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Late Persisting Leaves on Deciduous Trees. Every autumn and winter we have such questions to answer as, "What species of New England Oak is it that holds its foliage into the late autumn or winter?" Other queries are propounded along similar lines. In regard to persisting dead leaves on deciduous Oaks it may be said that the phenomenon is not peculiar to any one species in this part of the country. It is a very variable feature in trees of the same species, depending on ecological conditions or environment, and in the cases of some introduced species upon inherited peculiarities acquired or developed in their native habitat.

This question of leaf persistence among deciduous trees is often considered by the planter or landscape architect in the selection of species for certain types of effective plantations. Of all the trees which call forth inquiries concerning these peculiarities of the leaves the Oaks are probably most often referred to. This is especially so of the White Oak (*Quercus alba*) but is applicable also to other species. On such trees the leaves persist in a dry and withered state far into the winter but it may be noticed that the leaves on the upper parts of the trees have dropped while those on the middle or lower branches may still persist. The shedding of leaves is naturally affected by their maturation and by the formation of the little cork cells which separate twigs from leaves as the latter ripen. On some trees it would appear that the leaves on the uppermost branches, having most light and air, attain more perfect maturity before being finally killed by freezing weather. They are, therefore, in good condition for their normal shedding. On those trees where growth has been prolonged because of some unusual local factor the leaves may not have completed their preparation for shedding before they are frozen and in such cases the withered foliage may persist long beyond the normal time for falling. Light frosts hasten the final process where leaves are practically matured, so that after such frosts we witness an un-

usual heavy fall of foliage, but where the leaves on lower branches persist beyond the normal falling of those ripened and sun-matured on the upper limbs it may be due to the fact that these shaded leaves were still green and unprepared for winter when overtaken by decidedly freezing temperatures. They may then persist through the winter months, the petioles being broken by wind action, leaving a ragged remnant on the twig instead of the smooth scars left in the process of normal ripening.

In general it may be said that young trees, developing vigorous growth, show a tendency to hold leaves longer than older trees of the same species. Very often it will be noted that trees of any particular kind when brought north from milder or southern climates, where the growing season is longer, show a tendency to prolong their growth, without ripening, into freezing weather. Trees from the mild, moist regions of Europe, where the growing season is long, may show a tendency to longer leaf persistence than northern North American species of the same genus. The English Elm (*Ulmus procera*, sometimes called *U. campestris*) and the so-called English Hawthorn (*Crataegus oxyacantha*) and its forms may be cited as examples. Sometimes the persistence of leaves is an indication of trouble or disease. A single branch with persisting dried leaves among branches normally healthy and early deciduous may indicate death or disease caused by some boring insect or other agency, causing the leaves to die before properly maturing and, therefore, to persist out of season. A broken or partly broken branch may show the same effect.

Protection of Tender Shrubs and Small Trees. There are many shrubs or small trees grown for ornament farther south which may also be grown as far north as Massachusetts, or even farther north, provided they receive special consideration and care. This has long been popularly recognized in the case of Roses grown in our gardens, some of which are decidedly tender and receive special attention when the garden is prepared for winter. The lack of hardiness in shrubs and trees brought from warm temperate regions is commonly due to their long-season growing habits, the wood not having a chance to ripen fully before being subjected to freezing weather. There are some so-called half hardy species of trees which may be grown in this climate if they are developed for two or three years before ultimately being planted out. When very young they appear to be more tender than when older. In treating such plants they should have first consideration as to location. This is quite as important as any protective covering in later years. The shelter of a wall is often decidedly advantageous, but this should be supplemented by a warm, well drained soil and a spot generally elevated rather than depressed. Low ground, where there is not only poor soil drainage but also poor air drainage, should not be chosen in selecting locations for tender or half hardy plants. In severe weather in winter the cold settles in the low pockets or depressions of the land so that it is really much more



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