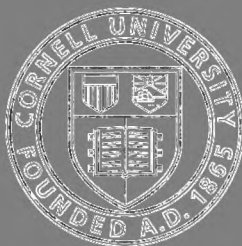


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Phenological notes for 1892-3.



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PHENOLOGICAL NOTES AT THE MISSOURI BOTANICAL  
GARDEN, FOR 1892 AND 1893.

BY J. C. WHITTEN.

During the last two years phenological observations have been made upon various plants in the arboretum. The notes on herbaceous plants and such woody plants as grow in the bog, were made in 1892 by Thomas Doss. His notes for 1893, on the same plants, were unfortunately lost. Notes upon the other woody plants were made in 1892 by F. W. Dewart and in 1893 by the writer, whom the Director of the Garden has requested to prepare these notes for publication.

Students of natural history have, from time to time, published observations upon the date of leafing, flowering and fruiting of plants, have cited the relation of climate to plant growth, and touched upon the importance of this study to the practical cultivator. Among American publications upon the subject may be mentioned those by Britton, in the Bulletin of the Torrey Botanical Club, vi, 211 and 235; Henry, in the Report of the Board of Regents of the University of Wisconsin, 1891, p. 35; Trelease, in the Report of the Agricultural Experiment Station of the University of Wisconsin for 1883, p. 56, 1884, p. 59; Halsted, in Iowa Agricultural College Bulletin, 1886, p. 43; and Pammel in Bulletin of the Torrey Botanical Club, xix, 375. An article on "the philosophy of the flower seasons," by Henry L. Clarke, appeared in The American Naturalist of September, 1893.

These observations are of value from several stand-points. The time of leafing, flowering and fruiting of a species

largely governs its position and importance in planting. In selecting specimens it is desirable to know the date that each blooms, so that the different species of the collection, flowering at different times, may represent the longest possible period of bloom.

Very early bloomers like Forsythia, autumn flowering sorts, like Witch Hazel and all those that flower when there is little else to gladden the eye, are always sought. For landscape effect, the time of leafing and fruiting is of equal importance. The Virginia Creeper, while it is an excellent summer cover, is perhaps most appreciated for a short time in autumn, when it assumes that crimson tinge, quite in keeping with the season, after many of the deciduous sorts have shed their leaves. The fact that some sorts carry their fruit into the winter months adds much to their value and helps to determine their relative positions in a planting. The ripening rose hips, turning from green to golden, red and brown, the fruits of *Euonymus* or Burning Bush, the Christmas Holly, with its bright red berries, rich foliage and rugged twigs, each have a winter beauty that is best brought out after a careful study of their phenological characteristics.

The different stages of the season's growth of trees and shrubs indicate to the meteorologist conditions of temperature that cannot be definitely arrived at by any mechanical method. While the thermometer may register the actual temperature of the atmosphere or soil at any given time, it does not, by any means, measure the sum total of heat that has been received, during a given period, as does a certain stage in the development of buds or leaves. This fact is taken advantage of by the cultivator. In planting for a succession of vegetables, for example, a difference of four weeks, in sowing the seed, may result in a difference of only one or two weeks in maturing the plants for the table. The time to plant, then, may be indicated by the rapidity of growth of trees and shrubs.

The phenological characteristics of plants also aid in

determining species. Most species of the wild grape, for example, have periods of flowering that are relatively quite definite. This is an aid to the botanist in classifying specimens that are otherwise variable.

In the following tables the herbaceous and woody plants are listed separately for more convenient reference to each class. The nomenclature of North American species conforms to Patterson's Check List of North American Plants, which is easily accessible, while its nomenclature is universally known.

To facilitate comparison with the phenology of plants in Europe, an asterisk is placed after species included in the list of the Royal Meteorological Society of Great Britain,\* and a dagger is placed after species included in the list of the Botanischer Verein der Provinz Brandenburg.† In the notes on woody plants, (1) indicates that at the time of writing (Jan. 25, 1894) the leaves have not entirely fallen, and (2) indicates that some fruit remains on the plant through the winter.

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\* Cf. list of Rev. T. S. Preston, 1883, etc.

† Magnus, Tabellarische Zusammenstellung phaenologischer Beobachtungen, 1893.

## HERBACEOUS PLANTS, 1892.

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
Actaea alba.....	Apr. 23	Apr. 2	July 12	May 16	Aug. 13	Oct. 5
"    spicata,						
var. rubra	" 21	May 16	May 22	June 20	July 18	" 30
Ageratum						
Mexicanum	May 10	Aug. 25	Sept. 2	Sept. 2		" 11
Agropyrum						
dasystachyum	" 26	June 10	June 20	June 29	" 12	" 23
Alisma Plantago...	" 23	July 20	Aug. 1	Aug. 29	Sept. 17	Nov. 6
Allium reticulatum.	" 17	June 11	June 22	June 30	July 7	July 30
"    cernuum...	June 7	July 21	Aug. 12	Aug. 3	Aug. 20	Sept. 17
"    platycaule..	May 1	May 6	May 29	June 1	June 9	Aug. 23
Amianthium						
Muscaetoxicum		" 28	June 15	" 19	July 20	Sept. 29
Ambrosia trifida...	" 2	Aug. 24	Aug. 31	Sept. 7	Sept. 18	" 29
Anemone acuta....	" 10	Apr. 2	May 15	May 2	May 26	Oct. 25
"    dichotoma		May 27	July 10	June 29	Sept. 9	" 17
"    Hepatica ..	" 12	Apr. 4	May 18	May 3	May 27	" 1
"    Virginiana.	June 2	June 22	July 11	July 13	Aug. 11	" 13
Anemonella						
thalictroides	May 3	Apr. 18	May 2	May 16	May 27	Sept. 11
Angelica						
atropurpurea	" 16	June 23	July 11	July 19	Aug. 30	" 15
Antennaria						
plantaginifolia	June 18	July 24	" 31	Aug. 14	" 14	Oct. 2
Aquilegia caerulea.	May 8	May 15	June 7	June 4	July 5	
"    Canadensis	" 6	Apr. 27	" 4	" 26	" 5	" 19
"    formosa ..	" 7	May 14	" 9	" 12	" 2	Nov. 28
Aralia nudicaulis..	" 10	" 16	May 30	" 13	" 17	Oct. 2
"    quinquefolia	" 15	June 16	June 29	" 26	" 9	Aug. 15
"    racemosa...	Apr. 23	" 18	" 29	July 9	" 23	Oct. 15
Arenaria Michauxii	May 10	May 25	" 15	June 24	" 29	Sept. 28
"    stricta ...	Apr. 23	" 24	" 13	" 21	" 23	Oct. 9
Arisaema						
triphillum		Apr. 29	June 10	June 7	July 2	Aug. 29
Asarum arifolium..	May 1	May 6	" 2	May 19	" 18	Nov. 30
"    Canadense.	" 1	" 5	May 25	" 15	June 7	" 15
Asclepias incarnata	" 30	June 24	July 26	July 28	Aug. 18	Oct. 27
"    quadrifolia	" 12	May 28	June 2	June 19	June 19	Aug. 19
"    tuberosa...	" 10	July 11	July 19	Aug. 14	Aug. 30	
Bidens						
chrysanthemoides	June 5	June 27	" 7	July 16	July 29	Sept. 26
Blephilia ciliata ...	May 17	" 15	June 23	" 8	" 13	Oct. 5
Boehmeria						
cylindrica	June 1	July 15	Aug. 10	Aug. 19	Sept. 1	" 29
Bouteloua						
racemosa	" 11	June 25	July 1	July 20	Aug. 19	Nov. 9
Brachyelytrum						
aristatum, var.						
Engelmanni	" 7	" 25	" 17	" 30	" 25	" 7

HERBACEOUS PLANTS, 1892 — *Continued.*

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
<i>Brasenia peltata</i> ...	Apr. 25					
<i>Brevoortia coccinea</i>	May 15	June 6	June 16	June 14	June 27	
<i>Brodiaea capitata</i> ...	" 20	" 9	" 17	" 19	" 29	
" <i>congesta</i> ...	" 14	" 6	" 19	" 19	" 30	July 25
" <i>grandiflora</i>	June 12	" 23	" 27	July 5	July 9	" 16
" <i>Howellii</i> ...	May 12	May 3		May 14		May 5
" <i>ixioides</i> ...	" 1	June 8	" 20	June 15	June 30	July 25
" <i>multiflora</i> ...	" 12	" 1	" 30	" 12	July 24	" 18
<i>Bromus secalinus</i> ..		May 23	" 19	" 14	" 13	Nov. 9
<i>Brunella vulgaris</i> ..	" 11	June 14	July 2	Aug. 10	Aug. 30	Oct. 3
<i>Cacalia tuberosa</i> ...	" 7	" 25	" 29	July 9	" 20	Sept. 17
<i>Calandrinia</i>						
" <i>compressa</i> ..	" 20	" 1	June 20	June 15	July 2	July 16
" <i>procumbens</i>	" 18	" 1	" 17	" 11	June 29	" 11
<i>Calla palustris</i> ....	" 2	May 4	" 23	" 20	July 18	Aug. 13
<i>Callirrhoe</i>						
" <i>involucrata</i>	June 1	June 18	" 26	July 8	" 20	Oct. 26
<i>Calochortus</i>						
" <i>caeruleus</i> ..	May 13	May 19	May 25	May 30	" 9	July 3
" <i>lilacinus</i> ..	" 18	" 25	June 3	June 8	" 11	Aug. 15
" <i>pulchellus</i>	" 15	" 25	" 15	" 2	" 2	" 9
<i>Caltha palustris</i> *..	" 10	Apr. 14	May 18	May 27	June 2	July 16
<i>Calypso borealis</i> ...	" 4	" 29	" 17	" 17		June 16
<i>Camassia esculenta</i>	" 1	May 7	" 16	" 20	May 30	Aug. 19
<i>Cannabis sativa</i> ....	" 2	" 16	June 28	June 9	Sept. 2	Oct. 29
<i>Carex grisea</i> .....	" 3	" 18	" 24	" 5	Aug. 29	Dec. 7
" <i>plantaginea</i> ..	" 11	" 20	" 5	" 2	June 30	Nov. 29
" <i>Shortiana</i> ...	" 10	" 14	May 24	May 28	July 25	" 19
" <i>tribuloides</i> , var. <i>cristata</i>	" 12	" 18	June 16	June 10	" 20	Dec. 6
<i>Caulophyllum</i>						
" <i>thalictroides</i>	Apr. 23					
<i>Chamaelirium</i>						
" <i>Carolinianum</i>	" 27					
<i>Chenopodium</i>						
" <i>opulifolium</i>	May 12	" 15	" 2	" 29	" 8	July 20
<i>Chionodoxa Luciliae</i>	" 3			Apr. 9	May 14	May 19
<i>Cimicifuga</i>						
" <i>racemosa</i>	" 4					
<i>Claytonia</i>						
" <i>Caroliniana</i>	" 1	Apr. 4	May 2	May 14	" 9	Aug. 10
" <i>parviflora</i> ..	" 12	May 26	June 9	June 29	July 2	Oct. 27
" <i>Virginiana</i>	" 2	Apr. 18	May 11	May 9	May 18	July 11
<i>Clintonia borealis</i> ..	" 1	May 3	" 19	June 11	June 23	Sept. 20
<i>Conioselinum</i>						
" <i>Canadense</i>	" 15	" 24	June 22	" 14	Aug. 11	Oct. 27
<i>Crepis intermedia</i> ..	June 4	June 22	Aug. 10	July 19	Sept. 6	" 1
<i>Cynoglossum</i>						
" <i>officinale</i>	May 10	May 18	June 3	Aug. 10	Sept. 3	Oct. 15
<i>Cypripedium acaule</i>	" 2	" 5	May 31	May 21		Aug. 19
" <i>arietinum</i>	Apr. 25	" 3	" 12	" 14	May 18	" 27
" <i>candidum</i>	May 5					

HERBACEOUS PLANTS, 1892 — *Continued.*

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
Cypripedium						
" pubescens	Apr. 25	May 2	May 12	May 17	May 30	Aug. 30
" spectabile	May 12	" 20	" 28	June 7	June 20	" 29
Darlingtonia						
Californica	July 2	" 6	June 21	June 10	July 2	Oct. 14
Datura inermis....	May 18	June 10	Aug. 8	July 7	Aug. 30	Sept. 26
Decodon						
verticillatus	" 12	Aug. 20	" 31	Sept. 12	Sept. 12	Nov. 3
Delphinium						
tricorne	" 1	May 2	June 2	May 25	June 18	June 28
Dentaria laciniata..	Apr. 9	" 22	May 1	" 30	" 3	Sept. 12
Diclytra cucullaria.	May 4	Apr. 21	" 6	" 1	May 6	June 4
" eximia ...	" 16	" 27	June 1	Oct. 6	Oct. 27	Nov. 19
" formosa ..	" 1	May 2	" 1	Sept. 29	" 9	
Dodecatheon						
ellipticum.	Apr. 20	" 7	" 3	May 21	July 14	Aug. 12
" Hendersoni	" 22	" 3	" 12	" 18	" 13	" 9
" Meadia....	" 20	" 5	" 15	" 31	" 8	" 1
Epigaea repens....	May 3	Apr. 23	" 15	" 15	June 17	Nov. 9
Epilobium alpinum	June 1	June 8	" 14	June 17	" 29	July 17
" alsinaefolium	May 16	" 15	" 23	" 30	July 13	Aug. 16
Erodium						
Stephanianum	" 13	May 17	" 19	May 28	" 21	Sept. 9
Erythronium						
grandiflorum	" 2	Apr. 1		Apr. 16		
Eupatorium						
ageratoides .	" 18	Aug. 26	Sept. 12	Sept. 30	Oct. 9	Oct. 22
" sessilifolium	" 13	" 25	" 11			
Euphorbia corollata	" 15					
" Darlingtonii	Apr. 24	May 12		June 29	July 6	Nov. 7
Fagopyrum						
Tataricum	May 12	" 23	June 7	" 19	" 18	Oct. 17
Fragaria vesca†....	" 1	" 4		May 19		June 5
Fritillaria						
parviflora	" 1	" 3		" 13		May 18
" pudica...	" 1	Apr. 1		Apr. 15		" 15
Gentiana Andrewsii	" 26	Aug. 30	Sept. 20	Sept. 20	Oct. 9	Oct. 28
" linearis ..	" 26	Sept. 5		" 20		" 28
Goodyera repens...	" 18	July 6	July 13	Aug. 4	Aug. 11	" 29
Habenaria dilatata.	Apr. 25	May 30	May 29	June 12	July 30	Aug. 20
" hyperborea	" 25	" 20	June 5	" 10	" 1	Sept. 1
" psycodes ..	" 25	June 17	" 29	July 11	" 27	Aug. 30
Helianthemum						
grandiflorum	June 5	July 9		Aug. 5		
Hibiscus militaris..	May 18	Aug. 4	Aug. 18	Aug. 17	Sept 30	Oct. 27
" Moscheutos	" 18	July 12	July 22	" 16	Aug. 31	Sept. 15
Hieraceum						
aurantiacum	" 13	Aug. 5	Aug. 16	" 15	Sept. 12	" 17
Houstonia caerulea	" 18	Apr. 18	May 9	June 8	June 20	" 27
Hydrophyllum						
Canadense	" 6	June 9	June 27	" 20	July 12	Nov. 13
" Virginianum		May 15	" 7	May 27	June 29	Dec. 2



HERBACEOUS PLANTS, 1892 — *Continued.*

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
<i>Hymenocallis</i>						
<i>occidentalis</i>	May 18	June 18	July 6	June 22	July 28	Oct. 3
<i>Hypericum Ascyron</i>	Apr. 26	" 30	" 13	July 29	Aug. 11	Nov. 5
" <i>perforatum</i>	May 30	" 25	" 22	" 31	" 16	Oct. 11
<i>Hypoxis erecta</i> ....	" 3	May 6	June 28	" 10	" 19	Sept. 20
<i>Iberis Fruiti</i> .....	June 14	July 18	July 30	Aug. 7	" 16	Aug. 29
<i>Iris cristata</i> .....	May 1	May 6	May 18	May 15	June 5	Sept. 29
" <i>hexagona</i> .....	Apr. 10	" 15	"	" 30	" 27	" 11
" <i>versicolor</i> ....	May 15	" 24	Aug. 6	June 15	Aug. 30	Nov. 4
<i>Jeffersonia diphylla</i>	Apr. 25					
<i>Jussiaea repens</i> ....	June 2	June 27	July 30	Aug. 5	" 29	Oct. 21
<i>Lilium Canadense</i> ..	May 12	July 11	Aug. 6	" 2	" 20	Aug. 28
" <i>var. flavum</i> ....	" 11	" 5	July 25	July 29	" 16	" 30
" <i>Carolinianum</i>	" 25	Aug. 18	Aug. 23	Aug. 27	Sept. 9	Oct. 1
" <i>Humboldtii</i> ..	" 9	June 29	July 13	July 12	Aug. 2	Aug. 29
" <i>pardalinum</i> ..	" 10	July 2	" 10	" 18	" 9	" 27
" <i>parvum</i> .....	" 13	June 2	June 19	June 15	July 29	Oct. 5
" <i>superbum</i> ...	" 11	July 14	Aug. 12	July 23	Aug. 28	Sept. 2
" <i>Washingtonianum</i>	" 12	June 17	June 26	June 28	July 8	July 17
<i>Lithospermum</i>						
<i>canescens</i>	" 12	May 23	" 11	" 31	" 29	Sept. 5
<i>Lobelia siphilitica</i> .	" 23	Aug. 8	Sept. 2	Aug. 29	Oct. 10	Oct. 30
<i>Lophanthus</i>						
<i>nepetoides</i>	" 12	" 17	"	" 31	" 1	" 5
<i>Lupinus perennis</i> ..	" 12	May 18	June 3	May 30	June 30	Sept. 7
<i>Melilotus alba</i> .....	" 10	June 16	July 18	July 7	Aug. 10	Oct. 29
<i>Mertensia Virginica</i>	" 12	Apr. 18	May 11	May 7	May 20	May 31
<i>Mesembryanthemum pinnatifidum</i>	" 20	June 1	June 15	June 13	June 25	Aug. 7
<i>Mimulus ringens</i> ...	Apr. 23	" 24	July 7	July 18	Aug. 3	Oct. 7
<i>Mitella diphylla</i> ...	May 8	Apr. 29	May 12	May 14	May 25	June 11
<i>Monarda didyma</i> ...	June 4	June 30	July 15	July 19	Aug. 17	Oct. 26
<i>Muhlenbergia</i>						
<i>Mexicana</i>	" 16	" 25	" 5	Aug. 29	" 11	Nov. 14
<i>Nepeta Glechoma</i> *.	May 2	May 3	May 20	June 15	July 12	Oct. 14
<i>Nymphaea odorata</i> ..	Apr. 23	June 17	July 1	Aug. 29	Sept. 13	" 29
" <i>var. minor</i>	May 1	July 6	" 9	" 31	" 11	" 15
<i>Oakesia sessilifolia</i>	Apr. 27	May 3	June 25	May 10	July 5	" 20
<i>Oenothera biennis</i> ..	June 2	July 28	Aug. 5	Sept. 28	Oct. 9	Nov. 1
<i>Orchis spectabilis</i> ..	May 3	May 6	May 16	May 26	May 31	July 30
<i>Osmorrhiza</i>						
<i>Claytonii</i>	May 4	May 13	"	May 23	"	"
<i>Oxalis stricta</i> .....	" 13	June 8	June 29	"	July 9	Oct. 28
" <i>Suksdorfii</i> ...	" 15	" 8	July 20	Aug. 12	Aug. 2	Aug. 19
" <i>violacea</i> ....	" 3	" 22	" 17	" 20	Sept. 14	Oct. 12
<i>Panicum latifolium</i> ..	" 20	" 2	" 24	June 21	Aug. 14	Nov. 20
<i>Papaver Alpinum</i> ..	June 16	" 24	"	July 24	July 26	Aug. 15
<i>Penstemon</i>						
<i>laevigatus</i>	" 1	" 22	" 15	" 13	Aug. 12	Nov. 9
" <i>ovatus</i> ....	May 20	July 11	"	" 28	" 15	" 15
<i>Phlox divaricata</i> ...	" 1	May 6	June 1	May 21	June 20	" 17

HERBACEOUS PLANTS, 1892 — *Continued.*

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
Phlox pilosa.....	May 7	May 15	June 4	June 12	July 6	Nov. 29
Phryma						
Leptostachya	" 30	July 2	July 23	Aug. 1	Aug. 19	Oct. 1
Phytolacca						
decandra		June 24	June 2	" 24		Sept. 28
Pimpinella						
integerrima	" 1	May 3	" 5	June 1	June 29	
Pinguicula vulgaris	" 1	" 11	May 21	May 29	" 24	July 2
Plantago						
lanceolata*	" 13	June 15	July 13	July 3	Aug. 12	Oct. 27
Poa compressa....	" 28	" 3	June 18	June 30	July 19	" 29
Polemonium						
caeruleum	" 7	May 2	May 26	May 18	June 9	Sept. 25
reptans...	" 16	" 3	June 6	" 26	" 28	
Polygonum						
Pennsylvanicum	" 12	" 25	July 27	" 31	Sept. 29	Oct. 17
Polymnia						
Canadensis	" 28	June 30	" 21	Aug. 2	Aug. 29	" 30
Pontederia cordata.	June 28	July 12	Aug. 10	" 11	Sept. 7	" 22
Portulaca rostellata	" 9	June 24	July 3	July 22	Aug. 13	Sept. 26
Potentilla argentea	May 15	May 30	June 14	June 20	July 8	Aug. 16
Primula						
Mistassinica	" 1	Apr. 29	May 27	May 18	June 24	Sept. 1
Ranunculus acris*.	" 7	May 15	July 1	July 15	Aug. 30	Nov. 29
"  sceleratus	" 27	July 11	" 16	" 24	" 12	Aug. 27
Rhexia Virginica...	" 28	" 18	Aug. 6	Aug. 26	" 30	Sept. 15
Ruellia ciliosa.....	" 23	" 21	" 19	" 14	Sept. 18	Nov. 13
Rumex Acetosa....	" 25	June 2	June 17	June 19	July 5	" 3
"  altissimus....	" 14	May 19	May 30	" 12	June 29	Sept. 27
"  crispus.....	" 15	" 25	July 16	" 10	Aug. 20	" 9
"  dentatus....	" 14	June 3	June 27	" 19	July 21	Oct. 29
"  bucephalo-						
phorus	" 15	May 23	" 7	" 13	Aug. 12	Sept. 17
"  glomeratus...	" 9	" 20	" 10	" 13	July 20	Oct. 2
"  hastatus...	June 23	July 20	Aug. 4	Aug. 20	Aug. 31	Aug. 10
"  occidentalis...	May 16	May 10	May 18	May 29	June 29	Sept. 28
"  persicarioides	June 12	July 19	July 31	Aug. 16	Aug. 25	Oct. 17
"  roseus.....	May 9	May 4	June 19	June 12	July 5	July 18
"  salicifolius...	" 17	" 20	" 2	" 10	June 28	Oct. 2
Saponaria						
officinalis	Apr. 23	June 20		Aug. 1	Aug. 16	Nov. 3
"  Vaccaria.	May 12	" 9	June 20	June 29	July 13	July 13
Sanguinaria						
Canadensis	" 10	Apr. 4		Apr. 20		Aug. 5
Sarracenia flava ...		May 7		May 20	June 12	
"  purpurea	" 2	" 24	July 12	June 12	July 4	Dec. 2
"  rubra....	" 17	June 7	" 5	" 19		
Saxifraga						
Virginensis		Apr. 18	May 10	May 10		Aug. 17
Scirpus lineatus...	" 14	May 29	June 30	June 13	" 11	Oct. 29
Scorpiurus						
vermiculata	" 7	" 12	May 16	May 30	May 30	Sept. 17

HERBACEOUS PLANTS, 1892 — *Continued.*

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
<i>Scutellaria</i>						
<i>canescens</i>	June 7	July 19	July 30	Aug. 20	Aug. 26	Oct. 27
" <i>versicolor</i>	May 12	June 21	" 12	July 16	" 30	" 6
<i>Sedum Nevii</i> .....	" 5	" 12	June 17	June 2	July 13	
<i>Silene</i>						
<i>Pennsylvanica</i>	Apr. 20	May 2	May 23	May 20	June 2	" 30
" <i>Virginica</i> .....	" 20	" 9	" 19	" 25	May 31	" 26
<i>Sisyrinchium</i>						
<i>anceps</i>	May 18	" 25	June 8			
<i>Smilacina</i>						
<i>amplexicaulis</i>		Apr. 5		Apr. 10		Aug. 17
" <i>racemosa</i> ....	Apr. 20	" 4	May 11	May 7		" 29
" <i>stellata</i> .....	" 23	May 4		" 20		Oct. 31
<i>Smilax glauca</i> .....	" 29					
" <i>hispida</i> ....	" 29					
<i>Solea concolor</i> ....	" 23	June 1	July 2	July 29	Aug. 20	Oct. 28
<i>Sorghum halepense</i>	May 6	Aug. 11	Aug. 29	Aug. 30	Oct. 12	Nov. 13
<i>Steironema</i>						
<i>lanceolatum</i>	" 30	July 5	July 23	July 19	Aug. 27	Oct. 11
<i>Streptopus</i>						
<i>amplexifolius</i>	Apr. 27	May 6	June 20	May 18	July 2	Sept. 6
" <i>roseus</i> .....	" 27	" 4	May 12	" 15	May 23	Aug. 30
<i>Symplocarpus</i>						
<i>foetidus</i>	" 23	Mar. 22	Apr. 1	Mar. 28	Apr. 12	Nov. 9
<i>Thalictrum dioicum</i>	May 6	Apr. 21	May 13	May 4	May 28	Oct. 29
" <i>polygamum</i>	" 7	June 16	June 26	July 12	Aug. 20	" 20
<i>Thaspium aureum</i> ..	" 13	May 25	" 30	June 14	June 2	Nov. 13
<i>Trillium cernuum</i> ..	Apr. 27					
" <i>erectum</i> .....	May 5	Apr. 4	May 26	May 2		June 8
" <i>erythrocarpum</i>	" 2	May 7	July 10	" 20	Aug. 13	Aug. 22
" <i>grandiflorum</i> ..	" 2	Apr. 17	June 20	" 10	July 12	Oct. 1
" <i>recurvatum</i> ...	" 8	" 22	May 10	" 8	May 18	
" <i>rivale</i> .....	" 2	" 4		Apr. 9		May 23
" <i>stylosum</i> .....	Apr. 27	May 7		May 18		Sept. 11
<i>Triosteum</i>						
<i>perfoliatum</i>	May 11	May 30	June 12	June 15	June 22	Oct. 13
<i>Tripsacum</i>						
<i>dactyloides</i>	June 7	June 23	Aug. 19	July 18	Sept. 30	Nov. 21
<i>Uvularia</i>						
<i>grandiflora</i>	May 3	Apr. 27	June 3	May 2	July 6	Sept. 20
" <i>perfoliata</i> ..	Apr. 29					
<i>Vancouveria</i>						
<i>hexandra</i>	" 23	May 11	May 19	" 30	June 13	" 25
<i>Veratrum</i>						
<i>Californicum</i>	May 20					
<i>Verbesina</i>						
<i>helianthoides</i>	" 26	June 21	July 25	July 24	Aug. 26	
<i>Veronica Virginica</i>	" 6	July 5	" 29	" 31	" 22	Nov. 20
<i>Viola blanda</i> .....	" 10	Apr. 23	May 28	May 17	June 26	
" <i>Canadensis</i> ..	Apr. 18	May 1	" 31	" 25	Aug. 11	Oct. 31
" <i>pedata</i> .....	May 4	" 3	" 12	" 28	June 4	
"    " <i>var. bicolor</i>	" 8	" 12	" 19	" 23		

HERBACEOUS PLANTS, 1892 — *Concluded.*

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
<i>Viola pubescens</i> ...		May 9	June 23		Aug. 9	Sept. 20
“ <i>rostrata</i> ....	May 2	Apr. 28	“ 24	May 15	Sept. 10	
“ <i>rotundifolia</i> ..	Apr. 23	May 9	May 19	June 29	July 13	Aug. 30
“ <i>striata</i> .....	May 12	Apr. 23	June 3	May 19	June 30	Nov. 14
<i>Zizia aurea</i> .....		May 6	July 12	June 15	Aug. 22	
“ <i>cordata</i> .....	“ 12	“ 23	“ 17	“ 10	Sept. 11	Oct. 29

## WOODY PLANTS, 1892.

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
<i>Acer dasycarpum</i> ..	Apr. 16	Mar. 10	Apr. 27			
“ <i>platanoides</i> †..	“ 20					
“ <i>rubrum</i> .....	“ 18	“ 31	“ 30			
“ <i>saccharinum</i> ..	“ 16	“ 10	“ 27			
“ <i>spicatum</i> ....	“ 28					
<i>Aesculus flava</i> ....	“ 22	May 2				
“ <i>glabra</i> .....	“ 20	Apr. 29				
“ <i>Hippo-</i> <i>castanum</i> *†	“ 24	May 12				
“ <i>macrostachya</i>	“ 20	June 25				
“ <i>rubicunda</i> ...	“ 12	“ 12				
<i>Ailanthus</i> <i>glandulosa</i>	May 3	“ 26				
<i>Alnus viridis</i> .....	Apr. 25					
<i>Amelanchier</i> <i>oligocarpa</i>	May 1	Apr. 30	May 15	May 4	May 29	
<i>Aralia nudicaulis</i> ..		May 16	May 30	June 13	July 17	Oct. 2
<i>Aristolochia</i> <i>Serpentaria</i>	May 4					
“ <i>Sipho</i> .....	“ 6					
<i>Betula lutea</i> .....	“ 5					
<i>Catalpa</i> <i>bignonioides</i>	“ 4	June 15				
<i>Cercis Canadensis</i> ..	“ 11	Apr. 24				
<i>Cladrastis tinctoria</i>	Apr. 19					
<i>Clematis Fremonti</i> ..	May 7					
“ <i>Virginiana</i>	“ 8					
<i>Cornus sericea</i> ....	Apr. 23					
<i>Dirca palustris</i> ....	May 5	Apr. 15		May 1		Aug. 10
<i>Euonymus</i> <i>atropurpureus</i>	Apr. 25					
<i>Gymnocladus</i> <i>Canadensis</i>	May 5					
<i>Hydrangea</i> <i>arborescens</i>	Apr. 25	June 19	June 30	July 27	July 27	Nov. 8

WOODY PLANTS, 1882 — *Continued.*

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
<i>Ilex verticillata</i> ...	Apr. 29					
<i>Lindera Benzoin</i> ...	" 25					
<i>Magnolia</i>						
<i>acuminata</i> ..	May 20	May 7				
<i>conspicua</i> ..	Apr. 30	Apr. 4				
<i>cordata</i> ....	May 2	May 7				
<i>Lenne</i> .....	Apr. 30	Apr. 17				
<i>macrophylla</i>	" 30	May 28				
<i>purpurea</i> ...	" 30	Apr. 17				
<i>speciosa</i> ....	May 2	" 22				
<i>stellata</i> ....	Apr. 22	" 4				
<i>tripetala</i> ...	" 29	May 26				
<i>Menispermum</i>						
<i>Canadense</i>	" 26	June 16	July 5	July 20	Aug. 9	Oct. 27
<i>Myrica Gale</i> .....	" 25	" 12	" 2	" 7	July 30	Nov. 3
<i>Philadelphus</i>						
<i>Lewisii</i>	May 12					
<i>Physocarpus</i>						
<i>opulifolius</i>	Apr. 25					
<i>Pinus Austriaca</i> ...	May 12	May 12				
<i>inops</i> .....	" 1	" 10				
<i>resinosa</i> ....	" 11	" 10				
<i>rigida</i> .....	" 9	" 9				
<i>sylvestris</i> †..	" 11	" 9				
<i>Populus alba</i> .....	Apr. 29	Apr. 6				
<i>grandidentata</i>		Mar. 30				
<i>monilifera</i> ...	" 22	" 31				
<i>nigra</i> var.						
<i>pyramidalis</i>		" 31				
<i>Pyrus arbutifolia</i> ..		May 7	" 15	May 30	Aug. 28	" 12
<i>Rhamnus alnifolia</i> ..	" 26	June 16	" 5	July 20	" 9	Oct. 27
<i>Rhododendron</i>						
<i>Catawbiense</i>	May 6	May 4		May 11		
<i>maximum</i> ...		" 13		" 21		
<i>Rhus aromatica</i> ....	Apr. 7	Apr. 11	May 12	" 1	June 2	
<i>glabra</i> .....	May 3	June 24		July 14		Nov. 10
<i>typhina</i> .....	" 10					
<i>Ribes Cynosbati</i> ...	Apr. 26					
<i>lacustre</i> ....	" 29					
<i>prostratum</i> ..	May 2	May 6	June 7	May 10	July 22	Sept. 12
<i>rubrum</i> †....	Apr. 25					
<i>Robinia hispida</i> ....	May 2	" 16				
<i>Pseudacacia</i> †	Apr. 28	" 13				
<i>viscosa</i> .....	May 4	" 18				
<i>Rosa blanda</i> .....	Apr. 25	" 24	Aug. 29	June 7	Sept. 19	Oct. 4
<i>pisocarpa</i> ....	" 25					
<i>setigera</i> ....	" 23					
<i>Rubus occidentalis</i> ..	" 30	" 26	July 1	" 2	July 18	" 11
<i>strigosus</i> ....		" 17	June 11	" 2	" 15	" 29
<i>Salix balsamifera</i> ..	" 25	" 19	May 30	" 3	June 16	Nov. 5
<i>candida</i> .....	" 26	" 30	June 7	" 23	July 12	Oct. 2
<i>myrtilloides</i> ..	May 5	Apr. 19	May 18	May 12	May 2	

WOODY PLANTS, 1892 — *Continued.*

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
<i>Sambucus</i>						
<i>Canadensis</i>	May 5	June 7	Aug. 17	June 30	Sept. 22	Nov. 22
" <i>racemosa</i> ..	" 10	Apr. 27	May 9	May 7	May 20	Oct. 19
<i>Spiraea salicifolia</i> ..	Apr. 25	June 22	July 1	July 7	July 29	Nov. 1
" <i>tomentosa</i> ..	" 5	July 9	" 19	Aug. 6	Aug. 17	
<i>Staphylea trifolia</i> ..	" 20	Apr. 30	May 14	May 15	June 3	Sept. 4
<i>Syringa vulgaris</i> * †	Mar. 29	" 27				
<i>Tilia Americana</i> ....	Apr. 22	June 18	June 24			
" <i>argentea</i> .....	" 30	" 25	July 1			
" <i>heterophylla</i> ..	May 2	" 20	June 27			
" <i>ulmifolia</i> .....	" 4	" 28	July 4			
" <i>vulgaris</i> .....	" 2	" 13	June 17			
<i>Ulmus Americana</i> ..	Apr. 25	Mar. 29	Apr. 18			
" <i>campestris</i> ..	May 2	Apr. 6	May 4			
<i>Vaccinium</i>						
<i>uliginosum</i>	Apr. 29					
<i>Viburnum</i>						
<i>acerifolium</i>	" 28					
" <i>dentatum</i> ..	" 29					
" <i>lantanoides</i>	" 26	May 3	June 18	June 28	July 9	Nov. 11
" <i>Lentago</i> ...	" 26					
" <i>opulifolium</i>	" 25					
" <i>pauciflorum</i>	" 29					

## WOODY PLANTS, 1893.

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
<i>Acer dasycarpum</i> ..	Apr. 6	Mar. 5	May 2	Mar. 18	May 13	Nov. 9
" <i>platanoides</i> †	" 12	Apr. 5	Sept. 21	Apr. 15	Oct. 14	" 13
" <i>rubrum</i> .....	" 12	Mar. 31		" 5		" 13
" <i>saccharinum</i> ..	" 17					" 13
<i>Aesculus glabra</i> ....		Apr. 18	Oct. 14	May 5	Oct. 22	Oct. 30
" <i>Hippocas-</i>						
<i>tanum</i> * †	" 12	May 12	Sept. 28	" 22	" 14	Nov. 16
" <i>macrostachya</i>		June 24		July 17		" 15
" <i>rubicunda</i> ...		May 1	" 21	June 17	" 14	" 9
<i>Ampelopsis</i>						
<i>quinquefolia</i>	" 8	July 9	" 14	July 20	Nov. 3	" 12
<i>Berberis</i>						
<i>vulgaris</i> (1)	" 5	May 13		May 16		" 15
<i>Carpinus</i>						
<i>Betulus</i> (1) †	" 12	Apr. 12		Apr. 17		" 24
<i>Castanea vesca</i> (1).	May 12	June 24	Oct. 7	July 4	Oct. 18	" 15
<i>Catalpa</i>						
<i>bignonioides</i>	" 15	" 11	" 24	" 1		Oct. 31
<i>Cornus florida</i> .....		Apr. 29	Sept. 17	May 17	" 14	Nov. 15

WOODY PLANTS, 1893 — *Concluded.*

NAME OF PLANT.	First Leaf.	First Flower.	First Ripe Fruit.	Last Flower.	Last Fruit.	Last Leaf.
<i>Euonymus atropurpureus</i>	Apr. 10	May 31		June 25		Nov. 15
<i>Fraxinus Americana</i>	May 8	Apr. 14		Apr. 17		" 9
" <i>excelsior</i> †	" 10	" 14		" 17		" 24
<i>Ginkgo biloba</i> (2) ..	Apr. 13		Oct. 24			" 15
<i>Gleditsia triacanthos</i>	" 28	May 20	Sept. 26	May 28		" 9
<i>Gymnocladus Canadensis</i>	" 28					" 9
<i>Juglans cinerea</i> ....	May 3	" 27		June 31		
" <i>nigra</i> .....	Apr. 4	" 17	Oct. 7	May 22	Nov. 1	Oct. 30
<i>Larix Europaea</i> ....	May 4					Nov. 20
<i>Lonicera tatarica</i> ..	" 6	" 25		June 12		" 20
<i>Negundo aceroides</i> ..	Mar. 22	Apr. 3		Apr. 8		" 9
<i>Persica vulgaris</i> ....	Apr. 5	" 5		" 15	Sept. 25	" 25
<i>Populus alba</i> .....	" 8	Mar. 28		" 3		" 13
" <i>monilifera</i> ..	" 12	" 31		" 3		" 13
" <i>nigra</i> var. <i>pyramidalis</i>	" 12	" 31		" 2		" 13
<i>Prunus Cerasus</i> ....	" 8	Apr. 8		" 12		" 13
" <i>serotina</i> ....	" 6	May 11	July 24	May 16	Aug. 27	" 13
<i>Pyrus baccata</i> .....	Mar. 24	Apr. 12		Apr. 28		" 24
" <i>coronaria</i> ...		May 2	Sept. 22	May 10	Oct. 12	" 13
" <i>Ioensis</i> .....	Apr. 3	Apr. 28	" 24	" 8	" 18	" 17
" <i>Malus</i> † .....	" 8	" 12		Apr. 25		" 20
<i>Quercus alba</i> (1) ...	May 3	" 21		" 10		" 24
" <i>Robur</i> (1) ..	" 1	May 1				" 24
" <i>rubra</i> .....	" 3	" 3				" 15
<i>Ribes rubrum</i> † .....	Apr. 2	Apr. 15	June 22			
<i>Robinia hispida</i> ....	May 1	May 13	" 5			" 15
<i>Robinia Pseudacacia</i> †		May 17				Nov. 15
<i>Syringa vulgaris</i> * †	Mar. 13	Apr. 14		May 8		" 13
<i>Taxodium distichum</i>	Apr. 12					" 28
<i>Tilia Americana</i> ...	" 19	June 22		June 25		Oct. 30
" <i>vulgaris</i> .....	" 12	" 8		" 14		" 30
<i>Viburnum Opulus</i> ..	" 8	May 3		May 21		
<i>Weigelia rosea</i> (1) .	" 10	" 5		June 10		Nov. 24















