
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
2004

JANUARY

Auroral Fire and Ice

Here is a study in contrasts that join the Sun's energy to Earth's soil and air. Dark foreground trees point to high thin clouds, which glow like ice backlit by an aurora's red flames. As the recent solar maximum subsides, these displays will become rarer in the next few years.

Photo by Rod Innes

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury:* visible in second half of month low in SE in morning twilight *Venus:* low in SW in evening twilight, sets in SW by 8pm *Mars:* high in SSW after dark, sets in W near midnight *Jupiter:* rises in E after 9 pm, visible for rest of night *Saturn:* in E after dark, very low in WNW at start of 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 which are given in local 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	*"Somewhere, In* *The Centre of Night* *A Plasma Explosion,* *Of Sun Kissed Flight.* *"Ions, Charged* *Magnetically Right* *She Waits; She Receives* *A Curtain of Light!"* *G. Holsten*	40°N 50°N Set 1:51 2:06 Rise 12:52 12:34 **1** *New Year's Day*	40°N 50°N Set 2:51 3:15 Rise 13:17 12:50 **2**	40°N 50°N Set 3:52 4:25 Rise 13:46 13:11 **3** Sunrise 7:22 7:58 Sunset 16:47 16:10
40°N 50°N Set 4:53 5:34 Rise 14:19 13:38 **4** ***Quadrantid meteors peak 1 am*** ***Earth at perihelion (147,094,300 km) 1 pm***	40°N 50°N Set 5:53 6:40 Rise 15:00 14:12 **5**	40°N 50°N Set 6:50 7:40 Rise 15:48 14:58 **6**	40°N 50°N Set 7:42 8:31 Rise 16:43 15:55 *Full Moon* 10:40 **7**	40°N 50°N Set 8:27 9:11 Rise 17:45 17:02 **8**	40°N 50°N Set 9:05 9:42 Rise 18:50 18:14 **9** ***Ceres at opposition***	40°N 50°N Set 9:37 10:06 Rise 19:56 19:30 **10** Sunrise 7:22 7:56 Sunset 16:53 16:19
40°N 50°N Set 10:05 10:25 Rise 21:02 20:45 **11**	40°N 50°N Set 10:30 10:42 Rise 22:09 22:01 **12** ***Jupiter 3° S of Moon best in W of N. America 6 am***	40°N 50°N Set 10:54 10:57 Rise 23:16 23:18 **13**	40°N 50°N Set 11:18 11:12 Rise -- -- *Last Quarter* 23:46 **14** *M.W. Burke-Gaffney, Professor Emeritus of Astronomy, SMU, dies 25 years ago*	40°N 50°N Rise 0:25 0:37 Set 11:44 11:28 **15** *Einstein Observatory begins examining sky in X-rays, 25 years ago*	40°N 50°N Rise 1:37 2:00 Set 12:13 11:48 **16**	40°N 50°N Rise 2:53 3:25 Set 12:48 12:13 **17** Sunrise 7:19 7:51 Sunset 17:01 16:29 ***Mercury at greatest elongation W (24°)***
40°N 50°N Rise 4:10 4:52 Set 13:32 12:48 **18**	40°N 50°N Rise 5:25 6:14 Set 14:27 13:37 **19** *Martin Luther King Jr. Day (USA)*	40°N 50°N Rise 6:33 7:24 Set 15:33 14:43 **20**	40°N 50°N Rise 7:30 8:16 Set 16:47 16:02 *New Moon* 16:05 **21**	40°N 50°N Rise 8:16 8:53 Set 18:03 17:28 **22** *Chinese New Year*	40°N 50°N Rise 8:52 9:20 Set 19:17 18:52 **23**	40°N 50°N Rise 9:22 9:40 Set 20:27 20:12 **24** Sunrise 7:15 7:45 Sunset 17:09 16:40
40°N 50°N Rise 9:47 9:56 Set 21:33 21:28 **25** *Clementine launches to Moon for a successful mapping mission, 10 years ago*	40°N 50°N Rise 10:10 10:11 Set 22:37 22:41 **26**	40°N 50°N Rise 10:32 10:24 Set 23:39 23:52 **27** ***Mars 3° N of Crescent Moon best in W of N. America 11 pm***	40°N 50°N Rise 10:54 10:38 Set -- -- **28**	40°N 50°N Set 0:41 1:02 Rise 11:18 10:54 *First Quarter* 1:03 **29**	40°N 50°N Set 1:42 2:12 Rise 11:45 11:13 **30**	40°N 50°N Set 2:43 3:21 Rise 12:17 11:38 **31** Sunrise 7:10 7:36 Sunset 17:17 16:52

FEBRUARY

Greetings from the Deep South

Only thirty degrees from the South Pole, the Large Magellanic Cloud on the right is drifting as a satellite galaxy to our own Milky Way, whose central disc of dark nebulae, stellar furnaces, and new starclouds flow as a great river of light. At the left, the dark Coal Sack sits under the Southern Cross; and the brilliant Carina Nebula dominates this sweep of the Milky Way.
Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 40°N 50°N Set 3:44 4:29 Rise 12:55 12:09	**2** 40°N 50°N Set 4:42 5:31 Rise 13:40 12:51	**3** 40°N 50°N Set 5:36 6:26 Rise 14:34 13:44 *First flight of Russian cosmonaut, Sergei Krikalev, on U.S. spacecraft, 10 years ago* *Challenger launches for 1st untethered space walks, 20 years ago*	**4** 40°N 50°N Set 6:23 7:10 Rise 15:34 14:48	**5** 40°N 50°N Set 7:04 7:44 Rise 16:38 16:00 *Mariner 10 returns photos of Venus's cloud cover, 30 years ago*	**6** 40°N 50°N Set 7:38 8:10 Rise 17:45 17:16 *Full Moon* 3:47	**7** 40°N 50°N Set 8:08 8:31 Rise 18:53 18:33 Sunrise 7:03 7:25 Sunset 17:26 17:04
8 40°N 50°N Set 8:34 8:48 Rise 20:01 19:51 *Fritz Zwicky, who introduced morphological classification of galaxies, dies 30 years ago*	**9** 40°N 50°N Set 8:58 9:03 Rise 21:09 21:08 ***Zodiacal Light visible in W after evening twilight for next two weeks***	**10** 40°N 50°N Set 9:22 9:18 Rise 22:18 22:27	**11** 40°N 50°N Set 9:47 9:34 Rise 23:28 23:48 *Yuri Schwebler turns Washington Monument into largest gnomon on record, 30 years ago*	**12** 40°N 50°N Set 10:15 9:52 Rise -- --	**13** 40°N 50°N Rise 0:42 1:11 Set 10:47 10:15 *Last Quarter* 8:40	**14** 40°N 50°N Rise 1:56 2:36 Set 11:27 10:45 Sunrise 6:55 7:13 Sunset 17:34 17:16 *Valentine's Day*
15 40°N 50°N Rise 3:10 3:58 Set 12:16 11:27	**16** 40°N 50°N Rise 4:19 5:11 Set 13:15 12:24 *President's Day (USA)* *Winter Star Party, Florida Keys www.scas.org (through Feb. 24)*	**17** 40°N 50°N Rise 5:19 6:08 Set 14:24 13:37	**18** 40°N 50°N Rise 6:08 6:50 Set 15:38 14:59	**19** 40°N 50°N Rise 6:47 7:20 Set 16:53 16:23	**20** 40°N 50°N Rise 7:19 7:42 Set 18:05 17:46 *New Moon* 4:18	**21** 40°N 50°N Rise 7:46 8:00 Set 19:14 19:04 Sunrise 6:46 7:00 Sunset 17:42 17:28
22 40°N 50°N Rise 8:10 8:15 Set 20:20 20:20 *Islamic New Year*	**23** 40°N 50°N Rise 8:33 8:29 Set 21:24 21:33 *Georges van Biesbroeck, Professor Emeritus of Astronomy at Yale, dies 30 years ago* ***Venus 3° to right of Crescent Moon best in E of N. America 7 pm***	**24** 40°N 50°N Rise 8:55 8:43 Set 22:26 22:44	**25** 40°N 50°N Rise 9:19 8:58 Set 23:29 23:56 ***Mars 1.1° N of Crescent Moon best in S of N. America 10 pm***	**26** 40°N 50°N Rise 9:45 9:15 Set -- --	**27** 40°N 50°N Set 0:31 1:06 Rise 10:14 9:37 *First Quarter* 22:24	**28** 40°N 50°N Set 1:33 2:15 Rise 10:50 10:05 Sunrise 6:36 6:46 Sunset 17:50 17:40
29 40°N 50°N Set 2:32 3:20 Rise 11:32 10:42 *Columbus impresses natives with lunar eclipse, 500 years ago*		*"The River of Heaven wheels round at night* *Drifting the circling stars,* *At Silver Bank, the floating clouds* *Mimic the murmur of water."* *Li Ho 790 AD, A Ballad of Heaven*		**The planets this month** *Mercury: not easily observed* *Venus: low in WSW after dark, sets in W near 9 pm* *Mars: high in WSW after dark, sets in WNW before midnight* *Jupiter: rises in E near 7 pm, in WSW at start of morning twilight* *Saturn: high in SE after dark, sets in NW before start of 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 which are given in local 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

The Tarantula Nebula

The Large Magellanic Cloud (see February) boasts one of the most extensive H-II regions in the universe. Here in close-up, the stupendous Tarantula Nebula, which dwarfs the Orion Nebula thirtyfold, creates stars in its red cauldrons of hydrogen. These new-born stars of blue-white intensity then drift away in loose clouds and open clusters.
Photo by Rajiv Gupta

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: visible in second half of month low in W during evening twilight* *Venus: in W after dark, sets in W near 10 pm* *Mars: in W after dark, sets in WNW before midnight* *Jupiter: in E after dark, sets in WNW during morning twilight* *Saturn: high in SSW after dark, sets in NW by about 2:30 am*	40°N 50°N Set 3:27 4:18 Rise 12:22 11:31 **1**	40°N 50°N Set 4:17 5:06 Rise 13:19 12:31 **2**	40°N 50°N Set 5:00 5:43 Rise 14:22 13:40 **3**	40°N 50°N Set 5:37 6:12 Rise 15:29 14:55 **4** *Voyager 1 discovers ring around Jupiter, 25 years ago* *George Gamow, popularizer of astronomy and physics, is born 100 years ago* ***Jupiter at opposition***	40°N 50°N Set 6:08 6:35 Rise 16:37 16:13 **5** ***2 shadows on Jupiter, visible in all of N. America 2:22 am***	40°N 50°N Set 6:36 6:53 Rise 17:46 17:32 *Full Moon* 18:14 Sunrise 6:25 6:32 Sunset 17:58 17:51 **6**
40°N 50°N Set 7:01 7:09 Rise 18:56 18:52 **7**	40°N 50°N Set 7:25 7:24 Rise 20:06 20:12 **8** *Alvan Clark Sr., maker of first achromatic lenses in U.S., is born 200 years ago*	40°N 50°N Set 7:50 7:40 Rise 21:18 21:34 **9** ***Zodiacal Light visible in W after evening twilight for next two weeks***	40°N 50°N Set 8:17 7:57 Rise 22:32 22:59 **10**	40°N 50°N Set 8:48 8:18 Rise 23:47 -- **11**	40°N 50°N Rise -- 0:25 Set 9:26 8:46 **12** ***2 shadows on Jupiter, visible in most of N. America 4:16 am***	40°N 50°N Rise 1:02 1:49 Set 10:11 9:23 *Last Quarter* 16:01 Sunrise 6:14 6:17 Sunset 18:05 18:03 **13**
40°N 50°N Rise 2:13 3:04 Set 11:07 10:15 **14** *Einstein born, 125 years ago*	40°N 50°N Rise 3:14 4:05 Set 12:12 11:22 **15**	40°N 50°N Rise 4:05 4:50 Set 13:23 12:40 **16**	40°N 50°N Rise 4:47 5:23 Set 14:36 14:02 **17**	40°N 50°N Rise 5:20 5:47 Set 15:48 15:24 **18**	40°N 50°N Rise 5:48 6:05 Set 16:57 16:43 **19** ***2 shadows on Jupiter, visible in W of N. America 6:10 am***	40°N 50°N Rise 6:12 6:20 Set 18:03 17:59 *New Moon* 17:41 Sunrise 6:03 6:02 Sunset 18:12 18:14 **20** ***Spring Equinox 1:49 am***
40°N 50°N Rise 6:35 6:34 Set 19:08 19:13 **21** ***2 shadows on Jupiter, visible in all of N. America 12:38 am***	40°N 50°N Rise 6:57 6:48 Set 20:12 20:26 **22** ***All five naked-eye planets and the Moon visible in evening sky for next two weeks*** ***2 shadows on Jupiter, visible in E of N. America 7:07 pm***	40°N 50°N Rise 7:20 7:02 Set 21:15 21:38 **23** *Norman R. Pogson, who discovered asteroids and variable stars, is born 175 years ago*	40°N 50°N Rise 7:44 7:18 Set 22:18 22:50 **24** ***Venus 2.3° to right of Cr. Moon 9 pm***	40°N 50°N Rise 8:13 7:38 Set 23:20 -- **25** ***Mars 0.6° S of Crescent Moon best in NE of N. America 8 pm***	40°N 50°N Set -- 0:01 Rise 8:45 8:03 **26**	40°N 50°N Set 0:21 1:08 Rise 9:25 8:36 Sunrise 5:51 5:47 Sunset 18:20 18:25 **27**
40°N 50°N Set 1:18 2:09 Rise 10:11 9:20 *First Quarter* 18:48 **28** ***3 shadows on Jupiter, visible in all of N. America 3:00 am***	40°N 50°N Set 2:10 3:01 Rise 11:05 10:14 **29** *Mariner 10 transmits first detailed photographs of Mercury, 30 years ago* ***Mercury at greatest elongation E (19°) best evening view in 2004*** ***Venus at greatest elongation E (46°)*** ***2 shadows on Jupiter, visible in most of N. America 9:16 pm***	40°N 50°N Set 2:55 3:42 Rise 12:05 11:20 **30** *Bernard V. Schmidt, inventor of the Schmidt telescope, is born 125 years ago*	40°N 50°N Set 3:34 4:13 Rise 13:10 12:32 **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 which are given in local 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	

APRIL

The Ecliptic Crosses the Galactic Plane

The ecliptic or the plane of the solar system is here represented by morning twilight, Venus, Jupiter, and Saturn in a line extending just under the bright Pleiades star cluster, which Venus approaches closely on April 2. The Winter Milky Way lies along the galactic plane and rises vertically to the right of Jupiter, intersecting the ecliptic in western Gemini.
Photo by Roland Dechesne

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: visible with difficulty early in month low in W in evening twilight* *Venus: in WNW after dark, sets in NW near midnight* *Mars: in W after dark, sets in NW near midnight* *Jupiter: high in SSE after dark, sets in WNW at start of morning twilight* *Saturn: high in W after dark, sets in NW after 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 which are given in local 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		**1** *40°N 50°N* Set 4:07 4:38 Rise 14:17 13:48	**2** *40°N 50°N* Set 4:36 4:58 Rise 15:25 15:07 ***Venus 0.6° S of the Pleiades*** ***9 pm***	**3** *40°N 50°N* Set 5:01 5:14 Rise 16:35 16:26 Sunrise 5:40 5:31 Sunset 18:27 18:36
4 *40°N 50°N* Set 6:26 6:30 Rise 18:46 18:47 ***Daylight Saving Time Begins*** ***2 am***	**5** *40°N 50°N* Set 6:51 6:45 Rise 19:59 20:11 *Full Moon* 7:03	**6** *40°N 50°N* Set 7:17 7:01 Rise 21:14 21:37 *First Day of Passover* *Solar Max repaired in space, 20 years ago* ***2 shadows on Jupiter, visible in all of N. America*** ***12:54 am***	**7** *40°N 50°N* Set 7:47 7:21 Rise 22:32 23:06	**8** *40°N 50°N* Set 8:23 7:46 Rise 23:50 --	**9** *40°N 50°N* Rise -- 0:34 Set 9:07 8:21 *Good Friday*	**10** *40°N 50°N* Rise 1:04 1:55 Set 10:00 9:09 Sunrise 6:29 6:17 Sunset 19:34 19:47
11 *40°N 50°N* Rise 2:10 3:02 Set 11:04 10:12 *Last Quarter* 23:46 *Easter Sunday*	**12** *40°N 50°N* Rise 3:05 3:52 Set 12:14 11:28	**13** *40°N 50°N* Rise 3:48 4:28 Set 13:26 12:49 ***2 shadows on Jupiter, visible in most of N. America*** ***3:31 am***	**14** *40°N 50°N* Rise 4:23 4:53 Set 14:38 14:10 *Christiaan Huygens, who discovered Saturn's moon, Titan, is born 375 years ago*	**15** *40°N 50°N* Rise 4:52 5:12 Set 15:46 15:29	**16** *40°N 50°N* Rise 5:17 5:28 Set 16:52 16:45	**17** *40°N 50°N* Rise 5:39 5:42 Set 17:56 17:58 Sunrise 6:19 6:02 Sunset 19:41 19:58
18 *40°N 50°N* Rise 6:01 5:55 Set 18:59 19:10	**19** *40°N 50°N* Rise 6:23 6:09 Set 20:02 20:22 *New Moon* 9:21 *International Astronomy Week (through April 25)* ***Partial Solar Eclipse not visible in North America***	**20** *40°N 50°N* Rise 6:46 6:24 Set 21:05 21:34	**21** *40°N 50°N* Rise 7:13 6:42 Set 22:08 22:46	**22** *40°N 50°N* Rise 7:44 7:05 Set 23:10 23:55 ***Lyrid meteors peak*** ***12 am***	**23** *40°N 50°N* Rise 8:21 7:34 Set -- -- ***Mars 2.7° below the Crescent Moon with Venus nearby best in E of N. America*** ***10 pm***	**24** *40°N 50°N* Set 0:09 0:59 Rise 9:04 8:13 Sunrise 6:09 5:48 Sunset 19:48 20:09 *International Astronomy Day* *www.astroleague.org/al/astroday/astroday.html* *www.rasc.ca/activity/astroday*
25 *40°N 50°N* Set 1:03 1:55 Rise 9:55 9:03	**26** *40°N 50°N* Set 1:50 2:39 Rise 10:52 10:04	**27** *40°N 50°N* Set 2:31 3:14 Rise 11:54 11:12 *First Quarter* 13:32	**28** *40°N 50°N* Set 3:06 3:41 Rise 12:59 12:26	**29** *40°N 50°N* Set 3:35 4:02 Rise 14:05 13:42 ***Jupiter 3° S of Moon*** ***11 pm***	**30** *40°N 50°N* Set 4:02 4:19 Rise 15:13 14:59	*"Amid a transparent clear belt of ether yet left in the east,* *Ascends large and calm the lord-star Jupiter,* *And nigh at hand, only a very little above,* *Swim the delicate sisters the Pleiades."* *Walt Whitman, Leaves Of Grass*

MAY

Upon Reflection, A Nebula

In the vicinity of the bright reddish-yellow star Antares and the impressive globular cluster M4 above it, massive clouds of dust-grains reflect light from hot new stars in "a rhapsody of blue," lilac, and purple. The nascent stellar winds are blowing dark clouds and dust grains to other parts of the galaxy for future acts of stellar creation.
Photo by Stephen Barnes

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: not easily observed* *Venus: low in WNW after dark, lost in twilight by end of month* *Mars: low in WNW in evening twilight, sets in NW soon after dark* *Jupiter: high in SW after dark, sets in WNW near 3 am* *Saturn: low in W after dark, sets in NW near midnight*	*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 which are given in local 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				1 40°N 50°N Set 4:26 4:34 Rise 16:22 16:18 Sunrise 6:00 5:36 Sunset 19:55 20:19
2 40°N 50°N Set 4:50 4:49 Rise 17:33 17:40 ***Venus at greatest brilliancy***	3 40°N 50°N Set 5:16 5:05 Rise 18:48 19:05	4 40°N 50°N Set 5:44 5:23 Rise 20:06 20:35 *Full Moon* 16:33 ***η-Aquarid meteors peak 1 pm*** ***Total Lunar Eclipse not visible in North America***	5 40°N 50°N Set 6:17 5:45 Rise 21:27 22:07	6 40°N 50°N Set 6:58 6:16 Rise 22:46 23:35	7 40°N 50°N Set 7:49 6:59 Rise 23:58 --	8 40°N 50°N Rise -- 0:51 Set 8:51 7:59 Sunrise 5:51 5:24 Sunset 20:02 20:30
9 40°N 50°N Rise 0:59 1:49 Set 10:02 9:13 *Mother's Day* *Multiple Mirror Telescope is dedicated at Mt. Hopkins, Arizona, 25 years ago*	10 40°N 50°N Rise 1:48 2:30 Set 11:16 10:35	11 40°N 50°N Rise 2:26 2:59 Set 12:29 11:58 *Last Quarter* 7:04	12 40°N 50°N Rise 2:56 3:20 Set 13:38 13:18	13 40°N 50°N Rise 3:22 3:36 Set 14:45 14:34	14 40°N 50°N Rise 3:45 3:50 Set 15:49 15:48 ***Mercury at greatest elongation W (26°) not easily observed***	15 40°N 50°N Rise 4:06 4:03 Set 16:52 16:59 Sunrise 5:44 5:13 Sunset 20:09 20:40
16 40°N 50°N Rise 4:28 4:17 Set 17:54 18:10 *Texas Star Party, Fort Davis, TX www.texasstarparty.org (through May 23)*	17 40°N 50°N Rise 4:51 4:31 Set 18:56 19:22	18 40°N 50°N Rise 5:16 4:48 Set 19:59 20:33	19 40°N 50°N Rise 5:45 5:09 Set 21:01 21:44 *New Moon* 0:52	20 40°N 50°N Rise 6:19 5:35 Set 22:01 22:50 *Sidney van den Bergh, known for extragalactic nebulae and star clusters, is born 75 years ago*	21 40°N 50°N Rise 7:00 6:11 Set 22:57 23:49 *USSR Academy of Sciences opens Central Observatory, 50 years ago*	22 40°N 50°N Rise 7:49 6:57 Set 23:47 -- Sunrise 5:39 5:05 Sunset 20:15 20:49
23 40°N 50°N Set -- 0:37 Rise 8:43 7:54 ***Saturn 1.6° S of Mars 11 pm***	24 40°N 50°N Set 0:29 1:15 Rise 9:43 8:59 *Victoria Day (Canada)*	25 40°N 50°N Set 1:05 1:44 Rise 10:46 10:10	26 40°N 50°N Set 1:36 2:06 Rise 11:51 11:24 *David Gill reaches the Cape as Director of Royal Cape Observatory, 125 years ago*	27 40°N 50°N Set 2:03 2:24 Rise 12:56 12:39 *First Quarter* 3:57	28 40°N 50°N Set 2:27 2:39 Rise 14:03 13:54 *Riverside Telescope Makers Conference, Big Bear, CA, www.rtmc-inc.org (through May 30)*	29 40°N 50°N Set 2:51 2:54 Rise 15:11 15:12 Sunrise 5:34 4:58 Sunset 20:21 20:58
30 40°N 50°N Set 3:15 3:08 Rise 16:22 16:34	31 40°N 50°N Set 3:40 3:25 Rise 17:37 18:00 *Memorial Day (USA)*		*"Millions and whole myriads of millions of centuries will flow on, during which always new worlds and systems of worlds will be formed."* *Immanuel Kant*			

JUNE

The Moon Casts a Long Shadow

Why are the edges of this unusual portrait of a total solar eclipse so bright and sunlit? It is a visually extraordinary demonstration of how the Moon's conical shadow reaches Earth surrounded by the light of the Sun. The transit of Venus on June 8 is a much rarer example of a solar-system body crossing the Sun's disk.

Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: not observable* *Venus: slowly emerges in ENE morning twilight in second half of month* *Mars: visible with difficulty in evening twilight very low in WNW early in month* *Jupiter: low in W after dark, sets in WNW near midnight* *Saturn: lost in WNW evening twilight early in month*		1 40°N 50°N Set 4:10 3:44 Rise 18:56 19:30	2 40°N 50°N Set 4:47 4:10 Rise 20:17 21:02	3 40°N 50°N Set 5:34 4:47 Rise 21:36 22:27 *Full Moon* 0:20 ***Largest Full Moon of 2004*** ***Closest Lunar Perigee of 2004***	4 40°N 50°N Set 6:32 5:40 Rise 22:44 23:36	5 40°N 50°N Set 7:41 6:50 Rise 23:40 -- Sunrise 5:32 4:53 Sunset 20:26 21:05
6 40°N 50°N Rise -- 0:26 Set 8:57 8:13	7 40°N 50°N Rise 0:24 1:01 Set 10:14 9:40	8 40°N 50°N Rise 0:58 1:25 Set 11:27 11:03 ***Venus in inferior conjunction*** ***Venus Transits the Sun end visible after sunrise in central & eastern USA and prairie & eastern Canada***	9 40°N 50°N Rise 1:26 1:43 Set 12:36 12:23 *Last Quarter* 16:02	10 40°N 50°N Rise 1:50 1:58 Set 13:42 13:38	11 40°N 50°N Rise 2:12 2:11 Set 14:45 14:50 ***Pluto at opposition***	12 40°N 50°N Rise 2:33 2:25 Set 15:47 16:01 Sunrise 5:31 4:51 Sunset 20:29 21:10
13 40°N 50°N Rise 2:56 2:38 Set 16:49 17:12	14 40°N 50°N Rise 3:20 2:54 Set 17:52 18:23	15 40°N 50°N Rise 3:48 3:14 Set 18:54 19:34	16 40°N 50°N Rise 4:20 3:38 Set 19:54 20:41	17 40°N 50°N Rise 4:59 4:11 Set 20:52 21:43 *New Moon* 16:27 ***Farthest Lunar Apogee of 2004***	18 40°N 50°N Rise 5:45 4:54 Set 21:43 22:34	19 40°N 50°N Rise 6:38 5:47 Set 22:28 23:15 Sunrise 5:31 4:50 Sunset 20:32 21:13
20 40°N 50°N Rise 7:36 6:51 Set 23:06 23:47 *Father's Day* ***Summer Solstice 8:57 pm***	21 40°N 50°N Rise 8:39 8:00 Set 23:38 --	22 40°N 50°N Set -- 0:11 Rise 9:42 9:12	23 40°N 50°N Set 0:06 0:30 Rise 10:46 10:26 ***Jupiter 2.3° S of Moon 11 pm***	24 40°N 50°N Set 0:31 0:46 Rise 11:51 11:39 *St.-Jean-Baptiste Day (Québec)*	25 40°N 50°N Set 0:53 1:00 Rise 12:56 12:54 *First Quarter* 15:08	26 40°N 50°N Set 1:16 1:14 Rise 14:04 14:11 Sunrise 5:33 4:52 Sunset 20:33 21:13 *Ulysses is first vehicle to fly over a solar pole, 10 years ago*
27 40°N 50°N Set 1:40 1:28 Rise 15:14 15:32	28 40°N 50°N Set 2:07 1:46 Rise 16:29 16:58	29 40°N 50°N Set 2:39 2:08 Rise 17:48 18:28	30 40°N 50°N Set 3:20 2:38 Rise 19:07 19:56	*"The Sun's rim dips; the stars rush out:* *At one stride comes the dark;* *With far-heard whisper, o'er the sea,* *Off shot the spectre-bark."* *Coleridge, Rime Of The Ancient Mariner*	*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 which are given in local 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

The Trifid Nebula's Milky Way

At centre, the Trifid Nebula (M20) floats in a sea of stars and dark and emission nebulae. The larger Lagoon Nebula (M8) is also creating stars in its red clouds of hydrogen but lacks the Trifid's additional blue colour from one of the largest reflection nebulae in the night sky. The yellow colour in the surrounding star-fields is the result of obscuring dust near the galactic core.

Photo by Kevin Black

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: visible with difficulty only near mid-month very low in WNW after sunset* *Venus: very low in ENE in morning twilight* *Mars: not observable* *Jupiter: low in W in evening twilight, sets in W less than 3 hours after Sun* *Saturn: not observable*	*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 which are given in local 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		**1** 40°N 50°N Set 4:12 3:22 Rise 20:21 21:14 *Canada Day* *Saheki observes bright flare at Edom Promontorium, Mars, 50 years ago* *Cassini probe arrives today at Saturn after 7-year journey*	**2** 40°N 50°N Set 5:16 4:23 Rise 21:25 22:14 *Full Moon* 7:09 *RASC General Assembly, St. John's www.rasc.ca/ga2004 (through Jul. 4)*	**3** 40°N 50°N Set 6:31 5:42 Rise 22:15 22:56 Sunrise 5:36 4:57 Sunset 20:32 21:12
4 40°N 50°N Set 7:49 7:11 Rise 22:54 23:26 *Independence Day (USA)* *Crab supernova explodes, 950 years ago* ***Venus 1.1° N of Aldebaran best in S of N. America 5 am***	**5** 40°N 50°N Set 9:07 8:39 Rise 23:26 23:47 ***Earth at aphelion (152,095,300 km) 7 am***	**6** 40°N 50°N Set 10:20 10:03 Rise 23:52 --	**7** 40°N 50°N Rise -- 0:03 Set 11:30 11:22	**8** 40°N 50°N Rise 0:15 0:18 Set 12:35 12:37	**9** 40°N 50°N Rise 0:37 0:31 Set 13:39 13:50 *Last Quarter* 3:34 ***Juno at opposition***	**10** 40°N 50°N Rise 1:00 0:45 Set 14:42 15:02 Sunrise 5:40 5:03 Sunset 20:30 21:08 ***Mars 0.2° SW of Mercury best in S of N. America 10 pm***
11 40°N 50°N Rise 1:23 1:00 Set 15:44 16:13 *Skylab 1 crashes to Earth in Australia, 25 years ago*	**12** 40°N 50°N Rise 1:50 1:18 Set 16:47 17:24	**13** 40°N 50°N Rise 2:21 1:41 Set 17:48 18:33 *Aristarch Belopolsky, discoverer of spectroscopic binaries, born 150 years ago*	**14** 40°N 50°N Rise 2:58 2:11 Set 18:46 19:36 *Sir Thomas Maclear, Director of Royal Cape Observatory, dies 125 years ago* ***Venus at greatest brilliancy***	**15** 40°N 50°N Rise 3:41 2:51 Set 19:40 20:31	**16** 40°N 50°N Rise 4:33 3:41 Set 20:27 21:16 *Comet Shoemaker-Levy 9 strikes Jupiter, 10 years ago*	**17** 40°N 50°N Rise 5:30 4:42 Set 21:07 21:50 *New Moon* 7:24 Sunrise 5:46 5:10 Sunset 20:26 21:01
18 40°N 50°N Rise 6:32 5:51 Set 21:41 22:16	**19** 40°N 50°N Rise 7:35 7:03 Set 22:10 22:36	**20** 40°N 50°N Rise 8:40 8:17 Set 22:35 22:52	**21** 40°N 50°N Rise 9:44 9:30 Set 22:58 23:07	**22** 40°N 50°N Rise 10:48 10:44 Set 23:20 23:20	**23** 40°N 50°N Rise 11:54 11:58 Set 23:43 23:34	**24** 40°N 50°N Rise 13:02 13:16 Set -- 23:50 *First Quarter* 23:37 Sunrise 5:52 5:19 Sunset 20:21 20:53
25 40°N 50°N Set 0:08 -- Rise 14:13 14:37	**26** 40°N 50°N Set 0:37 0:09 Rise 15:27 16:03 ***Mercury at greatest elongation E (27°)***	**27** 40°N 50°N Set 1:12 0:34 Rise 16:44 17:29 ***S. δ-Aquarid meteors peak 3 pm***	**28** 40°N 50°N Set 1:57 1:10 Rise 17:59 18:51	**29** 40°N 50°N Set 2:54 2:02 Rise 19:06 19:59	**30** 40°N 50°N Set 4:03 3:12 Rise 20:03 20:48	**31** 40°N 50°N Set 5:21 4:37 Rise 20:47 21:23 *Full Moon* 14:05 Sunrise 5:58 5:29 Sunset 20:14 20:43 ***Second Full Moon this Month sometimes called a "Blue Moon"***

AUGUST

Star Trails, Meteor Trail

A Perseid meteor streaks through this beautifully composed juxtaposition of seemingly static Earth and moving stars. This month's Perseid meteor shower (August 12) should be particularly notable thanks to a new Moon and consequently dark skies, thereby enabling more accurate counts of the shower's intensity.

Photo by Ron Berard

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 40°N 50°N Set 6:40 6:07 Rise 21:22 21:48	**2** 40°N 50°N Set 7:57 7:35 Rise 21:51 22:07 *Civic Holiday (Canada)*	**3** 40°N 50°N Set 9:10 8:58 Rise 22:16 22:22	**4** 40°N 50°N Set 10:19 10:17 Rise 22:39 22:36	**5** 40°N 50°N Set 11:25 11:33 Rise 23:02 22:50 ***Neptune at opposition***	**6** 40°N 50°N Set 12:30 12:47 Rise 23:25 23:05	**7** 40°N 50°N Set 13:34 14:00 Rise 23:51 23:22 *Last Quarter* 18:01 Sunrise 6:04 5:39 Sunset 20:06 20:32 *First image is acquired by the Canada-France-Hawaii Telescope, 25 years ago*
8 40°N 50°N Set 14:37 15:12 Rise -- 23:43	**9** 40°N 50°N Rise 0:21 -- Set 15:40 16:23	**10** 40°N 50°N Rise 0:55 0:11 Set 16:39 17:29	**11** 40°N 50°N Rise 1:37 0:47 Set 17:35 18:27	**12** 40°N 50°N Rise 2:26 1:34 Set 18:24 19:14 ***Perseid meteors peak*** ***7 am***	**13** 40°N 50°N Rise 3:21 2:32 Set 19:07 19:52 *Stellafane Convention, Springfield, VT www.stellafane.com (through Aug. 14)* *Saskatchewan Star Party, Cypress Hills, SK prana.usask.ca/~rasc/rasc.html (through Aug. 15)*	**14** 40°N 50°N Rise 4:22 3:39 Set 19:42 20:20 Sunrise 6:11 5:49 Sunset 19:57 20:19 *Mount Kobau Star Party, Osoyoos, BC www.mksp.ca (through Aug. 22)*
15 40°N 50°N Rise 5:26 4:51 Set 20:13 20:42 *New Moon* 21:24	**16** 40°N 50°N Rise 6:31 6:05 Set 20:39 20:59	**17** 40°N 50°N Rise 7:36 7:20 Set 21:03 21:14 ***Venus at greatest elongation W (46°)***	**18** 40°N 50°N Rise 8:41 8:34 Set 21:25 21:28	**19** 40°N 50°N Rise 9:47 9:49 Set 21:48 21:41 *Starfest, Mount Forest, ON www.nyaa-starfest.com (through Aug. 22)*	**20** 40°N 50°N Rise 10:54 11:06 Set 22:12 21:56 *Nova East, Smiley's Provincial Park, NS halifax.rasc.ca/ne (through Aug. 22)*	**21** 40°N 50°N Rise 12:03 12:25 Set 22:39 22:13 Sunrise 6:18 5:59 Sunset 19:48 20:06
22 40°N 50°N Rise 13:16 13:48 Set 23:11 22:36	**23** 40°N 50°N Rise 14:31 15:13 Set 23:51 23:07 *First Quarter* 6:12	**24** 40°N 50°N Rise 15:44 16:35 Set -- 23:50	**25** 40°N 50°N Set 0:42 -- Rise 16:53 17:46 *Hulse & Taylor discover binary pulsar, 30 years ago*	**26** 40°N 50°N Set 1:44 0:51 Rise 17:52 18:41	**27** 40°N 50°N Set 2:57 2:09 Rise 18:40 19:21 ***Uranus at opposition***	**28** 40°N 50°N Set 4:14 3:36 Rise 19:18 19:49 Sunrise 6:24 6:10 Sunset 19:37 19:51
29 40°N 50°N Set 5:32 5:04 Rise 19:49 20:10 *Full Moon* 22:22	**30** 40°N 50°N Set 6:47 6:30 Rise 20:16 20:26 *Pioneer 11 begins transmitting photographs from Saturn, 25 years ago*	**31** 40°N 50°N Set 7:58 7:52 Rise 20:40 20:41		**The planets this month** *Mercury: not observable* *Venus: rises 3.5 hours before Sun in ENE, low in ENE at start of morning twilight* *Mars: not observable* *Jupiter: very low in W after sunset in first half of month* *Saturn: slowly emerges in ENE morning twilight during 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 which are given in local 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

A North American Neighbour

At the far right is a portion of North American Nebula in Cygnus. Dominating this portrait is the nearby but relatively unknown H-II region Sharpless 2-119. Its elusive light is even fainter than the Pelican Nebula, which lies a few degrees to the west. Can it be detected visually with the aid of O-III or H-Beta filters?

Photo by John Mirtle

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: visible in E in evening twilight, except for last week of month* *Venus: rises nearly 4 hours before Sun in ENE, low in E at start of morning twilight* *Mars: not observable* *Jupiter: not observable* *Saturn: rises after 1 am in ENE, in E at start of 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 which are given in local 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	1 40°N 50°N Set 9:07 9:10 Rise 21:02 20:55 *Harding discovers Juno, 3rd asteroid found, 200 years ago* ***Venus 2.0° S of Saturn 5 am***	2 40°N 50°N Set 10:13 10:27 Rise 21:26 21:09	3 40°N 50°N Set 11:19 11:42 Rise 21:51 21:25	4 40°N 50°N Set 12:24 12:56 Rise 22:19 21:45 Sunrise 6:31 6:20 Sunset 19:26 19:37 *Elizabeth Roemer, who recovered 37 periodic comets, is born 75 years ago*
5 40°N 50°N Set 13:28 14:09 Rise 22:52 22:09	6 40°N 50°N Set 14:30 15:18 Rise 23:31 22:42 *Last Quarter 11:11* *Labour Day*	7 40°N 50°N Set 15:27 16:19 Rise -- 23:25	8 40°N 50°N Rise 0:17 -- Set 16:19 17:11	9 40°N 50°N Rise 1:11 0:19 Set 17:04 17:52 *Alberta Star Party, Caroline, AB www.syz.com/rasc/asp.htm (through Sep. 12)* ***Mercury at greatest elongation W (18°) best morning view in 2004***	10 40°N 50°N Rise 2:10 1:23 Set 17:42 18:23 ***Mercury 0.2° below Regulus 6 am***	11 40°N 50°N Rise 3:13 2:34 Set 18:14 18:47 Sunrise 6:38 6:31 Sunset 19:15 19:21
12 40°N 50°N Rise 4:18 3:48 Set 18:42 19:05	13 40°N 50°N Rise 5:24 5:04 Set 19:06 19:21 ***Vesta at opposition*** ***Zodiacal Light visible in E before morning twilight for next two weeks***	14 40°N 50°N Rise 6:30 6:19 Set 19:29 19:35 *New Moon 10:29*	15 40°N 50°N Rise 7:36 7:35 Set 19:52 19:48	16 40°N 50°N Rise 8:44 8:53 Set 20:16 20:03 *Rosh Hashanah*	17 40°N 50°N Rise 9:54 10:13 Set 20:42 20:19	18 40°N 50°N Rise 11:07 11:36 Set 21:12 20:40 Sunrise 6:44 6:41 Sunset 19:03 19:06
19 40°N 50°N Rise 12:22 13:02 Set 21:50 21:07	20 40°N 50°N Rise 13:36 14:25 Set 22:37 21:46	21 40°N 50°N Rise 14:46 15:39 Set 23:35 22:41 *First Quarter 11:54*	22 40°N 50°N Rise 15:46 16:38 Set -- 23:52 ***Fall Equinox 12:30 pm***	23 40°N 50°N Set 0:42 -- Rise 16:36 17:21	24 40°N 50°N Set 1:57 1:14 Rise 17:17 17:52	25 40°N 50°N Set 3:12 2:40 Rise 17:49 18:14 Sunrise 6:51 6:52 Sunset 18:51 18:50 *Yom Kippur*
26 40°N 50°N Set 4:27 4:05 Rise 18:16 18:31	27 40°N 50°N Set 5:38 5:28 Rise 18:41 18:46	28 40°N 50°N Set 6:48 6:47 Rise 19:04 19:00 *Full Moon 9:09* *Dr. John Chapman, a founder of Canadian space program, dies 25 years ago*	29 40°N 50°N Set 7:55 8:04 Rise 19:27 19:14	30 40°N 50°N Set 9:02 9:20 Rise 19:51 19:29		

OCTOBER

M33 and NGC 604 Face-On

The galaxy M33 in Triangulum appears here in an observatory-quality image taken only with amateur equipment. Young Population I stars in the spiral arms contrast with the older yellow Population II stars in the nucleus. Red NGC 604 at the upper right, with a diameter of 1000 light years, is one of the largest H-II regions in the universe (see also March).
Photo by Tony Hallas

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: not observable* *Venus: rises nearly 3.5 hours before Sun, low in E at start of morning twilight* *Mars: slowly emerges in ESE morning twilight in last week of month* *Jupiter: emerges in E morning twilight during month* *Saturn: rises before midnight in ENE, high in SE at start of 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 which are given in local 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 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30			1 40°N 50°N Set 10:08 10:36 Rise 20:18 19:47	2 40°N 50°N Set 11:13 11:51 Rise 20:49 20:09 Sunrise 6:58 7:02 Sunset 18:40 18:35
3 40°N 50°N Set 12:17 13:02 Rise 21:25 20:38 *Hermann von Struve, who studied Mars, Saturn, and their orbits, is born 150 years ago* ***Venus 0.3° W of Regulus 6 am***	4 40°N 50°N Set 13:17 14:08 Rise 22:09 21:17	5 40°N 50°N Set 14:12 15:05 Rise 22:59 22:07 *Mark Garneau becomes first Canadian in space, 20 years ago*	6 40°N 50°N Set 14:59 15:50 Rise 23:56 23:07 *Last Quarter 6:12*	7 40°N 50°N Set 15:40 16:24 Rise -- --	8 40°N 50°N Rise 0:58 0:15 Set 16:14 16:50	9 40°N 50°N Rise 2:02 1:28 Set 16:43 17:10 Sunrise 7:05 7:13 Sunset 18:29 18:20
10 40°N 50°N Rise 3:07 2:42 Set 17:08 17:27	11 40°N 50°N Rise 4:13 3:58 Set 17:32 17:41 *Thanksgiving Day (Canada)* *Columbus Day (USA)* *Kepler discovers supernova in Ophiuchus, 400 years ago*	12 40°N 50°N Rise 5:19 5:14 Set 17:54 17:55 *Magellan mission ends after orbiting Venus for 4 years, 10 years ago* ***Zodiacal Light visible in E before morning twilight for next two weeks***	13 40°N 50°N Rise 6:27 6:32 Set 18:18 18:09 *New Moon 22:48* ***Partial Solar Eclipse not visible in North America, except western Alaska***	14 40°N 50°N Rise 7:38 7:53 Set 18:43 18:24	15 40°N 50°N Rise 8:52 9:17 Set 19:12 18:43 *First day of Ramadân* *Asaph Hall Sr., who discovered Mars's two moons, is born 175 years ago*	16 40°N 50°N Rise 10:08 10:45 Set 19:48 19:09 Sunrise 7:12 7:24 Sunset 18:18 18:06 *Siding Spring Observatory in Australia is dedicated, 30 years ago*
17 40°N 50°N Rise 11:25 12:12 Set 20:33 19:44	18 40°N 50°N Rise 12:38 13:31 Set 21:28 20:34	19 40°N 50°N Rise 13:42 14:36 Set 22:34 21:41	20 40°N 50°N Rise 14:36 15:23 Set 23:46 23:00 *First Quarter 17:59* ***Orionid meteors peak 11 pm***	21 40°N 50°N Rise 15:18 15:56 Set -- --	22 40°N 50°N Set 1:01 0:25 Rise 15:52 16:20	23 40°N 50°N Set 2:14 1:49 Rise 16:20 16:38 Sunrise 7:20 7:36 Sunset 18:08 17:52
24 40°N 50°N Set 3:25 3:11 Rise 16:44 16:53	25 40°N 50°N Set 4:34 4:29 Rise 17:07 17:07	26 40°N 50°N Set 5:40 5:45 Rise 17:29 17:20	27 40°N 50°N Set 6:46 7:01 Rise 17:52 17:34 *Full Moon 23:07* ***Total Lunar Eclipse most of the umbral phase visible in all of North America***	28 40°N 50°N Set 7:52 8:16 Rise 18:18 17:51	29 40°N 50°N Set 8:58 9:32 Rise 18:47 18:11	30 40°N 50°N Set 10:03 10:45 Rise 19:21 18:37 Sunrise 7:27 7:47 Sunset 17:59 17:39
31 40°N 50°N Set 10:05 10:55 Rise 19:02 18:12 *Halloween* ***Daylight Saving Time Ends 2 am***						

NOVEMBER

A Deep-Sky Trio in Gemini

In the generous field given here, IC 443 is the supernova remnant just above centre. A challenging visual object, it is detectable with the help of an O-III filter. At lower left is the H-II region NGC 2174, where stars are being formed. At lower right, M35, one of the finest of all open clusters, lies above NGC 2158, a similar cluster six times farther away.
Photo by Matt BenDaniel

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: visible with difficulty low in SW after sunset in second half of month* *Venus: rises about 3 hours before Sun, very low in ESE at start of morning twilight* *Mars: low in ESE in morning twilight* *Jupiter: rises 4 hours before Sun in E, low in ESE at start of morning twilight* *Saturn: rises by 9 pm in ENE, high in SSW at start of morning twilight*	1 40°N 50°N Set 11:03 11:55 Rise 19:50 18:57 *Wind is launched to detect magnetic fields, particles and waves, 10 years ago* *Charles W. Tuttle, who computed cometary orbits, is born 175 years ago*	2 40°N 50°N Set 11:53 12:45 Rise 20:45 19:53	3 40°N 50°N Set 12:36 13:23 Rise 21:44 20:58 *Isaac Newton demonstrates that comets are subject to gravitation, 325 years ago*	4 40°N 50°N Set 13:12 13:52 Rise 22:46 22:08 ***S. Taurid meteors peak 11 pm***	5 40°N 50°N Set 13:43 14:14 Rise 23:50 23:21 *Last Quarter 0:53* ***Jupiter 0.6° to right of Venus 6 am*** ***2 shadows on Jupiter, visible in W of N. America 6:28 am***	6 40°N 50°N Set 14:09 14:32 Rise -- -- Sunrise 6:35 6:59 Sunset 16:52 16:28
7 40°N 50°N Rise 0:54 0:35 Set 14:33 14:47	8 40°N 50°N Rise 1:59 1:49 Set 14:55 15:00 *Anna Fisher, first mother in space, is launched in Discovery, 20 years ago*	9 40°N 50°N Rise 3:06 3:06 Set 15:18 15:14 ***Jupiter 1.2° below the Crescent Moon best in NW of N. America, corresponds to a daytime occultation 8:00 am***	10 40°N 50°N Rise 4:15 4:25 Set 15:42 15:28	11 40°N 50°N Rise 5:27 5:48 Set 16:10 15:46 *Remembrance Day (Canada)* *Veteran's Day (USA)* *Comet van den Bergh, first comet discovered by a Canadian, 30 years ago* ***N. Taurid meteors peak 10 pm***	12 40°N 50°N Rise 6:44 7:16 Set 16:43 16:08 *New Moon 9:27*	13 40°N 50°N Rise 8:03 8:46 Set 17:25 16:40 Sunrise 6:43 7:10 Sunset 16:45 16:18
14 40°N 50°N Rise 9:21 10:12 Set 18:17 17:25	15 40°N 50°N Rise 10:32 11:26 Set 19:21 18:28	16 40°N 50°N Rise 11:31 12:21 Set 20:34 19:46 *First radio message to the stars is sent at Arecibo, Puerto Rico, 30 years ago*	17 40°N 50°N Rise 12:18 12:59 Set 21:50 21:11 ***Leonid meteors peak 4:00 am***	18 40°N 50°N Rise 12:55 13:26 Set 23:05 22:37	19 40°N 50°N Rise 13:24 13:46 Set -- 23:59 *First Quarter 0:50*	20 40°N 50°N Set 0:17 -- Rise 13:50 14:01 Sunrise 6:51 7:21 Sunset 16:40 16:10 ***Mercury at greatest elongation E (22°)***
21 40°N 50°N Set 1:25 1:18 Rise 14:12 14:15	22 40°N 50°N Set 2:31 2:33 Rise 14:34 14:28	23 40°N 50°N Set 3:36 3:48 Rise 14:57 14:42	24 40°N 50°N Set 4:41 5:02 Rise 15:21 14:57	25 40°N 50°N Set 5:46 6:16 Rise 15:48 15:15 *Thanksgiving Day (USA)*	26 40°N 50°N Set 6:51 7:30 Rise 16:20 15:39 *Full Moon 15:07*	27 40°N 50°N Set 7:54 8:41 Rise 16:59 16:10 Sunrise 6:59 7:32 Sunset 16:36 16:03
28 40°N 50°N Set 8:54 9:45 Rise 17:44 16:52	29 40°N 50°N Set 9:47 10:39 Rise 18:36 17:44	30 40°N 50°N Set 10:33 11:22 Rise 19:34 18:46 *Mrs. E.H. Hodges in Sylacauga, AL, struck by 4-kg meteorite, 50 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 which are given in local 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

Emission and Reflection Nebulae in Orion

The Great Orion Nebula (M42) at right dominates the H-II star-forming regions of the northern winter sky and is one of the most alluring objects for visual astronomy. Relatively neglected, the blue reflection nebula NGC 1973-75-77 has embedded red H-II areas and presents a complex interplay of bright stars and delicate tendrils of nebulosity.

Photo by Jack Newton

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
The planets this month *Mercury: slowly emerges in SE morning twilight late in month* *Venus: rises about 2 hours before Sun, low in SE in morning twilight* *Mars: very low in ESE at start of morning twilight* *Jupiter: rises by 2 am in E, in SSE at start of morning twilight* *Saturn: rises soon after dark in ENE, high in WSW at start of 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 which are given in local 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	**1** 40°N 50°N Set 11:11 11:54 Rise 20:35 19:54	**2** 40°N 50°N Set 11:43 12:18 Rise 21:37 21:05	**3** 40°N 50°N Set 12:11 12:37 Rise 22:40 22:17	**4** 40°N 50°N Set 12:35 12:52 Rise 23:43 23:29 *Last Quarter* 19:53 Sunrise 7:06 7:41 Sunset 16:35 15:59
5 40°N 50°N Set 12:57 13:06 Rise -- -- ***Venus 1.2° N of Mars best in S of N. America 7 am***	**6** 40°N 50°N Rise 0:47 0:42 Set 13:19 13:18	**7** 40°N 50°N Rise 1:53 1:58 Set 13:41 13:32 ***Crescent Moon occults Jupiter visible in E of N. America 4 am***	**8** 40°N 50°N Rise 3:02 3:17 Set 14:06 13:47	**9** 40°N 50°N Rise 4:15 4:41 Set 14:36 14:07	**10** 40°N 50°N Rise 5:33 6:10 Set 15:13 14:33 *Meteorite hits a mailbox in Claxton, Georgia, 20 years ago* *Helios 1 is launched to observe Sun and solar wind, 30 years ago*	**11** 40°N 50°N Rise 6:53 7:40 Set 16:00 15:11 *New Moon* 20:29 Sunrise 7:12 7:49 Sunset 16:35 15:58
12 40°N 50°N Rise 8:09 9:03 Set 17:01 16:07	**13** 40°N 50°N Rise 9:16 10:09 Set 18:13 17:21 ***Geminid meteors peak 5 pm***	**14** 40°N 50°N Rise 10:11 10:56 Set 19:31 18:48	**15** 40°N 50°N Rise 10:53 11:28 Set 20:50 20:18	**16** 40°N 50°N Rise 11:26 11:51 Set 22:05 21:44	**17** 40°N 50°N Rise 11:53 12:08 Set 23:16 23:06	**18** 40°N 50°N Rise 12:17 12:22 Set -- -- *First Quarter* 11:40 Sunrise 7:17 7:54 Sunset 16:37 15:59 *Sir William Huggins describes ultraviolet spectra of white stars at Royal Society, 125 years ago*
19 40°N 50°N Set 0:24 0:23 Rise 12:39 12:36	**20** 40°N 50°N Set 1:29 1:38 Rise 13:02 12:49 *Mount Wilson Solar Observatory is founded, 100 years ago*	**21** 40°N 50°N Set 2:34 2:52 Rise 13:25 13:04 ***Winter Solstice 7:42 am***	**22** 40°N 50°N Set 3:38 4:06 Rise 13:51 13:21 *Louis F.C. Brequet, creator of device to measure speed of light, is born 200 years ago* ***Ursid meteors peak 2 am***	**23** 40°N 50°N Set 4:43 5:19 Rise 14:21 13:43	**24** 40°N 50°N Set 5:46 6:31 Rise 14:57 14:11	**25** 40°N 50°N Set 6:46 7:37 Rise 15:40 14:49 Sunrise 7:20 7:58 Sunset 16:41 16:03 *Christmas Day*
26 40°N 50°N Set 7:42 8:34 Rise 16:30 15:38 *Full Moon* 10:06 *Boxing Day (Canada)*	**27** 40°N 50°N Set 8:30 9:20 Rise 17:26 16:37 *Roberta Score finds meteorite containing controversial evidence of fossil life from Mars, 20 years ago*	**28** 40°N 50°N Set 9:11 9:55 Rise 18:27 17:44 *Maarten Schmidt, known for quasar-red-shift – distance relation, is born 75 years ago*	**29** 40°N 50°N Set 9:45 10:22 Rise 19:29 18:54 ***Venus 1.2° S of Mercury best in S of N. America 7 am*** ***Mercury at greatest elongation W (22°)***	**30** 40°N 50°N Set 10:13 10:42 Rise 20:31 20:05	**31** 40°N 50°N Set 10:38 10:58 Rise 21:33 21:17 *Giovanni A. Borelli, who discovered cometary parabolic orbits, dies 325 years ago*	*"A stunning complex of stars in the trauma of birth, swaddled in vortices and streamers of collapsing luminous gas, a star-cradle measured by light years and charged with the energy of Creation."* *Chet Raymo, The Soul Of The Night*

The Royal Astronomical Society of Canada Observer's Calendar

How to Use this Calendar

A graphical representation of the Moon's phase at midday is given in each daily box. 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 varies 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. The daily lunar graphics were prepared using data provided by Roger Fell, who generated the data using the Lunar Calculator computer program written by Alister Ling (see www.edmontonrasc.com/software/software.html).

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. Special astronomical events are given at the bottom of the boxes.

The Calendar lists events observable in some part of Canada or the continental United States. Days on which particularly interesting phenomena 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.

Adjusting Times for Actual Location

All 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).

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 corrections in minutes to the tabulated rise and set times for selected Canadian and US cities. In the column labelled **Correction**, an entry such as *50° N + 25* means add 25 minutes to the displayed 50° N time. This computed time is an approximation. In the column labelled **Accuracy**, the approximate maximum error in minutes for Moon rise and set using this method is indicated. The error for Sun rise and set is less. These errors can be substantially reduced by interpolating according to latitude, as explained in the following section.

Note that the rise and set times calculated using the above method *will be local times.* It is not necessary to adjust them for time zone.

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
Québec	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 in latitude between the user's location and that of the 50° N or 40° N site used by 4.5 and adding 0.2 times the difference in longitude.

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 4700 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 1908 and is recognized worldwide as the leading handbook of its type. The *Journal,* now in its 97th year of publication, contains articles of interest to amateur and professional astronomers. The *Beginner's Observing Guide* is an introduction to the night sky for the novice observer, and the *Observer's Calendar* is a forum for astrophotography by amateur astronomers.

For information on joining the Society, or to order an RASC publication, contact the national office at:

136 Dupont Street
Toronto ON M5R 1V2
Canada
888-924-7272 (toll free in Canada) or 416-924-7973

rasc@rasc.ca www.rasc.ca

The Photos and the Calendar

Details on the photos are given below and to the right. Monthly grids were generated using custom software written in the Fortran and PostScript programming languages.

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Printing
University of Toronto Press Inc.

Cover/December *(Emission and Reflection Nebulae in Orion):* Composite mosaic LRGB image formed using *MaxIm DL* and *Photoshop* from a total of 8 CCD images: 2 each at 6 minutes, 6 minutes, 7 minutes, and 7 minutes through L, R, G, and B filters respectively, on a Finger Lakes Dream Machine CCD camera using a 7-inch f/9 refractor (Jack Newton).

January *(Auroral Fire and Ice):* 30-second fixed-tripod exposure on Fuji Superia 400 colour negative film using a 35-mm lens at f/4; taken Mar. 23, 2002 from Powell River, British Columbia (Rod Innes).

February *(Greetings from the Deep South):* 15-minute piggyback exposure on Kodak Ektachrome E200 slide film using a 28-mm lens at f/3.5; photo taken from Australia (Alan Dyer).

March *(The Tarantula Nebula):* Composite image formed using *RegiStar* and *Photoshop* from 2 exposures, 130 minutes red-filtered and 165 minutes cyan-filtered on gas-hypersensitized Kodak Technical Pan black-and-white film using a 5-inch f/6 refractor (Rajiv Gupta).

April *(The Ecliptic Crosses the Galactic Plane):* 10-minute piggyback exposure on Kodak Elite 200 slide film using a 15-mm lens at f/4; taken Aug. 26, 2001 approximately 80 minutes before sunrise from Mount Kobau, British Columbia (Roland Dechesne).

May *(Upon Reflection, A Nebula):* Composite image formed using *RegiStar* and *Photoshop* from 3 exposures, each 7 minutes on Kodak Ektachrome E200 slide film using an 8-inch f/1.5 Schmidt camera (Stephen Barnes).

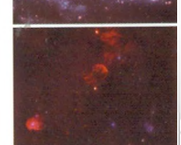
June *(The Moon Casts a Long Shadow):* 1/4-second fixed-tripod exposure on Fujichrome 100F slide film using a 50-mm lens at f/4; taken Dec. 4, 2002 from Ceduna, South Australia (Alan Dyer).

July *(The Trifid Nebula's Milky Way):* 33-minute medium-format piggyback exposure on Kodak Ektachrome E200 slide film using a 400-mm lens at f/4; original frame cropped (Kevin Black).

August *(Star Trails, Meteor Trail):* 35-minute fixed-tripod exposure on Kodak Supra 400 colour negative film using a 28-mm lens at f/3.5; taken Aug. 11, 2002 from Dinosaur Park, Alberta (Ron Berard).

September *(A North American Neighbour):* Composite image formed using *RegiStar* and *Photoshop* from 2 exposures, 40 minutes red-filtered on gas-hypersensitized Kodak Technical Pan film minutes and 8 minutes on Kodak Ektachrome E200 slide film, both using an 8-inch f/1.5 Schmidt camera (John Mirtle).

October *(M33 and NGC 604 Face-On):* Composite image formed using *RegiStar* from 4 exposures, each 60 minutes on gas-hypersensitized Kodak RG200 colour negative film using a 14.5-inch f/8 classical Cassegrain (Tony Hallas).



November *(A Deep-Sky Trio in Gemini):* Composite mosaic image formed using *RegiStar* and *Photoshop* from two 120-minute exposures and one 90-minute exposure, all on medium-format Kodak PPF 400 colour negative film using a 5-inch f/6 refractor (Matt BenDaniel).

2004

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

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15	16	17	18	19	***20***	21
22	23	24	25	26	27	28
29						

March

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14	15	16	17	18	19	***20***
21	22	23	24	25	26	27
28	29	30	31			

April

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25	26	27	28	29	30	

May

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23	24	25	26	27	28	29
30	31					

June

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13	14	15	16	***17***	18	19
20	21	22	23	24	25	26
27	28	29	30			

July

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				1	2	3
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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
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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

September

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			1	2	3	4
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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	

2005

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****.*

"We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time."

T.S. Eliot





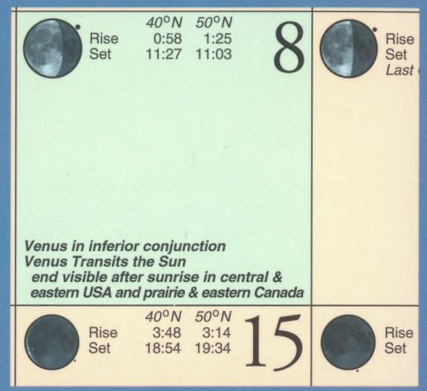







All photos in this unique Calendar were taken by amateur astronomers using backyard telescopes or ordinary cameras. It was produced by volunteer members of the Royal Astronomical Society of Canada.

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.



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