THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

OBSERVER'S CALENDAR

2001

JANUARY

Multi-Coloured Lunar Eclipse

Not all lunar eclipses are merely dark or monochromatic. Here, the angle of the Sun's light and dust in Earth's atmosphere shadow the Moonscape in varying hues: crimson, red, orange, yellow, and white. The range of colours gives the illusion of converging on the rayed crater Tycho at lower centre.

Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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50°N 40°N Set 5:21 4:49 Rise 14:18 14:52 **7** ***2 Shadows on Jupiter, visible in all of N. America 10:14 pm***	Set 6:37 6:00 Rise 15:09 15:47 **8**	Set 7:45 7:07 Rise 16:14 16:52 *Full Moon* 15:24 **9** ***Total Lunar Eclipse, beginning vis. in N of Canada and Alaska 2:50 pm***	Set 8:42 8:06 Rise 17:29 18:04 **10** *Robert Wilson, Nobel Laureate, born 65 years ago*	Set 9:27 8:57 Rise 18:51 19:19 **11**	Set 10:02 9:40 Rise 20:14 20:33 **12**	Set 10:31 10:17 Rise 21:35 21:45 **13** Sunrise 7:54 7:21 Sunset 16:24 16:57
50°N 40°N Set 10:55 10:49 Rise 22:52 22:54 **14**	Set 11:17 11:19 Rise -- -- **15** *Martin Luther King Jr.'s Birthday (USA)* ***2 Shadows on Jupiter, visible in all of N. America 1:37 am***	Rise 0:07 0:01 Set 11:39 11:48 *3rd Quarter* 7:35 **16**	Rise 1:19 1:05 Set 12:01 12:18 **17** ***Venus greatest elong. E (47°)***	Rise 2:29 2:08 Set 12:26 12:49 **18** *A 7 meter asteroid approached at 0.0011 AU 10 years ago*	Rise 3:37 3:09 Set 12:54 13:23 **19** *Jacobus Kapteyn, founder of statistical astronomy, born 150 years ago*	Rise 4:42 4:09 Set 13:27 14:02 **20** Sunrise 7:48 7:18 Sunset 16:35 17:05
50°N 40°N Rise 5:42 5:05 Set 14:07 14:45 **21**	Rise 6:36 5:58 Set 14:54 15:32 **22**	Rise 7:23 6:45 Set 15:48 16:25 **23**	Rise 8:02 7:28 Set 16:47 17:20 *New Moon* 8:07 **24** ***Farthest Lunar Apogee of 2001 2 pm***	Rise 8:34 8:05 Set 17:49 18:17 **25**	Rise 9:02 8:38 Set 18:54 19:15 **26**	Rise 9:25 9:08 Set 19:59 20:14 **27** Sunrise 7:40 7:13 Sunset 16:46 17:13
50°N 40°N Rise 9:46 9:35 Set 21:05 21:12 **28** *Challenger explosion 15 years ago* ***Mercury greatest elong. E (18°), favourable 2001 evening view***	Rise 10:05 10:01 Set 22:11 22:12 **29**	Rise 10:25 10:28 Set 23:19 23:12 **30**	Rise 10:45 10:55 Set -- -- **31**	*"With how sad steps, O Moon, thou climbst the skies! How silently, and with how wan a face!"* Philip Sidney, *Astrophel and Stella*	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

FEBRUARY

The Great Orion Nebula (M42)

Rarely does an image of Orion's great stellar nursery reveal its delicate wisps and curtains of glowing clouds as well as its young, hot stars, such as the Trapezium in its bright core. Irradiating the entire region, the energy of these new stars calls forth subtle expressions of blue, magenta, crimson, and red light.

Digital composite of images by Kevin Black, John Mirtle, and Jack Newton

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50°N 40°N Set 4:11 3:36 Rise 12:52 13:29 **4**	Set 5:22 4:43 Rise 13:48 14:27 **5**	Set 6:24 5:46 Rise 14:58 15:34 **6** *Lunar golf debut, by Alan Shepard of Apollo 14, 30 years ago*	Set 7:15 6:41 Rise 16:17 16:48 **7** ***Closest Lunar Perigee of 2001 5 pm***	Set 7:55 7:29 Rise 17:41 18:05 *Full Moon* 2:12 **8** ***Largest Full Moon of 2001***	Set 8:28 8:09 Rise 19:06 19:21 **9**	Set 8:55 8:45 Rise 20:28 20:34 **10** Sunrise 7:19 6:59 Sunset 17:10 17:30
50°N 40°N Set 9:19 9:17 Rise 21:47 21:44 **11** ***Zodiacal Light visible in W after evening twilight for next two weeks***	Set 9:41 9:47 Rise 23:03 22:52 **12**	Set 10:04 10:18 Rise -- 23:58 **13**	Rise 0:16 -- Set 10:28 10:49 *3rd Quarter* 22:23 **14** *Valentine's Day*	Rise 1:27 1:01 Set 10:56 11:23 **15** ***Mars 3°S of Moon 5 am***	Rise 2:34 2:02 Set 11:28 12:01 **16**	Rise 3:36 3:00 Set 12:05 12:42 **17** Sunrise 7:06 6:50 Sunset 17:22 17:38
50°N 40°N Rise 4:33 3:54 Set 12:50 13:29 **18**	Rise 5:21 4:43 Set 13:41 14:19 **19** *Sueberg Observatory, Gotha, Germany, destroyed by fire 100 years ago* *Winter Star Party, W. Summerland Key, FL (through February 25)*	Rise 6:03 5:27 Set 14:39 15:14 **20**	Rise 6:37 6:06 Set 15:41 16:10 **21** *Anderson and Borissiak discovered Nova Persei 100 years ago*	Rise 7:06 6:40 Set 16:45 17:09 **22** *Daniel W. Morehouse, discoverer of Comet 1908c, born 125 years ago*	Rise 7:30 7:11 Set 17:51 18:07 *New Moon* 3:21 **23**	Rise 7:51 7:39 Set 18:57 19:06 **24** Sunrise 6:53 6:40 Sunset 17:34 17:46
50°N 40°N Rise 8:11 8:05 Set 20:03 20:06 **25**	Rise 8:30 8:31 Set 21:11 21:06 **26**	Rise 8:50 8:58 Set 22:20 22:08 **27** *Wilhelm von Biela discovered comet named for him 175 years ago*	Rise 9:11 9:27 Set 23:31 23:11 **28**		*"...an unformed fiery mist, the chaotic material of future suns."* William Herschel	

MARCH

The LMC at Solstice

Due south of Orion, the Large Magellanic Cloud majestically rides at its highest in the southern summer sky. The young blue stars of this irregular companion galaxy to the Milky Way have emerged from emission nebulae such as the Tarantula at left centre, a stellar cauldron over 100 times larger than the Great Orion Nebula.
Digital montage of photos by Doug George

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50°N 40°N Set 3:06 2:28 Rise 11:33 12:11 **4**	Set 4:09 3:31 Rise 12:34 13:13 **5**	Set 5:03 4:27 Rise 13:47 14:22 **6** *Giotto flew by Halley's Comet 15 years ago*	Set 5:47 5:17 Rise 15:08 15:36 **7**	Set 6:23 6:00 Rise 16:32 16:52 **8**	Set 6:52 6:38 Rise 17:56 18:07 *Full Moon* 12:23 **9**	Set 7:17 7:11 Rise 19:18 19:20 **10** Sunrise 6:24 6:19 Sunset 17:57 18:02 *Vsevolod V. Sharonov, known for celestial body photometry, born 100 years ago*
50°N 40°N Set 7:41 7:43 Rise 20:38 20:31 **11** ***Mercury greatest elong. W (27°)***	Set 8:04 8:14 Rise 21:55 21:40 **12** ***Zodiacal Light visible in W after evening twilight for next two weeks***	Set 8:28 8:46 Rise 23:09 22:47 **13**	Set 8:54 9:20 Rise -- 23:51 **14**	Rise 0:21 -- Set 9:25 9:56 **15**	Rise 1:27 0:52 Set 10:01 10:37 *3rd Quarter* 15:45 **16** *Robert Goddard launched first liquid-fuelled rocket 75 years ago*	Rise 2:27 1:48 Set 10:44 11:23 **17** Sunrise 6:09 6:08 Sunset 18:08 18:09
50°N 40°N Rise 3:19 2:40 Set 11:34 12:12 **18**	Rise 4:03 3:25 Set 12:29 13:06 **19**	Rise 4:39 4:06 Set 13:30 14:02 **20** ***Spring Equinox 8:31 am***	Rise 5:09 4:41 Set 14:34 15:00 **21**	Rise 5:35 5:13 Set 15:40 15:59 **22**	Rise 5:57 5:42 Set 16:46 16:58 **23**	Rise 6:17 6:03 **24** Set 17:54 17:57 *New Moon* 20:31 Sunrise 5:54 5:52 Sunset 18:20 18:18
50°N 40°N Rise 6:36 6:35 Set 19:02 18:59 **25** *E. Purcell and E. M. Ewen found 21-cm radio frequency of hydrogen 50 years ago*	Rise 6:55 7:01 Set 20:11 20:01 **26**	Rise 7:16 7:29 Set 21:23 21:05 **27** ***2 Shadows on Jupiter, end visible in E of N. America 5:49 pm***	Rise 7:40 8:00 Set 22:35 22:10 **28** ***Saturn 1.7°N of Moon 11 pm***	Rise 8:08 8:35 Set 23:48 23:16 **29**	Rise 8:43 9:16 Set -- -- **30**	Set 0:52 0:21 Rise 9:27 10:05 **31** Sunrise 5:39 5:45 Sunset 18:31 18:23

APRIL

Northern Star-Trails over Aurora

The stark trees of a Canadian prairie landscape frame a long exposure of star trails, whose colours denote their different spectral classes and temperatures. Bright Capella sweeps upward at lower right, Polaris dominates the middle, and the hotter, blue stars of the Big Dipper at left centre head for the green and yellow glow of the aurora.
Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 50°N 40°N Set 3:03 1:24 Rise 11:22 12:02 *1st Quarter* 6:49 ***Daylight Savings Time Begins 2 am***	**2** Set 3:59 3:21 Rise 12:29 13:06	**3** Set 4:44 4:11 Rise 13:45 14:16 ***2 Shadows on Jupiter, best in central N. America 10:49 pm***	**4** Set 5:21 4:55 Rise 15:05 15:29 *Luna X imaged far side of Moon 35 years ago*	**5** Set 5:51 5:33 Rise 16:27 16:43	**6** Set 6:17 6:07 Rise 17:49 17:55	**7** Set 6:41 6:39 Rise 19:10 19:07 *Full Moon* 23:22 Sunrise 6:24 6:34 Sunset 19:42 19:30 *Compton Gamma Ray Observatory deployed from Atlantis 10 years ago*
8 50°N 40°N Set 7:03 7:10 Rise 20:29 20:17	**9** Set 7:26 7:41 Rise 21:46 21:26	**10** Set 7:52 8:14 Rise 23:01 22:33	**11** Set 8:21 8:50 Rise -- 23:38 *Donald Menzel, author of "A Field Guide to the Stars and Planets," born 100 years ago*	**12** Rise 0:11 -- Set 8:55 9:30 *Columbia, first space shuttle, launched 20 years ago* ***Mars 1.3°S of Moon 10 pm***	**13** Rise 1:16 0:38 Set 9:35 10:14 *Good Friday*	**14** Rise 2:13 1:33 Set 10:23 11:03 Sunrise 6:09 6:23 Sunset 19:53 19:38
15 50°N 40°N Rise 3:00 2:22 Set 11:18 11:56 *3rd Quarter* 11:31 *Easter Sunday*	**16** Rise 3:40 3:04 Set 12:17 12:52	**17** Rise 4:12 3:41 Set 13:20 13:49	**18** Rise 4:39 4:14 Set 14:26 14:48	**19** Rise 5:02 4:44 Set 15:32 15:47 *Salyut 1, first space station, launched by Soviets 30 years ago*	**20** Rise 5:22 5:11 Set 16:39 16:47	**21** Rise 5:41 5:37 Set 17:47 17:48 Sunrise 5:55 6:13 Sunset 20:03 19:45
22 50°N 40°N Rise 6:00 6:04 Set 18:57 18:50 ***Lyrid meteors peak 12 am***	**23** Rise 6:20 6:31 Set 20:09 19:54 *New Moon* 11:26	**24** Rise 6:43 7:01 Set 21:23 21:00	**25** Rise 7:09 7:35 Set 22:38 22:08	**26** Rise 7:42 8:14 Set 23:51 23:15	**27** Rise 8:23 9:01 Set -- --	**28** Set 0:59 0:19 Rise 9:16 9:56 Sunrise 5:42 6:04 Sunset 20:14 19:52 *International Astronomy Day*
29 50°N 40°N Set 1:58 1:18 Rise 10:19 10:58	**30** Set 2:46 2:10 Rise 11:32 12:06 *1st Quarter* 13:08	*"But like a wheel whose circling nothing jars Already on my desire and will prevailed The Love that moves the sun and the other stars."* Dante, *Divine Comedy*		*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

MAY

Stellar Nursery in Cassiopeia

When we look at the winter Milky Way, we are looking away from the centre of our galaxy and its great concentrations of bright nebulae. In the outer reaches of its spiral arms, we also find star-forming regions such as NGC281 in western Cassiopeia which presents dark pockets and lanes within the nebula's enveloping glow.
Digital composite of photos by John Mirtle

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50°N 40°N Set 5:28 5:39 Rise 19:23 19:07 **6**	Set 5:51 6:10 Rise 20:39 20:15 *Full Moon* 9:52 **7**	Set 6:18 6:44 Rise 21:52 21:21 **8**	Set 6:49 7:22 Rise 23:01 22:24 **9**	Set 7:27 8:05 Rise -- 23:22 **10**	Rise 0:02 -- Set 8:12 8:53 **11**	Rise 0:55 0:15 Set 9:05 9:45 **12** Sunrise 5:18 5:48 Sunset 20:35 20:06
50°N 40°N Rise 1:38 1:01 Set 10:03 10:40 **13** *Mother's Day* *Texas Star Party, Fort Davis, TX (through May 20)*	Rise 2:13 1:40 Set 11:06 11:37 **14**	Rise 2:42 2:15 Set 12:10 12:36 *3rd Quarter* 6:11 **15**	Rise 3:06 2:45 Set 13:16 13:34 **16** ***Mercury 3°N of Jupiter***	Rise 3:27 3:13 Set 14:22 14:34 **17**	Rise 3:46 3:39 Set 15:30 15:34 **18**	Rise 4:05 4:05 Set 16:39 16:35 **19** Sunrise 5:09 5:41 Sunset 20:45 20:12 *Mars 2 launched by Soviets to Mars 30 years ago*
50°N 40°N Rise 4:24 4:31 Set 17:50 17:38 **20**	Rise 4:45 5:00 Set 19:04 18:44 **21** *Victoria Day (Canada)*	Rise 5:10 5:32 Set 20:20 19:52 *New Moon* 22:46 **22** ***Mercury greatest elong. E (22°), favourable 2001 evening view***	Rise 5:40 6:10 Set 21:36 21:02 **23**	Rise 6:18 6:54 Set 22:49 22:09 **24**	Rise 7:08 7:47 Set 23:53 23:12 **25** *Riverside Telescope Makers Conference, Big Bear, CA (through May 27)*	Rise 8:09 8:49 Set -- -- **26** Sunrise 5:01 5:36 Sunset 20:54 20:18
50°N 40°N Set 0:46 0:08 Rise 9:20 9:56 **27** ***Pallas at opposition***	Set 1:27 0:56 Rise 10:38 11:07 **28** *Memorial Day (USA)*	Set 2:01 1:36 Rise 11:58 12:19 *1st Quarter* 18:09 **29**	Set 2:28 2:11 Rise 13:17 13:30 **30** *Mariner 9 launched by U.S. to Mars 30 years ago*	Set 2:51 2:43 Rise 14:35 14:39 **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	JUNE S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

JUNE

The Heart of the Milky Way (M8, M20, M21)

It all comes down to stars. Here in Sagittarius, near the galactic centre, dark lanes wreathe around the fiery stellar furnaces of the Lagoon Nebula (M8). At upper right, the Trifid (M20) juxtaposes a red star-forming region with a blue reflection nebula of light glancing off dusty particles. Out of this, stars, as in the cluster M21, are born.

Digital composite of photos by Stephen Barnes and Rajiv Gupta

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50°N 40°N Set 3:55 4:11 Rise 18:22 18:01 **3**	Set 4:20 4:43 Rise 19:35 19:07 **4** ***Pluto at opposition***	Set 4:48 5:18 Rise 20:45 20:11 *Full Moon* 21:39 **5**	Set 5:23 5:59 Rise 21:50 21:11 **6**	Set 6:04 6:44 Rise 22:47 22:06 **7** *Death of Joseph von Fraunhofer, known for dark absorption lines, 175 years ago*	Set 6:54 7:34 Rise 23:35 22:55 **8** ***Venus greatest elong. W (46°)***	Set 7:50 8:29 Rise -- 23:38 **9** Sunrise 4:51 5:31 Sunset 21:07 20:28
50°N 40°N Rise 0:13 -- Set 8:52 9:26 **10**	Rise 0:44 0:14 Set 9:56 10:24 **11**	Rise 1:10 0:46 Set 11:01 11:23 **12**	Rise 1:32 1:15 Set 12:07 12:21 *3rd Quarter* 23:28 **13** ***Mars at opposition***	Rise 1:51 1:41 Set 13:13 13:20 **14**	Rise 2:10 2:06 Set 14:20 14:20 **15**	Rise 2:28 2:32 Set 15:29 15:21 **16** Sunrise 4:50 5:31 Sunset 21:11 20:31
50°N 40°N Rise 2:48 2:59 Set 16:41 16:25 **17** *Father's Day*	Rise 3:10 3:29 Set 17:56 17:32 **18**	Rise 3:37 4:04 Set 19:13 18:41 **19**	Rise 4:11 4:45 Set 20:28 19:51 **20**	Rise 4:56 5:35 Set 21:38 20:58 *New Moon* 7:58 **21** ***Summer Solstice 3:38 am*** ***Total Solar Eclipse, visible in S of Africa***	Rise 5:53 6:34 Set 22:38 21:59 **22**	Rise 7:03 7:41 Set 23:25 22:51 **23** Sunrise 4:51 5:32 Sunset 21:13 20:33
50°N 40°N Rise 8:21 8:53 Set -- 23:36 **24** *St.-Jean-Baptiste Day (Quebec)*	Set 0:03 -- Rise 9:43 10:07 **25**	Set 0:32 0:13 Rise 11:04 11:20 **26**	Set 0:57 0:46 Rise 12:24 12:31 *1st Quarter* 23:19 **27**	Set 1:19 1:16 Rise 13:41 13:39 **28** *Meteorite kills Egyptian dog 90 years ago*	Set 1:40 1:45 Rise 14:56 14:46 **29** *Death of three cosmonauts, returning from Salyut space station, 30 years ago* *RASC General Assembly, London, ON (through July 1)*	Set 2:01 2:14 Rise 16:10 15:52 **30** Sunrise 4:54 5:34 Sunset 21:15 20:33

JULY

The Eagle or Star Queen Nebula (M16)
The Hubble Space Telescope has made famous the "Star Queen" pillar in this star-forming nebula north-east of the galactic core. That pillar is the small dusky "check-mark" at the centre of this image, whose field of view encompasses very hot and luminous stars that energize the region with ultraviolet light and elicit its fluorescence.
Photo by Ben Gendre

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 50°N 40°N Set 2:24 2:45 Rise 17:23 16:57 *Canada Day* *Smithsonian's Air and Space Museum opened 25 years ago*	**2** Set 2:51 3:19 Rise 18:34 18:01	**3** Set 3:22 3:56 Rise 19:40 19:02 *Ernst Mayer contributed 3,000,000th observation to AAVSO 30 years ago*	**4** Set 4:01 4:39 Rise 20:39 19:59 *Independence Day (USA)* ***Earth at aphelion (152,100 Mm)*** ***10 am***	**5** Set 4:47 5:28 Rise 21:30 20:50 *Full Moon* 11:04	**6** Set 5:41 6:20 Rise 22:12 21:35	**7** Set 6:41 7:17 Rise 22:46 22:14 Sunrise 5:00 5:38 Sunset 21:10 20:31 ***Ceres at opposition***
8 50°N 40°N Set 7:44 8:15 Rise 23:13 22:47	**9** Set 8:49 9:13 Rise 23:36 23:17 ***Mercury greatest elong. W (21°)***	**10** Set 9:54 10:12 Rise 23:56 23:43	**11** Set 11:00 11:10 Rise -- --	**12** Rise 0:15 0:09 Set 12:06 12:08 ***Mercury 1.9°S of Jupiter***	**13** Rise 0:33 0:34 Set 13:12 13:08 *3rd Quarter* 14:45	**14** Rise 0:51 0:59 Set 14:21 14:09 Sunrise 5:07 5:43 Sunset 21:04 20:28
15 50°N 40°N Rise 1:12 1:27 Set 15:33 15:13 ***Venus 0.7°S of Saturn, separation < 3° Jul. 12 - 17 Aldebaran nearby***	**16** Rise 1:36 1:58 Set 16:48 16:20	**17** Rise 2:05 2:35 Set 18:03 17:28 ***Saturn 0.6°N of Moon Venus and Aldebaran nearby*** ***9 am***	**18** Rise 2:44 3:20 Set 19:16 18:37	**19** Rise 3:35 4:15 Set 20:21 19:41 ***Mercury 1.0°S of Moon*** ***9 am***	**20** Rise 4:39 5:19 Set 21:16 20:39 *New Moon* 15:44 *Viking A landed on Mars in Chryse Planitia at 12:12:07 GMT 25 years ago*	**21** Rise 5:55 6:31 Set 21:59 21:28 Sunrise 5:15 5:49 Sunset 20:57 20:24
22 50°N 40°N Rise 7:19 7:47 Set 22:32 22:10	**23** Rise 8:43 9:03 Set 23:00 22:46 *Death of Giuseppe Piazzi, discoverer of first asteroid, Ceres, 175 years ago*	**24** Rise 10:07 10:17 Set 23:23 23:18	**25** Rise 11:27 11:28 Set 23:45 23:48	**26** Rise 12:45 12:37 Set -- --	**27** Set 0:06 0:17 Rise 14:00 13:45 *1st Quarter* 6:08 *George Biddell Airy, 7th Astronomer Royal, born 200 years ago*	**28** Set 0:29 0:48 Rise 15:14 14:51 Sunrise 5:24 5:55 Sunset 20:48 20:18 *First daguerreotype of total solar eclipse, at Königsberg, East Prussia 150 years ago* ***S δ-Aquarid meteors peak*** ***2 pm***
29 50°N 40°N Set 0:54 1:20 Rise 16:25 15:55	**30** Set 1:24 1:57 Rise 17:33 16:56 ***Neptune at opposition***	**31** Set 2:00 2:38 Rise 18:34 17:54		*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

AUGUST

The Milky Way in Large Scale

The centre of our galaxy lies just below the Lagoon (M8) in the middle of this image, which, from upper left to lower right, highlights the Eagle (M16), the Swan (M17), the great star-cloud M24, M8, and the red emission nebulae NGC6357 and 6334 ("Cat's Paw"). To the right of centre is the large dark nebula, the Prancing Horse.
Photo by Ben Gendre

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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	50°N 40°N Set 2:44 3:24 Rise 19:27 18:46 **1**	Set 3:35 4:15 Rise 20:11 19:33 **2**	Set 4:32 5:10 Rise 20:47 20:13 **3**	Set 5:35 6:07 Rise 21:17 20:48 *Full Moon* 1:56 Sunrise 5:34 6:01 Sunset 20:37 20:10 **4**
50°N 40°N Set 6:39 7:06 Rise 21:41 21:19 **5** ***Venus 1.2°S of Jupiter, separation < 3° Aug. 3 - 8***	Set 7:45 8:04 Rise 22:02 21:47 **6** *Civic Holiday (Canada)*	Set 8:50 9:02 Rise 22:20 22:12 **7**	Set 9:55 10:01 Rise 22:38 22:37 **8**	Set 11:01 10:59 Rise 22:56 23:02 **9**	Set 12:08 11:59 Rise 23:15 23:28 **10**	Set 13:17 13:00 Rise 23:37 23:57 Sunrise 5:44 6:08 Sunset 20:25 20:02 **11**
50°N 40°N Set 14:29 14:04 Rise -- -- *3rd Quarter* 3:53 **12** ***Perseid meteors peak*** ***6 am***	Rise 0:03 0:30 Set 15:42 15:10 **13** ***Saturn 0.2°N of Moon*** ***11 pm***	Rise 0:36 1:10 Set 16:54 16:17 **14**	Rise 1:20 1:58 Set 18:02 17:22 **15** ***Uranus at opposition***	Rise 2:16 2:57 Set 19:01 18:22 **16** *Starfest, Mount Forest, ON (through August 19)* ***Venus 1.9°S of Moon*** ***9 am***	Rise 3:26 4:04 Set 19:49 19:15 **17**	Rise 4:47 5:19 Set 20:27 20:01 *New Moon* 22:55 Sunrise 5:54 6:15 Sunset 20:12 19:52 **18** *Mount Kobau Star Party, BC (through August 26)*
50°N 40°N Rise 6:13 6:36 Set 20:58 20:40 **19**	Rise 7:39 7:53 Set 21:24 21:15 **20**	Rise 9:04 9:09 Set 21:47 21:46 **21**	Rise 10:25 10:21 Set 22:09 22:17 **22**	Rise 11:45 11:32 Set 22:32 22:48 **23**	Rise 13:02 12:40 Set 22:56 23:20 **24**	Rise 14:16 13:47 Set 23:25 23:56 *1st Quarter* 15:55 Sunrise 6:05 6:21 Sunset 19:58 19:42 **25**
50°N 40°N Rise 15:25 14:50 Set 23:59 -- **26**	Set -- 0:36 Rise 16:29 15:50 **27** *Voyager 2's closest approach to Saturn 20 years ago*	Set 0:41 1:21 Rise 17:25 16:44 **28**	Set 1:30 2:10 Rise 18:11 17:32 **29**	Set 2:25 3:04 Rise 18:50 18:14 **30** *Magellan's discovery on Venus of longest channel known, 10 years ago*	Set 3:27 4:01 Rise 19:20 18:50 **31**	*"They toiled and built a thousand years.* *In love's all powerful might:* *And so the Milky Way was made -* *A starry bridge of light."* Topelius

SEPTEMBER

The Veil Nebula and a Bow-Shock

In this image, a remnant of the supernova explosion that produced the Veil Nebula is expanding towards a bright star (52 Cygni) and clearing away dust so that more background stars shine below the bow-shock in comparison to the area above it. The green strands of excited oxygen are observable, but the red appears only in photographs.

Digital composite of photos by John Mirtle

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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50°N 40°N Set 5:36 5:58 Rise 20:07 19:50 *Full Moon* 17:43 **2**	Set 6:42 6:56 Rise 20:26 20:16 **3** *Labour Day* *Viking 2 landed on Mars 25 years ago*	Set 7:47 7:55 Rise 20:44 20:41 **4**	Set 8:53 8:53 Rise 21:02 21:05 **5**	Set 10:00 9:52 Rise 21:20 21:31 **6**	Set 11:08 10:53 Rise 21:40 21:58 **7**	Set 12:18 11:55 Rise 22:04 22:29 **8** Sunrise 6:26 6:34 Sunset 19:28 19:20 *Premiere of Star Trek 35 years ago*
50°N 40°N Set 13:29 12:59 Rise 22:34 23:05 **9**	Set 14:40 14:04 Rise 23:11 23:49 *3rd Quarter* 14:59 **10** ***Saturn 0.2°S of Moon Occultation visible in W of U.S.A.*** ***9 am***	Set 15:48 15:08 Rise -- -- **11**	Rise 0:00 0:41 Set 16:49 16:08 **12** *Alberta Star Party, Caroline, AB (through September 16)* ***Jupiter 1.0°S of Moon*** ***8 am***	Rise 1:03 1:43 Set 17:40 17:03 **13**	Rise 2:17 2:53 Set 18:22 17:51 **14**	Rise 3:39 4:08 Set 18:55 18:32 **15** Sunrise 6:30 6:41 Sunset 19:13 19:08 *Venus 3°S of Moon* *3 pm*
50°N 40°N Rise 5:05 5:25 Set 19:22 19:09 **16** ***Zodiacal Light visible in E before morning twilight for next two weeks***	Rise 6:32 6:41 Set 19:46 19:42 *New Moon* 6:27 **17**	Rise 7:56 7:57 Set 20:09 20:13 **18** ***Mercury greatest elong. E (27°)***	Rise 9:19 9:10 Set 20:31 20:44 **19**	Rise 10:40 10:22 Set 20:56 21:17 **20** ***Venus 0.5°N of Regulus, separation < 3°Sep. 18 - 22***	Rise 11:58 11:32 Set 21:24 21:52 **21**	Rise 13:13 12:39 Set 21:56 22:31 **22** Sunrise 6:47 6:46 Sunset 18:58 18:57 ***Fall Equinox*** *7:04 pm*
50°N 40°N Rise 14:21 13:42 Set 22:36 23:15 **23**	Rise 15:20 14:39 Set 23:23 -- *1st Quarter* 5:31 **24** ***Mars 2°S of Moon*** ***9 pm***	Set -- 0:04 Rise 16:11 15:30 **25**	Set 0:17 0:57 Rise 16:52 16:14 **26**	Set 1:17 1:54 Rise 17:24 16:52 **27**	Set 2:21 2:52 Rise 17:51 17:25 **28** *Japan launched its first scientific satellite, Shinsei, 30 years ago*	Set 3:26 3:50 Rise 18:13 17:54 **29** Sunrise 6:57 6:54 Sunset 18:42 18:45 *Seth B. Nicholson discovered Jupiter's 12th moon, Ananke, 50 years ago*
50°N 40°N Set 4:32 4:49 Rise 18:33 18:20 **30**						

OCTOBER

Auroral Burst in Autumn

The vast area of this auroral display is suggested by the background constellations: Cygnus at upper right, Delphinus at lower right, and the Great Square of Pegasus rising behind the tree. A riot of purples, blues, greens, and reds emanates from solar particles bombarding atmospheric oxygen and nitrogen roughly 100 km overhead.
Photo by Stephen Barnes

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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50°N 40°N Set 12:32 11:57 Rise 21:09 21:46 **7**	Set 13:41 13:01 Rise 21:53 22:34 **8** *Thanksgiving Day (Canada)*	Set 14:43 14:01 Rise 22:49 23:31 **9** ***2 Shadows on Jupiter, visible in W half of N. Amer. 7:23 am*** ***Jupiter 1.4°S of Moon 8 pm***	Set 15:36 14:57 Rise 23:57 -- *3rd Quarter* 0:20 **10**	Rise -- 0:36 Set 16:19 15:45 **11**	Rise 1:14 1:46 Set 16:54 16:27 **12**	Rise 2:36 3:00 Set 17:22 17:04 **13** Sunrise 7:19 7:09 Sunset 18:13 18:23
50°N 40°N Rise 4:01 4:15 Set 17:47 17:37 **14**	Rise 5:25 5:30 Set 18:09 18:09 **15** ***Zodiacal Light visible in E before morning twilight for next two weeks***	Rise 6:48 6:44 Set 18:31 18:39 *New Moon* 15:23 **16** ***2 Shadows on Jupiter, visible in far W of N. America 9:16 am***	Rise 8:11 7:58 Set 18:54 19:11 **17**	Rise 9:32 9:10 Set 19:20 19:45 **18**	Rise 10:51 10:20 Set 19:51 20:23 **19** ***2 Shadows on Jupiter, end vis. in Atlantic Canada 10:13 pm***	Rise 12:05 11:27 Set 20:28 21:06 **20** Sunrise 7:30 7:16 Sunset 17:59 18:13
50°N 40°N Rise 13:10 12:29 Set 21:13 21:54 **21** ***Orionid meteors peak 10 pm***	Rise 14:06 13:24 Set 22:05 22:47 **22**	Rise 14:51 14:11 Set 23:05 23:43 *1st Quarter* 22:58 **23** ***Mars 0.1°N of Moon 4 pm***	Rise 15:27 14:52 Set -- -- **24** *William Lassell discovered Uranus' moons, Ariel and Umbriel, 150 years ago* *Death of Tycho Brahe 400 years ago*	Set 0:08 0:42 Rise 15:56 15:27 **25** *Discovery of Ra-Shalom, smallest-orbit asteroid, 25 years ago*	Set 1:13 1:41 Rise 16:19 15:57 **26**	Set 2:19 2:39 Rise 16:39 16:24 **27** Sunrise 7:42 7:24 Sunset 17:45 18:04 ***2 Shadows on Jupiter, vis. in N. Amer. except far W 12:06 am***
50°N 40°N Set 2:26 2:38 Rise 15:57 15:49 **28** *Great Britain became 6th spacefaring nation by launching Prospero 30 years ago* ***Daylight Savings Time Ends 2 am***	Set 3:32 3:37 Rise 16:15 16:13 **29** *Galileo made 1st asteroid fly-by, of Gaspra, 10 years ago* ***Mercury greatest elong. W (19°), best morning view in 2001***	Set 4:39 4:37 Rise 16:32 16:38 **30**	Set 5:48 5:37 Rise 16:50 17:04 **31** *Halloween*			

SEPTEMBER

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

NOVEMBER

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

NOVEMBER

The Horsehead Beholds Barnard's Loop

The close-up of the Horsehead discloses a startling cap of blue which is outlined by the brightest red regions of fluorescing emissions in the background. On the large scale, Barnard's Loop forms a semi-circle to the left of the bright Great Orion Nebula and the barely discernible "notch" of the Horsehead below the leftmost "belt" star.
Photos by Peter Ceravolo and Jack Newton

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50°N 40°N Set 10:34 9:55 Rise 18:50 19:30 **4** ***2 Shadows on Jupiter, visible in far E of N. America*** ***9:30 pm***	Set 11:40 10:57 Rise 19:42 20:25 **5**	Set 12:35 11:54 Rise 20:46 21:27 **6** ***Jupiter 1.7°S of Moon*** ***2 am***	Set 13:21 12:44 Rise 22:00 22:35 **7**	Set 13:57 13:27 Rise 23:19 23:46 *3rd Quarter* 7:21 **8**	Set 14:26 14:05 Rise -- -- **9**	Rise 0:40 0:58 Set 14:51 14:37 **10** Sunrise 7:05 6:40 Sunset 16:22 16:48 ***2 Shadows on Jupiter, visible in all of N. America*** ***3:57 am***
Rise 2:01 2:11 Set 15:12 15:08 **11** *Remembrance Day (Canada)* *Veterans Day (USA)*	Rise 3:23 3:23 Set 15:33 15:37 **12** ***N Taurid meteors peak*** ***8 pm***	Rise 4:44 4:35 Set 15:55 16:08 **13**	Rise 6:05 5:47 Set 16:19 16:40 **14** *Mariner 9 first orbited another planet, Mars, 30 years ago*	Rise 7:25 6:58 Set 16:46 17:16 *New Moon* 1:40 **15**	Rise 8:42 8:07 Set 17:20 17:56 **16**	Rise 9:53 9:13 Set 18:01 18:43 **17** Sunrise 7:16 6:48 Sunset 16:13 16:42 ***2 Shadows on Jupiter, vis. in central and W N. Amer.*** ***6:33 am***
50°N 40°N Rise 10:55 10:12 Set 18:51 19:34 **18** ***Leonid meteors peak*** ***5 am*** ***(additional peaks expected at 1 pm)***	Rise 11:46 11:04 Set 19:49 20:30 **19**	Rise 12:26 11:49 Set 20:52 21:29 **20**	Rise 12:58 12:26 Set 21:58 22:28 **21**	Rise 13:24 12:58 Set 23:04 23:27 *1st Quarter* 18:21 **22** *Thanksgiving Day (USA)*	Rise 13:45 13:26 Set -- -- **23**	Set 0:10 0:26 Rise 14:03 13:52 **24** Sunrise 7:27 6:55 Sunset 16:06 16:38
50°N 40°N Set 1:16 1:25 Rise 14:20 14:16 **25**	Set 2:23 2:24 Rise 14:37 14:40 **26**	Set 3:31 3:24 Rise 14:55 15:05 **27** *Swedish astronomer and chemist Anders Celsius born 300 years ago* ***Vesta at opposition***	Set 4:40 4:26 Rise 15:15 15:33 **28**	Set 5:53 5:30 Rise 15:38 16:04 **29**	Set 7:07 6:36 Rise 16:08 16:41 *Full Moon* 15:49 **30** ***Saturn 0.5°S of Moon Occultation visible in U.S.A. except W. and E of Canada*** ***9 pm***	

DECEMBER

The Propitious Pleiades

The poet Milton describes the Sisters as "shedding sweet influence." One of the nearest open star clusters, the Pleiades' young hot blue stars and painterly blue reflection nebulae seem to float in front of the cooler yellow background stars, yielding a three-dimensional effect. Merope, Maia, and Alcyone have starring roles in the nebulosity.

Digital composite of photos by Rajiv Gupta

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50°N 40°N Set 9:30 8:49 Rise 17:35 18:17 **2**	Set 10:31 9:49 Rise 18:37 19:18 **3** ***Jupiter 1.6°S of Moon*** ***6 am*** ***Saturn at opposition***	Set 11:21 10:43 Rise 19:49 20:26 **4**	Set 12:01 11:28 Rise 21:07 21:37 **5**	Set 12:32 12:07 Rise 22:28 22:49 **6**	Set 12:57 12:41 Rise 23:48 – *3rd Quarter* 14:52 **7**	Set 8:21 7:43 Rise 16:46 17:25 **1** Sunrise 7:37 7:03 Sunset 16:01 16:35
50°N 40°N Rise 1:08 1:11 Set 13:39 13:40 **9**	Rise 2:26 2:21 Set 13:59 14:09 **10**	Rise 3:45 3:30 Set 14:21 14:39 **11**	Rise 5:03 4:40 Set 14:46 15:12 **12**	Rise 6:20 5:49 Set 15:16 15:50 **13** ***Geminid meteors peak*** ***11 pm***	Rise 7:34 6:56 Set 15:54 16:33 *New Moon* 15:47 **14** *Death of Donald Menzel, a leading authority on the Sun, 25 years ago* ***Annular Solar Eclipse, partial phase visible in U.S.A. and W and S of Canada***	Rise 8:40 7:58 Set 16:39 17:22 **15** Sunrise 7:52 7:15 Sunset 15:58 16:36
50°N 40°N Rise 9:37 8:54 Set 17:34 18:17 **16**	Rise 10:22 9:42 Set 18:36 19:15 **17**	Rise 10:58 10:23 Set 19:41 20:15 **18**	Rise 11:26 10:58 Set 20:48 21:15 **19**	Rise 11:49 11:27 Set 21:55 22:14 **20** *Walter S. Adams, known for stellar spectra and distance, born 125 years ago*	Rise 12:08 11:54 Set 23:01 23:12 **21** ***Winter Solstice*** ***2:21 pm***	Rise 12:26 12:18 Set – – *1st Quarter* 15:06 **22** Sunrise 7:57 7:19 Sunset 16:01 16:39 ***Ursid meteors peak*** ***7 am***
50°N 40°N Set 0:06 0:10 Rise 12:42 12:42 **23**	Set 1:12 1:09 Rise 12:59 13:06 **24**	Set 2:20 2:09 Rise 13:18 13:32 **25** *Christmas Day*	Set 3:30 3:11 Rise 13:39 14:01 **26** *Boxing Day (Canada)*	Set 4:43 4:16 Rise 14:05 14:34 **27**	Set 5:58 5:23 Rise 14:39 15:15 **28** ***Saturn 0.2°S of Moon Occultation visible in U.S.A. and S half of Canada*** ***3 am***	Set 7:11 6:31 Rise 15:23 16:04 **29** Sunrise 7:58 7:21 Sunset 16:06 16:43
50°N 40°N Set 8:18 7:35 Rise 16:21 17:03 *Full Moon* 5:40 **30** ***Penumbral Lunar Eclipse, visible in all of N. America*** ***3:25 am*** ***Jupiter 1.2°S of Moon*** ***9 am***	Set 9:14 8:34 Rise 17:31 18:10 **31**			*"Many a night I saw the Pleiads, rising through the mellow shade, Glitter like a swarm of fireflies tangled in a silver braid."* Tennyson, *Locksley Hall*		

The Royal Astronomical Society of Canada Observer's Calendar

How to Use this Calendar

A pictorial representation of the Moon's phase at midday is given in each daily box. The size of the Moon in the Calendar varies from day to day reflecting the change in the apparent size of the Moon in the sky as it moves closer to or further from the Earth.

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, such as eclipses, meteor showers, occultations, interesting planetary events, and equinoxes and solstices, are given at the bottom of the boxes.

The Calendar lists events observable in some part of Canada or the 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 *RASC Observer's Handbook*.

Adjusting Times for Actual Location

All times are adjusted for Daylight Savings 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 mid-northern latitudes. Times are displayed for locations 50° N latitude and 75° W longitude and for 40° 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
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
Montreal	50° N – 6	20	46
Niagara	40° N + 16	15	43
Okanagan	50° N – 2	10	50
Ottawa	50° N + 3	20	45
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

[1] Subtract 60 minutes in the summer.

U.S. Locations

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

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 4200 members 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 *RASC Observer's Handbook* has been published since 1908 and is recognized worldwide as the leading handbook of its type. The *Journal*, now in its 94th 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 *RASC Observer's Calendar* is a forum for astrophotography by members of the Society.

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

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

rasc@rasc.ca www.rasc.ca

The Photos and the Calendar

The majority of the images appearing in this Calendar are digital composites of two or more component photos. These images were registered and combined using Auriga Imaging's *RegiStar* and then further manipulated and enhanced using Adobe Systems' *Photoshop*.

Monthly grids with data were generated using special software written in the Fortran and Postscript programming languages.

All photographs were taken by members of the RASC, with details given at the right.

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Captions and Literary Quotations
Lee Johnson

Historical Anniversaries
Diane Brooks
David Chapman

Digital Film Output
Scan Art International Ltd., Vancouver, B.C.

Printing
University of Toronto Press Inc.

Cover / August: *The Milky Way in Large Scale.* 25-minute exposure on medium-format Kodak Pro PPF 400 film, piggyback using a Mamiya 645 camera with an 80-mm lens at f/4.5 (Ben Gendre).

January: *Multi-Coloured Lunar Eclipse.* 20-second exposure on Ektachrome E200 film using a 5-inch f/6 Astro-Physics refractor at f/12, taken January 20, 2000 (Alan Dyer).

February: *The Great Orion Nebula (M42).* Three separate colour images digtally combined using *RegiStar*: 26-minute exposure on Kodak PJ400 film using a 5-inch f/6 Astro-Physics refractor (Kevin Black); 50-minute exposure on chilled Kodak Gold 400 film with a Deep Sky Filter using an 8-inch f/6 Newtonian reflector (John Mirtle); colour CCD image formed with 3/6/6/12-minute L/R/G/B exposures on a Meade 1616XTE CCD camera using a 5-inch f/9 Meade refractor at f/5 (Jack Newton).

March: *The LMC at Solstice.* Montage of eight 10-minute exposures on Ektachrome E200 film using a Ceravolo 300-mm f/2.2 Maksutov-Newtonian astrograph (Doug George), digitally combined using *RegiStar*.

April: *Northern Star-Trails over Aurora.* 4-hour exposure on Fujichrome Velvia film using a 15-mm ultra-wide-angle lens at f/8, taken from southern Alberta (Alan Dyer).

May: *Stellar Nursery in Cassiopeia.* Two exposures digitally combined using *RegiStar* and *Photoshop*: an 80-minute exposure on gas-hypersensitized Kodak Technical Pan black-and-white film and a 55-minute exposure with a Deep Sky Filter on chilled Kodak Royal Gold 400 colour film, using an 8-inch f/6 Newtonian reflector (John Mirtle).

June: *The Heart of the Milky Way (M8, M20, M21).* Three exposures digitally combined using *RegiStar* and *Photoshop*: a 70-minute exposure on medium-format gas-hypersensitized Kodak Technical Pan black-and-white film using a 5-inch f/6 Astro-Physics refractor (Rajiv Gupta) and two 10-minute exposures on Fuji Super G 800 colour film using a Celestron 8-inch f/1.5 Schmidt camera (Stephen Barnes).

July: *The Eagle or Star Queen Nebula (M16).* 50-minute exposure on Ektachrome E200 film pushed one stop and transferred to an internegative, using a Celestron C-8 at f/6.3 (Ben Gendre).

September: *The Veil Nebula and a Bow Shock.* Two exposures digitally combined using *RegiStar* and *Photoshop*: a 70-minute exposure on gas-hypersensitized Kodak Technical Pan black-and-white film and a 50-minute exposure with a Deep Sky Filter on chilled Kodak Royal Gold 400 colour film, using an 8-inch f/6 Newtonian reflector (John Mirtle).

October: *Auroral Burst in Autumn.* 30-second exposure on Fuji Super G 800 film using a 50-mm Pentax lens at f/2.8, taken August 26, 1998 at Hardwood Lake, Ontario (Stephen Barnes).

November: *The Horsehead Beholds Barnard's Loop. Barnard's Loop*: three 10-minute exposures on Ektachrome E200 film, piggyback using a 50mm lens (Peter Ceravolo), digitally stacked using *RegiStar*. *Horsehead*: 10/10/10/20-minute L/R/G/B exposures on a Meade 1616XTE CCD camera using a 16-inch Meade LX200 at f/6.3 (Jack Newton).

December: *The Propitious Pleiades.* Three exposures digitally combined using *RegiStar* and *Photoshop*: 60-minute unfiltered and 110-minute cyan-filtered exposures on medium-format gas-hypersensitized Kodak Technical Pan black-and-white film, and 60-minute exposure on medium-format Kodak PPF colour film, using a 5-inch f/6 Astro-Physics refractor (Rajiv Gupta).

2001

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					

2002

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**.

"Look at the stars! look, look up at the skies!
O look at all the fire-folk sitting in the air!
The bright boroughs, the circle-citadels there!"

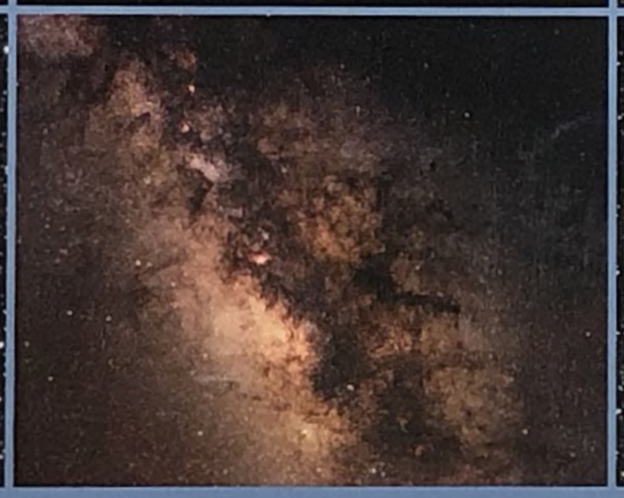
Hopkins





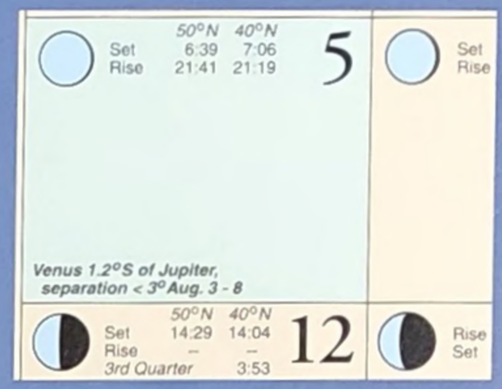





All photos in this unique calendar were taken by amateur astronomers using ordinary camera lenses and small telescopes. Volunteer members of the Royal Astronomical Society of Canada provided all the images and handled all aspects of this Calendar's assembly and production.

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



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