



## Effects During a Total Solar Eclipse



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A total solar eclipse **begins almost unnoticeably**. As the Moon starts its passage across the face of the Sun, a small "bite" appears on the western edge of the Sun. Gradually, as more and more of the Sun disappears, an interesting effect can be seen: the tiny spots of light shining through the leaves of a tree, for example, show up on the ground as crescent images of the slowly vanishing Sun.

As the partial phase progresses for about an hour, there is little hint of the approaching darkness. But in the last few minutes before totality, **daylight fades very quickly**.



While a small crescent of the sun remains in the sky, a curious eclipse phenomenon is often observed. Thin wavy lines of alternating light and dark can be seen moving and undulating in parallel on plain light-colored surfaces. These so-called [shadow bands](#) are the result of sunlight being distorted by irregularities in the Earth's atmosphere, and are best observed on an open floor or wall.

As the narrow crescent of the Sun finally begins to disappear, **tiny specks of light remain visible for a few seconds more**. These points of light are spaced irregularly around the disappearing edge of the Sun, forming the appearance of a string of beads around the dark disk of the Moon. These lights are known as [Baily's beads](#), named after Francis Baily, the 18th century English amateur astronomer who was the first to draw attention to them. The beads are actually the last few rays of sunlight shining through valleys on the edge of the Moon. Baily's beads make their brief appearance up to 15 seconds before totality. When a single point of sunlight remains, a beautiful "diamond ring" effect is created against the outline of the Moon. This final sparkling instant signals the arrival of the moon's shadow. The last ray of sunlight vanishes and totality begins.

**Suddenly the sky above is dark.** The Moon's shadow, racing along the Earth at speeds up to several thousand miles per hour, brings a swift and dramatic nighttime effect. The sky near the horizon still appears bright, and this distant scattered light produces a slight reddish glow and unusual shadow effects. This daytime darkness is not quite as black as at night. But its **startling onset and unearthly appearance** combine to create a unique visual ambience.



In the center of this darkened sky hangs the featured spectacle of the eclipse -- the corona of the Sun. This pearly white crown of light shines in all directions around the darkened solar disk. A million times fainter than the Sun itself, the **full glory of the corona is visible only during a total solar eclipse**. Wispy plumes and streamers of coronal light reach out distances up to several diameters of the Sun before they fade into darkness.

Against the backdrop of the white corona and the black disk of the Moon, two colorful effects are usually seen. First is the light from the Sun's lower atmosphere, the [chromosphere](#). For a few seconds both after the beginning and before the end of totality, this pinkish glow appears at the edge of the Moon. Also often visible are several [solar prominences](#). These red cloudlike appendages arch above the surface, reach a maximum height of nearly one-third the diameter of the Sun itself.

This marvelous view of the Sun clearly commands the center of attention during totality. But there are

other sights to see as well. Because the direct light of the Sun is blocked, some of the **brighter stars and planets become visible**. Sometimes a total solar eclipse **reveals a small comet** on its path near the Sun.

The darkness of totality resembles nighttime, and plants and animals react accordingly. Birds stop singing and may go to roost. Daytime flower blossoms begin to close as if for the night. Bees become disoriented and stop flying. The temperature drops in the coolness of the Moon's shadow. All of Nature seems **still and quiet for this brief moment of daytime darkness**.

And then the shadow passes. A bright speck of sunlight flashes into view at the western edge of the Sun as the corona disappears. Totality has ended. The same events that preceded totality now occur in reverse order and on the opposite side of the Sun. Baily's beads appear, followed by a thin crescent of the Sun. Daylight returns as more and more of the Sun is gradually uncovered by the passing Moon.

Finally the complete disk of the Sun is restored. The eclipse is over. The Moon continues in its orbit around the Earth, casting its shadow off into the vastness of space. Nothing tangible remains of the eclipse except some photographs and scientific data. Yet the memory of the experience is permanent -- **the fleeting beauty of the corona etched into the mind's eye by the sheer grandeur of the event**. There is simply nothing else like it.

**\*\* Material adapted from *ECLIPSE* by Bryan Brewer (\$14.95 plus S&H). [ECLIPSE Book Order Form](#). \*\***

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(Updated Jan. 14, 1998)