



THE ROYAL ASTRONOMICAL SOCIETY OF CANADA
OBSERVER'S CALENDAR

2005


































JANUARY

Planets, Take Your Places

Early this month in morning twilight, the Moon and naked-eye planets line up as a mirror image of the photo above, which shows a spring evening twilight. The Pleiades float above brilliant Venus and to the right of Mars. Saturn lies below the Moon, and the trail of the International Space Station above the Moon arcs towards tiny Mercury just above the horizon.

Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>The planets this month</p> <p><i>Mercury: very low in SE in morning twilight early in month</i></p> <p><i>Venus: very low in SE in morning twilight</i></p> <p><i>Mars: very low in SE at dawn</i></p> <p><i>Jupiter: rises in E near midnight, in S at dawn</i></p> <p><i>Saturn: rises in ENE at sunset, sets in WNW at sunrise</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 which are given in local 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</p> <p>5 6 7 8 9 10 11</p> <p>12 13 14 15 16 17 18</p> <p>19 20 21 22 23 24 25</p> <p>26 27 28 29 30 31</p> <p>FEBRUARY S M T W T F S</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</p>				<p> Set 11:00 11:12 Rise 22:36 22:28</p> <p>Sunrise 7:22 7:59 Sunset 16:46 16:09</p> <p>1</p> <p><i>New Year's Day</i></p> <p><i>Earth at perihelion (147,099,100 km) 8 pm</i></p>
<p> Set 11:21 11:24 Rise 23:38 23:40</p> <p>2</p>	<p> Set 11:43 11:37 Rise -- -- Last Quarter 12:46</p> <p>3</p> <p><i>Quadrantid meteors peak 7 am</i></p>	<p> Rise 0:44 0:54 Set 12:05 11:51</p> <p>4</p>	<p> Rise 1:52 2:13 Set 12:32 12:07</p> <p>5</p>	<p> Rise 3:05 3:37 Set 13:04 12:29</p> <p>6</p> <p><i>A 750 g meteorite crashes into a house in Argentina, 20 years ago</i></p>	<p> Rise 4:22 5:04 Set 13:44 13:00</p> <p>7</p> <p><i>Japan's 1st deep space probe launched to measure solar wind, 20 years ago</i></p>	<p> Rise 5:40 6:31 Set 14:37 13:45</p> <p>8</p> <p>Sunrise 7:22 7:57 Sunset 16:52 16:17</p>
<p> Rise 6:52 7:46 Set 15:44 14:50</p> <p>9</p>	<p> Rise 7:54 8:44 Set 17:01 16:13 New Moon 7:03</p> <p>10</p> <p><i>Closest Lunar Perigee of 2005</i></p>	<p> Rise 8:43 9:24 Set 18:22 17:45</p> <p>11</p> <p><i>1st cosmonauts to visit Salyut 4 space station launched, 30 years ago</i></p>	<p> Rise 9:22 9:51 Set 19:43 19:17</p> <p>12</p> <p><i>Asaph Hall Jr., who followed his father into astronomy, dies 75 years ago</i></p>	<p> Rise 9:53 10:11 Set 20:59 20:44</p> <p>13</p> <p><i>Youngest Mars meteorite, 180 million years, found in Antarctic 25 years ago</i></p> <p><i>Mercury 0.4° S of Venus best in S of N. America</i></p> <p>7 am</p> <p><i>Saturn at opposition</i></p>	<p> Rise 10:19 10:27 Set 22:10 22:06</p> <p>14</p>	<p> Rise 10:42 10:42 Set 23:19 23:24</p> <p>15</p> <p>Sunrise 7:20 7:52 Sunset 17:00 16:27</p>
<p> Rise 11:05 10:55 Set -- --</p> <p>16</p>	<p> Set 0:25 0:40 Rise 11:28 11:10 First Quarter 1:57</p> <p>17</p> <p><i>Martin Luther King Jr. Day (USA)</i></p>	<p> Set 1:30 1:55 Rise 11:54 11:26</p> <p>18</p>	<p> Set 2:35 3:09 Rise 12:23 11:46</p> <p>19</p> <p><i>Moon 2.0° below the Pleiades 7 pm</i></p>	<p> Set 3:39 4:22 Rise 12:57 12:12</p> <p>20</p>	<p> Set 4:40 5:30 Rise 13:37 12:47</p> <p>21</p> <p><i>Georges van Biesbroeck, Prof. Emeritus of Astronomy, Yale, born 125 years ago</i></p>	<p> Set 5:37 6:30 Rise 14:25 13:32</p> <p>22</p> <p>Sunrise 7:16 7:46 Sunset 17:07 16:38</p>
<p> Set 6:27 7:19 Rise 15:20 14:29</p> <p>23</p>	<p> Set 7:10 7:57 Rise 16:19 15:34</p> <p>24</p>	<p> Set 7:46 8:26 Rise 17:21 16:44 Full Moon 5:32</p> <p>25</p>	<p> Set 8:16 8:47 Rise 18:24 17:56</p> <p>26</p>	<p> Set 8:42 9:05 Rise 19:27 19:07</p> <p>27</p>	<p> Set 9:05 9:19 Rise 20:29 20:18</p> <p>28</p>	<p> Set 9:26 9:31 Rise 21:31 21:30</p> <p>29</p> <p>Sunrise 7:11 7:37 Sunset 17:16 16:50</p>
<p> Set 9:47 9:44 Rise 22:34 22:42</p> <p>30</p>	<p> Set 10:08 9:57 Rise 23:40 23:58</p> <p>31</p> <p><i>Full Moon today and Mar. 1 but no full Moon in Feb., 25 years ago</i></p> <p><i>Jupiter 1.5° N of Moon best in W of N. America</i></p> <p>5 am</p>					































FEBRUARY

Jewels of the Southern Sky

The four stars of the Southern Cross look like a kite above the Coalsack Nebula at the left, which is one of the largest dark areas of the sky. On the right, the Great Eta Carinae Nebula reigns as the brightest part of the Milky Way. Between these great examples of darkness and light, numerous arrays of star clusters and H-II regions flow along the galactic equator.

Photo by Alan Dyer

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>The planets this month</p> <p>Mercury: not easily observed</p> <p>Venus: not easily observed</p> <p>Mars: low in SE at dawn</p> <p>Jupiter: rises in E before 10 pm, in SW at dawn</p> <p>Saturn: high in ESE after dark, sets in WNW at dawn</p>		 <p>40°N 50°N Set 10:33 10:12 Rise -- --</p> <p>1</p>	 <p>40°N 50°N Rise 0:49 1:17 Set 11:01 10:30 Last Quarter 2:27</p> <p>2</p>	 <p>40°N 50°N Rise 2:02 2:40 Set 11:36 10:55</p> <p>3</p>	 <p>40°N 50°N Rise 3:17 4:05 Set 12:21 11:32</p> <p>4</p>	 <p>40°N 50°N Rise 4:30 5:24 Set 13:19 12:25</p> <p>5</p> <p>Sunrise 7:04 7:27 Sunset 17:24 17:02</p>
 <p>40°N 50°N Rise 5:35 6:28 Set 14:30 13:38</p> <p>6</p>	 <p>40°N 50°N Rise 6:30 7:16 Set 15:49 15:06</p> <p>7</p> <p>Winter Star Party, Florida Keys www.scas.org (through Feb. 13)</p> <p>Mars 0.7° N of Lagoon Nebula (M8) M20 and M21 also nearby 7 am</p>	 <p>40°N 50°N Rise 7:13 7:49 Set 17:11 16:39 New Moon 17:28</p> <p>8</p>	 <p>40°N 50°N Rise 7:48 8:12 Set 18:31 18:10</p> <p>9</p> <p>Chinese New Year</p>	 <p>40°N 50°N Rise 8:17 8:30 Set 19:47 19:38</p> <p>10</p> <p>Islamic New Year</p> <p>1st supernova imaged & discovered in Canada, by David Lane and Paul Gray, 10 years ago</p>	 <p>40°N 50°N Rise 8:42 8:45 Set 20:59 21:00</p> <p>11</p>	 <p>40°N 50°N Rise 9:06 9:00 Set 22:09 22:20</p> <p>12</p> <p>Sunrise 6:56 7:15 Sunset 17:33 17:14</p>
 <p>40°N 50°N Rise 9:29 9:14 Set 23:17 23:38</p> <p>13</p>	 <p>40°N 50°N Rise 9:54 9:30 Set -- --</p> <p>14</p> <p>Valentine's Day</p>	 <p>40°N 50°N Set 0:24 0:55 Rise 10:22 9:49 First Quarter 19:16</p> <p>15</p>	 <p>40°N 50°N Set 1:29 2:10 Rise 10:55 10:13</p> <p>16</p> <p>Moon 1.5° S of the Pleiades best in W of N. America 1 am</p>	 <p>40°N 50°N Set 2:33 3:21 Rise 11:34 10:45</p> <p>17</p>	 <p>40°N 50°N Set 3:32 4:24 Rise 12:19 11:26</p> <p>18</p> <p>Clyde Tombaugh discovers Pluto at Lowell Observatory, 75 years ago</p>	 <p>40°N 50°N Set 4:24 5:17 Rise 13:12 12:19</p> <p>19</p> <p>Sunrise 6:47 7:03 Sunset 17:41 17:26</p>
 <p>40°N 50°N Set 5:09 5:59 Rise 14:10 13:22</p> <p>20</p>	 <p>40°N 50°N Set 5:47 6:30 Rise 15:12 14:31</p> <p>21</p> <p>President's Day (USA)</p>	 <p>40°N 50°N Set 6:19 6:53 Rise 16:15 15:43</p> <p>22</p>	 <p>40°N 50°N Set 6:46 7:11 Rise 17:18 16:56 Full Moon 23:54</p> <p>23</p>	 <p>40°N 50°N Set 7:10 7:26 Rise 18:21 18:08</p> <p>24</p>	 <p>40°N 50°N Set 7:31 7:39 Rise 19:24 19:20</p> <p>25</p>	 <p>40°N 50°N Set 7:52 7:52 Rise 20:28 20:33</p> <p>26</p> <p>Sunrise 6:38 6:49 Sunset 17:49 17:38</p> <p>Zodiacal Light visible in W after evening twilight for next two weeks</p>
 <p>40°N 50°N Set 8:13 8:04 Rise 21:33 21:48</p> <p>27</p> <p>Jupiter 1.9° S of Moon best in W of N. America 9 am</p>	 <p>40°N 50°N Set 8:37 8:18 Rise 22:41 23:06</p> <p>28</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 which are given in local 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</p> <p>1</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>MARCH 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 31</p>


































MARCH

The Universe Above Mauna Kea

To visiting Canadian amateur astronomers, Polaris at 20 degrees latitude must have seemed low in the sky as the bright point of light above the 0.61-m telescope of the University of Hawaii. In this one-hour portrait of star trails at the summit of the mountain, the ghostly red images indicate the movements of the northern visitors.

Photo by Roy Bishop

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>The planets this month</p> <p><i>Mercury: low in W in evening twilight, best at midmonth</i></p> <p><i>Venus: not easily observed</i></p> <p><i>Mars: very low in SE at dawn</i></p> <p><i>Jupiter: rises at dusk in E, low in SW at dawn</i></p> <p><i>Saturn: high in S after dark, sets in WNW before dawn</i></p>		 40°N 50°N Set 9:03 8:35 Rise 23:52 --	 40°N 50°N Rise -- 0:27 Set 9:35 8:57	 40°N 50°N Rise 1:04 1:50 Set 10:15 9:28 Last Quarter 12:36	 40°N 50°N Rise 2:16 3:09 Set 11:07 10:13	 40°N 50°N Rise 3:23 4:18 Set 12:10 11:16 Sunrise 6:27 6:35 Sunset 17:56 17:49
				Moon Occults Antares 6 am		
 40°N 50°N Rise 4:20 5:10 Set 13:24 12:35	 40°N 50°N Rise 5:06 5:47 Set 14:43 14:05	 40°N 50°N Rise 5:43 6:13 Set 16:02 15:36	 40°N 50°N Rise 6:14 6:33 Set 17:19 17:04	 40°N 50°N Rise 6:41 6:49 Set 18:34 18:30 New Moon 4:10	 40°N 50°N Rise 7:05 7:04 Set 19:46 19:52	 40°N 50°N Rise 7:29 7:18 Set 20:56 21:13 Sunrise 6:16 6:20 Sunset 18:04 18:01
						Simon Newcomb born in Wallace Bridge, Nova Scotia, 170 years ago Mercury at greatest elongation E (18°) best evening view in 2005
 40°N 50°N Rise 7:53 7:33 Set 22:05 22:32	 40°N 50°N Rise 8:20 7:51 Set 23:14 23:51	 40°N 50°N Rise 8:52 8:13 Set -- --	 40°N 50°N Set 0:20 1:06 Rise 9:29 8:41	 40°N 50°N Set 1:22 2:14 Rise 10:12 9:20 First Quarter 14:19	 40°N 50°N Set 2:18 3:12 Rise 11:03 10:09	 40°N 50°N Set 3:06 3:58 Rise 11:59 11:09 Sunrise 6:05 6:05 Sunset 18:11 18:12
						Percival Lowell, whose calculations led to Pluto's discovery, born 150 years ago First space walk by cosmonaut, Aleksei Leonov, 40 years ago
 40°N 50°N Set 3:47 4:32 Rise 13:00 12:16	 40°N 50°N Set 4:21 4:58 Rise 14:03 13:28	 40°N 50°N Set 4:49 5:18 Rise 15:06 14:40	 40°N 50°N Set 5:14 5:34 Rise 16:10 15:53	 40°N 50°N Set 5:36 5:47 Rise 17:13 17:06	 40°N 50°N Set 5:57 5:59 Rise 18:17 18:19 Full Moon 15:58	 40°N 50°N Set 6:18 6:12 Rise 19:23 19:34 Sunrise 5:53 5:49 Sunset 18:18 18:23
						Good Friday Christian Huygens discovers Titan, Saturn's largest moon, 350 years ago Jupiter 2.0° E of Moon best in W of N. America 8 am
 40°N 50°N Set 6:41 6:25 Rise 20:31 20:53	 40°N 50°N Set 7:06 6:41 Rise 21:42 22:15	 40°N 50°N Set 7:37 7:02 Rise 22:56 23:38	 40°N 50°N Set 8:14 7:30 Rise -- --	 40°N 50°N Rise 0:08 1:00 Set 9:02 8:10		
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						FEBRUARY S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
						APRIL S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
'Easter Sunday	Zodiacal Light visible in W after evening twilight for next two weeks		Venus in superior conjunction			

































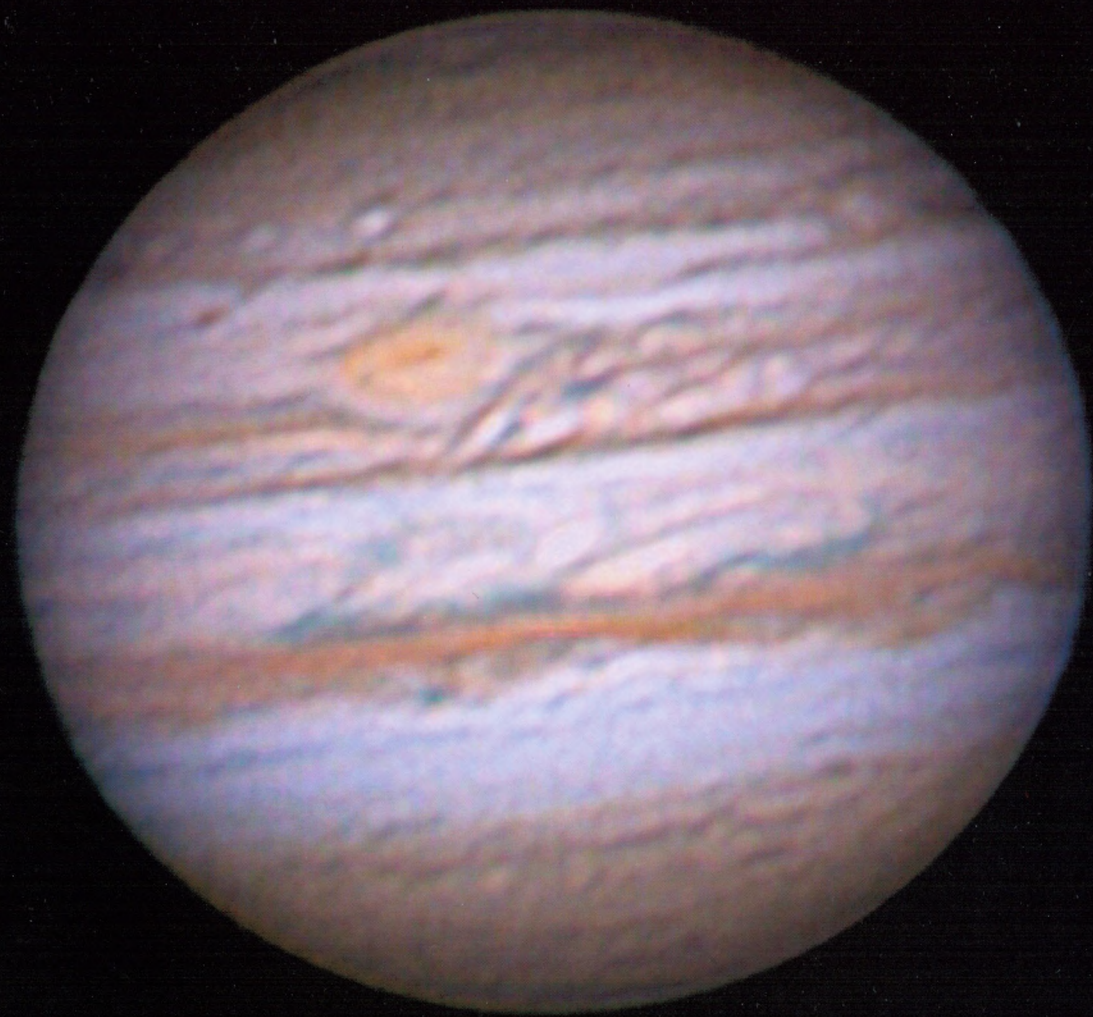
APRIL

The King of the Globulars

Omega Centauri, one of the greatest of all telescopic objects, has an apparent diameter rivalling that of the full Moon. Containing over one million stars, it astonishes the visual observer with brilliant points of light but challenges those who attempt to image it. Here, the image approaches perfection of resolution and colour.

Photo by Matt BenDaniel

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>The planets this month</p> <p><i>Mercury: not easily observed</i></p> <p><i>Venus: not easily observed</i></p> <p><i>Mars: low in SE in morning twilight</i></p> <p><i>Jupiter: rises after sunset in E, low in WSW at dawn</i></p> <p><i>Saturn: high in WSW after dark, sets in WNW near 3 am</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 which are given in local 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 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 31</p> <p>MAY 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> ^{40°N 50°N} Rise 1:16 2:12 Set 10:01 9:06 Last Quarter 19:50</p> <p>1</p>	<p> ^{40°N 50°N} Rise 2:15 3:08 Set 11:10 10:19</p> <p>2</p> <p>Sunrise 5:42 5:34 Sunset 18:25 18:34</p> <p>Jean Foucault takes first photo of Sun, 160 years ago</p>
<p> ^{40°N 50°N} Rise 4:04 4:48 Set 13:26 12:43</p> <p>3</p> <p>Daylight Saving Time Begins 2 am Jupiter at opposition</p>	<p> ^{40°N 50°N} Rise 4:43 5:17 Set 14:43 14:12</p> <p>4</p>	<p> ^{40°N 50°N} Rise 5:14 5:38 Set 15:59 15:39</p> <p>5</p>	<p> ^{40°N 50°N} Rise 5:41 5:55 Set 17:12 17:03</p> <p>6</p>	<p> ^{40°N 50°N} Rise 6:06 6:09 Set 18:24 18:25</p> <p>7</p>	<p> ^{40°N 50°N} Rise 6:29 6:23 Set 19:34 19:46 New Moon 16:32</p> <p>8</p> <p>Annular-Total Solar Eclipse partial phase visible in most of S of USA except extreme W</p>	<p> ^{40°N 50°N} Rise 6:53 6:37 Set 20:44 21:06</p> <p>9</p> <p>Sunrise 6:31 6:19 Sunset 19:33 19:45</p>
<p> ^{40°N 50°N} Rise 7:19 6:53 Set 21:54 22:26</p> <p>10</p>	<p> ^{40°N 50°N} Rise 7:48 7:13 Set 23:02 23:44</p> <p>11</p> <p>International Astronomy Week (through Apr. 17) Moon 1.3° S of the Pleiades best in E of N. America 8 pm</p>	<p> ^{40°N 50°N} Rise 8:23 7:39 Set -- --</p> <p>12</p>	<p> ^{40°N 50°N} Set 0:08 0:58 Rise 9:04 8:13</p> <p>13</p>	<p> ^{40°N 50°N} Set 1:08 2:01 Rise 9:53 8:58</p> <p>14</p>	<p> ^{40°N 50°N} Set 2:00 2:53 Rise 10:47 9:55</p> <p>15</p>	<p> ^{40°N 50°N} Set 2:44 3:32 Rise 11:47 11:00 First Quarter 10:37 Sunrise 6:20 6:05 Sunset 19:40 19:56</p> <p>16</p> <p>International Astronomy Day www.astroleague.org/al/astroday/astroday.html www.rasc.ca/activity/astroday Otto Wilhelm von Struve, discoverer of interstellar hydrogen, dies 100 years ago</p>
<p> ^{40°N 50°N} Set 3:20 4:01 Rise 12:49 12:10</p> <p>17</p>	<p> ^{40°N 50°N} Set 3:50 4:23 Rise 13:52 13:22</p> <p>18</p> <p>Albert Einstein dies, 50 years ago</p>	<p> ^{40°N 50°N} Set 4:16 4:40 Rise 14:55 14:34</p> <p>19</p>	<p> ^{40°N 50°N} Set 4:39 4:54 Rise 15:58 15:47</p> <p>20</p>	<p> ^{40°N 50°N} Set 5:00 5:06 Rise 17:02 17:00</p> <p>21</p>	<p> ^{40°N 50°N} Set 5:21 5:19 Rise 18:07 18:15</p> <p>22</p> <p>Lyrid meteors peak 6 am</p>	<p> ^{40°N 50°N} Set 5:43 5:32 Rise 19:15 19:33</p> <p>23</p> <p>Sunrise 6:10 5:51 Sunset 19:47 20:07</p>
<p> ^{40°N 50°N} Set 6:08 5:47 Rise 20:27 20:55 Full Moon 6:06</p> <p>24</p> <p>First Day of Passover Penumbral Lunar Eclipse visible in all of N. America, best in W</p>	<p> ^{40°N 50°N} Set 6:37 6:05 Rise 21:41 22:20</p> <p>25</p> <p>Space Shuttle deploys Hubble Space Telescope, 15 years ago</p>	<p> ^{40°N 50°N} Set 7:12 6:31 Rise 22:56 23:45</p> <p>26</p> <p>Mercury at greatest elongation W (27°) not easily observed</p>	<p> ^{40°N 50°N} Set 7:58 7:07 Rise -- --</p> <p>27</p>	<p> ^{40°N 50°N} Set 8:54 7:59 Rise 0:08 1:03</p> <p>28</p>	<p> ^{40°N 50°N} Set 1:11 2:05 Rise 10:01 9:08</p> <p>29</p>	<p> ^{40°N 50°N} Set 1:15 10:30 Rise 2:03 2:50</p> <p>30</p> <p>Sunrise 6:01 5:38 Sunset 19:54 20:18</p>


































MAY

A Good Month for Jupiter

Well placed for evening viewing this month, Jupiter's details are now being captured by amateurs using webcams, as here. As a result, both modern imaging techniques and visual observation can invite careful consideration of the Great Red Spot, belts, festoons, and subtle variations in colour commanded by the king of planets.

Photo by Mike Wirths

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																			
 <p>40°N 50°N Rise 2:44 3:22 Set 12:32 11:57 Last Quarter 2:24</p> <p>1</p> <p>Texas Star Party, Fort Davis, TX www.texasstarparty.org (through May 8)</p>	 <p>40°N 50°N Rise 3:17 3:44 Set 13:47 13:23</p> <p>2</p> <p>William Herschel discovers double star, Xi Ursae Majoris, 225 years ago</p>	 <p>40°N 50°N Rise 3:45 4:02 Set 14:59 14:47</p> <p>3</p>	 <p>40°N 50°N Rise 4:09 4:16 Set 16:10 16:07</p> <p>4</p> <p>η-Aquarid meteors peak 7 pm</p>	 <p>40°N 50°N Rise 4:32 4:30 Set 17:19 17:26</p> <p>5</p> <p>America's 1st planetarium, the Adler in Chicago, is dedicated, 75 years ago</p>	 <p>40°N 50°N Rise 4:55 4:43 Set 18:27 18:45</p> <p>6</p>	 <p>40°N 50°N Rise 5:20 4:58 Set 19:36 20:04</p> <p>7</p> <p>Sunrise 5:53 5:26 Sunset 20:01 20:28</p>																																																																																			
 <p>40°N 50°N Rise 5:47 5:16 Set 20:45 21:23 New Moon 4:45</p> <p>8</p> <p>Mother's Day Christian Peters, who calculated stellar distances by parallax, dies 125 years ago Ceres at opposition</p>	 <p>40°N 50°N Rise 6:20 5:40 Set 21:52 22:39</p> <p>9</p>	 <p>40°N 50°N Rise 6:58 6:10 Set 22:55 23:47</p> <p>10</p>	 <p>40°N 50°N Rise 7:44 6:51 Set 23:51 --</p> <p>11</p>	 <p>40°N 50°N Set -- 0:45 Rise 6:36 7:43</p> <p>12</p>	 <p>40°N 50°N Set 0:38 1:29 Rise 9:35 8:45</p> <p>13</p>	 <p>40°N 50°N Set 1:18 2:02 Rise 10:36 9:54</p> <p>14</p> <p>Sunrise 5:46 5:15 Sunset 20:08 20:38</p>																																																																																			
 <p>40°N 50°N Set 1:50 2:26 Rise 11:38 11:05</p> <p>15</p>	 <p>40°N 50°N Set 2:17 2:45 Rise 12:41 12:16 First Quarter 4:57</p> <p>16</p>	 <p>40°N 50°N Set 2:41 3:00 Rise 13:43 13:28</p> <p>17</p>	 <p>40°N 50°N Set 3:03 3:13 Rise 14:45 14:39</p> <p>18</p>	 <p>40°N 50°N Set 3:23 3:25 Rise 15:49 15:52</p> <p>19</p> <p>Atmospheric pollution causes Black Friday, the worst "dark day," 225 years ago 2 shadows on Jupiter, visible in extreme NE of N. America 7:45 pm Jupiter 1.7° NW of Moon best in NE of N. America 8 pm</p>	 <p>40°N 50°N Set 3:45 3:37 Rise 16:55 17:08</p> <p>20</p> <p>RASC General Assembly, Kelowna, BC www.rasc.ca/ga2005 (through May 23)</p>	 <p>40°N 50°N Set 4:08 3:51 Rise 18:05 18:28</p> <p>21</p> <p>Sunrise 5:40 5:06 Sunset 20:14 20:48</p>																																																																																			
 <p>40°N 50°N Set 4:35 4:08 Rise 19:19 19:53</p> <p>22</p>	 <p>40°N 50°N Set 5:07 4:31 Rise 20:36 21:21 Full Moon 16:18</p> <p>23</p> <p>Victoria Day (Canada)</p>	 <p>40°N 50°N Set 5:49 5:02 Rise 21:51 22:44</p> <p>24</p> <p>Moon Occults Antares visible in all of N. America except NE 4 am</p>	 <p>40°N 50°N Set 6:43 5:49 Rise 23:00 23:55</p> <p>25</p>	 <p>40°N 50°N Set 7:48 6:54 Rise 23:58 --</p> <p>26</p> <p>2 shadows on Jupiter, visible in E of N. America 9:40 pm</p>	 <p>40°N 50°N Set -- 0:48 Rise 9:03 8:15</p> <p>27</p> <p>Riverside Telescope Makers Conference, Big Bear, CA, www.rtmco-inc.org (through May 29)</p>	 <p>40°N 50°N Set 10:20 9:43 Rise 0:44 1:24</p> <p>28</p> <p>Sunrise 5:35 4:59 Sunset 20:20 20:56</p>																																																																																			
 <p>40°N 50°N Set 1:20 1:50 Rise 11:37 11:11</p> <p>29</p>	 <p>40°N 50°N Set 1:49 2:09 Rise 12:51 12:35 Last Quarter 7:47</p> <p>30</p> <p>Memorial Day (USA)</p>	 <p>40°N 50°N Set 2:14 2:24 Rise 14:01 13:56</p> <p>31</p> <p>Mars 1.5° N of Moon best in E of N. America 5 am</p>	<p>The planets this month</p> <p>Mercury: not easily observed</p> <p>Venus: emerges during month low in WNW evening twilight</p> <p>Mars: low in ESE in morning twilight</p> <p>Jupiter: in S after dark, sets in W near 4 am</p> <p>Saturn: 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 which are given in local 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></td><td></td><td></td><td>1 2</td></tr> <tr><td></td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8 9</td></tr> <tr><td></td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15 16</td></tr> <tr><td></td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22 23</td></tr> <tr><td></td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29 30</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></td><td></td><td></td><td>1</td><td>2</td><td>3 4</td></tr> <tr><td></td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10 11</td></tr> <tr><td></td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17 18</td></tr> <tr><td></td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24 25</td></tr> <tr><td></td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</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	
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JUNE

Giant M81 and a Dwarf Galaxy

The faint smudge above M81 is the dwarf galaxy Holmberg IX (UGC 5336). In the galactic showpiece itself, streams of young bluish stars and speckles of reddish H-II regions flow along M81's great spiral arms, which wind around the older, yellower stars in the bright nucleus.

Photo by Robert Gendler

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>The planets this month</p> <p>Mercury: very low in WNW in evening twilight late in month</p> <p>Venus: very low in WNW in evening twilight</p> <p>Mars: rises before 2 am in E, low in ESE at dawn</p> <p>Jupiter: low in WSW after dark, sets in W near 2 am</p> <p>Saturn: low in WNW in evening twilight, lost 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 which are given in local 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> <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>JULY</p> <p>S M T W T F S</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>Rise 40°N 50°N 2:37 2:37</p> <p>Set 15:10 15:15</p> <p>1</p>	 <p>Rise 40°N 50°N 3:00 2:51</p> <p>Set 16:17 16:32</p> <p>2</p> <p>2 shadows on Jupiter, visible in E of N. America 11:34 pm</p>	 <p>Rise 40°N 50°N 3:23 3:05</p> <p>Set 17:25 17:50</p> <p>3</p>	 <p>Rise 40°N 50°N 3:49 3:22</p> <p>Set 18:33 19:07</p> <p>4</p> <p>Sunrise 5:32 4:54</p> <p>Sunset 20:25 21:03</p>
 <p>Rise 40°N 50°N 4:19 3:43</p> <p>Set 19:40 20:23</p> <p>5</p>	 <p>Rise 40°N 50°N 4:55 4:10</p> <p>Set 20:44 21:34</p> <p>New Moon 17:55</p> <p>6</p>	 <p>Rise 40°N 50°N 5:38 4:47</p> <p>Set 21:42 22:36</p> <p>7</p>	 <p>Rise 40°N 50°N 6:28 5:35</p> <p>Set 22:33 23:25</p> <p>8</p> <p>Venera 9, 1st soft lander on Venus, launched 30 years ago</p>	 <p>Rise 40°N 50°N 7:25 6:33</p> <p>Set 23:15 --</p> <p>9</p>	 <p>Rise 40°N 50°N 8:25 7:40</p> <p>Set 23:50 0:02</p> <p>10</p> <p>2 shadows on Jupiter, visible in all of N. America except extreme E 1:29 am</p>	 <p>Set 40°N 50°N -- 0:29</p> <p>Rise 9:27 8:51</p> <p>11</p> <p>Sunrise 5:31 4:51</p> <p>Sunset 20:29 21:09</p>
 <p>Set 40°N 50°N 0:19 0:49</p> <p>Rise 10:29 10:02</p> <p>12</p>	 <p>Set 40°N 50°N 0:43 1:05</p> <p>Rise 11:31 11:12</p> <p>13</p> <p>Pluto at opposition</p>	 <p>Set 40°N 50°N 1:05 1:19</p> <p>Rise 12:32 12:22</p> <p>First Quarter 21:22</p> <p>14</p>	 <p>Set 40°N 50°N 1:26 1:31</p> <p>Rise 13:34 13:33</p> <p>15</p>	 <p>Set 40°N 50°N 1:46 1:43</p> <p>Rise 14:37 14:46</p> <p>16</p> <p>Jupiter 1.6° N of Moon best in W of N. America 3 am</p>	 <p>Set 40°N 50°N 2:08 1:55</p> <p>Rise 15:44 16:02</p> <p>17</p> <p>2 shadows on Jupiter, visible in extreme W of N. America 3:57 am</p>	 <p>Set 40°N 50°N 2:32 2:10</p> <p>Rise 16:55 17:24</p> <p>18</p> <p>Sunrise 5:31 4:50</p> <p>Sunset 20:32 21:12</p>
 <p>Set 40°N 50°N 3:02 2:30</p> <p>Rise 18:10 18:49</p> <p>19</p> <p>Father's Day</p>	 <p>Set 40°N 50°N 3:39 2:57</p> <p>Rise 19:27 20:16</p> <p>20</p>	 <p>Set 40°N 50°N 4:27 3:36</p> <p>Rise 20:40 21:35</p> <p>21</p> <p>Summer Solstice 2:46 am</p>	 <p>Set 40°N 50°N 5:28 4:33</p> <p>Rise 21:45 22:37</p> <p>Full Moon 0:14</p> <p>22</p>	 <p>Set 40°N 50°N 6:41 5:50</p> <p>Rise 22:37 23:21</p> <p>23</p>	 <p>Set 40°N 50°N 8:01 7:19</p> <p>Rise 23:18 23:52</p> <p>24</p> <p>St.-Jean-Baptiste Day (Quebec)</p>	 <p>Set 40°N 50°N 9:21 8:51</p> <p>Rise 23:51 --</p> <p>25</p> <p>Sunrise 5:32 4:52</p> <p>Sunset 20:33 21:13</p> <p>Saturn 1.3° S of Mercury and Venus best in S of N. America 10 pm</p>
 <p>Rise 40°N 50°N -- 0:13</p> <p>Set 10:38 10:19</p> <p>26</p> <p>Charles Messier, known for catalogue of nonstellar objects, born 275 years ago</p>	 <p>Rise 40°N 50°N 0:18 0:30</p> <p>Set 11:52 11:44</p> <p>27</p> <p>Mercury 0.1° to left of Venus with Saturn 2.5° to the W best in S of N. America 10 pm</p>	 <p>Rise 40°N 50°N 0:42 0:45</p> <p>Set 13:02 13:04</p> <p>Last Quarter 14:23</p> <p>28</p>	 <p>Rise 40°N 50°N 1:05 0:58</p> <p>Set 14:10 14:22</p> <p>29</p> <p>Mars 2.0° to left of Moon best in NE of N. America 1 am</p>	 <p>Rise 40°N 50°N 1:28 1:12</p> <p>Set 15:18 15:40</p> <p>30</p>		





AUGUST

The Centre of the Northern Cross

Nestled in a complex region of the northern Milky Way, the star Gamma Cygni is surrounded by glowing red clouds of hydrogen gas. At the far left, by contrast, are the blue reflection nebulas NGC 1614a/b, casting light off their dusty interstellar grains. At upper right is Van Gogh's ear NGC 6888, a bow-shock created by a hot Wolf-Rayet star.

Photo by Matt BenDaniel

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																											
<p>The planets this month</p> <p>Mercury: very low in ENE in morning twilight late in month</p> <p>Venus: very low in W in evening twilight</p> <p>Mars: rises near 11 pm in ENE, high in SE at dawn</p> <p>Jupiter: very low in WSW in evening twilight</p> <p>Saturn: very low in ENE in morning twilight late in month</p>	<p>40°N 50°N Rise 2:19 1:26 Set 18:26 19:20</p> <p>1</p> <p>Civic Holiday (Canada)</p>	<p>40°N 50°N Rise 3:12 2:18 Set 19:13 20:03</p> <p>2</p>	<p>40°N 50°N Rise 4:10 3:20 Set 19:52 20:36</p> <p>3</p>	<p>40°N 50°N Rise 5:11 4:29 Set 20:24 21:00 New Moon 23:05</p> <p>4</p> <p>Starfest, Mount Forest, ON www.nyaa-starfest.com (through Aug. 7)</p> <p>Saskatchewan Star Party, Cypress Hills, SK duke.usask.ca/~ges125/rasc (through Aug. 7)</p> <p>William Hamilton, known for 3-D Calculus and optical theory, born 200 years ago</p> <p>Farthest Lunar Apogee of 2005</p>	<p>40°N 50°N Rise 6:13 5:40 Set 20:51 21:18</p> <p>5</p> <p>Stellafane Convention, Springfield, VT www.stellafane.com (through Aug. 6)</p> <p>Neil Armstrong, first man on Moon, celebrates 75th birthday today</p>	<p>40°N 50°N Rise 7:15 6:51 Set 21:14 21:33</p> <p>6</p> <p>Sunrise 6:03 5:37 Sunset 20:08 20:34</p>																																																																																											
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<p>40°N 50°N Set 8:24 8:17 Rise 21:08 21:09</p> <p>21</p> <p>Chandrasekhar, known for neutron star minimum mass limit, dies 10 years ago</p>	<p>40°N 50°N Set 9:39 9:43 Rise 21:32 21:23</p> <p>22</p>	<p>40°N 50°N Set 10:51 11:06 Rise 21:57 21:38</p> <p>23</p> <p>1st NASA balloon payloads designed by undergrads, launched 10 years ago</p> <p>Mercury at greatest elongation W (18°)</p>	<p>40°N 50°N Set 12:03 12:28 Rise 22:24 21:55</p> <p>24</p>	<p>40°N 50°N Set 13:13 13:49 Rise 22:55 22:17</p> <p>25</p>	<p>40°N 50°N Set 14:21 15:06 Rise 23:32 22:45 Last Quarter 11:18</p> <p>26</p> <p>Moon 1.0° S of the Pleiades 3 am</p>	<p>40°N 50°N Set -- 23:22 Rise -- 23:22</p> <p>27</p> <p>Sunrise 6:23 6:08 Sunset 19:39 19:54</p>																																																																																											
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SEPTEMBER

A Towering Aurora

The field of view here is enormous (approx. 80 degrees) with Polaris in the middle and with Cassiopeia at upper left and the bowl of the Big Dipper at lower right framing this palette of auroral colours. Excited oxygen produces the red and yellow-green hues and nitrogen adds blue and green tones, all from an altitude of nearly 100 km.

Photo by Jean Chiasson

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>The planets this month</p> <p>Mercury: very low in ENE before sunrise very early in month</p> <p>Venus: very low in WSW in evening twilight</p> <p>Mars: rises in ENE near 10 pm, in S at dawn</p> <p>Jupiter: lost in evening twilight in WSW in second half of month</p> <p>Saturn: in E before dawn</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 which are given in local 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>1 2 3 4 5 6</p> <p>7 8 9 10 11 12 13</p> <p>14 15 16 17 18 19 20</p> <p>21 22 23 24 25 26 27</p> <p>28 29 30 31</p> <p>OCTOBER S M T W T F S</p> <p>1</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>40°N 50°N</p> <p>Rise 4:05 3:29</p> <p>Set 18:55 19:25</p> <p>1</p> <p>Alberta Star Party, Caroline, AB www.syz.com/rasc/asp.htm (through Sep. 4)</p> <p>Venus 1.2° S of Jupiter best in S of N. America 9 pm</p>	<p>40°N 50°N</p> <p>Rise 5:08 4:41</p> <p>Set 19:19 19:41</p> <p>2</p> <p>Nova East, Smiley's Provincial Park, NS halifax.rasc.ca/ne (through Sep. 4)</p>	<p>40°N 50°N</p> <p>Rise 6:09 5:51</p> <p>Set 19:41 19:53</p> <p>New Moon 14:45</p> <p>Sunrise 6:30 6:18</p> <p>Sunset 19:28 19:39</p> <p>3</p>
<p>40°N 50°N</p> <p>Rise 7:10 7:01</p> <p>Set 20:01 20:05</p> <p>4</p>	<p>40°N 50°N</p> <p>Rise 8:11 8:11</p> <p>Set 20:21 20:16</p> <p>5</p> <p>Labour Day</p> <p>Venus 1.7° N of Spica best in S of N. America 9 pm</p>	<p>40°N 50°N</p> <p>Rise 9:13 9:22</p> <p>Set 20:41 20:28</p> <p>6</p> <p>Jupiter 2.7° N of Cr. Moon 9 pm</p>	<p>40°N 50°N</p> <p>Rise 10:16 10:35</p> <p>Set 21:04 20:42</p> <p>7</p>	<p>40°N 50°N</p> <p>Rise 11:23 11:51</p> <p>Set 21:30 20:59</p> <p>8</p> <p>International Comet Explorer makes first comet flyby, 20 years ago</p>	<p>40°N 50°N</p> <p>Rise 12:32 13:11</p> <p>Set 22:03 21:22</p> <p>9</p>	<p>40°N 50°N</p> <p>Rise 13:43 14:31</p> <p>Set 22:44 21:55</p> <p>10</p> <p>Sunrise 6:36 6:29</p> <p>Sunset 19:17 19:24</p>
<p>40°N 50°N</p> <p>Rise 14:52 15:47</p> <p>Set 23:37 22:42</p> <p>First Quarter 7:37</p> <p>11</p>	<p>40°N 50°N</p> <p>Rise 15:56 16:51</p> <p>Set -- 23:47</p> <p>12</p>	<p>40°N 50°N</p> <p>Set 0:42 --</p> <p>Rise 16:50 17:39</p> <p>13</p>	<p>40°N 50°N</p> <p>Set 1:57 1:09</p> <p>Rise 17:34 18:13</p> <p>14</p>	<p>40°N 50°N</p> <p>Set 3:17 2:40</p> <p>Rise 18:10 18:38</p> <p>15</p>	<p>40°N 50°N</p> <p>Set 4:37 4:13</p> <p>Rise 18:40 18:57</p> <p>16</p>	<p>40°N 50°N</p> <p>Set 5:56 5:43</p> <p>Rise 19:06 19:12</p> <p>Full Moon 22:01</p> <p>Sunrise 6:43 6:39</p> <p>Sunset 19:05 19:09</p> <p>17</p>
<p>40°N 50°N</p> <p>Set 7:12 7:11</p> <p>Rise 19:31 19:27</p> <p>18</p>	<p>40°N 50°N</p> <p>Set 8:27 8:37</p> <p>Rise 19:56 19:42</p> <p>19</p>	<p>40°N 50°N</p> <p>Set 9:40 10:01</p> <p>Rise 20:22 19:58</p> <p>20</p>	<p>40°N 50°N</p> <p>Set 10:53 11:25</p> <p>Rise 20:52 20:18</p> <p>21</p>	<p>40°N 50°N</p> <p>Set 12:05 12:46</p> <p>Rise 21:27 20:43</p> <p>22</p> <p>Fall Equinox 6:23 pm</p>	<p>40°N 50°N</p> <p>Set 13:12 14:02</p> <p>Rise 22:09 21:18</p> <p>23</p>	<p>40°N 50°N</p> <p>Set 14:14 15:09</p> <p>Rise 22:58 22:03</p> <p>24</p> <p>Saturn 1.2° S of Beehive Cluster 6 am</p> <p>Sunrise 6:50 6:50</p> <p>Sunset 18:53 18:53</p>
<p>Discovery of Comet Ikeya-Seki, 40 years ago</p> <p>40°N 50°N</p> <p>Set 15:07 16:01</p> <p>Rise 23:53 23:00</p> <p>Last Quarter 2:41</p> <p>25</p>	<p>40°N 50°N</p> <p>Set 15:52 16:41</p> <p>Rise -- --</p> <p>26</p>	<p>40°N 50°N</p> <p>Rise 0:53 0:05</p> <p>Set 16:28 17:10</p> <p>27</p>	<p>40°N 50°N</p> <p>Rise 1:55 1:15</p> <p>Set 16:58 17:32</p> <p>28</p>	<p>40°N 50°N</p> <p>Rise 2:58 2:27</p> <p>Set 17:24 17:48</p> <p>29</p>	<p>40°N 50°N</p> <p>Rise 4:00 3:38</p> <p>Set 17:46 18:02</p> <p>30</p> <p>Pioneer 11's last transmission received, 10 years ago</p> <p>Henry Draper makes first photo of Orion nebula, 125 years ago</p>	



OCTOBER

M1: The Crab Supernova Remnant

Messier's catalogue begins with this famous object, first observed as a supernova in 1054 AD. Visually, it is a dim serpentine swath. Imaging, however, brings out its enveloping tendrils and filaments, especially in red light; and blue light captures the fluorescing gasses expanding away from the central pulsar, which was discovered by radio telescope.

Photo by Jack Newton

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>The planets this month</p> <p><i>Mercury: not easily observed</i></p> <p><i>Venus: low in SW in evening twilight</i></p> <p><i>Mars: rises in ENE in evening twilight, in WSW at dawn</i></p> <p><i>Jupiter: not observable</i></p> <p><i>Saturn: rises after midnight in ENE, high in ESE at 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 which are given in local 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>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</p> <p>NOVEMBER S M T W T F S</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>40°N 50°N</p> <p>Rise 5:01 4:49</p> <p>Set 18:06 18:14</p> <p>Sunrise 6:56 7:00</p> <p>Sunset 18:42 18:38</p> <p>1</p>
<p>40°N 50°N</p> <p>Rise 6:02 5:59</p> <p>Set 18:26 18:25</p> <p>2</p>	<p>40°N 50°N</p> <p>Rise 7:04 7:10</p> <p>Set 18:47 18:37</p> <p>New Moon 6:28</p> <p>3</p>	<p>40°N 50°N</p> <p>Rise 8:08 8:24</p> <p>Set 19:09 18:50</p> <p>4</p>	<p>40°N 50°N</p> <p>Rise 9:14 9:40</p> <p>Set 19:34 19:06</p> <p>5</p>	<p>40°N 50°N</p> <p>Rise 10:24 10:59</p> <p>Set 20:05 19:27</p> <p>6</p>	<p>40°N 50°N</p> <p>Rise 11:35 12:20</p> <p>Set 20:43 19:56</p> <p>7</p>	<p>40°N 50°N</p> <p>Rise 12:45 13:38</p> <p>Set 21:32 20:38</p> <p>Sunrise 7:03 7:11</p> <p>Sunset 18:31 18:23</p> <p>8</p>
<p>Zodiacal Light visible in E before morning twilight for next two weeks</p>	<p>Annular Solar Eclipse partial phase visible at sunrise in E of Newfoundland</p>	<p>Rosh Hashanah</p> <p>First day of Ramadan</p>			<p>de Vaucouleurs, 1st theorizer of local galactic supercluster, dies 10 years ago</p>	<p>Draconid meteors peak 1 pm</p>
<p>40°N 50°N</p> <p>Rise 13:49 14:45</p> <p>Set 22:32 21:36</p> <p>9</p>	<p>40°N 50°N</p> <p>Rise 14:45 15:37</p> <p>Set 23:42 22:51</p> <p>First Quarter 15:01</p> <p>10</p>	<p>40°N 50°N</p> <p>Rise 15:31 16:15</p> <p>Set -- --</p> <p>11</p>	<p>40°N 50°N</p> <p>Set 0:58 0:17</p> <p>Rise 16:09 16:41</p> <p>12</p>	<p>40°N 50°N</p> <p>Set 2:15 1:46</p> <p>Rise 16:40 17:01</p> <p>13</p>	<p>40°N 50°N</p> <p>Set 3:32 3:15</p> <p>Rise 17:06 17:17</p> <p>14</p>	<p>40°N 50°N</p> <p>Set 4:48 4:41</p> <p>Rise 17:31 17:32</p> <p>Sunrise 7:11 7:22</p> <p>Sunset 18:20 18:08</p> <p>15</p>
	<p>Thanksgiving Day (Canada)</p> <p>Columbus Day (USA)</p>		<p>Kepler proves celestial change by noting Sun's corona during eclipse, 400 years ago</p>	<p>Yom Kippur</p>		
<p>40°N 50°N</p> <p>Set 6:02 6:06</p> <p>Rise 17:55 17:46</p> <p>16</p>	<p>40°N 50°N</p> <p>Set 7:15 7:31</p> <p>Rise 18:20 18:01</p> <p>Full Moon 8:14</p> <p>17</p>	<p>40°N 50°N</p> <p>Set 8:29 8:55</p> <p>Rise 18:49 18:19</p> <p>18</p>	<p>40°N 50°N</p> <p>Set 9:42 10:19</p> <p>Rise 19:22 18:42</p> <p>19</p>	<p>40°N 50°N</p> <p>Set 10:53 11:40</p> <p>Rise 20:01 19:13</p> <p>20</p>	<p>40°N 50°N</p> <p>Set 12:00 12:53</p> <p>Rise 20:48 19:54</p> <p>21</p>	<p>40°N 50°N</p> <p>Set 12:58 13:53</p> <p>Rise 21:41 20:47</p> <p>Sunrise 7:18 7:34</p> <p>Sunset 18:10 17:55</p> <p>22</p>
	<p>Partial Lunar Eclipse visible in all of N. America except E</p>		<p>Moon 1.0° S of the Pleiades best in E of N. America 9 pm</p>		<p>Orionid meteors peak 5 am</p>	<p>Karl Jansky, radio astronomer, born 100 years ago</p>
<p>40°N 50°N</p> <p>Set 13:47 14:39</p> <p>Rise 22:41 21:50</p> <p>23</p>	<p>40°N 50°N</p> <p>Set 14:27 15:12</p> <p>Rise 23:43 23:00</p> <p>Last Quarter 21:17</p> <p>24</p>	<p>40°N 50°N</p> <p>Set 14:59 15:36</p> <p>Rise -- --</p> <p>25</p>	<p>40°N 50°N</p> <p>Rise 0:45 0:11</p> <p>Set 15:26 15:54</p> <p>26</p>	<p>40°N 50°N</p> <p>Rise 1:48 1:23</p> <p>Set 15:50 16:09</p> <p>27</p>	<p>40°N 50°N</p> <p>Rise 2:49 2:33</p> <p>Set 16:11 16:21</p> <p>28</p>	<p>40°N 50°N</p> <p>Rise 3:50 3:43</p> <p>Set 16:30 16:33</p> <p>Sunrise 7:26 7:45</p> <p>Sunset 18:01 17:42</p> <p>29</p>
		<p>Venera 10 lands on Venus 3 days after twin, Venera 9, 30 years ago</p>		<p>1st American solar eclipse expedition, 225 years ago</p>		<p>Mars closest approach</p>
<p>40°N 50°N</p> <p>Rise 3:52 3:54</p> <p>Set 15:51 15:44</p> <p>30</p>	<p>40°N 50°N</p> <p>Rise 4:55 5:07</p> <p>Set 16:12 15:57</p> <p>31</p>					
<p>Daylight Saving Time Ends 2 am</p>	<p>Halloween</p> <p>Zodiacal Light visible in E before morning twilight for next two weeks</p>					



NOVEMBER

Lunar Seas in a Sea of Clouds

Bright rays of the crater Tycho lead to the dark maria or "seas" on the Moon. Especially prominent at upper left are Oceanus Procellarum, Mare Imbrium, and Mare Serenitatis. In this portrait, the Moon appears to be floating on a sea of clouds which, by optical illusion, seem to enwrap the Moon as they glide by.

Photo by Brady Johnson

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>The planets this month</p> <p>Mercury: not easily observed</p> <p>Venus: low in SW after dark</p> <p>Mars: rises before sunset in ENE, sets in WNW in morning twilight</p> <p>Jupiter: emerges very low in ESE dawn twilight during the month</p> <p>Saturn: rises near 10 pm in ENE, high in S at dawn</p>		<p>40°N 50°N</p> <p>Rise 6:01 6:23</p> <p>Set 16:37 16:12</p> <p>New Moon 20:25</p> <p>1</p>	<p>40°N 50°N</p> <p>Rise 7:10 7:42</p> <p>Set 17:06 16:31</p> <p>2</p>	<p>40°N 50°N</p> <p>Rise 8:22 9:05</p> <p>Set 17:42 16:58</p> <p>3</p>	<p>40°N 50°N</p> <p>Rise 9:35 10:26</p> <p>Set 18:28 17:36</p> <p>4</p>	<p>40°N 50°N</p> <p>Rise 10:43 11:38</p> <p>Set 19:25 18:30</p> <p>5</p> <p>Sunrise 6:34 6:57</p> <p>Sunset 16:53 16:30</p>
				<p>Mercury at greatest elongation E (24°) not easily observed</p> <p>Venus at greatest elongation E (47°)</p>		<p>S. Taurid meteors peak 5 am</p>
<p>40°N 50°N</p> <p>Rise 11:42 12:35</p> <p>Set 20:33 19:41</p> <p>6</p>	<p>40°N 50°N</p> <p>Rise 12:31 13:17</p> <p>Set 21:47 21:04</p> <p>7</p>	<p>40°N 50°N</p> <p>Rise 13:10 13:46</p> <p>Set 23:04 22:31</p> <p>First Quarter 20:57</p> <p>8</p>	<p>40°N 50°N</p> <p>Rise 13:42 14:07</p> <p>Set -- 23:57</p> <p>9</p>	<p>40°N 50°N</p> <p>Set 0:19 --</p> <p>Rise 14:09 14:24</p> <p>10</p>	<p>40°N 50°N</p> <p>Set 1:32 1:22</p> <p>Rise 14:33 14:38</p> <p>11</p>	<p>40°N 50°N</p> <p>Set 2:44 2:44</p> <p>Rise 14:57 14:52</p> <p>12</p> <p>Sunrise 6:42 7:08</p> <p>Sunset 16:46 16:20</p>
	<p>Mars at opposition</p>			<p>Pons discovers Biela's comet, 200 years ago</p>	<p>Remembrance Day (Canada)</p> <p>Veteran's Day (USA)</p>	<p>Voyager 1 discovers moons 13 & 14 at Saturn, 25 years ago</p> <p>N. Taurid meteors peak 4 am</p>
<p>40°N 50°N</p> <p>Set 3:56 4:07</p> <p>Rise 15:21 15:06</p> <p>13</p>	<p>40°N 50°N</p> <p>Set 5:08 5:29</p> <p>Rise 15:47 15:23</p> <p>14</p>	<p>40°N 50°N</p> <p>Set 6:20 6:52</p> <p>Rise 16:18 15:43</p> <p>Full Moon 19:57</p> <p>15</p>	<p>40°N 50°N</p> <p>Set 7:32 8:15</p> <p>Rise 16:54 16:10</p> <p>16</p>	<p>40°N 50°N</p> <p>Set 8:41 9:32</p> <p>Rise 17:38 16:46</p> <p>17</p>	<p>40°N 50°N</p> <p>Set 9:44 10:39</p> <p>Rise 18:29 17:35</p> <p>18</p>	<p>40°N 50°N</p> <p>Set 10:38 11:31</p> <p>Rise 19:27 18:35</p> <p>19</p> <p>Sunrise 6:50 7:20</p> <p>Sunset 16:41 16:11</p>
<p>Leslie Peltier discovers first of 11 comets, 80 years ago</p>	<p>First telescopic discovery of a comet by Gottfried Kirch, 325 years ago</p>	<p>Johannes Kepler, known for three laws of planetary motion, dies 375 years ago</p> <p>Mars 2.5° S of Moon 2 am</p>	<p>Moon 0.7° S of the Pleiades best in W of N. America 8 am</p>	<p>Leonid meteors peak 10 am</p>		
<p>40°N 50°N</p> <p>Set 11:22 12:10</p> <p>Rise 20:29 19:43</p> <p>20</p>	<p>40°N 50°N</p> <p>Set 11:58 12:38</p> <p>Rise 21:32 20:54</p> <p>21</p>	<p>40°N 50°N</p> <p>Set 12:27 12:58</p> <p>Rise 22:34 22:06</p> <p>22</p>	<p>40°N 50°N</p> <p>Set 12:52 13:14</p> <p>Rise 23:36 23:16</p> <p>Last Quarter 17:11</p> <p>23</p>	<p>40°N 50°N</p> <p>Set 13:13 13:27</p> <p>Rise -- --</p> <p>24</p>	<p>40°N 50°N</p> <p>Rise 0:36 0:26</p> <p>Set 13:33 13:39</p> <p>25</p>	<p>40°N 50°N</p> <p>Rise 1:37 1:35</p> <p>Set 13:53 13:50</p> <p>26</p> <p>Sunrise 6:58 7:30</p> <p>Sunset 16:37 16:04</p>
		<p>James Watson, comet and asteroid discoverer, dies 125 years ago</p>		<p>Thanksgiving Day (USA)</p>		
<p>40°N 50°N</p> <p>Rise 2:39 2:46</p> <p>Set 14:14 14:02</p> <p>27</p>	<p>40°N 50°N</p> <p>Rise 3:43 4:00</p> <p>Set 14:37 14:16</p> <p>28</p>	<p>40°N 50°N</p> <p>Rise 4:51 5:18</p> <p>Set 15:04 14:34</p> <p>29</p>	<p>40°N 50°N</p> <p>Rise 6:03 6:40</p> <p>Set 15:37 14:57</p> <p>30</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 which are given in local 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>OCTOBER S M T W T F S</p> <p>1</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>DECEMBER S M T W T F S</p> <p>1 2 3</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>



DECEMBER

Epic Sweep of the Winter Milky Way

The vast expanse of this image extends from the California Nebula and the Pleiades at upper right to Sirius at lower left. The semicircle of Barnard's Loop curls around the Belt Stars and the Great Orion Nebula. To the left, the small, bright Rosette Nebula sets off the fainter nebulosity of the Cone, above which Saturn marks the ecliptic.

Photo by Wei-Hao Wang

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>The planets this month</p> <p><i>Mercury: very low in ESE in morning twilight, best at midmonth</i></p> <p><i>Venus: low in SW after dark</i></p> <p><i>Mars: in ESE after dark, sets in WNW before dawn</i></p> <p><i>Jupiter: low in SE at dawn</i></p> <p><i>Saturn: rises near 8 pm in ENE, high in WSW at 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 which are given in local 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</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>JANUARY 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>40°N 50°N</p> <p>Rise 7:16 8:04</p> <p>Set 16:20 15:31</p> <p>New Moon 10:01</p> <p>1</p>	<p>40°N 50°N</p> <p>Rise 8:28 9:23</p> <p>Set 17:15 16:20</p> <p>2</p>	<p>40°N 50°N</p> <p>Rise 9:33 10:28</p> <p>Set 18:21 17:27</p> <p>3</p> <p>Sunrise 7:05 7:40</p> <p>Sunset 16:35 16:00</p>
<p>40°N 50°N</p> <p>Rise 10:27 11:15</p> <p>Set 19:35 18:49</p> <p>4</p>	<p>40°N 50°N</p> <p>Rise 11:10 11:49</p> <p>Set 20:53 20:17</p> <p>5</p>	<p>40°N 50°N</p> <p>Rise 11:45 12:12</p> <p>Set 22:10 21:45</p> <p>6</p>	<p>40°N 50°N</p> <p>Rise 12:13 12:30</p> <p>Set 23:24 23:10</p> <p>7</p>	<p>40°N 50°N</p> <p>Rise 12:38 12:45</p> <p>Set -- --</p> <p>First Quarter 4:36</p> <p>8</p>	<p>40°N 50°N</p> <p>Set 0:35 0:32</p> <p>Rise 13:01 12:59</p> <p>9</p>	<p>40°N 50°N</p> <p>Set 1:45 1:53</p> <p>Rise 13:24 13:13</p> <p>10</p> <p>Sunrise 7:11 7:48</p> <p>Sunset 16:35 15:58</p>
			<p>Gerard Kuiper, solar system astronomer, is born 100 years ago</p> <p>Galileo enters orbit around Jupiter, 10 years ago</p>	<p>Karl Hencke discovers Astrea, the 5th asteroid, 160 years ago</p>	<p>Juno at opposition</p> <p>Venus at greatest brilliancy</p>	
<p>40°N 50°N</p> <p>Set 2:55 3:13</p> <p>Rise 13:49 13:28</p> <p>11</p>	<p>40°N 50°N</p> <p>Set 4:06 4:34</p> <p>Rise 14:17 13:46</p> <p>12</p>	<p>40°N 50°N</p> <p>Set 5:17 5:55</p> <p>Rise 14:51 14:10</p> <p>13</p>	<p>40°N 50°N</p> <p>Set 6:26 7:13</p> <p>Rise 15:31 14:42</p> <p>14</p>	<p>40°N 50°N</p> <p>Set 7:31 8:24</p> <p>Rise 16:19 15:25</p> <p>Full Moon 11:15</p> <p>15</p>	<p>40°N 50°N</p> <p>Set 8:28 9:22</p> <p>Rise 17:15 16:21</p> <p>16</p>	<p>40°N 50°N</p> <p>Set 9:16 10:06</p> <p>Rise 18:16 17:27</p> <p>17</p> <p>Sunrise 7:16 7:54</p> <p>Sunset 16:36 15:59</p>
	<p>Mars 1.0° S of Moon</p> <p>Mercury at greatest elongation W (21°)</p> <p>best morning view in 2005</p>	<p>Geminid meteors peak</p> <p>11 pm</p>				
<p>40°N 50°N</p> <p>Set 9:55 10:38</p> <p>Rise 19:19 18:38</p> <p>18</p>	<p>40°N 50°N</p> <p>Set 10:27 11:01</p> <p>Rise 20:22 19:50</p> <p>19</p>	<p>40°N 50°N</p> <p>Set 10:53 11:19</p> <p>Rise 21:24 21:01</p> <p>20</p>	<p>40°N 50°N</p> <p>Set 11:16 11:33</p> <p>Rise 22:24 22:10</p> <p>21</p>	<p>40°N 50°N</p> <p>Set 11:36 11:45</p> <p>Rise 23:24 23:19</p> <p>22</p>	<p>40°N 50°N</p> <p>Set 11:56 11:56</p> <p>Rise -- --</p> <p>Last Quarter 14:36</p> <p>23</p>	<p>40°N 50°N</p> <p>Rise 0:24 0:28</p> <p>Set 12:15 12:07</p> <p>24</p> <p>Sunrise 7:20 7:57</p> <p>Sunset 16:40 16:02</p>
			<p>Winter Solstice</p> <p>1:35 pm</p>	<p>Ursid meteors peak</p> <p>8 am</p>		
<p>40°N 50°N</p> <p>Rise 1:26 1:39</p> <p>Set 12:37 12:20</p> <p>25</p>	<p>40°N 50°N</p> <p>Rise 2:31 2:53</p> <p>Set 13:01 12:35</p> <p>26</p>	<p>40°N 50°N</p> <p>Rise 3:39 4:12</p> <p>Set 13:31 12:55</p> <p>27</p>	<p>40°N 50°N</p> <p>Rise 4:52 5:35</p> <p>Set 14:09 13:23</p> <p>28</p>	<p>40°N 50°N</p> <p>Rise 6:05 6:57</p> <p>Set 14:58 14:05</p> <p>29</p>	<p>40°N 50°N</p> <p>Rise 7:15 8:10</p> <p>Set 16:00 15:05</p> <p>New Moon 22:12</p> <p>30</p>	<p>40°N 50°N</p> <p>Rise 8:15 9:07</p> <p>Set 17:13 16:23</p> <p>31</p> <p>Sunrise 7:22 7:59</p> <p>Sunset 16:45 16:08</p>
<p>Christmas Day</p> <p>Moon Occults Spica</p> <p>best in NW of N. America</p> <p>8 am</p>	<p>Boxing Day (Canada)</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. The daily lunar graphics were prepared using data provided by Roger Fell, who generated the data using the Lunar Calculator computer program written by Alister Ling (see www3.telus.net/public/aling/lunarcalf/lunarcalf.htm).

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 position of the naked-eye 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 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

All times are adjusted for Daylight Saving Time. Moon phases and special events are given in Eastern time. The user's local time for events *other than* Moon and Sun rise and set may be determined by converting the given time to the user's time zone (e.g. Pacific time is Eastern time minus 3 hours). 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 corrections in minutes to the tabulated rise and set times for selected Canadian and US cities. In the column labelled **Correction**, an entry such as 50°N + 25 means add 25 minutes to the displayed 50°N time. This computed time is an approximation. In the column labelled **Accuracy**, the approximate maximum error in minutes for Moon rise and set using this method is indicated. The error for Sun rise and set is less. These errors can be substantially reduced by interpolating according to latitude, as explained in the following section.

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

Canadian Locations

City	Correction	Accuracy	Latitude
Calgary	50°N + 36	15	51
Charlottetown	40°N + 12	20	46
Edmonton	50°N + 34	25	54
Halifax	40°N + 14	25	45
Hamilton	40°N + 20	15	43
Kingston	40°N + 6	20	44
Kitchener	40°N + 22	15	43
London	40°N + 25	15	43
Moncton	40°N + 19	20	46
Montreal	50°N - 6	20	46
Niagara	40°N + 16	15	43
Kelowna	50°N - 3	10	50
Ottawa	50°N + 3	20	45
Prince George	50°N + 11	25	54
Québec	50°N - 15	15	47
Regina	50°N + 58 ⁽¹⁾	10	50
St. John's	50°N + 1	20	48
Sarnia	40°N + 30	15	43
Saskatoon	50°N + 67 ⁽¹⁾	15	52
Thunder Bay	50°N + 57	10	48
Toronto	40°N + 18	20	44
Vancouver	50°N + 12	15	49
Victoria	50°N + 13	20	49
Windsor	40°N + 32	15	42
Winnipeg	50°N + 29	5	50

U.S. Locations

City	Correction	Accuracy	Latitude
Atlanta	40°N + 37	30	34
Boston	40°N - 16	10	42
Chicago	40°N - 10	15	42
Cincinnati	40°N + 38	10	39
Denver	40°N + 0	10	40
Flagstaff	40°N + 27 ⁽¹⁾	30	35
Kansas City	40°N + 18	10	39
Los Angeles	40°N - 7	35	34
Minneapolis	40°N + 13	25	45
New York	40°N - 4	5	41
San Francisco	40°N + 10	20	38
Seattle	50°N + 9	20	48
Tucson	40°N + 24 ⁽¹⁾	40	32
Washington	40°N + 8	5	39

⁽¹⁾ Subtract 60 minutes in the summer.

Other Locations, and Improving Accuracy

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

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

The Royal Astronomical Society of Canada

Since it was founded in 1890, the RASC has filled a special role in both amateur and professional astronomy. Today, it has over 4900 members worldwide who share a passion for the night sky and make contributions to astronomy in many ways.

The RASC has a long tradition of high-quality, volunteer-produced publications. The *Observer's Handbook* has been published since 1908 and is recognized worldwide as the leading handbook of its type. The *Journal*, now in its 98th 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, the *Observer's Calendar* is a forum for astrophotography by amateur astronomers, and *Skyways* is a teacher's guide in astronomy.

For information on joining the Society, or to order an RASC publication, visit 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

The Photos and the Calendar

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

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Images

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Printing

University of Toronto Press Inc.



Cover/April (*The King of Globulars*): 90-minute exposure on Kodak PPF 400 colour negative film using a 5-inch f/6 Astro-Physics refractor; taken from Vicuña, Chile (Matt BenDaniel).



January (*Planets, Take Your Places*): 15-minute medium-format piggyback exposure on Fujichrome 100F slide film using a 35-mm ultra-wide-angle lens at f/4.5; taken Mar. 28, 2004 from Calgary (Alan Dyer).



February (*Jewels of the Southern Sky*): 15-minute medium-format piggyback exposure on Fujichrome 400F slide film using a 90-mm lens at f/4; taken from South Australia (Alan Dyer).



March (*The Universe Above Mauna Kea*): 62-minute fixed-tripod exposure on Kodak Elite 200 slide film using a 28-mm lens at f/3.5; taken during an observing expedition by five RASC Halifax Centre members to Mauna Kea in April 2002 (Roy Bishop).



May (*A Good Month for Jupiter*): Composite image formed using *RegiStax 2* and *Images Plus* from 111 frames shot at 5 fps on a ToUCam 740 pro webcam using a 5X Televue Powermate barlow on a Starmaster 18-inch Dobsonian telescope; taken Mar. 11, 2004 from Ottawa (Mike Wirths).



June (*Giant M81 and a Dwarf Galaxy*): Composite LRGB image formed using *RegiStar* and *Photoshop* from total exposures of 120:10:10:20 minutes on an SBIG ST10XME CCD camera using a 12.5-inch f/9 Ritchey-Chrétien telescope and total exposures of 120:30:30:30 minutes on an SBIG STL 11000 CCD camera using a 6-inch f/7 Astro-Physics refractor (Robert Gendler).



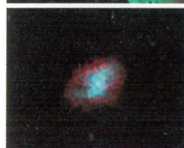
July (*Observing Dark Nebulas*): 50-minute medium-format telephoto exposure on Kodak Ektachrome E200 slide film using a 400-mm lens at f/5.6 (Kevin Black).



August (*The Centre of the Northern Cross*): Composite mosaic image formed using *RegiStar* and *Photoshop* from two 120-minute exposures on medium-format Kodak PPF 400 colour negative film using a 5-inch f/6 Astro-Physics refractor (Matt BenDaniel).



September (*A Towering Aurora*): 25-second fixed-tripod exposure on Fujicolor Superia 800 X-Tra colour negative film using a 17-mm ultra-wide-angle lens at f/3.5; taken Oct. 28, 2001 from Beauport, Quebec (Jean Chiasson).



October (*M1: The Crab Supernova Remnant*): Composite LRGB image formed using *MaxIm DL* and *Photoshop* from a total of 5 images: 4 each at 10 minutes through L, R, G, and B filters and one at 20 minutes through an H α filter, on a Finger Lakes Dream Machine CCD camera using a 16-inch f/10 Meade LX200 SCT (Jack Newton).



November (*Lunar Seas in a Sea of Clouds*): Autoexposure image on a Canon 300D Digital Rebel, prime focus using a Borg 3-inch f/6.6 refractor (Brady Johnson).



December (*Epic Sweep of the Winter Milky Way*): Composite mosaic image formed using *RegiStar*, *Photoshop*, and custom software from 10 80-minute medium-format exposures on Kodak E100S slide film using a 90-mm lens at f/3.5; exposures taken at 3500-m elevation at Mauna Kea (Wei-Hao Wang).

2005

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

2006





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

New Moon dates are displayed in **bold**.



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

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

	Set Rise	$40^{\circ}N$ $50^{\circ}N$ 1:46 1:43 14:37 14:46	16		Set Rise
<i>Jupiter 1.6° N of Moon best in W of N. America</i>			3 am	<i>2 shadows on extreme W of</i>	
	Set Rise	$40^{\circ}N$ $50^{\circ}N$ 6:41 5:50 22:37 23:21	23		Set Rise

Multiple print-competition award winner, including:

1999 *Award of Excellence*, Ontario Printing and Imaging Association

2001 *Silver*, International Gallery of Superb Printing

2003 *Gold*, Gallery of Superb Printing

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