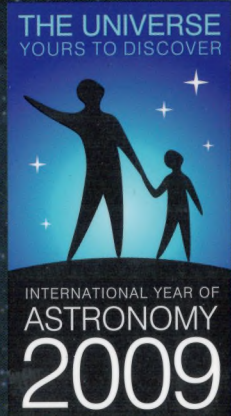




THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

# OBSERVER'S CALENDAR



# 2009







# JANUARY

## Slow and Steady

Forceful stellar winds from hot new stars carve a spherical cavity at the centre of this star-forming cloud. Energetic ultraviolet radiation from young stars at the centre excites the surrounding gas, which shines away the extra energy, making visible a flower-like object, called the Rosette Nebula. This long-exposure false-colour image was taken with three narrowband spectral line filters.

Photo by Paul Mortfield and Stefano Cancelli

## SUNDAY

## MONDAY

































## TUESDAY

## WEDNESDAY

## THURSDAY

## FRIDAY

## SATURDAY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p><b>The planets this month</b></p> <p><i>Mercury: very low in SW in evening twilight early in month, by end of month it emerges very low in SE in morning twilight</i></p> <p><i>Venus: in SW in evening twilight, sets by 9 pm</i></p> <p><i>Mars: not easily observed</i></p> <p><i>Jupiter: very low in SW in evening twilight early in month, lost in twilight by mid-month</i></p> <p><i>Saturn: rises in E before 10 pm, high in S before dawn</i></p>	<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>	<p>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</p> <p>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</p>	 <p>THE UNIVERSE Year for Uncovering INTERNATIONAL YEAR OF ASTRONOMY 2009</p> <p>www.astronomy2009.ca</p>	 <p>40°N 50°N Rise 10:10 10:19 Set 21:55 21:49</p> <p>1</p> <p>International Year of Astronomy Begins New Year's Day</p> <p>Mercury 1.9° to left of Jupiter visible soon after sunset</p>	 <p>40°N 50°N Rise 10:32 10:33 Set 22:58 23:01</p> <p>2</p> <p>Mercury 2.7° to left of Jupiter visible soon after sunset</p>	 <p>40°N 50°N Rise 10:55 10:47 Set -- --</p> <p>3</p> <p>Sunrise 7:22 7:58 Sunset 16:47 16:11</p> <p>Canadian Space Agency was founded 20 years ago</p> <p>Quadrantid meteors (ZHR=120) 8 am</p>
 <p>40°N 50°N Set 0:03 0:16 Rise 11:19 11:03 First Quarter 6:56</p> <p>4</p> <p>Mercury at greatest elongation E (19°) Earth at perihelion (147,099,100 km) 10 am Lunar Straight Wall visible best in E of N. America 6 pm</p>	 <p>40°N 50°N Set 1:12 1:34 Rise 11:48 11:22</p> <p>5</p> <p>Kuiper discovered Nereid, second moon of Neptune, 60 years ago</p>	 <p>40°N 50°N Set 2:24 2:56 Rise 12:22 11:47</p> <p>6</p>	 <p>40°N 50°N Set 3:39 4:21 Rise 13:06 12:22</p> <p>7</p>	 <p>40°N 50°N Set 4:54 5:43 Rise 14:01 13:12</p> <p>8</p>	 <p>40°N 50°N Set 6:03 6:53 Rise 15:09 14:19</p> <p>9</p> <p>Carrington and Hodgson recorded the first solar flare 150 years ago Pioneer 11 made a flyby of Saturn 30 years ago</p>	 <p>40°N 50°N Set 7:02 7:47 Rise 16:26 15:42 Full Moon 22:27 Sunrise 7:21 7:56 Sunset 16:54 16:20</p> <p>10</p> <p>International Year of Astronomy Canadian Launch of IYA 2009 www.astronomy2009.ca</p> <p>Greenwich Meridian accepted internationally 125 years ago</p> <p>Closest lunar perigee of 2009 Today's full Moon is the Wolf Moon</p>
 <p>40°N 50°N Set 7:50 8:26 Rise 17:46 17:13</p> <p>11</p>	 <p>40°N 50°N Set 8:28 8:54 Rise 19:05 18:42</p> <p>12</p> <p>40 Harmonia at opposition (m=9.6)</p>	 <p>40°N 50°N Set 8:59 9:15 Rise 20:20 20:08</p> <p>13</p>	 <p>40°N 50°N Set 9:26 9:32 Rise 21:31 21:29</p> <p>14</p> <p>Venus at greatest elongation E (47°)</p>	 <p>40°N 50°N Set 9:51 9:48 Rise 22:38 22:46</p> <p>15</p>	 <p>40°N 50°N Set 10:15 10:03 Rise 23:44 --</p> <p>16</p>	 <p>40°N 50°N Rise -- 0:01 Set 10:39 10:19 Last Quarter 21:46 Sunrise 7:19 7:51 Sunset 17:02 16:30</p> <p>17</p>
 <p>40°N 50°N Rise 0:49 1:15 Set 11:06 10:38</p> <p>18</p> <p>654 Zelinda at opposition (m=9.9)</p>	 <p>40°N 50°N Rise 1:53 2:28 Set 11:37 11:00</p> <p>19</p> <p>Martin Luther King Jr. Day (USA)</p>	 <p>40°N 50°N Rise 2:55 3:38 Set 12:13 11:29</p> <p>20</p>	 <p>40°N 50°N Rise 3:55 4:43 Set 12:55 12:06</p> <p>21</p> <p>Moon 1.5° to right of Antares visible before dawn Moon occults M4 visible from extreme SE U.S. 4 am</p>	 <p>40°N 50°N Rise 4:49 5:40 Set 13:43 12:53</p> <p>22</p>	 <p>40°N 50°N Rise 5:38 6:27 Set 14:38 13:50</p> <p>23</p>	 <p>40°N 50°N Rise 6:20 7:04 Set 15:38 14:55</p> <p>24</p> <p>Sunrise 7:15 7:44 Sunset 17:10 16:41</p>
 <p>40°N 50°N Rise 6:55 7:32 Set 16:40 16:05</p> <p>25</p>	 <p>40°N 50°N Rise 7:25 7:54 Set 17:43 17:17 New Moon 2:55</p> <p>26</p> <p>Chinese New Year</p> <p>Annular Solar Eclipse visible only in E hemisphere</p>	 <p>40°N 50°N Rise 7:52 8:12 Set 18:45 18:28</p> <p>27</p>	 <p>40°N 50°N Rise 8:15 8:27 Set 19:48 19:40</p> <p>28</p>	 <p>40°N 50°N Rise 8:38 8:41 Set 20:51 20:52</p> <p>29</p> <p>Cr. Moon 6° to lower right of Venus visible in evening twilight</p>	 <p>40°N 50°N Rise 9:00 8:55 Set 21:55 22:05</p> <p>30</p> <p>Cr. Moon 6° above Venus visible in evening twilight</p>	 <p>40°N 50°N Rise 9:24 9:10 Set 23:02 23:21</p> <p>31</p> <p>Sunrise 7:09 7:35 Sunset 17:18 16:53</p>




































# FEBRUARY

## Brilliant Pairing of Planets

Ten years ago this month the sunset sky was graced with a close conjunction of the solar system's two brightest planets. Apparently separated by less than one degree on the sky, Venus and Jupiter glow like cosmic jewels among foreground clouds and trees. Venus is the brightest of the pair. Jupiter, at slightly more than four times the distance to Venus, shines at a lesser magnitude.

Photo by Roy Bishop

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
 <p>40°N 50°N Rise 9:50 9:28 Set -- --</p> <p><b>1</b></p> <p><i>First Moon probe, Lunik 1, launched 50 years ago</i></p> <p><b>Comet N3 (Lulin) in binocular range low in S at morning twilight through February 7</b></p>	 <p>40°N 50°N Set 0:11 0:40 Rise 10:21 9:50 First Quarter 18:13</p> <p><b>2</b></p> <p><b>Lunar X near crater Werner best in W of N. America 1 am</b></p>	 <p>40°N 50°N Set 1:23 2:01 Rise 10:59 10:19</p> <p><b>3</b></p> <p><b>Lunar Straight Wall visible from W of N. America 1 am</b> <b>Moon occults Pleiades, visible in all of N. America 7 pm</b></p>	 <p>40°N 50°N Set 2:36 3:22 Rise 11:47 11:00</p> <p><b>4</b></p> <p><b>27 Euterpe at opposition (m=8.7)</b></p>	 <p>40°N 50°N Set 3:45 4:35 Rise 12:47 11:57</p> <p><b>5</b></p>	 <p>40°N 50°N Set 4:47 5:35 Rise 13:58 13:11</p> <p><b>6</b></p>	 <p>40°N 50°N Set 5:38 6:19 Rise 15:15 14:36</p> <p><b>7</b></p> <p>Sunrise 7:02 7:24 Sunset 17:27 17:05</p>
 <p>40°N 50°N Set 6:20 6:52 Rise 16:34 16:06</p> <p><b>8</b></p>	 <p>40°N 50°N Set 6:55 7:16 Rise 17:52 17:34 Full Moon 9:49</p> <p><b>9</b></p> <p><b>Penumbral Lunar Eclipse Moon sets during eclipse in W not visible in E of N. America Today's full Moon is the Snow Moon</b></p>	 <p>40°N 50°N Set 7:24 7:35 Rise 19:06 18:59</p> <p><b>10</b></p>	 <p>40°N 50°N Set 7:50 7:52 Rise 20:17 20:20</p> <p><b>11</b></p>	 <p>40°N 50°N Set 8:15 8:08 Rise 21:25 21:38</p> <p><b>12</b></p> <p><b>Zodiacal light readily visible in W after evening twilight for next two weeks Mars 2.9° to upper right of Jupiter visible with difficulty before sunrise from S areas of N. America, closing in next few mornings</b></p>	 <p>40°N 50°N Set 8:40 8:24 Rise 22:33 22:55</p> <p><b>13</b></p> <p><b>Mercury at greatest elongation W (26°)</b></p>	 <p>40°N 50°N Set 9:07 8:42 Rise 23:39 --</p> <p><b>14</b></p> <p>Sunrise 6:54 7:12 Sunset 17:35 17:17</p> <p><i>Valentine's Day</i></p>
 <p>40°N 50°N Rise -- 0:10 Set 9:36 9:03</p> <p><b>15</b></p>	 <p>40°N 50°N Rise 0:43 1:23 Set 10:11 9:29 Last Quarter 16:37</p> <p><b>16</b></p> <p><i>Family Day (some prov.) Presidents' Day (USA)</i></p>	 <p>40°N 50°N Rise 1:45 2:31 Set 10:50 10:03</p> <p><b>17</b></p> <p><b>Mars 0.6° to lower right of Jupiter visible with difficulty before sunrise from S areas of N. America</b></p>	 <p>40°N 50°N Rise 2:42 3:32 Set 11:37 10:47</p> <p><b>18</b></p> <p><b>Comet N3 (Lulin) in binocular range in S after midnight</b></p>	 <p>40°N 50°N Rise 3:33 4:23 Set 12:30 11:40</p> <p><b>19</b></p> <p><b>Venus at greatest illuminated extent (m=-4.5)</b></p>	 <p>40°N 50°N Rise 4:17 5:03 Set 13:28 12:43</p> <p><b>20</b></p> <p><b>Mars 1.6° to lower left of Jupiter visible with difficulty before sunrise</b></p>	 <p>40°N 50°N Rise 4:55 5:34 Set 14:29 13:51</p> <p><b>21</b></p> <p>Sunrise 6:45 6:59 Sunset 17:43 17:29</p> <p><i>Winter Star Party, Florida Keys www.scas.org/wsp.htm (through Feb. 28)</i></p>
 <p>40°N 50°N Rise 5:27 5:59 Set 15:32 15:02</p> <p><b>22</b></p> <p><b>Cr. Moon, Mercury, Jupiter, and Mars in a group visible in morning twilight Moon occults Mercury visible from Alaska in daylight 5 pm</b></p>	 <p>40°N 50°N Rise 5:55 6:18 Set 16:35 16:15</p> <p><b>23</b></p> <p><b>Comet N3 (Lulin) in binocular range in SE in evening through February 28 Mercury 0.7° to right of Jupiter visible in morning twilight</b></p>	 <p>40°N 50°N Rise 6:20 6:34 Set 17:38 17:27 New Moon 20:35</p> <p><b>24</b></p> <p><b>Titan's shadow on Saturn, visible in W of N. America, best in far W 5:53 am Mercury 0.7° below Jupiter visible in morning twilight</b></p>	 <p>40°N 50°N Rise 6:43 6:49 Set 18:42 18:40</p> <p><b>25</b></p> <p><b>1 Ceres at opposition (m=6.9) closest approach since 1857 and until at least until 3000 Young crescent Moon, 21 hours after new in E, 25 hours after new in W, visible in evening twilight</b></p>	 <p>40°N 50°N Rise 7:05 7:04 Set 19:47 19:53</p> <p><b>26</b></p> <p><b>Mercury 2.5° to lower left of Jupiter visible in morning twilight</b></p>	 <p>40°N 50°N Rise 7:29 7:18 Set 20:53 21:09</p> <p><b>27</b></p> <p><b>Moon 2.0° to left of Venus visible in evening twilight</b></p>	 <p>40°N 50°N Rise 7:55 7:35 Set 22:02 22:28</p> <p><b>28</b></p> <p>Sunrise 6:35 6:45 Sunset 17:51 17:41</p>
 <p>THE UNIVERSE YOURS TO DISCOVER INTERNATIONAL YEAR OF ASTRONOMY <b>2009</b> www.astronomy2009.ca</p>				<p><b>The planets this month</b></p> <p>Mercury: very low in SE in morning twilight Venus: in WSW in evening twilight, sets after 9 pm Mars: not easily observed Jupiter: not easily observed Saturn: rises in E before 8 pm, transits high in S after midnight</p>		<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>
<p>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</p> <p>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</p>						







































# MARCH

## Dusty Display

Sunlight reflecting faintly off interplanetary dust in the plane of Earth's orbit produces a glowing triangle of the rarely imaged Zodiacal Light, rising up on the left of this image. The plane of the Milky Way leans along the right of this remarkable image. Look closely. Can you find M31, M33, the Hyades, Pleiades, the Double Cluster, and the California Nebula?  
Photo by Jack Newton

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	
 <p>40°N 50°N Rise 8:24 7:56 Set 23:14 23:49</p> <p><b>1</b></p> <p>Mars 0.7° above Mercury, with difficulty before sunrise through March 4 from S areas of N. America</p>	 <p>40°N 50°N Rise 9:00 8:22 Set -- --</p> <p><b>2</b></p> <p>Moon occults Pleiades visible in late evening in W of N. America</p>	 <p>40°N 50°N Set 0:25 1:09 Rise 9:44 8:59</p> <p><b>3</b></p> <p>Lunar X near crater Werner best in E of N. America 9 pm</p>	 <p>40°N 50°N Set 1:35 2:24 Rise 10:38 9:49 First Quarter 2:46</p> <p><b>4</b></p> <p>Lunar Straight Wall visible 6 pm</p>	 <p>40°N 50°N Set 2:37 3:27 Rise 11:43 10:54</p> <p><b>5</b></p>	 <p>40°N 50°N Set 3:31 4:15 Rise 12:55 12:13</p> <p><b>6</b></p>	 <p>40°N 50°N Set 4:15 4:51 Rise 14:11 13:38</p> <p><b>7</b></p> <p>Sunrise 6:24 6:30 Sunset 17:59 17:52</p>	
 <p>40°N 50°N Set 5:51 6:17 Rise 16:27 16:05</p> <p><b>8</b></p> <p>Daylight Saving Time begins Saturn at opposition (m=0.5) 2 am</p>	 <p>40°N 50°N Set 6:22 6:38 Rise 17:41 17:29</p> <p><b>9</b></p>	 <p>40°N 50°N Set 6:49 6:56 Rise 18:53 18:51 Full Moon 22:38</p> <p><b>10</b></p> <p>Today's full Moon is the Worm Moon</p>	 <p>40°N 50°N Set 7:14 7:12 Rise 20:03 20:11</p> <p><b>11</b></p>	 <p>40°N 50°N Set 7:40 7:28 Rise 21:12 21:29</p> <p><b>12</b></p> <p>Titan's shadow on Saturn visible in all of N. America except Atlantic Canada 5:34 am</p>	 <p>40°N 50°N Set 8:06 7:45 Rise 22:20 22:46</p> <p><b>13</b></p> <p>Zodiacal light readily visible in W after evening twilight for next two weeks</p>	 <p>40°N 50°N Set 8:35 8:05 Rise 23:26 --</p> <p><b>14</b></p> <p>Sunrise 7:13 7:15 Sunset 19:06 19:04</p>	
 <p>40°N 50°N Rise -- 0:02 Set 9:08 8:30</p> <p><b>15</b></p>	 <p>40°N 50°N Rise 0:30 1:14 Set 9:46 9:01</p> <p><b>16</b></p> <p>Moon 2° to lower left of Antares visible late overnight and separating</p>	 <p>40°N 50°N Rise 1:30 2:19 Set 10:30 9:41</p> <p><b>17</b></p>	 <p>40°N 50°N Rise 2:25 3:14 Set 11:21 10:31 Last Quarter 13:47</p> <p><b>18</b></p>	 <p>40°N 50°N Rise 3:12 3:59 Set 12:17 11:30</p> <p><b>19</b></p>	 <p>40°N 50°N Rise 3:52 4:34 Set 13:17 12:36</p> <p><b>20</b></p> <p>Spring Equinox 7:44 am</p>	 <p>40°N 50°N Rise 4:26 5:01 Set 14:18 13:46</p> <p><b>21</b></p> <p>Sunrise 7:02 7:00 Sunset 19:13 19:15</p>	
 <p>40°N 50°N Rise 4:55 5:22 Set 15:21 14:57</p> <p><b>22</b></p> <p>29 Amphitrite at opposition (m=9.1)</p>	 <p>40°N 50°N Rise 5:21 5:40 Set 16:24 16:09</p> <p><b>23</b></p>	 <p>40°N 50°N Rise 5:45 5:55 Set 17:28 17:22</p> <p><b>24</b></p> <p>Moon 3° to upper left of Mars visible with difficulty in morning twilight in SE of N. America</p>	 <p>40°N 50°N Rise 6:09 6:10 Set 18:33 18:36</p> <p><b>25</b></p>	 <p>40°N 50°N Rise 6:32 6:25 Set 19:40 19:52 New Moon 12:06</p> <p><b>26</b></p>	 <p>40°N 50°N Rise 6:58 6:42 Set 20:50 21:12</p> <p><b>27</b></p> <p>Venus in inferior conjunction at 8°N of Sun, possible to see in both morning and evening within a few of today</p>	 <p>40°N 50°N Rise 7:27 7:01 Set 22:02 22:34</p> <p><b>28</b></p> <p>Sunrise 6:50 6:45 Sunset 19:20 19:26</p>	
 <p>40°N 50°N Rise 8:01 7:26 Set 23:15 23:56</p> <p><b>29</b></p>	 <p>40°N 50°N Rise 8:43 8:00 Set -- --</p> <p><b>30</b></p>	 <p>40°N 50°N Set 0:26 1:14 Rise 9:35 8:46</p> <p><b>31</b></p>	 <p>THE UNIVERSE FOR THE TO DISCOVER INTERNATIONAL YEAR OF ASTRONOMY 2009 www.astronomy2009.ca</p>		<p><b>The planets this month</b></p> <p>Mercury: very low in ESE in morning twilight in first week of month</p> <p>Venus: low in W in evening twilight, lost in twilight late in month</p> <p>Mars: not easily observed</p> <p>Jupiter: very low in ESE in morning twilight</p> <p>Saturn: rises in E near sunset, transits high in S near midnight</p>	<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>	<p>Earth Hour 2009 (8-9 pm local) www.earthhour.org</p> <p>Titan's shadow on Saturn, visible in all of N. America, best in W 4:25 am</p> <p>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</p> <p>APRIL S M T W T F S 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30</p>








# APRIL

## Illuminating Geology

A mist-shrouded Moon highlights the rugged snow-capped beauty of the Canadian Rocky Mountains as it sinks into the western horizon along with Earth's shadow, just prior to sunrise. Among the major planets of our solar system, Earth is uniquely blessed with a single large Moon that lights our skies and informs human cultures around the globe.

Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p><b>The planets this month</b></p> <p>Mercury: very low in WNW in evening twilight by mid-month, becoming best evening apparition by end of month</p> <p>Venus: very low in E in morning twilight</p> <p>Mars: very low in E in morning twilight</p> <p>Jupiter: very low in ESE in morning twilight</p> <p>Saturn: transits high in S after 10 pm, sets in W near 5 am</p>	<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time.</p> <p>Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>	<p>MARCH</p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7</p> <p>8 9 10 11 12 13 14</p> <p>15 16 17 18 19 20 21</p> <p>22 23 24 25 26 27 28</p> <p>29 30 31</p> <p>MAY</p> <p>S M T W T F S</p> <p>1 2</p> <p>3 4 5 6 7 8 9</p> <p>10 11 12 13 14 15 16</p> <p>17 18 19 20 21 22 23</p> <p>24 25 26 27 28 29 30</p> <p>31</p>	<p>40°N 50°N</p> <p>Set 1:31 2:21</p> <p>Rise 10:36 9:47</p> <p>1</p>	<p>40°N 50°N</p> <p>Set 2:27 3:13</p> <p>Rise 11:46 11:02</p> <p>First Quarter 10:34</p> <p>2</p>	<p>40°N 50°N</p> <p>Set 3:14 3:52</p> <p>Rise 12:59 12:24</p> <p>3</p>	<p>40°N 50°N</p> <p>Set 3:51 4:20</p> <p>Rise 14:13 13:47</p> <p>4</p> <p>Sunrise 6:39 6:30</p> <p>Sunset 19:28 19:37</p>
<p>40°N 50°N</p> <p>Set 4:23 4:43</p> <p>Rise 15:26 15:10</p> <p>5</p>	<p>40°N 50°N</p> <p>Set 4:51 5:01</p> <p>Rise 16:36 16:30</p> <p>6</p>	<p>40°N 50°N</p> <p>Set 5:16 5:17</p> <p>Rise 17:45 17:49</p> <p>7</p>	<p>40°N 50°N</p> <p>Set 5:41 5:33</p> <p>Rise 18:53 19:06</p> <p>8</p>	<p>40°N 50°N</p> <p>Set 6:06 5:50</p> <p>Rise 20:01 20:24</p> <p>Full Moon 10:56</p> <p>9</p>	<p>40°N 50°N</p> <p>Set 6:34 6:08</p> <p>Rise 21:08 21:40</p> <p>10</p>	<p>40°N 50°N</p> <p>Set 7:05 6:31</p> <p>Rise 22:14 22:54</p> <p>11</p> <p>Sunrise 6:28 6:15</p> <p>Sunset 19:35 19:48</p>
<p>Magellan was launched to map Venus by radar 20 years ago</p> <p>Follow Vega unaided into daylight, very challenging but can be done 6 am</p>	<p>Io occults half of Ganymede visible in E of N. America 5:59 am</p>		<p>15 Eunomia at opposition (m=9.8)</p>	<p>First Day of Passover</p> <p>Today's full Moon is the Pink Moon</p>	<p>Good Friday</p> <p>Boeddicker measured temperature change on Moon during lunar eclipse 125 years ago</p>	<p>Spot Sirius unaided before sunset polarizing sunglasses may help best within a few days of today 7 pm</p>
<p>40°N 50°N</p> <p>Set 7:41 7:00</p> <p>Rise 23:17 --</p> <p>12</p>	<p>40°N 50°N</p> <p>Rise -- 0:03</p> <p>Set 8:24 7:37</p> <p>13</p>	<p>40°N 50°N</p> <p>Rise 0:14 1:03</p> <p>Set 9:12 8:23</p> <p>14</p>	<p>40°N 50°N</p> <p>Rise 1:04 1:52</p> <p>Set 10:06 9:19</p> <p>15</p>	<p>40°N 50°N</p> <p>Rise 1:47 2:31</p> <p>Set 11:05 10:22</p> <p>16</p>	<p>40°N 50°N</p> <p>Rise 2:24 3:01</p> <p>Set 12:05 11:30</p> <p>Last Quarter 9:36</p> <p>17</p>	<p>40°N 50°N</p> <p>Rise 2:55 3:24</p> <p>Set 13:07 12:40</p> <p>18</p> <p>Sunrise 6:17 6:01</p> <p>Sunset 19:42 19:59</p>
<p>Easter Sunday</p>	<p>Titan's shadow on Saturn, visible in all of N. America, best in W 3:22 am</p> <p>Moon occults M4 visible W of Great Lakes 6 am</p> <p>Moon occults Antares in daylight visible from western Texas 9 am</p>	<p>Callisto occults half of Io, visible in extreme W of N. America 9:06 am</p>				
<p>40°N 50°N</p> <p>Rise 3:22 3:43</p> <p>Set 14:09 13:51</p> <p>19</p>	<p>40°N 50°N</p> <p>Rise 3:46 4:00</p> <p>Set 15:12 15:02</p> <p>20</p>	<p>40°N 50°N</p> <p>Rise 4:10 4:15</p> <p>Set 16:16 16:15</p> <p>21</p>	<p>40°N 50°N</p> <p>Rise 4:33 4:30</p> <p>Set 17:22 17:30</p> <p>22</p>	<p>40°N 50°N</p> <p>Rise 4:58 4:46</p> <p>Set 18:30 18:48</p> <p>23</p>	<p>40°N 50°N</p> <p>Rise 5:25 5:04</p> <p>Set 19:42 20:10</p> <p>New Moon 23:23</p> <p>24</p>	<p>40°N 50°N</p> <p>Rise 5:58 5:28</p> <p>Set 20:57 21:34</p> <p>25</p> <p>Sunrise 6:08 5:47</p> <p>Sunset 19:49 20:10</p>
<p>Texas Star Party, Fort Davis, TX www.texasstarparty.org (through Apr. 26)</p> <p>Moon 3° to upper right of Jupiter visible before dawn</p> <p>8 Flora at opposition (m=9.8)</p>		<p>14 Irene at opposition (m=8.9)</p> <p>Cr. Moon-Venus-Mars grouping visible in morning twilight</p>	<p>Lyrid meteors (ZHR=20) 6 am</p> <p>Moon occults Venus, visible at dawn in W of N. America, in daylight E of Toronto-Houston 10 am</p>		<p>Old crescent Moon, 19 hours before new in E, 15 hours before new in W, a tough challenge in morning twilight</p>	<p>Young crescent Moon, 20 hours after new in E, 24 hours after new in W, visible in evening twilight</p>
<p>40°N 50°N</p> <p>Rise 6:38 5:59</p> <p>Set 22:11 22:56</p> <p>26</p>	<p>40°N 50°N</p> <p>Rise 7:28 6:42</p> <p>Set 23:21 --</p> <p>27</p>	<p>40°N 50°N</p> <p>Set -- 0:10</p> <p>Rise 8:28 7:39</p> <p>28</p>	<p>40°N 50°N</p> <p>Set 0:22 1:08</p> <p>Rise 9:37 8:51</p> <p>29</p>	<p>40°N 50°N</p> <p>Set 1:12 1:52</p> <p>Rise 10:51 10:13</p> <p>30</p>		
<p>Mercury at greatest elongation E (20°) best evening view in 2009</p> <p>Cr. Moon leaving Pleiades visible in evening twilight</p> <p>Mercury 3° below, best in binoculars</p>	<p>International Astronomy Week (through May 3)</p> <p>Mercury to left of Pleiades, visible in evening twilight through May 9</p>		<p>Titan's shadow on Saturn visible in all of N. America except Atlantic Canada 2:22 am</p>			








# MAY

## Spectacular Surprise

Comet Holmes produced a global buzz of excitement when it experienced a major outburst in late 2007. In less than 24 hours it blazed from a dim magnitude 17 to easy visibility with the unaided eye. In a fortnight its coma rapidly expanded to a sphere larger in physical size than that of the Sun. Less easy to see was the comet's faint blue ion tail, whose delicate structure is beautifully captured in this remarkable image. *Photo by Jack Newton*

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																				
<p><b>The planets this month</b></p> <p>Mercury: very low in WNW in evening twilight in first few days of month</p> <p>Venus: very low in E in morning twilight</p> <p>Mars: very low in E in morning twilight</p> <p>Jupiter: rises near 2 am in ESE, low in SE in morning twilight</p> <p>Saturn: high in SSW after dark, sets in WNW near 3 am</p>	<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>	<p>APRIL</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr> <tr><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr> <tr><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td></td><td></td></tr> </table> <p>JUNE</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td></tr> <tr><td>28</td><td>29</td><td>30</td><td></td><td></td><td></td><td></td></tr> </table>	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			S	M	T	W	T	F	S		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					 <p>THE UNIVERSE YOUNG TO DISCOVER ASTRONOMY 2009</p> <p>www.astronomy2009.ca</p>		<p>40°N 50°N Set 1:52 2:24 Rise 12:05 11:36 First Quarter 16:44</p> <p>1</p> <p>Io transits Ganymede visible in central N. America 4:47 am Venus at greatest illuminated extent tomorrow (m=-4.4) Mercury to left of Pleiades, visible in evening twilight through May 9, fading</p>	<p>40°N 50°N Set 2:26 2:48 Rise 13:17 12:59</p> <p>2</p> <p>Sunrise 5:59 5:34 Sunset 19:56 20:21</p> <p>International Astronomy Day www.rasc.ca/astroday www.astroleague.org/ai/astroday/astroday.html</p> <p>Lunar Straight Wall visible 8 pm</p>
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<p>40°N 50°N Set 2:54 3:07 Rise 14:27 14:18</p> <p>3</p> <p>Voyager 1 arrived at Jupiter 30 years ago 6 Hebe at opposition (m=9.9) yesterday</p>	<p>40°N 50°N Set 3:20 3:23 Rise 15:35 15:36</p> <p>4</p> <p>Ganymede occults all of Io visible in N. America except NE and NW 5:36 am</p>	<p>40°N 50°N Set 3:44 3:39 Rise 16:42 16:52</p> <p>5</p> <p>Pluto reached perihelion 20 years ago η-Aquarid meteors (ZHR=60) 8 pm</p>	<p>40°N 50°N Set 4:09 3:55 Rise 17:48 18:07</p> <p>6</p>	<p>40°N 50°N Set 4:35 4:13 Rise 18:55 19:23</p> <p>7</p>	<p>40°N 50°N Set 5:05 4:34 Rise 20:00 20:37</p> <p>8</p>	<p>40°N 50°N Set 5:39 5:00 Rise 21:04 21:48 Full Moon 0:01 Sunrise 5:51 5:23 Sunset 20:03 20:31</p> <p>9</p> <p>Today's full Moon is the Flower Moon</p>																																																																																				
<p>40°N 50°N Set 6:19 5:34 Rise 22:03 22:51</p> <p>10</p> <p>Mother's Day</p>	<p>40°N 50°N Set 7:05 6:17 Rise 22:56 23:45</p> <p>11</p> <p>Ganymede occults two-thirds of Io visible in extreme W of N.A. 8:36 am</p>	<p>40°N 50°N Set 7:58 7:09 Rise 23:42 --</p> <p>12</p>	<p>40°N 50°N Rise -- 0:28 Set 8:55 8:10</p> <p>13</p>	<p>40°N 50°N Rise 0:21 1:01 Set 9:55 9:17</p> <p>14</p>	<p>40°N 50°N Rise 0:54 1:26 Set 10:56 10:26</p> <p>15</p> <p>Titan's shadow on Saturn visible in all of N. America except Atlantic Canada 1:26 am</p>	<p>40°N 50°N Rise 1:22 1:46 Set 11:57 11:35</p> <p>16</p> <p>Sunrise 5:44 5:12 Sunset 20:10 20:41</p> <p>Europa occults half of Io, visible in N. America except NE 5:34 am</p>																																																																																				
<p>40°N 50°N Rise 1:47 2:04 Set 6:19 5:34 Last Quarter 3:26</p> <p>17</p> <p>Two shadows on Jupiter, visible in E of N. America, best in far E 3:56 am Moon 2° to upper left of Jupiter Spot Jupiter unaided after sunrise 3° to lower right of Moon</p>	<p>40°N 50°N Rise 2:10 2:19 Set 14:00 13:55</p> <p>18</p> <p>Victoria Day (Canada)</p>	<p>40°N 50°N Rise 2:33 2:34 Set 15:03 15:07</p> <p>19</p>	<p>40°N 50°N Rise 2:57 2:49 Set 16:09 16:23</p> <p>20</p>	<p>40°N 50°N Rise 3:23 3:06 Set 17:19 17:42</p> <p>21</p> <p>Io totally occults Europa visible in E of N. America Cr. Moon, Venus, and Mars in grouping at dawn 1:27 am</p>	<p>40°N 50°N Rise 3:53 3:27 Set 18:32 19:05</p> <p>22</p> <p>RMTC Astronomy Expo, Big Bear, CA www.rmcastronomyexpo.org (through May 25)</p>	<p>40°N 50°N Rise 4:30 3:54 Set 19:48 20:30</p> <p>23</p> <p>Sunrise 5:38 5:04 Sunset 20:16 20:50</p> <p>Europa centrally transits Io visible in W of N. America 7:46 am</p>																																																																																				
<p>40°N 50°N Rise 5:16 4:32 Set 21:02 21:49 New Moon 8:11</p> <p>24</p> <p>Neptune 0.5° to north of Jupiter after midnight through May 30</p>	<p>40°N 50°N Rise 6:13 5:24 Set 22:08 22:56</p> <p>25</p> <p>Memorial Day (USA)</p>	<p>40°N 50°N Rise 7:20 6:33 Set 23:05 23:47</p> <p>26</p> <p>Jupiter with only one satellite visible in E of N. America 1:37 am Ganymede occults most of Io, visible in N. America except NW 4:01 am Europa transits Io visible in E of N. America 8:51 pm</p>	<p>40°N 50°N Rise 8:35 7:54 Set 23:50 --</p> <p>27</p>	<p>40°N 50°N Set -- 0:24 Rise 9:52 9:21</p> <p>28</p> <p>Io occults most of Europa, visible in N. America except NW 3:42 am</p>	<p>40°N 50°N Set 0:26 0:51 Rise 11:07 10:46</p> <p>29</p>	<p>40°N 50°N Set 0:57 1:12 Rise 12:19 12:08 First Quarter 23:22 Sunrise 5:34 4:57 Sunset 20:21 20:59</p> <p>30</p>																																																																																				
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







# JUNE

## Tenuous Wisp

A faint breath of dusty nothingness describes Van den Bergh 152, a dim reflection nebula about 1,400 light-years distant in the constellation Cepheus. A chance encounter with a bright star gives rise to the blue reflection component at the left of the nebula. A dense pocket of gas blocks background starlight and appears black. Less dense areas allow background stars to shine through.

Photo by Paul Mortfield and Stefano Cancelli

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																											
<p><b>The planets this month</b></p> <p><i>Mercury: very low in ENE in morning twilight in second half of month, but not easily observed</i></p> <p><i>Venus: very low in E in morning twilight</i></p> <p><i>Mars: very low in E in morning twilight</i></p> <p><i>Jupiter: rises after midnight in ESE, in SE in morning twilight</i></p> <p><i>Saturn: in WSW after dark, sets in W near 1 am</i></p>	 <p>40°N 50°N Set 1:48 1:46 Rise 14:35 14:42</p> <p><b>1</b></p> <p>Watch for noctilucent clouds in N sky during twilight this month best N of 50° latitude</p>	 <p>40°N 50°N Set 2:13 2:02 Rise 15:41 15:57</p> <p><b>2</b></p> <p>Two shadows on Jupiter (briefly) then 12 minutes later Ganymede occults most of Io, visible in E of N. America 2:12 am</p>	 <p>40°N 50°N Set 2:39 2:19 Rise 16:46 17:12</p> <p><b>3</b></p>	 <p>40°N 50°N Set 3:07 2:39 Rise 17:51 18:25</p> <p><b>4</b></p> <p>Io occults half of Europa, visible in S and W of N. America 5:55 am</p>	 <p>40°N 50°N Set 3:39 3:03 Rise 18:55 19:36</p> <p><b>5</b></p> <p>Venus at greatest elongation W (46°)</p>	 <p>40°N 50°N Set 4:17 3:34 Rise 19:55 20:42</p> <p><b>6</b></p> <p>Sunrise 5:32 4:53 Sunset 20:26 21:05</p>																																																																																											
 <p>40°N 50°N Set 5:01 4:13 Rise 20:50 21:39 Full Moon 14:12</p> <p><b>7</b></p> <p>Moon occults Antares, visible in W and NE of N. America, graze from Cornwall ON - Boston 3 am Today's full Moon is the Honey Moon</p>	 <p>40°N 50°N Set 5:51 5:02 Rise 21:39 22:25</p> <p><b>8</b></p>	 <p>40°N 50°N Set 6:47 6:01 Rise 22:20 23:01</p> <p><b>9</b></p> <p>Two shadows on Jupiter, visible in E of N. America, best in E 4:06 am</p>	 <p>40°N 50°N Set 7:46 7:06 Rise 22:54 23:29</p> <p><b>10</b></p>	 <p>40°N 50°N Set 8:46 8:14 Rise 23:24 23:51</p> <p><b>11</b></p> <p>Io occults half of Europa, visible in extreme SW of N. America 8:08 am</p>	 <p>40°N 50°N Set 9:47 9:23 Rise 23:50 --</p> <p><b>12</b></p>	 <p>40°N 50°N Rise -- 0:09 Set 10:48 10:32</p> <p><b>13</b></p> <p>Sunrise 5:31 4:50 Sunset 20:30 21:10</p> <p>Mercury at greatest elongation W (23°) Mars 3° to left of Venus visible in morning twilight moving to upper right by June 27</p>																																																																																											
 <p>40°N 50°N Rise 0:13 0:24 Set 11:48 11:41</p> <p><b>14</b></p>	 <p>40°N 50°N Rise 0:35 0:39 Set 12:50 12:50 Last Quarter 18:15</p> <p><b>15</b></p> <p>Titan's shadow on Saturn visible in all of N. America, except Atlantic and N. Canada 11:40 pm</p>	 <p>40°N 50°N Rise 0:58 0:53 Set 13:53 14:02</p> <p><b>16</b></p> <p>Two shadows on Jupiter, visible in W of N. America, best in far W 6:39 am</p>	 <p>40°N 50°N Rise 1:22 1:09 Set 14:59 15:18</p> <p><b>17</b></p>	 <p>40°N 50°N Rise 1:49 1:27 Set 16:09 16:37</p> <p><b>18</b></p>	 <p>40°N 50°N Rise 2:22 1:51 Set 17:22 18:00</p> <p><b>19</b></p> <p>Mars, Venus, cr. Moon in grouping Mercury to lower left visible in morning twilight</p>	 <p>40°N 50°N Rise 3:02 2:23 Set 18:37 19:22</p> <p><b>20</b></p> <p>Sunrise 5:31 4:51 Sunset 20:32 21:13</p> <p>Callisto casts shadow on Io, visible in all of N. America except NE 5:17 am</p>																																																																																											
 <p>40°N 50°N Rise 3:54 3:07 Set 19:47 20:36</p> <p><b>21</b></p> <p>Father's Day Summer Solstice 1:45 am</p>	 <p>40°N 50°N Rise 4:57 4:08 Set 20:50 21:35 New Moon 15:35</p> <p><b>22</b></p>	 <p>40°N 50°N Rise 6:10 5:26 Set 21:41 22:19</p> <p><b>23</b></p> <p>Pluto at opposition (m=13.9)</p>	 <p>40°N 50°N Rise 7:29 6:53 Set 22:23 22:51</p> <p><b>24</b></p>	 <p>40°N 50°N Rise 8:48 8:23 Set 22:57 23:15</p> <p><b>25</b></p>	 <p>40°N 50°N Rise 10:04 9:49 Set 23:26 23:35</p> <p><b>26</b></p>	 <p>40°N 50°N Rise 11:16 11:11 Set 23:52 23:52</p> <p><b>27</b></p> <p>Sunrise 5:33 4:53 Sunset 20:33 21:13</p>																																																																																											
 <p>40°N 50°N Rise 12:26 12:30 Set -- --</p> <p><b>28</b></p>	 <p>40°N 50°N Set 0:17 0:08 Rise 13:33 13:47 First Quarter 7:28</p> <p><b>29</b></p>	 <p>40°N 50°N Set 0:42 0:25 Rise 14:39 15:02</p> <p><b>30</b></p>	 <p>www.astronomy2009.ca</p>		<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>	<p>MAY</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td>1</td><td>2</td></tr> <tr><td></td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td></td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr> <tr><td></td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td></tr> <tr><td></td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td></tr> <tr><td></td><td>30</td><td>31</td><td></td><td></td><td></td><td></td></tr> </table> <p>JULY</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td></tr> <tr><td></td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td></td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td></tr> <tr><td></td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td></tr> <tr><td></td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td></tr> </table>	S	M	T	W	T	F	S						1	2		3	4	5	6	7	8		10	11	12	13	14	15		17	18	19	20	21	22		24	25	26	27	28	29		30	31					S	M	T	W	T	F	S					1	2	3		5	6	7	8	9	10		12	13	14	15	16	17		19	20	21	22	23	24		26	27	28	29	30	31
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# JULY

## Uncountable Stars

Summer nights in the Northern Hemisphere showcase the stars of Cygnus and the Milky Way arching high overhead. This region of our galaxy is packed with legions of stars, a wealth of pink emission nebulae, and obscuring dark nebulae that lie along the galactic plane. At centre left are the bright blue star Deneb and the famous North America Nebula. At centre bottom is the crescent-shaped Veil Nebula.

Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																																
<p><b>The planets this month</b></p> <p>Mercury: very low in WNW in evening twilight at end of month, but not easily observed</p> <p>Venus: low in E in morning twilight</p> <p>Mars: rises near 2 am in ENE, low in E at dawn</p> <p>Jupiter: rises near 10 pm in ESE, transits in S near 3 am</p> <p>Saturn: low in W in evening twilight, sets in W near 11 pm</p>	<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>	<p>JUNE</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td></td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr> <tr><td></td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td></tr> <tr><td></td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td></td><td>28</td><td>29</td><td>30</td><td></td><td></td><td></td></tr> </table> <p>AUGUST</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr> <tr><td></td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td></td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td></tr> <tr><td></td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td></tr> <tr><td></td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td></tr> <tr><td></td><td>30</td><td>31</td><td></td><td></td><td></td><td></td></tr> </table>	S	M	T	W	T	F	S		1	2	3	4	5	6		7	8	9	10	11	12		14	15	16	17	18	19		21	22	23	24	25	26		28	29	30				S	M	T	W	T	F	S							1		2	3	4	5	6	7		9	10	11	12	13	14		16	17	18	19	20	21		23	24	25	26	27	28		30	31					<p>40°N 50°N</p> <p>Set 1:10 --</p> <p>Rise 15:44 16:16</p> <p><b>1</b></p> <p>40°N 50°N</p> <p>Set 1:41 1:07</p> <p>Rise 16:48 17:28</p> <p><b>2</b></p> <p>40°N 50°N</p> <p>Set 2:16 1:35</p> <p>Rise 17:49 18:35</p> <p><b>3</b></p> <p>40°N 50°N</p> <p>Set 2:58 2:12</p> <p>Rise 18:46 19:34</p> <p><b>4</b></p> <p>Sunrise 5:37 4:57</p> <p>Sunset 20:32 21:11</p> <p>Independence Day (USA)</p> <p>The Pribram fireball was the first meteorite fall photographed 50 years ago</p> <p>Moon 3° to lower right of Antares visible after midnight</p> <p>Io casts shadow on Callisto, visible in all of N.A. except extreme NW 2:21 am</p> <p>Moon occults M4 visible in W of N. America 3 am</p>	<p>40°N 50°N</p> <p>Set 3:46 2:58</p> <p>Rise 19:36 20:24</p> <p><b>5</b></p> <p>40°N 50°N</p> <p>Set 4:40 3:53</p> <p>Rise 20:19 21:03</p> <p><b>6</b></p> <p>40°N 50°N</p> <p>Set 5:38 4:56</p> <p>Rise 20:56 21:33</p> <p>Full Moon 5:21</p> <p><b>7</b></p> <p>40°N 50°N</p> <p>Set 6:39 6:04</p> <p>Rise 21:27 21:56</p> <p><b>8</b></p> <p>40°N 50°N</p> <p>Set 7:40 7:13</p> <p>Rise 21:54 22:15</p> <p><b>9</b></p> <p>40°N 50°N</p> <p>Set 8:40 8:22</p> <p>Rise 22:18 22:31</p> <p><b>10</b></p> <p>40°N 50°N</p> <p>Set 9:41 9:30</p> <p>Rise 22:40 22:46</p> <p><b>11</b></p> <p>Sunrise 5:41 5:04</p> <p>Sunset 20:30 21:07</p>	<p>40°N 50°N</p> <p>Set 10:41 10:39</p> <p>Rise 23:02 23:00</p> <p><b>12</b></p> <p>40°N 50°N</p> <p>Set 11:42 11:49</p> <p>Rise 23:25 23:15</p> <p><b>13</b></p> <p>40°N 50°N</p> <p>Set 12:46 13:01</p> <p>Rise 23:50 23:31</p> <p><b>14</b></p> <p>40°N 50°N</p> <p>Set 13:52 14:17</p> <p>Rise -- 23:52</p> <p>Last Quarter 5:53</p> <p><b>15</b></p> <p>40°N 50°N</p> <p>Set 0:19 --</p> <p>Rise 15:02 15:36</p> <p><b>16</b></p> <p>40°N 50°N</p> <p>Set 0:55 0:19</p> <p>Rise 16:14 16:56</p> <p><b>17</b></p> <p>40°N 50°N</p> <p>Set 1:39 0:55</p> <p>Rise 17:25 18:13</p> <p><b>18</b></p> <p>Sunrise 5:46 5:11</p> <p>Sunset 20:26 21:00</p>	<p>40°N 50°N</p> <p>Rise 2:35 1:47</p> <p>Set 18:31 19:19</p> <p><b>19</b></p> <p>40°N 50°N</p> <p>Rise 3:43 2:55</p> <p>Set 19:27 20:10</p> <p><b>20</b></p> <p>40°N 50°N</p> <p>Rise 4:59 4:19</p> <p>Set 20:14 20:48</p> <p>New Moon 22:35</p> <p><b>21</b></p> <p>40°N 50°N</p> <p>Rise 6:20 5:49</p> <p>Set 20:52 21:16</p> <p><b>22</b></p> <p>40°N 50°N</p> <p>Rise 7:39 7:19</p> <p>Set 21:24 21:38</p> <p><b>23</b></p> <p>40°N 50°N</p> <p>Rise 8:55 8:46</p> <p>Set 21:52 21:56</p> <p><b>24</b></p> <p>40°N 50°N</p> <p>Rise 10:08 10:09</p> <p>Set 22:18 22:13</p> <p><b>25</b></p> <p>Sunrise 5:52 5:20</p> <p>Sunset 20:20 20:52</p>	<p>Io casts shadow on Europa visible in W of N. America</p> <p>Io occults one-third of Europa visible in W of N. America 6:59 am</p> <p>8:05 am</p> <p>Old crescent Moon, 19 hours before new in E, 15 hours before new in W, a challenge in morning twilight</p> <p>Total Solar Eclipse visible only in E hemisphere longest totality of the 21st Century</p> <p>Io casts shadow on Europa visible in Newfoundland 8:11 pm</p> <p>The Dam Star Party, Fredericton, NB www.nb.rasc.ca (through Jul. 26)</p> <p>Annual Telescope Making Contest (CAFTA) Salaberry-de-Valleyfield, QC membres.lycos.fr/cdadfs/cafta.html (through Jul. 26)</p> <p>Star-B-Q, Eccles Ranch, AB calgary.rasc.ca (through Jul. 26)</p>	<p>40°N 50°N</p> <p>Rise 11:19 11:29</p> <p>Set 22:44 22:30</p> <p><b>26</b></p> <p>40°N 50°N</p> <p>Rise 12:27 12:47</p> <p>Set 23:12 22:49</p> <p><b>27</b></p> <p>40°N 50°N</p> <p>Rise 13:34 14:03</p> <p>Set 23:42 23:11</p> <p>First Quarter 18:00</p> <p><b>28</b></p> <p>40°N 50°N</p> <p>Rise 14:40 15:17</p> <p>Set -- 23:37</p> <p><b>29</b></p> <p>40°N 50°N</p> <p>Set 0:16 --</p> <p>Rise 15:43 16:27</p> <p><b>30</b></p> <p>40°N 50°N</p> <p>Set 0:56 0:11</p> <p>Rise 16:41 17:29</p> <p><b>31</b></p> <p>Io casts shadow on Europa visible in all of N. America except extreme W 10:39 pm</p> <p>Io occults one-third of Europa, visible in N. America except W 11:21 pm</p>	<p>S 5-Aquarid meteors (ZHR=20) 11 pm</p>	<p>7 Iris at opposition tomorrow (m=8.7) Earth at aphelion (152,091,000 km) 10 pm</p> <p>Lunik 3 photographed far side of the Moon 50 years ago</p> <p>Titan's shadow on Saturn visible in all of N. America, except Atlantic and N. Canada 10:00 pm</p> <p>Cr. Moon separating from Pleiades visible before dawn, best in E Mars 4° to lower right</p> <p>Io casts shadow on Ganymede visible in W of N. America 7:54 am</p>	<p>Canada Day</p> <p>Ganymede eclipses Io, visible in all of N. America except NW 1:31 am</p> <p>Titan's shadow on Saturn visible in all of N. America, except Atlantic and N. Canada 10:49 pm</p> <p>Explorer 6 achieved first satellite photos of Earth 50 years ago</p> <p>Ganymede eclipses Io visible in all of N. America except extreme NE 4:27 am</p> <p>Ganymede eclipses Io visible in W of N. America 7:18 am</p> <p>Gateway to the Universe Star Party Restoule Provincial Park, ON www.gatewaytotheuniverse.org (through Jul. 19)</p>
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# AUGUST

## Star Maker at Work

The Pacman Nebula (NGC 281) is named for its superficial resemblance to the shape of a classic video-game character. In reality it is an active star-forming region about 10,000 light-years distant, in Cassiopeia. The complex includes a cluster of hot new stars, cold obscuring gas and dust clouds, and small dark knots of gas called Bok globules visible against the bright nebula.

Photo by Pierre Tremblay

### SUNDAY

### MONDAY


### TUESDAY

### WEDNESDAY

### THURSDAY

### FRIDAY

### SATURDAY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																				
<p><b>The planets this month</b></p> <p>Mercury: very low in W in evening twilight</p> <p>Venus: low in NE in morning twilight</p> <p>Mars: rises near 1 am in NE, in E at dawn</p> <p>Jupiter: low in SW after dark, transits in S near 1 am, very low in SE in morning twilight</p> <p>Saturn: very low in W in evening twilight</p>	<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>	<p>JULY</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr> <tr><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr> <tr><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td></td></tr> </table> <p>SEPTEMBER</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr> <tr><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td></tr> <tr><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td>27</td><td>28</td><td>29</td><td>30</td><td></td><td></td><td></td></tr> </table>	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		S	M	T	W	T	F	S			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				 <p>www.astronomy2009.ca</p>			<p>40°N 50°N</p> <p>Set 1:42 --</p> <p>Rise 17:33 18:22</p> <p>1</p> <p>Sunrise 5:59 5:30</p> <p>Sunset 20:13 20:42</p> <p>Venus slides 2.5° to lower right of M35, visible in morning twilight through August 4</p>
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<p>40°N 50°N</p> <p>Set 2:35 1:47</p> <p>Rise 18:19 19:04</p> <p>2</p>	<p>40°N 50°N</p> <p>Set 3:32 2:48</p> <p>Rise 18:57 19:36</p> <p>3</p>	<p>40°N 50°N</p> <p>Set 4:31 3:54</p> <p>Rise 19:30 20:02</p> <p>4</p>	<p>40°N 50°N</p> <p>Set 5:32 5:03</p> <p>Rise 19:58 20:22</p> <p>Full Moon 20:55</p> <p>5</p>	<p>40°N 50°N</p> <p>Set 6:34 6:12</p> <p>Rise 20:23 20:39</p> <p>6</p>	<p>40°N 50°N</p> <p>Set 7:34 7:21</p> <p>Rise 20:46 20:54</p> <p>7</p>	<p>40°N 50°N</p> <p>Set 8:35 8:30</p> <p>Rise 21:08 21:08</p> <p>8</p> <p>Sunrise 6:05 5:40</p> <p>Sunset 20:05 20:30</p>																																																																																				
<p>Titan's shadow on Saturn, visible in W of N. America, best in far W 9:12 pm</p>	<p>Civic Holiday (Canada)</p> <p>Edwin Hubble obtained photo with as many galaxies as foreground stars 75 years ago</p>		<p>Penumbral Lunar Eclipse not visible in W of N. America perhaps too shallow to be noticeable in E 8 pm</p> <p>Today's full Moon is the Sturgeon Moon</p>	<p>16 Psyche at opposition (m=9.3)</p>	<p>Io casts shadow on Europa and occults it 20 min later visible in all of N. America except the Arctic 1:10 am</p>																																																																																					
<p>40°N 50°N</p> <p>Set 9:36 9:39</p> <p>Rise 21:30 21:23</p> <p>9</p>	<p>40°N 50°N</p> <p>Set 10:38 10:50</p> <p>Rise 21:54 21:38</p> <p>10</p>	<p>40°N 50°N</p> <p>Set 11:43 12:04</p> <p>Rise 22:21 21:57</p> <p>11</p>	<p>40°N 50°N</p> <p>Set 12:50 13:20</p> <p>Rise 22:54 22:21</p> <p>12</p>	<p>40°N 50°N</p> <p>Set 13:59 14:38</p> <p>Rise 23:33 22:52</p> <p>Last Quarter 14:55</p> <p>13</p>	<p>40°N 50°N</p> <p>Set 15:09 15:54</p> <p>Rise -- 23:36</p> <p>14</p>	<p>40°N 50°N</p> <p>Rise 0:22 --</p> <p>Set 16:15 17:03</p> <p>15</p> <p>Sunrise 6:12 5:50</p> <p>Sunset 19:56 20:18</p>																																																																																				
	<p>Saturn's rings edge-on to the Sun next ring crossing is in 2025</p>	<p>Ganymede eclipses Europa visible in W of N. America 9:43 pm</p>	<p>Perseid meteors (ZHR=90) best seen in pre-dawn hours today or tomorrow 2 pm</p>	<p>RASC General Assembly, in conjunction with the Saskatchewan Summer Star Party www.rasc.ca/ga2009 (through Aug. 16)</p>	<p>Io casts shadow on Europa and occults it, visible in all of N. America except NE Arctic 3:48 am</p> <p>Last quarter Moon occults Pleiades visible before dawn in all except the E of N. America</p> <p>Jupiter at opposition (m=-2.9)</p>	<p>Io casts shadow on Ganymede visible in Atlantic Canada Moon 2.5° to left of Mars visible in late evening best in E of N. America 7:47 pm</p>																																																																																				
<p>40°N 50°N</p> <p>Rise 1:23 0:34</p> <p>Set 17:14 17:59</p> <p>16</p>	<p>40°N 50°N</p> <p>Rise 2:33 1:49</p> <p>Set 18:04 18:42</p> <p>17</p>	<p>40°N 50°N</p> <p>Rise 3:51 3:15</p> <p>Set 18:45 19:14</p> <p>18</p>	<p>40°N 50°N</p> <p>Rise 5:10 4:44</p> <p>Set 19:20 19:39</p> <p>19</p>	<p>40°N 50°N</p> <p>Rise 6:28 6:13</p> <p>Set 19:50 19:59</p> <p>New Moon 6:02</p> <p>20</p>	<p>40°N 50°N</p> <p>Rise 7:44 7:39</p> <p>Set 20:17 20:17</p> <p>21</p>	<p>40°N 50°N</p> <p>Rise 8:57 9:02</p> <p>Set 20:44 20:35</p> <p>22</p> <p>Sunrise 6:18 6:00</p> <p>Sunset 19:46 20:04</p>																																																																																				
<p>Saturn 3.0° above Mercury (Mercury m=0.1, Saturn m=1.1) visible soon after sunset best with binoculars</p>	<p>Neptune at opposition (m=7.8)</p>		<p>Ganymede eclipses Europa 2:00 am</p> <p>Old crescent Moon, 25 hours before new in E, 21 hours before new in W, visible in morning twilight</p> <p>Two shadows on Jupiter visible in Atlantic Canada 7:47 pm</p>	<p>Stellafane Convention, Springfield, VT www.stellafane.org (through Aug. 23)</p> <p>Starfest, Mount Forest, ON www.nyaa.ca (through Aug. 23)</p>	<p>Nova East, Smileys Provincial Park, NS halifax.rasc.ca/ne (through Aug. 23)</p> <p>Io completely occults Europa then casts shadow on it 20 min later visible in W of N. America 6:10 am</p>	<p>First day of Ramadan</p> <p>Io casts shadow on Ganymede visible in all of N. America except NW 11:15 pm</p>																																																																																				
<p>40°N 50°N</p> <p>Rise 10:08 10:24</p> <p>Set 21:12 20:53</p> <p>23</p>	<p>40°N 50°N</p> <p>Rise 11:18 11:43</p> <p>Set 21:42 21:14</p> <p>24</p>	<p>40°N 50°N</p> <p>Rise 12:26 13:00</p> <p>Set 22:15 21:39</p> <p>25</p>	<p>40°N 50°N</p> <p>Rise 13:32 14:13</p> <p>Set 22:54 22:11</p> <p>26</p>	<p>40°N 50°N</p> <p>Rise 14:33 15:19</p> <p>Set 23:38 22:51</p> <p>First Quarter 7:42</p> <p>27</p>	<p>40°N 50°N</p> <p>Rise 15:28 16:16</p> <p>Set -- 23:40</p> <p>28</p>	<p>40°N 50°N</p> <p>Set 0:29 --</p> <p>Rise 16:16 17:02</p> <p>29</p> <p>Sunrise 6:25 6:11</p> <p>Sunset 19:36 19:50</p>																																																																																				
<p>Mars slides within 1° to lower right of M35, visible in morning twilight through end of August</p>	<p>Mercury at greatest elongation E (27°) Io completely occults Europa visible in Atlantic Canada 7:24 pm</p> <p>Io casts shadow on Europa visible in E of N. America 8:06 pm</p>	<p>88 Thisbe opposition (m=9.9) yesterday</p>	<p>Ganymede eclipses Europa visible in W of N. America 6:54 am</p> <p>Jupiter with only one satellite visible 9:59 pm</p> <p>Two shadows on Jupiter, visible in all of N. America 10:42 pm</p>	<p>Moon occults Antares in daylight in E of N. America, graze from Brockville ON - S MA, USA 6 pm</p>	<p>Lunar Straight Wall visible best in E of N. America 8 pm</p>																																																																																					
<p>40°N 50°N</p> <p>Set 1:24 0:38</p> <p>Rise 16:57 17:38</p> <p>30</p>	<p>40°N 50°N</p> <p>Set 2:23 1:43</p> <p>Rise 17:31 18:06</p> <p>31</p>					<p>Io casts shadow on Ganymede visible in all of N. America except Atlantic Canada 3:41 am</p>																																																																																				




































# SEPTEMBER

## Fiery Elegance

One hundred light-years long and about 1,500 light-years away in the constellation Perseus is the California Nebula, so named because it resembles the shape of that state. Long-exposure photography reveals the nebula's exquisite structural detail. The cloud's gas has been ionized by ultraviolet light from the nearby bright blue star. It shines away the excess energy with the red light characteristic of emission nebulae. Photo by Wayne Malkin

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p><b>The planets this month</b></p> <p>Mercury: very low in E in morning twilight in last week of month</p> <p>Venus: low in E in morning twilight</p> <p>Mars: rises after midnight in NE, high in ESE at dawn</p> <p>Jupiter: transits in S after 10 pm, sets in WSW after 3 am</p> <p>Saturn: not easily observed</p>	 <p>www.astronomy2009.ca</p>	 <p>40°N 50°N Set 3:24 2:51 Rise 18:01 18:28</p> <p><b>1</b></p> <p>Venus slides within 1.5° to lower right of M44 in morning twilight through September 3</p>	 <p>40°N 50°N Set 4:25 4:01 Rise 18:27 18:46</p> <p><b>2</b></p> <p>Moon 3° to upper left of Jupiter visible all night Jupiter with only one satellite visible, 45 min later no satellite visible 11:58 pm</p>	 <p>40°N 50°N Set 5:26 5:10 Rise 18:51 19:02</p> <p><b>3</b></p> <p>Yuri Gagarin, the first human in space, born 75 years ago</p> <p>Jupiter with no satellites visible! 12:44 am Two shadows on Jupiter visible in all of N. America except Atlantic Canada 2:43 am</p>	 <p>40°N 50°N Set 6:27 6:19 Rise 19:13 19:16 Full Moon 12:03</p> <p><b>4</b></p> <p>Saturn's rings edge-on to Earth next ring crossing is in 2025 Today's full Moon is the Fruit Moon</p>	 <p>40°N 50°N Set 7:28 7:29 Rise 19:36 19:31</p> <p><b>5</b></p> <p>Sunrise 6:32 6:21 Sunset 19:25 19:35</p> <p>Multiple Mirror Telescope was dedicated in Arizona 30 years ago Io casts shadow on Europa, visible in extreme W of N. America 6:19 am</p>
 <p>40°N 50°N Set 8:31 8:40 Rise 20:00 19:47</p> <p><b>6</b></p>	 <p>40°N 50°N Set 9:35 9:53 Rise 20:26 20:04</p> <p><b>7</b></p> <p>Labour Day Voyager 2 made flyby of Jupiter 30 years ago</p>	 <p>40°N 50°N Set 10:42 11:09 Rise 20:57 20:26</p> <p><b>8</b></p> <p>42 Isis at opposition (m=9.4) Io casts shadow on Europa visible in E of N. America 7:37 pm</p>	 <p>40°N 50°N Set 11:50 12:26 Rise 21:33 20:55</p> <p><b>9</b></p>	 <p>40°N 50°N Set 12:59 13:42 Rise 22:18 21:34</p> <p><b>10</b></p> <p>Piggot discovered the first Cepheid variable, Eta Aquilae, 225 years ago Jupiter with only one satellite visible in W of N. America 4:04 am</p>	 <p>40°N 50°N Set 14:05 14:52 Rise 23:13 22:26 Last Quarter 22:16</p> <p><b>11</b></p> <p>Carl Sagan, astronomy educator, born 75 years ago</p>	 <p>40°N 50°N Set 15:05 15:52 Rise -- 23:32</p> <p><b>12</b></p> <p>Sunrise 6:38 6:32 Sunset 19:13 19:20</p> <p>Moon 3° to upper right of Mars visible after midnight</p>
 <p>40°N 50°N Rise 0:18 -- Set 15:56 16:38</p> <p><b>13</b></p> <p>Moon occults Mars in daylight, visible from Baffin Island and NE 12 pm</p>	 <p>40°N 50°N Rise 1:31 0:51 Set 16:40 17:13</p> <p><b>14</b></p>	 <p>40°N 50°N Rise 2:47 2:16 Set 17:16 17:40</p> <p><b>15</b></p> <p>Northern Prairie Starfest, near Tofield, AB edmontonrasc.com/nps.html (through Sep. 20) Io casts shadow on Europa visible in all of N. America except extreme W 10:11 pm</p>	 <p>40°N 50°N Rise 4:03 3:43 Set 17:47 18:01</p> <p><b>16</b></p>	 <p>40°N 50°N Rise 5:18 5:09 Set 18:16 18:20</p> <p><b>17</b></p> <p>Uranus at opposition (m=5.7) Follow Capella unaided into daylight best within a few days of today Zodiacal light readily visible in E before morning twilight for next two weeks</p>	 <p>40°N 50°N Rise 6:32 6:33 Set 18:43 18:38 New Moon 14:44</p> <p><b>18</b></p> <p>Annual Algonquin Adventure Algonquin Park, ON www.toronto.rasc.ca (through Sep. 20) Venus 2.5° above Regulus visible in morning twilight</p>	 <p>40°N 50°N Rise 7:45 7:55 Set 19:10 18:56</p> <p><b>19</b></p> <p>Sunrise 6:45 6:42 Sunset 19:02 19:04</p> <p>Rosh Hashanah Begins Alberta Star Party, Starland, AB calgary.rasc.ca (through Sep. 20) Venus 1.5° above Regulus visible in morning twilight</p>
 <p>40°N 50°N Rise 8:56 9:16 Set 19:40 19:16</p> <p><b>20</b></p> <p>Venus 0.5° to left of Regulus visible in morning twilight Europa transits Ganymede minutes after transiting Jupiter visible in SW of N. America 8:46 pm</p>	 <p>40°N 50°N Rise 10:06 10:36 Set 20:12 19:40</p> <p><b>21</b></p> <p>3 Juno at opposition (m=7.6) Venus 1.1° to lower left of Regulus visible in morning twilight</p>	 <p>40°N 50°N Rise 11:14 11:53 Set 20:49 20:09</p> <p><b>22</b></p> <p>Venus 2.2° to lower left of Regulus visible in morning twilight Fall Equinox 5:18 pm</p>	 <p>40°N 50°N Rise 12:19 13:03 Set 21:32 20:47</p> <p><b>23</b></p> <p>Io casts shadow on Europa 12:40 am Moon 3° to lower right of Antares visible in the evening</p>	 <p>40°N 50°N Rise 13:18 14:05 Set 22:21 21:33</p> <p><b>24</b></p> <p>20 Massalia at opposition (m=9.3)</p>	 <p>40°N 50°N Rise 14:09 14:56 Set 23:15 22:29</p> <p><b>25</b></p>	 <p>40°N 50°N Rise 14:53 15:36 Set -- 23:31 First Quarter 0:50 Sunrise 6:52 6:53 Sunset 18:50 18:49</p> <p><b>26</b></p>
 <p>40°N 50°N Set 0:13 -- Rise 15:30 16:07</p> <p><b>27</b></p> <p>Jupiter with only one satellite visible visible in E of N. America 8:02 pm Europa transits Ganymede, visible in all of N. America 11:37 pm</p>	 <p>40°N 50°N Set 1:13 0:38 Rise 16:02 16:31</p> <p><b>28</b></p> <p>Yom Kippur</p>	 <p>40°N 50°N Set 2:14 1:47 Rise 16:29 16:51</p> <p><b>29</b></p> <p>Moon 2° to upper left of Jupiter visible in evening</p>	 <p>40°N 50°N Set 3:15 2:56 Rise 16:54 17:08</p> <p><b>30</b></p> <p>Io casts shadow on Europa visible in W and S of N. America best in W 3:06 am</p>	<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>		<p>AUGUST S M T W T F S</p> <p>2 3 4 5 6 7 8</p> <p>9 10 11 12 13 14 15</p> <p>16 17 18 19 20 21 22</p> <p>23 24 25 26 27 28 29</p> <p>30 31</p> <p>OCTOBER S M T W T F S</p> <p>4 5 6 7 8 9 10</p> <p>11 12 13 14 15 16 17</p> <p>18 19 20 21 22 23 24</p> <p>25 26 27 28 29 30 31</p>







































# OCTOBER

## Luminous Pinwheel

Sparkling with the red of abundant star-forming regions and the blue of countless hot, young, massive stars, is M33, the Pinwheel Galaxy, in Triangulum. A member of the local group of galaxies, M33 lies only three million light-years away, and is a favourite telescopic target. Professional astronomers puzzle over the galaxy's unusually large stellar nurseries - the numerous bright pink nebulae easily visible in this image. Photo by Stuart Heggie

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p><b>The planets this month</b></p> <p>Mercury: very low in E in morning twilight, lost in twilight in last week of month</p> <p>Venus: very low in ESE in morning twilight</p> <p>Mars: rises near midnight in ENE, transits high in SE at dawn</p> <p>Jupiter: in SSE after dark, sets in WSW near 2 am</p> <p>Saturn: very low in E in morning twilight, more easily observed late in month</p>	<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>	<p>SEPTEMBER S M T W T F S</p> <p>1 2 3 4 5</p> <p>6 7 8 9 10 11 12</p> <p>13 14 15 16 17 18 19</p> <p>20 21 22 23 24 25 26</p> <p>27 28 29 30</p> <p>NOVEMBER S M T W T F S</p> <p>1 2 3 4 5 6 7</p> <p>8 9 10 11 12 13 14</p> <p>15 16 17 18 19 20 21</p> <p>22 23 24 25 26 27 28</p> <p>29 30</p>	 <p>THE UNIVERSE SCIENCE FICTION CONVENTION INTERNATIONAL YEAR OF ASTRONOMY 2009 www.astronomy2009.ca</p>	 <p>40°N 50°N Set 4:16 4:05 Rise 17:17 17:23</p> <p>1</p>	 <p>40°N 50°N Set 5:17 5:15 Rise 17:40 17:38</p> <p>2</p>	 <p>40°N 50°N Set 6:20 6:26 Rise 18:03 17:53</p> <p>Sunrise 6:58 7:03 Sunset 18:39 18:34</p> <p>3</p>
 <p>40°N 50°N Set 7:24 7:39 Rise 18:29 18:11 Full Moon 2:10</p> <p>4</p>	 <p>40°N 50°N Set 8:31 8:55 Rise 18:59 18:32</p> <p>5</p>	 <p>40°N 50°N Set 9:40 10:13 Rise 19:34 18:59</p> <p>6</p>	 <p>40°N 50°N Set 10:50 11:31 Rise 20:17 19:35</p> <p>7</p>	 <p>40°N 50°N Set 11:57 12:43 Rise 21:10 20:23</p> <p>8</p>	 <p>40°N 50°N Set 12:59 13:46 Rise 22:12 21:25</p> <p>9</p>	 <p>40°N 50°N Set 13:53 14:36 Rise 23:21 22:39</p> <p>Sunrise 7:05 7:14 Sunset 18:28 18:19</p> <p>10</p>
<p>Today's full Moon is the Harvest Moon</p>	<p>Saturn 2.9° to lower left of Mercury (Mercury m= -0.4, Saturn m=1.1) visible in morning twilight Mercury at greatest elongation W (18°) best morning view in 2009</p>	<p>Follow Sirius unaided into daylight best within a few days of today Saturn 2.0° to lower left of Mercury Venus 5.5° to upper right visible in morning twilight</p>	<p>Saturn 1.1° to lower left of Mercury visible in morning twilight Moon separating from Pleiades visible in evening twilight for all of N. America, best in E</p>	<p>Draconid meteors 3 am Saturn 0.3° to upper left of Mercury visible in morning twilight; closest approach 18' not visible 4 am</p>	<p>89 Julia at opposition (m=9.9) Saturn 1.3° to upper right of Mercury visible in morning twilight</p>	<p>Saturn 2.5° to upper right of Mercury visible in morning twilight 18 Melpomene at opposition (m=7.9) lo casts shadow on Europa visible in E of N. America 6:42 pm</p>
 <p>40°N 50°N Set 14:38 15:13 Rise -- -- Last Quarter 4:56</p> <p>11</p>	 <p>40°N 50°N Rise 0:34 0:01 Set 15:15 15:42</p> <p>12</p>	 <p>40°N 50°N Rise 1:48 1:24 Set 15:47 16:05</p> <p>13</p>	 <p>40°N 50°N Rise 3:01 2:47 Set 16:16 16:24</p> <p>14</p>	 <p>40°N 50°N Rise 4:13 4:09 Set 16:43 16:42</p> <p>15</p>	 <p>40°N 50°N Rise 5:24 5:30 Set 17:10 17:00</p> <p>16</p>	 <p>40°N 50°N Rise 6:35 6:50 Set 17:38 17:19</p> <p>Sunrise 7:13 7:25 Sunset 18:17 18:04</p> <p>17</p>
<p>Saturn 2.4° to lower left of Venus visible in morning twilight Moon 3° to lower left of Mars visible after midnight</p>	<p>Thanksgiving Day (Canada) Columbus Day (USA)</p> <p>Saturn 1.4° to lower left of Venus Mercury 4° to lower left of Saturn visible in morning twilight</p>	<p>Saturn 0.5° to left of Venus 5 am</p>	<p>Saturn 1.1° above Venus visible in morning twilight</p>	<p>Saturn 2.2° to upper right of Venus visible in morning twilight</p>	<p>Cr. Moon, Saturn, Mercury, and Venus grouping in morning twilight</p>	<p>Zodiacal light readily visible in E before morning twilight for next two weeks</p>
 <p>40°N 50°N Rise 7:45 8:10 Set 18:09 17:41 New Moon 1:33</p> <p>18</p>	 <p>40°N 50°N Rise 8:55 9:29 Set 18:44 18:08</p> <p>19</p>	 <p>40°N 50°N Rise 10:02 10:43 Set 19:25 18:42</p> <p>20</p>	 <p>40°N 50°N Rise 11:04 11:50 Set 20:12 19:25</p> <p>21</p>	 <p>40°N 50°N Rise 11:59 12:46 Set 21:05 20:18</p> <p>22</p>	 <p>40°N 50°N Rise 12:47 13:31 Set 22:02 21:19</p> <p>23</p>	 <p>40°N 50°N Rise 13:27 14:06 Set 23:02 22:24</p> <p>Sunrise 7:20 7:37 Sunset 18:07 17:51</p> <p>24</p>
			<p>Orionid meteors (ZHR=20) 6 am</p>			<p>Mars 2.5° to upper right of M44 and closing, visible in late evening</p>
 <p>40°N 50°N Rise 14:00 14:32 Set -- 23:32 First Quarter 20:42</p> <p>25</p>	 <p>40°N 50°N Set 0:02 -- Rise 14:29 14:54</p> <p>26</p>	 <p>40°N 50°N Set 1:03 0:41 Rise 14:55 15:12</p> <p>27</p>	 <p>40°N 50°N Set 2:03 1:49 Rise 15:18 15:27</p> <p>28</p>	 <p>40°N 50°N Set 3:03 2:58 Rise 15:41 15:43</p> <p>29</p>	 <p>40°N 50°N Set 4:05 4:08 Rise 16:05 15:58</p> <p>30</p>	 <p>40°N 50°N Set 5:08 5:20 Rise 16:30 16:15</p> <p>Sunrise 7:28 7:48 Sunset 17:59 17:38</p> <p>31</p>
	<p>Lunar Straight Wall visible best in E of N. America Moon 3° to right of Jupiter visible in evening 9 pm</p>					<p>Hallowe'en Mars within M44, rising in late evening, visible through Nov. 1</p>















































# DECEMBER

## Deservedly Famous

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

Photo by Pierre Tremblay

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p><b>The planets this month</b></p> <p>Mercury: very low in SW in evening twilight, best mid-month</p> <p>Venus: not easily observed</p> <p>Mars: rises after 8 pm in ENE, transits high in S near 4 am</p> <p>Jupiter: in SSW after dark, sets in WSW near 9 pm</p> <p>Saturn: rises in E after midnight, in S at dawn</p>	 <p>www.astronomy2009.ca</p>	 <p>40°N 50°N Set 6:24 7:06 Rise 15:51 15:08</p> <p><b>1</b></p> <p>Nearly full Moon occults Pleiades visible in morning twilight in W of N. America</p>	 <p>40°N 50°N Set 7:34 8:20 Rise 16:49 16:02 Full Moon 2:30</p> <p><b>2</b></p> <p>Today's full Moon is the Cold Moon</p>	 <p>40°N 50°N Set 8:37 9:22 Rise 17:56 17:12</p> <p><b>3</b></p> <p>Halley's Comet reached its first perihelion after orbit was calculated, 250 years ago</p>	 <p>40°N 50°N Set 9:30 10:10 Rise 19:11 18:33</p> <p><b>4</b></p>	 <p>40°N 50°N Set 10:14 10:46 Rise 20:27 19:58</p> <p><b>5</b></p> <p>Sunrise 7:07 7:42 Sunset 16:35 15:59</p>
 <p>40°N 50°N Set 10:51 11:13 Rise 21:42 21:23</p> <p><b>6</b></p>	 <p>40°N 50°N Set 11:22 11:35 Rise 22:54 22:45</p> <p><b>7</b></p>	 <p>40°N 50°N Set 11:49 11:53 Rise -- -- Last Quarter 19:13</p> <p><b>8</b></p>	 <p>40°N 50°N Rise 0:04 0:05 Set 12:15 12:11</p> <p><b>9</b></p> <p>19 Fortuna at opposition (m=9.3)</p>	 <p>40°N 50°N Rise 1:13 1:22 Set 12:42 12:29</p> <p><b>10</b></p>	 <p>40°N 50°N Rise 2:21 2:39 Set 13:10 12:48</p> <p><b>11</b></p>	 <p>40°N 50°N Rise 3:28 3:56 Set 13:41 13:11</p> <p><b>12</b></p> <p>Sunrise 7:13 7:50 Sunset 16:35 15:58</p>
 <p>40°N 50°N Rise 4:35 5:10 Set 14:17 13:39</p> <p><b>13</b></p>	 <p>40°N 50°N Rise 5:39 6:21 Set 14:59 14:15</p> <p><b>14</b></p> <p>Geminid meteors (ZHR=120) 12 am</p>	 <p>40°N 50°N Rise 6:39 7:25 Set 15:47 15:00</p> <p><b>15</b></p>	 <p>40°N 50°N Rise 7:32 8:18 Set 16:41 15:55 New Moon 7:02</p> <p><b>16</b></p>	 <p>40°N 50°N Rise 8:18 9:01 Set 17:39 16:58</p> <p><b>17</b></p>	 <p>40°N 50°N Rise 8:57 9:34 Set 18:40 18:04</p> <p><b>18</b></p> <p>Islamic New Year Mercury at greatest elongation E (20°)</p>	 <p>40°N 50°N Rise 9:29 9:59 Set 19:40 19:12</p> <p><b>19</b></p> <p>Sunrise 7:17 7:55 Sunset 16:37 16:00</p> <p>Neptune 0.5° to upper right of Jupiter visible in twilight next few evenings</p>
 <p>40°N 50°N Rise 9:57 10:20 Set 20:40 20:20</p> <p><b>20</b></p> <p>Two shadows on Jupiter visible in all of N. America except E, best in W 8:34 pm</p>	 <p>40°N 50°N Rise 10:22 10:37 Set 21:39 21:27</p> <p><b>21</b></p> <p>Mars is stationary Winter Solstice 12:47 pm</p>	 <p>40°N 50°N Rise 10:45 10:52 Set 22:38 22:34</p> <p><b>22</b></p> <p>Ursid meteors (ZHR=10) 9 am</p>	 <p>40°N 50°N Rise 11:07 11:07 Set 23:37 23:42</p> <p><b>23</b></p> <p>Lunar X near crater Werner visible in all of N. America 6 pm</p>	 <p>40°N 50°N Rise 11:30 11:22 Set -- -- First Quarter 12:36</p> <p><b>24</b></p> <p>Lunar Straight Wall visible best in E of N. America 6 pm</p>	 <p>40°N 50°N Set 0:38 0:51 Rise 11:54 11:38</p> <p><b>25</b></p> <p>Christmas Day</p>	 <p>40°N 50°N Set 1:42 2:03 Rise 12:22 11:58</p> <p><b>26</b></p> <p>Sunrise 7:21 7:58 Sunset 16:41 16:04</p> <p>Boxing Day (Canada)</p>
 <p>40°N 50°N Set 2:49 3:19 Rise 12:55 12:23</p> <p><b>27</b></p> <p>324 Bamberga at opposition (m=9.8)</p>	 <p>40°N 50°N Set 3:59 4:37 Rise 13:37 12:57</p> <p><b>28</b></p> <p>Gibbous Moon occults Pleiades visible in evening</p>	 <p>40°N 50°N Set 5:09 5:54 Rise 14:28 13:43</p> <p><b>29</b></p>	 <p>40°N 50°N Set 6:16 7:03 Rise 15:31 14:45</p> <p><b>30</b></p>	 <p>40°N 50°N Set 7:15 7:59 Rise 16:44 16:02 Full Moon 14:13</p> <p><b>31</b></p> <p>Largest full Moon of 2009 Partial lunar Eclipse visible extreme NE Canada, penumbral part visible from Quebec &amp; NE U.S. Today's full Moon is a Blue Moon</p>	<p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages.</p> <p>Please see back pages for photo details and additional information about this Calendar.</p>	<p>NOVEMBER S M T W T F S</p> <p>1 2 3 4 5 6 7</p> <p>8 9 10 11 12 13 14</p> <p>15 16 17 18 19 20 21</p> <p>22 23 24 25 26 27 28</p> <p>29 30</p> <p>JANUARY S M T W T F S</p> <p>1 2</p> <p>3 4 5 6 7 8 9</p> <p>10 11 12 13 14 15 16</p> <p>17 18 19 20 21 22 23</p> <p>24 25 26 27 28 29 30</p> <p>31</p>



# The Royal Astronomical Society of Canada Observer's Calendar

## How to Use this Calendar

A graphical representation of the Moon's appearance in the late evening is given in each daily box. In addition to the varying phase, the depicted size of the Moon varies, reflecting the change in the apparent size of the Moon in the sky as it moves closer to or farther from Earth. The depicted face of the Moon also changes slightly to reflect lunar libration, the rocking motion of the Moon, which means that over time approximately 59% of the lunar surface can be seen from Earth. A small dot of size proportional to the amount of libration appears near the lunar limb that is librated. These daily lunar graphics were prepared using images provided by Roger Fell.

Daily Moon and weekly Sun rise and set times, and the times of Moon phases, are shown in the top portion of the boxes. If no Moon rise or set time is given, this event occurs the next day.

A summary of the naked-eye visibility and position of the planets is given each month. Descriptions are for approximate latitude 45° and unless otherwise stated apply to midmonth; rise and set times at the beginning or end of the month may vary by an hour or more from those given. Times and compass directions may also differ somewhat from the given ones at other latitudes.

Special astronomical events are given at the bottom of the daily boxes. Events observable in some part of Canada or the continental United States are listed. Days on which particularly interesting phenomena or events occur are highlighted with light-green shading. Detailed information on all events, including their visibility from particular locations, may be determined by consulting the *Observer's Handbook*, which is published annually by the RASC.

### Adjustments for Actual Location

When it is in effect, times are adjusted for Daylight Saving Time. Moon phases and special events are given in Eastern time. The user's local time for events other than Moon and Sun rise and set may be determined by converting the given time to the user's time zone (e.g. Pacific time is Eastern time minus 3 hours). For occultations, a further adjustment of an hour or more may be needed for any particular geographical location because of parallax effects. Parallax also means that actual angular separations for events involving the Moon may vary by close to 1° from those given. Also, the Moon's rapid movement of approximately 0.5° per hour means that separations may be considerably larger at a time that is even a few hours away from the given time.

Two sets of rise and set times are given to accommodate North American observers in midnorthern latitudes. Times are displayed for locations 40°N latitude and 75°W longitude and for 50°N, 75°W. The actual times for a given location must be calculated using the tables at the right.

The tables give (longitude) corrections in minutes to the tabulated rise and set times for selected Canadian and U.S. cities. In the column 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
Quebec	50°N - 15	15	47
Regina	50°N + 58 <sup>(1)</sup>	10	50
St. John's	50°N + 1	20	48
Sarnia	40°N + 30	15	43
Saskatoon	50°N + 67 <sup>(1)</sup>	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 <sup>(1)</sup>	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 <sup>(1)</sup>	40	32
Washington	40°N + 8	5	39

<sup>(1)</sup> Subtract 60 minutes in the summer.

### Other Locations, and Improving Accuracy

For locations not listed in the tables to the left, the user should calculate a correction factor. This amount is +4 minutes for each degree that the user's location is west of the central meridian of the user's time zone or -4 minutes for each degree that it is east. This correction factor should be added to the displayed 50°N or 40°N time for the location whose latitude is nearest that of the user's site. The accuracy in minutes for Moon rise and set can be calculated by multiplying the difference between the user's latitude and 50°N/40°N respectively by 4.5, and then adding 0.2 times the difference between the user's longitude and 75°W.

Improvement in accuracy may be obtained for many sites by interpolating or extrapolating the 50°N and 40°N times depending on the user's latitude. For example, the latitude of Ottawa is approximately midway between 50°N and 40°N. An observer in Ottawa can improve accuracy to better than 5 minutes by averaging the given 50°N and 40°N times and then adding the correction factor for Ottawa, which is 3 minutes. Western observers may gain additional accuracy by adding about 10% of the difference between the listed time and the next day's time.

### The Royal Astronomical Society of Canada

Since it was founded in 1890, the RASC has filled a special role in both amateur and professional astronomy. Today, it has about 4,500 members worldwide who share a passion for the night sky and make contributions to astronomy in many ways.

The RASC has a long tradition of high-quality, volunteer-produced publications. The *Observer's Handbook* has been published since 1907 and is recognized worldwide as the leading handbook of its type. The *Journal*, also published since 1907, contains articles of interest to amateur astronomers. The *Beginner's Observing Guide* is an introduction to the night sky for the novice observer, the *Observer's Calendar* is a forum for astrophotography by amateur astronomers, and *Skylways* (available in French as *Explorons l'Astronomie*) is an astronomy teacher's guide.

For information on joining the Society, or to order an RASC publication, visit [www.rasc.ca](http://www.rasc.ca) or contact the national office at:

136 Dupont Street  
 Toronto ON M5R 1V2  
 Canada  
 888-924-7272 (toll free in Canada) or 416-924-7973  
 Email: [nationaloffice@rasc.ca](mailto:nationaloffice@rasc.ca)



## The Photos and the Calendar

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

### Editor

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Mary Lou Whitehorne

### Historical Anniversaries

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### Printing

Thistle Printing Limited



**Cover/November** (Massively Beautiful): Composite image made from 190 minutes of total exposure time (100 minutes in a luminance filter, and 30 minutes in each of red, green, and blue filters) on an SBIG STL-11000 CCD camera using a Takahashi FSQ-106 refracting telescope at f/5; taken on 2007 September 14 remotely using "Global Rent-a-Scope" located in Cloudcroft, New Mexico (Pierre Tremblay).



**January** (Slow and Steady): Composite image made from eight hours of total exposure time (two hours in SII (673 nm), four hours in H-alpha (656 nm), and two hours in OIII (500 nm) - all filters were Astrodon 6-nm bandpass) on an SBIG ST-10XME CCD camera using a Takahashi FSQ-106 (4-inch f/5) astrograph; taken over several nights in 2006 January from Toronto, Ontario (Paul Mortfield and Stefano Cancelli).



**February** (Brilliant Pairing of Planets): An 18-second exposure on Ektachrome 100 taken with an Olympus OM1 camera (fixed tripod) using a 50-mm f/2.8 lens; taken on 1999 February 22 from Wallbrook, Nova Scotia (Roy Bishop).



**March** (Dusty Display): An 8-minute exposure on a Hutech-modified Canon 5D DSLR camera (set at ISO 800) using a 19-mm f/4.5 lens piggy-backed on a Meade 8-inch telescope; taken on 2008 February 27 from Arizona Sky Village, Arizona (Jack Newton).



**April** (Illuminating Geology): A 1/160-second exposure on a Canon 20D DSLR camera (set at ISO 800) using a 135-mm f/4.5 lens; taken on 2007 August 28 from the Rothney Astrophysical Observatory near Calgary, Alberta (Alan Dyer).



**May** (Spectacular Surprise): Image made from three 4-minute exposures on a Hutech-modified Canon Rebel XT DSLR camera (set at ISO 800) using a Borg 101-mm refracting telescope (f/4); taken on 2007 November 4 from Arizona Sky Village, Arizona (Jack Newton).



**June** (Tenucus Wisp): Composite image made from six hours of total exposure time through Astrodon CRGB filters on an Apogee U9000 CCD camera using an RCOS 16-inch f/8.9 Ritchey-Chretien telescope; taken over several nights in 2008 June from Sierra Remote Observatories, California (Paul Mortfield and Stefano Cancelli).



**July** (Uncountable Stars): Image made from four 3-minute exposures on a Canon 20Da DSLR camera (set at ISO 400) using a 35-mm L-series lens at f2.8; taken on 2007 August 11 from the Saskatchewan Summer Star Party (Alan Dyer).



**August** (Star Maker at Work): Composite image made from 276 minutes of total exposure time (60 minutes in a luminance filter, 136 minutes in H-alpha, and 40 minutes in each of green and blue filters) on a Starlight Express SXV-H9 CCD camera using a Takahashi Sky 90 telescope with focal reducer (focal length = 411 mm); taken on 2005 September 10 from Quebec City, Quebec and 2006 September 21 remotely using "Global Rent-a-Scope" (luminance channel only) located in Cloudcroft, New Mexico (Pierre Tremblay).



**September** (Fiery Elegance): Composite image made from over 13 hours of total exposure time (in luminance, H-alpha, and red, green, and blue filters) on an SBIG STL-11000M CCD camera using a Pentax 400-mm apochromatic refractor at f/4; taken from suburban Edmonton, Alberta (Wayne Malkin).



**October** (Luminous Pinwheel): Composite image made from 1.5 hours of total exposure time (20 minutes in luminance and 25 minutes in each of red, green, and blue filters - all filters were from Astrodon LRGB set) on an SBIG ST-10XME CCD camera using an Astro-Physics AP155 EDF refractor at f/7; taken on 2007 November 10 from Flesherston, Ontario (Stuart Heggie).



**December** (Deservedly Famous): Composite image made from two hours of total exposure time (60 minutes in a luminance filter, and 20 minutes in each of red, green, and blue filters) on an SBIG STL-11000 CCD camera using a Takahashi FSQ-106 refracting telescope at f/5; taken on 2007 December 2 and 3, remotely using "Global Rent-a-Scope" located in Cloudcroft, New Mexico (Pierre Tremblay).

2009

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

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

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

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

2010

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

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

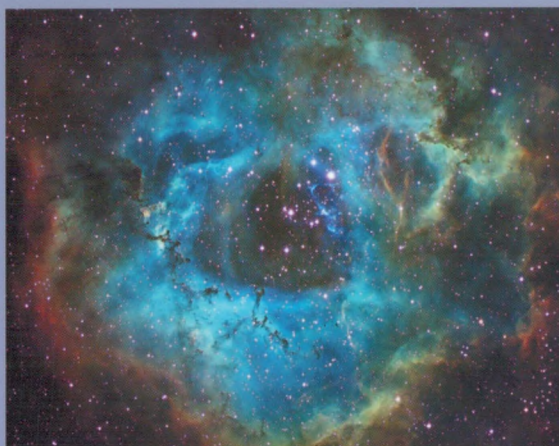
July							August							September							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
				1	2	3					1	2					1	2	3	4	5
4	5	6	7	8	9	10	8	9	<b>10</b>	11	12	13	14	5	6	7	<b>8</b>	9	10	11	
11	<b>12</b>	13	14	15	16	17	15	16	17	18	19	20	21	12	13	14	15	16	17	18	
18	19	20	21	22	23	24	22	23	24	25	26	27	28	19	20	21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

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



New Moon dates are displayed in bold.





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

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

<p>Saturn 2.9° to lower left of Mercury (Mercury <math>m = -0.4</math>, Saturn <math>m = 1.1</math>) visible in morning twilight Mercury at greatest elongation W (18°) best morning view in 2009</p>		<p>Follow Sirius u best within a i Saturn 2.0° to i Venus 5.5° to visible in mor</p>	
	<p>40°N 50°N Rise 0:34 0:01 Set 15:15 15:42</p>	<p>12</p>	
<p>Thanksgiving Day (Canada) Columbus Day (USA)</p>			
<p>Saturn 1.4° to lower left of Venus Mercury 4° to lower left of Saturn visible in morning twilight</p>		<p>Saturn 0.5° to</p>	

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