

January through June 2002: A Bonanza for Planet-watchers

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A brief planetarium demonstration and preview of evening planet visibility in the first half of 2002, including the spectacular convergence of five planets in the west at dusk in April-May. We hope planetarians and other astronomy educators will spread the word in advance of this very observable gathering!

January through June 2002 will provide a bonanza of planet lineups and gatherings for early evening skywatchers. In early January 2002, four planets are in favorable view in evening twilight: Mercury low in SW, Mars high in SSW, Saturn well up in E in Taurus near Aldebaran, and Jupiter in ENE in Gemini. Mercury disappears in January's third week, but after Venus emerges from the twilight glow in late February, at least four planets are visible at dusk continuously until late May. **In late April and early May 2002**, during Mercury's best appearance of the year, **all five naked-eye planets are visible simultaneously in the western sky.** The span of five planets is 54° long on April 20, 40° on April 30, and 36° on May 5. **This unusually compact arrangement provides a rare chance, on several evenings in late May, to capture all five bright planets on a single photograph.** Jupiter excluded, the remaining four planets, all in Taurus, fit into 13° on April 30, shrinking to a minimum span of 9° on May 7, and then Mercury fades rapidly in May's second week. Here is a summary of the most compact planet arrangements:

April 30: Mercury 6° lower right of Venus.

May 3: Mars 2.2° N of Saturn.

May 5: Compact triangle of Venus-Mars-Saturn less than 3° on a side.

May 6: Venus 2.4° N of Saturn.

May 10: Venus 0.3° N of Mars.

June 3: Venus 1.7° N of Jupiter, with Mars 13° to their lower right.

By June 2002, Mercury and Saturn have disappeared and the three remaining planets are in Gemini. In late June, Mars is closing in on Jupiter, but both sink into the solar glare before their mutual pairing, leaving Venus as the only evening "star."

Future gatherings: After **April-May 2002**, the next chance to view all five naked-eye planets simultaneously will come in **mid-March to early April 2004.** But the 5-planet span Mercury-Venus-Mars-Saturn-Jupiter will be a much wider 132° as Mercury reaches greatest elongation in the evening sky on March 29, and will decrease slightly to 128° in early April as Mercury fades rapidly. Another chance to see all five comes in **December the same year:** In the morning sky December 17-22, five planets span

135°, in order Mercury-Venus-Mars-Jupiter-Saturn. At year's end, they'll span 144°, and remain visible into January 2005.

Views of all five naked-eye planets in a single glance, such as we'll have in April-May 2002, are rare. That's because compact gatherings of all five planets are possible only in "windows" within about two years on either side of a "Great Conjunction." That's when Jupiter overtakes Saturn, an event that occurs at intervals of about 20 years. These slowest-moving of the bright planets had their most recent close pairing as they entered Taurus and emerged from dawn within 1.2° apart late in May 2000. By early July 2001, when Saturn followed Jupiter out of the glare of morning twilight, they were spread to 19° apart. By late November 2001, Jupiter moved nearly 33° east of Saturn. In the evening sky in the first months of 2002, the two giants temporarily narrow to 27° apart in March-April, then resume spreading apart. They'll be on opposite sides of the sky, nearly 180° apart, in 2010-2011. The next Jupiter-Saturn pairing, on December 21, 2020, will be a very close one, just 0.1° apart in the evening sky, in Capricornus near the Sagittarius border, 30 degrees east of the Sun. Just make sure your eyeglasses have an up-to-date prescription!

In the 21st Century, after April-May 2002, future generations will witness visible compact gatherings of the five naked-eye planets in September 2040 at dusk (just over 9° long), July 2060 at dawn (23° long), and November 2100 at dawn (17° long). But the first and third of these groupings, with some of the planets barely above the horizon in mid-twilight from northern latitudes, may require binoculars. Only the compact gathering in July 2060 will be clearly visible to the unaided eye.

Though more compact than the grouping in the spring of 2002, none of these three groupings will be as accessible to casual skywatchers as the gathering in late April and early May 2002. We hope you agree that next spring's five-planet gathering, spanning as little as 36° on May 5 while all the planets are easily visible, is well worth publicizing to the news media. Surely, this *observable* gathering deserves at least as much exposure as the *invisible* grouping of May 5, 2000, exactly two years earlier!

Photography tips: Planetary conjunctions provide excellent opportunities for student projects and for obtaining photos for use as a teaching aid. Using a 35-mm camera with a standard lens (about 50-mm focal length), take a series of photographs or slides to follow changes during the evening gathering of all five bright planets in April-May 2002. A pairing of Venus and Jupiter at dusk in early June 2002 will be visually impressive and easy to record on film. Take at least two or three photos per week when fast-moving Mercury or Venus is in the field, or two or three per month when only Jupiter and Saturn are in view. In a dark moonless sky, exposures of about 20 or 30 seconds with the lens wide open to f/1.2 to 2.0 should be about right. Use a tripod to steady the camera, and fast film such as Kodak Elite Chrome 400.