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**LEAF EXPANSION OF TREES AND SHRUBS IN 1904.**

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During the past spring an accurate record was kept of the time of appearance, at Columbus, of the leaves of our common native and cultivated woody plants. The results are given below. The spring was unusually cold and late so that the actual time of leafing is not to be taken as representing the usual date for this locality.

The trees were listed when the leaves began to break through the bud and became definitely distinguishable as leaves. In some species the leaf is nearly expanded in a day or two after this and the tree looks quite leafy, while in others the development is very slow. There is also much difference in individuals, even those standing side by side and apparently with the same environment. *Ulmus americana* showed bursting buds on April 30 in isolated individuals; but the last trees were just coming out on

the 14th of May. A period of fifteen days, therefore, intervened between the leafing of the first individuals and the last. In such cases the period marked was the time when the leaves were appearing rather commonly rather than the first individuals. The willows showed interesting peculiarities. Some species appear very early, others quite late. If this is the usual course, the time of leafing might be of some value in determining species in early spring. Some of the maples and buckeyes are the most sudden in the unfolding of their leaves. The catalpas, coffee-bean, fringe-tree, and hop-tree develop the foliage very slowly. It was also observed that many trees begin to leaf at the top.

*April 1.*

*Syringa vulgaris* L.

*April 2.*

*Larix laricina* (Du R.) Koch., *L. decidua* Mill., *Salix babylonica* L.

*April 5.*

*Salix fragilis* L., *Lonicera tartarica* L., *L. korolkowi* Stapf.

*April 7.*

*Salix alba* L.

*April 8.*

*Prunus serotina* Ehrh.

*April 11.*

*Euonymus atropurpureus* Jacq., *E. europæus* L., *Ribes aureum* Pursh., *Cydonia japonica* Pers., *Sambucus canadensis* L.

*April 14.*

*Euonymus obovatus* Nutt., *Spiraea hypericifolia* DC.

*April 16.*

*Rubus occidentalis* L., *Prunus virginiana* L.

*April 18.*

*Aesculus glabra* Willd.

*April 21.*

*Philadelphus coronarius* L.

*April 23.*

*Betula alba* L., *Sorbus aucuparia* L., *Symphoricarpos racemosus* Mx., *S. symphoricarpos* (L.) MacM.

*April 25.*

*Staphylea trifoliata* L., *Acer negundo* L., *Cornus baileyi* Coult. and Ev., *Ligustrum vulgare* L., *Viburnum opulus* L.

*April 26.*

*Berberis vulgaris* L., *Rosa rubiginosa* L., *Malus malus* (L.) Britt., *Prunus japonica* Thunb., *Cornus alba* L.

April 28.

*Pyrus communis* L., *Acer saccharinum* L.

April 29.

*Betula papyrifera* Marsh., *Opulaster opulifolius* (L.) Ktz., *Prunus cerasus* L., *Amygdalus persica* L., *Syringa villosa* Vahl., *Viburnum prunifolium* L.

April 30.

*Ostrya virginiana* (Mill.) Willd., *Cydonia cydonia* (L.), *Hypericum prolificum* L., *Acer rubrum* L., *Syringa persica* L.

May 2.

*Populus balsamifera* L., *P. tremuloides* Mx., *Carpinus caroliniana* Walt., *Hydrangea arborescens* L., *Amelanchier canadensis* (L.) Medic., *Parthenocissus quinquefolia* (L.) Plan., *P. tricuspidata* (Sieb. and Zucc.) Plan., *Acer platanoides* L., *Fraxinus americana* L., *Cornus alternifolia* L.

May 3.

*Picea excelsa* Link., *Juniperus communis* L., *Taxus baccata* L., *Populus alba* L., *P. dilatata* Ait., *Salix amygdaloides* Anders., *Quercus palustris* Du Roi., *Xanthoxylum americanum* Mill., *Cladrastis lutea* (Mx.) Koch., *Aesculus hippocastanum* L.

May 4.

*Pinus laricio* Poir., *Populus deltoides* Marsh., *P. grandidentata* Mx., *Ulmus americana* L., *Liriodendron tulipifera* L., *Menispermum canadensis* L., *Acer saccharum* Marsh., *Fraxinus quadrangulata* Mx.

May 5.

*Hicoria minima* (Marsh.) Britt., *Celtis occidentalis* L., *Hamamelis virginiana* L., *Prunus americana* Marsh., *Cratægus coccinea* L., *Gleditsia triacanthos* L., *Cotinus cotinus* (L.), *Celastrus scandens* L., *Vitis labrusca* L., *V. vulpina* L., *Acer nigrum* Mx., *Fraxinus lanceolata* Bork.

May 6.

*Pinus rigida* Mill., *P. silvestris* L., *Juglans nigra* L., *Hicoria alba* (L.) Britt., *Castanea dentata* (Marsh.) Bork., *Quercus rubra* L., *Q. macrocarpa* Mx., *Q. acuminata* (Mx.) Houda., *Ulmus racemosa* Thom., *Platanus occidentalis* L., *Cratægus pruinosa* (Wendl.) Bead., *Robinia pseudacacia* L., *Rhus radicans* L., *Acer pseudo-platanus* L., *Rhamnus cathartica* L., *Tilia americana* L., *Tecoma radicans* (L.) D C., *Cornus florida* L.

May 7.

*Ginkgo biloba* L., *Pinus strobus* L., *Abies balsamea* (L.) Mill., *Tsuga canadensis* (L.) Carr., *Taxodium distichum* (L.) Rich., *Thuja occidentalis* L., *Juniperus virginiana* L., *Salix nigra* Marsh., *Juglans cinerea* L., *Hicoria ovata* (Mill.) Britt., *H. laciniata* (Mx.) Sarg., *Fagus americana* Sw., *Quercus coccinea* Wang., *Q. velutina* Lam., *Q. alba* L., *Q. platanoides* (Lam.) Sudw., *Liquidambar styraciflua* L., *Amorpha fruticosa* L., *Rhus aromatica* Ait., *Ailanthus glandulosa* Desf., *Acer campestre* L., *Ampelopsis cordata* Mx.

*May 8.*

*Smilax hispida* Muhl., *Ulmus fulva* Mx., *Morus alba* L., *Toxylon pomiferum* Raf., *Gymnocladus dioica* (L.) Koch.

*May 9.*

*Ulmus campestris* Sm., *Sassafras sassafras* (L.) Karst., *Diospyros virginiana* L., *Fraxinus nigra* Marsh.

*May 10.*

*Quercus imbricaria* Mx., *Rhus glabra* L., *Catalpa catalpa* (L.) Karst., *C. speciosa* Ward.

*May 11.*

*Morus rubra* L., *Asimina triloba* (L.) Dun., *Tamarix galica* L.

*May 12.*

*Magnolia acuminata* L., *Nyssa sylvatica* Marsh.

*May 13.*

*Celtis mississippiensis* Bosc.

*May 14.*

*Ptelea trifoliata* L.

*May 16.*

*Chionanthus virginica* L.

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