

Equality on the Equinox?

— Howard L. Cohen

On equinox or solstice dates news media usually print articles about the onset of the new season. For example, a *Gainesville Sun* article, "Spring is in the air" (March 20, 2009) noted correctly that "Spring will officially blow into town today on northerly winds at 7:44 a.m."

However, most articles on this topic also usually state, "It is the first of two days when daylight and dark are equal lengths."

This is incorrect and propagates a common mistake!

For example, daylight in Gainesville, Florida on March 20, 2009 exceeded darkness by approximately fifteen minutes. One can see this by looking at sunrise and sunset times for Gainesville on this day, 7:33 a.m. and 7:40 p.m. EDT respectively.

In fact, equal days and nights for Gainesville occurred about March 16, four days before the equinox, when the Sun rose and set at 6:38 a.m. and 6:38 p.m. From this date until about September 27, and not this year's September 22nd equinox, daylight will exceed darkness. The actual dates depend on latitude with people on the equator always having more daylight than darkness.

Several effects cause this. Two important ones relate to the Sun's apparent size and our atmosphere. The Sun is not a point on our sky but a disk. We define sunrise when the Sun's upper edge first appears above the horizon and sunset when the Sun's bottom edge last disappears. These times determine the moments of first and last sunlight. Therefore, duration of daylight is not when the Sun's center is on the horizon but with the first and last appearance of the Sun's upper edge.

In addition, atmospheric refraction or bending raises the Sun's disk by slightly more than the its own apparent diameter when the Sun is near the horizon. Thus, we see the Sun for a few minutes before actual sunrise and see the Sun for a few minutes after it sets.

The result? In the Northern Hemisphere we get more sunlight than darkness from several days before the March equinox until several days after the September equinox.

Equinox may imply "equal" but its acceptance as truth is based more on constant repetition rather than fact. □