



THE ROYAL ASTRONOMICAL
SOCIETY OF CANADA
OBSERVER'S CALENDAR

2016





JANUARY

ORION'S PALETTE The iconic Horsehead Nebula at upper right almost pales in comparison to all the other activity and objects in this small portion of the Orion constellation—emission nebulae, dark lanes, gas clouds, star birth, flames—you name it, it's all here! | IMAGE BY LYNN HILBORN

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

THE PLANETS THIS MONTH

Mercury very low in WSW in evening twilight early in month, by month-end emerges very low in ESE in morning twilight

Venus very low in SE

Mars rises in ESE near 2 am, in S near dawn

Jupiter rises after 10 pm in E, transits high in S near 4 am

Saturn very low in SE in morning twilight

Rise 1:04 1:14
Set 12:32 12:19 **3**

Lunar Curtiss X visible in all of N. America except NW 5 am

Venus approaching Saturn at dawn this week

Moon 3° right of Mars before dawn

Jeremiah Horrox, a versatile English astronomer, died, 375 years ago

Rise 2:00 2:16
Set 13:04 12:47 **4**

Quadrantid meteors (ZHR=120) 3 am

Rise 2:57 3:17
Set 13:40 13:18 **5**

Rise 3:54 4:19
Set 14:20 13:54 **6**

Venus 3° upper right of Saturn at dawn, crescent Moon upper right

Rise 4:50 5:19
Set 15:05 14:36 **7**

Venus 1.8° upper right of Saturn at dawn, crescent Moon at left

Rise 5:46 6:16
Set 15:56 15:27 **8**

Venus 0.7° upper right of Saturn at dawn

Jupiter stationary

Rise 6:39 7:08
Set 16:53 16:25
Sunrise 7:22 7:57
Sunset 16:46 16:09 **9**

New Moon 20:31

Venus 0.4° lower left of Saturn at dawn

Gegenschein visible from a very dark site — highest in S at midnight

Rise 7:28 7:55
Set 17:55 17:30 **10**

Venus 1.5° lower left of Saturn at dawn

Follow Arcturus unaided into daylight this week

Robert Wilson, 1978 Nobel Laureate, was born, 80 years ago

Rise 8:14 8:36
Set 19:01 18:40 **11**

Young crescent Moon, 19 hours after new in E, 23 hours after new in W, soon after sunset

Venus 2.6° lower left of Saturn at dawn and separating this week

Rise 8:55 9:12
Set 20:08 19:53 **12**

Rise 9:34 9:45
Set 21:16 21:08 **13**

Rise 10:11 10:15
Set 22:24 22:23 **14**

Rise 10:47 10:44
Set 23:32 23:38 **15**

Rise 11:23 11:14
Set 23:52 23:41
Sunrise 7:20 7:52
Sunset 17:00 16:27 **16**

First Quarter 18:26

Lunar X near crater Werner visible in Atlantic Canada 4 pm

Set 12:01 11:46 **17**

Set 12:42 12:21 **18**

MARTIN LUTHER KING JR. DAY (USA)

Set 13:27 13:01 **19**

Moon occults Aldebaran, gamma, and double star theta Tau visible in all of N. America except far N and far S this evening. Graze SW Texas-S Georgia

NASA's New Horizons was launched on 1st mission to Pluto, 10 years ago

Set 14:16 13:47 **20**

Set 15:10 14:40 **21**

Set 16:07 15:39 **22**

Set 17:16 16:48
Sunrise 7:16 7:46
Sunset 17:08 16:38 **23**

Full Moon 20:46

Today's full Moon is the Wolf Moon

Set 18:06 17:45 **24**

Set 19:05 18:50 **25**

115 Thyra at opposition (m=9.9)

Set 20:04 19:54 **26**

Set 21:01 20:57 **27**

Moon 1.9° below Jupiter in mid-evening

Set 21:57 21:59 **28**

Challenger exploded, killing the crew, 30 years ago

Set 22:53 23:00 **29**

Set 10:32 10:22
Sunrise 7:11 7:37
Sunset 17:16 16:50 **30**

Rise 11:03 10:48 **31**

Last Quarter 22:28

| DEC | S | M | T | W | T | F | S |
|-----|----|----|----|----|----|----|----|
| | | 1 | 2 | 3 | 4 | 5 | |
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| FEB | S | M | T | W | T | F | S |
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| | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| | 28 | 29 | | | | | |

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FEBRUARY

STARRY TRAILS Point a camera at or near Polaris, the North Star, and set a timer to take 30-second exposures for an hour or two, and the result is what you see after merging them together to create this one image—the circumpolar stars making circular arcs, with the remainder truncated at the horizon. The exposures are long enough to bring out the colours evident in many of the star trails. | IMAGE BY WESLEY LIIKANE

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | |
|--|---|---|--|--|--|---|--|
| | <p>40°N 50°N Rise 0:44 1:02 Set 11:37 11:17</p> <p>1</p> <p>Venus approaching Mercury this week at dawn</p> <p>Asteroid 101 Helena occults mag 6.9 star HIP 57107 in 60-km-wide path E-W through Edmonton 2:30 am</p> <p>Moon 5° above Mars in the wee hours</p> | | <p>40°N 50°N Rise 2:36 3:03 Set 12:56 12:29</p> <p>3</p> <p>Crescent Moon 5° upper right of Saturn at dawn</p> <p>Schwartzchild published exact solution to Einstein field equations, 100 years ago</p> | | <p>40°N 50°N Rise 3:31 4:01 Set 13:44 13:15</p> <p>4</p> | <p>40°N 50°N Rise 4:25 4:55 Set 14:38 14:08</p> <p>5</p> <p>40 Harmonia at opposition (m=9.8)</p> | <p>40°N 50°N Rise 5:17 5:45 Set 15:37 15:10 Sunrise 7:04 7:27 Sunset 17:25 17:02</p> <p>6</p> <p>Venus-Crescent Moon-Mercury 5° group very low at dawn</p> <p>Alan Shepard played golf on Moon during Apollo 14 mission, 45 years ago</p> |
| <p>40°N 50°N Rise 6:05 6:29 Set 16:42 16:19</p> <p>7</p> <p>Mercury at greatest elongation (26° W) this morning (m=-0.1)</p> | <p>40°N 50°N Rise 6:49 7:09 Set 17:50 17:32</p> <p>8</p> <p>New Moon 9:39</p> <p>FAMILY DAY (BC) CHINESE NEW YEAR (MONKEY)</p> <p>Winter Star Party, Florida Keys, www.scas.org/wsp.html (through Feb 14)</p> | <p>40°N 50°N Rise 7:30 7:44 Set 18:59 18:49</p> <p>9</p> <p>Halley's Comet reached perihelion, 30 years ago</p> | <p>40°N 50°N Rise 8:09 8:16 Set 20:10 20:06</p> <p>10</p> | <p>40°N 50°N Rise 8:47 8:47 Set 21:20 21:24</p> <p>11</p> | <p>40°N 50°N Rise 9:24 9:17 Set 22:30 22:40</p> <p>12</p> | <p>40°N 50°N Rise 10:02 9:49 Set 23:38 23:55 Sunrise 6:56 7:15 Sunset 17:33 17:14</p> <p>13</p> | |
| <p>40°N 50°N Rise 10:43 10:24 Set — —</p> <p>14</p> <p>VALENTINE'S DAY</p> <p>Venus-Mercury 4° apart this week at dawn</p> | <p>40°N 50°N Set 0:45 1:08 Rise 11:26 11:02</p> <p>15</p> <p>First Quarter 2:47</p> <p>LOUIS RIEL DAY (MB) FAMILY DAY (AB,ON,SK) HERITAGE DAY (NS) ISLANDER DAY (PE) PRESIDENTS' DAY (USA)</p> <p>5 Astraea at opposition (m=8.7)</p> | <p>40°N 50°N Set 1:49 2:15 Rise 12:14 11:46</p> <p>16</p> <p>Moon occults Aldebaran, gamma, and double star theta Tau visible in W of U.S. before dawn</p> | <p>40°N 50°N Set 2:49 3:17 Rise 13:05 12:36</p> <p>17</p> | <p>40°N 50°N Set 3:43 4:12 Rise 14:00 13:31</p> <p>18</p> | <p>40°N 50°N Set 4:32 5:00 Rise 14:57 14:31</p> <p>19</p> <p>Moon occults lambda Geminorum visible in Newfoundland and far N of N. America in the wee hours</p> | <p>40°N 50°N Set 5:16 5:40 Rise 15:56 15:33 Sunrise 6:47 7:02 Sunset 17:41 17:26</p> <p>20</p> | |
| <p>40°N 50°N Set 5:55 6:15 Rise 16:55 16:37</p> <p>21</p> <p>Venus-Mercury 4° apart this week at dawn</p> | <p>40°N 50°N Set 6:31 6:45 Rise 17:53 17:41</p> <p>22</p> <p>Full Moon 13:20</p> <p>Today's full Moon is the Snow Moon</p> | <p>40°N 50°N Set 7:03 7:12 Rise 18:50 18:44</p> <p>23</p> <p>Moon 2° below Jupiter in mid-evening</p> | <p>40°N 50°N Set 7:34 7:37 Rise 19:47 19:47</p> <p>24</p> | <p>40°N 50°N Set 8:03 8:01 Rise 20:43 20:48</p> <p>25</p> | <p>40°N 50°N Set 8:33 8:25 Rise 21:39 21:50</p> <p>26</p> <p>Two shadows on Jupiter visible in all of N. America 4:37 am</p> | <p>40°N 50°N Set 9:04 8:51 Rise 22:34 22:50 Sunrise 6:37 6:49 Sunset 17:49 17:38</p> <p>27</p> <p>Old crescent Moon, 27 hours before new in E, 23 hours before new in W, a challenge just before sunrise</p> | |
| <p>40°N 50°N Set 9:36 9:18 Rise 23:29 23:50</p> <p>28</p> <p>Zodiacal light readily visible from a dark site in W after evening twilight for the next 2 weeks</p> | <p>40°N 50°N Set 10:12 9:49 Rise — —</p> <p>29</p> <p>Leap Year Day</p> <p>Two shadows on Jupiter visible E of Halifax 5:34 pm</p> <p>Moon 5° above Mars in the wee hours</p> | <p>THE PLANETS THIS MONTH</p> <p>Mercury very low in ESE in morning twilight with increasing difficulty toward the end of month</p> <p>Venus very low in SE, observed with difficulty at end of month</p> <p>Mars rises in ESE near 1 am, transits in S near dawn</p> <p>Jupiter rises after 8 pm in E, transits high in S near 2 am</p> <p>Saturn rises in SE after 3 am, in SSE near dawn</p> | | | | | |

| JAN | S | M | T | W | T | F | S |
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| | 31 | | | | | | |

| MAR | S | M | T | W | T | F | S |
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| | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
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MARCH

PURPLE HAZE Reflected in the calm, still waters, with the winter Milky Way high above, a gentle aurora lights up the night with the characteristic crimson emission of high-energy particles in the upper atmosphere giving up their photons. The Andromeda Galaxy glows as a white, oval smudge above the auroral streaks at left. | IMAGE BY COLIN CHATFIELD

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|---|---|---|---|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|
| <p>THE PLANETS THIS MONTH</p> <p>Mercury not observable this month</p> <p>Venus very low in SE, not observable after mid-month</p> <p>Mars rises in ESE near 1 am, transits in S near dawn</p> <p>Jupiter in E in evening twilight, transits near 1 am, low in W at dawn</p> <p>Saturn rises in SE after 2 am, in S near dawn</p> | | <p> Rise 40°N 50°N 0:25 0:50 Set 10:51 10:25 1</p> <p>Last Quarter 18:11</p> <p>Zodiacal light readily visible from a dark site in W after evening twilight for the next 2 weeks</p> | <p> Rise 40°N 50°N 1:19 1:47 Set 11:35 11:06 2</p> <p>Lunar Curtiss X visible in NW of N. America 10 am</p> <p>Moon 3° upper left of Saturn in the wee hours</p> | <p> Rise 40°N 50°N 2:12 2:42 Set 12:24 11:55 3</p> <p>Star cluster M23 reappears on dark limb of Moon near dawn, visible in E of N. America</p> | <p> Rise 40°N 50°N 3:04 3:33 Set 13:19 12:51 4</p> <p>Two shadows on Jupiter visible in all of N. America except E 6:31 am</p> <p><i>Norman Lockyer began spectroscopic solar observations, 150 years ago</i></p> | <p> Rise 40°N 50°N 3:52 4:19 Set 14:20 13:55 5</p> <p>Sunrise 6:27 6:34 Sunset 17:57 17:50</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p> Rise 40°N 50°N 4:38 5:00 Set 15:26 15:06 6</p> <p><i>Spacecraft Vega 1 and Giotto imaged Comet Halley nucleus, 30 years ago</i></p> | <p> Rise 40°N 50°N 5:21 5:38 Set 16:35 16:21 7</p> <p>Two shadows on Jupiter visible in E of N. America 7:28 pm</p> <p>Crescent Moon 2.8° left of Venus difficult in bright morning twilight</p> | <p> Rise 40°N 50°N 6:01 6:12 Set 17:46 17:39 8</p> <p>New Moon 20:55</p> <p>Jupiter at opposition (m=-2.5)</p> | <p> Rise 40°N 50°N 6:40 6:44 Set 18:59 18:59 9</p> <p>Total solar eclipse across Indonesia</p> <p>Young crescent Moon, 21 hours after new in E, 25 hours after new in W, soon after sunset</p> | <p> Rise 40°N 50°N 7:19 7:16 Set 20:11 20:18 10</p> | <p> Rise 40°N 50°N 7:58 7:48 Set 21:23 21:37 11</p> <p>Two shadows on Jupiter visible in W of N. America 8:25 am</p> | <p> Rise 40°N 50°N 8:37 8:23 Set 22:33 22:54 Sunrise 6:16 6:19 Sunset 18:04 18:01 12</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p> Rise 40°N 50°N 10:23 10:01 Set — — 13</p> <p>Daylight Saving Time begins 2 am</p> <p>Jupiter with only Callisto visible in all of N. America 2:47 am</p> <p>Spot Capella unaided before sunset this week</p> | <p> Set 40°N 50°N 0:40 1:05 Rise 11:11 10:44 14</p> <p>Two shadows on Jupiter visible in all of N. America except NW 9:22 pm</p> <p>Spot Capella unaided before sunset 30° N of Moon</p> | <p> Set 40°N 50°N 1:43 2:11 Rise 12:02 11:33 15</p> <p>First Quarter 13:03</p> <p>Lunar X near crater Werner visible in all of N. America except W 9 pm</p> <p>10 Hygiea at opposition (m=9.4)</p> | <p> Set 40°N 50°N 2:40 3:09 Rise 12:56 12:27 16</p> <p>6 Hebe at opposition (m=9.8)</p> | <p> Set 40°N 50°N 3:31 3:58 Rise 13:52 13:25 17</p> <p>ST. PATRICK'S DAY (NL)</p> <p>Moon occults lambda Geminorum visible in far NW of N. America before dawn</p> | <p> Set 40°N 50°N 4:16 4:41 Rise 14:50 14:26 18</p> <p>GOOD FRIDAY</p> <p>Saturn stationary</p> | <p> Set 40°N 50°N 4:56 5:17 Rise 15:48 15:29 Sunrise 7:04 7:04 Sunset 19:12 19:12 19</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p> Set 40°N 50°N 5:32 5:48 Rise 16:46 16:32 20</p> <p>Spring Equinox 12:30 am</p> <p>Jupiter with only Callisto visible in all of N. America except far E 5:30 am</p> | <p> Set 40°N 50°N 6:05 6:15 Rise 17:43 17:35 21</p> <p>Moon 2° below Jupiter this evening</p> | <p> Set 40°N 50°N 6:36 6:41 Rise 18:40 18:37 22</p> <p>Two shadows on Jupiter visible in all of N. America except W of Yukon 12:23 am</p> | <p> Set 40°N 50°N 7:05 7:05 Rise 19:36 19:39 23</p> <p>Full Moon 8:01</p> <p>Penumbral eclipse of the Moon visible in W of N. America, before sunrise</p> <p>Two shadows on Jupiter visible in E of N. America 7:47 pm</p> <p>Jupiter with only Callisto visible in Atlantic Canada 6:23 pm</p> <p>Today's full Moon is the Worm Moon</p> | <p> Set 40°N 50°N 7:35 7:29 Rise 20:31 20:40 24</p> | <p> Set 40°N 50°N 8:05 7:54 Rise 21:27 21:41 25</p> <p>GOOD FRIDAY</p> <p>Saturn stationary</p> | <p> Set 40°N 50°N 8:37 8:21 Rise 22:22 22:42 Sunrise 6:53 6:49 Sunset 19:19 19:23 26</p> <p>Earth Hour (8:30-9:30 pm local) www.earthhour.org</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p> Set 40°N 50°N 9:11 8:50 Rise 23:17 23:41 27</p> <p>EASTER SUNDAY</p> <p>Jupiter with only Callisto visible in W of N. America 7:06 am</p> <p>Zodiacal light readily visible from a dark site in W after evening twilight for the next 2 weeks</p> | <p> Set 40°N 50°N 9:48 9:24 Rise — — 28</p> <p>Moon-Mars-Saturn in loose group rising after midnight</p> <p>Two shadows on Jupiter visible in all of N. America 3:00 am</p> | <p> Rise 40°N 50°N 0:12 0:39 Set 10:30 10:02 29</p> <p>Moon-Mars-Saturn in loose group rising after midnight</p> | <p> Rise 40°N 50°N 1:04 1:34 Set 11:16 10:47 30</p> <p>Jupiter with only Callisto visible in all of N. America except W 9:39 pm</p> | <p> Rise 40°N 50°N 1:55 2:25 Set 12:08 11:39 31</p> <p>Last Quarter 11:17</p> | <p>APR</p> <table border="1"> <thead> <tr> <th>S</th> <th>M</th> <th>T</th> <th>W</th> <th>T</th> <th>F</th> <th>S</th> </tr> </thead> <tbody> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>7</td> <td>8</td> <td>9</td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> </tr> <tr> <td>14</td> <td>15</td> <td>16</td> <td>17</td> <td>18</td> <td>19</td> <td>20</td> </tr> <tr> <td>21</td> <td>22</td> <td>23</td> <td>24</td> <td>25</td> <td>26</td> <td>27</td> </tr> <tr> <td>28</td> <td>29</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </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 | | | | | |
| S | M | T | W | T | F | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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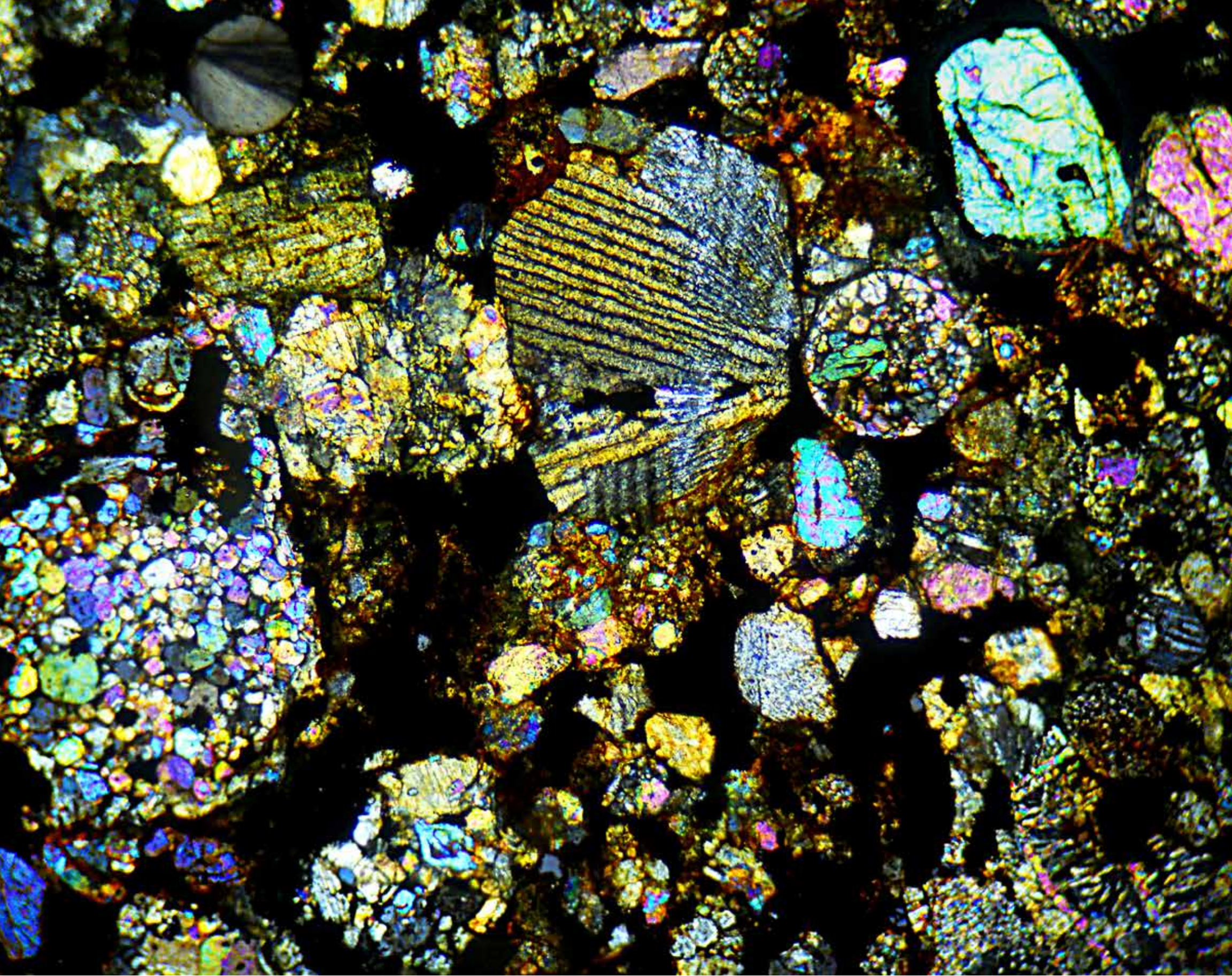
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APRIL

THE NEEDLE NGC 4564 is also known as Caldwell 38, but more commonly as the Needle Galaxy. This edge-on spiral resides in Coma Berenices, 30–50 million light-years away. Perhaps the same size and shape as our Milky Way Galaxy, this object shows signs of a previous encounter, evidenced by the slight warping at the extremes of its 100,000 light-year disc. | IMAGE BY HOWARD TROTTER

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | | | |
|---|--------|---|--|--|--|---|---|---|--|
| <p>THE PLANETS THIS MONTH</p> <p>Mercury very low in WNW, lost in Sun's glare at end of month</p> <p>Venus not observable this month</p> <p>Mars rises in ESE near midnight, transits in S near 4 am</p> <p>Jupiter high in SE after dark, transits near 11 pm, sets in W near 5 am</p> <p>Saturn rises in SE after midnight, transits in S near 4 am</p> | | | <p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time.</p> <p>Times for events involving planetary satellites refer to the start time.</p> <p>Detailed instructions on adjusting times for location are given in the back pages.</p> <p><i>Please see back pages for photo details and additional information about this Calendar.</i></p> | | <p>40°N 50°N 1</p> <p>Rise 2:44 3:11 Set 13:04 12:37</p> | | <p>40°N 50°N 2</p> <p>Rise 3:29 3:54 Set 14:06 13:43 Sunrise 6:42 6:34 Sunset 19:26 19:34</p> | | |
| <p>40°N 50°N 3</p> <p>Rise 4:12 4:32 Set 15:11 14:54</p> <p>Spot Sirius unaided before sunset this week</p> | | <p>40°N 50°N 4</p> <p>Rise 4:52 5:06 Set 16:20 16:09</p> <p>Follow Vega unaided into daylight this week</p> | | <p>40°N 50°N 5</p> <p>Rise 5:32 5:39 Set 17:31 17:27</p> <p>Two shadows on Jupiter visible in all of N. America except E 5:37 am</p> | | <p>40°N 50°N 6</p> <p>Rise 6:10 6:10 Set 18:44 18:48</p> <p>New Moon 7:24</p> | | <p>40°N 50°N 7</p> <p>Rise 6:49 6:42 Set 19:58 20:09</p> <p>Two shadows on Jupiter visible in Atlantic Canada 6:55 pm</p> | |
| <p>40°N 50°N 10</p> <p>Rise 9:02 8:37 Set 23:30 23:57</p> <p>Crescent Moon occults Aldebaran, gamma, and double star theta Tau visible S of graze central BC-Labrador, in daylight except in twilight for east coast</p> | | <p>40°N 50°N 11</p> <p>Rise 9:53 9:25 Set — —</p> | | <p>40°N 50°N 12</p> <p>Rise 10:48 10:19 Set 0:31 1:00</p> <p>First Quarter 23:59</p> | | <p>40°N 50°N 13</p> <p>Rise 11:45 11:17 Set 1:26 1:55</p> | | <p>40°N 50°N 14</p> <p>Rise 12:44 12:19 Set 2:14 2:41</p> | |
| <p>40°N 50°N 17</p> <p>Rise 15:38 15:28 Set 4:08 4:20</p> <p>Mars stationary Moon 2° lower right of Jupiter this evening</p> | | <p>40°N 50°N 18</p> <p>Rise 16:34 16:30 Set 4:39 4:46</p> <p>Mercury at greatest elongation (20° E) (m = -0.2). Best evening apparition of the year</p> | | <p>40°N 50°N 19</p> <p>Rise 17:30 17:31 Set 5:09 5:10</p> | | <p>40°N 50°N 20</p> <p>Rise 18:26 18:33 Set 5:38 5:34</p> | | <p>40°N 50°N 21</p> <p>Rise 19:21 19:34 Set 6:08 5:58</p> <p>Full Moon 1:24</p> <p>Lyrid meteors (ZHR=18) 2 am Today's full Moon is the Pink Moon</p> | |
| <p>40°N 50°N 24</p> <p>Rise 22:07 22:33 Set 7:48 7:24</p> <p>Moon-Mars-Saturn in loose group rising around midnight</p> | | <p>40°N 50°N 25</p> <p>Rise 23:00 23:29 Set 8:28 8:01</p> | | <p>40°N 50°N 26</p> <p>Rise 23:52 — Set 9:12 8:43</p> | | <p>40°N 50°N 27</p> <p>Rise 10:02 9:32 Set — 0:21</p> <p>Juno at opposition</p> | | <p>40°N 50°N 28</p> <p>Rise 10:56 10:27 Set 0:40 1:09</p> | |
| | | | | <p>40°N 50°N 29</p> <p>Rise 11:54 11:29 Set 1:26 1:52</p> <p>Last Quarter 23:29</p> | | <p>40°N 50°N 30</p> <p>Rise 12:56 12:36 Set 2:08 2:30 Sunrise 6:01 5:37 Sunset 19:54 20:18</p> <p>ST. GEORGE'S DAY (NL) FIRST DAY OF PASSOVER</p> | | | |



CLEO SPRINGS METEORITE After ~4.6 billion years at near-absolute zero, and as revealed in cross-polarized light, this thin section of the Cleo Springs meteorite shows chondrules and pristine and deformed circular mineral inclusions—the first solids that crystallized during the birth of our Solar System. The barred chondrule at centre is evidence of extremely rapid cooling from a molten or nearly completely molten state. | IMAGE BY RALPH A. CRONING

MAY

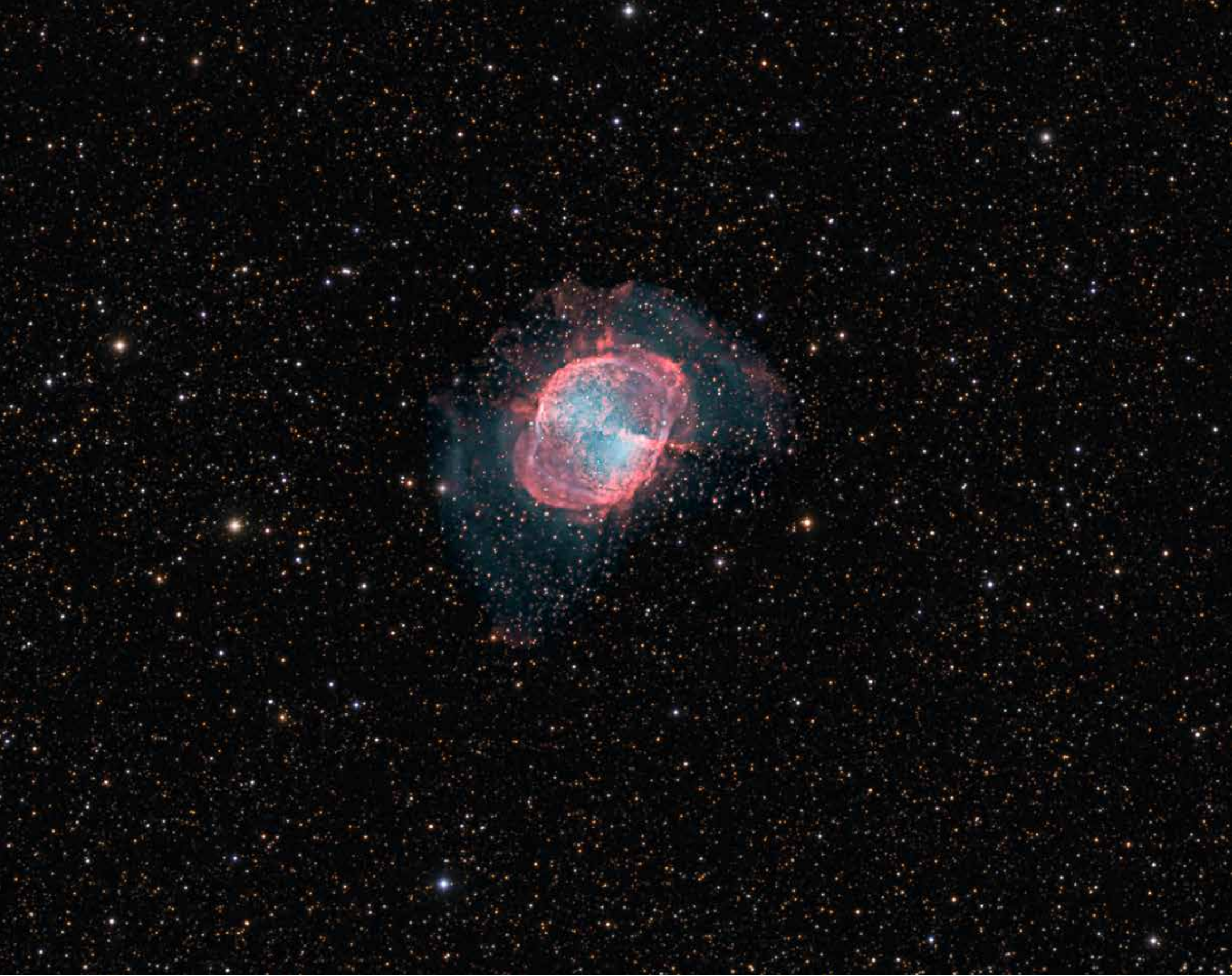
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>40°N 50°N Rise 2:48 3:05 Set 14:01 13:47</p> <p>1</p> <p>Texas Star Party, Fort Davis, Texas, www.texasstarparty.org (through May 8)</p> | <p>40°N 50°N Rise 3:26 3:36 Set 15:09 15:01</p> <p>2</p> <p>Waning crescent Moon occults lambda Aquarii visible N of graze central Montana-Lake Superior</p> | <p>40°N 50°N Rise 4:03 4:07 Set 16:19 16:18</p> <p>3</p> | <p>40°N 50°N Rise 4:41 4:38 Set 17:31 17:38</p> <p>4</p> | <p>40°N 50°N Rise 5:20 5:10 Set 18:44 18:58</p> <p>5</p> <p>Eta Aquariid meteors (ZHR=40) shower is best of year in southern hemisphere, very marginal in northern 4 pm</p> | <p>40°N 50°N Rise 6:02 5:45 Set 19:57 20:18</p> <p>6</p> <p>New Moon 15:29</p> | <p>40°N 50°N Rise 6:48 6:25 Set 21:08 21:34 Sunrise 5:53 5:26 Sunset 20:01 20:29</p> <p>7</p> <p>Two shadows on Jupiter visible in all of N. America except NW 12:39 am</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>40°N 50°N Rise 7:38 7:11 Set 22:15 22:44</p> <p>8</p> <p>MOTHER'S DAY</p> | <p>40°N 50°N Rise 8:33 8:04 Set 23:15 23:45</p> <p>9</p> <p>International Astronomy Week (Spring) (through May 15) Transit of Mercury visible in all North America, except after sunrise in the W, for 6.5h starting 7:12 am Jupiter stationary</p> | <p>40°N 50°N Rise 9:32 9:02 Set — —</p> <p>10</p> | <p>40°N 50°N Set 10:32 10:05 Rise 0:08 0:36</p> <p>11</p> | <p>40°N 50°N Set 11:32 11:10 Rise 0:54 1:18</p> <p>12</p> <p>First Quarter 13:02</p> <p>Lunar X near crater Werner visible in all of N. America except W 10 pm</p> | <p>40°N 50°N Set 12:32 12:14 Rise 1:34 1:54</p> <p>13</p> <p>International Astronomy Day (Spring) www.astroleague.org/al/astroday/astrodayform.html Moon 4° lower right of Jupiter this evening</p> | <p>40°N 50°N Set 13:30 13:18 Sunrise 5:45 5:15 Sunset 20:08 20:39</p> <p>14</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>40°N 50°N Set 2:42 2:51 Rise 14:28 14:21</p> <p>15</p> | <p>40°N 50°N Set 3:12 3:15 Rise 15:24 15:23</p> <p>16</p> | <p>40°N 50°N Set 3:41 3:39 Rise 16:20 16:25</p> <p>17</p> | <p>40°N 50°N Set 4:11 4:03 Rise 17:15 17:26</p> <p>18</p> | <p>40°N 50°N Set 4:41 4:28 Rise 18:11 18:27</p> <p>19</p> <p>RASC General Assembly hosted by the London Centre www.rasc.ca/ga2016 (through May 23)</p> | <p>40°N 50°N Set 5:13 4:55 Rise 19:07 19:28</p> <p>20</p> | <p>40°N 50°N Set 5:48 5:26 Sunrise 5:40 5:06 Sunset 20:14 20:48</p> <p>21</p> <p>Full Moon 17:14</p> <p>Moon-Mars-Saturn in loose group rising mid-evening Today's full Moon is the Flower Moon</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>40°N 50°N Set 6:27 6:00 Rise 20:57 21:25</p> <p>22</p> <p>Mars at opposition (m= -2.1)</p> | <p>40°N 50°N Set 7:10 6:41 Rise 21:49 22:19</p> <p>23</p> <p>VICTORIA DAY (CANADA)</p> | <p>40°N 50°N Set 7:58 7:28 Rise 22:39 23:09</p> <p>24</p> | <p>40°N 50°N Set 8:51 8:21 Rise 23:26 23:53</p> <p>25</p> | <p>40°N 50°N Set 9:47 9:21 Rise — —</p> <p>26</p> <p>RTMC Astronomy Expo, Big Bear, CA www.rtmcastronomyexpo.org (through May 30)</p> | <p>40°N 50°N Rise 10:09 0:32 Set 10:48 10:25</p> <p>27</p> | <p>40°N 50°N Rise 0:49 1:07 Set 11:50 11:34 Sunrise 5:35 4:59 Sunset 20:20 20:57</p> <p>28</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>40°N 50°N Rise 1:26 1:39 Set 12:56 12:45</p> <p>29</p> <p>Last Quarter 8:12</p> <p>7 Iris at opposition (m=9.2)</p> | <p>40°N 50°N Rise 2:02 2:09 Set 14:02 13:59</p> <p>30</p> <p>MEMORIAL DAY (USA)</p> | <p>40°N 50°N Rise 2:38 2:38 Set 15:11 15:15</p> <p>31</p> | <p>THE PLANETS THIS MONTH</p> <p>Mercury not observable this month</p> <p>Venus not observable this month</p> <p>Mars in SE after dark, transits in S near 2 am</p> <p>Jupiter high in S after dark, sets in W near 3 am</p> <p>Saturn rises in SE at dusk, transits in S near 2 am</p> | | | | <p>APR</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> <p>JUN</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr> <tr><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr> <tr><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td></td><td></td></tr> </table> <p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock. Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages. Please see back pages for photo details and additional information about this calendar.</p> | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S | M | T | W | T | F | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | 27 | 28 | 29 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



JUNE

FLOATING ON A STREAM Known by many names, but most famously as the Cocoon Nebula, this relatively nearby cluster of stars in Cygnus floats on the dark nebula Barnard 168. The object is both a reflection and an emission nebula, reflecting the light of nearby stars but also emitting light from ionized hydrogen gas excited by high-energy photons from the stars embedded in the cluster. | IMAGE BY HOWARD TROTTER

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--|---|---|--|--|---|--|--|----|----|----|----|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|--|--|--|--|--|--|---|---|----|----|----|----|----|--|---|---|---|---|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|----|----|----|----|----|----|----|--|--|--|--|--|--|--|--|----|--|--|--|--|--|--|
| <p>THE PLANETS THIS MONTH</p> <p>Mercury very low in ENE in morning twilight, lost after mid-month</p> <p>Venus not observable this month</p> <p>Mars in S after dark, sets in WSW near 4 am</p> <p>Jupiter in WSW after dark, sets in W near 2 am</p> <p>Saturn in SSE at dusk, low in SW near 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 and changes to/from Daylight Saving Time, which are given in local time.</p> <p>Times for events involving planetary satellites refer to the start time.</p> <p>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>40°N 50°N Rise 3:15 3:08 Set 16:21 16:32</p> <p>1</p> <p>Watch for noctilucent clouds in N sky during twilight this month. Best N of 50° latitude</p> | <p>40°N 50°N Rise 3:54 3:40 Set 17:33 17:50</p> <p>2</p> | <p>40°N 50°N Rise 4:36 4:17 Set 18:44 19:08</p> <p>3</p> <p>Saturn at opposition (m= 0.0)</p> | <p>40°N 50°N Rise 5:24 4:59 Set 19:53 20:21 Sunrise 5:32 4:54 Sunset 20:25 21:04</p> <p>New Moon 23:00</p> <p>4</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>40°N 50°N Rise 6:16 5:47 Set 20:58 21:28</p> <p>5</p> <p>Mercury at greatest elongation (24° W) this morning. Poor apparition (m= 0.5)</p> | <p>40°N 50°N Rise 7:13 6:44 Set 21:56 22:25</p> <p>6</p> <p>FIRST DAY OF RAMADAN</p> | <p>40°N 50°N Rise 8:14 7:46 Set 22:47 23:13</p> <p>7</p> | <p>40°N 50°N Rise 9:16 8:51 Set 23:30 23:53</p> <p>8</p> | <p>40°N 50°N Rise 10:18 9:58 Set — —</p> <p>9</p> | <p>40°N 50°N Rise 0:09 0:26 Set 11:19 11:04</p> <p>10</p> <p>Kouchibouquac Star Fest, Kouchibouquac N.P., NB www.nb.rasc.ca/ (through Jun 12)</p> | <p>40°N 50°N Set 0:43 0:54 Rise 12:18 12:09 Sunrise 5:31 4:51 Sunset 20:29 21:09</p> <p>11</p> <p>Jupiter visible in daylight 4° right of Moon. A challenge just before sunset</p> <p>8 Flora at opposition (m=9.4)</p> <p>Moon 5° left of Jupiter this evening</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>40°N 50°N Set 1:14 1:20 Rise 13:15 13:12</p> <p>12</p> <p>First Quarter 4:10</p> | <p>40°N 50°N Set 1:44 1:44 Rise 14:12 14:14</p> <p>13</p> | <p>40°N 50°N Set 2:13 2:08 Rise 15:07 15:16</p> <p>14</p> | <p>40°N 50°N Set 2:43 2:32 Rise 16:03 16:17</p> <p>15</p> | <p>40°N 50°N Set 3:14 2:58 Rise 16:59 17:18</p> <p>16</p> | <p>40°N 50°N Set 3:48 3:27 Rise 17:55 18:18</p> <p>17</p> <p>Moon-Mars-Saturn in loose group this evening</p> | <p>40°N 50°N Set 4:25 4:00 Rise 18:50 19:17 Sunrise 5:31 4:51 Sunset 20:32 21:12</p> <p>18</p> <p>Moon 3° upper left of Saturn this evening</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>40°N 50°N Set 5:07 4:39 Rise 19:44 20:14</p> <p>19</p> <p>FATHER'S DAY</p> | <p>40°N 50°N Set 5:53 5:23 Rise 20:36 21:06</p> <p>20</p> <p>Full Moon 7:02</p> <p>Summer solstice 6:34 pm</p> <p>Today's full Moon is the Strawberry/Honey Moon</p> | <p>40°N 50°N Set 6:45 6:15 Rise 21:24 21:53</p> <p>21</p> <p>NATIONAL ABORIGINAL DAY (NT)</p> | <p>40°N 50°N Set 7:41 7:13 Rise 22:09 22:35</p> <p>22</p> | <p>40°N 50°N Set 8:41 8:17 Rise 22:51 23:11</p> <p>23</p> | <p>40°N 50°N Set 9:44 9:25 Rise 23:29 23:44</p> <p>24</p> <p>FÊTE NATIONALE (QC)</p> | <p>40°N 50°N Set 10:48 10:35 Rise — — Sunrise 5:33 4:52 Sunset 20:33 21:13</p> <p>25</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>40°N 50°N Rise 0:05 0:14 Set 11:54 11:47</p> <p>26</p> | <p>40°N 50°N Rise 0:40 0:43 Set 13:00 13:01</p> <p>27</p> <p>Last Quarter 14:19</p> <p>DISCOVERY DAY (NL)</p> | <p>40°N 50°N Rise 1:15 1:11 Set 14:08 14:16</p> <p>28</p> | <p>40°N 50°N Rise 1:52 1:41 Set 15:17 15:31</p> <p>29</p> | <p>40°N 50°N Rise 2:32 2:15 Set 16:26 16:47</p> <p>30</p> <p>Mars stationary</p> | <table border="1"> <thead> <tr> <th>MAY</th> <th>S</th> <th>M</th> <th>T</th> <th>W</th> <th>T</th> <th>F</th> <th>S</th> <th>JUL</th> <th>S</th> <th>M</th> <th>T</th> <th>W</th> <th>T</th> <th>F</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>9</td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> <td></td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> </tr> <tr> <td>15</td> <td>16</td> <td>17</td> <td>18</td> <td>19</td> <td>20</td> <td>21</td> <td></td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> <td>15</td> <td>16</td> </tr> <tr> <td>22</td> <td>23</td> <td>24</td> <td>25</td> <td>26</td> <td>27</td> <td>28</td> <td></td> <td>17</td> <td>18</td> <td>19</td> <td>20</td> <td>21</td> <td>22</td> <td>23</td> </tr> <tr> <td>29</td> <td>30</td> <td>31</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>24</td> <td>25</td> <td>26</td> <td>27</td> <td>28</td> <td>29</td> <td>30</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>31</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | MAY | S | M | T | W | T | F | S | JUL | S | M | T | W | T | F | S | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | | | | | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 29 | 30 | 31 | | | | | | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | | | | | | | | 31 | | | | | | |
| MAY | S | M | T | W | T | F | S | JUL | S | M | T | W | T | F | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 15 | 16 | 17 | 18 | 19 | 20 | 21 | | 10 | 11 | 12 | 13 | 14 | 15 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 | | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | 30 | 31 | | | | | | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



JULY

DUMBBELL The Dumbbell Nebula (M27) was the first planetary nebula to be discovered by Charles Messier in 1764. In this image, the pink of hydrogen-alpha light is surrounded by the blue glow of doubly ionized oxygen (OIII). It is estimated that the expulsion of gas layers that created this energetic cloud occurred some 10,000 years ago. | IMAGE BY LYNN HILBORN

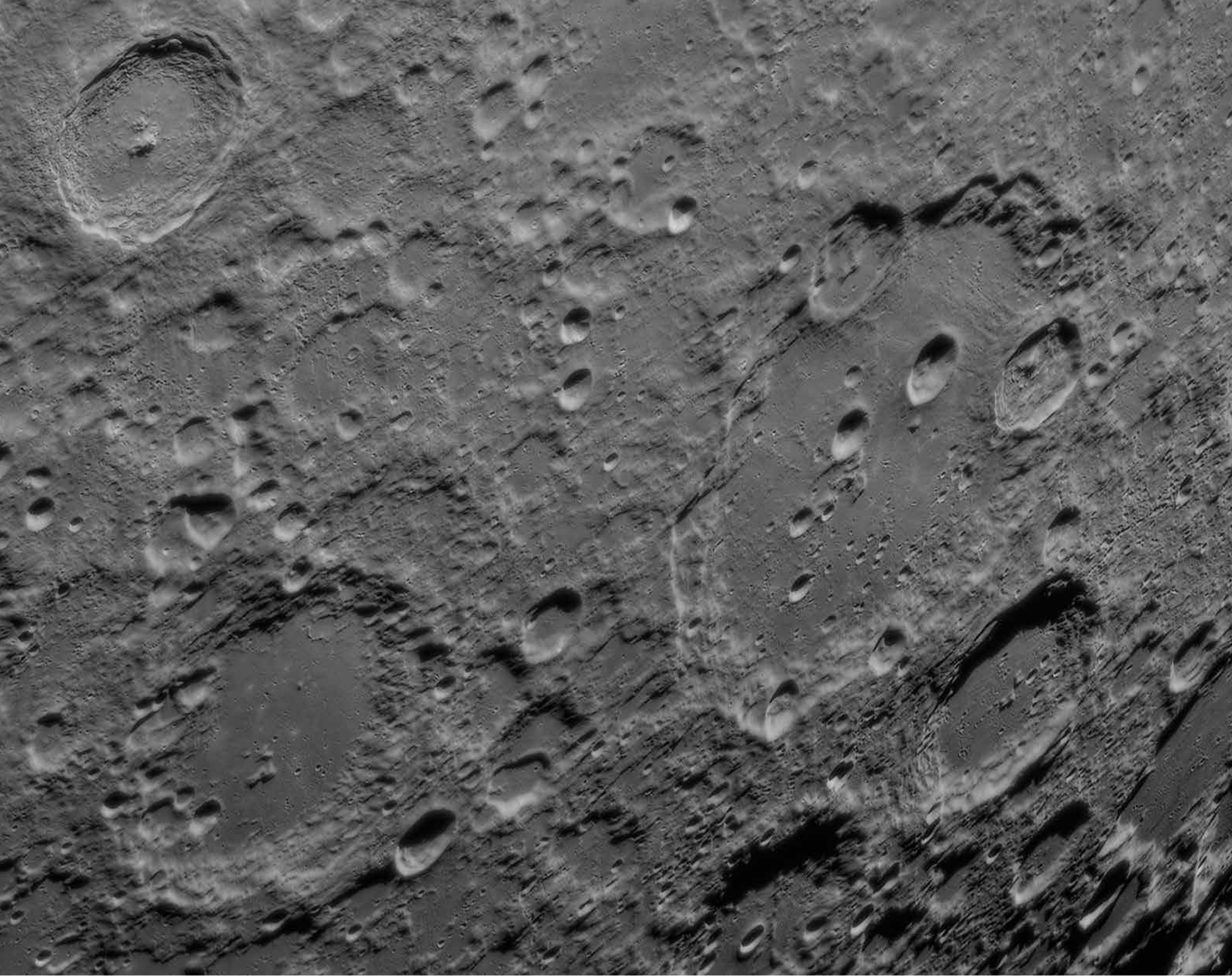
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| THE PLANETS THIS MONTH Mercury very low in WNW in evening twilight after mid-month Venus very low in WNW in evening twilight late this month Mars in S after dark, sets in SW near 2 am Jupiter low in W during twilight, sets in W near midnight Saturn in S at dusk, sets in WSW near 3 am | | | | | 40°N 50°N Rise 3:15 2:52 Set 17:35 18:01 1 | 40°N 50°N Rise 4:04 3:37 Set 18:40 19:09 Sunrise 5:36 4:56 Sunset 20:32 21:12 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40°N 50°N Rise 4:58 4:28 Set 19:41 20:11 3 | 40°N 50°N Rise 5:56 5:27 Set 20:35 21:03 4 New Moon 7:01 INDEPENDENCE DAY (USA) Earth at aphelion (152,103,769 km) | 40°N 50°N Rise 6:58 6:31 Set 21:23 21:47 5 | 40°N 50°N Rise 8:01 7:38 Set 22:05 22:24 6 | 40°N 50°N Rise 9:03 8:46 Set 22:41 22:56 7 Pluto at opposition (m=14.1) <i>Rudolf Wolf, who linked sunspots and magnetic storms, was born, 200 years ago</i> | 40°N 50°N Rise 10:04 9:52 Set 23:15 23:23 8 CANADA DAY Watch for noctilucent clouds in N sky during twilight this month. Best N of 50° latitude Dam Star Party, Mactaquac P.P., NB www.nb.rasc.ca (through Jul 10) Alberta Star-B-Q, Eccles Ranch, AB calgary.rasc.ca/starbq.htm (through Jul 10) Moon 5° lower right of Jupiter this evening | 40°N 50°N Rise 11:03 10:57 Set 23:45 23:48 Sunrise 5:40 5:02 Sunset 20:30 21:08 9 NUNAVUT DAY Thick crescent Moon occults beta Virginis S of graze N California-Alabama before midnight | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40°N 50°N Rise 12:01 12:01 Set — — 10 Spot Arcturus unaided before sunset this week | 40°N 50°N Set 0:15 0:12 Rise 12:57 13:03 11 First Quarter 20:52 Lunar X near crater Werner visible in E of N. America 7 pm | 40°N 50°N Set 0:45 0:36 Rise 13:53 14:05 12 | 40°N 50°N Set 1:15 1:02 Rise 14:49 15:06 13 Mercury 2.5° lower right of Venus soon after sunset visible from S of N. America | 40°N 50°N Set 1:48 1:29 Rise 15:45 16:06 14 Mercury 1.5° lower right of Venus soon after sunset visible from S of N. America Moon-Mars-Saturn in loose group in the evening | 40°N 50°N Set 2:23 2:00 Rise 16:40 17:06 15 Mercury 0.8° right of Venus soon after sunset visible in S of N. America Moon 3° above Saturn this evening | 40°N 50°N Set 3:03 2:36 Rise 17:35 18:04 Sunrise 5:45 5:10 Sunset 20:27 21:02 16 Mercury 0.6° upper right of Venus soon after sunset visible from S of N. America | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40°N 50°N Set 3:47 3:18 Rise 18:28 18:58 17 Mercury 0.9° above Venus soon after sunset visible in S of N. America | 40°N 50°N Set 4:37 4:07 Rise 19:18 19:48 18 Mercury 1.5° upper left of Venus soon after sunset visible in S of N. America | 40°N 50°N Set 5:32 5:03 Rise 20:06 20:33 19 Full Moon 18:57 Today's full Moon is the Thunder Moon | 40°N 50°N Set 6:31 6:05 Rise 20:49 21:12 20 | 40°N 50°N Set 7:34 7:13 Rise 21:30 21:47 21 | 40°N 50°N Set 8:39 8:24 Rise 22:07 22:18 22 | 40°N 50°N Set 9:45 9:37 Rise 22:43 22:48 Sunrise 5:51 5:18 Sunset 20:22 20:54 23 Gibbous Moon occults lambda Aquarii visible in SE of N. America in the wee hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40°N 50°N Set 10:53 10:51 Rise 23:18 23:17 24 | 40°N 50°N Set 12:00 12:05 Rise 23:54 23:46 25 | 40°N 50°N Set 13:08 13:20 Rise — — 26 Last Quarter 19:00 | 40°N 50°N Rise 0:32 0:17 Set 14:16 14:34 27 | 40°N 50°N Rise 1:13 0:53 Set 15:23 15:47 28 Mercury 2.7° lower right of Regulus soon after sunset visible from S of N. America | 40°N 50°N Rise 1:59 1:33 Set 16:28 16:56 29 Mt Carleton Star Party, Mt Carleton P.P., NB www.nb.rasc.ca (through Jul 31) Waning crescent Moon occults Aldebaran and double star theta Tau at dawn visible south of graze SW Texas-Montreal | 40°N 50°N Rise 2:49 2:20 Set 17:29 17:59 Sunrise 5:57 5:28 Sunset 20:15 20:45 30 Mount Kobau Star Party, Osoyoos, BC (through Aug 7) Mercury 0.5° above Regulus soon after sunset visible in S of N. America | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40°N 50°N Rise 3:44 3:14 Set 18:25 18:54 31 Mercury 2.0° upper left of Regulus soon after sunset visible in S of N. America | <table border="1"> <thead> <tr> <th>JUN</th> <th>S</th> <th>M</th> <th>T</th> <th>W</th> <th>T</th> <th>F</th> <th>S</th> </tr> </thead> <tbody> <tr><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td></td></tr> <tr><td></td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr> <tr><td></td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr> <tr><td></td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td></td><td></td></tr> </tbody> </table> | | JUN | 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 | | | <table border="1"> <thead> <tr> <th>AUG</th> <th>S</th> <th>M</th> <th>T</th> <th>W</th> <th>T</th> <th>F</th> <th>S</th> </tr> </thead> <tbody> <tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td></td></tr> <tr><td></td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr> <tr><td></td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td></td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td></tr> <tr><td></td><td>28</td><td>29</td><td>30</td><td>31</td><td></td><td></td><td></td></tr> </tbody> </table> | | AUG | 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 | | | | Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock. Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time. Times for events involving planetary satellites refer to the start time. Detailed instructions on adjusting times for location are given in the back pages. Please see back pages for photo details and additional information about this Calendar. |
| JUN | S | M | T | W | T | F | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | 12 | 13 | 14 | 15 | 16 | 17 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 19 | 20 | 21 | 22 | 23 | 24 | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 26 | 27 | 28 | 29 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUG | S | M | T | W | T | F | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | 7 | 8 | 9 | 10 | 11 | 12 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 28 | 29 | 30 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



AUGUST

ISOLATED ISLAND The centre of the Milky Way Galaxy appears to dive into the tranquil waters behind the solitary island. The Prancing Horse Nebula above the central tree is also known as the Pipe Nebula (the horse's hind leg and hip), and, in the American Southwest, as the Burro Nebula. These dark gas clouds littering the area obstruct starlight coming from distant parts of the galaxy. | IMAGE BY WESLEY LIIKANE

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time.</p> <p>Times for events involving planetary satellites refer to the start time.</p> <p>Detailed instructions on adjusting times for location are given in the back pages.</p> <p><i>Please see back pages for photo details and additional information about this Calendar.</i></p> | <p> 40°N 50°N Rise 4:43 4:15 Set 19:15 19:41 1</p> <p>CIVIC HOLIDAY (AB, BC, MB, NB, NS, NT, NU, ON, PE, SK)</p> <p>20 Massalia at opposition (m= 9.9)</p> | <p> 40°N 50°N Rise 5:45 5:20 Set 19:59 20:21 2</p> <p>New Moon 16:45</p> | <p> 40°N 50°N Rise 6:48 6:27 Set 20:38 20:55 3</p> <p>Saskatchewan Summer Star Party, Cypress Hills, SK www.usask.ca/rasc/starparty.html (through Aug 7)</p> | <p> 40°N 50°N Rise 7:49 7:35 Set 21:13 21:24 4</p> <p>Stellafane Convention, Springfield, VT (through Aug 7)</p> <p>Starfest, Mount Forest, ON, www.nyaa.ca (through Aug 7)</p> <p>Regulus 1.3° left of Venus soon after sunset best seen in S of N. America</p> <p>Crescent Moon 1.3° left of Mercury soon after sunset best in S of N. America</p> | <p> 40°N 50°N Rise 8:50 8:41 Set 21:45 21:51 5</p> <p>Butterpot Star Party, St. John's, NL www.stjohnsrasc.ca/ (through Aug 6)</p> <p>Keji Dark-Sky Weekend, Kejimikujik National Park, NS (through Aug 7)</p> <p>Crescent Moon 2.1° below Jupiter soon after sunset best seen in S of N. America</p> <p>Regulus 1.1° below Venus soon after sunset best seen in S of N. America</p> | <p> 40°N 50°N Rise 9:48 9:46 Set 22:16 22:15 6</p> <p>Sunrise 6:04 5:37 Sunset 20:07 20:33</p> <p>Moon occults eta Virginis visible in W of N. America after sunset</p> <p>Regulus 2° below Venus soon after sunset best seen in S of N. America</p> | <p> 40°N 50°N Rise 10:46 10:49 Set 22:45 22:40 7</p> <p>Regulus 3° below Venus soon after sunset best seen in S of N. 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| <p> 40°N 50°N Set 9:50 9:52 Rise 21:56 21:49 21</p> <p>Mars 2.3° upper right of Antares in the evening, Saturn above</p> | <p> 40°N 50°N Set 10:59 11:09 Rise 22:33 22:21 22</p> <p>2 Pallas at opposition (m= 9.2)</p> <p>Mars 2° above Antares in the evening, Saturn above</p> | <p> 40°N 50°N Set 12:08 12:24 Rise 23:14 22:55 23</p> <p>Venus-Jupiter-Mercury group soon after sunset best seen in S of N. America</p> <p>Mars 1.8° above Antares in the evening, Saturn above</p> | <p> 40°N 50°N Set 13:16 13:38 Rise 23:58 23:34 24</p> <p>Last Quarter 23:41</p> <p>Jupiter 3° upper left of Venus, Mercury at lower left, soon after sunset best seen in S of N. America</p> <p>Mars 1.8° upper left of Antares in the evening, Saturn above</p> <p><i>IAU presented official definition of "planet," 10 years ago</i></p> | <p> 40°N 50°N Set 14:21 14:48 Rise — — 25</p> <p>Third Quarter Moon occults Aldebaran in daylight S of graze N Oregon-S. Carolina</p> <p>Jupiter 2° upper left of Venus, Mercury at lower left, soon after sunset best seen in S of N. America</p> <p>Mars 2° upper left of Antares in the evening, Saturn above</p> | <p> 40°N 50°N Rise 0:46 0:18 Set 15:23 15:52 26</p> <p>Nova East, Smileys Provincial Park, NS halifax.rasc.ca/ne (through Aug 28)</p> <p>Lunar Curtiss X visible in NW of N. America 9 am</p> <p>Jupiter 1° upper left of Venus, Mercury at lower left, soon after sunset best seen in S of N. America</p> <p>Mars 2.2° upper left of Antares in the evening, Saturn above</p> | <p> 40°N 50°N Rise 1:39 1:09 Set 16:19 16:49 Sunrise 6:24 6:09 Sunset 19:38 19:53 27</p> <p>Asteroid 85 lo occults mag 7.4 star in 200-km-wide path Thunder Bay-SW Texas 12:28 am</p> <p>Jupiter 0.1° upper left of Venus, Mercury at lower left, soon after sunset best seen in S of N. America</p> <p>Mars 2.6° upper left of Antares in the evening, Saturn above</p> | <p> 40°N 50°N Rise 2:27 1:57 Set 17:10 17:38 28</p> <p>Jupiter 1° lower right of Venus, Mercury at lower left, soon after sunset best seen in S of N. America</p> <p>Mars 3° upper left of Antares and separating, in the evening</p> | <p> 40°N 50°N Rise 3:35 3:09 Set 17:55 18:19 29</p> <p>Jupiter 2° lower right of Venus, Mercury at lower left, soon after sunset best seen in S of N. America</p> | <p> 40°N 50°N Rise 4:36 4:14 Set 18:36 18:54 30</p> <p>Jupiter 3° lower right of Venus and separating, Mercury at lower left, soon after sunset best seen in S of N. America</p> | <p> 40°N 50°N Rise 5:37 5:20 Set 19:12 19:25 31</p> <p>Old crescent Moon, 24 hours before new in E, 20 hours before new in W, a challenge just before sunrise</p> | <p>THE PLANETS THIS MONTH</p> <p>Mercury very low in WNW in evening twilight, lost after mid-month</p> <p>Venus very low in W in evening twilight</p> <p>Mars in SSW after dark, sets in WSW near 1 am</p> <p>Jupiter very low in W soon after sunset, lost in twilight late this month</p> <p>Saturn in SSW at dusk, sets in WSW near 1 am</p> | <table border="1"> <thead> <tr> <th>JUL</th> <th>S</th> <th>M</th> <th>T</th> <th>W</th> <th>T</th> <th>F</th> <th>S</th> </tr> </thead> <tbody> <tr> <td></td> <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</td> <td>9</td> </tr> <tr> <td></td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> <td>15</td> <td>16</td> </tr> <tr> <td></td> <td>17</td> <td>18</td> <td>19</td> <td>20</td> <td>21</td> <td>22</td> <td>23</td> </tr> <tr> <td></td> <td>24</td> <td>25</td> <td>26</td> <td>27</td> <td>28</td> <td>29</td> <td>30</td> </tr> <tr> <td></td> <td>31</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>SEP</th> <th>S</th> <th>M</th> <th>T</th> <th>W</th> <th>T</th> <th>F</th> <th>S</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1 2 3</td> </tr> <tr> <td></td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10</td> </tr> <tr> <td></td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> <td>15</td> <td>16</td> <td>17</td> </tr> <tr> <td></td> <td>18</td> <td>19</td> <td>20</td> <td>21</td> <td>22</td> <td>23</td> <td>24</td> </tr> <tr> <td></td> <td>25</td> <td>26</td> <td>27</td> <td>28</td> <td>29</td> <td>30</td> <td></td> </tr> </tbody> </table> | JUL | 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 | | | | | | | SEP | 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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| JUL | S | M | T | W | T | F | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | 25 | 26 | 27 | 28 | 29 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



SEPTEMBER

TYCHO TO CLAVIUS "Magnificent desolation" is the way *Apollo 11* astronaut Buzz Aldrin described it, and this image of the area surrounding Tycho, at lower left, and Clavius, to the right of centre, is ample confirmation of the bleak and barren lunar surface. The small craters in Clavius are a good test of optics and seeing conditions; how many can you count in your telescope? | IMAGE BY MICHAEL WIRTHS

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

THE PLANETS THIS MONTH

| | |
|----------------|---|
| Mercury | very low in E in morning twilight after mid-month |
| Venus | very low in WSW in evening twilight |
| Mars | low in SSW after dark, sets in SW near 11 pm |
| Jupiter | not observable this month |
| Saturn | low in SW at dusk, sets in WSW near 11 pm |

AUG

| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
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| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

OCT

| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
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| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | | | | | |

Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.

Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time.

Times for events involving planetary satellites refer to the start time.

Detailed instructions on adjusting times for location are given in the back pages.

Please see back pages for photo details and additional information about this Calendar.

Rise 40°N 50°N 9:32 9:38
Set 21:16 21:07 **4**

Rise 40°N 50°N 10:28 10:40
Set 21:47 21:32 **5**

Rise 40°N 50°N 11:24 11:41
Set 22:20 22:00 **6**

Rise 40°N 50°N 12:19 12:41
Set 22:55 22:32 **7**

Rise 40°N 50°N 13:13 13:39
Set 23:34 23:07 **8**

Rise 40°N 50°N 14:06 14:35
Set — 23:49 **9**

Rise 40°N 50°N 14:58 15:28
Set 19:52 19:49 **10**

Set 1:07 0:37
Rise 15:47 16:16 **11**

Set 2:01 1:33
Rise 16:34 17:00 **12**

Set 3:01 2:35
Rise 17:17 17:39 **13**

Set 4:04 3:44
Rise 17:58 18:15 **14**

Set 5:11 4:57
Rise 18:37 18:47 **15**

Set 6:20 6:12
Rise 19:14 19:18 **16**

Set 7:31 7:30
Rise 19:52 19:49 **17**

Set 8:42 8:49
Rise 20:30 20:20 **18**

Set 9:54 10:08
Rise 21:11 20:54 **19**

Set 11:04 11:25
Rise 21:55 21:33 **20**

Set 12:13 12:38
Rise 22:43 22:16 **21**

Set 13:17 13:46
Rise 23:35 23:06 **22**

Set 14:16 14:45
Rise — — **23**

Rise 0:31 0:01
Set 15:08 15:36 **24**

Rise 1:29 1:02
Set 15:55 16:20 **25**

Rise 2:29 2:05
Set 16:36 16:56 **26**

Rise 3:29 3:11
Set 17:12 17:28 **27**

Rise 4:29 4:16
Set 17:46 17:56 **28**

Rise 5:28 5:21
Set 18:17 18:21 **29**

Rise 6:26 6:25
Set 18:47 18:46 **30**

Mars within 3° below Lagoon Nebula M8 this week in the evening

Penumbral lunar eclipse, NOT visible in N. America

Mercury at greatest elongation (18° W) (m= -0.6). Best morning apparition of the year

Moon 1.6° below Mercury, in morning twilight
11 Parthenope at opposition (m= 9.1)

Moon occults Jupiter N of graze Whitehorse-Montréal-SE. Daylight except before sunrise Yukon-W

Asteroid 51 Nemausa occults mag 7.4 HIP 8524 in 160-km-wide path Regina-Tucson 5:50 am

New Moon 5:03
Zodiacal light readily visible from a dark site in E before morning twilight for the next two weeks
Annular solar eclipse, visible Congo-Tanzania-Madagascar
E.E. Barnard discovered star with largest proper motion, 100 years ago

Alberta Star Party, Starland, AB Calgary. rasc.ca/asp.htm (through Sep 4)
Fundy Park Stargaze, Fundy N.P., NB www.nb.rasc.ca/ (through Sep 4)
Moon 0.4° left of Jupiter, Venus and Mercury nearby, soon after sunset best seen in S of N. America
Neptune at opposition (m= 7.8)

Lunar X near crater Werner visible in E of N. America 7 pm
Moon-Mars-Saturn-Antares in loose group in the evening
Television series Star Trek premiered, 50 years ago

First Quarter 7:49
Today's full Moon is the Harvest Moon

Fall Equinox 10:21 am
Spot Capella unaided after sunrise 30° N of Moon

Full Moon 15:05
Spica 2.6° lower right of Venus, soon after sunset best seen in S of N. America

Fall Equinox 10:21 am
Spot Capella unaided after sunrise 30° N of Moon

Last Quarter 5:56
Moon occults Jupiter N of graze Whitehorse-Montréal-SE. Daylight except before sunrise Yukon-W



OCTOBER

WANING HUNTER'S MOON Rising over the Edmonton cityscape, the Hunter's Moon transforms from a deep red and squashed appearance into a brilliant yellow-white globe in these well-timed exposures. | IMAGE BY LUCA VANZELLA

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

THE PLANETS THIS MONTH

- Mercury** very low in E in morning twilight, lost near mid-month
- Venus** very low in SW in evening twilight
- Mars** low in SSW after dark, sets in SW near 11 pm
- Jupiter** very low in E in morning twilight
- Saturn** very low in SW after sunset, sets after dusk

1
 Rise 7:23 7:28
 Set 19:17 19:10
 Sunrise 6:57 7:01
 Sunset 18:41 18:37

Zodiacal light readily visible from a dark site in E before morning twilight for the next two weeks

Dmitri Maksutov conceived new telescope design, 75 years ago

2
 Rise 8:20 8:30
 Set 19:47 19:35

3
 Rise 9:16 9:31
 Set 20:19 20:02

4
 Rise 10:11 10:32
 Set 20:54 20:32

5
 Rise 11:06 11:30
 Set 21:31 21:05

6
 Rise 11:59 12:27
 Set 22:13 21:44

7
 Rise 12:50 13:20
 Set 22:59 22:29

8
 Rise 13:40 14:09
 Set 23:50 23:20
 Sunrise 7:04 7:12
 Sunset 18:30 18:22

ISLAMIC NEW YEAR
 Follow Sirius unaided into daylight this week

ROSH HASHANAH BEGINS

Moon 5° right of Saturn this evening

Mars, lambda Sgr, globular M28 in 1.1° circle in the evening

Mars approaching globular M22 in the evening, Moon 8° upper right

Mercury approaching Jupiter visible just before sunrise best seen in S of N. America

9
 Rise 14:26 14:54
 Set — —

10
 Set 0:45 0:18
 Rise 15:10 15:34

11
 Set 1:45 1:22
 Rise 15:50 16:10

12
 Set 2:49 2:31
 Rise 16:29 16:43

13
 Set 3:56 3:45
 Rise 17:07 17:14

14
 Set 5:05 5:01
 Rise 17:44 17:45

15
 Set 6:17 6:20
 Rise 18:22 18:16
 Sunrise 7:11 7:23
 Sunset 18:20 18:08

First Quarter 0:33
 Spot Vega unaided before sunset this week
 Mars pulling away from globular M22 this week, in the evening

THANKSGIVING DAY (CANADA)
COLUMBUS DAY (USA)
 S Taurid meteors (ZHR=5)
 Radio telescope at Jodrell Bank began observations, 70 years ago

Mercury 0.7° left of Jupiter visible just before sunrise best seen in S of N. America

YOM KIPPUR
 Mercury 1.7° below Jupiter and dropping, visible just before sunrise best seen in S of N. America

Moon occults lambda Aquarii visible in W of N. America in the wee hours

Uranus at opposition (m=5.7)

16
 Set 7:30 7:41
 Rise 19:03 18:49

17
 Set 8:44 8:44
 Rise 19:46 19:26

18
 Set 9:56 9:56
 Rise 20:34 20:09

19
 Set 11:05 11:33
 Rise 21:26 20:57

20
 Set 12:08 12:38
 Rise 22:23 21:53

21
 Set 13:04 13:34
 Rise 23:22 22:53

22
 Set 13:54 14:20
 Rise — 23:57
 Sunrise 7:19 7:34
 Sunset 18:10 17:54

Full Moon 0:23
 Today's full Moon is the Hunter's Moon

Lunar Curtiss X visible in W of N. America except SW 10 am

Moon occults Aldebaran, gamma, and double star theta Tau in the wee hours visible S of graze Los Angeles-Lake Superior

Jupiter with only Callisto visible in E of N. America 7:04 am
 Orionid meteors (ZHR=15) 1:00 am
 1 Ceres at opposition (m=7.4)

Jupiter with only Callisto visible in W of N. America 9:50 am
 Crescent Moon 1° left of Jupiter in morning twilight
 Try to spot Uranus (m=5.7) unaided this weekend

18 Melpomene at opposition (m=8.0)

23
 Rise 0:23 —
 Set 14:37 14:59

24
 Rise 1:23 1:03
 Set 15:15 15:32

25
 Rise 2:23 2:08
 Set 15:49 16:01

26
 Rise 3:22 3:13
 Set 16:20 16:26

27
 Rise 4:20 4:17
 Set 16:50 16:51

28
 Rise 5:17 5:20
 Set 17:20 17:14

29
 Rise 6:13 6:22
 Set 17:49 17:39
 Sunrise 7:26 7:46
 Sunset 18:01 17:41

New Moon 13:38

HALLOWE'EN
 Farthest lunar apogee of the year ~406659 km

| SEP | S | M | T | W | T | F | S |
|-----|----|----|----|----|----|----|----|
| | | | | | | 1 | 2 |
| | 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 | |

| NOV | 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 | | | |

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.
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NOVEMBER

SEVEN SISTERS FLOATING Who hasn't gazed eastward on a late autumn evening to watch the Seven Sisters (M45, or The Pleiades) slowly climb out of the murky air at the horizon and try to count all seven stars? Over 1000 stars are embedded in the dust and gas, most of them hot, blue, and very luminous. The dust is not a leftover from the stars' formation, but a cloud through which the group is passing. | IMAGE BY ALAN DYER

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|--|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| <p>THE PLANETS THIS MONTH</p> <p>Mercury very low in SW in evening twilight near end of month</p> <p>Venus low in SW in evening twilight</p> <p>Mars in SSW after dark, sets in WSW near 10 pm</p> <p>Jupiter rises in ESE near 4 am</p> <p>Saturn very low in SW after sunset, lost in twilight late this month</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>6</p> <p>Rise 40°N 50°N Set 12:06 12:33 22:33 22:07</p> <p>Daylight Saving Time ends 2 am</p> <p>Lunar X near crater Werner visible in all of N. America except W coast 7 pm</p> | <p>7</p> <p>Rise 40°N 50°N Set 12:47 13:09 23:33 23:13</p> <p>First Quarter 14:51</p> | <p>8</p> <p>Rise 40°N 50°N Set 13:25 13:42</p> | <p>9</p> <p>Set 40°N 50°N Rise 0:36 0:22 14:02 14:12</p> | <p>10</p> <p>Set 40°N 50°N Rise 1:42 1:34 14:38 14:42</p> | <p>11</p> <p>Set 40°N 50°N Rise 2:51 2:50 15:14 15:11</p> <p>REMEMBRANCE DAY (CANADA) VETERANS DAY (USA)</p> <p>Venus within 3° of Lagoon Nebula M8, very low in late evening twilight, next four nights</p> | <p>12</p> <p>Set 40°N 50°N Rise 4:02 4:08 15:52 15:42</p> <p>Sunrise 6:43 7:09 Sunset 16:46 16:19</p> <p>N Taurid meteors (ZHR=5)</p> <p><i>Percival Lowell, whose calculations aided Pluto's discovery, died, 100 years ago</i></p> <p><i>First space deployment of Canadarm on Space Shuttle STS-2, 35 years ago</i></p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>13</p> <p>Set 40°N 50°N Rise 5:15 5:29 16:34 16:17</p> | <p>14</p> <p>Set 40°N 50°N Rise 6:29 6:50 17:19 16:57</p> <p>Full Moon 8:52</p> <p>Closest lunar perigee of the year ~356511 km</p> <p>Today's full Moon is the Beaver Moon</p> | <p>15</p> <p>Set 40°N 50°N Rise 7:42 8:08 18:11 17:43</p> | <p>16</p> <p>Set 40°N 50°N Rise 8:50 9:20 19:07 18:37</p> | <p>17</p> <p>Set 40°N 50°N Rise 9:53 10:23 20:07 19:38</p> <p>Leonid meteors (ZHR=15) 5:00 am</p> <p>Venus 0.3° left lambda Sgr, very low in late evening twilight</p> | <p>18</p> <p>Set 40°N 50°N Rise 10:48 11:16 21:10 20:43</p> <p>Venus within 2° lower left of globular cluster M22, very low in late evening twilight, next four nights</p> | <p>19</p> <p>Set 40°N 50°N Rise 11:35 11:59 22:13 21:50</p> <p>Sunrise 6:51 7:20 Sunset 16:40 16:10</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>20</p> <p>Set 40°N 50°N Rise 12:16 12:35 23:15 22:58</p> | <p>21</p> <p>Set 40°N 50°N Rise 12:52 13:05</p> <p>Last Quarter 3:33</p> <p>Moon 1.9° right of Regulus in the wee hours</p> | <p>22</p> <p>Rise 40°N 50°N Set 0:15 0:04 13:24 13:32</p> | <p>23</p> <p>Rise 40°N 50°N Set 1:14 1:08 13:54 13:57</p> <p>Crescent Moon occults beta Virginis near dawn N of graze Alaska-Winnipeg-Baltimore</p> | <p>24</p> <p>Rise 40°N 50°N Set 2:11 2:12 14:23 14:20</p> <p>THANKSGIVING DAY (USA)</p> | <p>25</p> <p>Rise 40°N 50°N Set 3:08 3:14 14:53 14:44</p> <p>Crescent Moon 4° lower left of Jupiter in morning twilight</p> | <p>26</p> <p>Rise 40°N 50°N Set 4:04 4:16 15:23 15:09</p> <p>Sunrise 6:58 7:31 Sunset 16:37 16:04</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>27</p> <p>Rise 40°N 50°N Set 4:59 5:17 15:55 15:36</p> | <p>28</p> <p>Rise 40°N 50°N Set 5:55 6:17 16:30 16:07</p> <p>Old crescent Moon, 24 hours before new in E, 20 hours before new in W, just before sunrise</p> | <p>29</p> <p>Rise 40°N 50°N Set 6:50 7:16 17:09 16:42</p> <p>New Moon 7:18</p> | <p>30</p> <p>Rise 40°N 50°N Set 7:43 8:12 17:52 17:22</p> | <p>OCT</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>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 | 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>DEC</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>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>31</td></tr> </table> | S | M | T | W | T | F | S | 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>Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.</p> <p>Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time.</p> <p>Times for events involving planetary satellites refer to the start time.</p> <p>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> |
| S | M | T | W | T | F | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



DECEMBER

SUBLIME BEAUTY Possibly the most photographed object in the winter sky is the Orion Nebula, here shown embedded in the orange-red glow of excited hydrogen. Not only is it popular, the starbirth cloud is one of the brightest nebulae visible with the naked eye. Its nearby proximity to the Solar System allows for the close study and direct observation of collapsing gas clouds forming into proto-stars. | IMAGE BY ALAN DYER

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

THE PLANETS THIS MONTH

| | |
|----------------|--|
| Mercury | very low in SW in evening twilight, lost near end of month |
| Venus | low in SW in evening twilight |
| Mars | in SSW after dark, sets in WSW near 10 pm |
| Jupiter | rises in E near 2 am, high in SSE near dawn |
| Saturn | not observable this month |

| NOV | 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 | | | |
| JAN | 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 | | | | |

Times in the upper half of the daily boxes are in the 24-hour clock; times in the lower half are given in the 12-hour clock.

Eastern time is used, except for rise and set events and changes to/from Daylight Saving Time, which are given in local time.

Times for events involving planetary satellites refer to the start time.

Detailed instructions on adjusting times for location are given in the back pages.

Please see back pages for photo details and additional information about this Calendar.

1

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 8:34 9:05 |
| Set | 18:39 18:08 |

2

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 9:22 9:52 |
| Set | 19:31 19:01 |

Crescent Moon 8° right of Venus, in evening twilight

3

| | |
|---------|-------------|
| 40°N | 50°N |
| Rise | 10:07 10:34 |
| Set | 20:26 19:59 |
| Sunrise | 7:05 7:40 |
| Sunset | 16:35 16:00 |

4

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 10:48 11:12 |
| Set | 21:24 21:02 |

Moon 5° lower right of Mars this evening

5

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 11:26 11:45 |
| Set | 22:25 22:08 |

6

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 12:02 12:15 |
| Set | 23:28 23:18 |

Moon occults lambda Aquarii S of graze through central Florida before midnight

7

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 12:36 12:44 |
| Set | — — |

First Quarter 4:03

8

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 0:33 0:29 |
| Rise | 13:11 13:11 |

9

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 1:41 1:44 |
| Rise | 13:46 13:40 |

10

| | |
|---------|-------------|
| 40°N | 50°N |
| Set | 2:50 3:00 |
| Rise | 14:24 14:11 |
| Sunrise | 7:12 7:48 |
| Sunset | 16:35 15:58 |

11

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 4:02 4:19 |
| Rise | 15:06 14:47 |

Mercury at greatest elongation (21° E) this evening (m = -0.5)

12

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 5:14 5:37 |
| Rise | 15:54 15:28 |

13

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 6:25 6:53 |
| Rise | 16:47 16:18 |

Full Moon 19:06

Nearly full gibbous Moon occults Aldebaran, gamma, and double star theta Tau in all of N. America except NW in the wee hours

Geminid meteors (ZHR=120) 9:00 pm

Today's full Moon is the Cold/Long Night's Moon

14

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 7:32 8:02 |
| Rise | 17:46 17:15 |

15

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 8:33 9:02 |
| Rise | 18:49 18:20 |

16

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 9:25 9:52 |
| Rise | 19:55 19:29 |

17

| | |
|---------|-------------|
| 40°N | 50°N |
| Set | 10:11 10:33 |
| Rise | 21:00 20:39 |
| Sunrise | 7:17 7:54 |
| Sunset | 16:36 15:59 |

18

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 10:50 11:07 |
| Rise | 22:03 21:48 |

19

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 11:25 11:36 |
| Rise | 23:04 22:55 |

20

| | |
|------|-------------|
| 40°N | 50°N |
| Set | 11:57 12:02 |
| Rise | — — |

Last Quarter 20:56

Carl Sagan died, 20 years ago

21

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 0:03 0:01 |
| Set | 12:27 12:26 |

Winter solstice 5:44 am

22

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 1:00 1:04 |
| Set | 12:56 12:49 |

Moon 5° upper right of Jupiter in the wee hours

Ursid meteors (ZHR=10) 4 am

Lunar Curtiss X visible in far N of N. America except NE 1 pm

First photographic asteroid discovery was made, 323 Brucia, 125 years ago

23

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 1:56 2:06 |
| Set | 13:26 13:14 |

24

| | |
|---------|-------------|
| 40°N | 50°N |
| Rise | 2:52 3:08 |
| Set | 13:57 13:40 |
| Sunrise | 7:20 7:58 |
| Sunset | 16:40 16:02 |

25

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 3:48 4:08 |
| Set | 14:31 14:09 |

CHRISTMAS DAY

26

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 4:43 5:08 |
| Set | 15:08 14:42 |

BOXING DAY (CANADA)

27

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 5:37 6:06 |
| Set | 15:49 15:20 |

28

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 6:29 7:00 |
| Set | 16:35 16:04 |

Old crescent Moon, 19 hours before new in E, 15 hours before new in W, a difficult challenge just before sunrise

29

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 7:19 7:50 |
| Set | 17:26 16:55 |

New Moon 1:53

Young crescent Moon, 14 hours after new in E, 18 hours after new in W, very difficult challenge soon after sunset

Neptune 1.7° upper left of Mars in the evening

30

| | |
|------|-------------|
| 40°N | 50°N |
| Rise | 8:06 8:35 |
| Set | 18:20 17:52 |

31

| | |
|---------|-------------|
| 40°N | 50°N |
| Rise | 8:49 9:14 |
| Set | 19:18 18:54 |
| Sunrise | 7:22 7:59 |
| Sunset | 16:45 16:08 |

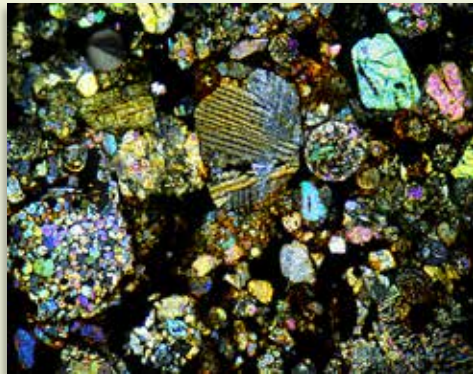


| | | |
|------|-------------|----------|
| | 40°N 50°N | 3 |
| Rise | 2:12 2:42 | |
| Set | 12:24 11:55 | |

Star cluster M23 reappears on dark limb of Moon near dawn, visible in E of N. America

| | | |
|------|-------------|----------|
| | 40°N 50°N | 4 |
| Rise | 3:04 3:33 | |
| Set | 13:19 12:51 | |

Two shadows on Jupiter visible in all of N. America except E 6:31 am
Norman Lockyer began spectroscopic solar observations, 150 years ago



| | | |
|------|-------------|-----------|
| | 40°N 50°N | 10 |
| Rise | 7:19 7:16 | |
| Set | 20:11 20:18 | |

| | | |
|------|-------------|-----------|
| | 40°N 50°N | 11 |
| Rise | 7:58 7:48 | |
| Set | 21:23 21:37 | |

Two shadows on Jupiter visible in W of N. America 8:25 am

The Royal Astronomical Society of Canada
Observer's Calendar 2016

All photos in this unique Calendar were taken by members of The Royal Astronomical Society of Canada (RASC) who are astronomy enthusiasts. It was produced by volunteer members of The Royal Astronomical Society of Canada.

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

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