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ARNOLD ARBORETUM
HARVARD UNIVERSITYBULLETIN
OF
POPULAR INFORMATION

JAMAICA PLAIN, MASS.

MAY 5, 1916

Effects of the winter in the Arboretum. The high temperature of January started the development of the flower-buds of some plants, for example those of the Silver Maple (*Acer saccharinum*) which was in full flower on the first day of February, or several weeks before the usual time. January was followed by two months of cold weather and frequent snowstorms. The snow protected small plants which without this covering would probably have suffered, and the number of plants that have been killed or seriously injured in the Arboretum is surprisingly small. The flower-buds, however, of many plants have been entirely or partially killed, while other plants which in an ordinary season lose their buds have not suffered and promise to yield unusual crops of flowers. The flower-buds of all Peach trees are killed but those of the Plums and Crabapples appear to be uninjured. The spring is from ten to twelve days later than usual.

Rhododendrons have suffered less than they did in the winter of 1914-15. Occasionally a leaf has been browned or a small branch killed, but apparently a good many flower-buds have suffered and the prospect for flowers is not so good as usual. *Rhododendron ponticum*, which usually suffers in this climate, appears to be killed outright. This plant which is so hardy in England, where it sometimes becomes a troublesome weed, has seriously interfered with the successful cultivation of Rhododendrons in this part of the world, for it has been used in European nurseries as stock on which is grafted the hybrids and varieties of other species, and the hardiness and vigor of many of these plants has been unfavorably influenced by this tender stock. A little hybrid Rhododendron known as *R. praecox*, "Little Gem," is per-

fectly hardy here but it blooms so early that in about nine years out of ten the flowers after they open are spoiled by frost. This year not a flower-bud has been injured and the plants are now in flower.

Forsythias. Many flower-buds of these plants have been killed as they were two years ago. All the flower-buds in the lower part of the great Forsythia bed on the slope above the Bussey Hill Road are entirely killed, while on the plants in the upper part of this bed, although many buds have suffered, there are open flowers enough to make this part of the bed conspicuous. In the lower ground of the general Shrub Collection the flower-buds of all the species and varieties of Forsythia have been entirely killed with the exception of those of the Albanian *F. europaea* which are uninjured. If the flower-buds of this species are better able to support cold than those of the other species, which are all natives of eastern continental Asia, the European plant should be better known and more generally cultivated. One of the last plants discovered in Europe, it is a vigorous, fast-growing shrub with more erect stems and branches than are usually found in the other species of this genus. The flowers are not quite so showy as those of *F. suspensa* and its hybrids and varieties, but they are always abundantly produced and of good color. This plant is still rare in gardens and it is doubtful if it can be found in American nurseries.

Magnolias. The Japanese shrubby species, *Magnolia stellata*, is usually the first of the Magnolias to flower in the Arboretum and the petals are sometimes browned by a late frost. This year many of the flower-buds have been killed and only a few flowers much reduced in size are now open on these beautiful and usually satisfactory plants. Some flowers are now open on the northern form of the Japanese *M. kobus* (var. *borealis*). This is a shapely tree, with small drooping flowers which open before the appearance of the leaves, and good foliage, but it never flowers here very freely and this year there are fewer flowers than usual. As a flowering tree for this climate it is inferior to the white-flowered Chinese species, *M. conspicua*, or as it now to be called, *M. denudata*, and its hybrids, which also flower before the appearance of the leaves and are not yet in flower.

Witch Hazels. The earliest of the Witch Hazels, *H. vernalis*, a native of southern Missouri and of Arkansas, opened its first flowers during the last week of December and these were followed in January and February by the flowers of the Chinese and Japanese species which were not affected by a temperature of several degrees below zero. In the size and color of its flowers and in foliage the Chinese *H. mollis* is the handsomest of these winter-flowering shrubs. It is hardy, fast-growing and free-flowering, and might well find a place in every garden where it can be seen from the windows of country or city houses. Unfortunately this shrub is still difficult to obtain from American nurseries.

The Cornelian Cherry (*Cornus mas*) is one of the earliest trees or arborescent shrubs to flower here. The flowers are light yellow and

are borne in clusters in the axils of the unfolding leaves, and although individually small are produced in such numbers that the branches are covered with them. They are followed by bright red, lustrous, oblong fruit the size of a small olive. The flower-buds and the flowers of this little tree are not injured by cold. The habit of this plant is good. The foliage is dark green and abundant and the fruit, although somewhat hidden by the leaves, is handsome. The Cornelian Cherry is a native of most European countries and of western Siberia, and has been an inhabitant of gardens for more than three hundred years. In the United States it was probably more generally planted in the first half of the last century than it is at present, although there are not many early flowering trees hardy in this climate which are better worth a place in the garden. In the Arboretum it can be seen in the Cornel Group near the junction of the Meadow and the Bussey Hill Roads.

Two Japanese plants. The leafless branches of *Euptelea polyandra* are now covered with flowers. The conspicuous part of these is the large bright orange-red anthers which hang on short filaments in axillary clusters from one end of the branches to the other. For its peculiar and early flowers this plant is well worth a place in New England gardens, and the large green leaves are handsome and abundant. There are several fine specimens of this large shrub or small tree on the lower side of Azalea Path and this week they are well worth examination. Another species, *E. Franchetii*, introduced by Wilson from western China, appears to be perfectly hardy in the Arboretum. The plants are still too small, however, to flower. The related *Cercidiphyllum japonicum*, which is the largest deciduous-leaved tree in Japan and now becoming common in American collections, is also beginning to flower. The flowers are inconspicuous but the red color of the unfolding leaves makes the tree attractive at this season. There is a group of this tree on the two sides of the Meadow Road not far beyond the Administration Building.

Corylopsis. This is a genus of the Witch Hazel Family, distributed, with several species, from the western Himalayas through western and central China to Japan. These plants have leaves which in general appearance resemble those of the Witch Hazel, and drooping spikes of fragrant yellow flowers which appear before the leaves, and terminate on what, later in the season, become short leafy branchlets. Several of these plants are hardy in this climate, but the flower-buds are often killed by intense cold, or, if they are not killed, the flowers open so early that they are destroyed by late frosts. This year the flower-buds have not been much injured, and the flowers of three species are now open. One of the best known of these plants is the Japanese *C. spicata*. It is a shrub with spreading branches four or five feet high, with yellow flowers, about half an inch long, and produced in from six to twelve-flowered spikes. There are plants of this shrub on Hickory Path near Centre Street. In the collection of Chinese shrubs on the southern slope of Bussey Hill two distinct and beautiful species introduced

by Wilson are now in flower, *C. Veitchiana* and *C. Willmottiae*. If the plants of this genus could be depended upon to flower every year they would deserve a place in all gardens where early spring flowers are desired, but in ordinary seasons they flower too early or the flower-buds are destroyed, and they cannot be recommended for general cultivation here. In the middle Atlantic states, wherever *Jasminum nudiflorum* succeeds they would probably give good results, and in California they may be expected to flourish and to become midwinter and early spring-flowering shrubs of first-rate value. Lovers of rare and little known plants will do well to see them in the Arboretum this spring for it may be many years before they flower so freely again.

Andromeda floribunda. There are so few broad-leaved evergreen trees or shrubs which are really hardy in this climate that it may be useful to call attention again to this *Andromeda* which is a native of the high slopes of the southern Appalachian Mountains and perfectly hardy in New England. It is a low, broad, round-topped bush with small, dark green lustrous leaves and short erect compound clusters of small white heath-like flowers which are now open. The flower-buds, which are fully grown in the autumn, are also white, and are conspicuous through the winter, adding to the value of this plant for the winter and spring garden.

Two eastern American shrubs now in flower show the value of some native plants for American gardens in which they are too seldom found. These flowering shrubs are the Leatherwood (*Dirca palustris*) and the aromatic Spicebush (*Benzoin aestivale*). They are now covered with small yellow flowers, and those of the Spicebush will be followed in the early autumn by lustrous, scarlet fruits. Masses of these two plants can be seen on the right-hand side of the Bussey Hill Road opposite the upper side of the Laurel Collection.

Automobiles are not admitted to the Arboretum, but visitors who desire carriages to meet them at the Forest Hills entrance can obtain them by telephoning to P. J. Brady, Jamaica 670, or to Malone & Keane, Jamaica 344.

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JAMAICA PLAIN, MASS.

MAY 9, 1916

Japanese Cherries. The publication by the Arboretum of an illustrated book on Japanese Cherries by E. H. Wilson greatly increases our knowledge of these plants and will lead, it is believed, to their more general cultivation in this country. Mr. Wilson has recently passed a year in Japan where he was sent by the Arboretum to solve many problems which have long perplexed students of the Japanese flora, and especially to study the character and distribution of the Japanese Cherry-trees and the origin and peculiarities of the numerous forms which are cultivated by the Japanese and which have made Japanese gardens famous. Mr. Wilson succeeded in seeing the ten Japanese species in their native forests and all the principal collections of the garden forms. The introduction into the Arboretum of plants of all the species and of seventy different named garden varieties is one of the results of this journey. Mr. Wilson states in his introduction that, although American and European gardeners have been importing Japanese flowering Cherries for half a century, scarcely one good-sized healthy tree can be found in this country or in Europe. These varieties are double-flowered or otherwise abnormal and therefore can only be propagated by grafting, and a choice of the right stock on which to graft them is important. The plants imported from Japan are all grafted on the variety Mazakura of *Prunus Lannesiana* which is a poor short-lived tree particularly subject to the attacks of scale and boring insects. It is used as stock by the Japanese because it can be quickly and cheaply raised from cuttings. In Europe and the United States one of the European Cherries has been used as stock for the Japanese varieties and on this they have succeeded no better

than on the ordinary Japanese stock; and the conclusion which Wilson has reached after a careful study of the subject is that these garden varieties of the Japanese Cherry can only succeed and make large and permanent plants when they are grafted on seedlings of the largest, hardiest and longest lived of the Japanese species. This is the northern tree which has been called *Prunus Sargentii* but now is known to be the northern form of *Prunus serrulata* and is to be called var. *sachalinensis*. During the last year seedlings of this northern tree raised from seeds ripened in the Arboretum have been used here as stock on which the varieties brought home by Wilson from Japan are being grafted, and there is no reason to doubt that the plants produced in this way will grow here to a large size and become as beautiful features in the parks and gardens of America as they are in those of Japan. Five Japanese species produce double-flowering forms. Those derived from the Sargent Cherry, the Yama-sakura or Mountain Cherry of the Japanese, will probably prove most valuable in this climate where they may be expected to grow to a larger size and last longer than the garden varieties of the other species.

In the Arboretum many of the flower-buds of Cherries have been killed during the winter. On

Prunus yedoensis the buds have all been killed. This is a white- and pink-flowered tree and one of the handsomest of the Japanese species. It is this Cherry which has been so largely planted in the streets, parks and cemeteries of Tokyo that when it blooms a general holiday is proclaimed by the Emperor that the public may enjoy its flowers. This Cherry is perfectly hardy in the Arboretum where it has flowered for several years and produced crops of fruit.

Prunus subhirtella. This is the Higan-zakura or Spring Cherry of the Japanese. It is a shrubby plant from ten to fifteen feet high and broad, and is not known as a wild plant, although it is much cultivated in western Japan. Mr. Wilson considers it "the most floriferous and perhaps the most delightful of all Japanese Cherries." This plant was raised in the Arboretum many years ago and from the Arboretum it has been widely distributed in the United States and Europe. For years it has flowered here regularly and has attracted as much attention perhaps as any plant in the Arboretum. The small pink flowers now completely cover the upper branches; those on the lower branches have all been killed no doubt by a lower temperature near the ground than a few feet above it.

Prunus subhirtella, var. pendula has lost, too, many of its flower-buds and the trees in the Arboretum promise to be less beautiful this spring than usual, although in some gardens near Boston this Cherry is now covered with its drooping pink or rose-colored flowers. This weeping Cherry, which has been largely planted in parks, temple grounds and cemeteries in Japan, is nowhere known as a wild tree. It was introduced into Europe and the United States many years ago,

and it is now fairly common in the gardens of the northern states. In propagating this tree American and European nurserymen have used as stock one of the European Cherries which are not suitable for the purpose, and such plants are short-lived and generally unsatisfactory. The wild type of this weeping tree and of *Prunus subhirtella* is

Prunus subhirtella var. *ascendens*, of which there is an excellent picture in Mr. Wilson's book. It is a tall tree with erect spreading branches, and grows in forests in Japan in Shinano Province, and in central China. It has escaped the attention of American and European gardeners, and there are only small seedling plants in the United States. One of these can now be seen with the other forms of *Prunus subhirtella* on the right-hand side of the Forest Hills entrance.

Prunus serrulata var. *sachalinensis*. The Sargent Cherry for the first time since it began to flower here some years ago has lost some of its flower-buds, especially those on the lower branches. This is the largest and the handsomest of the Cherry trees of eastern Asia, sometimes attaining in northern Japan the height of seventy-five feet and a trunk diameter of four feet. It is one of the trees planted in 1735 in the three mile-long avenue of Cherry-trees at Koganei, near Tokyo, which in early spring is still one of the great sights in Japan.

Hybrid Forsythias. By the path in the rear of the group of Forsythias on the slope at the foot of the Bussey Hill Road are several specimens of forms of the hybrid between *Forsythia suspensa* and *F. viridissima*. The general name of these hybrids is *Forsythia intermedia*, and there are several distinct forms. The plants are in a sheltered position and their flower-buds have not been injured. The handsomest of them is *F. intermedia spectabilis*, and of all the Forsythias which have been grown in the Arboretum this is perhaps the most beautiful. The flowers are larger than those of either of its parents, deep bright yellow, and are produced this year in countless numbers, completely covering the wide-spreading branches. This plant was probably raised in Germany as it was sent to the Arboretum from the Späth Nursery in Berlin. Other distinct and handsome forms of this hybrid are var. *primulina* and var. *pallida*; the former has pale primrose-colored flowers and appeared as a seedling in the Arboretum a few years ago. The var. *pallida* has pale straw-colored flowers which are of a lighter color than those of other Forsythias. This plant also first came to the Arboretum from Germany. These hybrids are beautiful garden plants, handsomer and perhaps hardier than either of their parents, and they are interesting as showing what may be expected from crossing different species of other trees and shrubs. A good deal has already been done in hybridizing Roses and Rhododendrons. New races of Lilacs, Spiraeas and Philadelphus produced by the skill of the hybridizer already beautify our gardens, but this business is only in its infancy and greater results may be expected from it than have ever yet been obtained.

Amelanchiers are beginning to flower and in a few days the Arboretum will be gay with the white flowers of these trees and shrubs which have been largely planted here along the margins of woods and by the borders of the drives. The species which has been most largely used in this way here is the shrubby *A. oblongifolia*, which grows naturally in the Arboretum where a large native specimen can be seen on the margin of the meadow across the path from the general collection of these plants which occupies the border between the Meadow Road and the parallel grass path on the left-hand side entering from the Jamaica Plain Gate. Another native species, *A. laevis*, is a tree sometimes forty feet high and easily distinguished from all other species by the red color of the unfolding leaves which are destitute of any covering of down. There are some large-sized native trees of this species on the wooded bank in the rear of the Crabapple Collection on the Forest Hills Road. The earliest species in the collection to flower is another tree and perhaps the largest in the whole genus, *A. canadensis*, which is widely distributed from western New York to Louisiana, and the only Amelanchier or Shad Bush in the southern states.

Ribes tenue. This is one of the Currants introduced by Wilson from central and western China, where it is a common plant on the mountains at high altitudes, and a shrub four or five feet high. There are several specimens in the Arboretum, but the handsomest is in the collection of Chinese shrubs on the southern slopes of Bussey Hill. The plant is now covered with short erect clusters of dull yellow flowers which will be followed by bright red, lustrous, juicy fruits. The fruit is sweeter than that of the common red-flowered garden Currant and this plant may prove to be valuable for its fruit, or to cross with the garden Currants. As an early spring-flowering shrub it deserves a place in northern gardens.

The yellow-flowered American Currants are still perhaps the most attractive of the Currants and Gooseberries which can be grown in this climate. The better known of these, the so-called Missouri Currant (*Ribes odoratum*) is often cultivated in the United States and is found in many old gardens. It owes its popular name to the fact that it was first found on the upper Missouri River, but it is now known to occur on the great plains from South Dakota to Texas. This plant is often called in books *Ribes aureum*, but this name belongs to a plant with smaller flowers and black or orange-colored fruits. This beautiful plant is rarely cultivated in American gardens. The two plants are growing together in the general Shrub Collection, and the difference in their general appearance and in the structure of the flowers can readily be seen.

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JAMAICA PLAIN, MASS.

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Flowers in the Arboretum. During the week this Bulletin reaches its readers a large number of trees and shrubs will be flowering in the Arboretum, including several species of Amelanchier, some of the early Honeysuckles, Currants, Gooseberries, Rhododendrons and Viburnums, many Willows, the early-flowering Canadian Plum tree, *Prunus nigra*, many of the Asiatic Crabapples, several species of Wild Pears, and one or two of the early-flowering species of Lilacs.

Unfolding leaves. Much is to be learned of trees by the study of their unfolding leaves. The color of these and the absence or presence of a covering of down may, for some trees like the Lindens, furnish the best characters for distinguishing related species. This is certainly one of the best times of the year for the study of Oak-trees and Hickories. The unfolding leaves are often brilliant in color, and their hairy covering, when such a covering exists, furnishes a useful character for determining such trees. Very beautiful and interesting, too, are the very young leaves of the Horsechestnuts. Indeed there is not a tree or shrub which, as the leaves unfold, is not capable of affording an observing lover of plants much information and the keenest pleasure, and this is a pleasure which can be found in the Arboretum in a new form every day from the unfolding in early April of the leaves of the California *Osmaronia cerasiformis* and the Chinese *Prinsepia sinensis* to the appearance of those of the Fringe-tree (*Chionanthus virginica*) which remains leafless until after the flowering of many shrubs and trees has passed.

The wild Pear-trees. Much attention has been paid to the formation of the Arboretum collection of these trees because several of the species are among the most beautiful of all flowering trees. To pomologists, too, they are of special interest as the wild types from which the cultivated pears have been derived, and as possible factors in the production of new and perhaps hardier races of fruit trees. Wild Pear-trees are found in China, on the Himalayas, in southwestern Asia and in southeastern and southern Europe. There is no native Pear-tree in Japan or in any part of America. About twenty-five species are recognized by botanists, and of these at least twenty with a few hybrids and varieties are now established in the Arboretum. The most important species but not the most beautiful in flower is *Pyrus communis*, one of the European species from which the common garden pears have been derived. The wild form of this tree is in the Arboretum collection. Some of the species, like *P. elaeagrifolia* of southeastern Europe, are conspicuous in early spring before the flowers open from the silvery color of the unfolding leaves, but as ornamental trees some of the Chinese species are better worth cultivating here than those of Europe or western Asia. All the eastern Asiatic species are now growing in the Arboretum; many of them have large, handsome and lustrous leaves, and on a few the fruit is conspicuous. Among the Chinese species which have been thoroughly tested in the Arboretum the handsomest perhaps is *P. ovoidea*, a native of the northern provinces and one of the first in the collection to open its flowers. These are followed by yellow juicy fruits of good flavor which, unlike those of all other Pear trees, are largest at the base and gradually taper to the apex. Another remarkable thing about this tree is that in the autumn the leaves turn as bright scarlet as those of any Asiatic Red Maple or Gum tree. As an ornamental tree this Pear deserves the attention of gardeners and its hardiness and the quality of its fruit suggests its possible value in the production of a new race of fruit trees. Another Chinese species, *P. Bretschneideri*, is also well worth the attention of pomologists; it is a tree with large lustrous leaves, large flowers and yellow, nearly globose fruit of good flavor. This is probably, in part at least, the wild origin of the excellent pears which are sold in Peking during September and October. The brown-fruited *Pyrus serrulata*, one of the new species discovered by Wilson in western China, is of particular interest, too, as from this species are evidently derived the round russet pears which in many forms have been so generally cultivated in Japan and are occasionally seen in American collections. The largest specimen of *P. serrulata* in the Arboretum is growing among the Japanese Azaleas on the southern slope of Bussey Hill where it flowered for the first time last year. The Leconte and the Keiffer are two hybrid pears well known in this country where they were raised many years ago by crossing a garden pear with some Chinese species of doubtful identity and uncertain origin. These hybrids have not proved very hardy in the north, but have been planted in immense numbers in some of the southern states where they pro-

duced large crops of fruit until the trees were attacked by the Pear blight which has ruined many of these orchards. *P. ovoidea* has been growing in the Arboretum for eighteen years and *P. Bretschneideri* for thirty-four years and have never been attacked by the Pear blight. It is suggested that by crossing these species with some of the garden Pears valuable results in the way of a new and very hardy race of Pear-trees may be secured. Among hybrid plants in this group attention is called to

Pyrus malifolia. This is a natural hybrid between the common Pear and the White Beam-tree of Europe, *Sorbus Aria*, and is very similar and perhaps a seedling of the hybrid Bollwyller Pear which appeared in Alsace more than three hundred years ago as it was first mentioned by the botanist Bauhin in 1619. *P. malifolia* has large pale oval leaves and large flowers in few-flowered clusters. It is perfectly hardy and a remarkably fast-growing tree which promises to attain a large size in this climate. It well deserves a place in New England collections of flowering trees.

The Asiatic Crabapples are beginning to flower and as the American species do not bloom until later it will be possible to enjoy in the Arboretum the beautiful flowers of these trees for several weeks. The collection is a large one and now contains plants large or small of all the American and Old World species with the single exception of the little known *Malus formosana*, a native, as its name implies, of the island of Formosa. The collections made by Mr. Wilson in China and Japan have thrown much light on several of the Asiatic species which are now much better known than they were a few years ago. The discovery that a common Apple-tree of western China, largely cultivated as a fruit tree in the mountainous districts of Hupeh and Szechuan, is a form of *Malus prunifolia* which, although it has been in European gardens for nearly a century, was not known before as a wildtree, is interesting. This form is now called

Malus prunifolia, var. rinki. It is a tree in its wild state with greenish yellow fruit sometimes with a reddish cheek, or rarely entirely red, rather longer than broad and not often more than an inch and a quarter in diameter; it is juicy and has an acid flavor. This tree was early introduced into Japan where it was formerly cultivated in many forms as a fruit tree. The good quality of the fruit of some of these is mentioned in his recently published reminiscences by Lord Redesdale who, in the early 60's as a member of an English Embassy, found them in a remote part of Japan. The cultivation of the Rinki was given up in Japan after the introduction of American and English Apple-trees and it is now a rare plant there. It is this Apple which is often called *Pyrus* or *Malus Ringo* in European publications. Judging by the climate where this tree grows naturally in western China, it should prove as hardy as the Siberian *Malus baccata* which is one of the parents of the hardy race of Apples now much cultivated in the

extreme north as Siberian Crabs, and it is not improbable that by crossing the Rinki with some of these hybrid Crabs, or with the hardiest varieties of the common Apple, a race may be obtained more valuable for the cold parts of North America than any of the Apples which can now be grown in some of the northern states and in the northwestern provinces of Canada.

Malus floribunda. Of the fifteen species of eastern Asiatic Crabapples, with their numerous varieties and hybrids, not one is more satisfactory as a garden plant than this tree. It is a low, bushy, round-topped tree not more than eighteen feet high which year after year covers itself with bright rose-colored flower-buds, which are followed by pink and finally by white flowers. Nothing is known of the history of this plant beyond the fact that it was sent to Europe by the Dutch naturalist Von Siebold before 1856 when the name first appeared in his catalogue of Japanese plants. Mr. Wilson, however, did not see it in Japan, and it does not appear to be known to Japanese botanists. It has been suggested by different authors that it might be a hybrid, various species having been named as its possible parents. Its hybrid origin is not improbable for seedlings show considerable variation, especially in the time of the falling of the fruit. On plants propagated by grafting from those originally introduced by Von Siebold the fruit drops early in the autumn, but on some of the seedling plants raised in the Arboretum the fruit remains on the branches until spring. There are several large plants of these seedlings in the neighborhood of the Administration Building which through the winter furnished large quantities of food to many different kinds of birds. A seedling of *M. floribunda* which appeared spontaneously many years ago in the Arboretum has larger flowers and fruit than that plant, and is evidently a hybrid with some form of *Malus baccata*. This hybrid has been named *M. Arnoldiana* and is one of the handsomest of all Crabapples.

The old Crabapple Collection is on the left-hand side of the Forest Hills Road, but the largest number of these plants will be found in the new collection at the eastern base of Hemlock Hill.

In subsequent bulletins attention will be called to the most interesting species as they flower.

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The Ohio Buckeye. This, the *Aesculus glabra* of botanists, is the first of the Horsechestnut family to open its flowers. It is a small tree rarely more than fifty feet tall and usually much smaller, with bark which on young trees is dark brown and scaly but on old trunks becomes ashy gray and deeply furrowed. It has pale yellow flowers, with petals shorter than the stamens and fruit covered with prickles like that of the European Horsechestnut; unlike those of that tree, the winter-buds are not resinous. It is one of the most widely distributed of the American Buckeyes as it ranges from western Pennsylvania to northern Alabama and to eastern Nebraska and Oklahoma. There is a variety in southern Arkansas with smooth pale bark which has been distinguished as var. *leucodermis*, and there is another variety in western Missouri with leaves composed of seven instead of five leaflets which is known as var. *Buckleyi*. The Ohio Buckeye and these two varieties have been in flower for several days in the Arboretum collection. Their flowers are much less showy than those of other Horsechestnuts and of most of their hybrids, but the Ohio Buckeye is interesting botanically as well as historically, for it is to this tree that one of the great and important states of the Union owes its popular name.

Rhododendron Kaempferi. This red-flowered Azalea from the mountains of central Japan promises to bloom well this spring for many of the plants are covered with flower-buds which are already showing color. There are masses of this hardy Azalea on both sides of Azalea Path and at the northern base of Hemlock Hill between the Hemlocks

and the Laurels. On Azalea Path the plants are fully exposed to the sun and the flowers, which are extremely delicate, soon wither. On Hemlock Hill where the plants are in partial shade they flower a week or ten days later, and the flowers remain longer in good condition and make one of the brilliant flower shows of the Arboretum year.

Rhododendron poukhanense. This is the Azalea which Mr. Jack introduced into the Arboretum from Korea. When it first flowered here it was described as *R. coreanum* before it was known that a French botanist had already named it for Poukhan, a Korean mountain where it had been found by a French missionary. It is a beautiful round-topped, compact shrub, with large, rosy pink, fragrant flowers. It appears to be perfectly hardy in the most exposed positions, and has flowered freely now in the Arboretum for several years. A double-flowered form of this plant, sent to this country from Japanese nurseries under the name of *Yodogawa* is a form of the Korean plant. A number of plants of *R. poukhanense* are now flowering on the upper side of Azalea Path.

Chinese Poplars in early spring. The beauty and interest of several of the Poplar trees of eastern Asia is increased by the bright red-bronze color of the young leaves. The unfolding leaves of Poplar trees from other parts of the world are not colored in this way, and those of *P. Maximowiczii*, *P. suaveolens*, *P. tomentosa*, *P. Simonii*, and *P. yunnanensis* of eastern Asia are green as they unfold. The young leaves of the other Chinese species, *P. szechuanica*, *P. Wilsonii*, *P. adenopoda*, *P. lasiocarpa*, *P. tremula*, var. *Davidiana* and its form *tomentella*, and the Japanese *P. Sieboldii* are all more or less deeply tinged with red. All the eastern Asiatic Poplars are now growing in the Arboretum with the exception of the Chinese form (var. *Duclouxiana*) of the Himalayan *P. rotundifolia* which has not been introduced, and they all prove to be hardy and fast-growing trees here with the exception of *P. lasiocarpa* which is not very hardy and suffers badly from borers here, and perhaps *P. yunnanensis* which has not been sufficiently tested yet in the Arboretum.

Hydrangea petiolaris. This vigorous Japanese climbing plant has usually been planted in this country to grow up the trunks of trees, and it does not appear to be generally known that it is one of the best plants that can be used in this climate for covering brick or stone walls to which it clings tenaciously. In such situations it grows rapidly and flowers more freely than when growing among the branches of trees. Its value as a wall covering is increased, too, by the early appearance of the dark green leaves which are nearly fully grown before there is the sign of a leaf on any of the Virginia Creepers or other deciduous-leaved climbing plants which can be grown here. All Hydrangeas need plenty of water, and probably *H. petiolaris* will do better on the north or east side of a building than in a southern exposure. A large specimen can be seen on the Administration Building.

Berberis (Mahonia) repens. The beautiful Oregon Grape, *Berberis (Mahonia Aquifolium)* of the northwest coast region is not a satisfactory plant in this climate unless it can be planted in exceptionally sheltered positions or can be carefully protected, for the cold here destroys or disfigures the leaves and often kills the plants. The species from the Rocky Mountains, *B. repens*, is a hardier plant and one of the most useful of the dwarf, broad-leaved evergreens which can be used here. It grows less than a foot high and spreads rapidly into large mats; the leaves are pale bluish green and are not lustrous like those of the Oregon species, and the flowers are bright yellow and produced in compact terminal clusters. This plant is now in flower in the Shrub Collection next to a plant of *Berberis Aquifolium*, which is also in flower and in better condition this spring than usual. There is a collection of different forms of the Mahonias on the lower side of Hickory Path near Centre Street, including the Japanese species (*B. japonica*) which has unexpectedly proved hardy in this sheltered position.

Early Lilacs. The white-flowered *Syringa affinis* and its variety *Giraldii*, with pale lilac or mauve-colored flowers, *S. Meyeri* and *S. hyacinthiflora*, are already in flower and in a few days many of the varieties of the common Lilac will open their flowers. *S. affinis* and its variety are tall shrubs of a straggling habit, but are valuable on account of their early and very fragrant flowers. The white-flowered form is the common and apparently the only kind of Lilac cultivated in the gardens of Peking. *S. Meyeri* is a dwarf shrub of northern China with compact clusters of very fragrant dark purple flowers which are distinct in the exceptionally long slender tube of the corolla. *S. hyacinthiflora* is a hybrid between the common Lilac and the Chinese *S. oblata*; the flowers are lilac-colored, small and double, in rather small clusters; it is a vigorous, fast growing plant, however, of good habit and is chiefly valuable in prolonging the Lilac season.

Daphnes. *Daphne Mezereum* and its white-flowered variety bloomed several weeks ago before the snow had entirely disappeared. They are dwarf European shrubs with erect branches, and have now become naturalized in several places in the northern states. A more beautiful plant, *D. Cneorum*, is now in flower in the Shrub Collection and on the lower side of Azalea Path; it forms a broad mat of wiry semiprostrate stems less than a foot long, covered with dark green leaves and terminating in dense heads of rose-colored delightfully fragrant flowers. It is a plant which with the same treatment and in the same soil succeeds in some gardens and fails utterly in others. Fortunately it does well in the Arboretum where it is one of the most admired plants in the Collection. The pale lilac-flowered *D. genkwa* is blooming in the special Chinese Collection on the southern slope of Bussey Hill. This Daphne was sent to the United States many years ago from Japan, but the plants derived from Japanese gardens did not succeed here. It is a Chinese plant introduced into Japan, and the plants now flowering in the Arboretum were raised from seeds collected by Wilson in

western China. If they prove permanently successful here this *Daphne* will be a delightful addition to our early-flowering dwarf shrubs.

Crataegus Arnoldiana. This Hawthorn was never fuller of flower-buds than it is this spring and these will soon be open. This tree was discovered growing naturally on a wooded bank in the Arboretum; it grows also on the banks of the Mystic River in West Medford, Massachusetts, and near New London, Connecticut. It belongs to the Molles group of Hawthorns, which are trees distinguished by their large size, by their large early flowers which usually open with the unfolding of the leaves, and by the large, often edible, scarlet or rarely yellow fruits. There are several species found from the valley of the St. Lawrence River in the Province of Quebec to Texas. The species are, however, most numerous in the region west of the Mississippi River, and are almost entirely wanting in the southeastern states. *C. Arnoldiana* is one of the handsomest of the species of this group which is hardy here. The brilliant red fruit ripens late in August and falls in September earlier than that of the other species. In winter this tree is easily recognized by its upright growing, distinctly zigzag branches which are more thickly covered with spines than those of many of the related species. The largest trees of this Thorn can be seen on the left-hand side of the Valley Road just inside the Centre Street Gate and in front of the *Platanus* Collection. There are also several of these trees in front of the group of White Oaks, also on the left-hand side of the Valley Road. At the South Street entrance there are large plants of three other species of the Molles Group, *C. mollis* from the Ohio-Illinois region, *C. arkansana* from central Arkansas, and *C. submollis*, a Canadian and New England tree. These will all be in flower in a few days.

Malus Sieboldii, var. calocarpa. This Japanese Crabapple is one of the handsomest in the Arboretum both in spring and autumn. It is a broad tree-like shrub or small tree with only slightly lobed leaves, pink and white flowers fully an inch in diameter and brilliant scarlet lustrous fruits which are half an inch in diameter and more beautiful perhaps than those of any other Crabapple. This beautiful plant was raised from seed presented to the Arboretum in 1890 by Dr. William Sturgis Bigelow of Boston. It can be seen in the front row of the Crabapple Collection at the eastern base of Hemlock Hill. It has been found that *Sieboldii* is the oldest and therefore the proper name for the Chinese and Japanese Crabapple which up to this time has been known in gardens as *Malus* or *Pyrus toringo*.

It is interesting to note that Wilson found in western China the wild, single-flowered form of the beautiful Crabapple with rose-colored, semi-double flowers, *Malus Halliana*, or the Parkman Crab, which first came to this country from Japan, and was long believed to be a Japanese species. It is the Kaido of Japanese gardens. To the double-flowered form, which is the one generally cultivated in eastern gardens, the name *Malus Halliana Parkmanii* has been given; it is flowering well in the Arboretum this year.

ARNOLD ARBORETUM

HARVARD UNIVERSITY

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The Redbud (*Cercis canadensis*) is blooming well this year, although the flower-buds of this southern tree are sometimes killed in this latitude. The southern Redbud is a common woodland tree from southern New Jersey to Nebraska and to Florida and eastern Texas. Under favorable conditions it is often forty or fifty feet high, but cultivated here at the north it rarely grows to half that size. In some parts of the country, especially in eastern Oklahoma, southern Arkansas and eastern Texas, it makes in early spring one of the most brilliant floral features of the American forest. There is a white-flowered form (var. *alba*) which was found a few years ago in one of the western states, and a plant of this variety is now in flower on Hickory Path near Centre Street. The Texas Redbud (*C. reniformis*) lives in the Arboretum on Azalea Path, but the branches are often killed in severe winters and it has not yet flowered here. *C. chinensis* is also to be seen on the upper side of Azalea Path; it is a shrub from western China which has long been cultivated in Japanese gardens and first reached this country from Japan several years ago. The plants of Japanese origin were never hardy here but those raised from Chinese seeds are more successful and sometimes flower more fully than they are blooming this year. The flowers are larger and are of a better color than those of the American species, and in the neighborhood of New York and further south this little Redbud is one of the most beautiful of early-flowering shrubs. Young plants of *C. racemosa* from central China have not proved hardy in the Arboretum. This with its long drooping clusters of large flowers is probably the most beautiful member of the genus. The Redbud, or Judas-tree of southern Europe,

C. siliquastrum, is not hardy in New England. There is also a white-flowered form of this tree.

Malus Sargentii. Only about half the plants of this Japanese species are blooming in the Arboretum this year. This failure to flower is not a common occurrence, and this wide-spreading, Japanese shrub is an excellent plant for small gardens or to plant in front of a group of the larger growing Crabapples. It blooms later than the Asiatic species. The flowers, although smaller than those of the other species, are attractive because the petals, which are tinged with rose color before the buds open, after opening are pale straw color, the large bright yellow anthers adding to the beauty of the flowers. The bright scarlet, comparatively large fruits of this shrub remain on the branches until spring but do not appear to be relished by birds.

Malus Sieboldii. This Chinese and Japanese Crabapple is one of the last of the Asiatic species to flower in the Arboretum. Although the flowers are hardly more than three-quarters of an inch in diameter, the plants when in bloom are attractive, for like those of other Crabapples they do not all open at once, and the dark rose-colored buds make a delightful contrast with the expanded petals which are pure white on the inner surface and faintly tinged with rose color on the outer surface, especially on the margins. The dark gray-green of the young leaves adds to the interest of these plants when they are in bloom. The form of this Crabapple on which this species was founded is a round-topped shrub three or four feet high and eight or ten feet broad with stout, rather drooping branches. There is a tree form (var. *arborescens*) with tall stems and long branches spreading horizontally. The two forms which were raised from seed sent to the Arboretum many years ago from Pekin are in the old collection on the Forest Hills Road and in the collection at the base of Peter's Hill, and they are both flowering well this year. The fruit of this Crabapple is very small, and on some individuals it is red and on others yellow.

Exochorda Giralddii Wilsonii. The Chinese Pearl Bush (*Exochorda racemosa*) has long been a familiar and much admired shrub in many American gardens on account of its showy racemes of large pure white flowers. Old specimens assume an open and not a very attractive habit, and lose much of their early beauty. The variety (*E. Giralddii*) which was discovered by Wilson in western China and named for him, although in its native country it is a wide-spreading shrub, in cultivation here grows like a tree with a single straight stem and comparatively short branches which form a narrow pyramidal head. The flowers are much larger than those of the old-fashioned Pearl Bush, and this new introduction promises to be a better garden plant. It is now well established in the Arboretum where several plants are now in flower, and in other Massachusetts gardens. The Chinese *Exochorda* is best known as *E. grandiflora*, but the older and correct name is *E. racemosa*. On Hickory Path, near Centre Street, *E. macrantha*, an interesting hybrid between the Chinese *E. racemosa* and *E. Korolkowii* from central Asia,

is in flower. The flowers and foliage resemble those of the Chinese plant but the branches, like those of its Turkestan parent, are much more upright in growth.

Morus acidosa. This is one of the most interesting and perhaps one of the most economically valuable of the plants introduced by Wilson. It is a perfectly hardy shrub which on the cliffs of western China sometimes grows to the height of twenty feet, although usually it is not more than six or eight feet high. The plants in the Arboretum are now four or five feet tall and from six to eight feet in diameter. The leaves are sometimes deeply lobed and sometimes entire. The flowers, although rather smaller, resemble in general appearance those of other Mulberries. The fruit, which is produced in great quantities, ripens in the Arboretum at the end of June. It is about half an inch long, black and lustrous and has a pleasant subacid flavor. It is suggested that this Mulberry may prove exceedingly valuable in supplying hens with food. Its dwarf habit makes it possible to plant it in small yards; plants raised from seeds begin to bear fruit in six or seven years, and the fruit which drops in a small area under the bushes would be easily found by the birds. *Morus acidosa* is a common and widely distributed plant in eastern Asia, being found from Japan and Korea to the extreme western borders of China, in Formosa and in India. Plants now in flower in the Arboretum can be seen at the end of the bed containing the collection of Chinese plants on the southern slope of Bussey Hill. This is one of the coldest and most exposed positions in the Arboretum. Several of these Mulberries can also be seen in the Peter's Hill Nursery.

Rhododendron (Azalea) canescens. The flowers of this northern pink-flowered Azalea soon follow those of *Rhododendron (Azalea) Vaseyi*, the earliest of the American species to open its flowers. It is a common shrub on the hillsides of central Massachusetts, and ranges far southward in the eastern states. *R. canescens* has been largely planted on both sides of Azalea Path, and the mass of these plants on the right-hand side of the Meadow Road is covered with opening flower-buds and will in a few days be one of the most attractive objects in the whole Arboretum.

Rhododendron (Azalea) Schlippenbachii. This Azalea, raised from seeds brought from Korea by Mr. Jack, has flowered abundantly this year on the upper side of Azalea Path. It is one of the handsomest of the Asiatic Azaleas, and has large, obovate leaves and white flowers more or less tinged with rose which are three inches or three inches and a half across. It is a very common plant on the low grass-covered hills which rise above the Korean coast and in eastern Manchuria, but it is still little known in gardens. Mr. H. J. Veitch found it in 1892 in a nursery garden in Tokyo and sent plants to England where, although a picture of it was published two years later in the Botanical Magazine, very little has been heard of it. This beautiful plant promises so well in this climate that it should be taken up by American or Dutch nurserymen that it may be possible to plant it in quantity.

Fothergillas. The three species of *Fothergilla* are flowering unusually well this year. This is a genus of shrubs related to the Witch Hazels. The small white flowers are produced in nearly round terminal clusters, and the foliage which has the general appearance of that of the Witch Hazel, turns in the autumn to brilliant shades of red and orange. The largest specimen in the Arboretum is a plant of *F. major* in the Hamamelis Group near the small pond at the junction of the Meadow and the Bussey Hill Roads; and the three species can be seen in the Shrub Collection and on Azalea Path where there are a number of plants. First cultivated in England more than a century ago, *Fothergilla* seems to have disappeared from gardens until it was reintroduced by the Arboretum a few years ago. Few of the shrubs of eastern North America are more interesting and conspicuous when in flower than these inhabitants of the southern states.

Bush Honeysuckles. For northern gardens there are no more beautiful shrubs than some of the Bush Honeysuckles, for in early spring they are covered with myriads of yellow, white, rose-colored or red flowers, and in summer or autumn with lustrous, usually scarlet fruits. Many of these shrubs are able to show their greatest beauty in this climate, but this can be obtained only by planting them in rich soil and with sufficient space for growth in all directions. In poor soil and when crowded by other plants they are usually miserable objects. The large-growing kinds, like *L. tatarica*, *L. bella*, and *L. notha*, should be planted as isolated specimens at least twenty feet from any other plant. *L. Morrowii*, a plant of the Amoor region, requires even more space for its lowest branches which cling close to the ground and naturally spread over a great area. This shrub has gray-green foliage, comparatively large white flowers and bright red fruits. Like many other Bush Honeysuckles, *L. Morrowii* hybridizes easily with other species, and most of the plants raised from seeds sold by nurserymen are hybrids of that species with *L. tatarica* and are of little value for those who want plants with the peculiar habit of *L. Morrowii*. Among vigorous growing plants in this group attention is called to two hybrids of *L. Korolkowii* in the Sub-Collection, *L. amoena* and *L. Arnoldiana*. These have gray-green foliage and small, bright pink, very attractive flowers. *L. chrysantha* from eastern Siberia, with large yellow flowers, is also a conspicuous object at this time. There is a large collection of these Bush Honeysuckles in the general Shrub Collection, and plants of a few of the larger-growing kinds have been planted in the grass border on the right-hand side of the Bussey Hill Road, opposite the Lilac Collection to show how these plants can develop when sufficient room for free growth is given to them.

The Lilacs this year, on the whole, are more covered with flowers than ever before and are now in their best condition. Many of the plants of the newer varieties which have been added to the collection in recent years are now large enough to show their real qualities, and add greatly this year to the beauty and interest of the display.

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Chinese Cotoneasters. Cotoneasters are shrubs or rarely small trees of the Rose Family, related to the Apples, Pears and Hawthorns. The genus has long been known in Europe and eastern Siberia, but it is only in recent years that it has been discovered that the largest number of species of these plants grows in China. The first Chinese species was known to botanists as early as 1832; forty-five years passed before another of these Chinese plants was recognized, and it was not until Henry and Wilson began the systematic exploration of the flora of central and western China that any one suspected its richness in these plants. Now forty-eight or fifty Chinese species and well marked varieties are recognized. Of those with deciduous leaves twenty-four are now well established in the Arboretum. Among them are some of the handsomest shrubs in cultivation, and for this climate at least some of the species are perhaps the most valuable shrubs introduced by Wilson. For the embellishment of northern gardens the introduction and successful cultivation of the Chinese Cotoneasters rank in importance with the improvements made in Europe in recent years in the garden Lilacs, with the forms of hybrid *Philadelphus* made by Lemoine, and with the collection of American Hawthorns discovered and raised in the last sixteen years through the activities of the Arboretum. Some of the Chinese Cotoneasters are low shrubs only a few inches high and admirably suited for the decoration of rock gardens; others are large broad bushes eight or ten feet high; and it is not possible to say which of these plants is the best for some of them are better suited for one purpose and some for another. On some species the leaves are small, thick, dark green and very lustrous; on others

they are thin and of different shades of green, and of different sizes. On some of the species with thick and lustrous leaves the foliage does not fall until the beginning or middle of winter; that of the larger-leaved species falls late in the autumn, on some species assuming in the fall brilliant shades of orange and scarlet. On some species the flowers are bright red, and white on others, and the lustrous fruit which varies greatly in size is black on some of these plants and red on others. As flowering plants the most beautiful in the Arboretum are *C. hupehensis*, *C. racemiflora*, var. *soongarica*, and *C. multiflora*, var. *calocarpa*. These three plants have flowers comparatively large for the genus, about half of an inch in diameter, and bright red shining fruits. The first is a broad, tall and shapely shrub with bright green leaves which will be covered in a few days with flowers which make the plant as conspicuous as any Spiraea. These are followed by small, scarlet fruits which are a good deal hidden by the leaves. *C. racemiflora*, var. *soongarica*, is also a large and vigorous shrub; the flowers are a little larger than those of *C. hupehensis*, the leaves are dull blue-green in color, and the fruit is larger and more showy than that of the last species. *C. multiflora*, var. *calocarpa*, is flowering for the first time in the Arboretum. It is a shrub with slender, gracefully arching stems and blue-green leaves. The arching of the stems makes the flowers, which are borne in erect clusters on short lateral branches, conspicuous and there is now in the Arboretum no shrub in flower more graceful in habit or more charming in the arrangement of its flowers. The fruit of this species, judging by specimens collected in China, is abundantly produced: it is scarlet and about a quarter of an inch in diameter. Of the large-growing species with thick lustrous leaves attention is called to *C. divaricata* with red fruit and *C. nitens* with black fruit. These species have small, globose red flowers which are now open and are large, fast-growing, hardy shrubs valuable through the summer and autumn on account of their beautiful foliage. None of the species are perhaps so attractive in the autumn as *C. foveolata*; this is one of the most vigorous of all the species with larger leaves which late in the season turn brilliant orange and scarlet. The flowers of this plant are red and the fruit is black. The best of the dwarf species in this climate is *C. horizontalis*. This is now the most generally known of the Chinese Cotoneasters, as it was first raised in France forty years ago and has been growing in the Arboretum for more than a quarter of a century. When growing naturally it is a plant not more than two feet high, with wide-spreading branches; it has small, dark green, shining leaves, minute red flowers and small bright red fruit. Here the leaves fall in early winter, but in regions of milder climate they remain on the branches until a new crop appears in the spring. This is an excellent plant for a large rock garden, and in Europe it is often trained to cover low walls, for which purpose it is well suited, although the branches do not naturally attach themselves to stone or brick. *C. horizontalis*, var. *perpusilla* is a dwarf form with rather smaller leaves and is equally useful

for the rock garden. This variety, Mr. Wilson tells us, is the common Cotoneaster of the moorlands of western Hupeh. *C. adpressa*, which is the dwarfest of these plants, is distinguished from *C. horizontalis* by its thinner and less lustrous leaves, larger fruit which ripens several weeks earlier, and by its creeping and often rooting stems which form a dense carpet closely appressed to the ground. There are few shrubs better suited for the rock garden. Most of the Chinese Cotoneasters are with the other new Chinese shrubs on the southern slope of Bussey Hill. On Hickory Path, near Centre Street, can be seen the largest plant of *C. horizontalis* in the Arboretum, several plants of *C. adpressa* and some other species.

Berberis verruculosa, an evergreen Barberry discovered by Wilson in western Szechuan, is flowering freely for the first time in the Arboretum. It is a small shrub with slender, arching stems, thickly covered with dark brown excrescences, small oval leaves dark green and very lustrous on the upper surface and pale below, and small golden yellow flowers which are solitary or produced in few-flowered clusters. The berries are black, oblong or bottle-shaped and covered with a glaucous bloom. On its native mountains this Barberry is said sometimes to grow three feet tall, but the plants in the Arboretum are only a few inches high. These plants have now been growing for several years on the exposed southern slope of Bussey Hill where they have never been injured. *Berberis verruculosa* appears to be the hardiest and for this climate it is probably the most valuable of the Chinese evergreen species. The small size and compact habit make it a good subject for the rock garden.

Aesculus discolor. It is fortunate that the scarlet-flowered variety (var. *mollis*) of this Buckeye is hardy here, for the flowers are not surpassed in brilliancy by the flowers of any other Horsechestnut. On the typical *Aesculus discolor* the flowers have a red calyx and yellow petals generally more or less flushed with rose. This is a much less common plant than the variety *mollis* on which both the calyx and the corolla are bright red. This is a very common plant in Georgia and Alabama and ranges west to southeastern Missouri and to eastern Texas. It is the only red-flowered Buckeye which has been found west of the Mississippi River, and it sometimes reaches the size and assumes the habit of a small tree. On the Edwards Plateau in western Texas there is a yellow-flowered form (var. *flavescens*) which, because it has yellow flowers, was long mistaken by botanists for the Appalachian tree Buckeye, *Aesculus octandra*. *Aesculus discolor* and its varieties can be distinguished from the other American species by the soft covering of pale down on the lower surface of the leaflets, and from all species of the genus except *Aesculus californica* by the pale orange-brown color of the seeds. *Aesculus discolor*, var. *mollis* is just coming into flower in the large bed in the rear of the Horsechestnut Group on the right-hand side of the Meadow Road. Here it is growing with several plants of

Aesculus georgiana. This shrub, which is a native of central Georgia, is covered again with its compact clusters of yellow and rose-colored flowers. Perfectly able apparently to support the New England climate, this Buckeye is one of the handsomest and most interesting southern shrubs which the Arboretum has made known and introduced into gardens.

Aesculus Briotii. This French form of the so-called red-flowered hybrid Horsechestnut (*Aesculus carnea*) is in flower in the Collection. It is the most brilliantly colored of all the forms of *Aesculus carnea*, and few trees hardy in this climate bear such showy flowers. It begins to flower when not more than ten feet high; it is perfectly hardy, and it should be seen more generally in American gardens.

Daphnes. Three white-flowered Daphnes are now in flower on Azalea Path, *D. alpina* from the mountains of central Europe, *D. caucasica* from the Caucasus, and *D. altaica* from the mountains of southern Siberia. They are small, erect-growing shrubs with narrow leaves. *D. alpina* may be distinguished from the others by the downy covering on the lower surface of the young leaves and on the young branchlets. The others are perhaps only geographical forms of one species, but the flowers of *D. altaica* are very fragrant, and those of *D. caucasica* have a disagreeable odor.

American Magnolias. Several of these plants can now be seen in flower in the Magnolia Group on the right-hand side of the Jamaica Plain entrance; those already in flower are *M. Fraseri*, *M. cordata*, *M. acuminata* and *M. tripetala*. *M. macrophylla*, *M. glauca* and the hybrid *M. Thompsoniana* will not open their flower-buds until later.

Diervilla florida, var. venusta. The specimen of this Korean plant on Hickory Path, near Centre Street, is now covered with large deep rose colored flowers and is one of the most strikingly beautiful objects in the Arboretum. As a flowering plant it is doubtful if any other species or any of the numerous hybrids in this genus equals this in beauty.

An illustrated guide to the Arboretum containing a map showing the position of the different groups of plants has recently been published. It will be found useful to persons unfamiliar with the Arboretum. Copies of this guide can be obtained at the Administration Building in the Arboretum, from the Secretary of the Massachusetts Horticultural Society, 300 Massachusetts Avenue, Boston, from The Houghton, Mifflin Company, 4 Park Street, Boston, and at the office of the Harvard Alumni Bulletin, 50 State Street, Boston. Price, 30 cents.

The subscription to these Bulletins is \$1.00 per year, payable in advance.

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The Arboretum in early summer. The Arboretum is never more interesting or more full of beauty than it is in the early days of June. The leaves of most of the deciduous-leaved trees have now attained their full size and this year, thanks to the abundant rains of the spring, they are unusually large and are not yet greatly disfigured by insects. The conifers are now covered with their new leaves and are more beautiful than at any other season of the year. The Arboretum is still full of flowers for this is the time when several American *Viburnums* begin to bloom and some of them have been largely used in border and roadside plantations. Late-flowering Lilacs are in bloom and will continue to open their buds during the month. The Rhododendrons, although later than usual this year, already make a brave show; and the yellow-flowered American Azaleas are beginning to bloom before all the flowers of the Japanese Azaleas have disappeared. Early Cornels, Roses and Mock Oranges are already in flower. A large number of American and Old World Hawthorns are covered with flowers, and many plants in the Horsechestnut Group are exceptionally fine this year. Many of the American Magnolias are still in full bloom, and in the Shrub Collection visitors can find the flowers of many shrubs, including those of many Barberries, to interest them.

Viburnums. There are no small trees better suited for the decoration of American parks and roadsides than the three arborescent *Viburnums* of the eastern United States. The first of these to flower is *V. prunifolium*, the Black Haw of the middle states where it is a common arborescent shrub or small tree on rocky hillsides and in fence-rows, sometimes growing 30 feet high. It has rather narrower leaves than the other arborescent species from which it may be distinguished

by the absence from the leaf stalks of the wing-like margins which are found on those of the other species. The clusters of pure white flowers are rather smaller than those of the others and the fruit is dark blue covered with a glaucous bloom, and remains on the branches until the beginning of winter. This is the common tree *Viburnum* of the middle states, only reaching New England in southwestern Connecticut. It is perfectly hardy in the Arboretum where it has been blooming for two or three weeks and is now passing out of flower. The northern species, *Viburnum Lentago*, the Sheepberry or Nannyberry, has broad and lustrous leaves and large clusters of creamy white flowers which are followed by sweet and rather juicy nearly black or dark blue fruits. This is a common northern tree or treelike shrub often twenty or thirty feet tall, and just now is a conspicuous feature in many parts of the Arboretum. The third arborescent species, *V. rufidulum*, is perhaps the most beautiful of all *Viburnums*. It is a southern tree which naturally does not grow further north than southern Virginia and southern Illinois; in the rich soil found along the borders of river-bottom lands in Mississippi, Louisiana and Arkansas it is a tree often forty feet high with a tall straight trunk and widespreading branches forming a symmetrical round-topped head. The leaves of this tree are thick, dark green, and more lustrous than those of other deciduous-leaved *Viburnums*. The flowers are pure white and are borne in broad, flat-topped clusters, and the fruit is bright blue and covered with a glaucous bloom. This *Viburnum* can be distinguished from the other species by the rusty brown covering of hairs on the margins of the leaf-stalks, branches of the flower-clusters and winter-buds. It has long been an inhabitant of the Arboretum where, although it is hardy in sheltered positions, it is only a shrub and probably will never grow into a tree. The best specimen is on Hickory Path near Centre Street. Of the shrubby species now in flower attention is called to *Viburnum pubescens*, a plant with small pointed leaves and small compact clusters of white flowers which are followed by shining black fruits. There is a large compact group of this shrub on the right-hand side of the Bussey Hill Road opposite the upper end of the Lilac Group now entirely covered with flowers. No other *Viburnum* blooms more profusely. In the same border are now in flower three *Viburnums* of the *Opulus* section of the genus in which the cluster of fertile flowers is surrounded by a ring of large and showy, white, sterile flowers. On the whole, the handsomest of these three plants is the European *Viburnum Opulus* or Guelder Rose. The flower-clusters are smaller perhaps than those of the other species, but the plant grows to a larger size and is more compact in habit; the leaves remain on the branches much later in the season, and the fruit is larger and of a deeper color. The Snowball of old-fashioned gardens is a form of this plant in which all the flowers are sterile (var. *sterile*). There is a form with yellow fruit (var. *xanthocarpum*) and a dwarf form (var. *nanum*) which is a low, compact, little bush which rarely flowers. The American species, *V. americanum* or Cranberry-tree, is a plant of looser habit, with translucent orange-red fruit which hangs on the branches until early spring. The leaves turn in the autumn to bright shades of orange and scarlet. The species of northeastern Asia, *V. Sargentii*, has larger sterile flowers than the other species and is de-

cidedly a handsomer flowering plant. The long-pointed leaves are interesting and of a good color, but the fruit is small, dull in color and inconspicuous. These *Viburnums* are all flowering in the *Viburnum* Collection where many of the Asiatic species are also now in flower.

Early Summer Lilacs. The so-called Persian Lilac (*Syringa persica*) is now in flower. This is a native of Afghanistan and is said to have been cultivated in Persia and India from time immemorial and to have reached eastern Europe nearly three centuries ago. It is a broad, rather low shrub with long-pointed leaves and small fragrant flowers in few-flowered clusters which are crowded at the ends of the slender drooping branches and appear like one long narrow inflorescence. The flowers are pale lilac color. There is a white-flowered form (var. *alba*) and one with deeply lobed leaves (var. *laciniosa*). The Persian Lilacs are graceful and delightful plants, and although they were early brought to the United States they are now too rarely found in American gardens. Crossed with the common Lilac (*S. vulgaris*) the Persian Lilac produced in the Botanic Garden at Rouen a hybrid with broader leaves and immense clusters of reddish flowers intermediate in size between those of its parents. This hybrid is one of the most vigorous, largest and most useful of all Lilacs. Unfortunately it has been called *Syringa chinensis*; it is also known as *S. rothomagensis* and as the Rouen Lilac. There is a variety (var. *alba*) with pale pink, not very attractive flowers, and there are forms with flowers deeper red than those of the type, and with double flowers.

Syringa villosa is a large, very vigorous and hardy shrub from northern China which is now just beginning to open its flower-buds. The flowers are pale rose-color or rarely nearly white, and are produced in immense quantities in short broad clusters. In spite of the disagreeable odor of the flowers this is a valuable plant as it is one of the last of the true Lilacs to flower and greatly prolongs the season of Lilac flowers. Crossed with the Hungarian *S. Josikaea*, which is also now in flower, *S. villosa* has produced in Paris a hybrid race to which the name of *S. Henryi* has been given. One of these hybrids known as Lutèce is now in flower and is one of the handsomest of garden Lilacs. It is a large and vigorous shrub with large dark green leaves and great clusters of blue-purple flowers. Some of the new Chinese species will flower a little later and these will be followed by the tree Lilacs of northeastern Asia.

Robinia Kelseyi. This Rose Acacia, which was discovered only a few years ago on the slopes of the southern Appalachian Mountains, proves a hardy and valuable garden plant. The flowers are smaller and lighter-colored than those of the well known Rose Acacia (*R. hispida*) which flowers a little later, and the branches are not covered with the viscid hairs to which the Rose Acacia owes its name. *R. Kelseyi* is a shrub sometimes growing from six to eleven feet high, with slender stems and branches, leaves composed of nine or eleven narrow lanceolate leaflets which are bronze color as they unfold, and short racemes appearing with the unfolding leaves and composed of from four to seven flowers produced from the axils of the leaves of short lateral young branchlets which grow from end to end of the branches of the previous year. Sometimes as many as four flower-

clusters are developed on one of the short lateral branchlets, and as the flowers in the upper clusters on the branchlet do not open until later than those of the lower clusters the plants are covered with fresh flowers for a long time. This Robinia will probably prove to be a better garden plant than the Rose Acacia, for although the flowers are not as large or of as deep rose-color it does not spread by underground stems, a habit which makes the Rose Acacia a weed which once established it is almost impossible to control.

The Pawpaw (*Asimina triloba*). A colony of this handsome tree, which is very common in the southern states but at the north occurs in only a few isolated stations, is now established on Hickory Path near Centre Street, and this year the leafless branches have been well covered with the curious, dark-brown, bad-smelling flowers. Under favorable conditions the Pawpaw is sometimes a tree forty feet high with a tall stout trunk; it has handsome drooping, dark green leaves often a foot long and six inches wide, but it is chiefly interesting as the only extra-tropical North American tree, with the exception of some of the wild Plums, which produces edible fruit. This is borne in few-fruited clusters and is from three to five inches long and from an inch to an inch and a half in diameter, greenish yellow, becoming almost black when fully ripe with semitranslucent, sweet, luscious flesh. The ripe fruit does not bear transportation and is rarely sold in markets, and so is little known except to boys who live near Pawpaw thickets. The American Genetic Association, however, has now taken up the possibility of the improvement of this fruit and is offering prizes for information about the largest trees, and about trees, regardless of their size, which bear fruit of unusually good quality.

Rhododendron (*Azalea*) *calendulaceum*. Of the American Azaleas the pink-flowered *R. Vaseyi* and the Rhodora are already past blooming. The flowers of two other pink-flowered species, *R. canescens* and *R. nudiflorum*, are fast falling, but *R. calendulaceum* from the Appalachian Mountain slopes, the handsomest of the whole group, is now beginning to open its yellow or orange-colored flowers. This is a perfectly hardy shrub which can be found scattered through the roadside plantations in the Arboretum and in a large mass on the slope below Azalea Path where the variation in the color of the flowers can be studied. As a garden plant this is superior to any of the hybrids which have been in part derived from it. A large number of these hybrids were raised in Europe nearly a century ago by crossing *R. calendulaceum* with the American *R. viscosum* and the Caucasian *R. luteum*. These plants are usually known as Ghent Azaleas, but the correct name for them is *Rhododendron (Azalea) Mortierii*, for the Ghent baker named Mortier who raised a number of such hybrids. As found in nurseries these plants are all grafted and therefore do not grow so well as seedlings. The hardiness of many of them is reduced by the blood of the Caucasian species which is not hardy in this climate, and they are more or less valuable here as garden plants as the influence of the blood of the American species is greater or less. None of them surpass, however, *R. calendulaceum* in the beauty of their flowers and none of them are so long-lived or so satisfactory garden plants.

ARNOLD ARBORETUM

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Laurels. Rarely if ever before have the Arboretum Laurels (*Kalmia latifolia*) been as full of flower-buds as they are now, and by the time this bulletin reaches its Massachusetts readers many of the plants will be covered with flowers. The flowering of the Laurels is the last of the great Arboretum flower shows of the year, and none of those which precede it are more beautiful, for the Mountain Laurel, or the Calico Bush as it is often called, is in the judgment of many flower-lovers the most beautiful of all North American shrubs or small trees. Many Rhododendrons have larger leaves and larger and more brilliantly colored flowers, but of all the broad-leaved evergreen plants which can be grown successfully in this climate the Laurel is the handsomest and most satisfactory. It is not perhaps strange that so little attention has been paid to it by American gardeners for the American gardeners, of earlier generations at least, derived their inspiration almost entirely from England and usually despised American plants as too common for their attention. For some reason which it is not easy to explain *Kalmia latifolia* has never been a popular plant in England where it is still not often seen and where it certainly grows less freely than many species and hybrids of the Rhododendrons. For this reason, perhaps, no distinct forms of the Laurel and no hybrids have been developed by cultivators, and the few recognized variations in the flowers and leaves have all been found on wild plants. Of these there are forms with pure white flowers (var. *alba*) and there is a form with deep pink, nearly red, flowers and rather dark leaves (var. *rubra*). Between these extremes there are others with flowers of all shades of pink, and there is one with flowers conspicuously marked by a chocolate band (var. *fuscata*). There is a dwarf form (var. *myrtifolia*)

with small leaves and small clusters of minute flowers; and there is one in which the corolla is deeply divided into narrow lobes (var. *poly-petala*). This plant, which is not at all ornamental, was found near Deerfield, Massachusetts, and has been propagated and distributed from the Arboretum. A form with broad, handsome, Rhododendron-like leaves (var. *obtusata*) which rarely flowers was found a few years ago near Pomfret, Connecticut. These forms, with the exception of var. *fuscata*, are all established in the general Kalmia collection which is planted on both sides of Hemlock Hill Road at the northern base of Hemlock Hill. This part of the Arboretum where there are other interesting plants, including the collection of Rhododendrons, is easily and quickly reached from the South Street entrance of the Arboretum.

Syringa yunnanensis. This Liliac from southwestern China is now in flower. It has long-pointed, glabrous leaves dull green above and pale below, and large, rather open clusters of small creamy white flowers faintly tinged with rose color, with an unusual and delicate perfume which greatly adds to the attraction of the plant. *S. yunnanensis* is one of the plants introduced by George Forrest through the Bee Company of Liverpool and has now been growing in the Arboretum for several years. Although it first flowered here in 1913, it has not shown its real character as a flowering plant until this season. *S. yunnanensis* can be seen on the lower side of the path which follows the top of the bank occupied by the Lilac Collection.

Syringa Julianae. This Chinese Lilac has flowered in the Arboretum every year since 1909 but never so abundantly as this year. In the shape of the leaves and in the long slender corolla-tube it has something in common with *S. pubescens*. This, however, is a native of the northern part of the empire; it blooms fully three weeks earlier here, and the flower-buds are rose color, not purple. The flowers, too, of *S. Julianae* are without the strong perfume of *S. pubescens* which, especially in the evening, is stronger than that of the flowers of any other Lilac. *S. Julianae* is one of the most distinct of the numerous Lilacs discovered by Wilson in western China and promises to be a useful garden plant here, if for no other reason, on account of the lateness of the flowers. It can be seen with all the other Chinese Lilacs discovered by Wilson nearly opposite the plant of *S. yunnanensis* on the path at the top of the Lilac bank.

Caragana Maximowicziana. This is a good addition to the so-called Siberian Pea-trees which can be successfully grown in northern gardens. It is a shrub with slender, wide-spreading and arching, spiny stems, small pinnate leaves and narrow, canary yellow flowers which are produced in great numbers and appear later than those of the other Caraganas in the collection. It is a native of northern China and first flowered in the Arboretum two years ago when not more than two feet high. Plants in flower can be seen in the Shrub Collection and among the Chinese plants on the southern slope of Bussey Hill.

Photinia villosa. This is a small tree or arborescent shrub of a genus of the Rose Family closely related to Crataegus and Cotoneaster and is widely distributed in eastern Asia. It has thick, dark green leaves and white flowers produced in great profusion in compact, many-

flowered, flat-topped clusters, terminal on short leafy branches of the year, and oval, bright scarlet fruit about a third of an inch long. *P. villosa* is now in flower in the Shrub Collection and in some of the border plantations, and growing with it in the Shrub Collection is a variety (var. *laevis*) which is already out of flower. This is a tall shrub with numerous slender, spreading stems and branches, narrower leaves, and handsomer and more abundant fruits. The leaves of these two plants assume in the autumn brilliant shades of orange and scarlet.

Kolkwitzia amabilis. The specimen of this Chinese plant suffered during the winter in the low ground occupied by the general Shrub Collection, but on the southern slope of Bussey Hill where it is planted with the other new Chinese shrubs it has proved perfectly hardy and is now in flower. *Kolkwitzia* is related to *Diervilla* and *Abelia*, and the flowers are borne in pairs on long stems at the ends of short, lateral, leafy branchlets and are an inch long with a two-lobed oblique corolla deep rose color in the bud, becoming paler after opening, the inner surface of the three divisions of the lower lobe being white blotched with orange color at the base. As a flowering shrub this is one of the most beautiful and interesting of recent introductions from China.

Sophora viciifolia. Shrubs with blue flowers hardy in this climate are rare, and none of them are as satisfactory as this *Sophora* which is a native of central and western China, where it is a common under-shrub in dry hot valleys. It has been growing in the Arboretum for several years; it is now about four feet high, and produces its small blue and white pea-shaped flowers every year in great profusion. It can be seen in flower on Hickory Path near Centre Street, and with the other Chinese shrubs on the southern slope of Bussey Hill.

Philadelphus. Some of the plants of the large Arboretum collection of *Philadelphus*, or Mock Orange, are already in flower. The earliest to bloom is *P. Schrenkii*, var. *Jackii*, a plant discovered by Mr. Jack in Corea a few years ago. It is a dwarf shrub with erect stems and rather small flowers, and is chiefly valuable for its earliness. *P. hirsutus* from the southern Appalachian Mountain region is also in flower. This is a small-flowered species, and in cultivation is a large, loose-growing shrub of unattractive habit, and compared with many of the plants of this group has little value as a garden plant.

Neillia sinensis. This member of a genus of the Rose Family, closely related to the North American Ninebark (*Physocarpus*) and to the *Spiraeas*, is flowering for the fourth year in the Arboretum and by some enthusiastic visitors is considered the most beautiful of the shrubs brought here from China in recent years. It has very slender, rather pendulous branches, red-brown bark, which, like that of the Ninebark, separates freely into long, narrow shred-like scales, long-pointed, more or less deeply lobed leaves, and narrow clear pink, bell-shaped flowers nearly half an inch long, in spreading and slightly drooping, many-flowered racemes about three inches in length and terminal on short, slender leafy branchlets of the year. The pointed pod-like fruit, which is covered with long glandular hairs, is not more ornamental than that of the Ninebark. There are two other Chinese species now in the Arboretum but they have not yet flowered. The

largest plants of *N. sinensis* are on Hickory Path near Centre Street, and it can also be seen in the collection of Chinese shrubs on the southern slope of Bussey Hill.

Dwarf Hawthorns. Among the dwarf Hawthorns of the United States are a number of plants which promise to be of great value for the decoration of gardens, where, however, they are still almost unknown; indeed until a few years ago they had been almost entirely overlooked or neglected by botanists and gardeners. One dwarf species, however, *C. uniflora*, was cultivated in England by Bishop Compton as early as 1713 and is still occasionally met with in gardens. It is a shrub a foot or two high with small leaves, and small flowers in one or rarely in two-flowered clusters, and green fruit. This little shrub grows in sandy soil from Pennsylvania to Alabama, usually in the region near the coast. It is now in flower in the Arboretum and has no great value as a garden plant. It is interesting, however, as the type of one of the natural groups, the Uniflorae, in which the species of Hawthorns are arranged. Another species of this group, *C. Smithii*, is also in flower. This little shrub is a native of western Pennsylvania and is distinguished by the serration of its leaves and by its two- or three-flowered flower-clusters. Only one other dwarf species, *C. intricata*, was cultivated before 1900 when the Arboretum began the systematic study of American Hawthorns. This shrub was described in Europe in 1894 from a plant cultivated in the Botanic Garden at Copenhagen and has been made the type of the Intricatae Group. The plants of this group are mostly shrubs from one to four feet high, although in the southern Appalachian region a few of the species become small trees. The largest number of species is found in Pennsylvania but these plants are not rare in southern New England, New York and Ontario. Only a few have been found in the region west of the Mississippi River and they do not occur in the coast region of the South Atlantic and Gulf States. These plants mostly flower late and have large and showy flowers usually in few-flowered clusters, and large, red, yellow or green, late-ripening fruit. A number of the Intricatae are flowering in the Arboretum this year where they can be seen on the lower side of the road at the eastern base of Peter's Hill, directly north of the Crabapple Collection. *Crataegus triflora*, the type of another group, the Triflorae, is also in flower here. This is a shrub with large leaves, flowers probably larger than those of any other dwarf Hawthorn, and often an inch and a quarter in diameter, in from three- to six-, usually only three-flowered clusters, and large dull red fruit. A comparatively rare plant, *C. triflora* grows on the bluffs of the Coosa River, at Rome, Georgia, in one or two places in northern Alabama, and in northeastern Mississippi.

Lonicera pileata. Evergreen shrubs hardy in this climate are so few in number that it is desirable to call attention to this little Chinese Honeysuckle which has now been growing without protection in the Arboretum for several years and has been in flower for several weeks. It has prostrate stems which form a low compact mat, leaves which resemble those of some form of the Box-tree, and small, pale-yellow, very fragrant flowers. This Honeysuckle should prove an excellent plant for the rock garden. Plants can be seen on Hickory Path near Centre Street and in the collection of Chinese shrubs on the southern slope of Bussey Hill.

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Summer-flowering American Viburnums. For many flowers the Arboretum is indebted in early summer to four American species of *Viburnum* which have been used in large numbers in its borders and roadside plantations. The earliest of these, *V. dentatum*, is already in bloom; it has handsome dark green leaves conspicuously toothed on the margins, and broad flat clusters of white flowers which are followed in early autumn by bright blue fruits on erect stems. This is a common roadside and meadow shrub in the northeastern part of the country. The second of these four *Viburnums*, *V. cassinoides*, is also in bloom. It is a native of swamps in the northeastern part of the country where it sometimes grows twenty feet high with slender straggling stems. In cultivation it forms a broad, low, round-topped bush, and has proved one of the handsomest of all the *Viburnums* introduced into the Arboretum. The leaves are thick and lustrous and vary greatly in size and shape. The flowers are slightly tinged with yellow and are borne in wide slightly convex clusters which also vary greatly in size. The fruit is larger than that of the other summer-flowering American species, and at first yellow-green later becomes pink, and finally blue-black and covered with a pale bloom, fruit of the three colors occurring in early autumn in the same cluster. In the *Viburnum* Collection, near the junction of the Bussey Hill and the Valley Roads, there are a number of plants of this *Viburnum* selected to show the variation in the shape of the leaves and in the size of the flower-clusters. The third of these summer flowering *Viburnums*, *V. venosum*, resembles in its general appearance *V. dentatum* but it flowers two weeks later, and the young branchlets and the lower surface of the leaves are thickly covered with a coat of stellate hairs. This *Viburnum* is found growing naturally only in the neighborhood of the

coast from Cape Cod and Nantucket to New Jersey. A larger and a handsomer plant with larger leaves, more showy flowers and larger, later-ripening fruit, *V. Canbyi* is the fourth of these species. It is a native of eastern Pennsylvania and northern Delaware where it is not common, and of central Indiana; and it is the last of all the *Viburnum*s in the Arboretum to flower. There are large specimens of this plant in front of the Administration Building and at other points on the Meadow Road. All these *Viburnum*s can be improved by cultivation and with generous treatment grow into larger and handsomer bushes than the wild plants, and bear larger leaves and better flowers and fruit. Few shrubs better deserve a place in American parks and gardens where they are still less often seen than they should be. Two rare American *Viburnum*s can now be seen in flower in the Arboretum, *V. molle*, a native of southern Kentucky and southern Missouri, with which *V. venosum* was once confused, and *V. bracteatum* which is known to grow naturally only on the cliffs of the Coosa River near Rome, Georgia. One of the few plants in cultivation is on Hickory Path near Centre Street. *V. mollis* is in the general *Viburnum* Collection.

Red-fruited *Viburnum*s. With the exception of the species which belong to the *Opulus* Group no American *Viburnum*s have red fruit, but in eastern Asia there are several red-fruited species. The handsomest of these in the Arboretum is *V. dilatatum*, which is a native of Japan, Korea, and western China. It is a large, shapely and vigorous shrub with broad, abruptly pointed leaves and wide flat clusters of flowers which are followed by small bright red fruits. This is a good shrub for the decoration of summer and autumn gardens. It is in the general *Viburnum* Collection, and there are good plants on the right-hand side of the Bussey Hill Road opposite the upper end of the Lilac Group. The fruit is smaller and less showy than that of another red-fruited Japanese species, *V. Wrightii*. This is a smaller shrub and flowered some time ago. The flower-clusters are smaller than those of *V. dilatatum* and the plants are not always perfectly hardy in exposed situations, but the fruit is larger and handsomer than that of the other red-fruited *Viburnum*s of eastern Asia. Another of these plants, *V. theiferum*, from western China is not yet in flower. It is a tall, narrow shrub with erect stems, small leaves and small flower-clusters. It has little to recommend it as a flowering plant but the fruit is large, abundant and of good color, and the plant has an economic interest as an infusion of the leaves is the "sweet tea" used by the monks of the monasteries on Mt. Omei, one of the five sacred mountains of China.

Magnolia glauca in the *Magnolia* Collection, on the right-hand side of the Jamaica Plain entrance, is covered again with flowers. Although it has often been insisted on in these bulletins, the fact that this is one of the handsomest plants which can be grown in our gardens cannot be too often repeated. Often a large tree in the southern states, at the north *M. glauca* never grows to any great size and is more often a large shrub than a tree. The leaves are dark green and very lustrous on the upper surface and silvery white on the lower surface. In the south they remain on the branches until spring; here they retain their brilliancy and do not fall until December. The flowers are

small, cup-shapes, and during many weeks fill the air, especially in the evening, with a delightful fragrance. There is no plant which will give here at the north a greater return in beauty and fragrance, yet it is impossible to find this Magnolia in any quantity in American nurseries, and it is still unknown to most American planters of this generation.

Lonicera pileata. To persons who admire plants which produce beautiful fruits this little Chinese Honeysuckle will be a delight. It is a shrub which does not grow more than two or three feet high. The leaves vary from one to two inches in length; on the upper surface they are dark yellowish green and lustrous, and are silvery white on the lower surface. The flowers are pale yellow, about a third of an inch long and are not conspicuous, and the great beauty of this plant is in the fruit. This is half an inch broad, square at the ends, somewhat compressed, wider than high, bright scarlet and translucent. It hangs down from the lateral branchlets on slender stalks two-thirds of an inch in length. The earliest fruit ripened several days ago, but as that which develops from the axils of leaves higher on the branchlet ripens later the plant is conspicuous for its fruit for a long time. *L. pileata* is a common woodland shrub in central and western China where it was discovered by Dr. Augustine Henry. It was introduced into gardens by Wilson and first flowered in the Arboretum in 1913. It can now be seen on the southern slope of Bussey Hill with the other new Chinese Honeysuckles in the collection of Chinese shrubs.

Styrax japonicus. Although at least one hundred species of *Styrax* are now recognized, with four species in the southern United States and one in California, only two Japanese species up to the present time have proved really hardy in the Arboretum. The more satisfactory of these two species, *S. japonicus*, is a large shrub which is covered every year at this time with white bell-shaped flowers which hang down from the branches on long slender stems. The globose, drupelike dry fruits are not particularly ornamental, and the leaves fall late in the autumn without change of color. There is a group of large plants of this *Styrax* on Hickory Path, near Centre Street, and that it is perfectly at home there is shown by the innumerable seedlings which every spring come up under the plants. The other Japanese species, *S. Obassi*, is a small tree with larger leaves than those of *S. japonicus*, and flowers in long drooping clusters; it can be seen on the upper side of Azalea Path where it is quite hardy but does not flower.

Cotinus. In the Sumach Group, on the left-hand side of the Valley Road and opposite the Euonymus Group, the Smoke-tree (*Cotinus Coggryia*) is in bloom. The flowers are very small, in loosely arranged clusters and are not at all conspicuous; and it is their much lengthened hairy colored stems which are interesting and showy, and make this plant such a feature of the summer garden. The fruit is small and of no particular beauty, but in the autumn the dark green leaves sometimes assume dull shades of red and orange. The Smoke-tree is a native of southern and southeastern Europe, the Himalaya and western China, and is perfectly hardy in New England where it was probably brought early from Old England where it was cultivated soon after the middle of the seventeenth century. In the same group there is a large specimen of the American species, *C. americanus*. This as

it grows in the south is sometimes a tree thirty feet tall with a stout trunk a foot in diameter, but here in the Arboretum it is always bush-like in habit. The leaves are often six inches long and four inches wide, of a cheerful light and yellow-green color, and in the autumn they turn to most brilliant shades of orange and scarlet. In this autumn color is found the chief ornamental value of this plant, for the lengthening stalks of the flowers makes little show in comparison with those of the European plant. *Cotinus americanus* grows only in a few isolated stations in the southern states from northern Alabama to southern Missouri, Oklahoma and eastern Texas, and has been considered a comparatively rare plant, but this year Mr. E. J. Palmer has found it as a small shrub covering thousands of acres in the rocky cañons and on the steep hillsides near Spanish Pass in Kendall County, Texas.

Philadelphus. Few genera of hardy shrubs give as much beauty to summer gardens as *Philadelphus* or, as it is popularly called, Mock Orange or *Syringa*, and to few genera of cultivated plants have so many important additions been made in recent years. As early as 1811 English gardeners cultivated only two species, and twelve years later only eleven species were recognized by botanists. Now there are established in the Arboretum some thirty species and a large number of varieties and hybrids. The beauty of these plants is found in their white flowers; the fruit, which is a dry capsule, has as little beauty as that of a Lilac. There is nothing particularly interesting in the habit of any of the plants, and the leaves fall early in the autumn without change of color. As flowering plants, however, not many shrubs surpass them in beauty, and the importance of the group is increased by the length of the flowering season which in the Arboretum extends through six weeks. *Philadelphus* has gained most by the art of the hybridizer, although the handsomest, perhaps, of the Old World species, *P. purpurascens*, is of recent introduction, having been discovered only a few years ago by Wilson in China. The first of the hybrids to attract attention was raised in France before 1870 by Monsieur Billard and is sometimes called *Souvenir de Billard*, although the oldest and correct name for this plant is *P. insignis*. This is one of the most beautiful of the large-growing *Syringas* and one of the last of the whole group to flower. A hybrid between two of the American species appeared a few years ago in the Arboretum and has been named *P. splendens*. This is a large-growing and very vigorous plant with unusually large scentless flowers, and one of the handsomest plants in the collection. Another supposed hybrid is *P. maximus*; this grows to a larger size than other *Syringas* and plants from twenty to thirty feet high can sometimes be found in old Massachusetts gardens where this plant is not rare. One of the greatest gardening triumphs was achieved by Lemoine at Nancy when a few years ago he had the happy inspiration to cross *P. coronarius*, the Mock Orange of old gardens, with the dwarf Rocky Mountain *P. microphyllus*, a shrub with small leaves and small very fragrant flowers. The first plant obtained by this cross was named *Philadelphus Lemoinei*; it is a perfectly hardy shrub four or five feet high and broad, with slender stems which are now bending under the weight of fragrant flowers which are intermediate in size between those of the two parents. Many distinct forms of this hybrid are in the collection.

ARNOLD ARBORETUM

HARVARD UNIVERSITY



BULLETIN

OF

POPULAR INFORMATION

JAMAICA PLAIN, MASS.

JULY 1, 1916

Tree Lilacs. This name is often given to three large-growing Lilacs of northeastern Asia which are now in flower and are conspicuous objects in the Arboretum. These plants all have white flowers in large clusters, and differ from other Lilacs in the shape of their flowers. In all other Lilacs the tube of the corolla is much longer than the calyx and longer than the stamens which are enclosed by it, while in the Tree Lilacs the tube of the corolla is not much longer than the calyx and shorter than the stamens which are therefore seen when the flowers open. On account of this difference in their flowers the Tree Lilacs have been thought by some botanists to belong to a different genus to which the name *Ligustrina* was given, and this is now the name of the section of the genus *Syringa* in which they are placed. The three species are much alike and only differ in the shape of the leaves, in the size of the flower-clusters and in the time of flowering. They lose their leaves early in the autumn without any change of color, and in this early shedding of their leaves is found their only drawback as garden plants for they are all hardy, grow rapidly, are good in habit and bloom freely, although the flowers of one of the species, *Syringa japonica*, are usually produced more abundantly in alternate years. The first of these plants to bloom, *S. amurensis*, is a native of eastern Siberia and northern China, and is a small, bushy, rather flat-topped tree which in cultivation rarely exceeds twenty feet in height. The leaves are thick, dark green, long-pointed, from three to four inches long and from two and a half to three inches wide, and the spreading and slightly drooping flower-clusters are usually from twelve to fourteen inches long and broad. This plant was first raised in this country before 1870 in the Harvard Botanic Garden from seeds received from the Botanic Garden at St. Peters-

burg. It appears to be less commonly cultivated than the other Tree Lilacs. Judging by the climate of the region where it grows naturally, it will probably prove one of the best shrubs or small trees for the northern interior region of Canada and for the northern states of the Mississippi valley. *S. pekinensis* is usually the next of the three Tree Lilacs to bloom, although this year it is beginning to flower rather later than *S. japonica*. It is a native of northern China and is a shrub rather than a tree, although it sometimes grows in this country thirty feet high, with numerous stout, spreading stems distinctly drooping at the ends and covered with light yellowish brown bark separating into thin layers like that of some of the Birch-trees. The leaves are narrower than those of the other species, long-pointed, drooping on long stalks, and usually about three inches long and from half an inch to an inch wide. The flower-clusters, which are produced every year in immense numbers, are smaller than those of the other Tree Lilacs and are flat, very unsymmetrical, partly drooping and about five or six inches long and broad. This fine plant has been growing in the Arboretum since 1883 when it was raised from seeds sent here from Peking by the late Dr. Bretschneider. *S. pekinensis* has been somewhat distributed by American nurserymen and there are now large specimens in several Massachusetts gardens. The last of the three Tree Lilacs, *S. japonica*, is a native of the forests of northern Japan and a tree sometimes forty feet high with a tall stem sometimes a foot or more in diameter and covered with lustrous reddish brown bark like that of a Cherry-tree, and comparatively small, spreading and ascending branches which form a rather narrow round-topped head. The leaves are dark green, lustrous, four or five inches long and about two and a half inches wide, and the flower-clusters, which are erect and more symmetrical than those of the other Tree Lilacs, are from twelve to eighteen inches long and from twelve to fourteen inches wide. This tree was first cultivated in the Arboretum from seeds sent here from Sapporo in Hokkaido in 1876 by Mr. W. S. Clark, the first president of the Agricultural College at Sapporo. The seedlings grow rapidly and in 1886 were fifteen or sixteen feet high. The Tree Lilacs are growing on the bank on the left-hand side of the Bussey Hill Road in the Lilac Collection, and one of the original seedlings of *S. japonica* which was planted in what was once a nursery can be seen on the left-hand side of the Forest Hills Road in front of the Crabapple Collection. This is the year for the abundant bloom of the Japanese species and the plants are covered with flower-clusters.

Salvia officinalis. This little aromatic shrub is now in bloom in the Shrub Collection. The flowers are bright purple, showy, about three-quarters of an inch long, and are arranged in erect, terminal, compound racemes six inches in length. This plant is a native of southern Europe and has been cultivated in Europe for centuries for medicinal and culinary purposes, and formerly was much used in making "sage tea." Although rarely seen outside of the kitchen garden, it is well worth a place as a flowering plant in a collection of dwarf shrubs.

Thymus Serpyllum. This is another fragrant plant of the same family as the Salvia, and is growing near it in the Shrub Collection where it forms a broad mat of light green leaves only a few inches high. In a few days this will be covered with innumerable small lilac-colored flowers. The "Mother of Thyme," as this plant is sometimes

called, is an old inhabitant of gardens and is a useful rock garden plant. The fragrant leaves are sometimes used like those of the common Thyme in cooking.

Philadelphus purpurascens. This Chinese species is now covered with flowers. It is a large, vigorous shrub with long arching branches from which numerous branchlets spread at broad angles and are from four to six inches long; on these are borne on drooping stems the flowers which have a strong pungent and delightful odor, and are about an inch and a half in diameter with a light purple calyx and pure white petals which do not spread like those of many of the species but form a bell-shaped corolla. This is one of the most distinct and beautiful of all the Old World species, and one of Wilson's important introductions from western China. It can best be seen in the Philadelphia Group on the Bussey Hill Road opposite the Lilacs.

Philadelphus inodorus. This native of the southern Appalachian foothill region, although the flowers are without fragrance, is for many persons the most beautiful plant of the genus. It is one of the medium-sized species with gracefully arching stems and pure white, cup-shaped flowers from an inch and a half to two inches in diameter. It is not often seen in gardens, although it was one of the first species of *Philadelphus* cultivated in Europe where it was first seen about the middle of the eighteenth century. The plants in the Shrub Collection and in the Bussey Hill Group are now covered with flowers.

A double-flowered Philadelphus. A *Philadelphus* raised by Lemoine and called by him *Argentina* is flowering for the first time on Bussey Hill Road. It is still a small shrub with erect, rather rigid stems now covered with large semi-double flowers which look like small white roses. More curious than beautiful, this addition to summer-flowering garden shrubs will perhaps be valued by persons who admire floral monstrosities.

Aesculus Harbisonii. This interesting plant which unfolds its leaves later than any other in this group and, with the exception of *A. parvifolia*, is the last to flower, is now blooming near the other dwarf Buckeyes. Two individuals of this peculiar plant appeared here in 1905 among a number of seedlings of *A. georgiana* and are believed to be hybrids of that species and the red-flowered variety of *A. discolor*, the two species growing together where the seed was gathered near Stone Mountain in central Georgia. The leaves of this hybrid are lighter green than those of either of its supposed parents; the flowers are borne on stout red stems in broad red panicles and are about three-quarters of an inch in length with a rose-colored calyx and canary yellow petals tinged with red toward the margins. The hybrid origin of these plants is shown by the fact that glands and hairs are mixed together on the margins of the petals, hairs only being found on the margins of the petals of plants of the group of *Aesculus* to which *A. georgiana* belongs and only glands on those of the plants of the group to which *A. discolor* belongs, so that when both hairs and glands are found on the margins of the petals of one of the Buckeyes it is good evidence that the plants are of hybrid origin.

Cornus racemosa. This northern Cornel has been largely used in the Arboretum in roadside plantations and is now conspicuous as the

plants are covered with their small clusters of creamy white flowers. These later in the season will be followed by white, translucent fruits borne on bright red stalks. This Cornel blooms here with some of the native Roses and their pink flowers compose perfectly with the white flowers of the Cornel; and when these plants are used together, as along some of the Arboretum roads, delightful effects are obtained.

June-flowering Hydrangeas. For a quarter of a century *Hydrangea Bretschneideri*, a native of northern China, has been a favorite plant in the Arboretum. It is a large and vigorous shrub with dark green leaves and flat heads of fertile flowers surrounded, as in other species of *Hydrangea*, by a ring of pure white ray flowers. The largest plant of this *Hydrangea* in the Arboretum is at Mr. Dawson's house on Centre Street. Several of the *Hydrangeas* introduced by Wilson from western China are now in flower in the collection of Chinese Shrubs on Bussey Hill and for the first time show their real value as garden plants in this climate. The tallest and most vigorous of these plants is *Hydrangea Rosthornii*, which is already eight feet high, with flower-clusters eight inches across. *H. xanthoneura* is closely related to *H. Bretschneideri* and can only be distinguished from it by a slight variation in the shape of the leaves, and by the almost entire absence of hairs from their lower surface. The plants are now covered with flower-clusters which are about eight inches across. Two forms of this *Hydrangea*, var. *Wilsonii* and var. *seichuenensis* are also in bloom, and as garden plants are as valuable as the species itself.

***Hydrangea petiolaris*.** There are now few handsomer plants in the Arboretum than the specimen of this climbing *Hydrangea* on the Administration Building, although the long-stalked white ray flowers which surround the clusters of fertile flowers are beginning to fall. There are about a hundred of the flower-clusters on the plant and many of them are eight or nine inches across and terminal on short lateral branchlets which stand out from the body of the plant and give it an irregular surface which adds to its beauty. This *Hydrangea* is certainly the best deciduous-leaved climbing plant which can be grown against brick or stone walls in this climate.

***Potentilla fruticosa Veitchii*.** This white-flowered form of the widely distributed yellow-flowered Cinquefoil is an excellent garden plant in this climate. It is dwarf in habit, blooms freely every year, and the plants are covered with flowers during several weeks. It can be seen in the general Shrub Collection and with the other Chinese shrubs on Bussey Hill.

Potentilla tridentata is an excellent little rock garden shrub not often seen in cultivation. It is a native of eastern North America where, especially on the coast, it is common in rocky and exposed situations. The leaves are composed of three leaflets which are dark green and very lustrous, and the small white flowers are produced in several flowered-clusters standing well up above the plant on long stems. This is well established in the general Shrub Collection where it is now flowering.

***Lonicera saccata*.** By an unfortunate error "*Lonicera pileata*" was printed on page 35 of the last of these Bulletins instead of *Lonicera saccata*, the plant which was there described.

ARNOLD ARBORETUM

HARVARD UNIVERSITY



BULLETIN

OF

POPULAR INFORMATION

JAMAICA PLAIN, MASS.

JULY 6, 1916

Lindens are the most important of the summer-flowering trees in this climate, and many of the plants in the Arboretum collection are now large enough to flower and to be interesting; although none of them are old enough to show the form and bark of mature trees. Linden trees are very generally distributed in all the temperate regions of the northern hemisphere with the exception of western North America, and, in addition to numerous species, several hybrids are cultivated. All the species are very similar in flower and fruit, and chiefly vary in the size and shape of their leaves, in the presence or absence of hairs on the leaves and branchlets, and in the nature of their hairy covering when it occurs. A fact not easy to explain is the presence in the flowers of all the American species of five petal-like scales opposite the petals and connected with the clusters of stamens, while in the flowers of all the Old World Lindens such scales do not exist. It is almost a universal rule that the trees of eastern North America and eastern Asia are more successful here in cultivation than those of Europe, but an exception is found in the Lindens. All the European species and many of their hybrids flourish here and some of them have grown in Massachusetts to a large size. Of the American species cultivated plants of the northern *T. americana* suffer greatly, especially when used as street trees, from the attacks of the red spider which often badly disfigures the leaves, and the leaves of this tree suffer, too, from various fungal diseases. The silver-leaved *T. heterophylla* from the South may do better in this part of the country but not much is yet known of it as a cultivated tree. There are other Linden trees, natives of the extreme southern states, but none of them have been cultivated except occasionally in southern towns. Judging by the results obtained in the Arboretum none of the

Asiatic Lindens promise to become valuable trees here, although the species recently discovered in western China are still so young that it is not possible to say much about them. Species, however, from Japan, eastern Siberia and Manchuria have been cultivated in the Arboretum for several years, and of these only *T. japonica* and *T. mongolica* have ever grown large enough to flower and produce seeds. The former is a small tree here with gracefully drooping branches and is conspicuous in early spring as the small yellow-green leaves appear a week or two earlier than those of any other Linden in the collection. It is one of the latest species to flower. *T. mongolica* is a small, short-lived tree with small, long-pointed shining leaves and is of no value except as a botanical curiosity. The best plants in the country of this Linden are now in Rochester, New York. The four European species and some of the hybrids between these species, and between them and the American species, all flourish in the northern and middle states; and the largest and handsomest Linden-tree which has been planted in the neighborhood of Boston is a supposed hybrid between the two species of eastern Europe, *T. platyphyllos* and *T. cordata*, and known as *T. vulgaris*, *T. europaea*, *T. intermedia* and *T. hybrida*. Although widely distributed in central Europe, this tree is much less common than either of its supposed parents; this fact and the variation in the size, shape and color of the leaves on different individuals make its hybrid origin possible, but whatever its origin this Linden is an excellent tree to plant here in rich moist soil where abundant space for free development can be allowed to it. The two silver-leaved Lindens of eastern Europe, *T. argentea* and *T. petiolaris*, are distinct and handsome trees which might well be more generally seen in New England plantations. The former, which is common in the forests of Hungary, is a large tree with erect-growing branches forming a compact, round-topped head, and large, erect-growing leaves dark green above and silvery white below. This tree has been a good deal planted in some of the parks in New York City where large and interesting specimens can now be seen. It does not appear to be well known in Massachusetts. *T. petiolaris* is better known in New England, and there are large and beautiful specimens of this tree growing in Newport, Rhode Island. Like those of *T. argentea*, the leaves of this tree are silvery white on the lower surface; they droop, however, on long slender stems and flutter gracefully in the slightest breeze. The branches, too, are drooping and form a narrow open head. *T. petiolaris* is not known in a wild state and is of very uncertain origin. A supposed hybrid of this tree with *T. americana* is one of the handsomest of all Linden trees; it has been called *T. vestita* and *T. hybrida spectabilis*. The leaves are of the size and shape of those of the American parent but are silvery white on the lower surface. The flowers of the earliest of the Lindens, the European *T. platyphyllos*, have been open for several days, and for another month Linden-flowers in the Arboretum will fill the air with fragrance and delight the bees with abundant nectar. The Linden Collection occupies the meadow on the right-hand side of the Meadow Road beyond the Administration Building.

Sambucus canadensis. This is the last of the native shrubs to make a conspicuous show of flowers in the Arboretum, and as the corollas of the Laurels begin to fall the wide, flat flower-clusters of the black-fruited Elder begin to whiten. Few native shrubs make a greater

show of flowers and fruits, and the numerous Elders sown by birds on the banks of the Bussey Brook in the valley north of Hemlock Hill, and by the little ponds near the junction of the Meadow and Bussey Hill Roads add much to the beauty of the Arboretum in July. Growing with *Sambucus canadensis* in the Shrub Collection is a form with leaflets deeply divided into narrow segments (var. *acutiloba*) and more curious than beautiful. There are here also a form with yellow fruit (var. *chlorocarpa*), and var. *maxima*, which originated a few years ago in a European nursery and which has flower-clusters three times as large as those of the wild plant and such large and heavy bunches of fruit that the branches can hardly support them. A variety with yellow leaves (var. *aurea*) is also in the collection. More objectionable than many yellow-leaved shrubs because it is hardier and grows more rapidly to a larger size than some of them, this plant now disfigures many European gardens and is too often seen in those of this country.

Zelkova serrata, or, as it is more generally known, *Z. keaki*, Keaki being the Japanese name for this tree, is one of the important trees of Japan. Although no longer very common or of a large size in the Japanese forests, it is one of the largest of Japanese trees, for specimens one hundred feet high with trunks from eight to ten feet in diameter are not uncommon in temple gardens and by village roadsides. The wood is more valued by the Japanese than that of any other tree; it is tough, elastic and durable both in the ground and when exposed to the air, and is considered the best building material in the empire. Keaki, however, has now become so scarce that it is not used for building except in temples in which the large, round, light brown, polished columns which support the roof are always made of this wood; it is universally used in the manufacture of jinrikishas, and it is still much employed in cabinet-making and turnery. *Zelkova* is a genus related to *Ulmus*. The leaves resemble those of some of the small-leaved Elms; the male and female organs, however, are in separate flowers on different parts of the branch; the fruit is a small drupe, and the bark is more like that of a Beech-tree than of an Elm-tree. The Keaki is probably worth general cultivation as a timber tree in some parts of the United States. That it can flourish here at least for many years is shown by the trees planted in Warren, Rhode Island, in 1862, by the late Dr. George R. Hall. Thirty years later these trees were fifty feet high with trunks a foot in diameter, and were producing large crops of seeds from which seedling plants were growing spontaneously in large numbers. Two of these seedlings can be seen in the Arboretum in the *Celtis* Group on the slope below the right-hand side of the Bussey Hill Road above the group of *Sassafras* trees. Here may be seen, too, a young plant of the Caucasian species, *Z. crenata*. This has been a difficult plant to establish in the Arboretum but there is a picturesque old specimen in the Harvard Botanic Garden.

Hemiptelea Davidii. Specimens of this interesting tree from northern China, known as the "Prickly Elm," are established in the *Celtis* Group and larger specimens can be seen in the nursery near the top of Peter's Hill. In foliage this tree also looks like a small-leaved Elm but the branches are furnished with sharp thorns. The flowers are similar to those of the *Zelkova*, but the fruit is slightly winged and distinctly short stalked. Of no particular value as an ornamental

tree, *Hemiptelea* is of much botanical interest as the representative of one of the monotypic genera of trees which are such a conspicuous feature in the flora of China.

***Eucommia ulmoides*.** This, the so-called "Hardy Rubber-tree," which has been of more interest to the energetic newspaper reporter than it can ever be to the manufacturer of rubber goods, is also monotypic. It is a small tree with inconspicuous flowers, and fruits which have some resemblance in shape to those of an Elm-tree. The leaves are thick, dark green, very lustrous, and five or six inches long, and give ornamental value to the tree. *Eucommia* is a native of central and western China where it is cultivated in the neighborhood of houses for the bark which yields a drug valued by the Chinese. The leaves and bark contain an elastic gum but in such small quantities that it can have no commercial significance. *Eucommia* is perfectly hardy and is now well established in the Arboretum. Plants can be seen on the upper side of Azalea Path.

***Magnolia macrophylla*.** This, the last of the Arboretum *Magnolias* to bloom, is now opening its flower-buds. It is a handsome small tree of good habit, and particularly interesting from the fact that of all the trees which grow beyond the tropics it has the largest leaves and the largest flowers. The leaves are from twenty to thirty inches long and from eight to nine inches wide, and are silvery white on the lower surface. The cup-shaped creamy white, fragrant flowers are often a foot in diameter. This southern tree is perfectly hardy in the northern states, but it should be planted in sheltered positions that the delicate leaves may be protected from the wind which tears and disfigures them.

***Tripterygium Regelii*.** This is a near relative of the Bitter Sweet (*Celastrus*), a native of northern Japan and Korea, and one of the plants brought to the Arboretum by Mr. Jack from Korea; it is still rare in gardens. It is a half-climbing shrub with stems sometimes thirty feet long on its native hill sides, long-pointed dark green leaves often six inches long, small white flowers in terminal clusters often ten inches in length, and three-lobed and three-winged fruits rather more than half an inch long. This plant is perfectly hardy here in the Arboretum and began to flower when not more than three feet high. On such small plants the stems are nearly erect and almost self-supporting, but larger plants will need the support of rocks or bushes over which to stray. Specimens of *Tripterygium* can now be seen in flower on Hickory Path near Centre Street and in the Shrub Collection.

Lonicera Henryi is a native of western China and valuable and interesting for, with the exception of *Evonymus radicans* and *Vinca minor*, it is the only vine with evergreen leaves which is hardy in this climate. It has long, dark green, pointed leaves and axillary clusters of flowers which are rose color when they first open but soon become orange-red; they are without odor. On the slopes of its native mountains this plant scrambles over rocks and bushes and, like other climbing Honeysuckles, it will do best when allowed to grow naturally in this way, for none of these Honeysuckles are really happy when they are fastened to a trellis. There is a good specimen of this plant now covered with flowers in the bed of Chinese shrubs on the southern slope of Bussey Hill.

ARNOLD ARBORETUM

HARVARD UNIVERSITY

BULLETIN
OF
POPULAR INFORMATION

JAMAICA PLAIN, MASS.

JULY 13, 1916

Weeping Trees. A year ago a short account of fastigiate trees, that is trees with abnormally erect branches, appeared in one of these bulletins, and it may be interesting to supplement this with an account of the trees commonly called "weeping," that is trees with abnormally drooping branches. Such abnormal trees have been industriously hunted for and largely propagated by nurserymen because many of their customers are interested in curious plants which are the joy of the owners of many suburban gardens, especially in Europe where happily such plants are in more general use than they are in this country. It can be said that "weeping" trees are less useful than some of the pyramidal trees for they cannot be used in mixed plantations or bear crowding, and must stand as isolated specimens in the park or on the lawn or the effect of the peculiar habit for which they are valued will be lost. Weeping trees of many of the large Willows are propagated by cuttings, and those of other trees by grafting a weeping branch on a stem of a normal tree of the same or of a related species, and it can be said generally that the Willows with pendulous branches produced from cuttings are the handsomest of the pendulous trees because they appear less abnormal.

Willows. The best known of the trees with pendulous branches is the Weeping Willow from China, a large tree with long slender drooping branchlets which sweep the ground, and narrow, dark green, very lustrous leaves. This is the common tree Willow in the region bordering the Yangtse River for two thousand miles from its mouth, and the one frequently planted in villages and cemeteries in other parts of the empire. For centuries this has been a favorite tree with the Chinese, and is a familiar object in many Chinese pictures, and is often repre-

sented on Chinese porcelains and wood-carvings. It is uncertain when this tree first reached Europe but it was probably brought to western Europe from Asia Minor late in the seventeenth or early in the eighteenth century, and as it was supposed to be a native of the valley of the Euphrates it was named *Salix babylonica*. It is unknown when this tree was first brought to North America where for many years it has been exceedingly common in the middle and some of the southern states. In Massachusetts it often suffers from cold, and this tree is less common here now than it was fifty years ago. Hybrids of *Salix babylonica* with the European *S. alba* and *S. fragilis* are sometimes cultivated in the northern states where they are very hardy and the most beautiful of the trees with pendulous branches which can be successfully grown in Massachusetts. The best known perhaps of these trees, *S. Salamonii*, is supposed to be a hybrid between *S. babylonica* and *S. alba*. It is a large tree with a broad head of drooping branches and leaves which are dark green above and silvery white on the lower surface. Only the female tree is known and it is not known where it originated. This is a tree which should be more generally known and planted in this country. The tree known as the Wisconsin Willow is probably of similar parentage. This tree has been largely planted in the northern states where it is perfectly hardy and a handsome and useful tree; the branches are perhaps rather less pendulous than those of *S. Salamonii*. *S. elegantissima*, *S. blanda* and *S. pendulina* are supposed to be hybrids of *S. babylonica* and *S. fragilis*, and are intermediate in habit and foliage between their parents. *S. elegantissima* is often found under the name of *S. babylonica* in regions where the latter is not hardy. In the northern states it is sometimes called Thurlow's Willow. *S. alba vitellina pendula* is usually considered a pendulous form of the Golden-barked Willow, or as a hybrid of the latter and *S. babylonica*. Whatever its origin may be this is one of the handsomest Willows which can be grown in the northern states. In nurseries in this country it sometimes appears as *S. babylonica*, var. *ramulis aureis*, or as the Golden-barked Babylon Willow. The Kilmarnock Willow is a form (var. *pendula*) of the European *S. caprea*. It is a plant with thick pendulous branches, and when grown as a standard these form a regular umbrella-like head. This is a popular tree with American nurserymen but the specimens which they produce are more curious than beautiful.

Beeches. The European Beech, *Fagus sylvatica*, has produced several forms with pendulous branches. The best known of these trees, var. *pendula*, does not grow very tall, and the principal branches are horizontal and wide-spreading, and from them the branchlets hang down nearly vertically. In habit this is one of the most remarkable of all the trees of abnormal growth, and the great tent-like specimens which can be seen in Europe are remarkable objects. This tree was first planted in the United States many years ago. It is perfectly hardy in the northern states but grows slowly here, and there are no exceptionally large specimens in this country. Other varieties of the European Beech are var. *miltonensis* and var. *bornyensis*, with more erect trunks and horizontal and pendulous branches; they are handsome trees still little known in this country. Other forms of the Weeping Beech are known as var. *pagnyensis*, var. *remillyensis* and var. *tortuosa*.

Elms. There are two forms of the Wych or Scotch Elm, *Ulmus glabra*, or, as it is often called, *U. montana*. The best known of these, the Camperdown Elm (var. *camperdownensis*) as it appears in gardens is a round-topped tree with stout pendulous branches which droop to the ground from all sides of the stem and form a broad-shaded arbor. *Ulmus glabra*, var. *pendula*, often called var. *horizontalis*, is a more graceful tree. The branches are usually best developed on one side of the stem and are wide-spreading, the principal ones slightly ascending and furnished with numerous pendulous branchlets. This tree is much cultivated in Europe, especially in Germany. A form of *U. americana* with rather pendulous branches has been propagated in some American nurseries as *U. fulva pendula*. Trees of the American Elm with more or less drooping branches are not uncommon but none of them are likely to appeal to the lovers of trees of abnormal growth.

Birches. One of the European Birches, *Betula pendula*, is a tree with slender usually pendulous branches and some of its forms are among the best known and most generally planted weeping trees. The var. *dalecarlica*, sometimes called *Betula alba*, var. *pendula laciniata* or the Cut-leaved Weeping Birch, is a tree with pendulous branchlets and deeply divided leaves. For many years this tree was planted in immense numbers in all the northern states, but insects working under the bark of the trunk and branches have killed most of the trees and large specimens are now rarely seen in this country. The var. *Youngii* has more pendulous branches and when these are grafted on to a tall stem they form a picturesque head in general outline something like that of the common form of the Weeping Beech. Another Weeping Birch in habit very similar to the last but with deeply divided leaves, is var. *gracilis*, sometimes called in nurseries *B. alba laciniata gracilis pendula* or *B. elegans laciniata*.

The Weeping Ash. There are several forms of the European Ash, *Fraxinus excelsior*, with pendulous branches. The commonest of these trees (var. *pendula*) forms when grafted on a tall standard a broad umbrella-like head. Under favorable conditions this variety sometimes grows in Europe to a great size, but *Fraxinus excelsior* and all its varieties do not succeed in eastern North America and are rarely seen here in good condition. In the Arboretum pinetum there is a fairly healthy specimen of this Weeping Ash, the last survivor of an old garden which once occupied the ground. The form of *Fraxinus rotundifolia* with pendulous branches (var. *pendula*) is established in the Arboretum and is a small tree with gracefully drooping branches which form a narrow head. *F. rotundifolia* is a native of southern Europe and southwestern Asia and is sometimes called *F. parvifolia* or *F. lentiscifolia*.

Prunus. There are at least three Cherries which have produced abnormal forms with pendulous branches. The handsomest of these is the Weeping Cherry of Japan, a tall tree with spreading main branches and long slender branchlets which hang nearly perpendicularly from them, and in early spring are covered with drooping pink flowers. The correct name for this tree is *Prunus subhirtella*, var. *pendula*. Not known as a wild tree, it has been cultivated in Japan for centuries. This beautiful Cherry-tree was brought to the United States many years ago and is now often seen in northern gardens. Few early

spring-flowering trees are more beautiful than this Cherry. The form (var. *reflexa*) of the European *Prunus fruticosa* or *P. Chamaecerasus*, as it was formerly called, with drooping branches is a handsome and hardy little Cherry worth a place in small gardens. Few North American trees have produced forms with pendulous branches. An exception is *Prunus serotina*, of which there is a weeping form (var. *pendula*) which is occasionally cultivated. There are varieties of the Apricot and of the Peach with pendulous branches of no particular beauty or interest.

Cornus florida. This is another North American tree which has produced a form with wide-spreading and partly pendulous branches (var. *pendula*). As an ornamental plant this tree is not particularly valuable.

Morus alba. A seedling of a Russian variety of this tree (var. *tatarica*), known as Teas' Weeping Mulberry, appeared several years ago in the nursery of John C. Teas at Carthage, Missouri, and it is now one of the most generally planted weeping trees in the United States. When the branches are grafted on a tall stem of the common Mulberry they form a narrow, round-topped plant with branches sweeping the ground.

Malus. A form of the common Apple-tree (var. *pendula*), popularly known as "Elisa Rathke," with stout, very pendulous branches, is sometimes found in collections grown as a tall standard. As it appears in the Arboretum this tree is more curious than beautiful.

Sophora japonica. The form (var. *pendula*) of this Chinese tree with stout drooping branches is one of the best known "weeping" trees and when grafted on a tall stem of the ordinary form the branches make a broad round-topped tree which can be used as an arbor. The weeping form flowers very rarely or not at all.

Crataegus monogyna. This is the common European Hawthorn or May, and the form with pendulous branches (var. *pendula*) is a tree of graceful habit and well worth a place in a collection of these plants. There is a variety of this weeping tree with leaves blotched with white (var. *pendula variegata*).

Ilex. There are handsome forms of the European Holly (*I. Aquifolium*) with pendulous branches. Unfortunately this tree, which is one of the handsomest of broad-leaved evergreens, is not hardy in New England, although it flourishes in several of the middle and southern states. The most distinct of the weeping forms are var. *pendula* with rather rigid, arching and pendulous branches which form a round-topped head, and the variety *argentea marginata pendula*, known in England as Perry's Weeping Holly.

Carpinus. The European Hornbeam, *Carpinus Betulus*, has produced forms with more or less pendulous branches of which the best known (var. *pendula*) has a rather broad head. As it grows in the Arboretum the branches are not particularly drooping. A handsomer plant is the variety *pendula Dervaesii* which is not in the collection.

Want of space makes it necessary to defer until another occasion an account of the weeping forms of a number of coniferous trees.

ARNOLD ARBORETUM
HARVARD UNIVERSITYBULLETIN
OF
POPULAR INFORMATION

JAMAICA PLAIN, MASS.

JULY 19, 1916

Summer-flowering shrubs. The flowers of many shrubs can now be seen in the Arboretum, and others will appear almost constantly until the late autumn or early winter when the Witch Hazels carry the period of blooming into another year. The last of the Azaleas the two white-flowered species of eastern North America, *Rhododendron (Azalea) arborescens* and *R. (Azalea) viscosum*, are now in bloom. A mass of the former can be seen on the right-hand side of the Valley Road in front of the Hickories, and *Rhododendron (Azalea) viscosum* can be seen in quantity on both sides of the Meadow Road. Azaleas of different species have been flowering continuously in the Arboretum since the middle of May, and the blooming of no other group of plants extends here over such a long period although that of the Viburnums and Cornels is almost as long.

Rhododendron maximum. This native species is the last of the Rhododendrons with evergreen leaves to bloom, and it can now be seen on the left-hand side of the road entering by the South Street gate. This is one of the hardiest of all Rhododendrons in this climate and no other species which can be successfully grown here has such large and handsome leaves. The flowers are handsome in their delicate colors but are a good deal hidden by the young branchlets which make their growth before the buds open.

Rosa Jackii. This beautiful Rose was introduced into the Arboretum from Korea several years ago by Mr. J. G. Jack for whom it is named. It is one of the Multiflorae Roses and has long stems which lie flat on the ground, lustrous foliage and pure white flowers in wide many-flowered clusters. The flowers have the delicate fragrance of the Musk Rose. The hybridizer should be able to find in it a good subject

from which to raise a race of hardy, late-flowering Rambler Roses. It is now in bloom in the Shrub Collection.

Rosa setigera. This is the Prairie Rose from the central part of the continent where it is scattered from Michigan to Texas. It is a vigorous plant with tall arching stems, pale handsome leaves and broad clusters of pure pink flowers. No wild Rose is more beautiful, and the hybridizer with all his cunning has not produced a single Rose which can compare with this wild plant in grace of habit or in charm of flowers. There is a mass of these Roses just coming into bloom on the right-hand side of the Forest Hills Road in front of the Cherry Collection.

Coluteas, known as Bladder Sennas, are useful summer flowering shrubs. Three species can now be seen in bloom in the Shrub Collection, *C. arborescens*, *C. cilicica* and *C. orientalis*. The first is a native of southern and southeastern Europe, and is a very old inhabitant of gardens, for it is said to have been cultivated in England for at least three centuries. It is a vigorous and hardy plant with erect much-branched stems, deciduous pinnate leaves and axillary racemes of yellow pea-shaped flowers; these are produced on the branches of the year and continue to open as the branches grow and new leaves appear. The flowers are followed by inflated bladder-like pods which are more or less tinged with rose color and are very ornamental. Fully grown pods from the first flowers appear on the plants with the late flowers. This plant does not occur to be as well known in this country as it is in England where it is now often naturalized. *Colutea cilicica* is a native of Asia Minor, and very similar to *C. arborescens*, and as a garden plant is not superior to that species. *C. orientalis* is distinguished from the other species by its pale grayish foliage and by its sulphur-colored or orange-red flowers. It is a native of Asia Minor and has long been known in gardens. This shrub is worth a place in collections of summer-flowering plants.

Cornus paucinervis. The plant of this Cornel in the collection of Chinese shrubs on the southern slope of Bussey Hill is covered with flower-buds which will open in a few days. It is a shrub five or six feet tall with erect stems, small, narrow, pointed leaves with only two or three pairs of prominent veins, small flat clusters of white flowers and black fruits. Although this *Cornus* was found by Wilson at low altitudes in the valley of the Yangtsze River, it has proved perfectly hardy in the Arboretum and is one of the most distinct and interesting plants introduced by him.

Heather. It does not seem to be generally understood that the Heather of northern Europe (*Calluna vulgaris*) can be successfully grown in this country, although it is now many years since it was discovered that it had become naturalized in Nova Scotia and in Tewksbury and Townsend, Massachusetts. The ends of the branches are sometimes killed here in severe winters, but this is an advantage rather than an injury to the plants, for English gardeners to secure the best results cut back their plants severely after they have finished flowering. In this country the Heather should be planted in well-drained, sandy soil fully exposed to the sun; planted in the shade it usually suffers in cold winters as in the shade it continues to grow late in the autumn and the wood does not ripen properly. There are a

number of handsome and interesting varieties in the Arboretum collection. Some of the best of these are the variety *alba* with white flowers; the variety *alba minor*, a white-flowered plant of dwarfer habit; var. *rubra*, a dwarf compact variety with crimson flowers, and one of the earliest to flower and one of the handsomest of the set; var. *tomentosa*, a compact plant with gray-green foliage and red flowers; var. *alba Serlei*, a tall growing form with white flowers; vars. *alba tenella* and *alba rigida* with white flowers, var. *Alportii*, a tall growing form with crimson flowers, and var. *hypnoides*, a very compact, small-leaved plant producing only sparingly its small purple flowers. These plants can be seen in the Shrub Collection, and quantities of Heather have been planted on the sides of the Meadow Road.

Cytisus nigricans. No plant now in bloom in the Shrub Collection is more beautiful than this little shrub which is a native of southern and southeastern Europe, and as it grows here is a compact round-topped bush from two to three feet high and broad. It differs from most of the other plants of this group in the fact that the flowers are borne in long racemes terminal on the branches. The pea-shaped flowers are bright yellow and are produced in the greatest profusion. This is one of the handsomest, and the hardiest here, of the yellow-flowered shrubs of the Pea Family, which are such a feature of the flora of southern Europe and which are so much cultivated in the gardens of regions where the climate is less severe than that of New England.

Ceanothus. Of this important North American genus, which is best represented in California, only two species of the eastern part of the country and one Rocky Mountain species, *C. Fendleri*, are hardy in the Arboretum where the beautiful Pacific Coast species cannot live. The two northeastern species, often called New Jersey Tea, *C. americanus* and *C. ovatus*, are shrubs two or three feet high and broad, with small white flowers in dense, oblong, terminal and axillary clusters produced on branches of the year. These two species vary chiefly in the shape of the leaves, but *C. ovatus* bloomed nearly a month ago, while *C. americanus* is just now covered with flowers. These plants are valuable for naturalizing on wood borders, and few shrubs make better returns in midsummer flowers than the New Jersey Tea which, however, appears to be rarely cultivated. A large number of hybrids between *C. americanus* and some of the California species have been raised in Europe and one of these hybrids, known as Gloire de Versailles, with its large clusters of deep blue flowers is a popular plant there. Unfortunately these hybrids, with a single exception, are not hardy in this climate. The exception is a beautiful plant with pale rose-colored flowers which came many years ago to the Arboretum from the Lemoine Nursery at Nancy, France. It has not been possible to find the name or trace the origin of this plant. It is now in bloom in the Shrub Collection and on the lower side of Azalea Path.

Ginkgo biloba. This is the only representative of a Family of trees which in Tertiary times was widely distributed over the northern hemisphere. To the shape of its deciduous leaves which resemble those of a Maidenhair Fern, the Ginkgo owes its popular name, Maidenhair-tree. The fruit, which is of the size and shape of an olive, has a fleshy covering with a rancid and most disagreeable odor, but the kernel of

the almond-like stone has a delicate flavor and is much esteemed by Chinese and Japanese. The Ginkgo was carried to Japan some twelve hundred years ago by Buddhist priests of China, and near some Japanese temples there are specimens fully one hundred feet high with stems six or seven feet in diameter. It reached Europe about the middle of the eighteenth century, and is supposed to have been first planted in this country in 1784 by Mr. William Hamilton in his famous garden in what is now West Philadelphia. It is now a common tree in this country. Bostonians of the last generation may remember Dr. Jacob Bigelow's poem on the removal of the Ginkgo tree from Mr. Gardiner Green's garden in Pemberton Square to Boston Common when this garden was given up in 1832 after Mr. Green's death. This tree is said to have been forty feet high with a trunk a foot in diameter when it was moved, and to have been "of full size" when Mr. Green bought the Pemberton Square property in 1798. This tree is still standing on the Beacon Street mall nearly opposite the foot of Joy Street. It has not grown well, however, for many years, and it is not a handsome or a large tree for its age, probably never having recovered from the effects of the moving in 1832. One of the remarkable things about the Ginkgo-tree is the fact that although it has been undoubtedly cultivated by the Chinese for many centuries, the region where it grows naturally and spontaneously has remained unknown, travelers having failed to find any trees growing in the forest or anywhere except in the neighborhood of temples or shrines where they had evidently been planted. A year ago, however, Mr. F. N. Meyer, the well-known botanical explorer for the Department of Agriculture, found the Ginkgo growing spontaneously in rich valleys over some ten square miles near Changhua Hsien, about seventy miles west of Hangchou, in the Chekiang province. There were many seedlings and the trees here were so common that they were cut for firewood, something which has never been seen before in China. It is by no means certain that this is the original home of the Ginkgo as these trees may all have descended from a planted tree. It is exceedingly interesting, whatever may be the history of these trees, to find that there is at least one place in China where the Ginkgo grows in the woods and reproduces itself spontaneously. Hangchou and Changhua Hsien are of easy access from Shanghai and it is remarkable that Mr. Meyer was the first botanist to visit this region. His visit was a fortunate one, for besides the Ginkgo he made one of the most interesting discoveries a botanist has ever made in China—a Chinese Hickory-tree which has been described at the Arboretum as *Carya cathayensis*. Until last year the Hickory was supposed to be exclusively eastern American, as the Sassafras, the Tulip-tree and the Kentucky Coffee-tree, were supposed to be exclusively American, but these trees like the Hickory are now known to grow in China.

This is an interesting time to visit the Arboretum. The foliage of trees and shrubs has never been finer, and the grass has never been greener at midsummer. Many plants, especially the Bush Honey-suckles and the Tartarian Maple (*Acer tatarica*), are covered with brilliant fruits, and the great north meadow will soon be loaded with a yellow sheet of Goldenrods as the white flowers of the Meadow Rue, never so abundant as they are just now, begin to fade.

These Bulletins will now be discontinued until the autumn.

ARNOLD ARBORETUM
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Gordonia alatamaha. With the exception of the Witch Hazel, which in this latitude is a shrub rather than a tree, this *Gordonia* is the last tree of the year to flower in the Arboretum, and its pure white, cup-shaped flowers, resembling a single *Camellia* flower, can now be seen on the plants on Azalea Path and on Hickory Path near Centre Street. This handsome little tree has an interesting history. It was discovered by John Bartram, the famous Pennsylvania traveler and botanist, in 1765 near Fort Barrington on the Altamaha River in Georgia. John Bartram's son William visited the locality in 1778 and collected seeds and roots of this tree, and Dr. Moses Marshall who visited the locality in 1790 was the last botanist who has seen it growing naturally. Many botanists have hunted for it in vain in the neighborhood of Fort Barrington but without success, and this tree has been preserved by the plants and seeds collected by William Bartram and their descendants. Many of these are growing in gardens near Philadelphia and there are large and very old specimens in the neglected arboreta of the Brothers Painter at Medina and of John Evans in Radnor Township, Delaware County. Good plants may be seen in Fairmount Park near the Horticultural Building and in a few private gardens near the city. This *Gordonia* has been an inhabitant of the Arboretum for many years where it flowers in sheltered positions every autumn. Late in the season the leaves turn orange and scarlet before falling.

Summer and autumn fruits. The interesting and often brilliant fruits of many trees and shrubs can be found in the Arboretum every year from July to March, and although this is not a remarkably good season for fruits here some plants are producing unusually large and brilliantly colored crops. Nowhere else are the fruits of trees and

shrubs more attractive and more beautiful than in the northeastern United States, but the value of fruit-bearing plants for the decoration of summer and autumn gardens is hardly appreciated yet by American gardeners who are slow to realize that plants which are interesting for their flowers and fruits and increase in beauty from year to year make a setting for the gardens of eastern America which cannot be found in any other land. Such plants abound in the Arboretum and nowhere else can the fruits of trees and shrubs hardy in New England be seen and studied to such advantage.

Crataegus Arnoldiana. This Thorn is a native of eastern Massachusetts and one of the first of the American species raised at the Arboretum where it was found growing wild on a wooded bank. It is a tree with a well developed trunk, erect and spreading branches which are furnished with many long stout thorns, the smaller branches being conspicuously zigzag. The flowers are large in ample clusters and open with the unfolding of the leaves which later grow to a good size, and are dark green in color. The fruit, however, is the handsomest thing about this tree; it is nearly globose, about an inch in diameter and bright red, and beginning to ripen from the middle to the end of August falls gradually the end of September or early in October. Of the Thorns in the Arboretum collection with early-ripening fruits *C. Arnoldiana* is the handsomest, and as a fruit tree it may well find a place in every American garden in which an early autumn display is desired.

Crataegus pinnatifida. This is a native of northeastern Asia and has long been an inhabitant of the Arboretum. It is a large shrub or small tree with large, deeply divided, dark green very lustrous leaves, large flowers, and bright scarlet fruit which ripens while the leaves are still green. This is one of the handsomest of all Thorns, and it is economically interesting because one of the large-fruited forms is cultivated in orchards as a fruit tree in the neighborhood of Peking and in other parts of northern China. There is a large specimen of this Thorn among the Maples near the parkway boundary of the Arboretum and others can be seen in the *Crataegus* Collection on the eastern slope of Peter's Hill and on the Bussey Hill Overlook.

Viburnum cassinoides. There are only small crops of fruit on several of the American *Viburnums* this year but that of this inhabitant of northern swamps has never been larger or in better condition. As it grows naturally *Viburnum cassinoides* is a tall and usually unsymmetrical shrub, but in good soil it develops into a broad, round-topped compact bush. The leaves are thick, dark green and lustrous. The creamy white flowers are produced in large convex clusters, and the fruit when fully grown is at first nearly white, turning as it ripens bright pink and finally dark blue, berries of the three colors often appearing together in the same cluster. This *Viburnum* is a fast-growing and perfectly hardy shrub, and there are few plants which combine so much beauty of foliage, flowers and fruits. It has been largely used in the Arboretum and good plants can be seen in many of the roadside plantations, especially by the road at the top of Peter's Hill.

The Chinese Viburnums. As compared with most of the American and some of the Japanese species the new Viburnums from western China are of small value as flowering plants, but at least two of them, *V. theiferum* and *V. hupehense*, deserve a place in the garden for their handsome fruits. That of *V. theiferum* is found in broad, long-stalked, drooping clusters and is oval and about half an inch long. Early in October this fruit is light orange color and very lustrous but later becomes scarlet. This Viburnum has grown rapidly in the Arboretum where it forms a broad shrub with rather spreading stems. The leaves are thick, long and narrow, dark dull green, conspicuously veined, and hang on long stalks; the flowers are small, and in small, compact clusters. The leaves are used by the Chinese in the mountain regions of the west as a substitute for those of the Tea plant. As it grows here it proves to be the best of the numerous Viburnums introduced by Wilson. *Viburnum hupehense* is a vigorous shrub with erect stems, smaller and thinner leaves than those of *V. theiferum*, and globose scarlet fruits about one-third of an inch in diameter, in broad lax, many-fruited clusters. Of no particular beauty when in flower, just now this plant is one of the most attractive of the red-fruited Viburnums in the collection. These two plants can be seen in the general Viburnum Collection on the right-hand side of the Bussey Hill Road and to better advantage in the collection of Chinese shrubs on the southern slope of Bussey Hill.

Malus Sieboldii, var. calocarpa. In the collection of Crabapples at the eastern base of Peter's Hill there is now no more beautiful plant than this large-flowered, large-fruited form of a common Japanese plant. As it grows in the Arboretum this Crabapple is a bush eight or ten feet tall and broad with dark green leaves which are oblong and slightly toothed on the fruiting branches and broad and deeply three-lobed on vigorous shoots. The flowers are rose-colored and white, and from an inch to nearly an inch and a quarter in diameter, and the large, bright red lustrous fruits are sometimes nearly an inch in diameter. This beautiful Crabapple was raised at the Arboretum from seeds sent here from Japan by Dr. W. Sturgis Bigelow and it is doubtful if it is known in many other gardens. In this climate *Malus Sieboldii*, var. *calocarpa* is a garden plant of the first class.

Malus baccata, var. Jackii. This variety of the common Crabapple of eastern Siberia was raised at the Arboretum from seeds collected by Mr. J. G. Jack at Seoul in 1905 and has proved one of the handsomest and most interesting of the different forms of *Malus baccata* in the Arboretum where it is established in the Crabapple Collection at the eastern base of Peter's Hill. The trees, although small, are shapely in habit with clean stems and spreading branches. The leaves are thick, almost coriaceous, long-stalked, from four to six inches in length, very dark rather dull green above and pale below. The pure white flowers are nearly two inches in diameter, and the fruit, which is now nearly ripe, hangs gracefully on long red drooping stems. It is about half of an inch long, rather longer than broad, deep crimson and very lustrous. This is a valuable addition to the list of Crabapples which can be successfully cultivated in this climate. Unfortunately the new Crabapples which have been introduced in recent years from

eastern Asia can only reach other gardens slowly for the plants in a large collection like that of the Arboretum hybridize so persistently that seedlings raised from seeds produced here are rarely like the seed parents, and the Arboretum Crabapples in their true form can only be obtained by grafting or budding.

Chinese Cotoneasters. The handsomest shrub in the Arboretum during nearly the entire month of September was a form from western China of *Cotoneaster racemiflora* which has been called variety *soongorica*. It is a tall shrub with spreading and drooping stems, pale leaves, white flowers, and large bright red fruits which completely cover the branches. Some of the Chinese species have more conspicuous flowers and handsomer foliage, but none of them have yet equalled in the Arboretum this inhabitant of the dry arid river valleys of western Szech'uan in the size, brilliancy and abundance of their fruits.

Cotoneaster divaricata. Of the large-growing Chinese species this is perhaps the handsomest at this time, for the small bright red fruits which are produced in great abundance make a handsome contrast with the small, dark green, shining leaves. The flowers of this shrub are small and bright rose color. The new Chinese Cotoneasters are best seen on the southern slope of Bussey Hill, and the collection will repay careful study as it contains some of the most valuable shrubs for American gardens of recent introduction.

The Sassafras. There is now no more beautiful tree on the margins of New England woods and by New England roadsides than the Sassafras, as the leaves have turned or are turning orange or yellow more or less tinged with red. The autumn colors of several trees are more brilliant but none of them equal the Sassafras in the warmth and delicacy of their autumn dress. The Sassafras is a handsome tree at other seasons of the year. In winter it is conspicuous by its deeply furrowed, dark cinnamon-gray bark and slender light green branches; in early spring before the leaves appear it is covered with innumerable clusters of small bright yellow flowers which make it at that season a conspicuous and delightful object. The leaves are thick, dark green and lustrous above, paler below, and vary remarkably in shape as they are sometimes deeply three-lobed at the apex and sometimes entire without a trace of lobes. The fruit is a bright blue berry surrounded at the base by the much enlarged and thickened scarlet calyx of the flower and raised on a long bright red stalk. No other northern tree produces such brilliantly colored fruit. Unfortunately there is little time to enjoy it for the birds eagerly seek it as it ripens. The living wood of the Sassafras is not attacked by borers and the leaves are not destroyed and are rarely disfigured by insects. The thick spongy roots of the Sassafras produce suckers freely and these with a little care can be easily and safely transplanted. How many persons now plant the Sassafras and in what American nursery can it be found? It was, however, one of the first North American trees carried to Europe as it was established in England some time before the middle of the seventeenth century. The American tree was believed to be the only Sassafras until 1879 when another species, *S. tzumu*, was discovered in central China. This tree is now in the Arboretum but its ability to grow here has not yet been established.

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JAMAICA PLAIN, MASS.

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Clematis dioscoreifolia. This *Clematis*, which first flowered in the Arboretum a year ago, can now be seen again in flower on the trellis on the eastern border of the Shrub Collection. In general appearance it resembles the Japanese and Chinese *Clematis paniculata* which is now one of the most popular climbing plants in the northern states. The leaves, however, are thicker and the flowers are larger with broader sepals, and are therefore even more showy than those of the Japanese plant. They are borne in long loose panicles and are exceedingly fragrant. The fact that this new *Clematis* does not begin to flower until after the flowers of *Clematis paniculata* have fallen, and that it remains in flower until after the middle of October, should make it a valuable garden plant. It is a native of the Island of Quelpaert off the southern coast of Corea where it was discovered by the French missionary Tacket in 1908. The Arboretum plant was raised from seeds sent here in 1911 by Monsieur M. L. de Vilmorin. That this *Clematis* has grown here so rapidly and is so hardy in exposed positions shows that it is a plant with an unusually strong constitution for a *Clematis*, for very few species or varieties flourish in the Arboretum where the conditions for the successful cultivation of these plants are extremely unfavorable.

Rhus javanica. This is the oldest and correct name of a small Chinese tree usually cultivated as *Rhus Osbeckii* or as *R. semialata*. This is not a rare tree in gardens, and attention is now called to it, for the autumn color of the leaves has been exceptionally beautiful this year in its deep tints of red and orange, and has made this little tree one of the beautiful objects in the Arboretum where it can be seen near

the other species of *Rhus* on the left-hand side of the Meadow Road opposite the Euonymus Collection. *Rhus javanica* blooms at midsummer and the large terminal clusters of white flowers make it attractive at a season when few trees are in bloom. The bright yellow leaves of the Varnish or Lacquer-tree of China and Japan, *Rhus verniciflua*, in this group have also been conspicuous this year. In the nursery near the top of Peter's Hill there are larger and better specimens of this tree which is as poisonous as our native so-called Poison Ivy and should be admired from a distance. The autumn change of color in the leaves of the trees and shrubs of eastern Asia usually occurs three or four weeks later than it does in those of the allied eastern American species. These two species of *Rhus* are exceptions to this general statement, and other conspicuous exceptions are *Acer ginnala* and *Evonymus alatus*. The former is a small tree or treelike shrub with deeply divided leaves and small compact clusters of flowers which are exceptionally fragrant for Maple flowers. The leaves of no other plant in the Arboretum turn in the autumn more brilliant scarlet and for this reason, if for no other, this Maple deserves a place in northern gardens. It is among the first of all Maples to show the autumn change of color and the leaves have now nearly all fallen. *Acer ginnala* is common in eastern Siberia and was one of the first Asiatic plants introduced into the Arboretum; it has proved perfectly hardy in northern New England and as far northward as Ottawa, Ontario.

Evonymus alatus, which is a native of Japan and northern and central China, is a vigorous great shrub which, when sufficient space is allowed it, grows as broad or broader than high with its lower branches resting on the ground. The corky wings on the small branches to which it owes its name are interesting, but the flowers and fruit are not conspicuous; the leaves are smaller than those of many of the species, and the real value of the plant is found in their autumn color which is deep rose and unlike that of any other plant in the Arboretum. The autumn change of color comes early and the leaves are already falling, but while it lasts it is so beautiful that this Burning Bush deserves a place in northern gardens. It appears to best advantage when planted by itself that the branches may have sufficient room in which to spread widely, for when crowded by other shrubs in mixed plantations it loses its beauty of habit. There is a large specimen in the *Evonymus* Group on the right-hand side of the Meadow Road, and there is another in the grass border on the Bussey Hill Road above the Lilacs.

Crataegus arkansana. This Hawthorn is one of the Molles Group of species which all have large flowers which appear with or before the unfolding of the leaves, and large, sometimes edible red or rarely yellow fruit. The fruit of some of the species of this group, like *C. mollis* and *C. Arnoldiana*, ripens early and has already disappeared, but that of *C. arkansana* does not become fully ripe until November, so that in late October this is one of the handsomest species for the leaves are still fresh and green, and add to the brilliancy of the large and abundant fruits. The largest plant in the Arboretum is on the left-hand side of the South Street entrance outside the gate. There is

another specimen in the old Hawthorn Collection on the bank by the parkway boundary, near the Forest Hills entrance to the Arboretum.

Crataegus succulenta. This is one of the large and handsome Thorns of the thick-leaved section of the Tomentosae Group of these plants, distinguished from all the other groups by the longitudinal cavities in the inner face of the nutlets of the fruit. *C. succulenta* is a tree sometimes twenty feet high with a short trunk, stout, wide-spreading branches, and thick, dark green and very lustrous leaves. The flowers are only about two-thirds of an inch in diameter but they are arranged in broad, many-flowered, lax clusters and are produced on long slender stalks. The fruit is also comparatively small and not more than three-quarters of an inch in diameter, but it is borne in large clusters on elongated gracefully drooping stems; it is bright scarlet and very lustrous, and the fruit of no other Thorn is more brilliant. A specimen of this plant in the old Hawthorn Collection is now covered with fruit. The leaves, which are still green, will later turn orange and scarlet.

Crataegus nitida. This is a tree which under favorable conditions sometimes grows thirty feet high and forms a tall straight trunk eighteen inches in diameter, stout, wide-spreading lower branches and ascending upper branches forming a rather open flat-topped head. The leaves are narrow, pointed, two or three inches long and half as wide, dark green and shining above, paler below, and late in the autumn turn rich orange color through shades of bronze and orange-red. The flowers are rather less than an inch in diameter, and are arranged in broad many-flowered clusters thickly placed along the upper side of the branches. They are followed by oblong fruits about half an inch long and are borne on slender, much elongated stems. The fruit is red, covered with a glaucous bloom, and is now fully grown and colored, although it will not become ripe for two or three weeks. This Thorn is a native of the bottom-lands of the Mississippi River near East St. Louis, Illinois, and was first raised in the Arboretum thirty-six years ago. It is one of the handsomest of the whole genus, and if a selection of six species as ornamental plants was to be made it would in the opinion of many persons be one of the six. There are several large specimens in the old Thorn Collection.

Crataegus pruinosa. The tree of this species in the old collection is fruiting well again this year and is a good representative of one of the northern group called Pruinosaes which contains some beautiful species. *Crataegus pruinosa* is a tree sometimes from fifteen to twenty feet tall with a small trunk and spreading branches forming a broad rather open head, or it often grows as a tall shrub with numerous intricately branched stems. The leaves are broad, thick, dark blue-green, and often covered with a pale bloom, and are now beginning to turn a dark orange color more or less passing into red. The flowers, which open here toward the end of May, are exceptionally handsome for they are about an inch wide and are conspicuous from the large, deep rose-colored anthers of the twenty stamens. The large globose fruit is apple-green, thickly covered with a glaucous bloom until after it is fully grown, becoming about the first of November when it ripens dark pur-

ple-red and very lustrous. This is one of the widely distributed species as it is found from southwestern Vermont to Illinois and Missouri, and southward in the Appalachian region to the foothills of the southern mountains. Like many of the American Thorns, it delights in soil strongly impregnated with lime.

Crataegus aprica. The specimen of this species in the old collection is also covered with ripening fruit. It is a small tree with small yellow-green leaves, large flowers in compact from three to six-flowered clusters, and dull orange-red sub-globose fruit about half an inch in diameter, borne on stout, nearly erect stems. As a garden plant this tree is chiefly interesting as being one of the hardiest of a group of species entirely confined to the southeastern states known as Flavae. *C. aprica* is a native of dry valleys in the foothills of the southern Appalachian Mountains where it is widely distributed from southwestern Virginia southward at elevations between fifteen hundred and thirty-five hundred feet above the sea level.

Dwarf species of Crataegus. Several of the little Hawthorns belonging to the *Intricatae* group are now covered with handsome fruit. These shrubs which are natives of the northern states, have been almost entirely neglected by gardeners. They all have large and showy flowers which on most of the species do not open until the leaves are fully grown, and many of them have large and bright colored fruits. Many of these shrubs are only two or three feet high when fully grown, and several of them are well suited for small gardens or for planting in front of groups of the larger species. The plants of this group are arranged on the lower side of the drive at the eastern base of Peter's Hill.

Evonymus Bungeana, which has been an inhabitant of the Arboretum for thirty years, deserves more general cultivation than it has yet received in this country. It is a tree or treelike shrub with slender rather pendulous branches and narrow, pointed, yellow-green leaves which are now turning yellow or yellow and red. The great beauty of this plant is in the rose-colored fruit which is produced in large clusters near the ends of the branches on which it remains for several weeks after the leaves have fallen. This is one of the handsomest of the Asiatic species in the late autumn and a plant which should be better known.

Magnolia glauca. This, the Sweet Bay of the Atlantic and Gulf Coast regions from Massachusetts to Texas, is still covered with its bright green shining leaves which are silvery white on the lower surface and which will not become discolored or fall before December. Attention has often been called in these Bulletins to the value of this tree as an ornament to New England gardens. Few deciduous-leaved trees are more beautiful or have more persistent foliage. The cup-shaped, creamy white flowers continue to open during many weeks in early summer and fill the air with their fragrance; and the fruit, like that of all the Magnolias, is interesting and handsome when the scarlet seeds hang from the branches on long slender threads.

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OF
POPULAR INFORMATION

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Prostrate Junipers. This general name is given to a number of low-growing Junipers with wide-spreading branches lying close to the ground and forming broad mats. For covering banks, the margins of ponds or beds of larger conifers they are useful and are much used in some parts of the country, although there is still a great deal of confusion in commercial nurseries about the identity and correct names of these Junipers.

The prostrate Red Cedar. This is perhaps the handsomest of all these plants. On exposed parts of the wind-swept cliffs near Ogunquit and at Kennebunkport, Maine, this Juniper grows only about two feet high, with branches extending over a diameter of eighteen or twenty feet, their ends lying flat on the ground. At Kennebunkport, in a position not fully exposed to the wind, one of these plants has formed a short stem about two feet high from the summit of which start branches spreading horizontally and forming a broad head. Whether the dwarf habit of these Junipers is due to the exposed position where they grow or not cannot be determined until plants are raised from seeds produced by them, for it is possible such seedlings may assume the ordinary upright habit of this tree. The fact that such prostrate plants sometimes occur at a distance from the coast, as in Lexington, Massachusetts, indicates perhaps that the prostrate form has become fixed, as it is in the case of prostrate forms of some other Junipers. Dwarf forms of *Juniperus virginiana* are described in German books on trees under the name of *Juniperus virginiana repens* or *J. virginiana horizontalis*, but the Arboretum has no information about these plants and it is impossible to determine if they are

similar to the prostrate plants of the Maine coast which possibly are still without a name. In this country the prostrate *Juniperus virginiana* is not known in cultivation, and in this Arboretum there are only a few small grafted plants of the tall-stemmed specimen at Kennebunkport. This Juniper well deserves the attention of the lovers of hardy conifers.

Juniperus communis, var. *depressa*. This is a dwarf form of the common Juniper and forms broad masses of stems ascending from a prostrate base and covered with linear, sharp-pointed, dark blue-green leaves marked on the upper surface by broad white bands. This dwarf Juniper is very common in the northeastern states on dry gravelly hills and in old pastures, sometimes almost entirely occupying the ground to the exclusion of other plants. In nurseries this plant is sometimes called *Juniperus canadensis* or *J. nano canadensis*. The erect-growing form, which is more common in Europe than in the United States, very rarely occurs in New England and sometimes grows on the lower slopes of the Appalachian Mountains as far south as North Carolina. On the hills in the neighborhood of the Delaware Water Gap in Pennsylvania this upright form seems more abundant than in other parts of the country and to be the prevailing Juniper. Erect forms of *J. communis*, known in gardens as the Swedish or Irish Junipers, are often planted in the middle states but are not very satisfactory in Massachusetts. There is a form of the variety *depressa* (var. *aurea*) with yellow-tipped branches which has been a popular garden plant in the United States for several years. The variety *montana* is the dwarfiest of the prostrate forms of *J. communis*, rarely growing more than two feet high and forming dense mats of prostrate stems. From variety *depressa* it may also be distinguished by its shorter and broader incurved leaves. This little plant grows on the Atlantic coast from Maine to Newfoundland, on the Rocky Mountains, in Alaska, and through northern Asia and Europe. It is sometimes called *Juniperus nana*, *J. alpina* and *J. sibirica*. On the high mountains of Japan there is a form of *J. communis* (var. *nipponica*) with wide-spreading and ascending or often prostrate stems which is similar to the variety *montana*. Nothing is known of the value of this Japanese variety in gardens here as it does not appear to have been introduced until Wilson sent seeds to the Arboretum two years ago from which only a single plant has yet appeared.

Juniperus horizontalis. This is one of the handsomest of the prostrate Junipers and an excellent garden plant. It has procumbent and prostrate stems which often develop roots and sometimes extend over broad areas. The leaves are scale-like, acute, blue-green or steel-blue, and the fruits are bright blue and ripen at the end of the second season. This is a widely distributed plant from the coast of Maine to British Columbia, ranging south to Massachusetts, western New York, Illinois and Montana. It grows on sea cliffs, gravelly slopes, or in western New York in deep, often inundated swamps. For many years, until it was found to be distinct from the European Juniper, this plant was known as *Juniperus Sabina* var. *procumbens*. It has also been called *J. prostrata* and *J. repens*. There is a form of this Juniper (var. *Douglasii*) with steel blue foliage, turning purple in the

autumn, which grows on the sand dunes of Lake Michigan and is known in gardens as the Waukegan Prostrate Juniper. There are large beds of *J. horizontalis* in the general Juniper Collection.

Juniperus procumbens. This is the best known of the prostrate Junipers which Japan has sent to the gardens of the west. It is a plant with wide-spreading procumbent stems, blue-green, sharply pointed leaves marked on the upper surface by two white lines. The fruit is not known. This Juniper finds a place in nearly every Japanese garden, but it must be a rare and probably local plant in its distribution as a wild plant was not seen by Wilson during his extended travels in Japan. It is said to have been introduced into Great Britain before the middle of the last century but was soon lost from European gardens until it was reintroduced in 1893. This Juniper is largely used as a garden plant in California where it is imported from Japan, and less commonly in the eastern states. It is perfectly hardy and well established in the Arboretum, and can be seen with the other Junipers. This Japanese Juniper is closely related to the prostrate Juniper of western China and the Himalaya *J. squamata*, a plant with awl-shaped, sharply pointed leaves in clusters of three, and dark purple-black berries. Plants from western China can be seen in the Arboretum.

Juniperus chinensis, var. Sargentii. This dwarf form of a wild tree of China and Japan appears to have been first collected by Professor Sargent near Mororan in southern Hokkaido in the autumn of 1892, and the plants raised from the seeds which he collected at that time are probably the only ones in cultivation. This Juniper forms a low dense mat of wide-spreading branches covered with small, dark green, scale-like leaves, mixed with pointed ones. It finds its most southern home on the high mountains of northern Hondo; it is more abundant in Hokkaido where it sometimes descends to the sea-level and ranges northward to Saghalin and the more southern Kurile Islands. In the Arboretum it is now the handsomest of the prostrate Junipers. It can be seen here to advantage on the Hemlock Hill Road opposite the Laurels where several plants form a large mass and show considerable seminal variation. There are also three large plants on the eastern slope of the knoll on which the general Juniper Collection is planted.

Juniperus conferta, which has been called *J. litoralis*, is also a Japanese species ranging northward from the southern island of Tanegashima to Saghalin and to the shores of the Sea of Okhotsk. The sand dunes of Hakodate Bay in southern Hokkaido are covered with the long prostrate stems of this plant which root freely as they grow and extend over broad areas. The leaves are thickly crowded, straight, sharp-pointed, concave, pale above and dark below. The fruit is three-seeded and ripens at the end of the second year. Although this Juniper has been known to botanists for more than fifty years it has never been cultivated until Wilson sent seeds from Japan to the Arboretum two years ago. From this seed a number of plants have been raised; they are doing well and there is reason to hope that this plant will soon be better known in eastern gardens. In northern Japan it grows on the sandy seashore with *Rosa rugosa*, which is such a good plant in the most exposed places on the New England coast, and it seems reason-

able to expect that this Juniper may prove the most valuable plant which has yet been tried to hold the drifting sands of our eastern coast.

Juniperus Sabina. The dwarfest of all the prostrate Junipers in the Arboretum collection is a form of this European species with branchlets ascending only a few inches from prostrate stems and covered with dark blue-green scale-like leaves. The right name for this little plant is probably var. *cupressifolia*; another name is var. *nana*. A better known variety of *Juniperus Sabina* is the var. *tamariscifolia* from the mountains of central and southern Europe. This is a dwarf plant with procumbent or rarely ascending branches and needle-shaped, slightly incurved, dark green leaves marked on the upper surface with a white line.

Autumn colors in the Arboretum have been at their best this week, although the leaves of many plants have already fallen and those of many others, especially of the trees and shrubs of eastern Asia, are still as green as they were at midsummer. Some of the most brilliant plants during the week have been individuals of the White Oak (*Quercus alba*), the leaves of other individuals being still entirely green; the Tupelo or Sour Gum (*Nyssa sylvatica*), of which there are a number of plants by the pond near the junction of the Meadow and Bussey Hill Roads; the American Smoke-tree (*Cotinus americanus*); the Fragrant Sumach (*Rhus canadensis* or as it has been often called, *R. aromatica*), which has been largely used as a border plant along the drives; many species of Crataegus on the eastern slope of Peter's Hill; the curious Japanese Apple (*Malus Tschonoskii*); the Tulip-tree (*Liriodendron Tulipifera*) which is always splendid in its golden autumn dress; the Black Haw of the southern woods with its dark red leaves and fruit just turning from white to dark blue; the Sweet Gum (*Liquidambar Styraciflua*), with its star-shaped leaves turning scarlet and yellow. In early spring the Arboretum owes much to the flowers of one of the native species of Juneberry (*Amelanchier oblongifolia*) which has been largely planted along the drives where there are now many large specimens. During the past week these plants have been as beautiful and conspicuous as they were in May, for the leaves have turned the color of old gold and have retained this color for several days. All the American species of Amelanchier are beautiful spring-flowering plants, and although they do not remain many days in flower no other shrubs can be more safely used to enliven wood and swamp borders in the northern states. The bright scarlet of the leaves of the Highbush Blueberry (*Vaccinium corymbosum*) is not now surpassed in brilliancy by that of any other plant in the Arboretum. Attention has often been called in these Bulletins to the value of this native shrub for garden decoration. Fortunately it was early planted in large numbers in the Arboretum shrubbery and many of the plants have now grown to a good size and show their value. As an ornamental plant this Blueberry has everything to recommend it. The habit is excellent; it blooms freely and the flowers are handsome; they are followed by large dark blue fruits of the best quality, and if for no other reason it deserves a place in any garden for the late and splendid colors of its dying leaves. A number of plants at the entrance of Azalea Path opposite the Bussey Hill Overlook show the different shades of color the leaves assume at the end of October.

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Evonymus yedoensis. The fruit of few other plants in the Arboretum is now more beautiful than that of this *Evonymus*. It is a large, vigorous, hardy, tree-like shrub or small tree with a short trunk and wide-spreading branches which form a symmetrical round-topped head. The leaves are unusually large for a plant of this genus and, having turned yellow, have now nearly all disappeared, leaving in full sight the fruit which covers the branches from end to end. It is rose color, about half of an inch in diameter, that is unusually large for that of an *Evonymus*, and as it opens shows the bright scarlet shining seeds. This was one of the plants sent direct to the United States from Japan between 1860 and 1870, and has been growing in the Arboretum for fully thirty years. It is still, however, little known and rare in American and European gardens. There are several specimens, large and small, in the *Evonymus* Group on the right-hand side of the Meadow Road which is better worth a visit late in the autumn than at any other time of the year.

Evonymus europaeus. This, the Burning Bush as the English call it, is a widely distributed and variable European shrub or small tree. The fact that the leaves usually remain green or nearly green on the branches until after the fruit has colored and opened adds to its beauty. The fruit is about two-thirds the size of that of *E. yedoensis* and deep dull red with lustrous bright orange-colored seeds. There are several forms of this small tree in the collection. One of the handsomest of these has been raised here from seeds sent to the Arboretum from Hungary. On this form the leaves are now dark purple on the upper

side and green below. With this are plants of the variety *ovatus* with leaves as fresh and green as they were at midsummer.

Evonymus radicans var. vegetus. Visitors to the Evonymus Collection should look also at the plants of this broad-leaved evergreen from the forests of Hokkaido. Although it is capable of climbing high up the trunks of trees and the sides of buildings it has been grown in the collection as a broad, low, round-topped shrub. Of all the forms of *E. radicans* it is the hardiest and the best for this climate; none of the others bloom here so freely or produce such abundant crops of fruit. This is white, slightly tinged with yellow and the seeds, which can now be seen, are bright orange color.

Platanus orientalis. This name now appears in many American nursery catalogues, and a tree under this name has been largely planted in recent years in the middle and less commonly in the New England States. This tree, however, is not *Platanus orientalis*, which has leaves deeply divided into long pointed lobes, and is a native of southeastern Europe and of western and southern Asia Minor. Under favorable conditions it grows to an enormous size and attains a great age. Very large specimens can be seen in Greece, in the neighborhood of Constantinople, in Dalmatia, and in other countries of southern Europe. There are a few old trees in Great Britain, some of which are believed to be more than two centuries old. In the Arboretum *Platanus orientalis* is only a small bush, the branches being killed to the ground nearly every winter, and we have no information of the occurrence of any other specimen in the eastern United States. This noble tree will probably be hardy and grow to a large size in some parts of California. The tree which is grown as *Platanus orientalis* in the eastern United States is *Platanus acerifolia*, which is easily distinguished from the Oriental Plane by the much less divided leaves which in shape are very similar to those of the native Plane tree. It is this tree which has been so generally planted in London that it is often called the London Plane. The origin of this tree is unknown. Some students believe it is a hybrid between the Oriental Plane and the Plane-tree of the eastern United States; others that it is a species from the mountains of Asia Minor, Afghanistan or northern Persia. No tree, however, like *P. acerifolia* is now known to grow wild in any part of that region, and those who support its hybrid origin point out the fact that the leaves resemble those of the American species and that the fruit is usually furnished with the terminal prickle which is found on that of *Platanus orientalis*. Whatever its origin *Platanus acerifolia* is a noble tree, and the Planes in the streets and squares of London, in spite of the difficulties of London conditions for trees, are probably the finest trees to be found in any city. This tree has been cultivated in the United States for more than a century and has proved an excellent tree for street planting in the middle Atlantic states; it is a comparatively new tree to New England where it is generally satisfactory, although it sometimes suffers from severe cold. It is desirable that the name, *Platanus orientalis* should disappear from American nursery catalogues.

The Japanese Yew. The value of this plant for the northern states has been pointed out before in these Bulletins, and as the years pass its hardiness and value are confirmed by longer trial. There are three or four quite distinct forms of this plant. The one probably most often seen here grows as a large, vase-shaped shrub with several spreading stems. Plants of this sort have been raised in the Arboretum from the seeds of tall forest trees collected by Professor Sargent in Hokkaido. Among these plants there are some which are beginning to develop a single leader and promise to grow into trees. There is another form which is grown in some American nurseries under the unpublished name of variety *capitata*. This is merely a seminal form which begins to grow with a single leader with treelike habit as soon as the seeds germinate. For those who want the Japanese Yew in the form of a tree rather than a bush this form will best produce the desired results. Another bushy form with wide-spreading, nearly horizontal branches, which on plants thirty or forty years old often turn up at the ends and darker green leaves, is often seen in American gardens in which specimens only four or five feet high but sometimes twenty feet in diameter are found. In this country this variety is generally called variety *brevifolia*, but the correct name for it is var. *nana*. A dwarf, round-topped plant (var. *compacta*) is the smallest and most compact of all the forms of the Japanese Yew in this country. A good plant of this dwarf form can be seen in the Arboretum collection where it has been growing for many years. Plants intermediate between the varieties *compacta* and *nana*, differing in size and habit, are sometimes found in American gardens. What is probably the largest Japanese Yew in the United States is one of the bushy vase-shaped plants which was planted about 1870 by Dr. George R. Hall in his garden in Warren on Bristol Neck, Rhode Island. In October, 1889, this plant was twelve feet high and covered a space on the ground of forty feet round. In October, 1916, twenty-seven years later, it is twenty-two feet tall and covers a space one hundred and thirty-two feet round. In 1887 there were only a few fruits on this Yew, but this year it is bearing such a great crop that the berries make the whole plant look red. The foliage unfortunately is not dense, and the plant is evidently failing, probably from insufficient nourishment. The Japanese Yew is now reported to be perfectly hardy in central New Hampshire and in Minneapolis, Minnesota, parts of the country where the winter cold is much greater than it is in eastern Massachusetts, and there is no reason to doubt the statement which has been made that this Yew is the most valuable plant which Japan has furnished our north Atlantic states.

Sorbus commixta. This Japanese Mountain Ash was the first of the species from eastern Asia cultivated in the Arboretum where it was first planted in 1888. It is a common plant in Japan, and as it grows here it is a narrow tree with a tall clear stem, leaves composed of narrow leaflets, flower-clusters of moderate size and bright red fruits. It is chiefly interesting on account of the beautiful orange and red colors of the leaves which turn later and more brilliantly than those

of the other Mountain Ashes in the collection. This tree is growing with other species of *Sorbus* on the right-hand side of the path leading into the Shrub Collection from the Forest Hills Gate.

***Berberis diaphana*.** In the early days of November no Barberry in the Arboretum equals this Chinese species in the brilliancy of its scarlet leaves. It is a low, broad, compact, round-topped shrub with small leaves which appear very late in the spring, usually solitary but large, pale yellow flowers and large oblong red fruits. The beauty, however, of this plant is chiefly found in its habit and in the color of the leaves in late autumn. There is a plant of this Barberry in the Shrub Collection and others in the supplementary Barberry Collection on Hickory Path near Centre Street.

***Crataegus Boyntonii*.** This small tree, which is a native of the Appalachian foothills from southwestern Virginia to Alabama, and one of the largest of the *Intricatae* Group, is well worth a place in collections of these plants for the brilliant orange and red colors of the leaves at this time. It has large flowers in few-flowered clusters, yellow anthers and nearly globose yellow-green fruit flushed with red which is still to be found on the plant in the Arboretum where it can be seen among the other *Intricatae* on the lower side of the road at the eastern base of Peter's Hill.

***Crataegus Buckleyi*.** This is another arborescent species of the *Intricatae*, which inhabits mountain slopes from two thousand to three thousand feet elevation from southwestern Virginia through western North Carolina to eastern Tennessee. It has flowers in more compact clusters than those of *C. Boyntonii*, rose-colored anthers, and sub-globose, red or russet-red fruit. The leaves of this little tree turn as brilliantly as those of the last named species near which it is growing.

An illustrated guide to the Arboretum containing a map showing the position of the different groups of plants has recently been published. It will be found useful to persons unfamiliar with the Arboretum. Copies of this guide can be obtained at the Administration Building in the Arboretum, from the Secretary of the Massachusetts Horticultural Society, 300 Massachusetts Avenue, Boston, from The Houghton, Mifflin Company, 4 Park Street, Boston, and at the office of the Harvard Alumni Bulletin, 50 State Street, Boston. Price, 30 cents.

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The Pinetum. After two seasons of abundant rain the conifers are in good condition this autumn, and the Pinetum is now perhaps the most interesting part of the Arboretum to visit. At one time or another every conifer which had any chance of surviving has been tried in the Arboretum, and some useful information on the value of the different exotic and American species, with the exception of the new introductions from China, as ornamental trees in this climate has been obtained from the Arboretum experiments. Considering how generally unfavorable the New England climate is for trees of this class, the large number that succeed here is surprising, although it must be remembered that in this climate many conifers, especially Spruces and Firs, are often at their best when not more than forty or fifty years old and that as they grow older they gradually fail and lose their value as ornamental trees. This is true of the so-called Colorado Blue Spruce (*Picea pungens*), which is still one of the most popular conifers in the northern United States, where it is propagated and planted in immense numbers, in spite of the fact that it early loses its value as an ornamental tree. The Blue Spruce is very hardy, is easily raised and grows rapidly; young plants are of good shape and dense habit with their lower branches resting on the ground. There are two forms, one with dull green and the other with blue leaves, and the latter especially appeals to persons who are fond of unusual looking and sensational plants. For the nurseryman the Blue Spruce has everything to recommend it, easy germination of the seed, quick growth and unusual beauty in the young plants, and therefore a certainty of a quick sale. For the planter looking for something more impor-

tant than a plant for a city garden or a small suburban yard this tree has proved a failure. It is not surprising for *Picea pungens*, growing in small groves near streams in the valleys of the Rocky Mountains of Colorado, long before it attains its full size is a thin, scrawny, miserable looking tree with a few short branches only near the top of the stem. This tree was discovered in 1862; seed was planted the following year in the Harvard Botanic Garden, and one of the plants raised at that time is still alive in the Arboretum on the southern slope of Bussey Hill where it is kept as a warning for planters who are deceived by the beauty of young plants of the Blue Spruce.

***Picea Engelmannii*.** This tree as it grows nearly up to the timber line of the central Rocky Mountains, where it once formed great forests, is one of the handsomest of the Spruces with its narrow spire-like crown, soft gray-green foliage and tall trunk covered with bright red scaly bark. It was also discovered in 1862 and what are probably the largest specimens in cultivation are in the Arboretum Pinetum. Until two or three years ago these were narrow, perfect pyramids with the lower branches resting on the ground; then the lower branches began to die gradually without apparent cause. This has continued; and the stems of some of the trees are now bare of branches for six or eight feet from the ground, and their beauty as specimen trees is ruined.

***Picea canadensis*.** This, the White Spruce of British North America, is a very hardy, fast-growing tree here, and is one of the handsomest of the Spruces which can be grown in this region; but the climate of eastern Massachusetts is evidently too warm for it and after it is thirty or forty years old it becomes thin and unsightly.

***Picea rubra*.** This is the Appalachian timber Spruce and retains here its beauty longer than the White Spruce, for it is a native of Massachusetts and ranges southward along the mountains to the high Carolina peaks. It is a handsome tree with dark green leaves, but it probably grows more slowly than any other large coniferous tree, and it is not easy to establish. For these reasons it will probably never be a favorite tree with nurserymen.

***Picea omorika* and *P. orientalis*.** These are handsome and hardy trees, the former a native of the Balkan peninsula, and the latter of the Caucasus. No weakness has yet been found here in these trees except that they too often lose their leaders from the attacks of the borer which so often destroys the leaders of the White Pine.

***Picea Glehnii*.** What the future may have in store for this tree here, which is a native of northern Japan and Saghalien, no one can predict as it has been in cultivation in the Arboretum for only twenty-two years. The trees now grow rapidly, are perfectly hardy and show no signs of failure of any sort. The best specimens here are now about eighteen feet high.

***Picea jezoensis*.** This is the most widely distributed of the species of eastern Asia; ranging as it does from the Amoor region to Manchuria, Korea, and to northern and central Japan. This is the only Spruce in all that region with flat leaves like those of *P. omorika* and

P. sitchensis of our northwest coast. It has been sometimes called *Picea ajanensis*, *P. microsperma* and *P. hondoensis*. In Great Britain, where it is usually incorrectly called *Picea Alcockiana*, it grows remarkably well and has been recommended as a timber tree for forest planting. In a collection of exotic trees made in 1870 by Dr. George R. Hall in Warren, Rhode Island, there is a specimen of this tree from sixty to seventy feet high with a trunk forty-six and a half inches in diameter and branches spreading on the ground. In this Arboretum and in the Hunnewell Pinetum at Wellesley this tree has grown badly, losing many of its branches and soon becoming unsightly.

Picea bicolor. This is one of the rarest of the Japanese conifers, and as it grows in the Hunnewell Pinetum it is now the handsomest of all the Spruce trees which can be grown in this climate. Mr. Hunnewell's trees are now about forty feet high with the lower branches resting on the ground and covering a space from thirty-five to forty feet across and with perfectly straight stems. This beautiful tree is probably better known by its incorrect name of *Picea Alcockiana*. It is one of the rarest of the Japanese conifers in cultivation and it is to be regretted there are no good specimens now in this Arboretum.

Picea Abies. This unfortunately is the correct name for the so-called Norway Spruce of Europe which has generally been known as *Picea excelsa*. Fifty or sixty years ago this tree was very generally planted in southern New England where it has not proved a success as an ornamental tree as it begins to fail at the top when about thirty years old and then soon becomes ragged and unsightly. In some parts of Virginia and in the Middle States this is a better tree than it is in Massachusetts. In the National Cemetery at Gettysburg in Pennsylvania there are magnificent specimens of the Norway Spruce in as perfect health and beauty as can be found anywhere.

Firs. The number of Fir trees that can be successfully grown in this climate for many years is not large. One of the handsomest here is the White Fir of western North America, *Abies concolor*. There are fine specimens of this beautiful tree in the Arboretum raised here from seed planted in 1874 and now about sixty feet high, with the lower branches resting on the ground, and solid masses of gray-green foliage. As handsome and as promising in this climate is the Japanese *Abies homolepis*, or, as it has been more often called, *Abies brachyphylla*. This is a large tree on the mountains of central Japan with dark green leaves silvery white on the lower surface and violet-purple cones. It has proved perfectly hardy in this climate. The largest specimen in the Hunnewell Pinetum is now fifty-five feet high with branches sweeping the ground. The Arboretum trees are smaller but already produce their handsome cones. A variety of this tree, (var. *umbellata*) with green cones and rather lighter-colored leaves is established in the Arboretum where it has grown rapidly, the largest specimen raised from seeds planted in 1891 being thirty-five feet high. *Abies cilicica* from Asia Minor and *A. cephalonica* from southeastern Europe are hardy trees in the Arboretum and now promise to grow here to a large size. *Abies Veitchii* from Japan is still a handsome tree in the

Arboretum but it is doubtful if it carries its beauty to old age. *A. amabilis* and *A. grandis* from northeastern North America are handsome young trees here, and *A. nobilis* from the same region just keeps alive here as a nearly prostrate shrub, although in Methuen, in the extreme northern part of this state, there are handsome and healthy specimens of this Fir nearly thirty feet high.

Pines. Among exotic Pines the three Japanese species, *Pinus parviflora*, *P. Thunbergii* and *P. densiflora*, have all grown well here in this climate for nearly thirty years and are still handsome and attractive trees of much promise. The Scotch Pine (*Pinus sylvestris*) and the Austrian Pine (*P. nigra*) are perfectly hardy and grow rapidly in this climate, but they are comparatively short-lived trees here and do not promise to be so valuable as the Japanese species. The White Pine of the Balkan peninsula (*Pinus peuce*) is very hardy here, producing its cones freely, and now promises to be a large and valuable tree. The Swiss Pine (*P. cembra*) is hardy but grows very slowly but it is possible that the form of this tree from central Siberia may prove more successful in this climate. The Asiatic representative of this Pine, *Pinus koraiensis*, from eastern Siberia, Korea and Japan, grows well here and produces its cones freely. Of the Pines of western America *Pinus flexilis* of the Rocky Mountain region grows slowly in the Arboretum but is healthy and perfectly hardy, as are the two White Pines, *P. Lambertiana*, the great Sugar Pine of California and Oregon, and *P. monticola* which ranges from Idaho to the coast of British Columbia and to the high Sierras of California.

Callicarpa japonica. Attention is again called to the group of these shrubs which are on the left-hand side of Azalea Path close to its entrance from the Bussey Hill Road. The leaves have fallen from the branches which are now covered with small violet-colored fruits which are produced in compact axillary clusters. The small pale pink flowers, which do not appear until after midsummer, are not conspicuous and the real beauty of this shrub is in the late and abundant fruit of a color that is not found on any other tree or shrub hardy in this climate. The largest and best plants in the group have been raised in the Arboretum from seeds sent here from Korea. There are three Chinese species of this genus in the collection, but it is too soon to speak with confidence of their value as garden plants.

Cornus sanguinea. This is now one of the conspicuous shrubs in the Arboretum, for the leaves are now the color of old Spanish leather which they will retain for some time longer and until they fall. This Cornel is a native of Siberia, and here in New England often grows ten or twelve feet high and forms a mass of stems which are often broader than the plant is high. The flowers are white in small compact clusters, and these are followed by nearly black fruit. The value, however, of this plant is found in its vigor and excellent habit, and in the color of the foliage in November. A large specimen can be seen in the Cornel Group at the junction of the Meadow and Bussey Hill Roads.

These Bulletins will now be discontinued until next spring.

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