

The Parade of the Falling Leaves-the Last Act of Autumn

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Nothing could be more symbolic of autumn than the coloring and falling of the leaves of the deciduous trees. Nature becomes a palette of warm colors and signals the winter to come. The deciduous trees of the Northeast are particularly suited to be the stars of this annual parade. From the colorful maples, to the stately oaks, and the birches, beeches, ironwoods, dogwoods, aspens, larches, poplars, cherries and others, they are the final tribute to a season gone by.

But why, exactly, do leaves color and drop? Like virtually everything alive in nature, from humans, to animals, insects and plants, daylight affects their life cycles. As the days shorten and the amount of daylight is reduced, this change tells the leaf to prepare for winter. Leaves stop producing chlorophyll (a necessary element in photosynthesis and the source of their green color) and the true colors in the leaves (the oranges, reds and yellows) become visible. The three ingredients necessary for this dramatic change are length of night (or absence of daylight), leaf pigments already in leaves, and weather.

And although all these factors play a role, the color changes and the leaf drop to follow are most significantly governed by the lengthening and cooling nights. Biochemical changes within the leaf begin the parade of colors to come. None of the other environmental factors, such as temperature, rainfall or food supply, are as immutable as the lengthening nighttime.

The leaf pigments that determine the color of the leaf are the carotenoids which produce the oranges, yellows and browns, anthocyanin which colors the reddish or purplish hue to apples, cranberries, purple grapes, cherries, plums and blueberries, and chlorophyll, the necessary ingredient for the process of photosynthesis, the chemical reaction involving sunlight to manufacture the sugars for plant health. Trees in temperate zones such as ours store these sugars for winter dormancy. Chlorophyll production is slowed and then stops completely as night length increases. The ever-present carotenoids and anthocyanins are now visible in their fall colors. Also with the decreasing amount of daylight, the leaf veins that carry fluids into and out of the leaf begin to close off with a layer of cells at the base of each leaf that will trap the sugars within the leaf. Once this abscission layer is complete, and connecting tissues are also sealed, the leaf drops. Deciduous trees now have created their winter wardrobe-- leafless limbs to help them survive harsh winter conditions of freezing temperatures. The stems, twigs, and buds are able to withstand these conditions whereas tender tissues in leaves would freeze, so deciduous trees protect themselves by disposing of these leaves altogether. But the tougher evergreens have needles or scale-like foliage that are covered with a waxy coating which

protects during the severe winter cold. Isn't nature awe-inspiring in its ability to adapt its living creatures to the conditions of the seasonal changes?