 2.7° to right of Beehive (M44) low in evening twilight***	40°N 50°N Set 0:41 0:36 Rise 13:45 13:56 *First Quarter* 0:30 **19** Sunrise 5:31 4:50 Sunset 20:32 21:12 ***Lunar X near crater Werner best in W of N. America*** ***3 am*** ***Venus 1° to right of Beehive (M44) low in evening twilight for N Canada, a challenge***
40°N 50°N Set 1:10 0:55 Rise 14:55 15:15 **20** *Father's Day* ***Venus 45' above the Beehive (M44) low in evening twilight*** ***Lunar Straight Wall visible from all of N. America*** ***11 pm***	40°N 50°N Set 1:40 1:17 Rise 16:05 16:33 **21** ***Summer Solstice*** ***7:29 am*** ***Venus 1.7° to upper left of Beehive (M44), low in evening twilight***	40°N 50°N Set 2:14 1:43 Rise 17:13 17:49 **22** ***Venus 2.7° to upper left of Beehive (M44), low in evening twilight***	40°N 50°N Set 2:54 2:16 Rise 18:18 19:00 **23**	40°N 50°N Set 3:40 2:57 Rise 19:18 20:02 **24** *Fête nationale du Québec*	40°N 50°N Set 4:32 3:47 Rise 20:10 20:54 **25** ***Pluto at opposition (m=13.9)***	40°N 50°N Set 5:30 4:47 Rise 20:55 21:34 *Full Moon* 7:30 **26** Sunrise 5:33 4:52 Sunset 20:33 21:13 ***Partial lunar eclipse near dawn, except penumbral only from E of line Winnipeg-Georgia*** ***Today's full Moon is the Honey Moon***
40°N 50°N Set 6:30 5:53 Rise 21:32 22:05 **27** ***15 Eunomia at opposition (m=9.0)***	40°N 50°N Set 7:32 7:01 Rise 22:03 22:29 **28** ***63 Ausonia at opposition (m=9.7)***	40°N 50°N Set 8:33 8:10 Rise 22:31 22:49 **29**	40°N 50°N Set 9:33 9:17 Rise 22:55 23:06 **30**		*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

JULY

Star Maker

This hydrogen gas cloud, IC 1396, is glowing red with energy imparted to the nebula by the bright blue star at its centre. The emission nebula lies in a rich star field of the northern Milky Way in the constellation Cepheus. About 3,000 light-years away, it is a beautiful stellar nursery patterned with blotches of cold, dark, and obscuring dust clouds.

Photo by Jack Newton

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: at month end very low in W in evening twilight* *Venus: very low in W in evening twilight sets in WNW near 11 pm* *Mars: low in WSW in evening twilight sets in W near 11 pm* *Jupiter: rises after 11 pm in E in SSE in morning twilight* *Saturn: very low in WSW after dark sets in W in late evening*	*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		*40°N 50°N* Set 10:31 10:24 Rise 23:18 23:22 **1** *Canada Day* *RASC General Assembly hosted by the New Brunswick Centre www.rasc.ca/ga2010 (through Jul. 4)* ***Watch for noctilucent clouds in N sky during twilight this month best N of 50° latitude***	*40°N 50°N* Set 11:29 11:29 Rise 23:41 23:37 **2**	*40°N 50°N* Set 12:28 12:36 Rise -- 23:53 **3** Sunrise 5:36 4:56 Sunset 20:32 21:12 ***Spot Jupiter unaided after sunrise 8° to lower left of the Moon 29 Amphritite at opposition (m=9.4)***
40°N 50°N Rise 0:04 -- Set 13:27 13:43 *Last Quarter* 10:35 **4** *Independence Day (USA)*	*40°N 50°N* Rise 0:30 0:11 Set 14:29 14:53 **5**	*40°N 50°N* Rise 0:59 0:32 Set 15:33 16:05 **6** ***Earth at aphelion (152,096,500 km)***	*40°N 50°N* Rise 1:33 0:59 Set 16:39 17:18 **7** ***Venus 2.8° to right of Regulus approaching next few evenings for N Canada in twilight, a challenge***	*40°N 50°N* Rise 2:15 1:35 Set 17:45 18:28 **8** *Stargazing Manitoulin, ON www.gordonspark.com (Jul. 9-12)* ***Moon close to Pleiades in morning twilight***	*40°N 50°N* Rise 3:07 2:23 Set 18:46 19:31 **9** *Gateway to the Universe Star Party Restoule Provincial Park, ON www.gatewaytotheuniverse.org (through Jul. 11)* ***Venus 1.1° to upper right of Regulus***	*40°N 50°N* Rise 4:08 3:24 Set 19:42 20:22 **10** Sunrise 5:40 5:02 Sunset 20:30 21:08 *Star-B-Q, Eccles Ranch, AB calgary.rasc.ca (through Jul. 11)* *Rosetta mission flyby of 21 Lutetia* ***Venus 1.2° above Regulus separating next few evenings***
40°N 50°N Rise 5:19 4:40 Set 20:29 21:03 *New Moon* 15:40 **11** ***Total solar eclipse visible only in the South Pacific*** ***Mercury, Venus, Mars and Saturn line up in evening twilight this week*** ***Moon passes below Jul. 12-16***	*40°N 50°N* Rise 6:34 6:03 Set 21:10 21:34 **12**	*40°N 50°N* Rise 7:52 7:30 Set 21:44 22:00 **13**	*40°N 50°N* Rise 9:08 8:56 Set 22:15 22:21 **14**	*40°N 50°N* Rise 10:22 10:20 Set 22:44 22:41 **15** ***Spot Arcturus unaided before sunset polarizing sunglasses may help very challenging but can be done***	*40°N 50°N* Rise 11:35 11:42 Set 23:13 23:01 **16**	*40°N 50°N* Rise 12:46 13:03 Set 23:43 23:23 **17** Sunrise 5:45 5:10 Sunset 20:27 21:02
40°N 50°N Rise 13:56 14:22 Set -- 23:48 *First Quarter* 6:11 **18**	*40°N 50°N* Set 0:16 -- Rise 15:05 15:39 **19** ***Lunar Straight Wall visible from all of N. America 7 pm***	*40°N 50°N* Set 0:54 0:18 Rise 16:11 16:52 **20**	*40°N 50°N* Set 1:37 0:56 Rise 17:12 17:56 **21**	*40°N 50°N* Set 2:27 1:42 Rise 18:06 18:50 **22**	*40°N 50°N* Set 3:22 2:39 Rise 18:53 19:34 **23**	*40°N 50°N* Set 4:22 3:42 Rise 19:32 20:07 **24** Sunrise 5:51 5:18 Sunset 20:21 20:54 ***Jupiter stationary***
40°N 50°N Set 5:23 4:49 Rise 20:05 20:33 *Full Moon* 21:36 **25** ***Mercury 2.4° to lower right of Regulus low in bright evening twilight*** ***Today's full Moon is the Thunder Moon***	*40°N 50°N* Set 6:24 5:58 Rise 20:34 20:55 **26** ***Mercury 1.1° to lower right of Regulus low in bright evening twilight*** ***Mars 2.7° to lower right of Saturn low in evening twilight***	*40°N 50°N* Set 7:24 7:05 Rise 20:59 21:13 **27** ***Mercury 23' to lower left of Regulus low in bright evening twilight*** ***Mars 2.4° to lower right of Saturn low in evening twilight***	*40°N 50°N* Set 8:23 8:12 Rise 21:23 21:29 **28** ***Mercury 1.6° to left of Regulus low in bright evening twilight*** ***Mars 2.1° below Saturn low in evening twilight***	*40°N 50°N* Set 9:21 9:18 Rise 21:45 21:44 **29** ***Mars 1.9° below Saturn low in evening twilight***	*40°N 50°N* Set 10:19 10:24 Rise 22:08 22:00 **30** ***Mars 1.8° below Saturn low in evening twilight***	*40°N 50°N* Set 11:17 11:30 Rise 22:32 22:17 **31** Sunrise 5:57 5:28 Sunset 20:15 20:44 ***Mars 1.8° to lower left of Saturn low in evening twilight***

AUGUST

Graceful Sweep of Gas

The western portion of the Veil Nebula, NGC 6960, is part of a supernova remnant in the constellation Cygnus. Also called the Witch's Broom Nebula, it drifts across the bright star 52 Cygni. These red and blue gas streamers are expanding outward from a cataclysmic stellar blast that occurred some 5,000 to 10,000 years ago.

Photo by Paul Mortfield and Stefano Cancelli

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 40°N 50°N Set 12:17 12:38 Rise 22:59 22:36 ***Begin watching for early Perseids*** ***Mars 1.9° to lower left of Saturn*** ***low in evening twilight***	2 40°N 50°N Set 13:19 13:48 Rise 23:31 23:00 *Civic Holiday (Canada)* ***Mars 2.3° to lower left of Saturn*** ***low in evening twilight***	3 40°N 50°N Set 14:23 14:59 Rise -- 23:31 *Last Quarter* 0:59 ***Mars 2.6° to left of Saturn*** ***Venus 5° to lower right*** ***low in evening twilight***	4 40°N 50°N Rise 0:08 -- Set 15:27 16:08 ***Venus, Mars and Saturn in 6° circle*** ***low in evening twilight***	5 40°N 50°N Rise 0:54 0:11 Set 16:29 17:13 *Stellafane Convention, Springfield, VT* *www.stellafane.org (through Aug. 8)* *80th birthday of Neil Armstrong,* *first person to step on the Moon* ***Venus, Mars and Saturn in 5.5° circle*** ***low in evening twilight***	6 40°N 50°N Rise 1:49 1:05 Set 17:27 18:10 *Manitoulin Star Party, ON* *www.gordonspark.com (through Aug 9)* *Mt. Carleton Star Party, Mt. Carleton* *Provincial Park and Dark Sky Preserve, NB* *www.nb.rasc.ca (through Aug. 8)* ***Mercury at greatest elongation E (27°)*** ***Venus, Mars and Saturn in 5° circle*** ***low in evening twilight***	7 40°N 50°N Rise 2:54 2:12 Set 18:18 18:55 Sunrise 6:04 5:38 Sunset 20:07 20:33 ***Venus, Mars and Saturn in 5° circle*** ***low in evening twilight***
8 40°N 50°N Rise 4:07 3:32 Set 19:02 19:31 ***Venus, Mars and Saturn in 4.8° circle*** ***low in evening twilight***	9 40°N 50°N Rise 5:24 4:58 Set 19:39 20:00 *New Moon* 23:08 ***Old crescent Moon, 19 hours before*** ***new in E, 15 hours before new in W*** ***tough challenge just before sunrise*** ***Venus, Mars and Saturn in 5.4° circle*** ***low in evening twilight***	10 40°N 50°N Rise 6:42 6:26 Set 20:13 20:23 ***Venus, Mars and Saturn in 6° circle*** ***low in evening twilight***	11 40°N 50°N Rise 7:59 7:53 Set 20:43 20:45 *First day of Ramadan* *Mount Kobau Star Party, Osoyoos, BC* *www.mksp.ca (through Aug. 15)* ***Crescent Moon and Mercury 7° below*** ***planet grouping of Aug. 10, very low*** ***Perseid meteors (pre-peak) overnight***	12 40°N 50°N Rise 9:15 9:19 Set 21:13 21:06 *Starfest, Mount Forest, ON* *www.nyaa.ca (through Aug. 15)* *Saskatchewan Summer Star Party* *http://homepage.usask.ca/~ges125/rasc/* *starparty.html (through Aug. 15)* *Echo I, first passive communications* *satellite launched 50 years ago* ***Perseids post-peak (ZHR=90)*** ***11 pm***	13 40°N 50°N Rise 10:30 10:43 Set 21:44 21:27 *Sunshine Coast 6th Annual Star Party* *Porpoise Provincial Park, BC* *www.coastastronomy.ca (through Aug 15)* ***Two shadows on Jupiter*** ***visible in N. America except E*** ***best in W*** ***6:11 am***	14 40°N 50°N Rise 11:43 12:06 Set 22:17 21:52 Sunrise 6:11 5:48 Sunset 19:58 20:20 ***Mars 2.4° to upper left of Venus*** ***low in evening twilight***
15 40°N 50°N Rise 12:54 13:26 Set 22:54 22:20 ***Mars 2.2° above Venus*** ***low in evening twilight***	16 40°N 50°N Rise 14:03 14:41 Set 23:36 22:56 *First Quarter* 14:14 ***Mars 2° above Venus, sliding*** ***to the right in the next few days*** ***low in evening twilight*** ***Lunar X near crater Werner*** ***best in W of N. America*** ***11 pm***	17 40°N 50°N Rise 15:06 15:49 Set -- 23:40 ***Lunar Straight Wall visible*** ***from all of N. America*** ***7 pm*** ***Moon 2° to upper left of Antares*** ***best soon after dark***	18 40°N 50°N Set 0:24 -- Rise 16:02 16:47	19 40°N 50°N Set 1:18 0:34 Rise 16:51 17:33	20 40°N 50°N Set 2:16 1:35 Rise 17:33 18:10 ***Venus at greatest elongation E (46°)*** ***Neptune at opposition (m=7.8)*** ***Two shadows on Jupiter*** ***visible in W of N. America*** ***8:05 am***	21 40°N 50°N Set 3:16 2:40 Rise 18:07 18:38 Sunrise 6:17 5:59 Sunset 19:48 20:07
22 40°N 50°N Set 4:16 3:48 Rise 18:37 19:01	23 40°N 50°N Set 5:17 4:56 Rise 19:04 19:20	24 40°N 50°N Set 6:16 6:03 Rise 19:28 19:37 *Full Moon* 13:05 ***Smallest full Moon of 2010*** ***Today's full Moon is the Sturgeon Moon***	25 40°N 50°N Set 7:14 7:09 Rise 19:51 19:52	26 40°N 50°N Set 8:12 8:14 Rise 20:14 20:08	27 40°N 50°N Set 9:10 9:20 Rise 20:37 20:24	28 40°N 50°N Set 10:10 10:27 Rise 21:03 20:43 Sunrise 6:24 6:09 Sunset 19:38 19:52 ***Venus 2.8° W of Spica*** ***low in evening twilight***
29 40°N 50°N Set 11:10 11:36 Rise 21:33 21:05 ***Venus 2° W of Spica*** ***low in evening twilight***	30 40°N 50°N Set 12:12 12:45 Rise 22:07 21:32 ***Venus 1.3° to lower right of Spica*** ***low in evening twilight***	31 40°N 50°N Set 13:15 13:54 Rise 22:48 22:08 ***Venus 1° below Spica*** ***Mars 4° to the right*** ***low in evening twilight*** ***Moon moving away from Pleiades*** ***closest at moonrise in late evening***		**The planets this month** *Mercury: very low in W in evening twilight becoming difficult after mid-month* *Venus: very low in W in evening twilight sets in W after 9 pm* *Mars: very low in WSW in evening twilight sets in W near 10 pm* *Jupiter: rises after 9 pm in E in S near 3 am* *Saturn: very low in W in evening twilight sets shortly after*	*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

SEPTEMBER

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 America 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 Leslie Marczi

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: very low in E in morning twilight best mid-month* *Venus: very low in WSW after sunset early in month* *Mars: very low in WSW after sunset sets in W after 8 pm* *Jupiter: rises after 7 pm in E transits in S near 1 am sets in W near sunrise* *Saturn: very low in W after sunset early in month, not easily observed afterwards*	*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 14:16 14:59 Rise 23:38 22:54 *Last Quarter* 13:22 **1** ***Venus 1.3° to lower left of Spica Mars 4.5° to the right low in evening twilight***	*40°N 50°N* Set 15:14 15:57 Rise -- 23:54 **2** ***Venus 2° to left of Spica Mars 4.7° to the right low in evening twilight***	*40°N 50°N* Rise 0:37 -- Set 16:06 16:46 **3** *Nova East, Smileys Provincial Park, NS halifax.rasc.ca/ne (through Sep. 5)* ***Venus 2.7° to left of Spica Mars 4.9° to the right low in evening twilight***	*40°N 50°N* Rise 1:44 1:05 Set 16:52 17:26 **4** Sunrise 6:31 6:19 Sunset 19:27 19:37 ***Mars 2.1° to upper right of Spica very low in evening twilight***
40°N 50°N Rise 2:57 2:26 Set 17:32 17:57 **5** ***Mars 2° above Spica, very low in evening twilight, and fading***	*40°N 50°N* Rise 4:13 3:52 Set 18:07 18:23 **6** *Labour Day* ***Zodiacal light readily visible in E before morning twilight for next two weeks***	*40°N 50°N* Rise 5:31 5:19 Set 18:39 18:46 **7** *Northern Prairie Starfest, near Tofield, AB edmontonrasc.com/nps.html (through Sep. 11)* ***Old crescent Moon, 25 hours before new in E, 21 hours before new in W a challenge just before sunrise Saturn crosses ecliptic (N to S)***	*40°N 50°N* Rise 6:48 6:46 Set 19:10 19:07 *New Moon* 6:30 **8**	*40°N 50°N* Rise 8:04 8:13 Set 19:41 19:29 **9** *Rosh Hashanah Begins*	*40°N 50°N* Rise 9:20 9:38 Set 20:14 19:53 **10** *Annual Algonquin Adventure Algonquin Park, ON www.toronto.rasc.ca (through Sep. 13)* *Alberta Star Party, Starland, AB calgary.rasc.ca (through Sep. 12)* ***Grouping of Venus, Mars, Spica and the Moon, visible from S of N. America***	*40°N 50°N* Rise 10:35 11:03 Set 20:51 20:21 **11** Sunrise 6:37 6:30 Sunset 19:15 19:22 *International Cometary Explorer was first spacecraft to encounter a comet, 25 years ago* ***8 Flora at opposition (m=8.2) Spica, Mars, Venus and the Moon in crooked line, very low in ev. twilight***
40°N 50°N Rise 11:47 12:23 Set 21:32 20:55 **12**	*40°N 50°N* Rise 12:55 13:36 Set 22:20 21:37 **13**	*40°N 50°N* Rise 13:55 14:39 Set 23:12 22:28 **14** ***39 Laetitia at opposition (m=9.1)***	*40°N 50°N* Rise 14:47 15:30 Set -- 23:28 *First Quarter* 1:50 **15**	*40°N 50°N* Set 0:10 -- Rise 15:32 16:10 **16** ***Lunar Straight Wall visible from all of N. America 7 pm***	*40°N 50°N* Set 1:09 0:32 Rise 16:09 16:41 **17** ***Follow Capella unaided into daylight best for a few mornings near the 17th***	*40°N 50°N* Set 2:10 1:40 Rise 16:40 17:06 **18** Sunrise 6:44 6:40 Sunset 19:04 19:07 *Yom Kippur* ***Uranus 49' north of Jupiter second of three in triple conjunction third is 2011 Jan 04***
40°N 50°N Set 3:10 2:47 Rise 17:08 17:26 **19** ***Mercury at greatest elongation W (18°) best morning view in 2010***	*40°N 50°N* Set 4:09 3:54 Rise 17:32 17:44 **20**	*40°N 50°N* Set 5:08 5:00 Rise 17:56 18:00 **21** ***Jupiter at opposition (m= -2.9) Uranus at opposition (m=5.7) 6 Hebe at opposition (m=7.7)***	*40°N 50°N* Set 6:06 6:05 Rise 18:19 18:16 **22** ***Fall Equinox 11:09 pm***	*40°N 50°N* Set 7:04 7:11 Rise 18:43 18:32 *Full Moon* 5:17 **23** ***Today's full Moon is the Harvest Moon Venus at greatest illuminated extent (m= -4.5)***	*40°N 50°N* Set 8:03 8:18 Rise 19:08 18:50 **24**	*40°N 50°N* Set 9:03 9:26 Rise 19:36 19:11 **25** Sunrise 6:50 6:51 Sunset 18:52 18:51
40°N 50°N Set 10:05 10:35 Rise 20:09 19:37 **26** ***471 Papagena at opposition (m=9.7)***	*40°N 50°N* Set 11:07 11:44 Rise 20:48 20:10 **27** ***Moon 2° S of Pleiades closest at moonrise in late evening***	*40°N 50°N* Set 12:08 12:50 Rise 21:34 20:52 **28**	*40°N 50°N* Set 13:06 13:49 Rise 22:29 21:46 **29**	*40°N 50°N* Set 13:59 14:40 Rise 23:31 22:51 *Last Quarter* 23:52 **30**		

OCTOBER

Swimming in Stars

Floating serenely in a sea of stars, the Swan Nebula, also called M17, the Omega Nebula, or the Horseshoe Nebula, is a stellar nursery in the southern Milky Way. Hot, energetic new stars born of, and hidden within the nebula, irradiate its gas with intense ultraviolet light. The excited gas glows red, shining away excess energy, and producing a stunning target for even small telescopes. ***Photo by Stuart Heggie***

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: very low in E in morning twilight first days of month, not observable after* *Venus: not easily observed* *Mars: very low in WSW after sunset* *Jupiter: in SE after dark transits in S near 11 pm sets in W near 5 am* *Saturn: very low in ESE in morning twilight late in 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.*	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			*40°N 50°N* Set 14:46 15:22 Rise -- -- **1**	*40°N 50°N* Rise 0:39 0:05 Set 15:27 15:55 **2** Sunrise 6:57 7:02 Sunset 18:41 18:36 *Hayden Planetarium opened in New York 75 years ago*
40°N 50°N Rise 1:51 1:26 Set 16:02 16:22 **3**	*40°N 50°N* Rise 3:06 2:49 Set 16:35 16:46 **4** ***Follow Sirius unaided into daylight best for a few mornings near the 6th***	*40°N 50°N* Rise 4:21 4:14 Set 17:06 17:08 **5**	*40°N 50°N* Rise 5:36 5:39 Set 17:37 17:29 **6** ***Zodiacal light readily visible in E before morning twilight for next two weeks***	*40°N 50°N* Rise 6:52 7:05 Set 18:09 17:52 *New Moon* 14:44 **7**	*40°N 50°N* Rise 8:08 8:31 Set 18:44 18:19 **8** ***Draconid meteors (ZHR<10?) likely best on W coast*** ***9 am***	*40°N 50°N* Rise 9:23 9:55 Set 19:24 18:51 **9** Sunrise 7:04 7:12 Sunset 18:30 18:21
40°N 50°N Rise 10:35 11:14 Set 20:10 19:30 **10** *Very Large Array radio telescope was dedicated 30 years ago*	*40°N 50°N* Rise 11:41 12:23 Set 21:03 20:19 **11** *Thanksgiving Day (Canada)* *Columbus Day (USA)*	*40°N 50°N* Rise 12:38 13:21 Set 22:00 21:17 **12**	*40°N 50°N* Rise 13:26 14:06 Set 23:00 22:21 **13**	*40°N 50°N* Rise 14:07 14:41 Set -- 23:29 *First Quarter* 17:27 **14** ***Lunar X near crater Werner best in W of N. America*** ***11 pm***	*40°N 50°N* Set 0:01 -- Rise 14:41 15:08 **15** ***Lunar Straight Wall visible from all of N. America*** ***7 pm***	*40°N 50°N* Set 1:02 0:37 Rise 15:10 15:30 **16** Sunrise 7:11 7:23 Sunset 18:19 18:07 *Fall Astronomy Day*
40°N 50°N Set 2:01 1:44 Rise 15:36 15:49 **17**	*40°N 50°N* Set 3:00 2:50 Rise 16:00 16:06 **18**	*40°N 50°N* Set 3:58 3:55 Rise 16:23 16:22 **19**	*40°N 50°N* Set 4:56 5:01 Rise 16:46 16:38 **20**	*40°N 50°N* Set 5:55 6:07 Rise 17:11 16:56 **21** ***Orionid meteors (ZHR=20)*** ***12 pm***	*40°N 50°N* Set 6:55 7:15 Rise 17:39 17:17 *Full Moon* 21:36 **22** ***Today's full Moon is the Hunter's Moon***	*40°N 50°N* Set 7:57 8:25 Rise 18:11 17:41 **23** Sunrise 7:19 7:35 Sunset 18:09 17:53 ***Two shadows on Jupiter visible in N. America except extreme W*** ***9:40 pm***
40°N 50°N Set 9:00 9:34 Rise 18:49 18:12 **24**	*40°N 50°N* Set 10:02 10:42 Rise 19:33 18:52 **25** ***Moon 1.4° S of Pleiades closest toward dawn***	*40°N 50°N* Set 11:01 11:43 Rise 20:25 19:43 **26**	*40°N 50°N* Set 11:55 12:37 Rise 21:25 20:44 **27**	*40°N 50°N* Set 12:43 13:20 Rise 22:31 21:55 **28** ***Venus in inferior conjunction at 6°S of Sun. Be very careful if attempting***	*40°N 50°N* Set 13:25 13:56 Rise 23:40 23:12 **29**	*40°N 50°N* Set 14:01 14:24 Rise -- -- *Last Quarter* 8:46 **30** Sunrise 7:27 7:46 Sunset 18:00 17:40
40°N 50°N Rise 0:51 0:31 Set 14:34 14:48 **31** *Hallowe'en* ***Two shadows on Jupiter visible in all of N. America*** ***12:16 am***						

NOVEMBER

Tale of Two Tails

Comet Lulin glows green as its coma fluoresces from the Sun's radiation. Geometry favoured us with this rare edge-on view of the comet's fan-shaped tail. The ion tail extends to the upper right, while the dust tail appears to point toward the Sun, in the opposite direction. This **antitail** *is an illusion caused by the unusual viewing angle.*

Photo by Jack Newton

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: after mid-month, very low in SW in evening twilight, best at month end* *Venus: very low in ESE in morning twilight* *Mars: visible with difficulty very low in SW after sunset* *Jupiter: in SE at dark transits in S near 8 pm sets in W near 2 am* *Saturn: low in ESE in morning twilight in SE near sunrise*	40°N 50°N Rise 2:03 1:52 Set 15:04 15:10 **1** ***S. and N. Taurid meteors weak rates throughout Nov. slow, relatively bright***	40°N 50°N Rise 3:15 3:14 Set 15:34 15:31 **2** *U.S. astronomer Harlow Shapley born 125 years ago*	40°N 50°N Rise 4:28 4:37 Set 16:04 15:52 **3**	40°N 50°N Rise 5:42 6:00 Set 16:38 16:17 **4**	40°N 50°N Rise 6:57 7:24 Set 17:15 16:46 **5** ***S. Taurid meteors (ZHR=10)*** ***1 pm***	40°N 50°N Rise 8:10 8:46 Set 17:59 17:22 *New Moon* 0:52 Sunrise 7:35 7:58 Sunset 17:52 17:29 **6**
40°N 50°N Rise 8:20 9:01 Set 17:49 17:07 **7** ***Jupiter with only one satellite end of event not visible in E of N. America*** ***1:24 am*** ***Daylight Saving Time ends*** ***2 am*** ***Two shadows on Jupiter visible in N. America except E, best in W*** ***3:12 am***	40°N 50°N Rise 9:23 10:06 Set 18:45 18:02 **8**	40°N 50°N Rise 10:16 10:57 Set 19:45 19:05 **9**	40°N 50°N Rise 11:01 11:37 Set 20:48 20:13 **10**	40°N 50°N Rise 11:38 12:08 Set 21:50 21:22 **11** *Remembrance Day (Canada)* *Veterans Day (USA)* *First photo of Earth's curvature was made by Explorer 2 75 years ago*	40°N 50°N Rise 12:10 12:33 Set 22:51 22:30 **12** *Voyager 1 made its closest approach to Saturn 30 years ago* ***N. Taurid meteors (ZHR=15)*** ***11 am***	40°N 50°N Rise 12:37 12:53 Set 23:50 23:37 *First Quarter* 11:38 Sunrise 6:43 7:10 Sunset 16:45 16:18 **13**
40°N 50°N Rise 13:02 13:10 Set -- -- **14** ***Jupiter with only one satellite visible in W of N. America*** ***2:32 am*** ***Mercury, Mars and Antares very low in bright evening twilight visible from S of N. America*** ***Lunar Straight Wall visible from all of N. America*** ***6 pm***	40°N 50°N Set 0:48 0:43 Rise 13:25 13:27 **15** ***Mercury, Mars and Antares very low in bright evening twilight visible from S of N. America***	40°N 50°N Set 1:46 1:48 Rise 13:49 13:43 **16** ***Mars 3° to upper left of Mercury, very low in bright evening twilight visible from S of N. America for another week***	40°N 50°N Set 2:44 2:54 Rise 14:13 14:00 **17** ***Leonid meteors (ZHR=20) best after moonset*** ***3 pm*** ***Jupiter with only one satellite visible in E of N. America*** ***4:11 pm***	40°N 50°N Set 3:44 4:01 Rise 14:40 14:20 **18**	40°N 50°N Set 4:45 5:10 Rise 15:10 14:43 **19** ***Jupiter stationary***	40°N 50°N Set 5:48 6:20 Rise 15:46 15:12 **20** Sunrise 6:51 7:21 Sunset 16:40 16:10 ***Mercury 1.7° lower left of Mars, very low in bright evening twilight visible from S of N. America***
40°N 50°N Set 6:51 7:29 Rise 16:29 15:49 *Full Moon* 12:27 **21** ***Today's full Moon is the Beaver Moon***	40°N 50°N Set 7:53 8:34 Rise 17:19 16:37 **22**	40°N 50°N Set 8:50 9:32 Rise 18:18 17:36 **23**	40°N 50°N Set 9:41 10:19 Rise 19:23 18:46 **24** ***Jupiter with only one satellite visible in all of N. America*** ***7:56 pm***	40°N 50°N Set 10:25 10:57 Rise 20:32 20:02 **25** *Thanksgiving Day (USA)*	40°N 50°N Set 11:03 11:28 Rise 21:43 21:21 **26**	40°N 50°N Set 11:36 11:53 Rise 22:53 22:40 **27** Sunrise 6:58 7:31 Sunset 16:37 16:04
40°N 50°N Set 12:07 12:15 Rise -- -- *Last Quarter* 15:36 **28** ***37 Fides at opposition (m=9.6)***	40°N 50°N Rise 0:04 0:00 Set 12:36 12:35 **29**	40°N 50°N Rise 1:15 1:20 Set 13:05 12:56 **30**			*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

DECEMBER

Near and Far

From left to right sparkle a series of celestial attractions: the Hyades and Pleiades star clusters, the California Nebula, and the Perseus OB association, displayed against stars, dust, and gas of the Milky Way. Glowing through the fabric of our galaxy, at lower right, is M31, the Andromeda galaxy. At 2.5 million light-years, it is our nearest large galactic neighbour.

Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: very low in SW in evening twilight, not observable by mid-month* *Venus: low in SE in morning twilight* *Mars: visible with difficulty very low in SW after sunset* *Jupiter: in S after dark sets in W 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.*	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* Rise 2:26 2:40 Set 13:36 13:18 **1** ***Venus, Spica, the Moon and Saturn grouping in morning twilight*** ***Mercury at greatest elongation E (21°)***	*40°N 50°N* Rise 3:38 4:01 Set 14:10 13:44 **2** ***Venus, Spica, the Moon and Saturn grouping in morning twilight***	*40°N 50°N* Rise 4:50 5:22 Set 14:50 14:16 **3** ***Cr. Moon, Venus, Spica and Saturn form crooked line in morning twilight***	*40°N 50°N* Rise 6:00 6:39 Set 15:36 14:56 **4** Sunrise 7:06 7:41 Sunset 16:35 16:00 ***Venus at greatest illuminated extent (m= -4.6)***
40°N 50°N Rise 7:05 7:48 Set 16:29 15:47 *New Moon* 12:36 **5**	*40°N 50°N* Rise 8:03 8:46 Set 17:28 16:47 **6** ***Moon 0.9° N of Mars, very low in evening twilight, occulted in zone from Winnipeg to Alabama*** ***Cr. Moon likely not visible 5:30 pm***	*40°N 50°N* Rise 8:53 9:31 Set 18:31 17:53 **7** *Islamic New Year* ***Crescent Moon to upper left of Mercury, low in evening twilight***	*40°N 50°N* Rise 9:34 10:06 Set 19:34 19:03 **8**	*40°N 50°N* Rise 10:08 10:34 Set 20:37 20:13 **9** ***16 Psyche at opposition (m=9.4)***	*40°N 50°N* Rise 10:37 10:56 Set 21:37 21:21 **10**	*40°N 50°N* Rise 11:03 11:15 Set 22:36 22:28 **11** Sunrise 7:12 7:48 Sunset 16:35 15:58
40°N 50°N Rise 11:27 11:32 Set 23:34 23:33 **12**	*40°N 50°N* Rise 11:50 11:48 Set -- -- *First Quarter* 8:59 **13** ***Spot Jupiter unaided before sunset 6° below the Moon***	*40°N 50°N* Set 0:32 0:39 Rise 12:14 12:04 **14** ***Geminid meteors (ZHR=120) best after moonset 6 am*** ***Lunar Straight Wall visible from all of N. America 6 pm***	*40°N 50°N* Set 1:30 1:45 Rise 12:40 12:23 **15**	*40°N 50°N* Set 2:30 2:52 Rise 13:08 12:44 **16**	*40°N 50°N* Set 3:32 4:01 Rise 13:41 13:10 **17**	*40°N 50°N* Set 4:35 5:11 Rise 14:21 13:44 **18** Sunrise 7:17 7:54 Sunset 16:37 15:59 ***Moon 1.2° S of Pleiades visible most of the night***
40°N 50°N Set 5:38 6:19 Rise 15:08 14:27 **19** *Mercury 1 was launched on unmanned test flight 50 years ago*	*40°N 50°N* Set 6:38 7:20 Rise 16:04 15:22 **20**	*40°N 50°N* Set 7:33 8:13 Rise 17:09 16:29 *Full Moon* 3:13 **21** ***Total lunar eclipse visible in all of N. America, best in W*** ***cluster NGC 2129 occulted during totality 2 am*** ***Today's full Moon is the Cold Moon*** ***Winter Solstice 6:38 pm***	*40°N 50°N* Set 8:21 8:56 Rise 18:18 17:45 **22** ***Ursid meteors (ZHR=10) 3 pm***	*40°N 50°N* Set 9:02 9:30 Rise 19:31 19:06 **23**	*40°N 50°N* Set 9:38 9:57 Rise 20:43 20:28 **24**	*40°N 50°N* Set 10:10 10:20 Rise 21:55 21:49 **25** Sunrise 7:20 7:58 Sunset 16:40 16:03 *Christmas Day* ***Two shadows on Jupiter visible in E of N. America and N Canada 5:45 pm***
40°N 50°N Set 10:39 10:41 Rise 23:06 23:09 **26** *Boxing Day (Canada)* ***Two shadows on Jupiter best in E of N. America 8:06 pm***	*40°N 50°N* Set 11:08 11:02 Rise -- -- *Last Quarter* 23:18 **27**	*40°N 50°N* Rise 0:17 0:29 Set 11:38 11:23 **28**	*40°N 50°N* Rise 1:28 1:48 Set 12:11 11:47 **29**	*40°N 50°N* Rise 2:38 3:07 Set 12:48 12:16 **30**	*40°N 50°N* Rise 3:47 4:24 Set 13:30 12:52 **31** ***Crescent Moon, Venus, Mercury and Antares in wide grouping in morning twilight***	

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:

203-4920 Dundas Street West
Toronto ON M9A 1B7
Canada
Phone: 416- 924-7973
Email: nationaloffice@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.

Editors
Dave Lane (calendareditor@rasc.ca)
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Jack Newton
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Mary Lou Whitehorne

Historical Anniversaries
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Proofreading
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Cover/August (Graceful Sweep of Gas): A false-colour composite image made from 3.5 hours of exposure through an Astrodon H-alpha filter and 1.5 hours of exposure through an Astrodon OIII filter on an Apogee U9000 CCD camera using an RCOS 16-inch f/8.9 telescope; processed with CCAP, CCD Stack, MaxIm DL and Photoshop CS3 software; taken during 2008 July from the Sierra Remote Observatories, California (Paul Mortfield and Stefano Cancelli).

January (Dark Horse): A composite image made from exposures in luminance, H-alpha, red, green and blue filters on an SBIG STL-11000 CCD camera using a Takahashi FSQ106 ED telescope (focal length of 530-mm) taken on 2008 November 24 remotely using "Global Rent-a-Scope" located in Cloudcroft, New Mexico (Pierre Tremblay).

February ("Magnificent Desolation"): A stack of 190 frames taken on a Lumenera Infininty 2-2 video camera using a Starmaster 18-inch driven Dobsonian telescope plus a Tele Vue 2.5X Powermate with a True Tech R/IR filer; processed with Registax 4 and Photoshop CS software; taken on 2008 October 18 from Baha Mexico (Mike Wirths).

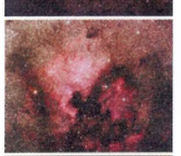
March (Stellar Symphony): A composite image made from 3.1 hours of total exposure time through Astrodon LRGB filters on an Apogee U16M CCD camera using a Ceravolo 300 Astrograph working at f/4.9; processed with MaxIm DL, Registar and Photoshop CS2 software; taken at Sunglow Ranch, Arizona (Debra and Peter Ceravolo).

April (Earth's Greatest Tidal Range): A 1/40-second exposure (ISO 100 setting) on a Canon XTi DSLR camera using a 300-mm lens at f/8; taken on 2008 November 13 during evening twilight from Evangeline Beach, Nova Scotia (Roy Bishop).

May (Dazzling Star Swirl): A composite image made from over nineteen hours of total exposure time using two telescopes located in Grimsby and Toronto, Ontario. A Celestron C6 at f/10 with a QHY-8 one-shot colour CCD camera and a Vixen VC200L at f/9 with an SBIG ST10XME CCD camera were used (Stefano Cancelli and Kerry-Ann Lecky Hepburn).

June (Glittering Galactic Fossils): A composite image made from nearly four hours of total exposure time through Astrodon LRGB filters on an SBIG ST10XME CCD camera using a Vixen VC200L f/9 telescope; taken on 2008 May 17 and 25 from Toronto, Ontario (Stefano Cancelli).

July (Star Maker): A composite image made from eight 10-minute exposures on a Hutech-modified Canon DSLR camera using a BORG 77-mm Astrograph at f/4; processed with MaxIm DL and Photoshop CS3 software; taken on 2008 November 5 from the Arizona Sky Village (Jack Newton).



September (Cosmic Continent): A composite image made from 47 72-second exposures on a Hutech-modified Canon 300-D DSLR camera using a Canon 200-mm L series lens set at f/3.5; processed with Deep Sky Stacker, Images Plus, and Photoshop CS3 software; taken on 2008 June 7 from Wellandport's Chippawa Creek Conservation Area, Ontario (Leslie Marczi).

October (Swimming in Stars): A composite image made from a total exposure of 2.5 hours (60 minutes in H-alpha and 25 minutes in each of red, green and blue filters – all filters were from the Astronomik HaRGB set) on an SBIG STL11000 CCD camera using a Takahashi FSQ f/5 Astrograph; processed with CCDSoft5, MaxIm DL, Photoshop CS2; taken on 2008 August 1 from Flesherton, Ontario (Stuart Heggie).

November (Tale of Two Tails): A composite image made from eight 4-minute exposures on a QHY-8 one-shot colour CCD camera using a Meade 14-inch f/2 Hyperstar telescope; processed with MaxIm DL and Photoshop CS3 software; taken on 2009 February 21 from the Arizona Sky Village (Jack Newton).

December (Near and Far): A composite image made from four 10-minute exposures on a Canon 20Da DSLR camera using a Canon 15-mm lens set at f/4.5; taken on 2009 January 18 from rural Alberta (Alan Dyer).

2010

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	

2011

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			

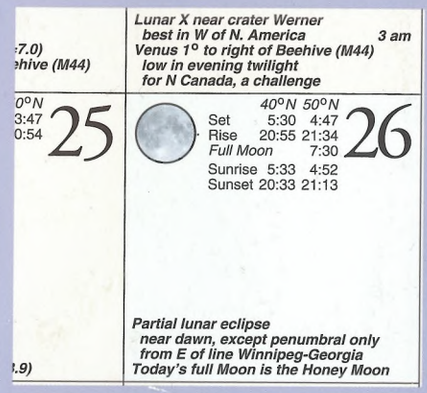
December

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 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 using readily available telescopes and cameras. 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 978-0-9813292-2-2

$16.95 Can. / U.S.