



THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

# OBSERVER'S CALENDAR

2000

























# JANUARY

## A Moon for Night Owls

After midnight, the third-quarter Moon presents a smooth-shaven face. The great "seas," such as Mare Imbrium in the upper half of this month's image, contrast with the lunar mountains which dominate the terminator between light and darkness. The sweeping arc of the lunar Appennines points to the rayed crater Copernicus. Photo by Jay Oueller

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<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</p> <p>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</p> <p>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</p>				<p> Rise 2:51 2:35 Set 13:21 13:38</p> <p>Sunrise 7:59 7:22 Sunset 16:08 16:45</p> <p><i>New Year's Day</i></p>
<p> Rise 50°N 40°N 3:55 3:33 Set 13:47 14:10</p> <p>2</p>	<p> Rise 4:57 4:30 Set 14:17 14:46</p> <p>3</p>	<p> Rise 5:56 5:25 Set 14:52 15:25</p> <p>4</p> <p>Fall of Loist City meteorite at Oklahoma, 30 years ago</p> <p>Quadrantid meteors peak 1 am Farthest Lunar Apogee of 2000 7 am</p>	<p> Rise 6:52 6:18 Set 15:34 16:09</p> <p>5</p>	<p> Rise 7:43 7:06 Set 16:22 16:57 New Moon 13:14</p> <p>6</p>	<p> Rise 8:28 7:55 Set 17:17 17:50</p> <p>7</p>	<p> Rise 9:07 8:37 Set 18:18 18:46</p> <p>8</p> <p>Sunrise 7:53 7:22 Sunset 16:16 16:51</p>
<p>Leslie Pether, eminent variable star observer, born, 100 years ago</p> <p> Rise 50°N 40°N 9:40 9:15 Set 19:21 19:45</p> <p>9</p>	<p> Rise 10:09 9:49 Set 20:28 20:45</p> <p>10</p> <p>Earth at perihelion (147,100 Mm) 10 am</p> <p>Mars 2.8° to right of Moon (best in eastern N. Amer.) 7 pm</p>	<p> Rise 10:34 10:21 Set 21:36 21:47</p> <p>11</p>	<p> Rise 10:58 10:51 Set 22:46 22:49</p> <p>12</p>	<p> Rise 11:21 11:21 Set 23:57 23:53</p> <p>13</p>	<p> Rise 11:45 11:52 Set -- 8:34 1st Quarter</p> <p>14</p>	<p> Set 1:11 1:00 Rise 12:12 12:26</p> <p>15</p> <p>Sunrise 7:53 7:20 Sunset 16:26 16:59</p>
<p> Set 50°N 40°N 2:27 2:08 Rise 12:42 13:03</p> <p>16</p> <p>Meteorite reported to have killed a man in Orangi, India, 175 years ago</p>	<p> Set 3:44 3:19 Rise 13:19 13:47</p> <p>17</p> <p>Martin Luther King Jr.'s Birthday (MLK)</p>	<p> Set 5:01 4:30 Rise 14:05 14:37</p> <p>18</p>	<p> Set 6:13 5:38 Rise 15:02 15:36</p> <p>19</p>	<p> Set 7:16 6:41 Rise 16:09 16:42 Full Moon 23:40</p> <p>20</p> <p>Total Lunar Eclipse, visible in all of N. America Largest Full Moon of 2000 10:01 pm</p>	<p> Set 8:07 7:37 Rise 17:24 17:53</p> <p>21</p>	<p> Set 8:48 8:24 Rise 18:41 19:04</p> <p>22</p> <p>Sunrise 7:47 7:17 Sunset 16:27 17:07</p> <p>2 Shadows on Jupiter (visible in Atlantic Canada) Regulus 1.5° to right of Moon (best in eastern N. Amer.) 3:00 pm 3:10 pm</p>
<p> Set 50°N 40°N 9:23 9:05 Rise 19:58 20:14</p> <p>23</p>	<p> Set 9:51 9:40 Rise 21:13 21:20</p> <p>24</p> <p>Japan becomes third nation to launch a lunar satellite, Hiten, 10 years ago</p>	<p> Set 10:16 10:12 Rise 22:24 22:25</p> <p>25</p>	<p> Set 10:39 10:41 Rise 23:33 23:26</p> <p>26</p> <p>Charles Messier discovers first of 13 comets, 240 years ago</p>	<p> Set 11:01 11:10 Rise -- --</p> <p>27</p> <p>Pallas at opposition</p>	<p> Rise 0:39 0:26 Set 11:24 11:40 3rd Quarter 2:57</p> <p>28</p>	<p> Rise 1:44 1:26 Set 11:50 12:11</p> <p>29</p> <p>Sunrise 7:38 7:12 Sunset 16:48 17:15</p>
<p> Rise 50°N 40°N 2:47 2:22 Set 12:18 12:45</p> <p>30</p>	<p> Rise 3:48 3:18 Set 12:52 13:23</p> <p>31</p> <p>Winter Star Party, W. Summerland Key, FL (through February 5)</p>					<p>... the Moon, whose Orb Through Optic Glass the Tuscan Artists' views At Evening from the top of Fesole, Or in Valdarno, to descry new Lands, Rivers or Mountains in her spotty Globe *</p> <p>Milton, Paradise Lost</p> <p>*Galileo</p>





Big and Bright in Southern Skies



# FEBRUARY

## Big and Bright in Southern Skies

The northern Andromeda and Whirlpool galaxies here yield to southern counterparts, NGC253 in Sculptor and, to its left, M83 in Hydra. In the eyepiece, the diameter of NGC253 rivals the Moon, and its mottled, dusty arms invite careful scrutiny. The dynamic spiral arms of M83 suggest a gigantic reversed "S." CCD images by Jack Newton

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																											
<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>50°N 40°N Rise 4:45 4:12 Set 13:31 14:05</p> <p><b>1</b></p>	<p>Rise 5:38 5:03 Set 14:17 14:52</p> <p><b>2</b></p> <p>Venus 1.1° below Cr. Moon (best in western N. Amer.) 7 am</p>	<p>Rise 6:25 5:51 Set 15:10 15:43</p> <p><b>3</b></p>	<p>Rise 7:06 6:35 Set 16:09 16:39</p> <p><b>4</b></p>	<p>Rise 7:42 7:15 Set 17:12 17:38 New Moon 8:03 Sunrise 7:28 7:05 Sunset 17:00 17:23</p> <p><b>5</b></p>																																																																																											
	<p>Rise 8:12 7:51 Set 18:19 18:38</p> <p><b>6</b></p>	<p>Rise 8:39 8:24 Set 19:27 19:40</p> <p><b>7</b></p> <p>Report of water discovered in Jupiter's atmosphere, 25 years ago</p>	<p>Rise 9:03 8:55 Set 20:37 20:43</p> <p><b>8</b></p>	<p>Rise 9:27 9:25 Set 21:48 21:46</p> <p><b>9</b></p>	<p>Rise 9:50 9:55 Set 23:00 22:51</p> <p><b>10</b></p>	<p>Rise 10:15 10:27 Set -- 23:58</p> <p><b>11</b></p>	<p>Set 0:14 -- Rise 10:43 11:02 1st Quarter 18:21 Sunrise 7:17 6:57 Sunset 17:12 17:32</p> <p><b>12</b></p>																																																																																										
	<p>Set 1:29 1:06 Rise 11:16 11:42</p> <p><b>13</b></p> <p>Aldebaran 0.9° S of Moon 11 pm</p>	<p>Set 2:44 2:14 Rise 11:57 12:28</p> <p><b>14</b></p> <p>Valentine's Day Mercury greatest elong. E (18°) (best evening view in 2000) 8 pm</p>	<p>Set 3:55 3:21 Rise 12:47 13:21</p> <p><b>15</b></p>	<p>Set 5:00 4:25 Rise 13:47 14:22</p> <p><b>16</b></p>	<p>Set 5:55 5:22 Rise 14:57 15:29</p> <p><b>17</b></p> <p>Giordano Bruno burned at the stake for heliocentric cosmology, 400 years ago</p>	<p>Set 6:40 6:12 Rise 16:13 16:39</p> <p><b>18</b></p> <p>Clyde Tombaugh discovers Pluto, 70 years ago</p>	<p>Set 7:18 6:56 Rise 17:30 17:49 Full Moon 11:27 Sunrise 7:04 6:48 Sunset 17:24 17:40</p> <p><b>19</b></p>																																																																																										
	<p>Set 7:48 7:24 Rise 18:47 18:58</p> <p><b>20</b></p>	<p>Set 8:15 8:07 Rise 20:01 20:05</p> <p><b>21</b></p>	<p>Set 8:39 8:39 Rise 21:13 21:10</p> <p><b>22</b></p>	<p>Set 9:02 9:09 Rise 22:22 22:12</p> <p><b>23</b></p> <p>Pioneer 11 becomes fourth spacecraft to leave solar system, 10 years ago</p>	<p>Set 9:26 9:39 Rise 23:29 23:12</p> <p><b>24</b></p>	<p>Set 9:50 10:10 Rise -- --</p> <p><b>25</b></p>	<p>Rise 0:34 0:11 Set 10:18 10:43 3rd Quarter 20:53 Sunrise 6:51 6:39 Sunset 17:36 17:48</p> <p><b>26</b></p>																																																																																										
	<p>Rise 1:37 1:09 Set 10:50 11:19</p> <p><b>27</b></p>	<p>Rise 2:36 2:04 Set 11:27 12:00</p> <p><b>28</b></p>	<p>Rise 3:31 2:56 Set 12:10 12:45</p> <p><b>29</b></p>			<p>JANUARY</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>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr> <tr><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td></tr> <tr><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td></tr> <tr><td>30</td><td>31</td><td></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	31						<p>MARCH</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 3 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>	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	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	31																																																																																												





Cepheus "Rosette"



# MARCH

## Cepheus' "Rosette"

This huge, annular region of excited hydrogen (IC1396) in Cepheus is much larger than its brighter namesake, the Rosette in Monoceros. Special digital processing techniques heighten the contrast between the glowing annulus and its dark clouds, which stand out like fingers. Especially striking is *vdB142*, just to right of centre. Composite of photos by Peter Ceravolo and Rajiv Gupta

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<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>FEBRUARY</p> <p>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</p>	<p>APRIL</p> <p>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</p>	<p>50°N 40°N</p> <p>Rise 4:20 3:45</p> <p>Set 13:00 13:35</p> <p>1</p>	<p>Rise 5:04 4:31</p> <p>Set 13:57 14:29</p> <p>2</p>	<p>Rise 5:41 5:12</p> <p>Set 14:59 15:26</p> <p>3</p>	<p>Rise 6:13 5:49</p> <p>Set 16:05 16:27</p> <p>4</p> <p>Sunrise 6:36 6:26</p> <p>Sunset 17:46 17:56</p> <p>John Flamsteed appointed first Astronomer Royal, 325 years ago</p>
<p>50°N 40°N</p> <p>Rise 6:41 6:24</p> <p>Set 17:14 17:29</p> <p>5</p>	<p>Rise 7:07 6:56</p> <p>Set 18:25 18:33</p> <p>New Moon 0:17</p> <p>6</p>	<p>Rise 7:31 7:27</p> <p>Set 19:37 19:38</p> <p>7</p>	<p>Rise 7:55 7:57</p> <p>Set 20:50 20:43</p> <p>8</p>	<p>Rise 8:19 8:29</p> <p>Set 22:05 21:50</p> <p>9</p>	<p>Rise 8:46 9:03</p> <p>Set 23:20 22:59</p> <p>10</p>	<p>Rise 9:16 9:41</p> <p>Set -- --</p> <p>Sunrise 9:21 9:17</p> <p>Sunset 17:59 18:03</p>
<p>50°N 40°N</p> <p>Set 0:35 0:07</p> <p>Rise 9:55 10:25</p> <p>12</p>	<p>Set 1:47 1:14</p> <p>Rise 10:41 11:15</p> <p>1st Quarter 1:59</p> <p>13</p>	<p>Set 2:52 2:17</p> <p>Rise 11:36 12:11</p> <p>14</p>	<p>Set 3:49 3:15</p> <p>Rise 12:41 13:14</p> <p>15</p>	<p>Set 4:36 4:06</p> <p>Rise 13:52 14:21</p> <p>16</p>	<p>Set 5:15 4:50</p> <p>Rise 15:08 15:30</p> <p>17</p>	<p>Set 5:47 5:29</p> <p>Rise 16:23 16:39</p> <p>Sunrise 6:06 6:06</p> <p>Sunset 18:12 18:12</p>
<p>Aldebaran 2.6° to left of Moon (best in western N. Amer.) 3 am</p> <p>50°N 40°N</p> <p>Set 6:15 6:04</p> <p>Rise 17:38 17:46</p> <p>Full Moon 23:44</p> <p>19</p>	<p>Set 6:39 6:36</p> <p>Rise 18:51 18:51</p> <p>20</p> <p>Spring Equinox 2:35 am</p>	<p>Set 7:03 7:06</p> <p>Rise 20:02 19:55</p> <p>21</p> <p>Mercury greatest elong. W (28°) 4 pm</p>	<p>Set 7:26 7:36</p> <p>Rise 21:12 20:57</p> <p>22</p> <p>Ceres at opposition</p>	<p>Set 7:50 8:07</p> <p>Rise 22:19 21:58</p> <p>23</p>	<p>Set 8:17 8:39</p> <p>Rise 23:24 22:57</p> <p>24</p> <p>Zodiacal Light visible in W after evening twilight for next two weeks</p>	<p>Set 8:47 9:15</p> <p>Rise -- 23:54</p> <p>Sunrise 6:51 6:50</p> <p>Sunset 18:22 18:18</p>
<p>50°N 40°N</p> <p>Rise 0:25 --</p> <p>Set 9:21 9:54</p> <p>26</p>	<p>Rise 1:23 0:48</p> <p>Set 10:02 10:37</p> <p>3rd Quarter 19:21</p> <p>27</p> <p>Death of Wilhelm Beer who found heights of 1,000 lunar mountains, 150 years ago</p>	<p>Rise 2:14 1:39</p> <p>Set 10:49 11:25</p> <p>28</p>	<p>Rise 3:00 2:25</p> <p>Set 11:43 12:17</p> <p>29</p>	<p>Rise 3:39 3:08</p> <p>Set 12:43 13:13</p> <p>30</p>	<p>Rise 4:13 3:46</p> <p>Set 13:47 14:12</p> <p>31</p>	






A Porthole to the Stars  
From horizon to horizon, the Milky Way surrounds an abundance of stars. The main area is the Great Rift of



# APRIL

## A Porthole to the Stars

From horizon to horizon, the Milky Way provides an avalanche of stars that gives way to the Great Rift of dark matter at the lower right. Red, star-forming regions of hydrogen, also seen elsewhere in this Calendar, pepper the galactic plane. At the left, the bright new stars of the Pleiades and Hyades begin their careers. Photo by Peter Ceravolo

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<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</p> <p>S M T W T F S</p> <p>1 2 3 4</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>MAY</p> <p>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> Rise 4:42 4:22 Set 14:55 15:14 <b>1</b></p> <p>Sunrise 5:36 5:43 Sunset 18:33 18:25</p>
<p> Rise 50°N 40°N 6:09 5:54 Set 17:06 17:17 <b>2</b></p> <p>Daylight Savings Time Begins 2 am</p>	<p> Rise 6:33 6:26 Set 18:18 18:22 <b>3</b></p>	<p> Rise 6:57 6:57 Set 19:33 19:29 New Moon 14:12 <b>4</b></p>	<p> Rise 7:21 7:28 Set 20:49 20:37 <b>5</b></p>	<p> Rise 7:47 8:02 Set 22:07 21:47 <b>6</b></p> <p>Mars 1.1°N of Jupiter (vis. low in the W after dark) 8 pm Saturn 2.9° to right of Cr. Moon Jupiter and Mars are nearby best in SE USA 9 pm</p>	<p> Rise 8:18 8:40 Set 23:24 22:58 <b>7</b></p>	<p> Rise 8:54 9:22 Set -- -- <b>8</b></p> <p>Sunrise 6:21 6:32 Sunset 18:44 18:32</p> <p>Frank Drake begins SETI. 43 years ago International Astronomy Day</p>
<p> Set 50°N 40°N 0:39 0:07 Rise 9:37 10:10 <b>9</b></p>	<p> Set 1:48 1:12 Rise 10:30 11:06 <b>10</b></p>	<p> Set 2:47 2:12 Rise 11:32 12:07 1st Quarter 9:30 <b>11</b></p>	<p> Set 3:37 3:05 Rise 12:41 13:12 <b>12</b></p>	<p> Set 4:17 3:50 Rise 13:54 14:19 <b>13</b></p>	<p> Set 4:50 4:30 Rise 15:08 15:26 <b>14</b></p>	<p> Set 5:18 5:04 Rise 16:22 16:33 <b>15</b></p> <p>Sunrise 6:08 6:22 Sunset 19:55 19:39</p> <p>Death of Heinrich S. Schwabe, discoverer of 11-year sunspot cycle, 125 years ago</p> <p>Regulus 1.4°S of Moon (best in western N. Amer.) 3 am</p>
<p> Set 50°N 40°N 5:43 5:36 Rise 17:34 17:38 <b>16</b></p> <p>Mars 2.4°N of Saturn (vis. low in the W after dark) 10 pm</p>	<p> Set 6:06 6:06 Rise 18:45 18:41 <b>17</b></p>	<p> Set 6:28 6:35 Rise 19:55 19:44 Full Moon 13:41 <b>18</b></p>	<p> Set 6:51 7:05 Rise 21:03 20:45 <b>19</b></p>	<p> Set 7:16 7:37 Rise 22:10 21:45 <b>20</b></p>	<p> Set 7:45 8:11 Rise 23:14 22:44 <b>21</b></p> <p>Good Friday Lyrid meteors peak 7 pm</p>	<p> Set 8:17 8:48 Rise -- 23:43 <b>22</b></p> <p>Sunrise 5:52 6:12 Sunset 20:05 19:48</p> <p>Zodiacal Light visible in W after evening twilight for next two weeks</p>
<p> Rise 50°N 40°N 0:14 -- Set 8:56 9:30 <b>23</b></p> <p>Easter Sunday</p>	<p> Rise 1:08 0:32 Set 9:40 10:16 <b>24</b></p>	<p> Rise 1:56 1:20 Set 10:31 11:07 <b>25</b></p> <p>Hubble Space Telescope launched, 10 years ago</p>	<p> Rise 2:37 2:04 Set 11:28 12:01 3rd Quarter 15:30 <b>26</b></p>	<p> Rise 3:13 2:44 Set 12:30 12:58 <b>27</b></p>	<p> Rise 3:43 3:20 Set 13:36 13:56 <b>28</b></p> <p>Jan Oort born, 100 years ago</p>	<p> Rise 4:10 2:53 Set 14:44 14:55 <b>29</b></p> <p>Sunrise 5:39 6:02 Sunset 20:16 19:53</p>
<p> Rise 50°N 40°N 4:35 4:24 Set 15:55 16:03 <b>30</b></p> <p>Texas Star Party, Ft. Davis, TX (through May 7)</p>			<p><i>'When I behold this goodly Frame, this World Of Heav'n and Earth consisting, and compute Their magnitudes, this Earth a spot, a grain, An Atom, with the Firmament compar'd And all her number'd Stars, that seem to roll Spaces incomprehensible ...'</i></p> <p>Milton, Paradise Lost</p>			







# MAY

## Dark Clouds at the Galactic Centre

The heart of the Milky Way is a complex mixture of bright star clouds and great, irregular regions of dark matter. Lighting up those regions are emission nebulae such as the Lagoon (M8) at the top and the Cat's Paw (NGC6334) at the lower right. The degree of darkness at the galactic core may seem surprising.

Photo by Ben Gendre

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																											
<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>50°N 40°N Rise 4:58 4:54 Set 17:09 17:09</p> <p><b>1</b></p>	<p>Rise 5:22 5:25 Set 18:25 18:17</p> <p><b>2</b></p> <p>Death of Johann Palisa, discoverer of 120 asteroids, 75 years ago</p>	<p>Rise 5:47 5:58 Set 19:43 19:27</p> <p><b>3</b></p>	<p>Rise 6:15 6:34 Set 21:03 20:40 New Moon 0:12</p> <p><b>4</b></p> <p>η-Aquarid meteors peak 12 pm</p>	<p>Rise 6:49 7:15 Set 22:22 21:52</p> <p><b>5</b></p>	<p>Rise 7:30 8:02 Set 23:37 23:02</p> <p>Sunrise 5:27 5:54 Sunset 20:27 20:00</p> <p><b>6</b></p>																																																																																											
<p>Rise 8:21 8:57 Set -- --</p> <p><b>7</b></p>	<p>Set 0:42 0:06 Rise 9:22 9:58</p> <p><b>8</b></p>	<p>Set 1:37 1:03 Rise 10:30 11:03</p> <p><b>9</b></p>	<p>Set 2:20 1:51 Rise 11:44 12:11 1st Quarter 16:00</p> <p><b>10</b></p>	<p>Set 2:55 2:32 Rise 12:58 13:19</p> <p><b>11</b></p>	<p>Set 3:24 3:08 Rise 14:12 14:25</p> <p><b>12</b></p>	<p>Set 3:49 3:40 Rise 15:24 15:23</p> <p>Sunrise 5:16 5:45 Sunset 20:37 20:07</p> <p><b>13</b></p>																																																																																											
<p>Set 16:34 16:32 Rise 50°N 40°N 4:12 4:10</p> <p><b>14</b></p> <p>Mother's Day</p>	<p>Set 4:33 4:38 Rise 17:43 17:34</p> <p><b>15</b></p>	<p>Set 4:55 5:07 Rise 18:51 18:35</p> <p><b>16</b></p>	<p>Set 5:19 5:37 Rise 19:58 19:35</p> <p><b>17</b></p>	<p>Set 5:46 6:10 Rise 21:03 20:35 Full Moon 3:34</p> <p><b>18</b></p>	<p>Set 6:16 6:46 Rise 22:05 21:32</p> <p><b>19</b></p>	<p>Set 6:52 7:26 Rise 23:02 22:26</p> <p>Sunrise 5:07 5:40 Sunset 20:47 20:13</p> <p><b>20</b></p> <p>Birth of George F. Donald, discoverer of innermost ring of Saturn (M104)</p>																																																																																											
<p>Set 7:34 8:10 Rise 23:52 23:16</p> <p><b>21</b></p>	<p>Set 8:23 8:59 Rise -- --</p> <p><b>22</b></p> <p>Victoria Day (Canada)</p>	<p>Rise 9:36 9:02 Set 9:17 9:51</p> <p><b>23</b></p>	<p>Rise 1:14 0:43 Set 10:17 10:47</p> <p><b>24</b></p>	<p>Rise 1:46 1:19 Set 11:21 11:45</p> <p><b>25</b></p> <p>Riverside Telescope Makers Conference, Big Bear, CA (through May 29)</p>	<p>Rise 2:13 1:53 Set 12:27 12:45 3rd Quarter 7:55</p> <p><b>26</b></p>	<p>Rise 2:36 3:01 Set 13:26 13:51</p> <p>Sunrise 5:13 5:39 Sunset 20:56 20:17</p> <p><b>27</b></p>																																																																																											
<p>Rise 3:01 2:53 Set 14:46 14:50</p> <p><b>28</b></p> <p>Memorial Day (USA)</p>	<p>Rise 3:23 3:23 Set 15:59 15:55</p> <p><b>29</b></p>	<p>Rise 3:47 3:54 Set 17:15 17:04</p> <p><b>30</b></p>	<p>Rise 4:13 4:28 Set 18:35 18:15</p> <p><b>31</b></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</td></tr> <tr><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr> <tr><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td></tr> <tr><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td></tr> <tr><td>30</td><td></td><td></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							<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></td><td></td><td>1 2 3</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td></tr> <tr><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td></tr> <tr><td>25</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																																																																																																	
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																																																																																												





The Pelican Nebula  
Lies just below Deneb, the brightest star in Cygnus; the Pelican is large but elusive, especially to the visual



# JUNE

## The Pelican Nebula

Lying just below Deneb, the brightest star in Cygnus, the Pelican is large but elusive, especially to the visual observer. It nonetheless reveals its exquisite detail and delicate gradations of contrast in this image, which records varying intensities of bright emissions and their embedded dark areas such as the Pelican's eye.

Photo by Rajiv Gupta

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<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</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>JULY</p> <p>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>30°N 40°N</p> <p>Rise 4:43 5:06</p> <p>Set 19:55 19:28</p> <p>1</p> <p>ROSAT X-ray observatory, joint project of Ger., UK and US, launched, 10 years ago</p> <p>Pluto at opposition 2 pm</p>	<p>30°N 40°N</p> <p>Rise 5:21 5:50</p> <p>Set 21:14 20:41</p> <p>New Moon 8:14</p> <p>2</p>	<p>30°N 40°N</p> <p>Rise 6:08 6:42</p> <p>Set 22:27 21:51</p> <p>Sunrise 4:54 5:30</p> <p>Sunset 21:03 20:24</p> <p>3</p>
<p>30°N 40°N</p> <p>Rise 7:05 7:42</p> <p>Set 23:29 22:53</p> <p>4</p>	<p>30°N 40°N</p> <p>Rise 8:13 8:48</p> <p>Set -- 23:47</p> <p>5</p>	<p>30°N 40°N</p> <p>Set 0:18 --</p> <p>Rise 9:28 9:58</p> <p>6</p>	<p>30°N 40°N</p> <p>Set 0:58 0:32</p> <p>Rise 10:45 11:08</p> <p>7</p>	<p>30°N 40°N</p> <p>Set 1:29 1:10</p> <p>Rise 12:00 12:16</p> <p>1st Quarter 23:29</p> <p>8</p> <p>Venera 9 launched for first soft landing on Venus, 25 years ago</p>	<p>30°N 40°N</p> <p>Set 1:55 1:44</p> <p>Rise 13:14 13:22</p> <p>9</p> <p>Mercury greatest elong. E (24°) 9 am</p>	<p>30°N 40°N</p> <p>Set 2:19 2:14</p> <p>Rise 14:25 14:20</p> <p>Sunrise 4:51 5:31</p> <p>Sunset 21:08 20:28</p> <p>10</p> <p>Jupiter 1.7° to left of Saturn vis. low in the E before sunrise separation &lt; 3° until June 23</p>
<p>30°N 40°N</p> <p>Set 15:34 15:26</p> <p>Rise 2:40 2:43</p> <p>11</p> <p>Venus at superior conjunction 7 am</p>	<p>30°N 40°N</p> <p>Set 3:02 3:11</p> <p>Rise 16:42 16:29</p> <p>12</p>	<p>30°N 40°N</p> <p>Set 3:25 3:41</p> <p>Rise 17:49 17:28</p> <p>13</p>	<p>30°N 40°N</p> <p>Set 3:49 4:12</p> <p>Rise 18:54 18:28</p> <p>14</p>	<p>30°N 40°N</p> <p>Set 4:18 4:46</p> <p>Rise 19:57 19:25</p> <p>15</p>	<p>30°N 40°N</p> <p>Set 4:51 5:24</p> <p>Rise 20:56 20:20</p> <p>Full Moon 18:27</p> <p>16</p>	<p>30°N 40°N</p> <p>Set 5:31 6:07</p> <p>Rise 21:40 21:12</p> <p>Sunrise 4:50 5:31</p> <p>Sunset 21:12 20:31</p> <p>17</p> <p>William Parsons, builder of the 100-inch century telescope, 20th, 21st cent.</p>
<p>30°N 40°N</p> <p>Set 6:17 6:54</p> <p>Rise 22:35 21:59</p> <p>18</p> <p>Father's Day</p>	<p>30°N 40°N</p> <p>Set 7:10 7:45</p> <p>Rise 23:15 22:42</p> <p>19</p> <p>William Parsons, announces his discovery of spiral nebulae, 150 years ago</p>	<p>30°N 40°N</p> <p>Set 8:08 8:40</p> <p>Rise 23:49 23:20</p> <p>20</p> <p>Summer Solstice 9:48 pm</p>	<p>30°N 40°N</p> <p>Set 9:10 9:37</p> <p>Rise -- 23:54</p> <p>21</p>	<p>30°N 40°N</p> <p>Rise 0:17 --</p> <p>Set 10:15 10:35</p> <p>22</p>	<p>30°N 40°N</p> <p>Rise 0:42 0:26</p> <p>Set 11:21 11:35</p> <p>23</p>	<p>30°N 40°N</p> <p>Set 12:09 12:04</p> <p>1st Quarter 11:34</p> <p>Sunrise 4:49 5:30</p> <p>Sunset 21:13 20:32</p> <p>24</p> <p>St. Jean-Baptiste Day (Quebec)</p>
<p>30°N 40°N</p> <p>Rise 1:27 1:24</p> <p>Set 13:39 13:39</p> <p>25</p>	<p>30°N 40°N</p> <p>Rise 1:49 1:53</p> <p>Set 14:52 14:44</p> <p>26</p> <p>Charles Messier born, 270 years ago</p>	<p>30°N 40°N</p> <p>Rise 2:13 2:24</p> <p>Set 16:08 15:52</p> <p>27</p>	<p>30°N 40°N</p> <p>Rise 2:40 2:59</p> <p>Set 17:26 17:03</p> <p>28</p>	<p>30°N 40°N</p> <p>Rise 3:13 3:39</p> <p>Set 18:46 18:15</p> <p>29</p>	<p>30°N 40°N</p> <p>Rise 3:54 4:26</p> <p>Set 20:02 19:27</p> <p>30</p> <p>RASC General Assembly, Winnipeg (through July 2)</p>	<p>"A wonderful bird is the pelican, His bill can hold more than his belly, He can take in his beak, Food enough for a week, But I'm dimmed if I see how the helican!"</p> <p>Dixon Merritt</p>






































# JULY

## The Veil Nebula in a Different Light

The outstanding features of this image of the eastern arc of the Veil supernova remnant are its justice to fine structural details and its meticulous rendering of colours – from the red of hydrogen to the green of oxygen, with an astonishing palette of combinations to produce yellows, oranges, and touches of crimson and ruby. Composite of photos by Rajiv Gupta and John Mirtle

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<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>JUNE</p> <p>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</p>	<p>AUGUST</p> <p>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> Rise 4:46 5:22 Set 21:11 20:34 New Moon 15:20 Sunrise 4:55 5:35 Sunset 21:12 20:33</p> <p><b>1</b></p> <p>Canada Day</p> <p>Closest Lunar Perigee of 2000 6 pm</p>
<p> Rise 5:50 4:00N 6:26 Set 22:08 21:34</p> <p><b>2</b></p>	<p> Rise 7:03 7:36 Set 22:53 22:25</p> <p><b>3</b></p> <p>Earth at aphelion (152,100 Mm) 6 pm</p>	<p> Rise 8:22 8:49 Set 23:29 23:07</p> <p><b>4</b></p> <p>Independence Day (USA)</p>	<p> Rise 9:42 10:01 Set 23:58 23:44</p> <p><b>5</b></p>	<p> Rise 10:59 11:10 Set -- --</p> <p><b>6</b></p>	<p> Set 0:23 0:16 Rise 12:13 12:16</p> <p><b>7</b></p>	<p> Set 0:46 0:46 Rise 13:24 13:20 1st Quarter 8:53 Sunrise 5:01 5:39 Sunset 21:09 20:31</p> <p><b>8</b></p>
<p> Set 1:08 1:15 Rise 14:33 14:22</p> <p><b>9</b></p>	<p> Set 1:30 1:44 Rise 15:40 15:22</p> <p><b>10</b></p>	<p> Set 1:54 2:15 Rise 16:46 16:21</p> <p><b>11</b></p>	<p> Set 2:21 2:48 Rise 17:49 17:19</p> <p><b>12</b></p>	<p> Set 2:53 3:24 Rise 18:49 18:15</p> <p><b>13</b></p>	<p> Set 3:30 4:05 Rise 19:45 19:05</p> <p><b>14</b></p>	<p> Set 4:14 4:57 Rise 20:37 19:57</p> <p><b>15</b></p> <p>Sunrise 5:08 5:44 Sunset 21:02 20:29</p> <p>Wega first star photographed by Chinese, Bond and J.A. Whipple, 180 AD</p> <p>Seymour and Anolis lizards battle</p> <p>International Day of the Girl</p>
<p> Set 5:05 5:41 Rise 21:15 20:41 Full Moon 9:55</p> <p><b>16</b></p> <p>Total Lunar Eclipse, beginning visible in W. N. America 7:57 am Vesta at opposition</p>	<p> Set 6:01 6:34 Rise 21:51 21:21</p> <p><b>17</b></p>	<p> Set 7:02 7:31 Rise 22:21 21:57</p> <p><b>18</b></p>	<p> Set 8:06 8:29 Rise 22:47 22:29</p> <p><b>19</b></p>	<p> Set 9:12 9:26 Rise 23:11 22:58</p> <p><b>20</b></p>	<p> Set 10:19 10:29 Rise 23:32 23:27</p> <p><b>21</b></p>	<p> Set 11:27 10:57 Rise 23:51 23:39</p> <p><b>22</b></p> <p>Sunrise 5:16 5:54 Sunset 21:07 20:34</p>
<p> Set 12:37 12:32 Rise -- --</p> <p><b>23</b></p>	<p> Rise 0:16 0:24 Set 13:50 13:37 3rd Quarter 7:02</p> <p><b>24</b></p>	<p> Rise 0:41 0:56 Set 15:04 14:44</p> <p><b>25</b></p>	<p> Rise 1:09 1:32 Set 16:21 15:54</p> <p><b>26</b></p> <p>Saturn 2.7° to N of Moon (best in SE USA) 5 am</p>	<p> Rise 1:45 2:14 Set 17:37 17:04</p> <p><b>27</b></p> <p>Aldebaran 1.3° to right of Moon (best in eastern Canada) 1 am Mercury greatest along W (20°) 5 am Neptune at opposition 7 pm</p>	<p> Rise 2:30 3:04 Set 18:49 18:12</p> <p><b>28</b></p> <p>Sδ-Aquarid meteors peak 8 am</p>	<p> Rise 3:19 3:52 Set 19:57 19:13</p> <p><b>29</b></p> <p>Sunrise 3:29 4:04 Sunset 20:44 20:09</p> <p>Mount Kobau Star Party, BC (through August 6)</p> <p>2 Shadows on Jupiter (visible in E. N. America) 3:31 am</p>
<p> Rise 4:36 5:11 Set 20:43 20:11 New Moon 22:25</p> <p><b>30</b></p> <p>Partial Solar Eclipse, visible in Western and N. Canada, N. W. USA and Alaska</p>	<p> Rise 5:53 6:23 Set 21:24 20:58</p> <p><b>31</b></p>			<p><i>"Roll on ye stars! exult in youthful prime, Mark with bright curves the pinless steps of time. Flowers of the sky! ye too to age must yield, Faint as your saken sisters of the field"</i></p> <p>Erasmus Darwin (Grandfather of Charles Darwin)</p>		







# AUGUST

## The Antares Region

Here is a panoply of emission, reflection, and dark nebulae. The yellow nebulosity around bright Antares arises from reflection off its own ejected material, unlike blue nebulae which result from reflection off dust passing near a star. Red emission regions complete an impressive array of colours in contrast to the region's dark fingers.

Photo by Ben Gendri

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<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>50°N 40°N Rise 7:14 7:37 Set 21:57 21:39</p> <p><b>1</b></p>	<p>Rise 8:35 8:50 Set 22:24 22:14</p> <p><b>2</b></p>	<p>Rise 9:52 9:59 Set 22:49 22:46</p> <p><b>3</b></p>	<p>Rise 11:07 11:06 Set 23:11 23:16</p> <p><b>4</b></p>	<p>Rise 12:19 12:11 Set 23:34 23:46</p> <p><b>5</b></p> <p>Sunrise 5:36 6:02 Sunset 20:35 20:09</p> <p>Neil Armstrong born, 70 years ago 2 Shadows on Jupiter (visible in W. N. America) 5:24 am</p>
<p>50°N 40°N Rise 13:29 13:13 Set 23:58 21:02</p> <p><b>6</b></p>	<p>Set -- 0:16 Rise 14:36 14:14</p> <p><b>7</b></p> <p>Civic Holiday (Canada)</p>	<p>Set 0:24 0:48 Rise 15:41 15:13</p> <p><b>8</b></p>	<p>Set 0:54 1:24 Rise 16:42 16:09</p> <p><b>9</b></p>	<p>Set 1:29 2:03 Rise 17:39 17:03</p> <p><b>10</b></p>	<p>Set 2:11 2:47 Rise 18:30 17:54</p> <p><b>11</b></p>	<p>Set 2:59 3:36 Rise 19:15 18:40</p> <p><b>12</b></p> <p>Sunrise 5:48 6:09 Sunset 20:23 20:00</p> <p>Echo 1 launched, first indigenous Canadian satellite, 40 years ago Perseid meteors peak 12 am 2 Shadows on Jupiter (vis. in extreme W. N. Amer.) 7:18 am Juno at opposition</p>
<p>Set 3:54 4:28 Rise 19:52 19:21</p> <p><b>13</b></p>	<p>Set 4:54 5:24 Rise 20:24 19:58</p> <p><b>14</b></p>	<p>Set 5:58 6:23 Rise 20:52 20:31</p> <p>Full Moon 1:13</p> <p><b>15</b></p>	<p>Set 7:04 7:22 Rise 21:16 21:02</p> <p><b>16</b></p>	<p>Set 8:11 8:22 Rise 21:38 21:30</p> <p><b>17</b></p>	<p>Set 9:19 9:24 Rise 21:59 21:56</p> <p><b>18</b></p>	<p>Set 10:28 10:26 Rise 22:21 22:27</p> <p><b>19</b></p> <p>Sunrise 5:56 6:16 Sunset 20:10 19:50</p> <p>Uranus at opposition 1 am</p>
<p>Set 11:39 11:29 Rise 22:44 22:57</p> <p><b>20</b></p>	<p>Set 12:52 12:34 Rise 23:11 23:31</p> <p><b>21</b></p>	<p>Set 14:06 13:41 Rise 23:43 14:51</p> <p>3rd Quarter</p> <p><b>22</b></p>	<p>Set 15:20 0:10 Rise 14:49</p> <p><b>23</b></p>	<p>Set 0:22 0:55 Rise 16:32 15:56</p> <p><b>24</b></p>	<p>Set 1:12 1:48 Rise 17:36 17:00</p> <p><b>25</b></p>	<p>Set 2:14 2:11 Rise 18:31 17:55</p> <p><b>26</b></p> <p>Sunrise 6:07 6:28 Sunset 19:56 19:35</p> <p>Viking 1 launched, first U.S. Mars orbiter/lander, 25 years ago</p> <p>2 Shadows on Jupiter (visible in Newfoundland) 10:23 pm</p> <p>Aldebaran 1.2° below the Moon (best in western N. Amer.) 6 am</p> <p>Starkest, Mount Forest, ON (through August 27)</p> <p>Nova East, Fundy National Park, NB (through August 28)</p>
<p>Set 3:26 3:59 Rise 19:16 18:47</p> <p><b>27</b></p>	<p>Set 4:45 5:11 Rise 19:52 19:31</p> <p><b>28</b></p>	<p>Set 6:06 6:25 Rise 20:22 20:08</p> <p>New Moon 6:19</p> <p><b>29</b></p>	<p>Set 7:26 7:37 Rise 20:48 20:42</p> <p><b>30</b></p>	<p>Set 8:44 8:46 Rise 21:12 21:13</p> <p><b>31</b></p>	<p><b>JULY</b></p> <p>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><b>SEPTEMBER</b></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>Voyager 2 at Saturn, 20 years ago Mercury greatest elong. W (20°) 5 am</p> <p>Nova Cygni, 25 years ago Alberta Star Party, Caroline, AB (through September 4)</p> <p>2 Shadows on Jupiter (visible in E. N. America) 1:00 am</p>







# SEPTEMBER

## The Heart of the Northern Cross

The region of Gamma Cygni is a meeting place of great diversity. Next to Gamma, a finger of dark matter interrupts glowing clouds of hydrogen, which shade off into the less intense but larger nebulosities to the right. At the lower right, Van Gogh's Ear (NGC6888) is powered by the intense energy of a Wolf-Rayet star. Composite of photos by John Mirtle and Murray Paulson

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<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</p> <p>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>OCTOBER</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>☉ Rise 9:59 9:54</p> <p>☉ Set 21:35 21:44</p> <p><b>1</b></p>	<p>☉ Rise 11:11 10:59</p> <p>☉ Set 21:59 22:14</p> <p>Sunrise 6:17 6:29</p> <p>Sunset 19:41 19:29</p> <p><b>2</b></p>
<p>☉ Rise 12:22 12:02</p> <p>☉ Set 22:24 22:47</p> <p><b>3</b></p>	<p>☉ Rise 13:29 13:03</p> <p>☉ Set 22:53 23:21</p> <p><b>4</b></p> <p>Labour Day</p>	<p>☉ Rise 14:33 14:01</p> <p>☉ Set 23:27 --</p> <p>1st Quarter 12:27</p> <p><b>5</b></p>	<p>☉ Set -- 0:00</p> <p>☉ Rise 15:32 14:57</p> <p><b>6</b></p> <p>2 Shadows on Jupiter (visible in all of N. America) 3:37 am</p>	<p>☉ Set 0:06 0:42</p> <p>☉ Rise 16:26 15:49</p> <p><b>7</b></p>	<p>☉ Set 0:52 1:29</p> <p>☉ Rise 17:12 16:36</p> <p><b>8</b></p>	<p>☉ Set 1:45 2:21</p> <p>☉ Rise 17:52 17:19</p> <p>Sunrise 6:27 6:38</p> <p>Sunset 19:26 19:18</p> <p><b>9</b></p>
<p>☉ Set 2:44 3:16</p> <p>☉ Rise 18:26 17:57</p> <p><b>10</b></p>	<p>☉ Set 3:47 4:14</p> <p>☉ Rise 18:55 18:32</p> <p><b>11</b></p> <p>First comet flyby, In1 Cometary Explorer at P/Giacobini-Zinner, 15 years ago</p>	<p>☉ Set 4:52 5:13</p> <p>☉ Rise 19:20 19:03</p> <p><b>12</b></p>	<p>☉ Set 6:00 6:14</p> <p>☉ Rise 19:43 19:33</p> <p>Full Moon 15:37</p> <p><b>13</b></p>	<p>☉ Set 7:09 7:16</p> <p>☉ Rise 20:04 20:01</p> <p><b>14</b></p>	<p>☉ Set 8:19 8:18</p> <p>☉ Rise 20:26 20:30</p> <p><b>15</b></p> <p>Magellan's mapping of Venus begins, 10 years ago</p>	<p>☉ Set 9:32 9:32</p> <p>☉ Rise 20:48 21:50</p> <p>Sunrise 6:35 6:42</p> <p>Sunset 19:10 19:00</p> <p><b>16</b></p> <p>Mars 3.8°N of Regulus, 10 years ago</p>
<p>☉ Set 10:43 10:27</p> <p>☉ Rise 21:14 21:32</p> <p><b>17</b></p>	<p>☉ Set 11:57 11:34</p> <p>☉ Rise 21:44 22:09</p> <p><b>18</b></p> <p>Discovery of Comet Ikeya-Seki, 35 years ago</p> <p>Saturn 2.6° above the Moon (best in eastern N. Amer.) 11 pm</p>	<p>☉ Set 13:11 12:41</p> <p>☉ Rise 22:20 22:51</p> <p><b>19</b></p>	<p>☉ Set 14:23 13:46</p> <p>☉ Rise 23:05 23:41</p> <p>3rd Quarter 21:29</p> <p><b>20</b></p>	<p>☉ Set 15:28 14:51</p> <p>☉ Rise -- --</p> <p><b>21</b></p>	<p>☉ Rise 0:01 0:38</p> <p>☉ Set 16:25 15:49</p> <p><b>22</b></p> <p>Fall Equinox 1:27 pm</p>	<p>☉ Rise 1:03 1:03</p> <p>☉ Set 17:12 18:02</p> <p>Sunrise 6:49 6:51</p> <p>Sunset 18:56 18:50</p> <p><b>23</b></p>
<p>☉ Rise 2:22 2:52</p> <p>☉ Set 17:50 17:25</p> <p><b>24</b></p>	<p>☉ Rise 3:41 4:03</p> <p>☉ Set 18:21 18:04</p> <p><b>25</b></p>	<p>☉ Rise 5:00 5:15</p> <p>☉ Set 18:48 18:38</p> <p><b>26</b></p> <p>Zodiacal Light visible in E before morning twilight for next two weeks</p>	<p>☉ Rise 6:18 6:25</p> <p>☉ Set 19:12 19:10</p> <p>New Moon 15:53</p> <p><b>27</b></p>	<p>☉ Rise 7:35 7:33</p> <p>☉ Set 19:35 19:41</p> <p><b>28</b></p>	<p>☉ Rise 8:50 8:40</p> <p>☉ Set 19:59 20:11</p> <p><b>29</b></p>	<p>☉ Rise 10:02 9:45</p> <p>☉ Set 20:23 20:43</p> <p>Sunrise 6:59 6:56</p> <p>Sunset 18:40 18:43</p> <p>First photo of Orion Nebula, 120 years ago</p> <p><b>30</b></p>







# OCTOBER

## Joining Orion Together: A Nebular Complex

Where does a cloud begin or end? The breathtaking sweep of this image runs from the Horsehead at the lower left to the Orion Nebula at the upper right. What this image makes clear is that all its objects are bathed in a complex of nebulosity made up of sheets, swirls, and loops that pervade Orion's southern reaches.

Composite of photos by Peter Ceravolo and John Mirtle

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																						
Rise 50°N 40°N 11:13 10:49 Set 20:51 21:17 <b>1</b>	Rise 12:20 11:50 Set 21:23 21:54 <b>2</b>	Rise 13:22 12:48 Set 22:00 22:35 <b>3</b>	Rise 14:19 13:42 Set 22:44 23:21 <b>4</b>	Rise 15:08 14:31 Set 23:34 -- 1st Quarter 6:59 <b>5</b>	Set -- 0:11 Rise 15:51 15:16 <b>6</b>	Set 0:31 1:05 Rise 16:27 15:56 <b>7</b>  Sunrise 7:10 7:03 Sunset 18:25 18:32																																																																																						
Set 50°N 40°N 1:32 2:02 Rise 16:57 16:31 <b>8</b>	Set 2:37 3:00 Rise 17:23 17:04 <b>9</b>	Set 3:44 4:01 Rise 17:46 17:34 <b>10</b>	Set 4:53 5:03 Rise 18:08 18:02 <b>11</b>	Set 6:03 6:06 Rise 18:29 18:31 <b>12</b>	Set 7:16 7:10 Rise 18:52 19:01 Full Moon 4:53 <b>13</b>	Set 8:30 8:16 Rise 19:16 19:33 <b>14</b>  Sunrise 7:21 7:10 Sunset 18:10 18:21																																																																																						
Set 50°N 40°N 9:46 9:24 Rise 19:45 20:08 <b>15</b>	Set 11:02 10:33 Rise 20:19 20:49 <b>16</b>	Set 12:16 11:42 Rise 21:02 21:37 <b>17</b>	Set 13:24 12:47 Rise 21:54 22:32 <b>18</b>	Set 14:34 13:46 Rise 22:58 23:34 <b>19</b>	Set 15:13 14:39 Rise -- 3:59 3rd Quarter <b>20</b>	Rise 0:29 0:41 Set 15:52 15:24 <b>21</b>  Sunrise 7:32 7:17 Sunset 17:56 18:11																																																																																						
Set 50°N 40°N 1:25 1:50 Rise 16:24 16:03 <b>22</b>	Set 2:42 3:00 Rise 16:51 16:38 <b>23</b>	Set 3:59 4:09 Rise 17:15 17:10 <b>24</b>	Set 5:15 5:17 Rise 17:38 17:40 <b>25</b>	Rise 6:29 6:23 Set 18:00 18:09 <b>26</b>	Rise 7:42 7:29 Set 18:23 18:40 New Moon 3:58 <b>27</b>	Rise 8:54 8:03 Set 18:45 18:11 <b>28</b>  Sunrise 7:54 7:21 Sunset 17:43 18:01																																																																																						
Rise 50°N 40°N 9:03 8:36 Set 18:19 18:49 <b>29</b>	Rise 10:09 9:36 Set 18:54 19:26 <b>30</b>	Rise 11:09 10:33 Set 19:35 20:13 <b>31</b>	<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</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>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr> <tr><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td></tr> <tr><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td></tr> <tr><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</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	<p>NOVEMBER</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><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>	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																																																																																						
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>Comet West discovered by Richard West, 25 years ago</p> <p>Saturn 2.0° above the Moon 3 am</p> <p>Venera 9 returns first surface photos of another planet, Venus, 25 years ago</p> <p>Daylight Savings Time Ends 2 am</p>	<p>Thanksgiving Day (Canada)</p>	<p>Very Large Array (VLA) radio telescope network dedicated, 20 years ago</p>	<p>William Herschel</p>	<p>Zodiacal Light visible in E before morning twilight for next two weeks</p>	<p>Ulysses, first probe to fly over the Sun's poles, launched, 10 years ago</p> <p>Mercury greatest elong, E (26°) 6 am</p>	<p>Orionid meteors peak 3:20</p>																																																																																						







# NOVEMBER

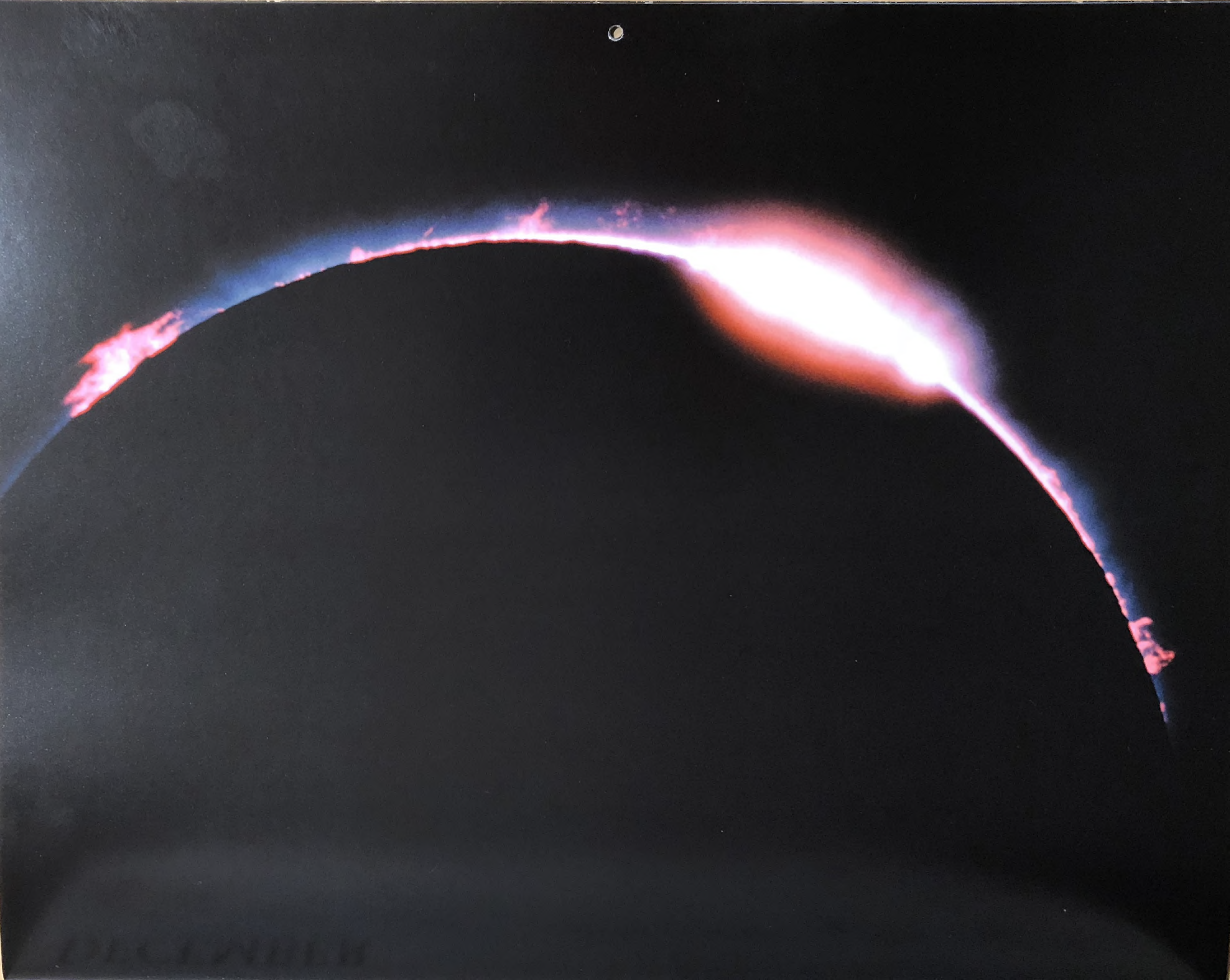
## The Butterfly Aurora

Aurora-watchers often behold coloured streamers and curtains, which are especially captivating when they ripple and flash. Here, an unusual shape further delights the observer as excited atmospheric oxygen and nitrogen appear to do a different dance in vivid colours that are most intense photographically.

Photo by Leo Brodeur

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<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</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>DECEMBER</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>50°N 40°N</p> <p>Rise 12:03 11:25</p> <p>Set 20:23 21:01</p> <p><b>1</b></p>	<p>Rise 12:46 12:12</p> <p>Set 21:17 21:54</p> <p><b>2</b></p> <p>S Taurid meteors peak 3 pm</p>	<p>Rise 13:27 12:53</p> <p>Set 22:17 22:49</p> <p><b>3</b></p>	<p>Rise 13:59 13:30</p> <p>Set 23:20 23:47</p> <p>1st Quarter 2:27</p> <p>Sunrise 6:55 6:33</p> <p>Sunset 16:31 16:54</p> <p><b>4</b></p>
	<p>50°N 40°N</p> <p>Rise 14:26 14:03</p> <p>Set -- --</p> <p><b>5</b></p>	<p>Set 0:26 0:46</p> <p>Rise 14:49 14:33</p> <p><b>6</b></p>	<p>Set 1:33 1:46</p> <p>Rise 15:11 15:02</p> <p><b>7</b></p>	<p>Set 2:42 2:48</p> <p>Rise 15:32 15:30</p> <p><b>8</b></p>	<p>Set 3:54 3:52</p> <p>Rise 15:54 15:59</p> <p><b>9</b></p>	<p>Set 5:08 4:58</p> <p>Rise 16:17 16:30</p> <p><b>10</b></p>
<p>50°N 40°N</p> <p>Set 7:43 7:17</p> <p>Rise 17:16 17:44</p> <p><b>12</b></p> <p>Voyager 1 makes closest approach to Saturn, 20 years ago</p> <p>Saturn 2.0°N of Moon (best in western N. Amer.) 6 am</p> <p>N Taurid meteors peak 2 pm</p>	<p>Set 9:01 8:28</p> <p>Rise 17:56 18:30</p> <p><b>13</b></p> <p>Leslie Peirce discovers first of 11 comets, 25 years ago</p> <p>Moon between Jupiter and Aldebaran 12 am</p>	<p>Set 10:14 9:37</p> <p>Rise 18:46 19:24</p> <p><b>14</b></p>	<p>Set 11:19 10:41</p> <p>Rise 19:47 20:25</p> <p><b>15</b></p> <p>The Bonds and Johann G. Galle discover Saturn's crape ring, 150 years ago</p> <p>Mercury greatest elong. W (19°) (best morning view in 2000) 1 am</p>	<p>Set 12:13 11:37</p> <p>Rise 20:58 21:32</p> <p><b>16</b></p>	<p>Set 12:55 12:25</p> <p>Rise 22:13 22:42</p> <p><b>17</b></p> <p>Leonid meteors peak (second peak expected Nov. 18, 3 am) 11 pm</p>	<p>Set 13:29 13:06</p> <p>Rise 23:20 23:51</p> <p>3rd Quarter 10:24</p> <p>Sunrise 7:18 6:48</p> <p>Sunset 16:12 16:17</p> <p><b>18</b></p>
<p>50°N 40°N</p> <p>Set 13:57 13:41</p> <p>Rise -- --</p> <p><b>19</b></p> <p>Saturn at opposition 8 am</p>	<p>Rise 0:47 1:00</p> <p>Set 14:21 14:13</p> <p><b>20</b></p>	<p>Rise 2:02 2:06</p> <p>Set 14:43 14:43</p> <p><b>21</b></p>	<p>Rise 3:15 3:12</p> <p>Set 15:05 15:11</p> <p><b>22</b></p>	<p>Rise 4:27 4:16</p> <p>Set 15:27 15:41</p> <p><b>23</b></p> <p>Thanksgiving Day (USA)</p>	<p>Rise 5:38 5:20</p> <p>Set 15:51 16:12</p> <p><b>24</b></p>	<p>Rise 6:45 6:23</p> <p>Set 16:18 16:40</p> <p>New Moon 16:11</p> <p>Sunrise 7:29 6:57</p> <p>Sunset 16:05 16:27</p> <p><b>25</b></p>
<p>50°N 40°N</p> <p>Rise 7:56 7:24</p> <p>Set 16:51 17:24</p> <p><b>26</b></p>	<p>Rise 8:59 8:23</p> <p>Set 17:29 18:06</p> <p><b>27</b></p> <p>Jupiter at opposition 9 pm</p>	<p>Rise 9:55 9:17</p> <p>Set 18:14 18:53</p> <p><b>28</b></p>	<p>Rise 10:45 10:07</p> <p>Set 19:06 19:44</p> <p><b>29</b></p> <p>Venus 1.4° below the Moon (best in NE N. Amer.) 4 pm</p>	<p>Rise 11:26 10:50</p> <p>Set 20:04 20:38</p> <p><b>30</b></p>		







# DECEMBER

## A Ring of Prominences

Cycles of solar activity run over approximately 11 years. In the current period of maximum activity, an eclipse is more likely to reveal flares and prominences, as shown dramatically by this image from 1988 during the last maximum. Look for loops in the prominences as they follow the magnetic fields of the Sun.

Photo by Randy Attwood

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<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</p> <p>S M T W T F S</p> <p>1 2 3 4</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</p>	<p>JANUARY</p> <p>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>☾ Rise 12:00 11:29</p> <p>Set 21:06 21:35</p> <p><b>1</b></p>	<p>☾ Rise 12:29 12:03</p> <p>Set 22:10 22:33</p> <p><b>2</b></p> <p>Sunrise 7:39 7:04</p> <p>Sunset 16:00 16:35</p>
<p>☾ Rise 50°N 40°N</p> <p>12:53 12:34</p> <p>Set 23:15 23:32</p> <p>1st Quarter 22:55</p> <p><b>3</b></p>	<p>☾ Rise 12:15 13:03</p> <p>Set -- --</p> <p><b>4</b></p>	<p>☾ Set 0:22 0:32</p> <p>Rise 13:36 13:30</p> <p><b>5</b></p>	<p>☾ Set 1:31 1:33</p> <p>Rise 13:56 13:58</p> <p><b>6</b></p>	<p>☾ Set 2:42 2:37</p> <p>Rise 14:18 14:27</p> <p><b>7</b></p>	<p>☾ Set 3:57 3:43</p> <p>Rise 14:42 14:56</p> <p><b>8</b></p>	<p>☾ Set 5:14 4:53</p> <p>Rise 15:11 15:35</p> <p><b>9</b></p> <p>Sunrise 7:47 7:10</p> <p>Sunset 15:58 16:35</p>
<p>☾ Set 50°N 40°N</p> <p>6:34 6:04</p> <p>Rise 15:47 16:18</p> <p><b>10</b></p>	<p>☾ Set 7:52 7:16</p> <p>Rise 16:33 17:09</p> <p>Full Moon 4:03</p> <p><b>11</b></p>	<p>☾ Set 9:04 8:25</p> <p>Rise 17:31 18:09</p> <p><b>12</b></p>	<p>☾ Set 10:05 9:27</p> <p>Rise 18:40 19:17</p> <p><b>13</b></p>	<p>☾ Set 10:54 10:21</p> <p>Rise 19:57 20:28</p> <p><b>14</b></p>	<p>☾ Set 11:32 11:06</p> <p>Rise 21:17 21:40</p> <p><b>15</b></p>	<p>☾ Set 12:02 11:44</p> <p>Rise 22:35 22:51</p> <p><b>16</b></p> <p>Sunrise 7:53 7:16</p> <p>Sunset 15:59 16:36</p>
<p>Jupiter 2.8°N of Moon (best in southern USA) 5 am</p> <p>☾ Set 50°N 40°N</p> <p>12:26 12:17</p> <p>Rise 23:51 23:59</p> <p>3rd Quarter 19:41</p> <p><b>17</b></p>	<p>☾ Set 12:50 12:47</p> <p>Rise -- --</p> <p><b>18</b></p>	<p>☾ Rise 1:05 1:05</p> <p>Set 13:12 13:16</p> <p><b>19</b></p>	<p>☾ Rise 2:17 2:09</p> <p>Set 13:33 13:44</p> <p><b>20</b></p>	<p>☾ Rise 3:28 3:12</p> <p>Set 13:56 14:14</p> <p><b>21</b></p>	<p>☾ Rise 4:37 4:14</p> <p>Set 14:21 14:47</p> <p><b>22</b></p>	<p>☾ Rise 5:45 5:15</p> <p>Set 14:51 15:22</p> <p><b>23</b></p> <p>Sunrise 7:57 7:19</p> <p>Sunset 16:02 16:39</p>
<p>100,000 francs offered in Paris for first extraterrestrial contact, 100 years ago</p> <p>☾ Rise 50°N 40°N</p> <p>6:49 6:15</p> <p>Set 15:27 16:02</p> <p><b>24</b></p>	<p>☾ Rise 7:48 7:10</p> <p>Set 16:09 16:47</p> <p>New Moon 12:22</p> <p><b>25</b></p> <p>Christmas Day</p> <p>Partial Solar Eclipse, visible in all of North America except parts of N. W. Territories, Yukon and Alaska</p>	<p>☾ Rise 8:40 8:02</p> <p>Set 16:59 17:37</p> <p><b>26</b></p> <p>Boxing Day (Canada)</p>	<p>☾ Rise 9:24 8:48</p> <p>Set 17:54 18:30</p> <p><b>27</b></p>	<p>☾ Rise 10:01 9:28</p> <p>Set 18:55 19:26</p> <p><b>28</b></p> <p>Winter Solstice 8:37 am</p>	<p>☾ Rise 10:32 10:04</p> <p>Set 19:56 20:24</p> <p><b>29</b></p> <p>Ursid meteors peak 1 am</p>	<p>☾ Rise 10:57 10:36</p> <p>Set 21:03 21:22</p> <p><b>30</b></p> <p>Sunrise 7:59 7:22</p> <p>Sunset 16:07 16:44</p>
<p>☾ Rise 50°N 40°N</p> <p>11:20 11:05</p> <p>Set 22:08 22:21</p> <p><b>31</b></p>		<p>"Beam of the Sun! What wilt thou be about, far-seeing one, O mother of mine eyes, O star supreme, in time of day Relt from us? Why, O why hast thou perplexed The might of man, And wisdom's way, Rushing forth on a darksome track?"</p> <p>PINDAR, Paean IX Greek lyric poet (c 518 - c 438 B.C.) On the solar eclipse of April 30, 463 B.C.</p>			<p>Venus 2.3°N of Moon 7 pm</p>	



# The Royal Astronomical Society of Canada Observer's Calendar

## How to Use this Calendar

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

Daily Moon and weekly Sun rise and set times, and the times of Moon phases, are shown in the top portion of the boxes. If no Moon rise or set time is given, this event occurs the next day. Special astronomical events, such as eclipses, meteor showers, occultations, interesting planetary events, and equinoxes and solstices, are given at the bottom of the boxes.

The Calendar lists events observable in some part of Canada or the United States. Days on which particularly interesting phenomena occur are highlighted with light green shading. Detailed information on all events, including their visibility from particular locations, may be determined by consulting the *RASC Observer's Handbook*.

### Adjusting Times for Actual Location

All times are adjusted for Daylight Savings Time. Moon phases and special events are given in Eastern time. The user's local time for events *other than* Moon and Sun rise and set may be determined by converting the given time to the user's time zone (e.g., Pacific time is Eastern time minus 3 hours).

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

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

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

### Canadian Locations

City	Correction	Accuracy	Latitude
Calgary	50°N + 36	15	51
Edmonton	50°N + 34	25	54
Halifax	40°N + 14	25	45
Hamilton	40°N + 20	15	43
Kingston	40°N + 6	20	44
Kitchener	40°N + 22	15	43
London	40°N + 25	15	43
Montreal	50°N - 6	20	46
Niagara	40°N + 16	15	43
Okanagan	50°N - 2	10	50
Ottawa	50°N + 3	20	45
Quebec	50°N - 15	15	47
Regina	50°N + 58 <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

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

### U.S. Locations

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

### Other Locations, and Improving Accuracy

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

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

### The Royal Astronomical Society of Canada

Since it was founded in 1890, the RASC has filled a special role in both amateur and professional astronomy. Today, it has over 3600 members who share a passion for the night sky and make contributions to astronomy in many ways.

The RASC has a long tradition of high-quality, volunteer-produced publications. The *RASC Observer's Handbook* has been published since 1908 and is recognized worldwide as the leading handbook of its type. The *Journal*, now in its 93rd year of publication, contains articles of interest to amateur and professional astronomers. The *Beginner's Observing Guide* is an introduction to the night sky for the novice observer, and the *RASC Observer's Calendar* is a forum for astrophotography by members of the Society.

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

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

rasc@rasc.ca

www.rasc.ca



### The Photos and the Calendar

The computer played a central role in every aspect of this calendar's production. Photos were scanned using a flatbed scanner and digitally processed using Adobe Systems' *Photoshop* and Auriga Imaging's *RegiStar*. Monthly grids with data were generated using specially written software.

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

#### Editing and Production

Rajiv Gupta (gupta@interchange.ubc.ca)

#### Editorial Assistance

Randy Atwood  
Doug George  
David Lane  
Anu Nayar  
Gary Seronik

#### Photographs

Randy Atwood (Toronto)  
Leo Brodeur (Kingston)  
Peter Ceravolo (Ottawa)  
Ben Gendre (Edmonton)  
Rajiv Gupta (Vancouver)  
John Mirtle (Calgary)  
Jack Newton (Victoria)  
Jay Ouellet (Quebec)  
Murray Paulson (Edmonton)

#### Monthly Grids and Astronomical Data

Rajiv Gupta  
David Lane  
Patrick Kelly

#### Captions

Lee Johnson

#### Historical Anniversaries

Diane Brooks  
Peter Broughton  
David Chapman

#### Literary Quotations

Lee Johnson  
Angela Squires

#### Digital Film Output

Electronic Colour and Type, Burnaby, B.C.

#### Printing

University of Toronto Press Inc.



**Cover / October:** *Joining Orion Together: A Nebular Complex.* 45-minute exposure on medium-format Kodak Pro 100 colour film using a 7.2-inch f/2.4 Maksutov astrograph (Peter Ceravolo) and 40-minute red-filtered exposure on gas-hypersensitized Kodak Technical Pan black-and-white film using an 8-inch f/1.5 Schmidt camera (John Mirtle), digitally combined using *RegiStar* and *Photoshop*.



**January:** *A Moon for Night Owls.* 2-second exposure on Kodak Technical Pan black-and-white film using a 5-inch Astro-Physics refractor at f/12, sandwiched with an unexposed and developed colour negative and printed on colour photographic paper (Jay Ouellet), then additionally processed using *Photoshop*.



**February:** *Big and Bright in Southern Skies.* 5-minute red-filtered, 20-minute green-filtered, and 40-minute blue-filtered exposures using a Meade LX200 16-inch SCT at f/6.2 with a Meade Pictor 1616XT CCD-camera (Jack Newton).



**March:** *Cepheus' "Rosette"* 165-minute and 210-minute red-filtered exposures on gas-hypersensitized medium-format Kodak Technical Pan black-and-white film using a 5-inch f/6 Astro-Physics refractor (Rajiv Gupta), and 40-minute exposure on Ektachrome E100 colour film using a 7.2-inch f/2.4 Maksutov astrograph (Peter Ceravolo), digitally combined using *RegiStar* and *Photoshop*.



**April:** *A Porthole to the Stars.* 20-minute exposure on medium-format Kodak Pro 100 film, piggyback using a 16-mm f/2.8 Minolta fisheye lens (Peter Ceravolo).



**May:** *Dark Clouds at the Galactic Centre.* 30-minute exposure on medium-format Kodak Pro PPF 400 film, piggyback using a Mamiya 645 camera with a 150-mm lens at f/4.5 (Ben Gendre).



**June:** *The Pelican Nebula.* 150-minute and 170-minute red-filtered exposures on gas-hypersensitized Kodak Technical Pan black-and-white film and three 65-minute exposures on Kodak Pro PPF 400 colour film, using a 5-inch f/6 Astro-Physics refractor (Rajiv Gupta), digitally combined using *RegiStar* and *Photoshop*.



**July:** *The Veil Nebula in a Different Light.* 100-minute red-filtered exposure on gas-hypersensitized Kodak Technical Pan black-and-white film using a 5-inch f/6 Astro-Physics refractor (Rajiv Gupta) and 50-minute exposure on Kodak Gold 400 colour film with a Deep Sky filter using an 8-inch f/6 Newtonian reflector with a cold camera (John Mirtle), digitally combined using *RegiStar* and *Photoshop*.



**August:** *The Antares Region.* Three 30-minute exposures on medium-format Kodak Pro PPF 400 film, piggyback using a Mamiya 645 camera with a 150-mm lens at f/4.5 (Ben Gendre), digitally stacked and adjusted using *RegiStar* and *Photoshop*.



**September:** *The Heart of the Northern Cross.* 50-minute red-filtered exposure on gas-hypersensitized Kodak Technical Pan black-and-white film, piggyback using a 180-mm f/2.8 lens (John Mirtle), and 15-minute exposure on Kodak PJM Multispeed colour film, piggyback using a 300-mm f/4.5 lens (Murray Paulson), digitally combined using *RegiStar* and *Photoshop*.



**November:** *The Butterfly Aurora.* 18-second exposure on Kodak 200 Gold film, fixed tripod using a 28-mm f/2.8 lens, taken September 24, 1998 from Cold Lake, Alberta (Leo Brodeur).



**December:** *A Ring of Prominences.* 1/125th-second exposure on Kodachrome 64 using an 8-inch Celestron SCT at f/10, taken during March 18, 1988 total solar eclipse from the Philippines (Randy Atwood).

2000

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	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	18	19	19	20	21	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	26	27	28	29	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	10	11	12	13	14	15	16		
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								

2001

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

New Moon Dates are displayed in bold.

"...regions of lucid matter taking form,  
Brushes of fire, hazy gleams,  
Clusters and beds of worlds, and bee-like swarms  
Of suns and starry streams..."  
Tennyson, *Merlin and Vivien*





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

The calendar gives a comprehensive listing of astronomical data such as lunar and planetary conjunctions, Sun and Moon rise and set times, eclipses, and major meteor showers.

☉	50°N	40°N	<b>16</b>	☾	Set Rise	
	Set	5:05				5:41
	Rise	21:15				20:41
	Full Moon	9:55				
Total Lunar Eclipse, beginning visible in W. N. America 7:57 am Vesta at opposition						
☾	50°N	40°N	<b>23</b>	☉	Rise Set	
	Set	12:37				12:32
	Rise	--				--

**OPIA** Best Calendar and Award of Excellence, 1999 Ontario Printing and Imaging Association competition.



\$13.95 Can. / \$11.95 U.S.