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An Optimistic Look at Falling Leaves

By Russell Shefrin

Over the years, as I have witnessed the gorgeous autumn foliage in New York State, I have often been aware of contradictory feelings. On the one hand, the beauty of fall colors is a delight to the eye; on the other hand, there is more than a little wistfulness at the thought of the passing of all those leaves whose various shades of green brought such pleasure during the summer months. Indeed, though often beautiful, the leaves of autumn have been associated, in literature and song, with themes of old age and eventual death. One thinks, for example, of Shakespeare's Sonnet 73, which begins, "That time of year thou mayst in me behold, when yellow leaves, or none, or few do hang upon those boughs which shake against the cold." I suppose I am one of those eternal optimists, given to finding silver linings in clouds. So, I have been wondering if the association of falling leaves with the approaching "end" may be misplaced. As I have looked into this matter, I have become convinced that, in fact, the autumn leaves are evidence the tree is quite alive and doing what it needs to do to stay that way.

A very early snow storm (dubbed "The October Surprise" by the news media) in 2006, here in Western New York, gave me the opportunity to observe what others have described. Specifically, during the subsequent months, leaves on intact branches followed their normal cycle of coloration and shedding. However, leaves on branches which had been broken off entirely by the heavy snow simply withered on the branch but remained attached.

Apparently, then, typical leaf coloration and shedding is more likely on a tree which is functioning normally (though I have seen the process occur unusually early in the season on trees which eventually proved to be unhealthy). Some twenty years ago, Professor Brian J. Ford wrote that the leaf changes which precede leaf fall constitute a "precisely coordinated metabolic sequence" which does not seem to be what one would expect if the leaf was simply degenerating. The process appears to serve some function.



Several theories have arisen to account for the apparent purpose of leaf fall. Professor Ford proposed that deciduous trees move certain substances into the autumn leaves as an excretory process. The leaf is then shed to remove those substances. Another hypothesis is that leaf fall reduces the chance that deciduous trees will dry out during the winter. In winter, when the soil is frozen, the water so bound up in ice is not available to the tree. A warm winter day might be sufficient to cause evaporation from a leaf, but the tree would be unable to replace the water lost in the process. The tree may then be in danger of dying. Finally, it has been suggested that leaf shedding in autumn reduces the chance that snow load will damage the tree. (Those of us who endured "The October Surprise" can vouch for that idea!)

Perhaps evolution has selected leaf shedding for all these functions or some others not yet understood. There has also been some suggestion that, not only leaf shedding but autumn coloration, may serve a purpose and may not just be a by-product of leaf "senescence." For example, anthocyanins, the frequently red pigments manufactured in the fall by some trees, may serve as a natural sunscreen during bright autumn days. These same pigments are also produced in certain young plants to protect new tissues from sun damage.

It does appear, then, that the colorful falling leaves of autumn are actually a sign of health, not decay. This uplifting concept adds to my enjoyment of the fall season and the winter to come. I am reminded of the observation, by the biologist Bernd Heinrich, that the bare winter trees, while appearing dead, having shed their leaves, are, in truth, "vibrantly alive."



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