Trees and Shrubs of the Dominion Arboretum

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Publication 1697 1980

Available in Canada through

Authorized Bookstore Agents
and other bookstores

or by mail from

Canadian Government Publishing Centre
Supply and Services Canada
Hull, Quebec, Canada K1A 0S9

Catalogue No. A53-1697/1980E
ISBN 0-660-10498-9

Canada: $19.95
Other countries: $23.95

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Cover photos:

Outside front cover. From left to right, top: leaves of red oak (*Quercus rubra*); willows (*Salix* spp.); center: autumn; flower of tuliptree (*Liriodendron tulipifera*); cones of Korean fir (*Abies koreana*); withe rod (*Viburnum cassinoides*); bottom: Scheidecker crab apple (*Malus ×scheideckeri*).

Outside back cover. From left to right, top: sugar maple (*Acer saccharum*) in fall; *Syringa vulgaris* 'Charles X'; center: Kentucky coffee tree (*Gymnocladus dioicus*); *Symphoricarpos doorenbosii* 'Mother of Pearl'; *Rosa* 'Carmen'; garland, or rose, daphne (*Daphne cneorum*); bottom: nest spruce (*Picea abies* 'Nidiformis').

ACKNOWLEDGMENTS

This book is the result of the knowledge of many talented and generous individuals who have helped me in its preparation. I herewith acknowledge my indebtness to them.

To Mr. Trevor Cole, present Curator of the Dominion Arboretum, Ottawa Research Station, who carefully read the manuscript, made many helpful suggestions, assisted with the correction of errors and omissions, and spent many hours bringing the nomenclature in line with current thinking.

To Mrs. Jean Perrin, Head, Scientific Editing/Text Processing Section, Research Program Service, and her staff, particularly Mrs. Sheilah Balchin and Mrs. Jocelyn Tomlinson, for extensive editorial assistance.

To the late Mr. Ross Jackson, former Head, Graphics Section, Research Program Service, and his staff, who examined hundreds of photographs for their reproducibility and whose excellent selection you see reproduced here.

To Mrs. Mary Brett, Graphic Design Services, Information Services, for the excellent cover design.

I thank my former colleagues Mr. W. J. Cody, Dr. B. Boivin, and Dr. J. M. Gillett, for their valuable assistance during the formative years of the text; Mr. H. Rhodes for his assistance with the shrubby potentillas; and Dr. R. J. Moore for the use of his notes on hardy buddleia species.

INTRODUCTION

The Dominion Arboretum and Botanic Garden of Canada located at the Central Experimental Farm in Ottawa displays a wide range of well-established trees and shrubs, some dating back to 1889 when the Arboretum was started. The existing Arboretum covers about 26 ha of rolling land between Prince of Wales Drive (Ontario Highway 16) and the Rideau Canal and comprises various soil types and moisture levels. Because it is north of 45° latitude, the Dominion Arboretum is the most northerly arboretum on the continent and is especially useful in testing for hardiness of plant materials.

The climate of the area has a significant bearing on the testing of new plants. Ottawa has a temperate, continental climate with a moderating influence in the winter because of the proximity of the Great Lakes. Large changes in the weather are often experienced from day to day and relatively large temperature variations occur from season to season. The mean annual temperature is 6°C. July is the warmest month, with a mean temperature of 16°C, and January is the coldest month, with a mean temperature of −11°C. During an average year, the normal minimum and maximum temperatures are −16°C in January and 27°C in July. Statistically a temperature above 35°C can be expected for one day each summer and below −32°C for one day each winter. The largest temperature range in one year at the Central Experimental Farm in Ottawa during the last 37 years occurred in 1943 when the temperature ranged from −36°C in February to 38°C in August. The highest and lowest temperatures ever recorded in Ottawa are 39°C on July 2, 1931, and −39°C on December 29, 1933. The average dates of the last frost in the spring and the first frost in the fall are May 13 and September 28; an average frost-free period of 137 days.

Many of the trees and shrubs planted in 1889 are now among the largest specimens of their species in Canada. In 1889, little was known about the hardiness of exotic plants in the Ottawa area so most of the trees planted were obtained from the famous nurseries of Spaeth in Germany, Louis Frères in France, Ellwanger and Barry in Rochester, N.Y., and the Arnold Arboretum in Jamaica Plains, Mass. Some of the plants from the Arnold Arboretum were from explorers in China, including Drs. E. Wilson and J. Rock.

Several specimens planted at this time have been killed back and now have multiple trunks arising from ground level. *Parrotia persica* planted in 1900 has been killed back to the snow line every year, but has formed an interesting mass of foliage, 1 m high and 3.5 m wide. Other trees were killed back when young, then grew single stems that survived and formed good trees. Two examples of this formation are the tuliptree (*Liriodendron tulipifera*), which was planted in 1897 and reached a height of 18 m before being severely injured by high winds in 1972, and the rare umbrella magnolia (*Magnolia tripetala*), which was planted in 1907 and is now 9 m high.

Because Ottawa can have temperatures as low as −39°C, many visitors are surprised to see specimens of these trees and other so-called tender plants such as the bald cypress (*Taxodium distichum*) planted in 1908, the eastern redbud (*Cercis canadensis*) planted in 1942, the shingle oak (*Quercus imbricaria*) planted in 1930, a tree magnolia (*Magnolia kobus* var. *borealis*) planted in 1952, the bottlebrush buckeye (*Aesculus parviflora*) planted in 1908, the Japanese angelicatree (*Aralia elata*) planted in 1910, and Sargent's cherry (*Prunus sargentii*) planted in 1934 and the only Japanese cherry reliably hardy at Ottawa. Many of these plants are located

in a small area northwest of the Arboretum that may have a less severe microclimate.

The collections at the Arboretum are also especially rich in such hardy groups as crab apples, junipers, lilacs, mock oranges, and shrubby potentillas. Trials of rhododendrons and azaleas began 10 years ago in the nursery lathe houses and are showing promise of providing many good species and cultivars hardy for use in Ottawa's climate under proper cultural conditions.

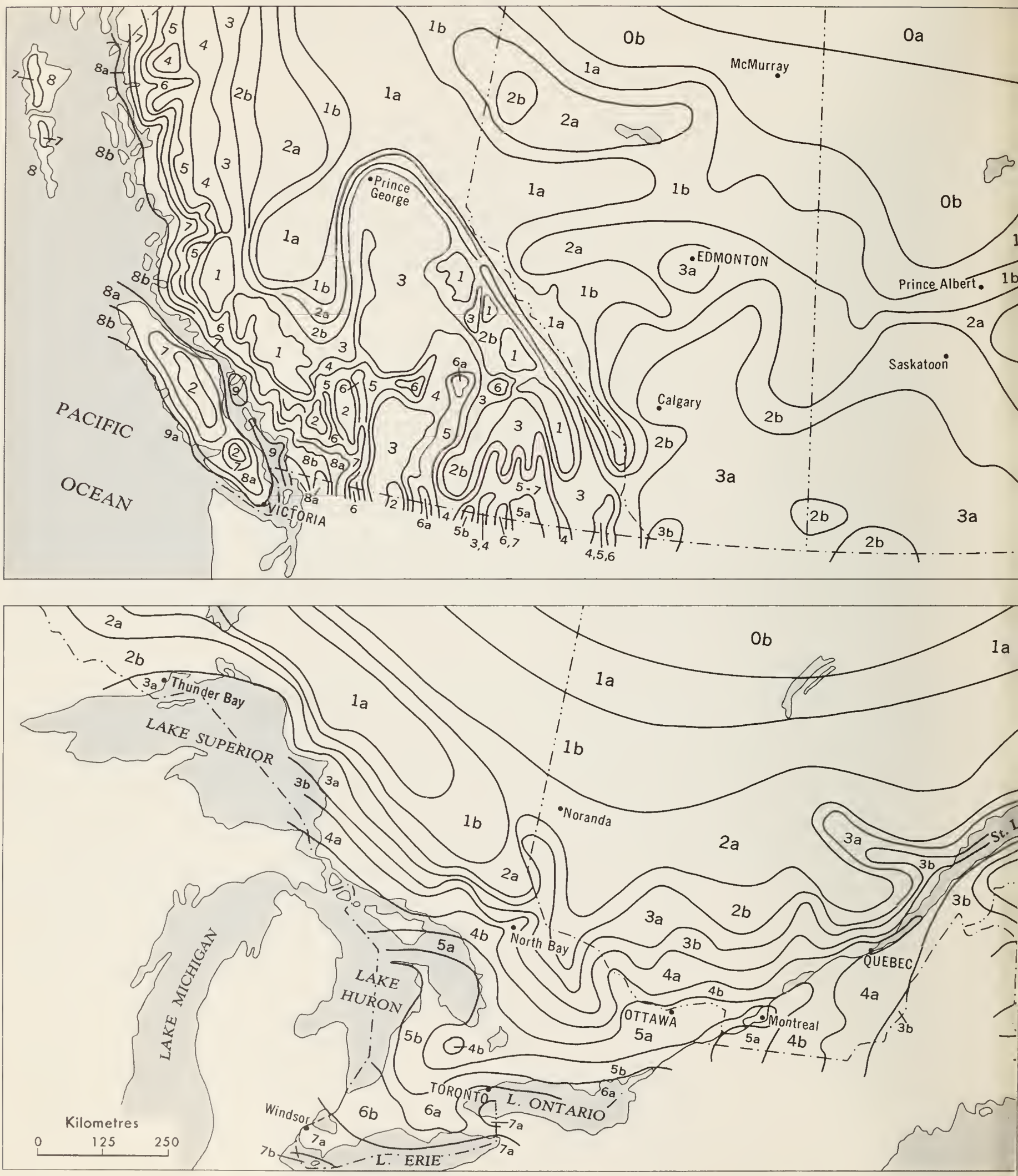
A 20 ha site south of the Arboretum, adjacent to the Rideau Canal, and overlooking Carleton University is being developed as the new botanic garden. The site already contains a large planting of the best small trees and shrubs. These will form the perimeter of an area planned to contain the display beds for annuals and perennials. Other parts of this area have been chosen to display collections of the native flora of Canada, both herbaceous and woody. Some plantings of native tree species hardy at Ottawa have already been completed. Other areas of the new site will eventually contain swamp gardens, native shrubs, a woodland garden, and a section for Canada's alpine and northern flora. All native plants come from authentic, documented, native stands and can therefore be used as research subjects in future projects by taxonomists, cytologists, and horticulturists.

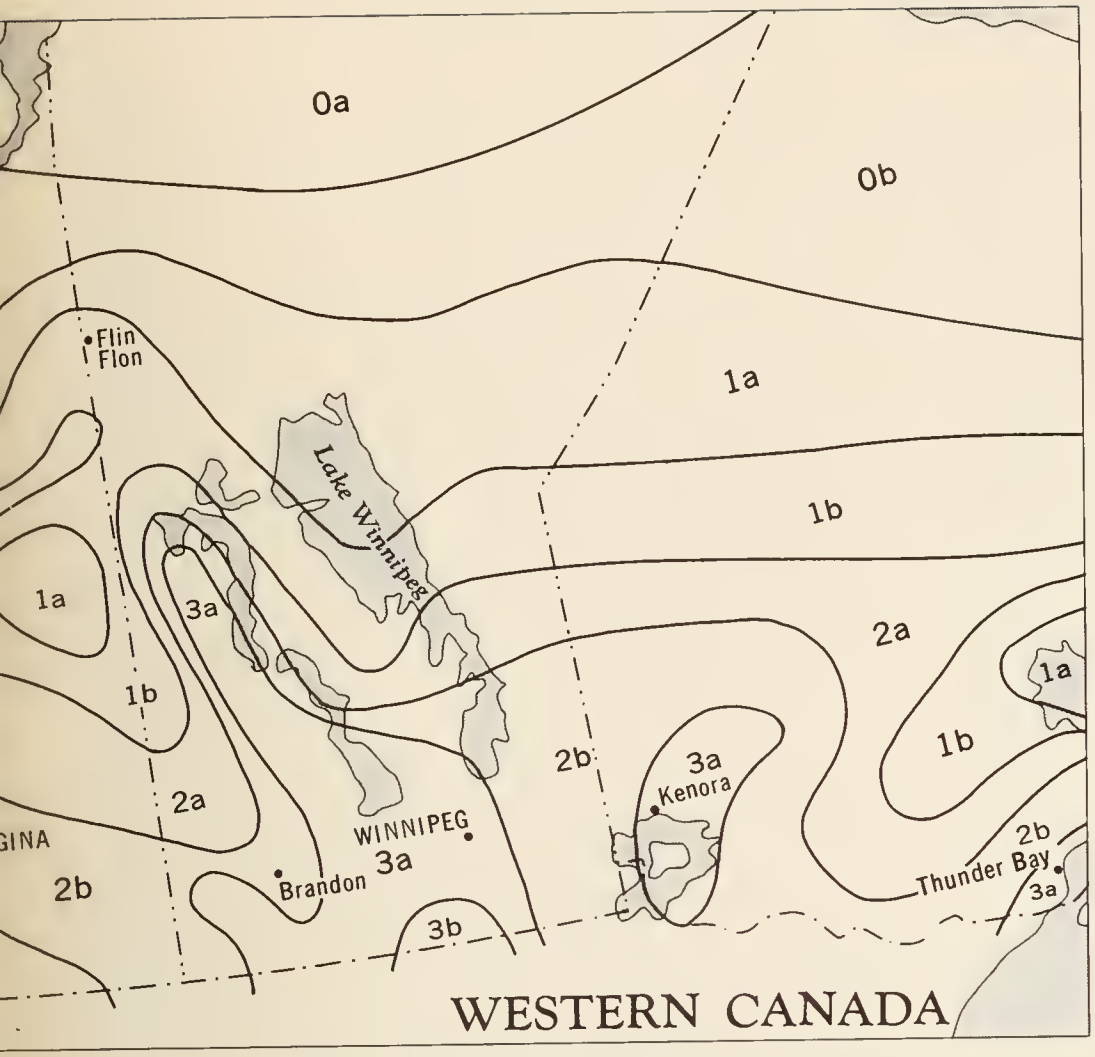
The purpose of this book is to provide a résumé of the trees and shrubs tested in the Arboretum, together with certain horticultural and botanical characteristics, their usefulness, special requirements, and degree of hardiness. In general, only those plants that have been correctly identified and specimens preserved in the herbarium now located at the Biosystematics Research Institute at Ottawa are included.

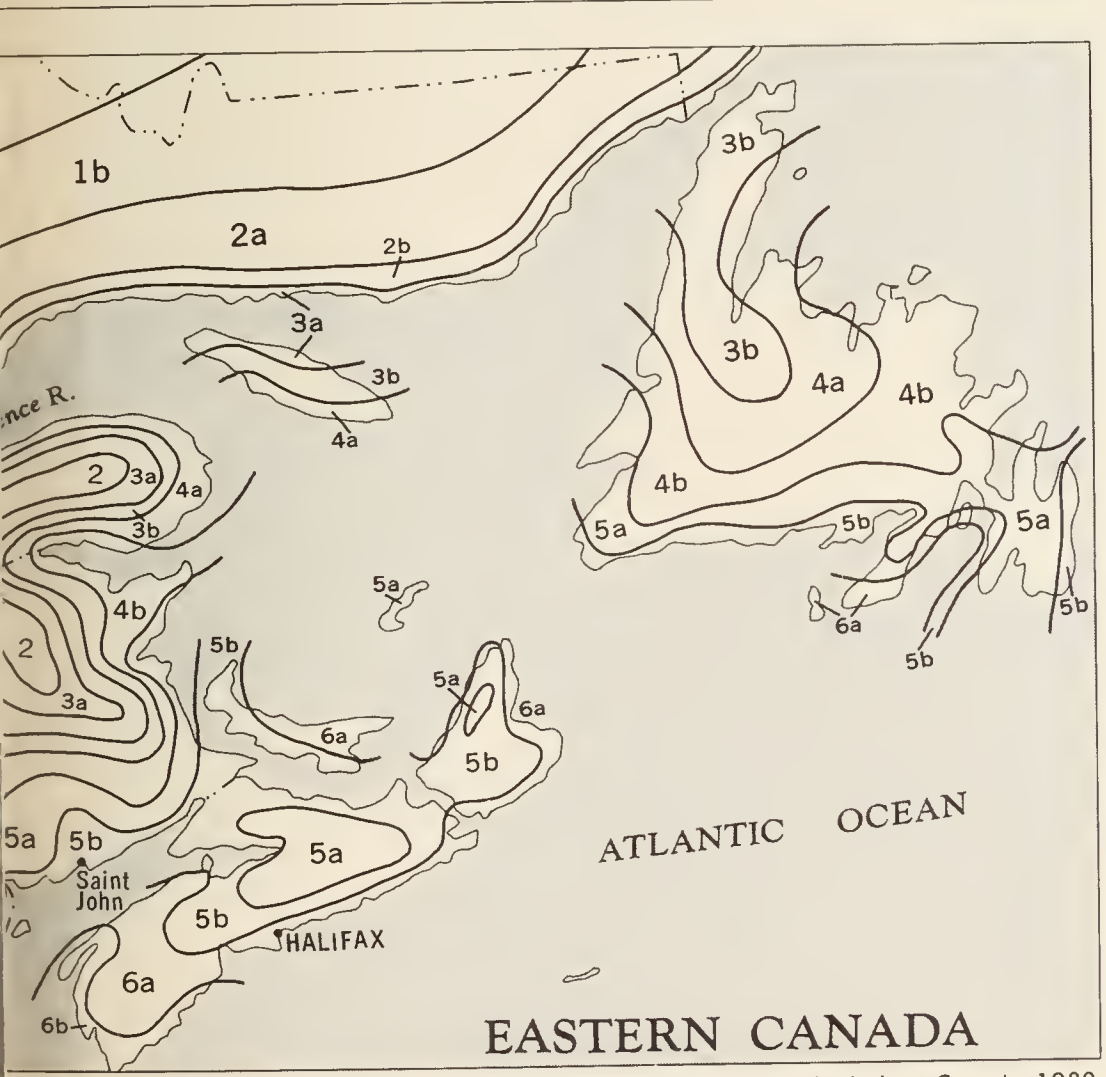
This book is intended as a guide for homeowners, gardeners, and nurserymen to illustrate the great variety of trees and shrubs, native and cultivated, that will be useful for planting in parks, city streets, and gardens in the Ottawa area and most of eastern North America. It will also serve as a unique source of information on hardiness, adaptability, and usefulness of these plants, as well as a simple means of identification. A great deal of work has been done to ensure that the nomenclature is in accordance with the greatest authorities and as such could be used in the nursery trade as a standard for all the taxa mentioned.

There are two sections to the book. The first deals with deciduous woody plants and the second with coniferous plants. Plant names are arranged alphabetically in each section. When the names of a hybrid's parents are given the female parent is listed first. Names of genera and species in the first section are generally in accordance with *Hortus Third*, by the staff of the L. H. Bailey Hortorium, Cornell University, Macmillan Publishing Co., Inc. The coniferous plants in the second section follow the nomenclature of the *Manual of cultivated conifers*, by P. den Ouden and B. K. Boom, Martinus Nijhoff, The Hague. Cultivar names follow closely the International code of nomenclature of cultivated plants, and could serve as a standard for horticultural use. There are occasions when the plant listed has not been mentioned in either of these two texts; in these cases, other references have been consulted.

MAP OF PLANT HARDINESS ZONES IN CANADA







Cartography by the Land Resource Research Institute, Research Branch, Agriculture Canada, 1980.

BLACK AND WHITE ILLUSTRATIONS

(Listed in order of placement.)

Part one

Deciduous woody plants

ABELIA — Caprifoliaceae

Zone 7

Three species of abelia, *A. chinensis* R.Br., *A.* ×*grandiflora* (André) Rehd., and *A. schumannii* (Graebn.) Rehd., have been planted but have not proved hardy. *A. chinensis* withstood two winters in the nursery before it was killed.

ABELIOPHYLLUM — Oleaceae

A. distichum Nakai — KOREAN ABELIALEAF

Zone 5b

A. distichum is the only species in this genus. With protection from the prevailing winds, it has proved hardy in Ottawa. It originated in Korea.

ACANTHOPANAX — Araliaceae

A genus of trees and shrubs noted for the subtropical effect of their leaves and their shiny black fruits, produced abundantly by some of the species. The plants are of special merit for use in the shade.

A. divaricatus (Siebold & Zucc.) Seem.

Zone 3

A native of Japan, this species was introduced into the Arboretum from the Imperial Botanic Gardens at Tokyo.

A. lasiogyne Harms

Zone 5

Planted in 1950, the specimen is 1.5 m high and 1 m wide. According to some American authorities this species should not be hardy in the Ottawa area, but it is growing well in the Arboretum. It is native to western China.

A. senticosus (Rupr. & Maxim. ex Maxim.) Harms — FIVE-LEAVED ARALIA

Zone 3

The specimen was planted in 1909 and died in 1947. Thus, this species is apparently hardy but short-lived. It comes from northern China and Manchuria.

A. sessiliflorus (Rupr. & Maxim. ex Maxim.) Seem.

var. ***parviceps*** Rehd.

Zone 2

The four plants of this variety in the collection were originally received as *A. sessiliflorus*, but they have since been identified as the variety *parviceps*. All four were planted in 1896 and have become large shrubs, 3 m high and 2.5 m wide. The variety comes from northern China. No specimens of the type species have been planted.

A. sieboldianus Mak.

Zone 5

The most ornamental of *Acanthopanax* species growing at the Arboretum. Although this plant, of Japanese origin, prefers the shade, it grows well in the sun. It gives a subtropical effect to the landscape.

Six other species, *A. henryi* (D. Oliver) Harms, *A. leucorrhizus* (D. Oliver) Harms, *A. setchuenensis* Harms, *A. simonii* Hort. Simon-Louis ex C. K. Schneid., *A. trifoliatus* (L.) Voss, and *A. wardii* W. W. Sm., have been planted on several occasions, but died in the nurseries during the first winter. *A. henryi* was tried 17 times, but never survived a winter.

ACER — Aceraceae

A widespread and important genus composed mostly of deciduous trees, some large, others small, and a few shrubby. Many exotic maples in the Arboretum have been killed back to ground level so often that they have produced a number of trunks from a wide-spreading bole just above soil level.

The collection of maples represents one of the largest groups planted. Most of the trees are located in the area directly south of Arboretum Building 74; others are growing at the extreme south end of the Arboretum on a gentle slope. Many cultivars of the more common maples obtained from the Spaeth nursery in Germany were planted from 1900 to 1920, but a large number appear to have reverted to the original form or to have outgrown the form they were supposed to represent. Such are the globe and weeping forms of the silver maple (*A. saccharinum* L.); after 60 years or more, they have not proved to be distinct from the type and are not recognized as such.

A. campestre L. — HEDGE MAPLE

Zone 5b

The specimen of *A. campestre* has formed eight main stems, some with a height of 6 m and a girth of approximately 10 cm. The plant has the appearance of a scrub tree and cannot be considered very ornamental. During severe winters it may be killed to ground level, although like many of these types of tree it appears to build up a resistance against winter injury after it has been killed back for many years; some of the main trunks are perfectly sound, even after a severe winter. The species is found in Europe and western Asia.

'Pendulum'

Zone 5b

The specimen appears to be almost identical to the species.

'Schwerinii'

Zone 5b

This cultivar is similar in behavior to the species, but its leaves are purplish when young.

A. circinatum Pursh — VINE MAPLE

Zone 6

Although still alive, this shrubby maple suffers worse winter injury than *A. campestre*. The vine maple is a native of western North America and is killed back almost every year at Ottawa, either to ground level or to half its height. The tallest of its six main shoots is 3 m. A large woody knoll at the base of the tree shows the history of its setbacks.

A. ×***dieckii*** (Pax) Pax

Zone 5

This hybrid (*A. lobelii* Ten. × *platanoides*) is indistinguishable from *A. platanoides* in general habit and appearance, but the lobes of its leaves are entire. It originated at the Zoeschen nursery in Germany in 1887.

A. ginnala Maxim. AMUR MAPLE

Zone 2

Most of the specimens in the collection have been pruned to one main stem, and have formed shapely, round-topped trees from 4.5 to 6 m high. The leaves are brilliant in early fall when they change to crimson. During July and August the rosy-hued fruits are also attractive. The species comes from China and Japan.

var. ***semenowii*** (Reg. & Herd.) Pax

Zone 2

A geographical variety of *A. ginnala*, native to Turkestan. Its leaves are smaller and often five lobed, and the fruits are often distinctive.

A. glabrum Torr. ROCKY MOUNTAIN MAPLE

Zone 5

A shrubby species but in western North America, its native habitat, it sometimes assumes tree-like proportions. In the Arboretum it has formed a large shrub 3.5 m high and 3 m wide. Its thin, lustrous leaves are distinct from those of other maples, and it might be useful for planting in shrubberies where diversity of foliage is desired.

A. grosseri Pax

var. ***hersii*** (Rehd.) Rehd.

Zone 6

A geographical variety native to central China, with longer lateral lobes on the leaves than the species and with equally fine autumn coloring. Its showy bark is marbled and striated with white, and its fruits are in long racemes. The young wood is red, the older wood yellowish green striped with red. The foliage is three lobed. An 8-year test of this variety has proved it is not completely hardy in the Ottawa area.

A. miyabei Maxim. MIYABE MAPLE

Zone 3

The two specimens have formed large, open trees about 15 m high. As ornamentals, however, they are no better than the Norway maple, which they resemble. Like the Norway maple, their leaves contain a characteristic milky fluid. The species comes from Japan originally.

A. mono see *A. truncatum* subsp. *mono*

A. monspessulanum L. MONTPELLIER MAPLE

Zone 7

Another shrubby maple with three-lobed, dark green leaves, which remain on the tree late into the fall. As an ornamental tree or shrub it has little to commend it, except perhaps its reddish stems and fruits. It originated in southern Europe and western Asia. The shrub in the Arboretum is 1.5 m high and 1 m wide and has many widely spaced stems.

A. negundo L. MANITOBA MAPLE, BOX-ELDER

Zone 2

A hardy native species that, in Eastern Canada particularly, is looked upon as a weed tree because of the abundance of fertile seeds it distributes lavishly to the surrounding area. It is distinguished easily from other North American maples by its compound leaves, consisting of three to five ovate, pointed, coarsed-toothed leaflets, and its fruits, borne in pendulous racemes 10–20 cm long.

Although this species is considered a weed, it makes a good lawn specimen and shows some yellow fall coloring; therefore where the soil is poor or the aspect unsuited to most trees this one will provide shade or a screen. The trees planted in the Arboretum have not been affected by ice-storms or wind more severely than other maples.

'Auratum' YELLOWLEAF BOX-ELDER

Zone 7

A cultivar with golden yellow leaves. Although young trees may appear to suffer from some mineral deficiency, large trees glisten and shine in the sunlight from early spring until fall. This tree has earned the name "Ghost tree" on the Pacific coast.

'Pseudocalifornicum'

Zone 7

A vigorous-growing tree originating in California and distinguished by its thorny green branches.

'Variegatum' SILVERLEAF BOX-ELDER

Zone 7

The leaflets of this cultivar may have an irregular border of white or may be wholly white, giving the tree a silvery appearance. An excellent variegated tree, but not completely hardy in the Ottawa area.

var. ***violaceum*** (Kirchn.) H. Jaeg. VIOLET BOX-ELDER

Zone 7

A distinctive geographical variety of the northwest, which has purplish or violet branches covered with a glaucous bloom. The specimens at the Arboretum have five or seven leaflets, pubescent on the undersides. This tree is not truly hardy in the Ottawa area.

A. nigrum see *A. saccharum* subsp. *nigrum*

A. opalus Mill.

subsp. ***obtusatum*** (Waldst. & Kit. ex Willd.) Gams. ITALIAN MAPLE

Zone 5b

A hairy-leaved geographical variety found mainly in Italy. It has heart-shaped leaves, more rounded at the lobes than those of the species and with hairy undersides. This variety has proved to be hardier than the species, but even so the specimen at the Arboretum is often killed back to ground level.

A. ×***ottawensis*** A. R. Buckley

Zone 2

A tree (?*A. truncatum* × *platanoides*) whose correct identity is uncertain. It keys out to *Acer truncatum* in every character except for a slight variation in the fruits and a much more vigorous habit. Its leaves are truncate, but not as thick as those of *A. truncatum* at other stations in Canada; also, the wings of the seeds are one and three-quarter times the length of the nutlet, although this character seems to vary according to the author. The plant compares favorably with herbarium specimens of *A. truncatum*. It is most likely a hybrid of that species and *A. platanoides*, because it looks like a Norway maple, but has good fall coloring. The specimen in the Arboretum came from Berlin Dahlem in 1963; it may thus be a hybrid that originated as a seed from the Seed Exchange.

ACER

A. palmatum Thunb.

'Dissectum' CUTLEAF JAPANESE MAPLE

Zone 6

The only cultivar of this Japanese maple that has withstood the winters at Ottawa to any degree. Even so, this little maple with its deeply dissected, vivid crimson leaves is only 45 cm high and its life is continuously threatened by the power mower. It is, perhaps, more suitable for planting in a sheltered position in a rock garden.

A. pensylvanicum L. STRIPED MAPLE, MOOSEWOOD

Zone 2b

A few specimens of this small tree have been planted in the Garden of Native Plants and are growing well. An earlier specimen planted in 1919 grew to a small, shapely tree and was healthy for many years. In 1945 one of its main trunks was severed at the crotch during a gale and the tree had to be removed. The species is a native of eastern North America.

A. platanoides L. NORWAY MAPLE

Zone 5

Some of the 16 specimens of this maple have survived the years unscathed, but many have lost large trunks and become unshapely. When first planted, this European species is often killed back for 30 cm or more during the first winter and thereafter develops many trunks. As the trunks grow large, they tend to split at the crotch and become susceptible to wind damage. If they are carefully pruned during the first few years to develop a main stem with a few well-placed branches, they become more presentable specimens. In the Arboretum the species requires a good soil and needs proper pruning.

'Almira'

Zone 5

A broad-tipped, globose type of cultivar similar to *A. platanoides* 'Globosum' but more elliptic. Grows to 5 m high and 2.5 m wide.

'Ascendens' see 'Erectum'

'Columnare' COLUMNAR NORWAY MAPLE

Zone 5

A columnar form of the Norway maple, standing 5.5 m high.

'Crimson King' CRIMSON KING MAPLE

Zone 5

A slow-growing tree, striking in appearance as it grows at the Arboretum. Its reddish leaves retain their coloring until fall, although the color is less intense during the summer than in spring. When first planted this tree died back for 60 cm, but it has recovered and is making good progress; its height is 2.5 m, with very little spread.

'Cucullatum' CRIMPED NORWAY MAPLE

Zone 5

The specimen has formed a remarkable narrow, pyramidal tree, 18 m high. Its fan-shaped leaves have a crimped appearance as though attacked by aphids. If all plants of the cultivar retain a form similar to this specimen's, they would be invaluable for street planting where a fastigiate form is desirable. The plant was introduced to the Arboretum from the Ellwanger and Barry nursery in New York.

'Drummondii' HARLEQUIN MAPLE

Zone 5

An attractive, slow-growing cultivar with bright leaves that have light cream margins. The trees planted at the Arboretum in 1960 originally stood 2.5 m high; 8 years later they were 3.5 m high with a spread of 2.5 m.

'Erectum' MOUNT HOPE MAPLE

Zone 5

An upright, narrow, pyramidal tree with dark foliage, a straight trunk, and close-knit branches. A specimen growing near the Forage Crops Building (building 12) on the Central Experimental Farm is 4.5 m high with a spread of 2.5 m. This is an excellent tree for narrow streets. It came to the Arboretum as *A. platanoides* 'Ascendens', from Rochester Park, N.Y. The original tree from which the selection was made is in the Mount Hope Cemetery, Rochester, N.Y.

'Faassen's Black'

Zone 5b

Two specimens of this cultivar, about 2 m high, were purchased from the nursery of Timm and Company in Germany and planted in the Arboretum in the spring of 1960. One plant did not recover from the stress of transplantation with exposed roots, but the other looks healthy. This cultivar has dark red foliage, but is not as brilliant as 'Crimson King' in early spring. During July the leaves of both 'Faassen's Black' and 'Crimson King' are similar in color.

'Globosum' GLOBE NORWAY MAPLE

Zone 5

This globose cultivar of the Norway maple is formal in outline, having a perfect ball-shaped head on a large 2.5 m stem.

Globe Norway maple (*Acer platanoides* 'Globosum')

'Goldsworth Purple'

Zone 5

Another maple that differs slightly from 'Crimson King' and 'Faassen's Black'. The leaves of all three cultivars remain dull purple throughout the summer. The leaves on the young shoots of 'Goldsworth Purple' are similar to those of the Schwedler maple (*A. platanoides* 'Schwedleri').

'Heterophyllum Variegatum'

Zone 5

A form with leaves that are irregular, margined with white. In some leaves the center lobe is short, and in others, broad but long.

'Palmatifidum' CUTLEAF NORWAY MAPLE

Zone 5

The most beautiful of the Norway maple cultivars in the collection. It has distinctive laciniated leaves, cut back to the stalk into three lobes and then divided again. The trees have a picturesque habit and all three specimens are beautiful. They are characterized by their gnarled, curving trunks and stand up to 18 m high with a very wide spread, up to 30 m. Because of their leaves, the shade they provide is less dense than that of the species, and for that reason alone, perhaps, they are more desirable.

'Royal Red' ROYAL RED MAPLE

Zone 5

It is difficult to see any difference between this tree and the other purple-leaved cultivars. It might possibly be another name for 'Crimson King'.

'Schwedleri' SCHWEDLER MAPLE

Zone 5

Specimens were planted early in the Arboretum's history, but none has survived. One tree would probably still be growing, but after 37 years it was removed to make way for a circular driveway. Two others were planted in 1950 but were destroyed during the winter, probably by skiers. It differs from the common Norway maple in that its leaves are purplish in spring, turning to dark green by early summer.

'Stollii' STOLL MAPLE

Zone 5

A form of the Norway maple that has larger leaves but otherwise is similar. The tree is about 18 m high.

'Summer Shade'

Zone 5

A rapid-growing, upright, heat-resistant Norway maple developed at the Princeton nurseries in Princeton, N.J. It has dark green leaves that remain on the tree longer in the fall than those of other maples.

'Undulatum'

Zone 5

A picturesque tree, which differs slightly from the others in leaf shape.

'Walderseei'

Zone 5

A dwarf specimen for a Norway maple, it is only 9–10.5 m high, with distinctive yellow-spotted foliage. The cultivar would be highly desirable for planting as a street tree, where small trees are required.

A. pseudoplatanus L. SYCAMORE, SYCAMORE MAPLE

Zone 5b

The two specimens at the Arboretum have formed six main stems, 9 m high. From the cut-off branches at the base it would appear that this species is killed back to ground level during severe winters. It grows in Europe and western Asia.

'Leopoldii' NIZET MAPLE

Zone 5b

The Nizet maple has improved in appearance in recent years. For a long time it was killed back to ground level annually, but its main shoot has grown 6 m high, with a girth of 15 cm. The colorful leaves of this cultivar appear to be stained yellow and purple. At its best, however, the tree would be most useful planted in a combined group of shrubs with colored foliage.

A. rubrum L. RED MAPLE, SWAMP MAPLE

Zone 3

The red maples planted in the collection vary greatly in intensity of fall color and in the time of leaf change. One specimen changes to a vivid crimson early in the fall while the others are still green. A native of eastern North America, it is perfectly hardy and appears to grow well in the sandy loam soil.

'Armstrong'

Zone 3

A narrow, fastigiate form named for Newton Armstrong of Windsor, Ohio, and selected by Edward Scanlon, Olmstead Falls, Ohio. A further selection has been made from it to produce a cultivar named *A. rubrum* 'Armstrong II', which has a more compact form, narrower crotches, and more tightly ascending branches.

'Columnare' COLUMNAR RED MAPLE

Zone 3

A fine pyramidal clone well adapted for narrow streets. It is not more than 2.5 m wide when it reaches a height of 15 m, and it is red like the species.

'Globosum' DWARF RED MAPLE

Zone 3

The two plants obtained from the old Ellwanger and Barry nursery may have had a globose form in early years, but their habit today differs little from that of the species.

'Sanguineum'

Zone 3

A form with bright red flowers in spring and some brilliant leaves in the fall. The leaves are more hairy than those of the species.

'Schlesingeri' SCHLESINGER RED MAPLE

Zone 3

A cultivar first brought to the attention of the trade by Professor Charles S. Sargent, first director of the Arnold Arboretum, who saw it growing in Mr. Schlesinger's garden in Massachusetts. It produces its brilliant fall color a month before the species, but otherwise it has the same habit. This characteristic may be influenced by the stock upon which it is grafted, or by the fact that it is grafted. The trees at the

Arboretum grow much more slowly than other red maples of the same age.

var. ***tomentosum*** (Desf.) K. Koch WOOLLY RED MAPLE

Zone 3

The leaves of this variety are pubescent or slightly tomentose beneath; but in habit and general appearance it resembles the common red maple.

A. rufinerve Siebold & Zucc. REDVEIN MAPLE

Zone 5b

The two specimens of this Japanese species have formed shrubby trees with several main trunks, and neither specimen has grown more than 1 m high. The bark of the branches has reddish markings and the young shoots are bluish.

A. saccharinum L. SILVER MAPLE

Zone 2b

The silver maples at the Arboretum have formed large, wide-spreading trees with somewhat straggly, open heads; they obviously suffer from a lack of early pruning. The species is native to eastern North America.

'Asplenifolium' FERN-LEAVED SILVER MAPLE

Zone 4

A form with narrowly cut foliage, much finer than *A. saccharinum* 'Wieri'; the specimen at the Arboretum is graceful.

'Laciniatum' see 'Wieri'

'Longifolium'

Zone 3

The cultivar differs from the species in its habit and its leaves appear to be narrower and longer. Rehder identified the tree as a cultivar but did not include it in his *Manual of cultivated trees and shrubs*. The plant was originally purchased from Spaeth of Germany, who raised it.

'Lutescens' YELLOW BRONZE MAPLE

Zone 4

A cultivar that has bright golden foliage with reddish petioles where the leaves unfold; later it changes to green, but the petioles remain red and the young branchlets are yellowish.

'Pyramidale' PYRAMIDAL SILVER MAPLE

Zone 3

A fast-growing pyramidal form of the silver maple, useful in wet areas where a close screen is desired.

'Tripartitum' TREFOIL SILVER MAPLE

Zone 3

A form of the silver maple similar in habit but with the leaves divided nearly to the base into three broad, lobulate divisions.

'Wieri' CUTLEAF SILVER MAPLE

Zone 2b

The specimen planted in 1944 stands 18 m high and has a head 7.5 m wide. The cultivar, which has been known as 'Laciniatum', differs from the species in that it has deeply cut leaves.

A. saccharum Marsh. SUGAR MAPLE, HARD MAPLE

Zone 4

The sugar, or hard, maples in the collection seldom set seeds, but fruits of this eastern North American species can be gathered from the roadside for the Seed Exchange. The trees are shapely and large.

'Columnare' see 'Newton Sentry'

'Green Mountain'

Zone 4

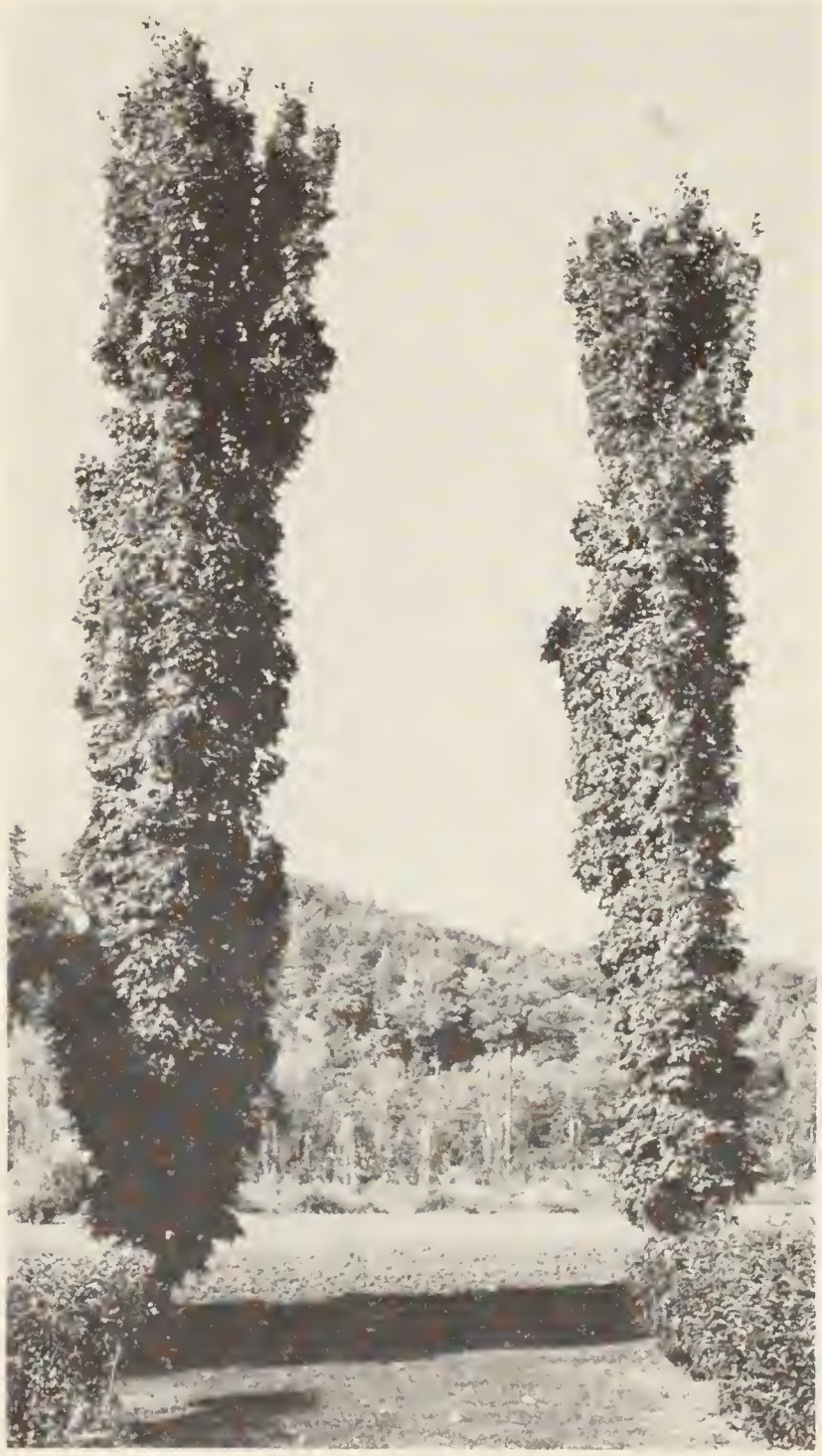
A form selected by the Princeton nurseries, with an upright, oval crown of dark gray foliage that turns orange and scarlet in the fall. Its leaves are thicker than those of ordinary maples of this size, which might explain their apparent resistance to dry, windy weather and drought.

'Monumentale' see 'Temple's Upright'

'Newton Sentry' SENTRY SUGAR MAPLE

Zone 5

An excellent, narrow, conical tree with one central leader and the same fine fall leaf color as the sugar maple. Often sold as *A. saccharum* 'Columnare'.



Sentry sugar maple (*Acer saccharum* 'Newton Sentry')

subsp. ***nigrum*** (Michx. f.) Desmarais BLACK MAPLE

Zone 4

A tomentose form of the sugar maple, which some botanists now consider to be a separate species because of its distinguishing characters. However, *Hortus Third* still lists it as a subspecies. The tree grows in eastern and central North America.

'Senecaense' SENECA MAPLE

Zone 5b

A naturally occurring hybrid (*A. s.* subsp. *leucoderme* (Small) Desmarais × subsp. *saccharum*), with the same brilliant fall coloring as the sugar maple but with smaller leaves and a dense, rounded crown. The tree does not reach more than 7.5–9 m at maturity.

'Temple's Upright'

Zone 5

An excellent narrow form with dark gray foliage. Often sold as *A. saccharum* 'Monumentale'.

A. sieboldianum Miq. SIEBOLD MAPLE

Zone 5b

A small tree from Japan, much like *A. japonicum* Thunb. but with seven- to nine-lobed leaves and yellow flowers rather than purple and red ones. The branches and leaf petioles are covered with down and the fruits are slightly downy and placed horizontally on the stem.

Acer saccharum 'Temple's Upright'

A. spicatum Lam. MOUNTAIN MAPLE

Zone 2

A shrubby species, which in the Arboretum has formed a bush 3.5 m high and 2.5 m wide. It has bright green, coarsely toothed, three-lobed leaves, which turn to orange and red in the fall. It grows in central and eastern North America.

A. tataricum L. TATARIAN MAPLE

Zone 2b

A maple similar to *A. ginnala* except that its leaves are lighter green in summer and are not lobed at the base. It comes from southeastern Europe and Asia Minor.

var. ***slendzinskii*** Raeib. f. ***oblonga***

Zone 3

This variety differs slightly from the species in leaf form and in the shape of its fruits.

A. truncatum Bunge PURPLEBLOW MAPLE

Zone 4

The small trees from Morden, Man., seem to resemble the true *A. truncatum* more closely than does the original specimen at the Arboretum. The branchlets have a tinge of purple that gives the tree its common name. The leaves are mostly truncate at the base and the lobes triangular, the basal one spreading outward and the three terminal ones with two large teeth. The species originated in China.

subsp. ***mono*** (Maxim.) E. Murr. MONO MAPLE

Zone 5

A picturesque tree, 9 m high and about 6 m wide. The wings of its fruits stand out horizontally and its large leaves are cordate at the base. This species, native to China, Japan, and Korea, was introduced into England in 1901 by Dr. E. Wilson, who sent it to Veitch's nursery. This specimen was received from Spaeth's nursery in Germany in 1901, so Spaeth must have acquired it a few years earlier. The mono maple would make a splendid shade tree for the small garden, because it takes up little room and throws a dense shade. Its fall effect, however, is negligible.

ACTINIDIA **Actinidiaceae**

A genus of climbing plants native to northern India, China, and Japan, with simple alternate leaves and unisexual

Acer truncatum* subsp. *mono

flowers. The fruit, when seen, is a fleshy berry. The plants in the Arboretum are killed back to ground level so often that they seldom reach the fruiting stage; therefore their best use in a climate such as Ottawa's is to provide shading against a garden wall. Their long, twisting and twirling branches are effective if used in this way. Because of their heavy texture, their leaves also add to landscape design.

A. arguta (Siebold & Zucc.) Planch. ex Miq.
TARA VINE, BOWER ACTINIDIA

Zone 5

The only species that has survived from the early days of the Arboretum's history. The plant has formed a tangled, intertwining mass of shoots 1 m high and 3 m wide. Its leaves are large, dark green, 7.5–12.5 cm long, ovate-oblong, and edged with bristle-like teeth. Its chief value lies in the speed with which it can cover unsightly objects such as tree stumps and old walls. A native of Japan and Korea.

A. kolomikta (Rupr. & Maxim.) Maxim.
KOLOMIKTA VINE

Zone 5b

The Kolomikta vine lived for 24 years in the Arboretum before it was winter-killed in 1929. This species is more attractive than *A. arguta* because it has a more striking leaf color. It grows in Japan and northern China.

AESCULUS — Hippocastanaceae

The buckeyes and horse-chestnuts are well represented in the Arboretum by some excellent large and small trees, although the horse-chestnut itself has never been established for long enough to form a sizeable plant.

A.* ×*carnea Hayne — RED HORSE-CHESTNUT

Zone 5b

This hybrid (*A. hippocastanum* × *pavia*) was planted in 1956, and is one of the showiest of all trees planted. It stands 4.5 m high, suffers very little from winter injury, and flowers profusely each year. Its deep red flowers with slightly protruding stamens are in panicles 15–20 cm long; the leaves are similar to those of the common horse-chestnut (*A. hippocastanum*).

A. glabra Willd. — OHIO BUCKEYE

Zone 2b

The two old specimens planted near the maple collection have formed shapely trees 12–15 m high, with a spread of 6 m. They have the digitate leaves of the common horse-chestnut, but have five shiny leaflets. The species, native to central and southeastern USA, flowers a week or more earlier than the others.

var. ***monticola*** Sarg. — OKLAHOMA BUCKEYE

Zone 3

The variety is similar to *A. glabra* in habit, although the tree has only reached a height of 4.5 m. Its leaves are deeper green and have a more prominent yellowish midrib and coarser teeth. It flowers at the same time as the species but the prickles on the fruits are much less prominent.

A. hippocastanum L. — HORSE-CHESTNUT

Zone 5b

The horse-chestnut, originally from Greece and Albania, cannot be considered reliably hardy in the Ottawa area. However, there are a few large specimens in the city planted in fairly sheltered places. None of these trees has grown to the proportions one would expect from the species, and all suffer damage during severe winters. The tree planted in the collection is 2.5 m high and has a spread of 2 m. It was killed halfway to the ground the first year after planting, but has flourished ever since.

'Baumannii' — BAUMANN HORSE-CHESTNUT

Zone 5

Five specimens of this double horse-chestnut have survived with no winter injury for more than 15 years, so it seems hardy. The double flowers are not more beautiful than those of the species, but since they produce no fruits the cultivar might be more desirable from the viewpoint of maintenance.

A.* ×*hybrida DC. — HYBRID BUCKEYE

Zone 5

A natural hybrid (*A. octandra* × *pavia*) that grows wild in the Allegheny Mountains. The tree at the Arboretum is 6 m high with a spread of 4.5 m, very much like *A. octandra* but with reddish yellow flowers.

A.* ×*mutabilis (Spach) Schelle — ARBORETUM BUCKEYE

Zone 5

This hybrid (*A. pavia* × *sylvatica*) grew well until 1945 when it had reached a height of 7.5 m, with a 5.5 m spread. Then most of the tree was blown down during a severe gale, and it had to be removed a few years later.

var. ***induta*** Sarg.

Zone 5

A hybrid from the same parents with glaucescent, bluish green leaves.

A. neglecta Lindl. — see ***A. sylvatica***

A. octandra Marsh. — SWEET BUCKEYE

Zone 3

This specimen has formed a shapely tree, 12 m high but not very wide. Its flowers are not showy but the leaves throw a

Hybrid buckeye (*Aesculus* ×*hybrida*)

Bottlebrush buckeye (*Aesculus parviflora*)

dense shade, so that the species might be desirable for lawn planting. It is a native of southeastern USA.

f. ***vestita*** (Sarg.) Fern.
CAROLINA YELLOW BUCKEYE

Zone 5

The three plants are all growing well, averaging 6–7.5 m high and with a 4.5 m spread. The geographical form is distinguished from the species mainly by its leaves, which are pubescent or tomentose below. It occurs in West Virginia.

A. parviflora Walt. BOTTLEBRUSH BUCKEYE

Zone 4b

One of the most beautiful of all large shrubs in the Arboretum. It stands 2.5 m high and has a spread of about 3 m. The long panicles of bloom are produced freely during July, when few flowering shrubs are to be seen. The plant never produces an abundance of seeds, but it bears a few each year. A large number of sucker shoots arise from its base, so that propagation by suckers offers an easy means of increase, and propagation by root cuttings may also be feasible. The shrub comes from southeastern USA.

A. pavia L. PINK BUCKEYE, RED BUCKEYE

Zone 6

Originating in southern USA, the species itself has never survived more than one or two winters in the Arboretum. However, the forms *A. pavia* 'Atrosanguinea' and one received as *A. pavia* var. *humilis* lived from 1896 to 1931, although they were killed back to ground level several times.

A. sylvatica Bartr. PAINTED BUCKEYE

Zone 5

In the Arboretum this tree has grown into a large specimen 15 m high with a spread of 3.5 m. It throws a dense shade and its yellowish flowers are attractive. The species comes from southeastern USA.

AILANTHUS — Simaroubaceae

A group of tall, mostly tropical trees with no special beauty of flower but often with attractive fruits and fine, graceful, pinnate foliage.

A. altissima (Mill.) Swingle TREE OF HEAVEN

Zone 6

This tree can be considered beautiful or obnoxious, according to its location. As a specimen in a large lawn area it is undeniably attractive, although the pungent odor of the male flowers does not invite too close an inspection. It is a weed tree, because when both sexes are present it produces abundant viable seeds, which are scattered over a wide area and sprout quickly in every corner of the land, despite any adverse soil conditions. They even germinate and grow in crevices.

The plant, a native of northern China, has never proved hardy in the Arboretum. However, it has persisted for as long as 10 years, although each year it is killed back to ground level. Hence, it would make a useful large-leaved shrub for planting against a solid white fence or wall where its graceful foliage would throw interesting shadows to enhance the area.

ALNUS — Betulaceae

Most alders are not particularly useful for the garden, but they grow fast and adapt well to wet or moist soils. Their catkins provide beauty, and some forms have interesting foliage.

A. cordata (Loisel.) Duby ITALIAN ALDER

Zone 6

One of the better alders for gardens in mild areas, with its dense, glossy foliage and rounded head. In Ottawa it often suffers from winter injury but has shrub-like growth. It comes from southern Italy.

A. firma Siebold & Zucc. JAPANESE GREEN ALDER

Zone 6

A distinctive Japanese alder with conspicuous, parallel veins on its leaves. In Japan it was often planted at the borders of rice fields and used for hanging freshly cut rice.

var. ***hirtella*** Franch. & Sav.

Zone 5b

In 20 years this variety has developed into a shrub 2.5 m high. It is one of the best alders when fully grown and is distinct from the others because of its closely set, conspicuous veins. The variety differs from the species in that it has shorter leaves, not doubly serrate, and larger, broader fruits. It is of Japanese origin also.

A. glutinosa (L.) Gaertn. BLACK ALDER

Zone 4

Several old black alders were removed when Service Building 72 was erected, but records show that two of the species grew for 30 years and proved to be hardy. A native of Europe and western Asia, in the Ottawa area this alder makes a small tree, 4.5–6 m high at best. In common with most alders, it has dark green leaves that remain green until they fall. Two specimens are growing in dense shade under an oak tree at the fringe of the native woodland.

'Aurea' GOLDEN ALDER

Zone 4b

The young leaves of this cultivar are bright yellow, later turning to green. The catkins are orange-yellow.

'Imperialis' ROYAL ALDER

Zone 4

The royal alder is a distinct form with its leaves very deeply cut. It is not of much value as a tree, but when several are planted in groups in a wet, shady place where no other trees can grow, they prove attractive. The specimen is 2.5 m high and has a spread of 1 m. It looks very light and graceful, especially when the afternoon sun glances across its leaves during the brief period of sunshine it receives.

'Laciniata' CUTLEAF BLACK ALDER

Zone 4

The leaves of this cultivar are not as deeply lobed or cut as those of 'Imperialis' and not as striking.

'Pyramidalis' PYRAMIDAL ALDER

Zone 4

This alder has a distinct pyramidal shape and dense branchlets. It is the lone specimen in front of Service Building 72 near the long rectangular flower bed, and it looks out of place. Its top twigs suffer considerable damage during some winters, but it obviously escapes injury most of the time. In a boggy place it would lend distinction.

A. hirsuta (Spach) Rupr. MANCHURIAN ALDER

Zone 5

One of the best alders, and when it is growing in a suitable location it forms a handsome tree 7.5–9 m high, with dark green leaves and broad pyramidal habit. It is related to *A. incana* but has larger fruits and rounder leaves. The specimens planted in the collection are 3 m high and have a spread of 1 m. Native to Japan and Manchuria.

A. incana (L.) Moench EUROPEAN WHITE ALDER

Zone 4

The oldest plant in the alder collection has grown 13.5 m high and has several grayish-barked stems. Its leaves are downy, or pubescent, on the undersides, and like those of other alders remain green until they fall. It grows in Europe, the Caucasus, and eastern North America.

'Aurea' YELLOWLEAF WHITE ALDER

Zone 5

A more striking tree than the species, with yellowish leaves all summer and orange-yellow branchlets. It is a fast-growing, narrow tree that might be of use near rivers and swamps and for damp areas in home gardens.

A. japonica (Thunb.) Steud. JAPANESE ALDER

Zone 4

Among the alders removed to make way for Service Building 72 was the Japanese alder, which was a nicely shaped pyramidal tree 6 m high and 3.5 m wide. The leaves were dense and dark green. The species comes from Japan.

A. oregona Nutt. RED ALDER

Zone 5b

The red alder planted in the collection has grown to 15 m and is a shapely specimen. It is similar to *A. rhombifolia* except that it has dark red bark, orange-red stalks, and more lobulate leaves. It grows from Alaska to California and east to Idaho. The species was formerly known as *A. rubra* Bong.

A. orientalis Decne.

var. ***weissii*** Späth

Zone 5b

The specimen of this geographical variety from Syria formed a shapely small tree similar to *A. cordata* in the 50 years before it had to be removed. The variety differs from *A. cordata* in that it has no wings on its seeds.

A. rhombifolia Nutt. WHITE ALDER

Zone 5

The single specimen planted near the canal is the largest alder in the collection. It stands 15 m high and has three main trunks about 25 cm in girth. Apparently rare in cultivation, its native range is from Washington to Idaho and southern California.

A. rubra see ***A. oregona***

A. rugosa (Du Roi) K. Spreng.
SPECKLED ALDER, HAZEL ALDER, SMOOTH ALDER

Zone 2b

The specimen grew to a shrub 3.5 m high and flourished until it had to be removed to make way for a parking area. It grows from Maine to Minnesota and south to Florida and Texas.

A. sinuata (Regel) Rydb. SITKA ALDER

Zone 3

A shrubby alder with large, light green leaves. It is found in both western North America and eastern Asia.

A. subcordata C. A. Mey. CAUCASIAN ALDER

Zone 5b

This species, from the Caucasus and Iran, has the largest leaves of all the alders. The specimen, about 13.5 m high and 6 m wide, has five main stems.

A. viridis (Chaix) DC. EUROPEAN GREEN ALDER

Zone 4

A spreading shrub forming a mass of vegetation 1.5 m high and 3.5 m across. It has reddish brown shoots, which later turn grayish. Of no special ornamental value, it would probably be of use on a wet, muddy bank by a riverside. A native of Europe.

AMELANCHIER **Rosaceae**

A genus of shrubs and small trees native to Europe, Asia, and North America, noted for their abundant but fleeting bloom in early spring, edible berries in June, and alternate, simple leaves that are coppery green when freshly unfolded and brilliant in the fall. The North American species are considered difficult to identify, because of the many intermediate forms and their ever-changing nomenclature.

A. alnifolia Nutt. SASKATOON, SERVICEBERRY

Zone 2b

A shrubby species with slender main stems and gray bark, spotted rather than lined with black markings. Its leaves are of similar shape and texture to those of the alders. The shrub grows wild in western North America.

A. bartramiana (Tausch) Roem.
MOUNTAIN JUNEBERRY, BARTRAM SERVICEBERRY

Zone 3b

A small shrub about 1 m high, distinguished by its rounded petals and few-flowered inflorescence. It is found in eastern North America.

A. canadensis (L.) Medic. SHADBLOW

Zone 4

The specimens have formed shrubby trees 4.5–6 m high with 9–12 main trunks. Like the other species they have attractive gray bark, on which, however, are long vertical straight lines of black. The leaves of the species are tomentose on both sides, a factor that helps in the identification of the shadblow. It is a native of eastern North America.

A. florida Lindl. PACIFIC SERVICEBERRY

Zone 5

The species is distinct as it grows in the large bed with others more recently planted. The bark of the others is gray, but this specimen's is bright brown; its leaves are much darker green and glabrous. The species grows in northwestern North America.

A. ×*grandiflora* Rehd. APPLE SERVICEBERRY

Zone 4

This hybrid (*A. arborea* (Michx. f.) × *laevis*) is a beautiful, large, vigorous, small-flowering tree. It has the largest flowers of all the serviceberries, and while in flower outshines the best of the crab apples. This fleeting beauty is soon followed by a picturesque display of salmon-pink berries that, like the others, turn to purple. Bird lovers are delighted with this plant for it attracts various types of birds in considerable numbers as soon as its fruits form; they seem to like the fruits before they ripen. As these notes were written, a large flock of cedar waxwings was enjoying the fruits.

'Robin Hill'

Zone 5

A cultivar with light rose flowers that stay on the plant for a few days. It is much deeper pink, almost red, in bud and is more desirable than its parent, although its beauty is still fleeting and its other characters are the same.

A. intermedia Spach PURPLE SERVICEBERRY

Zone 5

A low shrub with shoots and leaves similar to those of *A. laevis*.

A. laevis Wieg. ALLEGHANY SERVICEBERRY

Zone 3b

This North American species is similar to *A. canadensis* but can be distinguished by its unfolding coppery bronze foliage, which is devoid of down. Its purple-black fruits are sweet, whereas those of *A. canadensis* are tasteless. Its grayish bark has spiral markings on the trunk instead of the vertical, straight markings of the other species. Like the other serviceberries, this species has many main stems. The specimens at the Arboretum are 6 m high and have an overall spread of 4.5 m.

A. ovalis Medic. GARDEN SERVICEBERRY

Zone 5

In more than 10 years of growth, the garden serviceberry has formed an attractive shrub, especially during the early stage of development of its fruits, which are deep salmon. Later these fruits turn to bluish black if any remain, for they are quickly devoured by birds. The species comes from central and southern Europe.

A. spicata (Lam.) K. Koch DWARF SERVICEBERRY

Zone 5

This species is given in some literature as a cross (*A. oblongifolia* × *stolonifera*) and is indeed intermediate between the two species. The plants in the Arboretum have many stems and stand about 4.5–6 m high. The gray bark of the stems has twisted black markings but is not as regular as in *A. laevis*. The stems are thicker than those of the other serviceberries, about 15–20 cm in diameter. The flowers are in dense racemes and the sweetish fruits are black or purple-black.

A. stolonifera Wieg. RUNNING SERVICEBERRY

Zone 3b

As its name implies, this is a stoloniferous shrub; it grows to about 1 m high and increases by underground suckers. As the fruits ripen they turn black and have a sweet flavor. This North American shrub is distinguished from the other similar species by its finely toothed leaves, its sepals recurved at the top of the fruits, and the woolly apex of its ovary. Two specimens planted in 1889 lived until 1950, when they were removed.

×AMELASORBUS **Rosaceae**

An intergeneric hybrid between *Amelanchier* and *Sorbus*. It differs from *Amelanchier* mainly in that it has partly incomplete, pinnate leaves, and it differs from *Sorbus* in that it has oblong petals, five styles, and 8- or 10-celled fruits.

×*A. raciborskiana* Wroblewski

Zone 5

An intergeneric hybrid between *Amelanchier asiatica* (Siebold & Zucc.) Endl. and an unknown *Sorbus* species. The young twigs are covered with reddish hairs. The leaves are dark green, 15–20 cm long, with two or three pairs of veins, and divided at the margins. An uncommon tree.

AMORPHA **Leguminosae**

A genus of shrubs native to North America, with alternate pinnate leaves and long racemes of bluish, purple, or white flowers similar to those of the pea family to which the genus belongs. The species are probably best grown for their foliage effect rather than for their tightly packed flower stalks.

A. canescens Pursh LEADPLANT

Zone 2b

A subshrubby species growing about 1 m high. It is an interesting shrub with purplish blue flowers and conspicuous orange anthers. Its silvery gray foliage provides a striking contrast to other shrubs in the border, and for this purpose it is well worth growing. Since it appears to withstand poor, dry soils it might be considered for planting near the foundations of small homes, particularly in difficult hot, dry conditions. The common name "leadplant" refers to an old belief that, where the plant grew in its native state, lead would be found underneath. It is a native of eastern North America.

A. croceolanata P. Wats.
YELLOW-WOOL FALSE INDIGO

Zone 6

This species has survived 15 winters with little injury. The plants at the Arboretum are 2.5 m tall and have not yet flowered. They are similar to *A. fruticosa*, except that they have more leaflets and smooth branchlets. Apparently there is a difference in the hairiness of the calyx, *A. fruticosa* being sparingly pilose and *A. croceolanata* definitely villous. The shrub grows from Illinois to Florida.

A. fruticosa L. COMMON FALSE INDIGO

Zone 2b

A large, vigorous shrub up to 3 m high with slightly grooved branches and large pinnate leaves. The flowers, which are produced at the end of June or in July, are purplish blue with yellow anthers. Although it is hardy, this large shrub sometimes dies back to the base for no apparent reason. The species and its forms are too large and spreading to be of much ornamental value, but like all members of the genus they can grow in difficult hot, dry locations. The species occurs in southern USA.

var. *angustifolia* Pursh MIDWEST FALSE INDIGO

Zone 2b

A variety from central USA with narrower leaves than the species and a curved seed pod.

f. *crispa* (Kirchn.) C. K. Schneid.

Zone 2b

A form with leaflets that are curved at the margins.

var. *oblongifolia* Palmer

Zone 2b

Differs slightly from the others in the shape of the leaflets.

var. *tennessensis* (Shuttl.) Palmer
TENNESSEE FALSE INDIGO

Zone 4

A geographical variety found in southeastern USA. It has narrow, oblong leaflets and a seed pod that is only slightly curved.

A. glabra Desf. ex Poir. MOUNTAIN FALSE INDIGO

Zone 3

From an ornamental standpoint this species is equal to *A. fruticosa*. It differs from the other species in that it is glabrous throughout and has short, rounded calyx lobes.

Dwarf false indigo (*Amorpha nana*)

A. nana Nutt. DWARF FALSE INDIGO

Zone 2b

The prettiest species as it appears in the Arboretum. It makes a shapely, dense, dwarf bush with dainty, small, pinnate foliage. Its leaves are greener than those of *A. canescens* and its flowers are not as showy, but it is more ornamental through the summer months. *A. nana* would be a highly desirable shrub for planting where a neat dwarf type is desired. It is a true shrub, unlike *A. canescens,* which has more of the habits of a herbaceous perennial. It is a native of central North America.

A. virgata Small

Zone 3

A spreading shrub 1.5–2 m high, closely related to *A. fruticosa* and with the same dubious ornamental value. The specimen has larger leaflets than *A. fruticosa* and does not have grooved branchlets. It occurs in central USA.

AMPELOPSIS Vitaceae

A genus of vines, or trailing plants, allied to *Vitis* and *Parthenocissus*. It is distinguished from the grape (*Vitis*) by its petals, which are free instead of cohering at the apex, by its inflorescences, which are cymose rather than paniculate, and by its bark which is nonshredding instead of shredding. It differs from *Parthenocissus* only in that it has twining tendrils without sucker-like tips and floral disks distinct from the ovary instead of united to it. In the Arboretum these plants are allowed to trail on the ground in large circular beds instead of climbing on a trellis or wall where their usefulness might be better assessed. The hardiness of the plants often depends on the shelter they receive from winter winds and sunshine. Most of them grow best on the western side of the house and are winter-killed in other locations.

A. aconitifolia Bunge MONKSHOOD VINE

Zone 2b

The monkshood vine has diamond-shaped leaves, but they are always deeply and coarsely toothed, somewhat resembling the leaves of the herbaceous perennial monkshood (*Aconitum*). It makes a luxurious vine and is particularly striking when it is

laden with bluish fruits, which ripen to orange with bluish spots. It comes from northern China.

var. ***glabra*** Diels
THREE-LEAVED MONKSHOOD VINE

Zone 3

A form of the above species with narrower leaf segments. Its lower leaves are mostly three-lobed and are coarsely toothed.

A. brevipedunculata (Maxim.) Trautv.
PORCELAIN AMPELOPSIS

Zone 3

A vigorous climber with deeply lobed leaves and colorful fruits, which are produced in the fall. The fruits finally ripen to deep amethyst-blue and it is not unusual to see white, green, yellow, and blue fruits in the same cluster at the same time. For the ornamental value of its fruits alone it is well worth growing. A native of northeastern Asia.

'Citrulloides'

Zone 5b

The leaves of this cultivar are more deeply lobed than those of the species.

A. cordata Michx. HEART-LEAVED AMPELOPSIS

Zone 6

Although this species is a vigorous climber it has no special merit to recommend its use in place of others. It dies back at the tips during winter by breaking apart at the nodes, somewhat in the manner of a herbaceous perennial. Its leaves have a typical *Vitis* shape and its young bark is warted. It is native to southeastern and south-central USA.

A. humulifolia Bunge HOP AMPELOPSIS

Zone 5

A showy vine with large, cordate leaves resembling those of a true grape; they are bright green above and silvery white beneath. The fruits, which unfortunately are sparsely produced, are yellow with bluish markings or pure yellow. The species originated in northern China.

ANDROMEDA — Ericaceae

These choice little ericaceous plants inhabit bogs and peat marshes in all temperate parts of the world. The two species listed here grew for many years in a damp part of the small area set aside for native plants; the site was destroyed during the relocation of the railway.

A. glaucophylla Link DOWNY ANDROMEDA

Zone 2

The less ornamental of the two species, being less graceful and more robust. It differs from *A. polifolia* in that its leaves are white, tomentose beneath, and its pedicels are less than 1 cm long. A native of northeastern North America.

A. polifolia L. BOG-ROSEMARY

Zone 2

A low evergreen shrub about 45 cm high with linear-oblong leaves, tapered at both ends. It is a pretty little shrub with a pink, pitcher-shaped corolla. It is found both in North America and northern Asia.

APHANANTHE — Ulmaceae

A. aspera (Thunb.) Planch. MUKU TREE

Zone 6

A tree called by this name was planted in the Arboretum in 1913, and after it had been killed back each year for 6 years it finally died. *A. aspera* is allied to the genus *Celtis*, from which it differs because it has straight veins in the leaves, ending in the teeth, and because it invariably produces unisexual flowers. It is most likely not hardy in the Ottawa area, although it might survive farther south. It comes from Japan, Korea, and China.

ARALIA — Araliaceae

Although the aralias might be considered by many as gruesome prickly shrubs, they are now recognized as useful ornamental plants for small gardens where exotic foliage is desired.

These woody types have large branches armed with formidable spines. They bear alternate leaves that are pinnate or partly pinnate, measuring about 1 m long with petioles 30 cm or more in length.

A. chinensis L. CHINESE ANGELICATREE

Zone 5

A shrub from the northeastern Asia, similar to *A. spinosa* but less prickly. Its leaves are 45–60 cm long. It differs from *A. elata* in that it has an inflorescence with an elongated main axis and closely serrate leaflets.

var. ***nuda*** Nakai

Zone 5

A variety from China that is much less pubescent in all its parts than the species.

A. elata (Miq.) Seem. JAPANESE ANGELICATREE

Zone 5

The tree has only reached a height of 2.5 m in 68 years, so it will probably never grow to 9 m, the maximum height it is said to reach in more congenial climates. It has doubly pinnate leaves up to 75–90 cm long and 45–60 cm wide. The leaflets are short-stalked and 7.5 cm long; the stalks of the leaflets and leaves are prickly. The species itself is striking and has merit for planting in a shrub border, but its variegated cultivars *A. elata* 'Aureo-variegata' and *A. elata* 'Variegata' are extremely beautiful and among the best of variegated shrubs. They are being tested for hardiness at the Arboretum and will probably prove hardy. *A. elata* is native to northeastern Asia.

A. spinosa L.
HERCULES' CLUB, DEVIL'S-WALKINGSTICK, ANGELICATREE

Zone 6

This is a typical example of similarities between plants native to North America and plants from northern Asia, for *A. spinosa* differs from *A. chinensis* only in that its leaflets have curved veins and distinct stalks. It grows in southeastern USA.

ARCTOSTAPHYLOS — Ericaceae

A genus of ericaceous evergreen shrubs better known in western than in eastern North America. The plants are noted for their flaky bark, leathery-textured leaves, glove- to pitcher-shaped flowers, and mealy or fleshy berries. Only two species have proved hardy in the Arboretum.

A. alpina (L.) K. Spreng. ALPINE PTARMIGANBERRY

Zone 4

A low, spreading ericaceous plant, similar to *A. uva-ursi* in distribution and habit. Its leaves, however, are annual and its fruits are black, berry-like drupes. The plants tested at the Arboretum are well established in a damp, peaty spot near the *Salix* collection.

A. uva-ursi (L.) K. Spreng. BEARBERRY

Zone 2

The bearberry grows wild in the Ottawa area, as well as farther west, south, and north, being common to the temperate northern hemisphere. It is a trailing evergreen shrub only a few centimetres high, with leathery obovate leaves, pleasing pink flowers, and conspicuous red berries. The plants in the Arboretum are found in the native plant area, where they are massed as a ground cover, a use to which this plant is best suited. The bearberry grows well in poor, sandy soil and nothing excels it for covering sandy banks. Unlike most ericaceous plants, it is extremely easy to grow from softwood cuttings.

ARISTOLOCHIA — Aristolochiaceae

A genus of tropical, subtropical, and temperate climbing plants with the most remarkable of all flowers. They have no corolla and the calyx or perianth is tubular, curiously inflated, and bent in such a way that it bears a striking resemblance to a meerschaum pipe. One common name, birthwort, is derived from the last part of the name: *lochia* means childbirth and refers to the plant's supposed medicinal value.

A. durior J. Hill DUTCHMAN'S-PIPE

Zone 5

A vigorous climber with twining stems and heart-shaped leaves, 10–25 cm long and almost as wide. The curious flowers of this species are tubular and bent like a Dutch pipe at the ends. It makes a very good cover for trellises and pergolas, but is killed halfway back during severe winters and periodically requires some pruning of dead wood. It is native to eastern USA.

A. tomentosa Sims

Zone 6

Although similar to the preceding species but with smaller leaves, it appears to be slightly less hardy. It was winter-killed at the Arboretum after 13 years. The species has not been tested again, so that its hardiness cannot be properly evaluated. In any event, it is less attractive than *A. durior* because its leaves are much duller in tone. It comes from southeastern USA.

ARONIA — Rosaceae

The aronias are small North American deciduous shrubs closely allied to *Sorbus*, but differing because the flowers have five styles, the leaves are simple and apple-like, and the fruits are small, juicy, and red or black.

A. arbutifolia (L.) Pers. RED CHOKEBERRY

Zone 4b

If it is pruned carefully when young, the species makes an elegant, vigorous shrub. It has white or reddish flowers with conspicuous purplish anthers and the flowers are followed by red fruits. The plant in the Arboretum has four bare stems, stands 1 m high, and has a spread of 2 m. This species is distinguished from the others by the pubescent undersides of its leaves and inflorescence, and by its red fruits. It grows in eastern North America.

A. melanocarpa (Michx.) Elliott BLACK CHOKEBERRY

Zone 4b

As its name suggests, this species has black fruits. It flowers freely and can be grown into a fine, shapely shrub. Like *A. arbutifolia* it is native to eastern North America.

'Brilliant'

Zone 4b

A floriferous cultivar noted for its exceptionally brilliant fall coloring.

var. ***grandifolia*** (Lindl.) Schneid.
GREAT BLACK CHOKEBERRY

Zone 4b

A more floriferous variety than the species, which consequently produces a better show of black shiny berries. It has dark green, lustrous leaves and should be considered a desirable shrub. In the Arboretum it grows to a height of 2 m and has a spread of about 2 m.

A. prunifolia (Marsh.) Rehd. PURPLE CHOKEBERRY

Zone 4b

As it grows in the collection this species is more dwarfed and spreading than the other two. The shrub stands only 75 cm high and its numerous stems form a mass 2 m wide. It is distinguished mainly by its purple-black or dark purple berries. The leaves are slightly pubescent on the undersides, but much less so than those of *A. arbutifolia*. It is native to southeastern USA, but in the Ottawa area its fruits ripen much earlier than those of the other species.

ARTEMISIA — Compositae

The hardy woody artemisias are odoriferous plants varying in height from low procumbent species to shrubs 1.5–2 m high. All have pinnate, grayish foliage and no special beauty of flower. They are the "sagebrush" of the great plains of the United States and grow best on hot, dry but well-drained soil.

A. abrotanum L. SOUTHERNWOOD,
OLDMAN WORMWOOD

Zone 4

The plant growing in the Arboretum was received under the name of *A. arbrotanum* 'Tobolskianum'. It may be a hardier cultivar or geographical variety. It forms a shrub 1–1.5

m high, with finely divided, strongly fragrant leaves. Its flowers are dull yellow and not particularly attractive, although they can be effective as a filler in floral arrangements. The plant can be used in the shrub border or near the home, not so much for its ornamental value as for the scent of its leaves. The species comes from southern Europe.

A. tridentata Nutt. BIG SAGEBRUSH, COMMON SAGEBRUSH

Zone 3

The well-known sagebrush of the western U.S. plains may provide nostalgic memories for those who love the West, but despite its usefulness there are better ornamentals to choose. However, this plant will succeed and give good results in such dry alkaline soils as builders' rubble. It has silver-gray foliage, which provides contrast amongst evergreens, and the plant can be pruned to form a neat bush. Its strong fragrance is particularly noticeable after a heavy rain. Its leaves are of various sizes, grouped around the stem in clusters; they have a unique wedge shape, tapering from the apex to the stalk.

ASIMINA — Annonaceae

A. triloba (L.) Dunal COMMON PAWPAW

Zone 5b

The plants are growing in a row at the southern end of the Arboretum, in a particularly damp area. They sometimes suffer winter injury but have flowered and fruited on many occasions.

The pawpaw is a member of the tropical custard-apple family, Annonaceae, the only one that is hardy in the Ottawa area. It occurs naturally in southeastern USA. The species is easily identified by its large, alternate, glabrous leaves, up to 20 cm long, with short stalks. Its dull purple flowers are 2.5 cm long but not conspicuous. Its distinctive fruits are bottle shaped, 7.5–12.5 cm long, borne in whorls. When ripe, they are filled with a sweet, yellowish, edible pulp.

ATRAPHAXIS — Polygonaceae

Most of the woody plants of this genus are insignificant members of the knotweed family, with alternate leaves and pale, transparent, slender stipules that hug the stems and terminate in a point on each side. The flowers have no petals but four or five colored, petal-like sepals.

A. frutescens (L.) K. Koch BUCKWHEATBUSH

Zone 2

An odd shrub that has little ornamental value but is grown for its botanical interest, because it is one of the few woody polygonaceous plants. Its flowers have no petals but four or five sepals, whitish at first and later pink. They last for a considerable time and might be considered attractive by those who do not associate them with their weedy relatives, the smartweeds. The plant in the collection does not appear to be flourishing; it has a large gnarled trunk and not much foliage. Probably it would grow better in dry sandy soils than in the good loam where it is located. Its native range is from southeastern Europe and the Caucasus to Siberia.

BENZOIN see LINDERA

BERBERIS — Berberidaceae

Berberis is a contentious genus to grow in the Arboretum. It has never been certain whether or not a collection should be maintained, in view of the possible effect of the plants in spreading the dreaded rust disease of wheat. The following comments apply to the specimens assessed so far and to the observations made in the past. If a time comes when rust is no longer a menace to wheat, these comments will provide information on the hardiness of those grown at the Arboretum. The barberries are exquisite shrubs and would have a tremendous use in landscaping for small homes. There is no substitute for the coppery-leaved *B. vulgaris* 'Atropurpurea' or *B. thunbergii* 'Atropurpurea' in hedges, or their effect in foundation plantings.

B. amurensis Rupr. AMUR BARBERRY

Zone 4

A hardy species with yellowish gray, grooved bark, three- to five-parted spines, large leaves 4–7.5 cm long, and long pendulous racemes each containing 15–25 flowers. Its fruits are ellipsoid, about 1.5 cm long, bright red, and covered with a bloom. Native to northeastern Asia.

B. aristata DC. SPINETOOTH BARBERRY

Zone 6

A showy, compact bush from Nepal, with an elegant habit. It has grayish branches on which rest tufts of dark green spine-tipped leaves. The bright golden yellow flowers are produced in abundance on hanging racemes 5–10 cm long. The bright red, bloom-covered berries remain attractive throughout the fall.

B.* ×*emarginata Willd. NOTCHED BARBERRY

Zone 3

A hybrid (*B. vulgaris* × *sibirica* Pall.) with yellowish or purple angled branchlets and spines that are five- to seven-parted. It has deep red fruits on short styles.

B.* ×*laxiflora Schrad.

Zone 4

Another hybrid (*B. chinensis* Poir. × *vulgaris*) with grayish branches and obovate leaves.

'Oblanceolata'

Zone 4

A form with oblanceolate, densely serrate leaves.

B.* ×*mentorensis L. Ames MENTOR BARBERRY

Zone 4

A semi-evergreen barberry, which seems to winter well at Ottawa; it has formed a shapely bush 75 cm high. It is a hybrid (*B. julianae* C. K. Schneid. × *thunbergii*) and would be well worth cultivating for its dark green leathery leaves, yellow flowers, and deep red fruits. It has the appearance of *B. julianae* with the attractive bushy habit of *B. thunbergii*.

B.* ×*ottawensis C. K. Schneid. OTTAWA BARBERRY

Zone 5

A hybrid (*B. thunbergii* × *vulgaris*) that is distinguished by its many-flowered racemes of umbellate inflorescences, its serrulate leaves, and its yellowish brown branchlets. This

hybrid has no special merit over the other barberries, although it flowers and fruits well.

B.* ×*provincialis Schrad.

Zone 4

A hybrid (*B. vulgaris* × *sibirica*), nearer to the second parent species.

var. ***serrata*** Schneid.

Zone 4

A low shrub with reticulated leaves, grayish beneath.

B. thunbergii DC. JAPANESE BARBERRY

Zone 3

This Japanese species, with its red-leaved cultivar, *B. thunbergii* 'Atropurpurea', is perhaps the best known of all ornamental barberries. It grows well in any soil and can withstand very dry conditions. It has a dense, thorny habit and bright red fruits. In the fall its leaves turn scarlet. Both the species and its red-leaved forms have been widely used as hedges, either for boundaries or close against the wall of homes to provide a foundation planting. The species is distinguished from the other barberries by its bushy habit, by its unequal, obovate, bright green leaves, and by the abundance of its long, red fruits that last well into the winter.

'Atropurpurea' deep red or purple leaves

'Aurea' brilliant golden leaves

'Maximowiczii' purple bark and pointed leaves, green on both sides

'Minor' dwarf, usually 60 cm high, with small leaves and flowers

B. vulgaris L. COMMON BARBERRY

Zone 2b

A large shrub, attractive in blossom and fruit but not recommended for planting, because, like several others, it is an alternate host plant for stem rust fungus (*Puccinia graminis*) of cereals and grasses. The importation of this and other susceptible species from other countries, and from province to province, is prohibited in Canada. It grows in northern Africa and temperate regions of Asia.

'Atropurpurea'

Zone 2b

A tall purple-leaved form of the common barberry, often listed as 'Sheridan's Red'.

BERCHEMIA — Rhamnaceae

Zone 7

The berchemias, or supplejacks, are a group of twining shrubs belonging to the Rhamnus family. They have alternate leaves and small, inconspicuous flowers. The fruits of some species are attractive. Of those tested, only *B. racemosa* Siebold & Zucc. from Japan withstood the winter for any length of time, and this species lasted only for a year.

BETULA — Betulaceae

The birches are deciduous trees and shrubs with alternate leaves and unisexual flowers borne on catkins; both male and female are present on the same tree, the male catkins long and slender and the female short and straight. The alders may sometimes be mistaken for birches, but their catkins have persistent scales that do not disintegrate like those of the birch but fall away in one piece when ripe. At the Arboretum, the old collection was planted near Service Building 72, but many specimens died over 20 years, either from old age or because drains that were constructed changed the water table.

B. albo-sinensis Burkill CHINESE PAPER BIRCH

Zone 3

It is extraordinary that this tree is not grown very much in North America, for it is one of the most striking in existence. It has good green foliage all summer, which turns to golden yellow in the fall, and its vivid orange to orange-red bark is the most brilliant of tree barks. It was introduced by Dr. E. Wilson from western China in 1901, and again in 1910, but it has not yet found its place in gardens. A tree planted in 1954 in the Arboretum grew for 10 years with little or no winter injury, but was demolished by a large gang mower unit. Other trees growing in the test garden appear to be adapting themselves well. A variety, *B. albo-sinensis* var. *septentrionalis* C. K. Schneid., which has young shoots more glandular than the type and leaves silky-haired beneath, appears to be an improved form.

B. alleghaniensis Britt. YELLOW BIRCH

Zone 3b

The native yellow birch is seldom planted in gardens except by those who intended to plant a canoe (white) birch but dug out a yellow one by mistake in the woods. Where planted it forms a handsome tree which provides more shade than the canoe birch, and it has attractive yellowish peeling bark. Its leaves are ovate to oblong-ovate, up to 12.5 cm long, with 9–11 pairs of veins in each leaf. It grows better in a moist soil. The best specimen at the Arboretum is 18 m high with a spread of 24 m. The species has been known as *B. lutea.*

B. corylifolia Regel & Maxim. ex Regel

Zone 5b

A distinctive birch from Japan, which has ovate-elliptic leaves, glaucous underneath and with large, triangular, incurved teeth. The trees in the Arboretum are only 3.5 m high, but this species will eventually grow to 15 m. It has a grayish silky bark.

B. ermanii Cham. ERMAN'S BIRCH

Zone 6

This species ultimately reaches a very large size, up to 30 m high. Its trunk has peeling, creamy-white bark and its branchlets are orange-brown. The leaves are triangular ovate and coarsely serrate, up to 7.5 cm long. It makes a very ornamental tree but leafs out early in the spring and is subject to injury in districts where late frosts occur. A native of northeastern Asia.

B. fontinalis see ***B. occidentalis***

B. humilis Schrank SHRUBBY BIRCH

Zone 6

A shrubby type that grows to a height of about 2 m. Of no particular merit except that it grows well under boggy conditions. It comes from Europe and northern Asia.

B. lenta L. CHERRY BIRCH, SWEET BIRCH

Zone 4b

The specimen in the Arboretum might be considered ornamental. It has dark reddish brown bark, which, during the winter months, provides a contrast to the white bark of the canoe birch and the yellowish bark of the yellow birch. The pendulous catkins are attractive in early spring. Apart from the color of its bark it may be recognized by the sweet aroma of the bark when bruised. Its large, dull, glossy green leaves are ovate and heart-shaped at the base. The species is native to eastern North America.

B. lutea see ***B. alleghaniensis***

B. mandshurica see ***B. platyphylla***

B. middendorffii Trautv. & E. H. Mey. MIDDENDORFF BIRCH

Zone 5

A smaller-leaved species than most of the birches; its orbiculate-ovate or broad-ovate leaves are not more than 2.5–3 cm long. They are very coarsely serrate and rounded at the base. The specimen has formed a graceful little tree 2.5 m high, with a spread of 1.5 m. The species comes from north-eastern Asia.

B. nana L. DWARF BIRCH

Zone 2

A dwarf, neat bush 0.5–1.5 m high with smooth, not warted, erect branches. It differs from other shrubby and similar birches in that it has round-toothed, orbiculate leaves and bears no warts or glands on the shoots. It grows in northern latitudes, including Canada.

B. nigra L. RIVER BIRCH

Zone 3b

The river birch is one of the most interesting trees in the Arboretum. It has a broad outline, stands 9–12 m high, and has a spread of 18 m. Its branchlets are pendulous and its main limbs are covered with flakes of curling, blackish bark, which add a distinct ruggedness to the tree. Its leaves are large, as much as 7.5–12.5 cm long, diamond-shaped, and pointed. The tree inhabits the banks of the Mississippi, where it thrives under water-soaked conditions.

B. occidentalis Hook. WATER BIRCH

Zone 2b

A shrubby tree which grows to 4.5 m in the Ottawa area. It has a number of branches with black bark that does not peel. If pruned properly, it would make a graceful tree for the small garden. It grows in western North America.

B. papyrifera Marsh. PAPER BIRCH, CANOE BIRCH

Zone 2

This native birch, variously known as the paper birch, canoe birch, and white birch, is picturesque in summer and winter alike. Its smooth white bark peels in thin paper-like layers, sometimes revealing pinkish white bark beneath. The leaves are ovate to narrow-ovate, 5–10 cm long, sharply pointed and wedge-shaped at the base, coarsely toothed, smooth above and hairy on the veins beneath. It is not as graceful a tree as *B. pendula*, the European white birch, or its varieties; the latter species is usually chosen to provide ornamental trees for avenues and small gardens.

B. pendula Roth EUROPEAN WHITE BIRCH

Zone 2

All eight plants of this species were grown from seed sown in 1947. They have formed large trees that are 9 m high and have a spread of 3–5 m with trunk diameters of 20 cm. Originally from Europe and Asia Minor, they are hardy in the Ottawa area; several plants lived from 1890 to 1940 or 1945. Like many birches they are apparently short-lived. This species is easily distinguished from the native canoe birch by its smaller acuminate glabrous leaves with slender petioles.

'Fastigiata' COLUMNAR EUROPEAN BIRCH

Zone 2

Straight upright branches forming a columnar head, a distinctive type.

'Purpurea' PURPLELEAF BIRCH

Zone 2

A shapely form with purple foliage.

'Tristis' SLENDER BIRCH

Zone 2

A form with a round, regular head formed by slender, pendulous branchlets. Often sold as the weeping birch.

'Youngii' YOUNG'S WEEPING BIRCH

Zone 2

The odd-shaped tree with twisting and twirling branches invites much comment from all who see it. Planted in 1950, the trees at the Arboretum are small, but many larger specimens are growing in gardens in the Ottawa area.

B. platyphylla Sukachev JAPANESE WHITE BIRCH

Zone 3

This birch is similar to *B. pendula*, and the plants in the collection are difficult to distinguish from that species. Older specimens, however, have larger leaves than ***B. pendula*** with axillary tufts of hair beneath and more numerous veins. The species is found in Manchuria and Korea.

var. ***szechuanica*** (Schneid.) Rehd. SZECHWAN WHITE BIRCH

Zone 4

The western Chinese form of the Japanese white birch, which is distinguished by its dull green leaves that are densely glandular and dotted beneath, and glabrous or

Slender birch (*Betula pendula* 'Tristis')

slightly pilose. The leaves remain green until late in the fall and it has clean silvery bark. This variety has great possibilities as an ornamental.

B. populifolia Marsh. GRAY BIRCH

Zone 3

Many plants of the species have been grown in the Arboretum during the past 60 years, but they have all been short-lived. The oldest specimen was removed after growing well for 35 years. The species usually grows in shrubby clumps with ascending stems up to 3 m tall. It has triangular-shaped leaves with slender stalks, much like a trembling aspen (*Populus tremuloides* Michx.). The gray bark is not as showy as that of the canoe birch and does not peel into papery layers. The tree grows in very poor sandy soils and is now being used for ornamental purposes where a clump birch is sought. It grows in eastern North America.

B. pubescens J. F. Ehrh. HAIRY BIRCH

Zone 3

The hairy birch is similar to *B. pendula* and was once grouped with that species under *B. alba* L. It is not as ornamental, however, because its bark is darker and it does not possess the same graceful habit. It is easy to distinguish because its twigs are downy and not warted. It comes from Europe and northern Asia.

'Urticifolia' NETTLE-LEAVED BIRCH

Zone 3

A cultivar with doubly serrate leaves that are dark green and slightly pubescent above and more densely pubescent beneath. Said to have been found wild in Sweden. The fruiting catkins are more slender than those of the species.

B. pumila L. SWAMP BIRCH, LOW BIRCH

Zone 5

An erect shrub 2 m high with rounded leaves 2.5–4 cm long, rounded or bluntish at the apex. The young shoots are downy but not warty as are those of *B. humilis* and *B. fruticosa* Pall., with which it might be confused. It has little or no merit as a garden plant except that it grows in difficult boggy locations. Native to eastern North America.

B.* ×*sandbergii Britt. SANDBERG BIRCH

Zone 3

A natural hybrid (*B. glandulosa* Michx. × *papyrifera*); this shrubby plant has gray or yellowish gray bark.

B. schmidtii Regel SCHMIDT'S BIRCH

Zone 5

A handsome tree with black bark that falls off in thick irregular plates. Its leaves are ovate, slender-pointed, and rounded or widely tapered at the base. The wood is said to be too heavy to float in water. The species is found in Japan, Korea, and Manchuria.

B. verrucosa see ***B. pendula***

BROUSSONETIA Moraceae

Zone 7

Both species of the paper-mulberry, *B. kazinoki* Siebold & Zucc. and *B. papyrifera* (L.) Venten., have been planted several times in the Arboretum but neither has survived the first two winters. It is possible that this tree would prove hardy in the Niagara region, because at Rochester Park there is a good specimen about 30 years old.

BUDDLEIA Loganiaceae

In the Ottawa district most buddleias are unreliable plants. During mild winters its roots survive and send up good shoots that produce flowers in abundance, but the plant becomes weaker year after year until it finally dies out.

B. alternifolia Maxim. FOUNTAIN BUDDLEIA

Zone 5

This species is not usually recommended for planting in the Ottawa area, and yet the plant at the Arboretum has survived several severe winters in recent years. Each winter one or two of its 15 or more branches are killed back, but it still presents a pleasant appearance and flowers remarkably well. It is distinguished from other cultivated buddleias by its alternate leaves. The deep lilac flowers are produced in July all along the slender, arching branches. In Europe it looks particularly attractive when growing beside pools and lakes. It comes originally from China.

B. crispa Benth.

Zone 6

A lesser known species of buddleia from Afghanistan, northern India, and Nepal. It has proved root-hardy at Ottawa for more than 15 years, and because it bears flowers on the new wood it produces each year, it can become a very attractive shrub. It makes an annual growth of 60–90 cm and flowers from July until frost. It forms many stems clothed with soft, silvery pubescent, triangular to cordate leaves, and bears sessile or short-stalked clusters of pink flowers in the axils of the leaves, along the upper 15–30 cm of the branches.

B. davidii Franch. BUTTERFLYBUSH, SUMMER-LILAC

Zone 6

This species and all its forms except var. *nanhoensis*, although they have withstood several winters at the

Fountain buddleia (*Buddleia alternifolia*)

Arboretum, are killed back to ground level each year. After 5 or 6 years they inevitably die out. If the plants are hilled and covered like hybrid tea roses and grown in a well-drained soil, their chances for survival are considerably greater. They flower on the new wood so that only the roots need survive the winter. In milder climates they are often pruned back hard each year.

var. ***nanhoensis*** (Chitt.) Rehd.
KANSU BUTTERFLYBUSH

Zone 4b

Strangely enough, this splendid shrub has survived many winters in Manitoba, but always under another name. At one place it has been described as *B. crispa* 'Farreri' and at Morden it has been growing as *B. insignis*. In Ottawa it is much hardier than the species and should be useful for planting in small gardens where its early fall flowers will be appreciated. The shrub was originally introduced by Farrer from the Kansu River region in 1914.

BUXUS — Buxaceae

B. microphylla Siebold & Zucc. LITTLELEAF BOX

'Curlylocks'

Zone 5

This hardy plant has withstood the winter at the Arboretum for 20 years with very little injury. It forms a low hummock of foliage that is invariably covered by snow in winter.

var. ***koreana*** Nakai KOREAN LITTLELEAF BOX

Zone 5

The plants are located north of the Arboretum Greenhouse Range (building 73). They seem to thrive and have suffered no damage. This variety from Korea is an attractive little shrub, very compact with small, oval, leathery leaves and square stems.

B. sempervirens L.

'Welleri' WELLER'S BOX

Zone 6

This cultivar has withstood many winters in the Arboretum in an exposed location. During most winters, especially severe ones, the two plants appear badly burned, but they recover by the summer and in mid-August present a neat, trim habit. It would, however, be risky to plant the shrubs as a dwarf hedge, for which they are often used; they might not look very good through most of the summer, even if they eventually survived.

CALLUNA — Ericaceae

C. vulgaris (L.) Hull SCOTS HEATHER

Zone 6

The selections of Scots heather mentioned below are growing well in a corner of the nursery, in ordinary soil but sheltered by shrubs. Most of them flower in August and with their attractive foliage they make a pleasant showing. All were planted in 1952 and appear to be equally hardy.

'Alba Plena' double white flowers

'Alportii' crimson flowers, a little taller than the others

'Alportii Praecox' an earlier form of 'Alportii'

'Aurea' bright gold foliage, dwarf plant, purple flowers

'Cuprea' purple flowers, golden foliage turning to reddish in the fall

'C. W. Nix' deep crimson flowers

'Elegantissima' pure white flowers, dark green foliage

'Goldsworth Crimson' late-blooming, crimson flowers

'Hammondii' white flowers, taller plant than most

'H. E. Beale' silvery pink flowers, late blooming

'Mair's Variety' long spiked, white flowers

'Searlei' late-blooming, white flowers

'Tib' double crimson flowers, golden variegated foliage

CALYCANTHUS — Calycanthaceae

A genus of North American shrubs with fragrant wood and interesting purplish flowers, which are often inconspicuous among the large leaves.

C. fertilis Walt. PALE SWEETSHRUB

Zone 5

A shapely shrub with leaves 7.5–12.5 cm long, ovate, and acuminate. Its flowers are brownish purple but, unlike those of *C. floridus*, they do not possess scent. The species is found in southeastern USA.

C. floridus L. CAROLINA ALLSPICE

Zone 5

A rather straggly shrub 1.5–2 m high. Its leaves are from 7.5–12.5 cm long, oval, tapered at the base, dark green above and covered with pale silky down beneath. The flowers consist of numerous reddish purple, strap-shaped petals and sepals. The leaves, wood, and roots have a pleasant camphor-like fragrance. The bark was at one time used as a substitute for cinnamon. This plant also grows in southeastern USA.

'Mrs. Henry'

Zone 5

A cultivar with much larger and consequently more conspicuous flowers than the species.

CAMPSIS — Bignoniaceae

A genus of climbing plants containing two species, one in North America and the other in northeastern Asia. Neither is truly hardy in the Arboretum, but one plant of *C. radicans* survives on a shaded eastern wall although it never flowers, and another plant in a corner of the nursery flowers well each year as it trails along the ground.

C. radicans (L.) Seem. ex Bur. TRUMPETVINE

Zone 6

The only trumpetvine in the Arboretum is planted on the east side of the Arboretum Building (building 74). This plant grew rapidly for the first 5 years and covered a large expanse of wall, but it had to be cut back hard in 1950 because of renovation work. It grew vigorously again and has spread to cover about 1.5 m^2 of wall. It has never flowered in this position although it has suffered no severe winter damage. The

trumpetvine, native to southeastern USA, is considered a weed farther south, but its rich scarlet and orange trumpet-shaped flowers are beautiful as well as spectacular. Where wall space permits, the vine would be an extremely valuable plant, particularly on the shady part of a building where damage from late spring frosts would not retard its growth.

CARAGANA — Leguminosae

The caraganas form a group of shrubs noted for their attractive yellow flowers and their ability to withstand low temperatures and poor soil conditions. The species *C. arborescens* was originally introduced into Canada by the Arboretum. It soon found its way into the Prairie Provinces where it is now used extensively as a specimen shrub, but more particularly as a hedge or screen plant. Many of the original plants introduced in 1889 are still growing and have suffered no setbacks.

C. arborescens Lam.
CARAGANA, SIBERIAN PEASHRUB
Zone 2

The caragana, or Siberian peashrub, is the most commonly grown of all caraganas and is the one chiefly used for hedges. It grows fast and because it can be quickly established from seeds it is one of the cheapest of hedge plants. Its main assets are hardiness and ability to withstand drought. It is distinguished from the other species by having more than four leaflets, by its deciduous leaf stalks, and by its spiny stipules. It comes from Siberia and Manchuria.

'Globe' GLOBE PEASHRUB
Zone 2

A globular form of the species, which originated at the Research Station, Morden, Man. The two specimens growing at the Arboretum are perfect globe shrubs about 60–90 cm high.

f. ***lorbergii*** Koehne LORBERG'S PEASHRUB
Zone 2

A graceful form, more desirable than the species for planting as a specimen shrub.

var. ***pendula*** Carrière WEEPING PEASHRUB
Zone 2

A variety that is usually grafted high on the species, to form a pendulous standard.

C. aurantiaca Koehne DWARF PEASHRUB
Zone 2

If the flowers of this species showed above the foliage, it would be one of the best flowering shrubs. As it is, however, the shrub is still graceful and interesting. It has arching, pendulous branchlets with deep green leaves and orange-yellow flowers, and forms a shrub about 1 m high and 1.5 m wide. Its range is from Siberia to China.

C. brevifolia Kom. SHORT-LEAVED PEASHRUB
Zone 2

A species from northwestern China, similar to *C. aurantiaca* and *C. pygmaea,* with yellow flowers.

C. decorticans Hemsl. AFGHANISTAN PEASHRUB
Zone 2b

A native of Afghanistan, discovered in 1879 in the Kurrum Valley. It is similar to *C. arborescens* but the leaves and pods are shorter, the calyx has longer teeth, and the stipules are half as long as the petioles. Its flowers are pale yellow and as much as 2.5 cm long.

C. frutex (L.) K. Koch SHRUBBY CARAGANA
Zone 2

A large, coarse shrub with erect branches. When young it has a better habit, but no better than the Siberian peashrub. It is distinct from the other species because it does not have spines or down. It grows from eastern Europe to central Asia.

'Latifolia' broad leaves

var. ***macrantha*** Rehd. large flowers and short calyxes

C. fruticosa (Pall.) Steud. KOREAN PEASHRUB
Zone 3

A species from Korea related to *C. arborescens.* It has 8–14 oblong to obovate leaflets and herbaceous stipules, often producing long serpentine branches, which will grow for several years without dividing; it has, therefore, a thin, open habit.

C. jubata (Pall.) Poir. SHAGSPINE PEASHRUB
Zone 3

This odd-looking, spiny and hairy shrub has proved difficult to establish in the Ottawa area. It is perfectly hardy but needs hot, dry conditions to succeed; it does well on the prairies but is interesting only from its odd and remarkable appearance. Its native range is from Siberia to Turkestan.

C. maximowicziana Kom. MAXIMOWICZ PEASHRUB
Zone 3

A species with a densely branched and spreading habit, eventually forming a shrub 1 m high and two to three times as wide, with bright green foliage and large flowers. Its nearest relative is *C. spinosa,* which has large spines 5 cm long and much longer leaflets. The species would probably make a denser hedge than *C. arborescens,* but it would not grow as rapidly. It comes from China and Tibet.

C. microphylla Lam. LITTLE-LEAVED PEASHRUB
Zone 2b

A graceful shrub much wider than it is high, with small leaflets and long, slender, more or less pendent branches. It is sometimes grafted high on stocks of *C. arborescens* to form a pendulous small tree. The species grows in Siberia and northern China.

C. ×***prestoniae*** Moore
Zone 2b

An artificial hybrid (*C. aurantiaca* × *frutex*), similar in appearance to *C. frutex* but smaller. The leaflets are narrower and smaller and the flowers slightly smaller, often a deeper orange-yellow, and numerous. The cross was made by Miss Isabella Preston when she was plant breeder at the Horticultural Division, Central Experimental Farm, Ottawa.

'Goldsprite' large golden flowers, produced abundantly

C. pygmaea (L.) DC. PYGMY PEASHRUB

Zone 2b

All plants grown under this name at the Arboretum have been identified as the similar *C. aurantiaca*. The species *C. pygmaea*, from China and Siberia, would certainly be hardy in this area.

C. sinica (Buc'hoz) Rehd. CHINESE PEASHRUB

Zone 4

A deciduous shrub 1–1.5 m high with angular branches. The leaves are composed of two unequal pairs of leaflets, the pair near the apex being much larger. The leaf stalk has a spine at the tip and remains on the plant after the leaves have fallen. The flowers are 4 cm long, solitary on slender stalks 1.5–2 cm long, and reddish yellow. A native of northern China, noted for the licorice-like odor of its bruised branches and its large leaves.

C. ×*sophorifolia* Tausch
SOPHORA-LEAVED PEASHRUB

Zone 3

A hybrid (*C. arborescens* × *microphylla*), not as showy as the latter parent but a little more refined than the former.

C. spinosa (L.) DC.

Zone 3

The species grows to about 1 m high and has long, undivided spiny branches, hairy when young. The leaves are pinnate with two to four pairs of leaflets and long silky leaf stalks tipped with spines. The flowers are bright yellow. A good plant for a hedge where a thorny type is desired. Native to Siberia.

CARPINUS Betulaceae

The hornbeams are deciduous trees with zigzag twigs, alternate parallel-ribbed veins in the leaves, and grayish bark.

C. betulus L. EUROPEAN HORNBEAM

Zone 7

This species and several of its varieties have been tried many times in the Arboretum, but although the plants survived for 30 years they never made good-looking trees. At their best they formed bushes composed of many main stems before they were finally killed during the winter of 1934. The species is found in Europe and Asia Minor.

C. caroliniana T. Walt. BLUE BEECH, AMERICAN HORNBEAM

Zone 3b

The northern range of the blue beech extends to the Ottawa district as well as farther east and north. Many of the plants are growing in the copse of woodlands and may have been there since the Arboretum was established. They represent what some botanists recognize as a northern form of the tree, var. *virginiana* (Marsh.) Fern., with almost the same characteristics as the species but with more and larger teeth on the leaf margins; the character would probably not stand up too well as a distinguishing feature if one compared several specimens of the forms. Nothing is known about the hardiness of the so-called southern form in the Ottawa area, but it would probably not withstand the winters. The species is growing at the Arboretum, as it commonly does in the Ottawa area, in association with the American hop hornbeam, or ironwood, *Ostrya virginiana* (Mill.) K. Koch. The two species resemble each other at first glance but are easily distinguished on close examination by their barks. That of the blue beech is gray and smooth and has gnarled, bluish black margins, whereas that of the ironwood is flaky and rough. Both trees are growing under the large maples, elms, and hickories that form the main part of the woodlands. Where the blue beech is growing in the open with good soil and ideal conditions, it makes a splendid small tree and one suitable for the home garden. It has an ovoid head and is thick and compact. Its attractive bark and splendid fall color make it interesting all year round.

C. laxiflora (Siebold & Zucc.) Blume
LOOSE-FLOWERED HORNBEAM

Zone 6

Although the date of introduction of this species is given as 1914 by Rehder in his *Manual of cultivated trees and shrubs*, two plants were received here from Tokyo in 1897. They grew fairly well each year but during severe winters were killed at the tips, and in 1929 both plants were winter-killed. This species is closely allied to *C. betulus*, but has a loose fruit raceme and small bracts with a long central lobe.

C. tschonoskii Maxim. YEDDO HORNBEAM

Zone 6

A small tree that has shoots covered with hairs. Its leaves are up to 7.5 cm long and 4 cm wide, with a long tapering point and a rounded base. It does not appear to have any special merit as a small tree except for its rarity in Canada. It is a native of China.

CARYA Juglandaceae

The hickories are large deciduous North American trees with pinnate leaves. The leaflets, almost stalkless themselves, are wide apart on a common stalk. The trees are noted for their long tap roots, which make them difficult to transplant. In fact, they should be transplanted at a very early age or else seeded directly. The fruits are nuts surrounded by an outer husk of green that often thickens and becomes hard by the time the seed is ripe.

C. cordiformis (Wangenh.) K. Koch
BITTERNUT HICKORY

Zone 4

The age of the trees growing in the woodlands is difficult to establish, but they are well over 18 m high. The planted specimen has reached a height of only 4.5 m in 65 years. This slow rate of growth may have been because it was planted when it was too large. Both hickories and walnuts, if not planted very early in life, suffer a severe setback and never entirely recover; either tree should be planted in permanent quarters before the seedling is 3 years old. The bitternut hickory is distinguished by its bright yellow winter buds and its thin-shelled nuts. Its light brown bark separates from the trunk in thin scales. The tree is found in eastern North America.

C. glabra (Mill.) Sweet PIGNUT

Zone 5

The pignut did not survive long in the Arboretum and has not survived in subsequent plantings. In Ontario it occurs only

in the Niagara region and Lake Erie; its range is from Ontario to Maine and south to Florida, Alabama, and Mississippi.

C. illinoinensis (Wangenh.) K. Koch — PECAN

Zone 5b

Planted in 1950, the tree is about 3 m high and has long pinnate leaves with 11–15 leaflets, curved like a saber, pointed, and toothed. It has not yet shown any sign of fruiting. The tree, formerly known as *C. pecan* (Marsh.) Engl. & Graebn., is a native of southeastern and central USA.

C. ovata (Mill.) K. Koch — SHAGBARK HICKORY

Zone 4b

Two of the specimens planted in 1893 are growing fairly close together and have formed large trees 18 m high, with a trunk diameter of 45 cm. The species, native to eastern North America, is easily distinguished by its loose grayish bark, which separates from the trunk in broad flakes 30 cm or more long. The nuts are edible and rather thin-shelled. Several named varieties are in cultivation.

C. pecan see *C. illinoinensis*

C. tomentosa Nutt. — MOCKERNUT HICKORY

Zone 6

Although the mockernut hickory is said to be native to Ontario, it grows only in the milder areas around Lake St. Clair, Lake Erie, and Lake Ontario, and even there it is rare. In Ottawa it suffered much damage from winter injury and the trees soon succumbed. It grows south from Ontario as far as Florida and Texas.

CARYOPTERIS — Verbenaceae

Both *C. incana* (Thunb.) Miq. (bluebeard) (Zone 6) and *C.* ×*clandonensis* A. Simmonds ex Rehd. (Zone 6) have been tried a number of times in the Arboretum, without success. Both types withstood a few winters in the nursery but were winter-killed each time they were transferred to the collection. Apparently *C. mongholica* Bunge (Zone 7) has never been grown although it is given, in some texts, as being hardy on the prairies. Opinions differ however, since it was winter-killed in Surrey, England, according to a report.

CASSIA — Leguminosae

C. marilandica L. — WILD SENNA

Zone 7

It is questionable whether this plant can be considered a shrub, but it is planted in the Arboretum and has semiwoody stems; these are killed back each winter, but are replaced in the spring by new shoots rather in the manner of a herbaceous perennial. It produces its curious, showy yellow flowers with purple anthers in August, and whether treated as a perennial or placed with the shrubs it is worth growing. It comes from southeastern USA.

CASTANEA — Fagaceae

C. dentata (Marsh.) Borkh.
AMERICAN CHESTNUT, SWEET CHESTNUT

Zone 5

The only species of chestnut that withstood Ottawa's winters for any length of time without being entirely killed. The plant never made a good specimen, however, because it was killed back several times during about 30 years of growth. As far as is known, it never bore fruit. The tree is native to eastern North America.

C. mollissima Blume — CHINESE CHESTNUT

Zone 6

Attempts to establish this tree at the Arboretum have only recently been successful, and the species, which comes from China and Korea, may withstand the winters better than the American chestnut. Plants obtained from a nursery in 1954 are growing well and some of the newer hybrids may prove hardy. Hardiness, of course, is not the only factor that determines the survival of chestnuts in America. The chestnut bark disease, which has almost completely destroyed the American chestnut in the United States, is a serious problem. This Asiatic species, however, is reported to be resistant to it.

CATALPA — Bignoniaceae

The catalpas are fairly large trees with showy flowers, particularly the species *C. bignonioides*, *C.* ×*hybrida*, and *C. speciosa*. In the Arboretum the three species are of approximately equal hardiness, that is, they are often killed halfway to the ground during severe winters but grow back in a few years and soon produce an abundance of their gloxinia-like blooms. During the winter and until very late in the spring they present an untidy appearance, especially because their long bean-like pods remain on the trees. They have no beauty of shape and their branches have no intricacy of design.

C. bignonioides Walt.
INDIAN-BEAN, COMMON CATALPA, SOUTHERN CATALPA

Zone 5

This species, from eastern USA, differs from the western catalpa (*C. speciosa*) in that its leaves are abruptly acuminate instead of long-acuminate, its flowers are 4–5 cm instead of 6 cm across, and its panicle bears several rather than many flowers. The leaves of this species are reported to have an unpleasant odor when crushed. The fruits of all catalpas are long pods; in *C. bignonioides* the pods have thin walls, whereas in *C. speciosa* they have thick ones. The flowers of both species are similar, but those of *C. bignonioides* are supposed to have thickly spotted purple markings, whereas those of *C. speciosa* are spotted thinly or have inconspicuous purple markings. None of these characters are too reliable when applied to the plants in the Arboretum, which may therefore be of hybrid origin. In milder climates the trees are round-topped, but since they are often killed back at Ottawa this character cannot be assessed.

'Aurea' — GOLDEN COMMON CATALPA

Zone 5b

The golden-leaved form of *C. bignonioides* does not thrive in its location in the Arboretum, and it will probably never be showy. The two specimens are about 1.2 m high, with a

few short branches. This formal, mop-headed tree has been planted too frequently in some cities in the United States. It does have attractive golden yellow leaves, which become deeper colored as the season advances.

*C. **bungei*** C. A. Mey. MANCHURIAN CATALPA

Zone 6

A small tree with a bushy habit. Like most of the other catalpas, it suffers severe injury during cold, snowless winters. The species comes from northern China.

*C. ×**hybrida*** Hort. ex F. L. Späth HYBRID CATALPA

Zone 5

A hybrid (*C. bignonioides* × *ovata*) raised in Indiana in 1874. It is intermediate between the parent species but bears a greater resemblance to *C. bignonioides*. It has large leaves similar to those of *C. bignonioides* and also some angular-lobed leaves characteristic of *C. ovata*. Its flowers are very much like those of *C. bignonioides*. One tree near the Horticulture Building (building 55) at the Central Experimental Farm is 18 m high and never suffers from winter injury. Also known as *C. erubescens* Garr.

*C. **ovata*** G. Don CHINESE CATALPA

Zone 4

The only catalpa tried in the Arboretum that can be considered absolutely hardy in whatever location it is planted. As its common name indicates, it originated in China. Its leaves are broadly ovate with a heart-shaped base, often three-lobed, with each lobe pointed. Its flowers are much smaller than those of the other species in the collection and are not as showy, being a dull, creamy yellow, spotted with red inside. Some obvious hybrids of this species and *C. bignonioides* planted in the Arboretum have flowers of the same color, but much larger and more showy.

*C. **speciosa*** Warder ex Engeln. WESTERN CATALPA

Zone 5b

A small tree from central USA, with an upright habit. Its flowers are larger than those of the common catalpa, although not as large as the blooms of some older plants growing in the neighborhood. It is said to be hardier and more vigorous than *C. bignonioides*, but in the Arboretum the two species have about the same hardiness. Some specimens planted in 1897 survived in separate parts of the Arboretum for 30 years before they had to be removed.

CEANOTHUS **Rhamnaceae**

*C. **americanus*** L. NEW JERSEY TEA

Zone 4b

An interesting deciduous shrub about 1 m high, with ovate leaves and pinkish white flowers borne on long-stalked, dense panicles. When grown in good soil it makes a neat shrub and is especially valuable because it flowers in July when not too many shrubs are in bloom. It is a native of eastern and central USA.

*C. ×**delilianus*** Spach DELISLE CEANOTHUS

Zone 7b

A seedling of this hybrid (*C. americanus* × *coeruleus* Lag.) withstood 10 winters with little damage but was winter-killed in 1957. It had pale blue showy flowers and was attractive. The name *C. ×delilianus* refers to a group of well-known hybrids not hardy in the Ottawa area, such as 'Gloire de Versailles', 'Gloire de Plantières', and 'Léon Simon'. The seedling keyed out to this group but appeared to be as hardy as *C. americanus*.

*C. **ovatus*** Desf. INLAND CEANOTHUS

Zone 4b

The plants growing at the Arboretum were collected in the wild and on the banks of the Ottawa River. In USA it is found from Michigan to Iowa, Nebraska, and Texas. Except for its smaller leaf, smaller inflorescence, and shorter peduncles, it is similar to *C. americanus*.

CELASTRUS **Celastraceae**

A group of vigorous climbers or shrubs, of which the bittersweet (*C. scandens*) is the best known in Canada. In the Arboretum the specimens are left to twine and intertwine without supports, and they form a tangled mass of shoots. Where several plants of the same species are massed together, they produce an abundance of fruits.

*C. **loeseneri*** see ***C. rosthornianus***

*C. **orbiculatus*** Thunb. ORIENTAL BITTERSWEET

Zone 5a

For 10 years this strong, vigorous climber grew and fruited abundantly on the fence surrounding the Arboretum nursery. Then it gradually deteriorated and finally succumbed. While it was growing well it produced a fine effect with its brilliant-colored fruits that lasted for most of the winter. The fruits are green pea-shaped capsules that open later to reveal a golden yellow inner surface and shining scarlet seeds, giving a red and gold effect throughout. The species comes from north-eastern Asia.

var. ***punctatus*** (Thunb.) Rehd.
CHRISTMAS BITTERSWEET

Zone 5

This variety is in most ways the same as the species but it has smaller, less rounded leaves. It makes a handsome, vigorous twining vine with yellow and red fruits, and leaves that turn deep yellow in the fall. As with all celastrus species, plants of both sexes must be growing close together to provide a large crop of fruits. This species differs from *C. scandens* in that it has small lateral fruit clusters and not large terminal ones; also, its fruits are yellowish orange rather than bright orange and red.

*C. **rosthornianus*** Loes. LOESENER BITTERSWEET

Zone 6

An interesting climber with oval leaves, wedge-shaped at the base, dull dark green above and pale green beneath. Its showy fruits are yellow with red seed coats. It is similar to *C. orbiculatus* but has thicker and more oval leaves and fruits that appear red and yellow rather than orange and scarlet. It is a native of central and west China.

*C. **scandens*** L. BITTERSWEET

Zone 3

One of the most vigorous of hardy twining vines, so vigorous and strong that it often kills supporting plants by

girdling the stems. The showy fruits of the species are orange-scarlet with deep scarlet seeds. No other species makes such a beautiful spectacle in the fall as this North American vine, when it is planted in a mass or growing in its native woodlands. Because plants of both sexes are needed for fruit production, nurserymen should propagate from plants of known types and sell the staminate and pistillate plants in pairs.

CELTIS — Ulmaceae

Members of the celtis group are deciduous trees, sometimes shrubby in Canada, with alternate, mostly three-veined leaves. Their flowers have no appealing beauty although the pistillate ones have an odd, caterpillar-like stigmatic surface, prominent when the leaves are beginning to develop in early spring. The leaves of these trees resemble those of nettles and the common name of nettletrees is given to the group in Europe. The species are generally classified according to the veins, teeth, and hairiness of their leaves and the ribs of the fruits, but even so they are difficult to tell apart.

*C. **glabrata*** Steven

Zone 4

A small tree from western Asia, with a rounded crown and nettle-like, ovate leaves. It has orange-red fruits produced singly on a fruit stalk but in pairs on small brittle branchlets, which, as in *C. labilis* Schneid., drop off entirely when the fruits are ripe. The teeth of leaves incurve slightly and the bases are uneven. A fine tree for planting in small gardens.

*C. **occidentalis*** L. COMMON HACKBERRY

Zone 2b

The earlier-planted specimens of this North American species have formed trees 15 m or more high. Although considered by some as the possible successor to the American elm if the latter becomes extinct because of Dutch elm disease, it does not make as handsome a tree; its blue-black fruits are likely to be considered untidy before winter has passed. The common name hackberry is a derivative of 'hagberry', the Scottish name for the European bird cherry (*Prunus padus*). The English common name for the tree is sugarberry, because of its sweet fruits.

var. ***pumila*** (Pursh) A. Gray SMALL HACKBERRY

Zone 2b

A specimen of this tree planted in 1947 is 10.5 m high. It is distinguished from *C. occidentalis* because of its dwarf habit (although it grows larger than the 4 m given as its height by Rehder), and by its almost entire leaves. For planting in streets and small gardens it is more desirable than the common hackberry.

*C. **reticulata*** Torr. NETLEAF HACKBERRY

Zone 5

Three specimens are growing well at the Arboretum and show no evidence of winter injury. They are easily identified by their conspicuously net-veined leaves. The species grows in southwestern USA.

*C. **sinensis*** Pers. CHINESE HACKBERRY

Zone 6b

Six trees of this species were planted in the Arboretum, but all succumbed to the winter. Native to eastern China, Korea, and Japan, it is reputed to be a small tree with broad ovate leaves, reticulate above and glabrous beneath.

*C. **tournefortii*** Lam. ORIENTAL HACKBERRY

Zone 4

This species is growing well at the Arboretum and appears able to survive very low temperatures. The specimen's present height is 5 m, which is near its reported maximum. The plant is found in southeastern Europe and Asia Minor.

CEPHALANTHUS — Rubiaceae

*C. **occidentalis*** L. COMMON BUTTONBUSH

Zone 4b

This native shrub would probably pass unnoticed if it did not bloom in July when shrubs in flower are few. Although the flowers are not spectacular, they are beautiful when examined closely. Each flower resembles a perfect globe into which myriads of pins have been inserted. From a botanical point of view the buttonbush is noteworthy because it is the only large shrub from the family Rubiaceae that is hardy in the Ottawa area. The specimens in the Arboretum are doing well in ordinary soil although the species is found in moist locations in the wild. It grows well from cuttings, which root casily under mist.

CERCIDIPHYLLUM — Cercidiphyllaceae

*C. **japonicum*** Siebold & Zucc. ex J. Hoffm. & H. Schult. KATSURA TREE

Zone 5

One of the best trees for small home gardens, where it forms a broad pyramidal tree with interesting crimped leaves. In the Arboretum, two trees planted in 1911 have reached a height of 7.5 m with a spread of little more than 4.5 m. Both specimens have two or three main trunks arising from the base, probably because late spring frosts froze their main stem and caused it to break into several trunks when they were young. With early pruning, the trees could probably be trained to produce a single stem. The Katsura tree, from Japan, is described by some as wide-spreading and by others as pyramidal. Those in the Arboretum are definitely pyramidal, despite the multiple trunks to which some authors attribute their broad outline.

'Pendulum'

Zone 5

A pendulous form that originated in the Sheridan nurseries, Oakville, Ont., in 1967.

*C. **magnificum*** Nakai

Zone 5

The plant growing under this name is similar to *C. japonicum* and at one time was thought to be synonymous, but the leaf stems are vividly scarlet and the leaves are rounder. These characters themselves, however, are not sufficient to distinguish a separate species, because as the tree grows larger it may develop the same leaves and stems as the Katsura tree. The species is also Japanese in origin.

CERCIS — Leguminosae

C. canadensis L. EASTERN REDBUD

Zone 6

Few shrubs or trees are more beautiful than this species at its best. The trees at the Arboretum bloomed magnificently in 1956 and 1958, but were killed back in 1967 after suffering some damage in previous winters. The species, native to eastern North America, is borderline in hardiness. It cannot be recommended for planting in the Ottawa area except by those who are willing to protect it from the winters and who, for sentimental reasons, accept the appearance of what may often be a stunted, gnarled, and weather-beaten tree.

CHAENOMELES — Rosaceae

A genus better known as cydonia or japonica. In the Arboretum there are two plantings of this genus, an older group in the Circle and a newer group near the Arboretum Greenhouse Range (building 73). The newer group was received from a Dutch nursery in 1952 and is growing well because the plants are somewhat protected from the winters by the warm greenhouse wall. They have flowered profusely, to a height of 2 m.

C. japonica (Thunb.) Lindl. ex Spach JAPANESE QUINCE

Zone 5b

This species has a much lower habit than *C. speciosa*; in the Arboretum the plants have formed large, spreading mats 2.5 m in diameter and 45 cm high. In their open location they seem to have been confined to this height by the winters. *C. japonica* was introduced from Japan in 1869, by Messrs. Maule of Bristol, England.

C. lagenaria see *C. speciosa*

C. speciosa (Sweet) Nakai
COMMON FLOWERING QUINCE

Zone 5b

There are no plants of the species itself in the Arboretum, but the following cultivars (all Zone 5b) were planted in a border near the Aboretum Greenhouse Range (building 73) in 1952 and are growing extremely well. The species has been known as *C. lagenaria* (Loisel.) G. Koidz.

'Crimson and Gold'

'Falconnet Charlot'

'Fire Dance'

'Hollandia'

'Knap Hill Scarlet'

'Nivalis' single white flowers

'Rosea Plena' double rosy red flowers

'Rubra' deep red single flowers

'Spitfire'

'Umbilicata' single deep crimson flowers

'Vermilion' deep crimson flowers

'Vesuvius'

CHAMAEDAPHNE — Ericaceae

C. calyculata (L.) Moench LEATHERLEAF

Zone 2

These plants are set out in the native plant area in a prepared bed composed of peat moss, decayed leaves, and loam; they are growing well beside other ericaceous companions. They are all 60–90 cm high and each year bear an abundance of small, white flowers. The species is found in eastern North America and northern Europe.

'Nana'

Zone 2

A dwarf form, more desirable for planting in rock gardens.

CHIOGENES see GAULTHERIA

CHIONANTHUS — Oleaceae

C. virginicus L. WHITE FRINGETREE

Zone 5

The true species is represented in the Arboretum only by a recently planted specimen; the original plantings have long since been identified as var. *maritimus*. The white fringetree is an interesting small tree, suitable for planting in small home gardens. Its flowers are in panicles, each flower containing four or five long white petals with two stamens. The complete flower looks much like a lilac but is more graceful. The specimen in the Arboretum has made a shapely bush 1.5 m high, although it has not yet flowered. The species is a native of eastern North America.

var. *maritimus* Pursh DOWNY FRINGETREE

Zone 5

The only difference between this variety and the species is that it has pubescent leaves and panicles. The plants in the Arboretum have remained at a height of 3 m for more than 10 years. They flower profusely each year in mid-June, and in October display an abundant crop of large, blue berries.

CLADRASTIS — Leguminosae

There are four species of these beautiful small trees but only one, the American yellowwood, has been successfully grown in Ottawa. *C. sinensis* Hemsl. and *C. platycarpa*, from China and Japan respectively, might prove hardy if specimens from colder areas could be obtained for planting. Seedlings of *C. sinensis* have never withstood their first winter at the Arboretum, but neither have American yellowwood seedlings. To protect them during their first winter, they should either be mulched with straw or potted and brought inside a cool greenhouse, then replanted in the spring; this gives the seedlings a long period to become established before the next winter.

C. lutea (Michx.f.) K. Koch AMERICAN YELLOWWOOD

Zone 4b

The two specimens in the Arboretum are remarkably different in general appearance. One is a shapely tree of trim, ovoid habit, 9 m high and 3 m wide, whereas the other has a

gnarled, bent-over trunk and a wide-spreading habit; it stands about 6 m high and 6 m wide. The ovoid tree has thick, large foliage and produces very few flowers at any time; the gnarled old specimen has thin, smaller foliage but produces an abundance of flowers regularly every 2nd year. During intermediate years the few long, creamy white tresses that it produces still make the tree more ornamental than the other. The American yellowwood grows wild from North Carolina to Kentucky and Tennessee.

*C. **platycarpa*** (Maxim.) Mak.
JAPANESE YELLOWWOOD

Zone 7

A species from Japan, with stipuled leaves and winged seed pods. The flower standards are white with a little yellow spot at the base, borne on upright panicles. Two specimens from a nursery in Maryland grew for 2 years but were then winter-killed.

CLEMATIS — Ranunculaceae

The clematis collection in the Arboretum is contained within two beds at the north end near the pine grove. Not many species are represented, because they are twining plants and would need posts or arbors, which do not fit into the current landscape of the Arboretum. Those that are grown are either supported to some extent by posts or allowed to trail along the ground. The hardiness of the various species and varieties is difficult to assess because they may be winter-killed when climbing on an open support but hardy when planted against a warm house wall. When allowed to trail along the ground they are often covered with snow, which again may protect them and make them appear hardier than they really are.

*C. **apiifolia*** DC. OCTOBER CLEMATIS

Zone 4

A vigorous climber from central China and Japan. It grows to 3 m high, with slender, hairy stems and trifoliate leaves. The flowers are dullish white, less than 2.5 cm across on panicles 5–15 cm long. This is not a showy species; its silky styles are similar to those of *C. vitalba* L. but not as beautiful.

*C. ×**eriostemon*** Decne.

Zone 5

A hybrid (*C. integrifolia* × *viticella*) that takes the form of a subshrub with campanulate blue flowers.

*C. **flammula*** L. PLUME CLEMATIS

Zone 5

The chief attraction of this species is the fragrance of its blossoms, which disperse their hawthorn- or almond-like scent widely around the plant. The flowers, produced in August and September, are pure white in loose panicles up to 30 cm long. The plant forms a tangled mass of intertwining stems and bright green leaves. A native of southern Europe.

*C. **heracleifolia*** DC.

var. ***davidiana*** (Decne. ex B. Verl.) Hemsl.
FRAGRANT TUBE CLEMATIS

Zone 5

A semishrubby clematis that grows 1–1.5 m high if staked. If left to grow freely it clings to the ground and its upright flower stems give it the appearance of a spreading rock shrub. It has showy indigo-blue flowers, 2.5 cm or more across and bell-shaped at the base. The thick sepals spread above the tubular base but do not curl back. It is a showy shrub and provides attractive cut flowers, especially if the leaves are removed to reveal the blooms. It comes from China.

*C. **integrifolia*** L. SOLITARY CLEMATIS

Zone 4b

Another subshrubby species that makes an attractive plant if staked like a herbaceous perennial. It grows about 1 m high and produces large, solitary, violet-blue flowers at the end of each shoot. The flowers are followed by showy feathery styles that protrude from the achenes. The species is found in southeastern Europe and western Asia.

*C. ×**jackmanii*** T. Moore JACKMAN'S CLEMATIS

Zone 4b

C. ×jackmanii (*C. lanuginosa* Lindl. × *viticella*) is the well-known purple-flowered climber that is usually prominent in August. There are many old, well-established plants in the Ottawa area, but none of great age in the Arboretum itself. The hybrid must thus be hardy in the area, but nurserymen often graft it on to a tender species, so purchased plants of unknown origin may die in the first year. Plants are easily obtained from cuttings taken from forced plants in the winter, and most Canadian nurserymen sell plants derived by this method. Many of the hybrids usually classified in the Jackman group should also be hardy in the Ottawa area.

'Alba' white flowers

'Superba' violet-purple flowers

*C. **koreana*** Kom. KOREAN CLEMATIS

Zone 4b

A Korean species related to Canada's native *C. occidentalis* (Hornem.) DC., with a prostrate habit, dull purple flowers, elliptic sepals, and coarsely dentate leaves, the lower ones truncate at the base.

*C. ×**lawsoniana*** T. Moore & Jackm.
LAWSON'S CLEMATIS

Zone 5b

A hybrid (*C. lanuginosa* × *patens* C. Morr. & Decne.) with large, mauvish blue flowers.

*C. **recta*** L. GROUND CLEMATIS

Zone 4b

A herbaceous species noted for its terminal panicles crowded with showy white flowers. It has large, pinnate leaves, with leaflets that are ovate and rounded or cuneate at the base. It grows in southern and central Europe.

*C. **tangutica*** (Maxim.) Korsh. GOLDEN CLEMATIS

A hardy Chinese species that has rich yellow flowers and gray-green leaves with two or three unevenly toothed leaflets. This is the best yellow clematis because of its beautiful flowers, which are 10 cm in diameter, and its large head of feathery fruits.

*C. **texensis*** Buckl. SCARLET CLEMATIS

Zone 5

A semiherbaceous plant that either dies down or is killed back each winter. Like a few other herbaceous plants, it seems to be protected from winter injury by the Ottawa snowfall. Its rich, brownish red, solitary flowers are unusual among clematis. The leaves are pinnate, comprising oval leaflets that are two- or three-lobed and heart-shaped at the base, with netted veins. It is found in Texas.

C. viticella L. ITALIAN CLEMATIS

A woody climber that grows to 3.5 m high. It has slender bipinnate or pinnate leaves and rosy purple flowers, which are either solitary or three on a stalk. It blooms profusely from July to September and makes a graceful climber. A native of southern Europe.

Large-flowered clematis

Various hybrid cultivars have been grown recently in the Arboretum and have withstood the winters for a few seasons.

'Barbara Dibley' a showy clematis with violet-red flowers in June Zone 5b

'Bees Jubilee' mauve-pink flowers with deep carmine bars Zone 5b

'Crimson King' large carmine flowers Zone 6b

'Gypsy Queen' violet-purple flowers, *jackmanii* type Zone 5

'Hagley' shell-pink flowers with brown stamens, pointed sepals Zone 6

'Marie Boisselot' (Mme Le Coultré) pure white flowers Zone 5b

'Maureen' violet-purple flowers suffused with darker purple Zone 6

'Mrs. Oud' large, milky white flowers with reddish anthers Zone 6

'Nelly Moser' light mauve flowers with a carmine bar Zone 5b

'Prins Hendrik' enormous blue wavy-petaled flowers Zone 6

'Ramona' large, lavender-blue flowers with darker anthers and rounded petals Zone 6

'Robert Brydon' a sprawling climber up to 2.5 m high, with creamy pink flowers freely produced Zone 5

CLETHRA — Clethraceae

The clethras are allied to the heath family, Ericaceae, but are distinguished from that group by their corollas, which are so deeply divided that they appear to be composed of separate petals.

C. acuminata Michx. CINNAMON WHITE-ALDER

Zone 5

American textbooks follow the opinion of Rehder that the species *C. alnifolia* is the hardiest of the white-alders. Records at the Arboretum, however, favor *C. acuminata* as the hardiest. Certainly this species lived the longest, and it died because it was damaged by machinery rather than because of winter injury. However, in a good peaty soil both species may thrive in the area. Bean did not consider *C. acuminata* hardy in England except in the south, but it definitely was hardy in Ottawa; the plant was authoritatively identified in 1945.

A native of southeastern USA, the species in its wild state grows to 6 m high and might be considered a small tree. At the Arboretum it attained a height of 1.5 m with a spread of 1 m, which is probably a maximum for the Ottawa area. Its solitary racemes of white flowers are not as showy as the flowers of the other species.

C. alnifolia L. SUMMERSWEET, SWEET PEPPERBUSH

Zone 5

The showiest of all the clethras; when growing well it forms a large, handsome shrub and in August produces an abundance of white, veronica-like, spiky flowers. Its leaves differ from those of the other species in that they are almost entirely glabrous. Its range is from Maine to Florida, so that it is assumed to be hardy in this area. Plantings made in 1956 are well established and hardy, except for occasional frost injury.

'Rosea' PINK SUMMERSWEET

Zone 5

This pink-flowered form has proved to be hardier than the species itself. Its fragrant flowers are arranged in dense, cylindrical, downy racemes 5–15 cm long and are produced during August at the apex of the current year's shoots. The plant has reached a height of 1 m.

COLUTEA — Leguminosae

The bladder-sennas are not often planted in gardens, although they flower in late summer and have interesting bladder-like fruits. They are not considered to be showy and are said to be of use only for planting in dry areas and poor soils where no other plants can flourish. However, the plants in the Arboretum growing as isolated specimens are quite graceful and might find a place around modern homes.

C. arborescens L. COMMON BLADDER-SENNA

Zone 5

This vigorous shrub with yellow pea-like flowers has attained a height of 2 m. One of its distinguishing characters is that the wing petals are shorter than the keel petals. It has a large, inflated, bladder-like pod, which gives a sharp report when squeezed. The shrub can be kept to a neat shape by pruning each year. The species comes from southern Europe.

C. ×*media* Willd. HYBRID BLADDER-SENNA

Zone 5

This reputed hybrid (*C. arborescens* × *orientalis* Lam.) is similar in appearance to *C. arborescens*, but has bluer leaves and more segments to the leaf. Its brownish red or coppery bronze flowers are more like those of *C. orientalis*.

C. persica Boiss. PERSIAN BLADDER-SENNA

Zone 5

A smaller, neater shrub than *C. arborescens*. It has the same yellow flowers and glaucous blue leaves, but the wing petals are longer than the keel petals and the calyx has rounded lobes, whereas in *C. arborescens* the keel petals are the longer and the calyx has triangular lobes. The pods are a little shorter than those of the common bladder-senna and are open at one end. It grows in Iran.

COMPTONIA — Myricaceae

C. peregrina (L.) J. Coult. — SWEET-FERN

Zone 2

This lovely, graceful native deciduous shrub has leaves like a fern's but with a fragrance similar to bay leaves. It has not been planted to any great extent except in the past few years, when it has been used for certain roadside plantings in the United States. This is contrary to the supposition that the plant is difficult to transplant. However, it does not tolerate lime and requires a moist, peaty soil, which may account for many failures in transplanting.

CORNUS — Cornaceae

The *Cornus* collection is now completely confined to beds in the southeastern part of the Arboretum. At one time many species were planted in the area directly south of the Arboretum Greenhouse Range (building 73), where they looked unsightly in the early spring before the wood killed the previous winter was pruned. Species requiring this treatment are *C. mas*, *C. florida*, and *C. officinalis*, which flourish and present an attractive appearance after a mild winter, but are usually somewhat unappealing. The plants were moved to their present location for the sake of appearance and to fit in better with the correct taxonomic sequence.

C. alba L. — TATARIAN DOGWOOD

A large deciduous shrub 2.5 m high and thick, of no particular merit for ornamental purposes except where a mass of stems and leaves is required to screen unsightly objects. The leaves turn red in the autumn and can add considerably to the fall effect. Its flowers are yellowish white, not showy, and its fruits are whitish blue. The species grows wild from Siberia to Manchuria.

'Argenteo-marginata' — SILVERLEAF DOGWOOD

Zone 2

One finds this shrub in many nurserymen's catalogs under the name *C. alba* 'Elegantissima' or even *C. elegantissima*. The shrub grows vigorously, has creamy white marginal leaves, and is used extensively for landscape planting where a variegated shrub is desired. It grows in almost any type of soil and is easily propagated.

Fruits of Tatarian dogwood (*Cornus alba*)

***Cornus alba* 'Argenteo-marginata'**

'Coral Beauty'

Zone 2

A form with deeper coral-red bark, distinguishable only by its new wood.

'Elegantissima' — see 'Argenteo-marginata'

'Gouchaultii' — MOTTLED TATARIAN DOGWOOD

Zone 2

A yellowish and pink variegated form, not cultivated in the Arboretum but proving hardy in the new Botanic Garden.

'Kelsey' — see *C. stolonifera* 'Kelsey'

'Kesselringii' — PURPLETWIG TATARIAN DOGWOOD

Zone 2

A form with deep purple bark and red, young leaves as they unfold.

'Sibirica' — SIBERIAN DOGWOOD

Zone 2

More ornamental than the species because it is not as rampant and has vivid red bark that is showy in the winter. A variegated form of this cultivar has been reported, which might be superior to other variegated kinds because of its less vigorous growth.

'Spaethii' — YELLOWEDGE DOGWOOD, SPAETH'S CORNEL

Zone 2

A lovely yellow variegated cultivar, often described as the best of all yellow variegated shrubs. It appears to be hardy at the Arboretum, but is less vigorous than *C. alba* 'Argenteo-marginata'. It has another ornamental quality in that it has vivid red bark that is showy in winter.

C. amomum Mill. — SILKY DOGWOOD

Zone 4b

This species, like *C. alba*, has no great ornamental value. It is a large shrub with dark green leaves, glabrous above, and

yellowish white flowers produced in July. Its main distinguishing characters are its purplish brown bark, the silky reddish undersides of its leaves, and its pale blue fruits. It is native to eastern North America.

*C. **asperifolia*** Michx. ROUGHLEAF DOGWOOD

Zone 4b

Another large, loose shrub from eastern North America. It is of a type similar to *C. alba* and *C. amomum*, but differs in that its leaves are rough or slightly rough above and the bark of its branchlets is brown.

*C. **australis*** C. A. Mey.

Zone 5

A large, shrubby dogwood of little ornamental merit; it has oval leaves, narrowed at the apex, veins in three or four parts, and white flowers borne in clusters 5 cm across. The leaves of this species are conspicuous in the fall, when they turn bright red. It comes from western Asia.

*C. **baileyi*** see *C. **sericea*** f. ***baileyi***

*C. **controversa*** Hemsl. GIANT DOGWOOD

Zone 5b

If this plant grows to its full height it will make a shapely tree about 6 m high, but it does not appear to be hardy in the Ottawa area because it has already suffered a few setbacks. Unlike all dogwoods except *C. alternifolia* L.f., this species has alternate leaves. In milder climates it makes a larger and more shapely tree than *C. alternifolia*, and unlike that species it has straight, parallel hairs beneath the leaves, which are rounded at the base. The leaves of *C. alternifolia* have irregular, diverging hairs and are cuneate at the base. *C. controversa* is originally from China and Japan.

*C. **coreana*** Wanger. KOREAN DOGWOOD

Zone 5b

In its native Korea this species forms a small tree as much as 15 m high, similar to but larger than the better-known Chinese species *C. walteri* Wanger. Unlike that species, however, it has reddish brown or purple bark and slightly smaller leaves, which are rounded at the base.

*C. **elegantissima*** see *C. **alba*** 'Argenteo-marginata'

*C. **florida*** L. FLOWERING DOGWOOD

Zone 6b

Where the bracts survive the winter this species is one of the best flowering small trees for temperate climates. In Ottawa its roots are hardy but it is often killed to within 30 cm of the ground; even in mild winters the showy bracts seldom escape injury. The two specimens in the collection are 2 m high and have many branches forming a mass of shoots 1 m wide. Even though the bracts are not showy in this climate, the shrubs are beautiful in the fall with their vividly colored foliage. The tree occurs in eastern USA.

*C. **glabrata*** Benth. BROWN DOGWOOD

Zone 5

This plant was sent to the Arboretum from Spaeth's nursery in 1896, 2 years after the date of its introduction as reported by Bean and later by Rehder. Since it is unlikely that the Spaeth nursery could have produced a saleable stock in 2 years, the plant was probably introduced at least 10 years earlier. It possesses little beauty of flower, but it might have some use as a neat specimen shrub because it produces an abundance of small, shiny green leaves. This shrub, native to western North America, is surprisingly hardy in Ottawa.

*C. **hessei*** Koehne HESSE DOGWOOD

Zone 4

An especially valuable shrub because of its neat, dwarf, compact habit and dark green leaves. It seldom attains greater proportions than 45 by 90 cm and is extremely slow growing. It is excellent for planting around the foundation of small homes. This shrub comes from northeastern Asia.

*C. **kousa*** Hance JAPANESE DOGWOOD

Zone 6b

This species from Japan and Korea and its variety *chinensis* Osborn (Chinese dogwood) from China have been planted on many occasions at the Arboretum but have never survived their first winter.

*C. **mas*** L. CORNELIAN-CHERRY

Zone 6

The cornelian-cherry, a native of central and southern Europe, has been cultivated for centuries in Britain as a shrub or small tree. In milder areas than Ottawa, it is a very striking plant and produces its flowers in abundance. It blooms very early in the season before the leaves start to shoot. After mild winters at Ottawa, one old specimen produced many flowers but at no time was it really showy; it was planted in 1900 but died a few years ago. The fruits of this species are edible and have an acid flavor; they are showy but are mostly hidden by the leaves, and are never produced in such an abundance as to be ornamental.

*C. **obliqua*** see *C. **purpusii***

*C. **officinalis*** Siebold & Zucc. JAPANESE CORNEL

Zone 6

Similar to *C. mas*, but considered to be superior for ornamental planting because of its peeling bark. Like *C. mas*, it never produces a good floral effect in the Arboretum but its early flowers make it well worth planting farther south. It is native to Japan and Korea.

*C. **purpusii*** Koehne PALE DOGWOOD

Zone 4b

According to the literature, the only difference between this North American species and *C. amomum* is the lighter color of the undersides of the leaves and the whitish pubescence on the veins. This difference, however, was not found in all specimens of each species. According to Rehder, *C. purpusii* (*obliqua*) is more loosely branched, but because both species are loosely branched, this character is of doubtful help.

*C. **racemosa*** Lam. GRAY DOGWOOD

Zone 2b

A vigorous shrub, equal to most of the others but perhaps a better choice for planting as a screen or a large ground cover because it grows wild in the area. It flowers freely during June and produces its attractive white fruits in late summer. Its native range is eastern and central North America.

C. rugosa Lam. ROUNDLEAF DOGWOOD

Zone 3

A large shrub or small tree with large, rugged leaves and showy trusses of flowers and fruits. In the Arboretum after more than 10 years of growth it is a shapely shrub, 3 m high, with one main trunk. It is easily distinguished from the other North American dogwoods by its large orbiculate leaves, which are downy beneath.

C. sanguinea L. BLOODTWIG DOGWOOD, RED DOGWOOD

Zone 4b

Another dogwood of no special merit except for planting in waste areas, where it provides vivid fall coloring. The common name sometimes used, red dogwood, apparently applies to this coloring because its bark is not as red as that of many other species. It comes from Europe.

'Variegata' PIEBALD RED DOGWOOD

Zone 4b

A form of little value with slightly variegated leaves, a characteristic that is hardly noticeable and resembles a virus infection rather than a natural variegation.

'Viridissima'

Zone 4b

A form with green branches and fruits.

C. sericea L. RED-OSIER DOGWOOD

Zone 3

This North American species and its forms are valuable for the brilliance of their highly colored twigs. They are also useful for planting on river banks where erosion is likely to occur. Long known as *C. stolonifera* and usually listed as this.

'Kelseyi'

Zone 4b

A dwarf form, which grows to 60 cm high.

f. ***baileyi*** (J. Coult. & W. H. Evans) Fosb. BAILEY'S DOGWOOD

Zone 3

A large, erect shrub up to 3 m high, with pubescent shoots; similar to *C. sericia*, with which it is often confused. It is distinguished from that species chiefly by its woolly shoots and lower leaf surfaces, and by its lack of a stoloniferous habit. It grows well in sandy soils and is a native of eastern North America.

var. ***coloradensis*** (Koehne) C. K. Schneid.

Zone 3

Held by some authorities to be identical with the species, here it is distinctive having brownish red branches, small, pale green leaves, and fruits that are bluish white with the stem longer than it is broad. It grows from the Yukon and Manitoba to New Mexico.

'Flaviramea' YELLOWTWIG DOGWOOD

Zone 3

The yellow branches of this form are so vivid that it is often used as a hedge plant where winter emphasis is desirable.

C. stolonifera see ***C. sericea***

***Cornus sericea* 'Kelseyi'**

CORYLUS Betulaceae (Corylaceae)

A group of trees and shrubs identified by their slender catkins and their edible fruits or nuts, which are enclosed, wholly or partly, by bracts. Many of the species are hardy in the Ottawa area and produce fruits annually.

C. americana Marsh. AMERICAN HAZEL

Zone 2b

Shrubby specimens about 2.5–3 m high with large oval leaves, irregularly toothed. This species differs from its closest ally, *C. avellana*, in that its involucre is twice as long as the nut and tightly encloses it. Although it produces a large crop of nuts each year, it is not commonly planted for its fruits and is of no great value as an ornamental shrub. It is native to eastern North America.

C. avellana L. EUROPEAN HAZEL

Zone 5

A shrub 3–3.5 m high with rounded leaves, irregularly toothed. It produces abundant nuts, which are commonly eaten for dessert. Its chief ornamental value lies in its slender, pendulous catkins which are borne in the fall but burst forth in early spring, when the anthers break into soft yellow cascades of beauty. As in *C. americana* and *C. heterophylla*, the involucre of this species consists of two distinct or partly united bracts. It comes from Europe and western Asia.

'Aurea'

Zone 5

A cultivar with yellow leaves that are not particularly bright or attractive.

'Contorta' HARRY LAUDER'S WALKING-STICK

Zone 5

This remarkable plant has been growing in the Arboretum for 18 years. It has curiously curled and twisted branches.

'Fusco-rubra'

Zone 5

The dull purple form of the European hazel that is often sold as *C. avellana* 'Purpurea'. It is much less attractive than the purple filbert (*C. maxima* 'Purpurea').

'Heterophylla'

Zone 5

An attractive cultivar that has been planted a number of times but for some reason has not survived many years. It has smaller leaves than the type and deep lobes all around the blade of the leaf.

'Purpurea' see 'Fusco-rubra'

C. colurna L. TURKISH HAZEL

Zone 5

In the Arboretum the specimens have formed lovely little trees 7.5–9 m high, with perfect conical outlines. This species seems to have been overlooked by landscape architects seeking a perfectly formed tree for small homes. The height of this species probably never exceeds 10.5–12 m in the Ottawa area, although its maximum height is given as 24 m. Apart from its perfect form it has the same beautiful catkins in early spring as the European hazel. It appears to withstand very dry conditions and should be suited for planting in such areas. It grows in southeastern Europe and western Asia.

C. cornuta Marsh.
BEAKED HAZELNUT, BEAKED HAZEL

Zone 2b

This species, also known as *C. rostrata* Ait., forms a shrub 2.5 m high, with ovate or oval leaves, cordate at the base and pointed at the apex. The nuts are distinct from those of other species because they have a long-drawn-out husk, covered with bristles, which extends into a slender beak. The species is native to eastern and central North America.

C. heterophylla Fisch. & Trautv. SIBERIAN HAZEL

Zone 2b

The specimen at the Arboretum has formed a small shrub 2.5 m high. This species, from Japan and China, has variously shaped leaves, broadest at the apex, and differs from the European and American species because of its regular-toothed husk, which envelops the nut. The hairs on the husk are much more noticeable and longer than those of the other species; they are even more bristly than those of the beaked hazel.

Turkish hazel (*Corylus colurna*)

C. maxima Mill. FILBERT

Zone 6

The filbert and its beautiful purple-leaved form, *C. maxima* 'Purpurea', have been tested several times without success in the Arboretum. Planted in 1899, two shrubs lived for 4 years before being winter-killed. Others planted in 1938 and 1947 did not succeed. The plant grows in the Balkans.

C. rostrata see *C. cornuta*

COTINUS — Anacardiaceae

A small genus comprising two species, one in North America and one in southern Europe and central Asia. The American one, *C. obovatus* Raf., has never survived the winters at Ottawa, but the other species is hardy.

C. coggygria Scop. SMOKETREE

Zone 5

This species is more popularly known among nurserymen as *Rhus cotinus* L. Although beautiful and the most versatile of all shrubs, it is not as widely grown as other popular ones. This is difficult to understand because it grows in almost any soil, requires no special treatment, and is never subject to insect attack. Furthermore, it remains attractive from July until frosts occur and even after, when it provides beautiful fall color. Although its flowers are insignificant, its inflorescence, formed by the hairs on the fruit stalks, turns to pale rose and makes it appear to be smoke covered. Some writers state that one must propagate a flowering clone to ensure flowering plants, but at the Arboretum seedlings have always produced plants that flowered profusely. It has, however, taken 10 years for the first real floral effect to be seen. The range of this species extends from southern Europe to central China and Himalaya; it has been cultivated for centuries.

'Nordine Red'

Zone 5

A cultivar that originated at Morton Arboretum, DeLisle, Ill., it has deep purple fruit stalks and purple, young leaves.

'Purpureus' PURPLE SMOKETREE

Zone 5

A lovely cultivar with deep rosy inflorescence and coppery foliage, it is distinct from the species and is a much better plant, although its leaves are not as striking in the fall.

'Royal Purple'

Zone 5

An English cultivar with deep purple foliage and purple fruit stalks. The foliage remains purple all summer.

'Rubrifolius'

Zone 5

The leaves of this form are also purple, but not as deep a shade as in 'Royal Purple'.

COTONEASTER

COTONEASTER — Rosaceae

The cotoneasters are shrubs with interesting red or black berries and leathery green leaves. They possess no beauty of flower, except in one species, but they are useful for planting near foundations where the bright green leaves and red berries give a lasting effect. A few of the larger shrubby kinds produce a graceful arching effect and are highly desirable for planting as specimens.

C. acutifolius Turcz. PEKING COTONEASTER

Zone 2

A large shrub 2.5 m high with pendulous branches and pointed oval leaves. Fruits are reddish at first, then turn to black. Native to northern China.

C. adpressus Bois CREEPING ROCKSPRAY

Zone 4b

One of the most beautiful shrubs for planting where a dwarf, close-set shrub is desired, such as in front of landscape plantings. Its short, rigid branches and lush, small, green leaves dotted with vivid red berries make it most pleasing. It comes from western China.

var. ***praecox*** Bois & Berthault
EARLY CREEPING ROCKSPRAY

Zone 3

More vigorous than the species, with longer leaves and slightly deeper colored flowers. It has been considered a distinct species in the past. It is also found in western China.

'Type DeBoer'

Zone 3

A cultivar that is similar to the variety, but its fruits persist over a much longer period.

C. ambiguus Rehd. & E. H. Wils.

Zone 5

A species closely related to *C. acutifolius,* from which it differs in that its black fruits are obovate with three or four nutlets instead of ellipsoid with two nutlets. The young plant in the collection has become a distinctive, vase-shaped specimen and the species may prove valuable in landscape work. It grows in western China.

C. bullatus Bois HOLLYBERRY COTONEASTER

Zone 6

A beautiful species from western China, which produces large clusters of bright red fruits in the fall. It is, however, superseded by the form *floribundus*, which has more fruits in larger clusters and a better appearance in general.

f. ***floribundus*** (Stapf) Rehd. & E. H. Wils.
VILMORIN COTONEASTER

Zone 6

As mentioned above, this Chinese form, with its large clusters of globose scarlet fruits, is better than the species. In fruit, it is the most brilliant of all hardy cotoneasters.

C. dammeri C. K. Schneid. BEARBERRY COTONEASTER

var. ***radicans*** C. K. Schneid.

Zone 4

A prostrate shrub with slender stems that trail close to the ground. This Chinese variety makes a good evergreen carpeting shrub and, although not as neat as *C. adpressus* because its leaves are much larger, it is useful for planting as a ground cover. It produces a good crop of berries each year.

'Skogholm' SKOGHOLM COTONEASTER

Zone 3

A vigorous, semiprostrate, ground-cover shrub that grows up to 60 cm high. It has smaller leaves than the type, which turn to a yellowish orange in the fall. It does not produce fruits as readily as the species but its arching branches also send roots into the soil where they touch it.

C. dielsianus E. Pritz. ex Diels DIELS' COTONEASTER

Zone 3

A graceful shrub that should be popular for planting as a specimen plant or for foundation work. Its chief desirable character lies in the long, whip-like, arching shoots that lend it a graceful air. It also produces an excellent crop of red, egg-shaped berries in the fall, a time when it is unusually attractive. It comes from central China.

var. ***elegans*** Rehd. & E. H. Wils.
CORAL COTONEASTER

Zone 3

A variety from China with coral-red berries and smaller leaves; no more attractive than the species but equally desirable.

C. divaricatus Rehd. & E. H. Wils.
SPREADING COTONEASTER

Zone 5

Another outstanding shrub, with fine arching branches. This, too, has a good fall effect with its bright red fruits, but it does not make such a good specimen as the preceding species. Native to western China.

C. franchetii Bois FRANCHET COTONEASTER

Zone 7

A semievergreen shrub from China with small leaves and an abundance of orange-red fruits. It did not withstand the winters for long at the Arboretum and died.

C. horizontalis Decne. ROCKSPRAY

Zone 6

The species, from western China, does not stand the winters well and the specimen at the Arboretum died out after 7 years. The lovely cultivar Variegatus survived four winters before being killed.

C. ignavus E. Wolf TURKESTAN COTONEASTER

Zone 5

A species closely related to *C. melanocarpus* but with purple rather than black fruits. This shrub is a native of eastern Turkestan.

C. integerrimus Medic. EUROPEAN COTONEASTER

Zone 2

A shrub with a rounded, bushy habit, but not of much merit for ornamental planting. It is interesting because it is the only species native to Great Britain. Its range is from Europe to northern Asia.

C. lacteus W. W. Sm.

Zone 7

An evergreen shrub from China, belonging to the same group as *C. henryanus* (C. K. Schneid.) Rehd. & E. H. Wils. and *C. salicifolius* Franch., which are both too tender for the Ottawa area. *C. lacteus* remained alive for 6 years but it, too, succumbed.

C. lucidus Schlechtend. HEDGE COTONEASTER

Zone 1

One of the best of the black-fruited species, from central Asia. It has a dense bushy habit and glossy green leaves, characters that distinguish it from *C. acutifolius*, the nearest black-fruited species. Its dense habit has led several nurserymen to experiment with its use as a hedge, a purpose for which it should be highly desirable. Many plants in botanical gardens under this name are *C. acutifolius*.

C. melanocarpus Lodd.
BLACK-FRUITED COTONEASTER

Zone 2b

A black-fruited species that differs from others of its kind because its leaves are whitish and tomentose beneath. It has no special value as an ornamental except for its black fruits and its good autumn coloration. Its fruits do, however, color earlier than the others and in August they present a good array of purple-red berries, which, of course, later turn to black. It grows in eastern Europe and western Asia.

var. ***laxiflorus*** (Jacq. ex Lindl.) C. K. Schneid.

Zone 2b

A geographical variety from central Asia, with more than 12 flowers to each pendulous corymb; it has large leaves and more abundant black fruits than the species.

C. microphyllus Wallich ex Lindl.
LITTLE-LEAVED ROCK COTONEASTER

Zone 7b

A low-growing evergreen shrub, which forms dense mounds up to 1 m high. It has small, lustrous leaves from which arise, in spring, a fair abundance of white flowers followed by conspicuous scarlet fruits. Native to western China.

C. multiflorus Bunge SHOWY COTONEASTER

Zone 5b

This species, the only one noted for its floral beauty, grew long enough at the Arboretum to exhibit that character but died soon after. It will probably never withstand the severe winters at Ottawa, although it may succeed farther south. Where it can grow it is a graceful shrub and well worth cultivating. It comes from northwestern China.

C. obscurus Rehd. & E. H. Wils.
BLOODBERRY COTONEASTER

Zone 3b

Another bushy cotoneaster with bright red fruits and deeper green leaves. It has nothing to commend it over the other species of similar habits. Native to western China.

C. praecox see *C. adpressus* var. *praecox*

C. racemiflorus (Desf.) J. R. Booth ex Bosse

var. ***royleanus*** Dipp.

Zone 5b

Of no particular merit, this shrub from Himalaya has red fruits and glabrous green leaves that are whitish and tomentose beneath. Another variety, *C. racemiflorus* var. *soongoricus* (Regel & Herder) C. K. Schneid., which has gray-green leaves, is considered better and is also supposed to be as hardy.

C. roseus Edgew. REDCURRANT COTONEASTER

Zone 5

A species from northwestern Himalaya, similar to *C. racemiflorus* but with more glabrous leaves. At Ottawa its bright red fruits in the fall make it one of the most striking in the collection, but elsewhere it never seems to merit attention.

C. salicifolius Franch. WILLOWLEAF COTONEASTER

Zone 7

var. ***floccosus*** Rehd. & E. H. Wils.

Zone 6

This variety is scarcely hardy in the Ottawa area, where its habit is regulated by the winters; it forms a graceful ground-clinging plant because its shoots are killed back to 30 cm above the ground each year. Normally this variety and the species grow about 3.5 m high, forming graceful plants with long, pendulous branches and highly colored, large red fruits. It is a native of China.

'Herbstfeuer'

Zone 6

A hybrid (syn. 'Saldam') that originated in Westersteide, Germany, from seedings grown from seed obtained from Vilmorin at Paris. The plant forms large carpets that stay close to the ground much like *C. dammeri*, but it has larger leaves and a higher growth habit. Its oval, glossy, dark green leaves are 7.5 cm long by 2–2.5 cm wide. Its white flowers are in five- to twelve-flowered corymbs and its fruits are red.

C. simonsii Bak. SIMONS' COTONEASTER

Zone 3b

A vigorous, hardy shrub with oval or round, dark green, glossy leaves and scarlet fruits. Useful to plant in groups as shrub borders or where large shrubs are needed for screening; otherwise, it has not much to commend it over the other species. It comes from Himalaya.

C. sterianus (Turrill) Boom

Zone 6

An apomictic species formerly described by Turrill as *C. franchetii* var. *sterianus*. It differs little from *C. franchetii* except that it seems hardier in Ottawa. It is found in southeastern Tibet and northern Burma.

C. tomentosus (Ait.) Lindl.

Zone 4b

A hardy species with a woolly calyx and flower stalk, similar to *C. integerrimus* but with larger leaves. Its red fruits are prominent in the fall. Native to central and southern Europe.

C. wardii W. W. Sm. WARD'S COTONEASTER

Zone 6

This species did not flourish in the Arboretum but survived seven winters before it died. It should therefore prove to be hardy in southern Ontario or other areas with a similar climate. It is an evergreen species from southeastern Tibet, with dark, shining green leaves, silvery white underneath, and bearing orange-red fruits.

C. ×*watereri* Exell. WATERER COTONEASTER

Zone 7

A hybrid (*C. frigidus* Wallich ex Lindl. × *henryanus* (C. K. Schneid.) Rehd. & E. H. Wils.) intermediate between the two parents. A large shrub with arching branches, its leaves are large, dull green, and slightly rugose. It becomes badly scorched and injured during severe winters.

'Exburiensis'

Zone 7

A hybrid (*C. frigidus* 'Xanthocarpus' × *salicifolius*) with green branchlets later becoming brown, large glossy leaves, and yellowish fruits. Received as *C. watereri* 'Rothschildianus'. As with *C.* ×*watereri*, it suffers some injury during severe winters in open locations, but thrives undamaged if sheltered. It is not a true clone of *C. watereri* because it has a different parentage, but is placed here for convenience.

C. zabelii C. K. Schneid. ZABEL'S COTONEASTER

Zone 5

Another ordinary species, similar to *C. integerrimus* and *C. tomentosus* and about as useful ornamentally. It comes from China.

CRATAEGUS Rosaceae

The main hawthorn collection in the Arboretum is opposite the southeastern lookout. It is in a shady location and the plants are placed too close together. When these plants were set out in 1905 to 1908, the location was probably chosen so that the hawthorns might be as inconspicuous as possible. Later, however, specimens of some of the better species were scattered throughout the Arboretum and they are some of the most attractive trees.

C. arnoldiana Sarg. ARNOLD HAWTHORN

Zone 2b

The branches of this species have an interesting twiggy effect. It is among the earliest species to produce fruits, which are bright crimson. The white flowers are produced in early May. A native of northeastern USA.

C. calpodendron (J. F. Ehrh.) Medic. PEAR HAWTHORN

Zone 4

One of the most ornamental of the hawthorns when in fruit. The small tree has a graceful outline and is worthy of a place in small home gardens. Its native range is from Ontario to central USA.

C. canadensis Sarg.

Zone 2b

A species that grows on limestone ridges near the St. Lawrence River, with zigzagging, hairy branchlets and a round-tipped head. The tree is armed with stout, slightly curved spines. Its white flowers are freely produced and its red fruits last until midwinter. Its best use is probably as an impenetrable hedge, where plants are available.

C. canbyi Sarg.

Zone 4b

A bushy tree with wide-spreading branches, which bear white flowers and small, rose-colored anthers. It grows in northeastern USA.

C. champlainensis Sarg. CHAMPLAIN HAWTHORN

Zone 2b

A North American species noted for its blue-green leaves with reddish veins. Flowers are white with light yellow anthers. A round-topped tree with zigzag branch patterns.

C. chrysocarpa Ashe FIREBERRY

Zone 4b

A small North American tree with rounded, orange-red fruits and long spines.

var. *phoenicea* Palmer dark red fruits

C. crus-galli L. COCKSPUR HAWTHORN

Zone 2b

A flat-topped tree with spreading horizontal branches and long, rigid thorns. The glossy, dark green leaves and large, dark red fruits make this a most ornamental species. A hedge of this species growing near the Ornamental Gardens has formed an impenetrable thicket for more than 30 years. The tree grows in eastern and central North America.

'Splendens'

Zone 2b

A cultivar with glossy leaves, preferable to the species for ornamental planting.

C. cuneata Siebold

Zone 4b

A twiggy, shrubby species from Japan and China, with white flowers and pear-shaped red fruits.

C. fontanesiana (Spach) Steud.

Zone 4b

A distinctive species with narrow, glossy, dark green leaves and white flowers. It has dark purplish branches and dull red fruits. Found in eastern North America.

C. ×*grignonensis* Mouill.

Zone 2b

A hybrid (*C. crus-galli* × *pubescens* (HBK) Steud.) with bright red fruits and white flowers, forming a small tree less than 4.5 m high.

C. holmesiana Ashe HOLMES HAWTHORN

Zone 4

A tree 6 m high with red-brown, scaly bark and cube-shaped, reddish-tinged flowers with dark reddish purple anthers. It has lustrous, crimson, obovoid fruits spotted with occasional small dark dots. It grows in northeastern USA.

*C. **intricata*** J. Lange — THICKET HAWTHORN

Zone 3b

A shrubby species with sharply pointed, oval, yellowish green leaves and reddish brown fruits. Its range is from Massachusetts to New York and North Carolina.

*C. **jozana*** C. K. Schneid. — YEDDO HAWTHORN

Zone 4

A species from Japan with hairy branches and many-lobed leaves.

*C. ×**lavallei*** Herincq — LAVALLE HAWTHORN

Zone 5

A hybrid (*C. crus-galli* × *pubescens* f. *stipulacea* (Loud.) Stapf.). One of the handsomest of all thorns, whether in leaf, flower, or fruit. Its leaves are glossy, dark green above and downy beneath; its white flowers are fully 2.5 cm in diameter and produced in abundance. Its orange-red fruits are dotted with black and last most of the winter.

*C. **macrosperma*** Ashe

Zone 3b

A small tree with ovate to broad ovate, lobed leaves, truncate at the base, and small, red fruits. Grows from Nova Scotia to Minnesota and south to North Carolina and Illinois.

*C. **maximowiczii*** C. K. Schneid.
MAXIMOWICZ HAWTHORN

Zone 2b

Closely related to *C. sanguinea* Pall., but with less deeply lobed leaves, hairy below; an abundance of curved or curly hair on the inflorescences; and smooth, red fruits. Found in the Amur River region of northern Manchuria.

*C. **mollis*** (Torr. & A. Gray) Scheele
DOWNY HAWTHORN

Zone 2b

One of the most beautiful hawthorns in the Arboretum collection, both in flower and in fruit. Its large, white flowers, 2.5 cm in diameter and with pale yellow anthers, are produced in abundance in May and the red, downy fruits, also 2.5 cm in diameter, provide a good display in the fall. The tree grows to 6 m high with a wide spreading habit. It is found from Ohio and southwestern Ontario to northern Missouri and South Dakota, down to Nashville, Tenn.

*C. **monogyna*** Jacq. — COMMON HAWTHORN, SINGLESEED HAWTHORN, MAY

Zone 3

The common hawthorn of roadsides and hedgerows in England is hardier than the other English hawthorn (*C. laevigata* (Poir.) DC.), although not as beautiful. It forms a dense, rounded head with slightly pendulous branches armed with strong, sharp thorns. When in flower no other English wayside tree has greater beauty or fragrance. The cultivar *C. monogyna* 'Biflora' (*C. monogyna* 'Praecox') is the legendary Glastonbury thorn.

*C. ×**mordenensis*** Boom — TOBA HAWTHORN

'Toba'

Zone 3

A hybrid (*C. laevigata* 'Paul's Scarlet' × *succulenta*) developed at the Research Station at Morden, Man. The hybrid has the habit of *C. laevigata* but bigger leaves and larger, double flowers, which are light pink at first and change later to darker pink. Its flowers, unfortunately, are not long-lasting and remain on the tree in a faded brown form for several days. It produces few fruits; such a display has been sacrificed for its spring floral beauty.

*C. **nigra*** Waldst. & Kit.
HUNGARIAN THORN, EUROPEAN BLACK HAWTHORN

Zone 2b

A distinctive hawthorn, easily identified by its leaves, which are covered with dense, green, felty down. Its flowers are small and white, fading to pink, and its fruits are lustrous, black, and pulpy. Native to southeastern Europe.

*C. **pedicellata*** Sarg. — ONTARIO HAWTHORN

Zone 2b

Most of the specimens have developed into small trees 4.5 m high, with symmetrical, round heads. They all have broad ovate leaves and pear-shaped, bright scarlet, lustrous fruits with conspicuous calyxes. The species is found in northeastern North America.

var. ***ellwangerana*** (Sarg.) Eggl.

Zone 2b

A small tree, the trunk of which is covered with pale gray scaly bark. The branches form a broad symmetrical head, covered with oval or rounded, doubly serrate leaves. The large, white flowers with rose-colored stamens are produced in many-flowered corymbs. A native of eastern USA.

*C. **phaenopyrum*** (L.f.) Medic.
WASHINGTON HAWTHORN

Zone 5

Although this hawthorn has been in cultivation since 1738, it was not tested thoroughly at Ottawa until 1965, when plants were obtained from nurseries at Princeton, N.J. They have proved hardy so far and might be considered as ornamental trees for planting in the Ottawa area. The trees have a rounded head and showy scarlet fruit in large clusters; the green lustrous leaves turn to scarlet and orange in the fall. The species grows from Virginia to Alabama and Missouri.

*C. **pinnatifida*** Bunge — CHINESE HAWTHORN

Zone 2b

One of the better specimens of hawthorns in the Arboretum, and a species that should be planted more often. It forms a small tree as high as 4.5 m, with few, if any, thorns, and its wedge-shaped leaves are cut straight to the base, giving a pinnate effect. The trees in the Arboretum are striking in early spring with their abundant white flowers, and again in the fall when they produce vivid, large, red fruits. The species originated in northeastern Asia.

*C. **pratensis*** Sarg. — PRAIRIE HAWTHORN

Zone 2b

Another hawthorn similar to the large number of North American species, with a round-topped head and armed with long, gray, many-branched spines.

*C. ×**prunifolia*** (Lam.) Pers. — PLUMLEAF HAWTHORN

Zone 3

One of the most striking of hawthorns in the Arboretum, especially in the fall. Its handsome pendulous habit with

branches hanging to the ground and its vivid autumn coloring make it outstanding. In spring it has beauty of flower and in summer its rich green leaves form a dense mass. With these assets it can be recommended for planting in small home gardens. Its origin is unknown, although it is believed to have been derived from *C. crus-galli* and *C. succulenta* var. *macracantha* Lodd.

C. punctata Jacq. DOTTED HAWTHORN

Zone 5

A small tree growing to about 6 m high. One of the most attractive of the American hawthorns, it bears abundant flowers followed by crops of spotted yellow fruits. It is found in eastern North America.

C. rivularis Nutt. RIVER HAWTHORN

Zone 2b

A small tree, similar to *C. douglasii* Lindl. and in the *douglasii* group. It has few spines, but is of no outstanding value. From the western United States.

C. submollis Sarg. QUEBEC HAWTHORN

Zone 2b

The specimens, planted at various points throughout the Arboretum, attract considerable attention in spring when they never fail to give a splendid display of large, white flowers. This species might be admirably suited for planting as a small street tree, for it grows a little larger than the others and has dense, large, green leaves, which remain green well into the fall and provide good contrast for its vivid red fruits. It grows in the northeastern United States and southeastern Canada.

C. succulenta Link FLESHY HAWTHORN

Zone 2

Similar to the other North American species in general appearance, but differing chiefly in that the veins of the leaves are more deeply sunken in the upper side and the fruits are globose rather than oval.

var. ***macracantha*** (Lodd.) Eggl. SPIKE HAWTHORN

Zone 2

One of the most beautiful of hawthorns when in fruit. It forms a tree up to 4.5 m high and bears large, globose, rich crimson fruits. It has larger and more abundant thorns than *C. crus-galli*, but is worth cultivating for its prolific flowering and fruiting. Native to central North America.

C. tanacetifolia (Lam.) Pers.
TANSY-LEAVED HAWTHORN

Zone 3

A small tree with upright branches and few spines. It has short-stalked, obovate or ovate, gland-toothed leaves, 5 cm long and pinnately divided with five to seven narrow lobes; as the specific name suggests, they resemble tansy, or *Tanacetum* leaves. The fruits are yellow or reddish yellow and the flowers are large and plentiful. This thorn tree should be grown much more often in small gardens; it makes a handsome tree with its foliage, fruits, and flowers. Native to Asia.

C. wattiana Hemsl. & Lace WATT'S HAWTHORN

Zone 2b

A fine hawthorn that has bright green leaves, large corymbs of pure white flowers with white anthers, and orange or orange-yellow pulpy fruits. Its native range is from the Altai Mountains to Beluchistan.

CYDONIA Rosaceae

C. oblonga Mill. COMMON QUINCE

Zone 5

This small tree has been growing in the Arboretum with little or no winter injury since 1944. It has formed a tree 3.5 m high, not particularly ornamental but with large, pink or white flowers produced sparingly in May. The fruits are pear-shaped, golden yellow, and fragrant. It grows in northern Iran and Turkestan.

CYTISUS Leguminosae

The brooms in the Arboretum are mostly showy plants, varying in height from the dwarf *C. ×beanii*, 30 cm high, to the large *C. nigricans*, 2–2.5 m in height. The value of some types as ground covers on poor sandy soils has recently reawakened an interest in this genus. They flower freely each year, even in the poorest soils.

C. ×beanii Nichols.

'Golden Carpet'

Zone 5

One of the showiest brooms in the Arboretum. The original, planted in 1902, has grown to a mass 2 m in diameter and only 30 cm high. Each spring it is aglow with brilliant golden yellow flowers. The younger plants growing as ground covers are much taller than the original clump, but they too are beautiful in spring. The original plant was sent from Kew as *C. purgans*, but many years later it was identified by Rehder as *C. ×beanii*. It is strange that *C. ×beanii* was not selected until 1900 by Nicholson, but apparently was growing at the Arboretum 2 years later, though under the name *C. purgans*. It is also odd that neither *C. ardoini* E. Fourn. nor *C. purgans*, which are reported to be the parents of *C. ×beanii*, are reliably hardy in the Ottawa area. After growing this plant as *C. ×beanii* for many years, it is now recognized as a distinct hybrid that arose from the same cross, and is known at the Arboretum as *C. ×beanii* 'Golden Carpet'.

C. decumbens (Durande) Spach PROSTRATE BROOM

Zone 2

A prostrate broom not more than 15 cm high, with five-angled, hairy branches. The leaves are simple without stalks and the flowers are bright yellow, produced singly, in pairs, or in threes. It is the lowest growing of the brooms and is excellent as a ground cover in full sunlight. Native to southern Europe.

C. elongatus see ***C. glaber***

C. glaber L.f.

Zone 5

A strong broom characterized by partly flat-lying and partly upright hairs on its leaves, and silky seed pods. It produces light yellow flowers in fair abundance but is not an outstanding shrub. It grows from central Europe to the Caucasus.

C. nigricans L. SPIKE BROOM

Zone 3b

One of the most striking shrubs in the Arboretum. Although it attracts attention because it flowers in July, it would be outstanding even in spring when shrubs in flower are more numerous. It forms a shapely shrub, 2 m high and 1.5 m thick, and is covered in July with long terminal racemes of bloom. For more than 20 years it has never failed to produce a good display of bloom on a shapely plant, even though it is often killed back to about 30 cm above ground level. Because it blooms freely on new wood, the winterkill merely serves as a method of pruning. In mild climates it should be pruned back hard during late winter. Its range is from central and southeastern Europe to central USSR.

C. ×*praecox* Bean WARMINSTER BROOM

Zone 6

For regions more southerly than Ottawa, this beautiful hybrid (*C. multiflorus* (L'Hér. ex Ait.) Sweet × *purgans*) is well worth planting. Although it is flourishing after several fairly mild winters at Ottawa, it has shown some winter injury and may not survive more severe ones. From the parents of this hybrid one would expect it to be tender, but another hybrid, *C.* ×*beanii*, thrives despite its parentage. The Warminster broom is a beautiful shrub with sulfur-yellow flowers, produced in abundance during late May. At the Arboretum it grows much larger than *C.* ×*beanii*, up to 1 m in height.

'Allgold'

Zone 6

All the plants tested have survived the winters so far unscathed. An excellent deep yellow form that flowers profusely.

'Hollandia'

Zone 6

A form that has purple-red blooms with a yellow boss of stamens. It is not as hardy as 'Allgold' but has survived the winter with some injury.

'Warminster'

Zone 6

The true name for the type.

'Zeelandia'

Zone 6

The keels of the flower of this cultivar are lilac-pink and the wings yellow; they are produced in such abundance that the overall effect is impressive when the shrub is in full bloom. Much of the plant is killed back each year in the Ottawa area.

C. procumbens (Waldst. & Kit.) Sprenger GROUND BROOM

Zone 4b

A neat, prostrate shrub with slender, arching young branches 15–45 cm long. Its bright yellow flowers are produced in May or June and form an impressive raceme 7.5–15 cm long. It is similar to *C. decumbens*, which is even lower in stature and prominently pubescent. The ground broom comes from southeastern Europe.

C. purgans (L.) Spach PROVENCE BROOM

Zone 6

An almost leafless shrub, about 1 m high. In British Columbia it forms a low, wide mass of rigid, erect, grooved branches covered with rich golden flowers, so that it looks like a mound of gold. It has never survived for long in the Arboretum. Its native range is from France to central Spain.

C. purpureus Scop. PURPLE BROOM

Zone 5b

This attractive shrub grows about 1 m high in mild climates, but at Ottawa it forms a spreading mass not more than 45 cm high at its best. Repeated winterkills to ground level have shaped the plant into a ground cover rather than a specimen shrub. The plant has purple flowers that are produced in May, and it grows in central and southeastern Europe.

'Erectus' more upright branches than the species

C. sessilifolius L. SESSILE BROOM

Zone 5

A larger-growing type than the others, often up to 2 m high. It makes an attractive bush when in flower in June, but has no outstanding qualities. It comes from central and southern Europe.

C. supinus L. BIGFLOWER BROOM

Zone 5

A medium-sized shrub about 1 m high, with trifoliate leaves and terminal umbels of light yellow flowers. A good shrub for flowering in late June after the main spring-flowering shrubs have passed, but not outstanding otherwise. Another native of central and southern Europe.

C. ×*versicolor* (Kirchn.) Dipp.

Zone 4b

A hybrid (*C. hirsutus* L. × *purpureus*) with the general characteristics of *C. purpureus*. Its flowers are yellow with a purple overlay and its calyx is hairy, two points that set it apart from its parents. The plant is hardy at the Arboretum, where it has formed a rounded bush 60–90 cm high.

DAPHNE Thymelaeaceae

The daphnes are small, beautiful shrubs with fragrant flowers produced in terminal or axillary clusters. Many of them grow in locations where lime is abundant, and most species should be planted in a calcareous soil. Some are extremely difficult to establish unless provided with these conditions. For example, *D. blagayana*, a good alpine species, withstood the winters well for a few years in the rock garden but gradually deteriorated because the soil was unsuitable.

D. blagayana Freyer BALKAN DAPHNE

Zone 5b

A fine rock-garden species from southeastern Europe, with clusters of fragrant, creamy white flowers. It is difficult to establish, although according to W. J. Bean the secret of its successful cultivation is to layer the new shoots as they grow by weighing down the young branches with stones.

D. ×*burkwoodii* Turrill BURKWOOD'S DAPHNE

Zone 5

This hybrid (*D. caucasica* Pall. × *cneorum*) is the hardiest, healthiest, and most vigorous of all daphnes in the climate

of the Ottawa area. It is easy to grow and appears to like all soil types. An evergreen shrub of dense, rounded habit, it grows to about 1 m high. The plant in the Arboretum has pale pink, tubular, fragrant flowers borne in dense terminal clusters; it is extremely floriferous and remains beautiful at all times. The shrub appears to grow much better on its own roots and, because it is easy to raise from cuttings, the grafting practiced by European nurserymen seems unnecessary.

'Alba'

Zone 5

A white form that appears to be hardy.

'Albert Burkwood'

Zone 5

The true name of the type.

'Somerset' SOMERSET DAPHNE

Zone 5

A cultivar with deeper rose pink coloring. It appears to be as hardy as the hybrid 'Albert Burkwood', but the plant at the Arboretum is not so vigorous, probably because it has been grafted.

D. cneorum L. GARLAND DAPHNE, ROSE DAPHNE

Zone 2b

A precise, evergreen trailing shrub, useful as a ground cover in selected areas. It has beautiful rosy pink flowers, which cover the entire plant. The species grows in central and southern Europe.

'Alba'

Zone 2b

A cultivar with white flowers.

'Variegata'

Zone 3

A splendid form with white-edged leaves.

D. giraldii Nitsche GIRALDI DAPHNE

Zone 2b

A yellow-flowered daphne that does not produce an abundance of blooms or grow vigorously in the Ottawa area. It is a native of northwestern China.

D. ×mantensiana Manten ex T. Taylor & Vrugtm.

'Manten' MANTEN'S DAPHNE

Zone 6b

A hybrid (*D. burkwoodii* 'Somerset' × *retusa* Hemsl.), apparently as vigorous as the Somerset daphne, which it resembles except for its orchid-purple flowers. The young plants survived for some time at the Arboretum, then gradually died out, as did *D. arbuscula* Celak., *D. retusa* Hemsl., and *D. tangutica*. The hybrid may be hardy, but further trials will be necessary in other types of location and soil. Daphnes are notoriously hard to transplant and this one may be no exception, although the originator, Manten of White Rock, B.C., thinks otherwise. The hybrid could become a useful addition to the daphnes and should be acquired by all who seek a trim, neat shrub, and who can grow it in a reasonably mild climate.

D. mezereum L. FEBRUARY DAPHNE, MEZEREON

Zone 3

This species and its forms are the earliest shrubs to flower in the Arboretum. The species is an attractive, erect-branched shrub with purplish or violet flowers produced all around the stems. Like many daphnes, it is difficult to transplant and is not as vigorous as its white form; however, it has become naturalized in some parts of Canada, particularly in Nova Scotia. It comes originally from Europe, Asia Minor, and Siberia. Its vivid red fruits are poisonous and care should be taken to keep small children away from them.

'Alba'

Zone 3

More vigorous than the species, with glistening white flowers and yellow fruits.

'Ruby Glow'

Zone 3

A cultivar with deeper rose-red flowers.

D. tangutica Maxim.

Zone 5

An evergreen shrub growing to about 1 m high in the Ottawa area and bearing terminal umbels of closely packed flowers that are white, tinged with purple. The leaves remain more or less evergreen during winter, sometimes browning when exposed to full sun above the snow. The plant is not only floriferous but useful, especially in shaded areas of the garden, where its evergreen foliage is prominent. Native to the Kansu province of China.

DAVIDIA Nyssaceae

D. involucrata Baill. DOVETREE

Zone 7b

Two healthy plants of this species were planted in the spring of 1952. They survived the winter of 1953, although the tops were killed back halfway to ground level; then they succumbed the following winter and were removed. This is a beautiful tree with large, white bracts, worthy of planting in locations such as Victoria, B.C., and perhaps the Niagara Peninsula, where it should be hardy. It comes from western China.

DEUTZIA Saxifragaceae

The deutzias are Asiatic shrubs closely related to the mock oranges (*Philadelphus*), but differing in that they have 10 stamens with winged stalks, starry hairs, and five instead of four petals. In Ottawa the whole genus is exasperating, for although nearly all the species tried have proved root-hardy most of them are killed back nearly to ground level each year. After milder winters a few, such as *D. ×kalmiiflora* and *D. gracilis*, escape this injury and flower magnificently; and two species, *D. parviflora* and *D. ×lemoinei*, have proved perfectly hardy, surviving even the worst winters unscathed.

D. chunii H. H. Hu

Zone 5b

A small shrub that has grown to about 1 m high in 5 years. It has suffered some winter injury but not sufficient to

prevent it from becoming a fine plant. It has grayish green, lanceolate leaves and flowers much like those of *D. gracilis*, in panicles averaging 15 cm long. It is a native of China.

D.* ×*elegantissima (Hort. Lemoine) Rehd. ELEGANT DEUTZIA

Zone 6

A hybrid (*D. purpurascens* (L. Henry) Rehd. × *scabra*) with large, rose-tinted flowers and upright habit, two characters that it seldom exhibits in the Arboretum because the bush is consistently killed back to ground level and has never had a chance to show its flowers.

'Fasciculata'

Zone 6

A cultivar similar to the species.

D. glomeruliflora Franch.

Zone 6

A species from western China with white flowers in dense corymbs. A few flowers have appeared, but they did not make the shrub more attractive than usual.

D. gracilis Siebold & Zucc. SLENDER DEUTZIA

Zone 6

A little hardier than most deutzias, but not worth using in the home garden unless one is able to give it unusual protection from the winter. In such circumstances, it flowers well occasionally and makes an excellent dwarf shrub. It comes from Japan.

D.* ×*kalmiiflora Hort. Lemoine KALMIA DEUTZIA

Zone 6

This hybrid (*D. parviflora* × *purpurascens*) seldom fails to produce a few of its white and carmine flowers close to the ground. This suggests that it should be hardy in southern Ontario, where with protection it would probably flower profusely.

D.* ×*lemoinei Hort. Lemoine ex Bois LEMOINE DEUTZIA

Zone 5

This hybrid (*D. gracilis* × *parviflora*) is one of the hardiest species at the Arboretum. Since 1944 it has never failed to produce a crop of blooms on a bushy plant; it is the most spectacular of deutzias in flower in the Ottawa area and can be recommended as a shrub for the home landscape. It has pure white flowers produced in corymbs.

'Compacta'

Zone 5

This plant has proved hardy but has not been growing for long enough to show its merit. If it is the compact counterpart of the species it will, indeed, prove valuable.

D. longifolia Franch. LONGLEAF DEUTZIA

Zone 6b

The species is, unfortunately, only root-hardy at Ottawa, and although each year it sends up strong, beautiful shoots it has never blessed us with one of its purplish flowers. It originated in western China.

D.* ×*magnifica (Hort. Lemoine) Rehd. SHOWY DEUTZIA

Zone 6

A hybrid (*D. scabra* × *vilmoriniae* Hort. Lemoine) with double, white flowers produced sparsely at the Arboretum, where it, too, is killed back each winter.

D. parviflora Bunge MONGOLIAN DEUTZIA

Zone 3b

Grown from seed secured in 1943 from Dr. F. L. Skinner of Dropmore, Man. This species, from China and Manchuria, has always proved hardy at Ottawa. It makes an attractive upright shrub, about 1.5 m high, which flowers profusely each spring. In the deutzia bed, this species and *D.* ×*lemoinei* stand out vividly in spring against a forest of dead stems of the other species.

D.* ×*rosea (Hort. Lemoine) Rehd.

'Campanulata' BELLFLOWER DEUTZIA

Zone 6

A cultivar of the hybrid *D. gracilis* × *purpurascens*. Not very hardy, but it produces white flowers occasionally. The plant is always severely killed back during the winter.

D. scabra Thunb. FUZZY DEUTZIA

Zone 6

Another species that has been growing for more than 30 years, but has never given a good display of bloom or formed a normal plant. Sometimes it produces purplish-tinted white flowers, but never in abundance. A native of Japan and China.

DIERVILLA — Caprifoliaceae

This genus, now reduced to comprise the American species only, once included the more floriferous Asiatic weigelas. The weigelas, however, were separated on the basis of their regular instead of two-lipped flowers. The true diervillas are not showy or effective as garden shrubs, except that they have some fall color.

***Deutzia* ×*lemoinei* 'Compacta'**

D. lonicera Mill. HONEYSUCKLE DIERVILLA

Zone 2

A spreading native shrub that bears yellowish flowers and has leaves with short petioles.

D. rivularis Gatt. GEORGIA DIERVILLA

Zone 3

Closely related to the southern bush-honeysuckle but with stalked leaves, downy on both sides. It produces light yellow flowers in masses. A native of southeastern USA.

D. sessilifolia Buckl.
SOUTHERN BUSH-HONEYSUCKLE

Zone 4

This species is superior to *D. lonicera* in that it produces large masses of sulfur-yellow flowers; even so, it is not highly ornamental. It also comes from southeastern USA.

DIOSPYROS — Ebenaceae

D. virginiana L. COMMON PERSIMMON

Zone 7

The two specimens in the Arboretum have never reached tree-like proportions but remain through the years as large shrubs, from 2–2.5 m high, with thick branches. They are worth growing for their dense foliage; the plants are thickly covered with large, glossy, green leaves. In the Arboretum they produce flowers occasionally but they have never fruited. Providing it is grown in a sheltered location, this species is obviously hardier than is recognized in most textbooks. It grows wild in eastern USA.

DIRCA — Thymelaeaceae

D. palustris L. LEATHERWOOD

Zone 4

This native shrub is noted for its tough, flexible, almost unbreakable shoots. It is allied to the daphnes but is not as showy as that group. It does, however, produce flowers on its leafless branches early in the spring, and would serve admirably as a large ground cover under trees.

ELAEAGNUS — Elaeagnaceae

The genus is distinctive in that bright, silvery scales cover the branches, fruits, and leaves of most species. Many species have been tried in the Arboretum, but only two have survived for long.

E. angustifolia L. RUSSIAN OLIVE

Zone 3

A desirable small tree for home planting. It grows no higher than 7.5–9 m and becomes a striking silvery tree, which looks attractive against a background of evergreens or a red-brick house. It has small, sharp spikes on its branchlets. The tree, from temperate regions of Asia, is perfectly hardy and grows in any kind of soil. In winter, an additional attraction is its trunk, which is covered with brown shredding bark. Its flowers and fruits are not conspicuous because they are also covered with silvery scales and blend in with the leaves.

Russian olive (*Elaeagnus angustifolia*)

var. ***orientalis*** (L.) O. Kuntze

Zone 4

In one respect this variety may be regarded as superior to the species, because it does not have many spines. It has broader, shorter leaves which, however, do not glisten so noticeably underneath, and in overall appearance it is not as attractive as the Russian olive. It comes from the eastern Mediterranean area.

Leaves and fruits of Russian olive (*Elaeagnus angustifolia*)

E. argentea see *E. commutata*

E. commutata Bernh. SILVERBERRY

Zone 2

A beautiful shrub native to North America. It should be planted more often than it is because of its striking silver foliage. It is often sold under the name *E. argentea* and is also confused occasionally with the buffaloberry (*Shepherdia argentea*), from which it differs chiefly in that it has alternate instead of opposite leaves. The large, silvery leaves of this shrub look attractive among other shrubs and may also be used to advantage in floral arrangements. As with the other species, its flowers and fruits are not conspicuous because they are covered with silvery scales, but the yellowish flowers provide fragrance when they are borne in abundance.

ENKIANTHUS Ericaceae

E. campanulatus (Miq.) Nichols. REDVEIN ENKIANTHUS

Zone 5

Of all the species of enkianthus tried in the Arboretum, *E. campanulatus* is the hardiest; it is in a good location where it receives shade during part of the day in summer and protection from the prevailing winds in winter. The two plants have not received special attention as to soil; they are growing in clay loam. The creamy yellow flowers tipped with red are not showy, but their appearance is interesting. The leaves of the shrub are attractive, both in the summer when they show reddish veins and markings, and in the fall when they turn vivid red and gold. The shrub would be unlikely to succeed in gardens where it was neglected, but it should grow well in a rich soil and a semishaded position. Native to Japan.

EUCOMMIA Eucommiaceae

E. ulmoides D. Oliver HARDY RUBBERTREE

Zone 7

These plants are killed back during severe winters, so they will probably never make good specimen trees but rather remain large shrubs. However, they are interesting because they are the only hardy trees that produce rubber. The rubber, easily seen when the leaves are torn in half, is poor in quality, and even if it were not, it could not be obtained in profitable quantities from even a large number of the trees. In milder climates the tree reaches a height of 9 m, but it always has a straggly appearance. A native of central China.

EUONYMUS Celastraceae

The trees and shrubs in this group are beautiful, not for their flowers, but for the fruits of some species and the fall foliage of others. Some of the species are trailing types, others small trees and large shrubs; thus, they have various uses in the landscape. The fruits are pendulous and composed of three to five one-seeded, highly colored cells or lobes. The seed is partly covered with an outer coat known as the aril, which is usually brilliantly colored and adds to the ornamental effect of the fruits.

E. alatus (Thunb.) Siebold WINGED EUONYMUS

Zone 3

Three trees are growing at the northwestern corner of the Arboretum, near Highway 16. In early October no other trees have such vivid coloring as these, with their flamboyant crimson foliage, and in winter their curiously winged bark gives them an additional attraction. The species, from China and Japan, appears to adapt well to all soil conditions and should be excellent for planting around small homes. The trees should be placed where they can be seen in fall and winter.

'Compactus' DWARF WINGED EUONYMUS

Zone 3

A dwarf cultivar admirably suited for planting at the corners of buildings, especially against a white or gray background where its crimson foliage in the fall shows to advantage. It is more compact than the species and does not grow quite as large; thus, it may be planted near the house, whereas the species should be planted some distance away.

E. atropurpureus Jacq. BURNINGBUSH, WAHOO

Zone 3b

A large shrub, 2.5 m high, with glabrous young shoots. Its leaves are oval or narrowly obovate, 7.5–11 cm long, finely toothed, dark green and glabrous above, downy beneath. The flowers are dark purple. The showy fruits are glabrous, four-lobed, crimson, on pendant stalks with scarlet arils. The chief attraction of this shrub is its bright fall foliage that turns to brilliant scarlet. A native of North America.

E. bungeanus Maxim. WINTERBERRY EUONYMUS

Zone 5

A large shrub with long, graceful leaves and cymes of yellowish white flowers with purple anthers. The fruits are glabrous, 1.5 cm in diameter, yellowish white tinged with pink, and indented at the top; later they open to reveal orange seed coats or arils. The leaves are 7.5–10 cm long, ovate, and wedge-shaped at the base; their margins have small incurved teeth. Native to northern China and Manchuria.

'Pendulus'

Zone 5

A selection with long, pendulous branchlets and large hanging clusters of fruits.

E. europaeus L. EUROPEAN SPINDLETREE

Zone 4

This species bears particularly large, bright red fruits. Some of the plants have grown into perfect small trees, 4.5 m high, with single stems, whereas others have become large shrubs. Whether grown as shrubs or trees they are attractive, particularly after the foliage has fallen, when the fruits persist for a long period. Their native range is from Europe to western Asia.

'Aldenhamensis'

Zone 4

A cultivar with brilliant pink fruits, larger than those of the species and with longer stalks, so that the pendulous fruits are attractive.

var. *intermedius* Gaudin

Zone 4

One of the finest varieties of *E. europaeus*, distinguished chiefly by its large ovate leaves and by its abundant production of large, red fruits. It is found in southeastern Europe.

'Pumilus'

Zone 4

A dwarf, dense, upright cultivar with elliptic leaves. It has withstood the winters well in Ottawa, although it is more tender than the type, according to some reports.

'Redcap'

Zone 4

A new, small tree or large shrub that originated at the Nebraska Experimental Station, North Platte. It is an attractive plant, with good foliage all summer and a spectacular display of bright red fruits in the fall, which open up to reveal brilliant orange seeds. In most other respects it is like the species.

'Red Cascade'

Zone 4

A large shrub or small tree that bears pendulous branches of cascading opal-rose fruits with orange arils. The fruits on the shrub at the Arboretum are larger than those on other spindletrees.

'Variegated'

Zone 4

A form received in 1897 from Spaeth's nursery in Germany. About one-third of the tree has variegated green and yellow leaves; it is distinctive and might be worthy of cultivation as a variegated small tree.

E. fimbriatus Wallich

Zone 6

A species native to the Himalayas that should not be hardy in the Ottawa area, but which seems to be flourishing. The plant was obtained from the Arnold Arboretum and appears to be properly named. The shrubs are noted mainly for their finely and doubly fimbriate-serrulate leaves and their fruits with triangular wings.

E. fortunei (Turcz.) Hand.-Mazz. WINTERCREEPER

'Emerald 'n Gold'

Zone 6

A Canadian introduction with deep yellow and green variegation in the leaves.

'Sarcoxie'

Zone 5

A dense, upright evergreen, more robust than most cultivars.

var. ***vegetus*** (Rehd.) Rehd. BIGLEAF WINTERCREEPER

Zone 5

It is difficult to find a location for these trailing shrubs, although they fit in well with experiments on ground covers. The specimen at the Arboretum is growing as such and serves the purpose quite well.

'Woodland'

Zone 5

A vigorous ground cover with 5 cm leaves and spreading branchlets.

E. hamiltonianus Wallich HAMILTON EUONYMUS

var. ***lanceifolius*** (Loes.) Blakelock
LANCELEAF EUONYMUS

Zone 5

This variety has been known as *E. lanceifolius*. It comes from western and central China and forms a small tree 6 m high, with pink fruits similar to var. *yedoensis*. There are reports of some fine specimens, which bear prolific crops of fruit. It has larger leaves than does var. *yedoensis*, oval-oblong rather than obovate. The specimen at the Arboretum is not yet fully grown.

var. ***nikoensis*** (Nakai) Blakelock
NIKKO EUONYMUS

Zone 4

In the Arboretum this Japanese variety has grown into a shapely small tree 3–4.5 cm high; it produces an abundance of reddish fruits and makes a perfect picture in fall because its leaves drop early, leaving the fruits more exposed than in *E. europaeus* and some of the others. Also known as *E. nikoensis*.

var. ***yedoensis*** (Koehne) Blakelock
YEDDO EUONYMUS

Zone 4

Four specimens of this variety have formed shapely trees that are beautiful in the fall, when they never fail to produce an abundance of light rose fruits. The variety is a native of Japan and Korea.

E. kiautschovicus Loes. SPREADING EUONYMUS

Zone 5

A semievergreen shrub that grows 2–2.5 m high in the Ottawa area, with broad, elliptic leaves 5–7.5 cm long. The flowers are greenish white on loose cymes 7.5 cm across. The fruits are globose, 1.5 cm in diameter, with pinkish lobes and an orange-red axil. Their fruits are produced late in the season while the leaves are still on the tree. Native to eastern and central China.

E. lanceifolius see ***E. hamiltonianus*** var. ***lanceifolius***

E. nanus Bieb. DWARF EUONYMUS

Zone 2

A low, procumbent shrub with ascending branches that reach a height of about 1 m. It differs from all the other species in that it has narrow, willow-like leaves, decurved at the margins. Its native range extends from the Caucasus to western China.

'Koopmannii' see 'Turkestanicus'

'Turkestanicus' TURKESTAN EUONYMUS

Zone 2

A form with broader leaves, not decurved. A more vigorous shrub than the species, with sturdier and more erect growth. It, too, produces fruit sparingly. Often sold by nurserymen under its old name *E. nanus* 'Koopmannii'.

E. nikoensis see ***E. hamiltonianus*** var. ***nikoensis***

E. obovatus Nutt. STRAWBERRYBUSH

Zone 4

The two original specimens have formed low, procumbent mats 2–2.5 m in diameter and each year produce a crop of

strawberry-like, warted fruits, not enough to be showy, but sufficient to create interest. Many plants have been set out at the southern end of the Arboretum as ground covers, a purpose that they should serve well, particularly in damp areas. The species grows in eastern North America.

E. sachalinensis (Friedr. Schmidt) Maxim.
SAKHALIN EUONYMUS

Zone 5

A species closely allied to *E. latifolius* (L.) Mill., which is not represented in the Arboretum collections. The two specimens are shrubs 2 m high, with rosy red fruits and coarsely toothed obovate leaves 7.5–12.5 cm long. The species is handsome in fruit and worth a place in any shrub collection. It comes from northeastern Asia.

E. sanguineus Loes. ex Diels

Zone 5

This Chinese species is also allied to *E. latifolius*, but distinct because it has larger, thinner leaves and longer winter buds. The foliage is handsome and the red fruits are showy when they split open and reveal the yellow-coated seeds.

E. yedoensis see ***E. hamiltonianus*** var. ***yedoensis***

EXOCHORDA — Rosaceae

A small genus of rosaceous deciduous shrubs allied to spiraea, but with much larger individual flowers and larger fruits. In Ottawa, none of the species are reliably hardy although they struggle through the winters and occasionally produce an abundance of flowers.

E. giraldii Hesse

var. ***wilsonii*** Rehd. — WILSON PEARLBUSH

Zone 4

This variety, more floriferous and with a more upright habit than the species, is the best of all pearlbushes to grow. Like the other species it has large, white flowers in terminal racemes, but they are larger and produced more abundantly; when in bud, the flowers have a pinkish tinge. The variety occurs in central China.

E. korolkowii Lavall. — TURKESTAN PEARLBUSH

Zone 5b

Of more upright habit than the other species, but less floriferous; it seems to be as hardy as it has survived for more than 20 years. The species comes from Turkestan.

E. racemosa (Lindl.) Rehd. — COMMON PEARLBUSH

Zone 5b

A Chinese species, more rounded and bushier than the others. The specimen at the Arboretum does not always flower profusely, but, when it does, it is a magnificant sight. The common pearlbush differs from the other species in having 15–25 stamens, three to five in front of each petal; the petals narrow abruptly into a short claw. The other species have 20–30 stamens and their petals, which are shorter, narrow gradually into the claw.

FAGUS — Fagaceae

Although the beeches form a large group of trees, only two kinds are represented in the Arboretum collections and one of these is a variety of the European beech (*F. sylvatica*). The other is a native species that was abundant in the Ottawa area, but is now disappearing beneath the contractors' bulldozers.

F. grandifolia J. F. Ehrh. — AMERICAN BEECH

Zone 4

A lovely tree when growing in its native habitat, where it sometimes reaches a height of 21–24 m. When it grows naturally in a close stand, either as the only species (which is rare) or with other hardwoods, it has a straight, erect trunk that does not branch out until it is a good height. When growing in the open, it often branches out very low down and forms a massive crown of wide-spreading branches. This tree is not often seen as a specimen, but if properly pruned when young it should form a more beautiful tree than most others. It has excellent foliage throughout the spring and summer, and during the winter its light gray bark makes it outstanding. In this country, it is sold by one nursery that specializes in native trees. It grows wild in hardwood regions of Canada from Cape Breton Island to the north shore of Georgian Bay, although it does not occur as far north as the yellow birch or the sugar maple.

F. sylvatica L.

'Asplenifolia' — FERN-LEAVED BEECH

Zone 5b

This unique cultivar of the European beech has never succeeded in forming a good tree in the Arboretum, but has become a large shrub 4.5 m high and 3.5 m in diameter. During severe winters it used to be killed back, sometimes to ground level, but more recently it has been injured by frosts without much cutting back. Although more than 20 varieties of the European beech were planted from 1890 to 1900, the fern-leaved beech was the only one to survive. Even as it stands, this shrubby tree is beautiful with its long, fern-like leaves. In milder climates it forms a handsome tree and is said to be the best cut-leaved form. It would be admirably suited for large hedges if it were easier to propagate, but attempts to use softwood or hardwood cuttings have not been successful and the tree would have to be layered to grow on its own roots.

FONTANESIA — Oleaceae

A genus of the family Oleaceae with two species, one of which is more or less hardy in the Ottawa area. Neither species is of special ornamental merit, but the shrubs are similar to privet and could probably be used as hedges in milder climates.

F. fortunei Carrière — FORTUNE'S FONTANESIA

Zone 6

The specimen, 2 m high and 3.5 m across, is a wide shrub with pointed leaves as much as 10 cm long and 2 cm wide, bright green, and glabrous. During severe winters it is killed back to ground level like most of the privets, but it grows back fast, and a hedge of this shrub recovers sufficiently to overcome its injury in a short time. It has larger and more

uniformly shaped leaves than *F. phillyreoides* and stays green later in the season than most plants. It comes originally from China.

F. phillyreoides Labill. SYRIAN PRIVET

Zone 6

This species, from Asia Minor, is less hardy than the other. Repeated efforts have failed to establish it at the Arboretum.

FORESTIERA — Oleaceae

This genus consists of a group of species native to southwestern USA. They are not ornamental and are seldom grown except in botanical gardens.

F. neomexicana A. Gray NEW MEXICAN FORESTIERA

Zone 6

A large, deciduous shrub, which in the Ottawa area occasionally reaches a height of 2 m but is more often reduced to about 1 m by winter injury. The specimen has produced some of its bluish black fruits, but not in sufficient quantity to make the shrub attractive even in fruit. It has smallish, oval leaves and inconspicuous flowers. Found in southwestern USA.

FORSYTHIA — Oleaceae

All forsythias tested in the Arboretum have proved hardy as far as the roots and twigs are concerned. However, the flower buds are less hardy than the twigs, and most species flower only after mild winters or where the snow has been deep enough to protect their buds. The only species that flowers year after year at the Arboretum is *F. ovata*. An old plant of *F. europaea* growing near the native woodlands also produces flowers each year, but younger plants of the same species are not so reliable. It may be significant that this old plant and all the specimens of *F. ovata* lose their leaves early and naturally, whereas the other plants are often lush with green leaves when the hard frosts strike.

F. europaea Degen. & Bald. ALBANIAN FORSYTHIA

Zone 5b

Probably the least ornamental of forsythias, because it forms a lanky, loose shrub with yellow flowers produced either singly or in pairs. It is easily distinguished from other species by its ovate leaves, which are nearly always without serrations. Next to *F. ovata* it is the hardiest species. Although it was introduced from Albania by Baldacci, who sent seeds to Kew in 1899, it was planted at the Arboretum only 2 years later. A native of Albania.

F. ×intermedia Zab. BORDER FORSYTHIA

Zone 5

Stated to be a hybrid (*F. suspensa* × *viridissima*), and in mild climates it has a habit intermediate between the two parent species. It is more beautiful than the hardiest species in the Arboretum, but it seldom flowers profusely. A useful distinguishing character between it and *F. suspensa* is that its pith is solid at the nodes and lamellated between them, whereas in *F. suspensa* the stem is hollow between the nodes.

'Arnold Giant'

Zone 6

A large-flowered, vigorous shrub.

'Beatrix Farrand'

Zone 6

A tall, upright shrub with flowers like those of 'Arnold Giant' and 'Karl Sax', but produced more freely. Like most of the others, it rarely produces its full coat of flowers because the buds are winter-killed.

'Karl Sax'

Zone 6

A profusely flowering, light yellow forsythia. It has flowers as large as those of 'Beatrix Farrand', but it is somewhat hardier. A tetraploid cultivar produced in the Arnold Arboretum.

'Lynwood'

Zone 6

Listed also as 'Lynwood Gold'; a selection with bright yellow flowers, which blooms well after a mild winter. When it does, it presents a mass of golden beauty. The petals are much broader than in most of the others and the flowers are more bell shaped.

'Mertensiana'

Zone 5b

A low form originated by nurserymen of Mertens and Nussbaumer in Switzerland. It is distinguished by its crowded flowers and malformed leaves. It does not have much to recommend it, except perhaps its breeding possibilities.

'Primulina'

Zone 5b

A cultivar with pale yellow flowers, which are crowded at the base of the branchlets, and with a style that is shorter than the stamens.

'Spectabilis'

Zone 6

A cultivar at one time very popular. It has deeper yellow flowers, which are not as large as those of 'Lynwood' and 'Beatrix Farrand', which are now more widely grown.

'Spring Glory'

Zone 5b

A large, free-flowering form of *F. ×intermedia*. Although it is more showy than the others, its flower buds freeze to within 30 cm of ground level in the Ottawa area. Otherwise, it is one of the most spectacular varieties of forsythia that even approaches hardiness at Ottawa.

'Vitellina'

Zone 6

An erect, vigorous shrub with rich dark yellow flowers and a style that is longer than the stamens.

F. intermedia* × *japonica Mak.

'Arnold Dwarf'

Zone 5b

A low-growing, ground-hugging plant used in many gardens as a ground cover. It rarely produces flowers, but this is not essential in a ground cover.

Early, or Korean, forsythia (*Forsythia ovata*)

F. ovata Nakai
EARLY FORSYTHIA, KOREAN FORSYTHIA

Zone 5

A shapely shrub with bright yellow flowers and broad leaves that have conspicuous teeth. It is the hardiest of the species tried in the Arboretum, and although not as showy as *F. suspensa* and some of the new cultivars, it is acceptable in gardens. It has a more bushy habit and makes a splendid shrub, a quality possessed by few of the more showy kinds, which sometimes develop into leggy plants. It comes from Korea.

'Ottawa'

Zone 5

This cultivar has been growing in the Ornamental Gardens of the Central Experimental Farm at Ottawa since 1932. It is believed to be a hybrid, with *F. ovata* as one of the parents, or a sport of that species. No record exists as to its origin, but it may have come in a packet of seeds from the Arnold Arboretum along with the true *F. ovata*, which still grows in the Arboretum at Ottawa.

The cultivar was introduced mainly because it has a better form than the species. Other distinguishing characteristics are its closely set, twiggy branchlets; a more upright habit; wavy leaves that are darker but less shiny green above and grayer beneath; and flowers that are slightly darker yellow and have very short, almost nonexistent styles with the stigma lying flat against the ovary. The style of the true *F. ovata* specimen in the Arboretum is about 1 cm long and persists for a long time on the fruits after the petals have fallen.

'Tetragold'

Zone 5b

A tetraploid selection of *F. ovata* with large, thick, wide petals of golden yellow. The plants at the Arboretum have not yet produced a show of bloom, more because of a lack of flower buds than because of winter injury. This selection may not flower abundantly in any climate.

F. suspensa (Thunb.) Vahl GOLDENBELL

Zone 6

For beauty of blossom this species is similar to *F.* ×*intermedia*, and like that hybrid and its cultivars, has its flower buds winter-killed each year at Ottawa. It is not a shapely shrub and is best grown against walls or over arbors. Used in this way it will often give a good display of bloom if it is covered with burlap during the winter. The leaves of the species are often deeply lobed or divided into three parts. A native of China.

var. ***sieboldii*** (Dipp.) Zab. SIEBOLD'S GOLDENBELL

Zone 6

A variety with slender branchlets that often trail on the ground and root at the tips. Its habit makes it useful for covering steep slopes, and it is better than the species for trailing over arbors and trellises. Its leaves are usually simple, ovate or broad ovate, and its flowers are usually solitary. It comes from Japan.

This variety is included with the species in *Hortus Third*, but the plants in the Arboretum are sufficiently distinctive to warrant a separate description.

F. viridissima Lindl. GREENSTEM FORSYTHIA

Zone 6

This species is not as showy as *F. suspensa* or the cultivars of *F.* ×*intermedia*, but it blooms about 2 weeks later than they do and thus extends the flowering season. Its flower buds are not hardy at Ottawa and in some winters the entire plant has been killed back to within 30 cm of the ground. The leaves of the species are distinct from those of the others because they are elliptic-oblong, and its pith is lamellated. It originated in China.

var. ***koreana*** Rehd.
KOREAN GREENSTEM FORSYTHIA

Zone 5b

Distinguished from the species by its more spreading habit. It is supposed to have good fall color, but in the Ottawa area the plant differs little from *F.* ×*intermedia*, whose only distinctive fall effect is its slightly purplish leaves. It grows in Korea.

FOTHERGILLA Hamamelidaceae

Zone 6

All attempts to establish *F. gardenii* J. Murr., *F. major* (Sims) Lodd, and *F. monticola* Ashe in the Arboretum have failed despite the large number of plants from seeds and cuttings that have been tested. In most cases, the plants were winter-killed the 1st year after they were planted out, and none survived the 2nd year.

FRAXINUS Oleaceae

The old ash trees in the circle near the Arboretum Building (building 74) were among the first specimens set out in the Arboretum, soon after it was established in 1887. Most of them are white and green ashes and have formed large, shapely specimens.

F. americana L. WHITE ASH

Zone 3b

The largest and most commonly planted of all the ash trees. It is, however, too large for small gardens and too loose and widely spreading for the street. A vigorous, fast-growing tree, it has large, pinnate leaves that turn yellow or purplish bronze in the fall. The main characters that distinguish it from the other ashes are the round main leaf stalk, the terminal

wings of its fruits, and the glabrous young shoots. Its range is from Nova Scotia to Minnesota, and south to Florida and Texas.

F. biltmoreana Beadle — BILTMORE ASH

Zone 4

Similar to the white ash except that it has downy shoots, leaf stalks, and undersurfaces of the leaves. It grows from New Jersey to Alabama and Missouri.

F. bungeana A. DC.

Zone 5b

A small tree closely related to the flowering ash (*F. ornus*). It has the same showy bloom as that species but is much hardier. The petaled flowers are produced in terminal panicles and produce fruits averaging 2.5 cm long and 6 mm wide. It is distinguished from other ashes by its downy twigs and leaf stalks, although it has glabrous leaves. This species, from northern China, should be grown more in this country; probably no other specimens exist in Canada at the time of writing.

F. chinensis Roxb.

var. ***rhynchophylla*** (Hance) Hemsl.

Zone 5

This ash appears to be better suited for small homes or as a street tree than the other kinds in the Ottawa area. It differs from the species in that it has broader leaflets, which usually number five. The tree in the Arboretum stands 10.5 m high and has a spread of 3 m. It is native to Korea, China, and Japan.

F. excelsior L. — EUROPEAN ASH

Zone 5

A slow-growing species compared with most of the others. The two largest specimens are 9 m high and have spreads of 3–4.5 m. All the trees appear to be hardy, although one specimen has a large wound that may have been caused by wind severing a branch in 1938. The individual leaves of this species are more graceful than those of the white ash, but they remain green on the tree until the fall and no high color is apparent. The species originated in Europe and the Caucasus.

'Aureo-variegata'

Zone 5

This is the only tree in the Arboretum that has two distinct identities. The top part of the tree is *F. excelsior* and the lower part is *F. excelsior* 'Aureo-variegata', which has variegated leaves margined with yellow.

'Diversifolia'

Zone 5

A strange cultivar in which the terminal leaflets only, or occasionally one or two more, are developed. This one leaflet is oval, long-stalked, and long-toothed, usually 7.5–15 cm long and often 7.5–10 cm wide. The cultivar might be better known as either 'Heterophylla' or 'Monophylla'.

'Jaspidea'

Zone 5

A showy cultivar with yellow branchlets, and yellowish leaves in the spring and fall. The specimen was planted in 1960.

'Nana' — DWARF, OR GLOBE, EUROPEAN ASH

Zone 5

When grafted on 2–2.5 m standards, this tree makes a fine formal specimen; otherwise it is a dwarf, shrubby form. Its leaves are smaller than those of the species and it has many stems. The specimen in the Arboretum is only 45 cm high and 1 m wide.

'Rancho'

Zone 5

A round-headed form that grows 7.5–9 m high. The specimens at the Arboretum are grafted on 2.5 m standards and are wider and less formal than the species.

'Westhof's Glorie' — SEEDLESS EUROPEAN ASH

Zone 5

A vigorous tree introduced originally for reforestation in Europe, but which promises to be a good fast-growing ash. It has pinnate leaves with 11–13 large, emerald leaflets to a leaf. It produces no seed, which makes it useful as a street tree.

F. holotricha Koehne
'Moraine' — MORAINE ASH

Zone 6b

The moraine ash has not proved hardy in Ottawa. It has been reduced by winter injury to a large, many-branched shrub.

F. mandshurica Rupr. — MANCHURIAN ASH

Zone 3b

Appears to be a very hardy ash. It has deep green pinnate foliage, 30–40 cm long, with 9–12 almost stalkless, ovate leaflets 5–10 cm long and 2.5–5 cm wide. Its fruits are broad winged and borne on the previous year's wood in large clusters. The leaflets are distinctive because their veins are conspicuous and sunken above and protruding beneath. The species is closely allied to *F. nigra*, but native to northeastern Asia. Rehder says it is not satisfactory in culture, but the trees at the Arboretum are growing well and some are reported to be growing well in Manitoba, Kansas, and Wisconsin. Mature trees are from 7.5–9 m high.

F. nigra Marsh. — BLACK ASH

Zone 2b

A native tree, the wood of which is much used by Indians for basketmaking and similar purposes. It is distinguished by its leaflets, which are more sessile than those of *F. mandshurica*, but less tapered or rounded at the base; also the marginal teeth are shallow and inconspicuous. It is found in northeastern North America.

F. ornus L. — FLOWERING ASH

Zone 7b

These plants have struggled through many years to form shrubs 2 m high, with multiple stems and spreads of 2 m. Where it grows well, the species is a splendid tree with luxuriant foliage and flowers that are highly ornamental. It comes from southern Europe and Asia Minor.

F. pennsylvanica Marsh. RED ASH

Zone 2b

A well-known native tree distinguished from the white ash by its downy shoots and green undersides of the leaves, and by the wings, which are joined to the fruits for most of their length. Its range is from Nova Scotia to Manitoba, south to Georgia, Alabama, and Mississippi.

'Aucubifolia' AUCUBALEAF ASH

Zone 2b

A handsome, distinctive cultivar with mottled, yellow leaflets. The trees are about 9–10.5 m high with spreads of 6–7.5 m. They are shapely and would be worthy of a place in any garden.

var. ***lanceolata*** (Borkh.) Sarg. GREEN ASH

Zone 2b

The green ash is distinguished from the species by its bright green, glabrous shoots and its narrower, slightly stalked, toothed leaflets. It grows from Maine to Florida, west to Saskatchewan, Montana, and Texas.

'Marshall's Seedless'

Zone 4

A form that produces no seeds; otherwise the same as the green ash.

var. ***subintegerrima*** (Vahl) Fern. see var. ***lanceolata***

F. quadrangulata Michx. BLUE ASH

Zone 5

A distinctive ash with square, four-winged branchlets; in the Arboretum it has formed a shapely tree 7.5 m high, with a spread of 4.5 m. The blue ash is one of the better species for small home gardens and perhaps for city streets. The species is found from Michigan to Arkansas and Tennessee.

F. rotundifolia Mill.

'Pendula' ROUNDLEAF ASH

Zone 6

The specimen at the Arboretum has formed a shrub 1 m high and 3.5 m wide, with shapely, small, pinnate leaves. The specimen is of no special ornamental value, but a graceful small tree might result if the cultivar were grafted as a standard on *F. excelsior* stock. The species comes from southern Europe and western Asia.

F. sieboldiana Blume SIEBOLD ASH

Zone 5

A small tree (30 m) when compared to the large, native species of ash planted in the same area between 1890 and 1900. This species has the appearance of the European ash (*F. excelsior*), but it has much smaller acuminate leaflets, which unlike its European counterpart are mostly stalked, except for the two apical leaflets that are sessile. Although it belongs to the Ornus section of *Fraxinus*, it does not have the floral beauty that most species in that group display. It would probably flower more profusely in milder climates. Nevertheless, the Siebold ash is the most graceful species of ash in the collection and is worthy of propagation and dissemination. It was introduced from Japan to the United States in 1870; this specimen represents the first introduction into Canada. In Japan it is one of the leading lumber trees.

Siebold ash (*Fraxinus sieboldiana*)

F. syriaca Boiss. SYRIAN ASH

Zone 6

A dwarf tree 4 m high and 3.5 m wide, showy when in fruit. It has thick, crowded leaves and might be worth growing where a thick mass of foliage is desired. It originated in western and central Asia.

GAULTHERIA — Ericaceae

G. hispidula (L.) Muhlenb. ex Bigel.
CREEPING PEARLBERRY

Zone 3

The pearlberries appear to be thriving in the same bed with *Chamaedaphne* in the native garden. They are pretty trailing plants with small, white flowers, followed later by white berries. Although not particularly attractive as ornamental plants, they do fit well into the shade garden. To grow really well, they require a boggy location. They are found in North America and Japan.

GENISTA — Leguminosae

A large genus of shrubs, few of which are seen in gardens. Those usually grown, however, are attractive and have a definite place, especially on poor soils in full sun. The genus is closely related to broom (*Cytisus*) and differs only in a few fine characters, such as having seeds without an appendage

and the bases of the lower petals attaehed to the staminal tube. A number of genistas also have spiny branehes.

G. lydia Boiss.

Zone 3b

A small prostrate shrub with aseending branehes, laneeolate leaves, and blooms in short, few-flowered raeemes; the ealyx is two-lipped to the middle. Closely related to *G. tinctoria*, but smaller in every way. A native of the Balkans and western Asia, it is proving to be hardy at Ottawa.

G. pilosa L. SILKYLEAF WOADWAXEN

Zone 5

A low shrub that eould be used more often as a ground cover for poor soil in sunny locations. Like most genistas and many brooms, it is diffieult to transplant onee the shrub has grown large. It has a mass of bright yellow flowers in May or early June. In English gardens it is often used as a ground eover under large trees where it reeeives sunlight for part of the day. It is a native of Europe.

G. radiata (L.) Seop.

Zone 4b

Some authorities seem uneertain as to the hardiness of this plant and plaee its limit farther south. However, any plant that survived the winter of 1933–34, as this did, must be eonsidered hardy in the Ottawa area. In the Arboretum, *G. radiata* forms a rounded shrub 75 em high, with branehes that are tipped with spines. Its flowers are in terminal heads of six deep yellow blossoms, 2.5 em aeross and 1.5 em long. It is the only genista in the eolleetion that has opposite branehes and, indeed, is one of the few speeies with branehes that are so arranged. It might be eonsidered a good ornamental plant as it makes a rounded thieket of branehes and would be admirably suited for growing in the builder's sand that inevitably surrounds new homes, although in sueh loeations the red spider mite would be a problem. It comes from eentral and southern Europe.

G. tinctoria L.
DYER'S GREENWEED, COMMON WOADWAXEN

Zone 3

A hardy plant of ornamental value in the rock garden or on any sandy soil. It has bright golden yellow flowers, whieh are produeed in early June and again sparsely throughout the summer. Its green twigs make it attraetive in winter as well as summer, and for that reason one might reeommend its eulture. It grows in Europe and western Asia.

var. ***humilior*** (Bertol.) C. K. Sehneid.

Zone 3

A geographieal variety from Italy with a low prostrate habit, slender proeumbent branehes, narrow leaves, and silky, downy pods.

'Plena'

Zone 3

A neat, eompaet plant with high, double, yellow flowers. An exeellent subjeet for a sunny, sandy spot in the garden.

'Royal Gold'

Zone 3

A eompaet, rounded bush with bright golden flowers.

G. villarsii Clementi VILLARS WOADWAXEN

Zone 4

A dwarf broom, eventually forming one main stem and a tangled mass of stout twigs. The yellow flowers are solitary and arise from the leaf axils on the branehes. Useful for the sunny slope or the rock garden. It is found in Dalmatia, Istrian Peninsula, and southern Franee.

GLEDITSIA Leguminosae

The gleditsias have attraetive pinnate leaves, but to counterbalanee this beauty most have formidable thorns. Plants growing under the names *G. aquatica* Marsh., *G. caspica* Desf., *G. macracantha* Desf., and *G. sinensis* Lam. may be seen in the Arboretum, but they have not been identified with eertainty. They all appear to be identieal with *G. triacanthos.*

G. triacanthos L. COMMON HONEY-LOCUST

Zone 4b

Apparently the best speeies of this small genus for eultivation in temperate climates. Its fern-like, double-eompound leaves are 17.5–30 em long and throw a light shade that allows grass to grow freely under the tree. The leaves turn bright yellow in the fall and stand out among other autumnal tints. The largest of this group of trees is 7.5–9 m high and has a spread of not more than 6 m. The thorns on the trees are large and ean be dangerous to ehildren who attempt to elimb into the branehes. The two mature speeimens in the Arboretum produce abundant seeds, whieh add to their attraetiveness. The range of the speeies is from Pennsylvania to Nebraska, Texas, and Missouri.

'Imperial'

Zone 5

A thornless type with dark green leaves.

var. ***inermis*** Willd. THORNLESS HONEY-LOCUST

Zone 5

Some seedlings of *G. triacanthos* never bear thorns, and have been given this varietal name. The hortieultural varieties have been seleeted from this for their thornless habit. The two trees in the Arboretum are sterile and have never set fruits.

'Moraine'

Zone 5

A thornless eultivar seleeted for its shape, its sterility, and its vigor. It has reeently been planted as a street tree in many plaees, both in the USA and Canada. This elone, whieh originated in Ohio, hardly seems to differ enough from the two speeimens of var. *inermis* growing in the Arboretum to be eonsidered a separate eultivar. It may, however, be quite eonsistent in its shape, whieh appears more rounded than the two thornless types.

'Prineeton'

Zone 5

A eultivar obtained from the Sheridan nursery; it appears to be identieal to 'Shademaster'.

'Rubylaee'

Zone 5

A eultivar with bright reddish young leaves that later darken to bronzy green. A distinctive form that in Ottawa, at least, appears to retain its bronzy eoloring all year.

'Shademaster'

Zone 5

A fast-growing cultivar that at times grows 3.5 m in the Arboretum nursery in 1 year. It has a straight, strong trunk and its outline is symmetrical.

'Skyline'

Zone 5

The 'Skyline' honey-locust has a pyramidal outline that is consistent throughout the clones and is formed by branches with crotches at 60- to 90-degree angles. The leaves are dark green and closely spaced. It produces a small percentage of polygamous flowers and, thus, very few seeds.

'Sunburst'

Zone 5

A beautiful cultivar with bright golden leaves. Since the two trees were planted in the Arboretum, they have never shown any sign of leaf burn, a condition that has been reported by some who have grown it in other areas.

GYMNOCLADUS — Leguminosae

G. dioicus (L.) K. Koch — KENTUCKY COFFEETREE

Zone 5

The trees in the Arboretum are graceful specimens from 6–9 m high, with large, bipinnate leaves that provide excellent light shade. The leaves cause some annoyance in the fall when they drop, but this can be endured when one considers the winter beauty of the twigs and picturesque branches. The trees produce an abundance of large pods, but at this latitude the seeds seldom, if ever, ripen. They are still soft and green inside the pods by the time of the first frost. The species grows from New York and Pennsylvania to Minnesota, Nebraska, Oklahoma, and Tennessee.

'Variegata'

Zone 5

This form has leaves marked with white spots. The variegation is noticeable when the leaves are examined closely, but has no overall effect on the beauty of the tree.

HALESIA — Styracaceae

H. carolina L. — CAROLINA SILVERBELL

Zone 6

This splendid small tree or large shrub has survived the years in the Ottawa area despite repeated kill-back of large branches during severe winters. The older plant suffered considerably in the winter of 1957–58 and now has a single main branch arising from a knoll among the remains of at least 10 trunks that have had to be severed at the base. The other small, young plant has formed a shapely specimen and has remained untouched by the winters it has experienced. Both trees are covered with their snowdrop-like blossoms each year. The species is found from West Virginia to Florida and eastern Texas.

H. monticola (Rehd.) Sarg. — MOUNTAIN SILVERBELL

Zone 6

This species has larger flowers than the Carolina silverbell, but it is not as hardy. No plant tried in the Arboretum has reached an age of more than 10 years, although the current specimen appears to be sturdy and has already withstood some rugged winters. Where it is hardy this is the more desirable of the two species, because it makes a more symmetrical specimen tree and displays its blooms more prominently. It grows from Tennessee and North Carolina to Georgia.

Flowers of Carolina silverbell (*Halesia carolina*)

H. obligifolium

Zone 5b

The author could find no reference to this species in the literature at his disposal. The plants were obtained from the Tingle Nursery Co., Pittsville, Md., and have reached flowering size. They produce an abundance of white flowers with prominent yellow centers.

HALIMODENDRON — Leguminosae

H. halodendron (Pall.) Voss — SALTTREE

Zone 2b

The salttree, which is really a large shrub from 1–2 m high, appears to be hardy in the Ottawa area. It has spiny, spreading branches, grayish, and covered with a fine down when young. In Europe it is usually grafted on 2 m standards of *Caragana arborescens*. Displayed in this way it makes an elegant, pendulous, small tree and a good companion for grafted specimens of *C. arborescens* 'Pendula'. At the end of June it produces an abundance of fragrant, pale purple flowers, which stand out from its handsome, gray foliage and elegant growth. Its range extends from Transcaucasus to Turkestan.

The halimodendron hedge in the Arboretum is composed almost entirely of a green, smooth-leaved form of the species, with similar purple flowers.

HAMAMELIS — Hamamelidaceae

A genus of small trees and shrubs that produce unique blossoms at a time when flowers are extremely scarce: early October, winter, or early spring. These flowers have thin, strap-shaped, twisted petals, light yellow to deep gold. *H. virginiana* is the only species hardy in the Arboretum. *H. vernalis*, which showed some promise of hardiness, succumbed in the winter of 1956–57 after growing for 5 years. No success

has been experienced with either *H. mollis* D. Oliver or *H. japonica* Siebold & Zucc., the two other species.

H. vernalis Sarg. VERNAL WITCH-HAZEL

Zone 6b

A species that, as its name suggests, opens in early spring. During a mild spell in December it often bears its bright yellow flowers. It has not proved truly hardy in Ottawa, even in repeated trials. The latest acquisitions have been in the test garden areas for 10 years, but were killed back each winter. The plant is a native of central USA.

H. virginiana L. COMMON WITCH-HAZEL

Zone 4b

A large shrub, beautiful in flower, especially on a bright October day; it usually blossoms when the leaves are falling and gives a brilliant effect for several weeks. In Europe the leaves persist longer on this species than on the others, and they tend to hide any blooms that form; therefore, the Oriental species are preferred because they bloom during winter, long after leaf fall. When in full bloom the flowers give off a heavy odor. The leaves resemble those of the European hazelnut, which led early settlers to use its wood as a divining rod, just as the hazel is used in Europe. This, of course, accounts for its common name. The drug witch-hazel is made from extracts of the bark and leaves. It grows from Canada to Georgia, west to Nebraska and Arkansas.

HIBISCUS Malvaceae

H. syriacus L.
SHRUBBY-ALTHAEA, ROSE OF SHARON

Zone 6

No cultivars of the shrubby-althaea have proved reliably hardy in the Ottawa area. Out of a large number planted, only one survived the first winter. This clone, 'Roseus Plenus', continued to grow for 10 years, forming a bush 1.5 m high. In the winter of 1957–58 it was killed to ground level; the small basal part that survived died the following year.

Fruits of common sea-buckthorn (*Hippophae rhamnoides*)

HIPPOPHAE Elaeagnaceae

H. rhamnoides L. COMMON SEA-BUCKTHORN

Zone 2b

A distinctive large shrub with narrow, silvery leaves and bright orange berries produced in late fall. For large estates and parks it can be used effectively in masses, where a special winter display is desired. Although it does particularly well on sea shores, it also thrives inland, as the plants in the Arboretum testify; six of them, four female and two male, are growing in a group and all are in excellent health. Each year the female plants produce an abundant crop of fruits, which persist long into the winter. The fruits are not particularly attractive to birds, and they usually decompose and then fall from the tree. The species is a native of Europe and temperate parts of Asia.

HOLODISCUS Rosaceae

H. discolor (Pursh) Maxim.

var. ***ariifolius*** (Sm.) Aschers. & Graebn.
OCEAN SPRAY

Zone 5

A small rosaceous shrub with grayish green leaves and long, creamy white panicles of bloom resembling those of the false spirea (*Sorbaria* spp.). The species itself is seldom seen in gardens, but this variety is grown and has a definite place. While *Hortus Third* classes the species and its variety as synonymous, to the author's mind they are distinctive. As an isolated specimen against a dark hedge, where its flowers and graceful habit show to advantage, it rivals the beauty of the best spireas; its leaves resemble those of the whitebeam mountain ash (*Sorbus aria*) and are themselves attractive. The shrub is hardy in the Ottawa area; one specimen survived for more than 30 years. Botanically, the plant is related to the spirea, but is separated because of its seed vessels, which do not open. It comes from western North America.

HYDRANGEA Saxifragaceae

A group of shrubs native to Asia and North America. They sometimes reach tree-like proportions, and one species forms a climbing vine. This genus, like the viburnum group, is noted for having large sterile flowers and small fertile ones on the same inflorescence. The popularity of most of the hydrangeas depends mainly on the number and size of the sterile flowers, although one, *H. aspera* subsp. *sargentiana*, has such beautiful foliage that one can easily overlook its lack of floral value.

H. anomala D. Don

subsp. ***petiolaris*** (Siebold & Zucc.) McClint.
CLIMBING HYDRANGEA

Zone 5

The two plants of the subspecies, formerly known as *H. petiolaris* Siebold & Zucc., have been set out at the foundation of the east side of the Arboretum Building (building

Climbing hydrangea (*Hydrangea anomala* subsp. *petiolaris*)

74). They are growing vigorously there and suffer no ill effects from the winter. An interesting climbing plant, this hydrangea produces sterile flowers at the margins of the inflorescence and small fertile flowers in the center. The plant is said to make an elegant shrub if it is grown near an old stump or rock pile where it can climb and its branches can intertwine. It originated in Japan and China.

H. arborescens L.
SMOOTH HYDRANGEA, HILLS-OF-SNOW

'Annabelle'

Zone 3b

This cultivar was found naturalized in the woods in Union County, Ill.; the late Hubbart Kirkpatrick's mother and an aunt, Mrs. Amy R. Kirkpatrick, found it in 1910 and brought it to their home in Anna, Ill., where a clump still exists. It was brought to the attention of Professor T. C. McDaniel of the University of Illinois, who was responsible for its eventual introduction in 1964. It has much larger and more rounded panicles of bloom than the type and appears to have stronger stems, because it is less prone to injury by wind and rain.

subsp. ***discolor*** (Ser.) McClint. ASHY HYDRANGEA

Zone 3b

This subspecies has been known as *H. cinerea* Small. It has silvery leaves, which provide its main attraction because it does not produce sufficient sterile flowers to make it ornamental. A sterile form, *H. arborescens* subsp. *discolor* 'Sterile', has greater ornamental value, and although not as showy as the snowhill hydrangea (*H. arborescens* 'Grandiflora'), it is much stronger and also has attractive leaves. Its native range is from North Carolina and Tennessee to Alabama.

'Grandiflora SNOWHILL HYDRANGEA

Zone 3b

This cultivar is so much more showy than the original species that in cultivation it has almost entirely replaced the species. 'Grandiflora' is a lovely form with large, pure white, sterile flowers that last from July to September. Rehder states that it was found wild in Ohio before 1900. The greatest drawback to its popularity is its weak stems, which sometimes fail to support the large flowers and make it necessary to stake the shrub.

subsp. ***radiata*** (Walt.) McClint.
SILVERLEAF HYDRANGEA

Zone 3b

This shrub, formerly known as *H. radiata* Walt., is somewhat similar to subsp. *discolor*, but has leaves with vivid white undersurfaces like snow-white felt. This is the only character that makes the shrub attractive; its flowers are dull and inconspicuous. It is found in North Carolina and South Carolina.

H. aspera D. Don

subsp. ***sargentiana*** (Rehd.) McClint.
SARGENT HYDRANGEA

Zone 6

It is remarkable how this plant has survived about 30 winters. Each year it is killed back to about one-third of its height, but it still produces its large, velvety green leaves on a shapely plant 75–90 cm high. At its location in the hydrangea collection, it is mainly in the shade from noon until late evening, but otherwise it is fully exposed to sun and winter wind. Its large, deep green leaves make it look more like a tropical foliage plant than a shrub. It has never produced its massive heads of pinkish flowers in the Ottawa area, but it is well worth growing as an ornamental foliage plant in a shady location. A native of central China, it was formely named *H. sargentiana* Rehd.

Shaggy hydrangea (*Hydrangea heteromalla*)

H. bretschneideri see ***H. heteromalla***

H. cinerea see ***H. arborescens*** subsp. ***discolor***

H. heteromalla D. Don SHAGGY HYDRANGEA

Zone 3b

The two plants in the Arboretum (received as *H. bretschneideri*) have grown together as a huge shrub, 6.5 m high and 3 m wide; they dominate the hydrangea collection. The shrub bears flattened corymbs 15–20 cm across, with large sterile flowers at the base. In landscaping work the shrub is useful as a large specimen or a screen. It flowers in June and July, and although it does not have as attractive blooms as *H. arborescens* 'Grandiflora', it has much ornamental merit. It comes from northern China.

var. ***glabrescens*** Rehd.

Zone 3b

A variety with smoother elliptic leaves, almost glabrous beneath, and coarser teeth than the type.

H. macrophylla (Thunb.) Ser. HOUSE HYDRANGEA

'Bluebird'

Zone 6

A hardy form of *H. macrophylla* with bluish pink flowers. It survived for more than 5 years in the old Arboretum nursery.

'Blue Bouquet'

Zone 5b

Two plants were set out in the Macoun Memorial Garden in 1953 and survived to produce several flowering shoots. Although they are killed back to ground level almost every winter they still make presentable plants by late summer, under the shade of a large plane tree with protection by a shrubbery.

'Grayswood'

Zone 5b

Another hardier form with pink flowers. It has flourished for more than 5 years.

subsp. ***serrata*** (Thunb.) Mak. TEA-OF-HEAVEN

Zone 5b

It is a pity that this bushy shrub does not produce sufficient sterile flowers to make each inflorescence conspicuous, for if it did it would be the most ornamental of hardy hydrangeas. It is much hardier than the species, which it resembles in the color of both flowers and foliage. As it appears in the collection, however, with its coarse, pink, sterile flowers it is inferior to the ornamental types. It comes from Japan and southern Korea and was formerly named *H. serrata* (Thunb.) Ser.

H. paniculata Siebold

'Grandiflora' PEEGEE HYDRANGEA

Zone 3b

A larger-flowering cultivar than the species, which is a large shrub or small tree, growing sometimes 5.5–7.5 m high. This cultivar has large pyramidal trusses of bloom, which are white at first, then pink, and finally brown. Although the shrub might be considered somewhat coarse, it is valuable for its late summer flowers, which last from August until frost occurs.

'Praecox' EARLY PEEGEE HYDRANGEA

Zone 3b

An earlier-flowering cultivar of *H. paniculata*, but one that has less conspicuous flowers.

H. petiolaris see ***H. anomala*** subsp. ***petiolaris***

H. radiata see ***H. arborescens*** subsp. ***radiata***

H. sargentiana see ***H. aspera*** subsp. ***sargentiana***

H. serrata see ***H. macrophylla*** subsp. ***serrata***

HYPERICUM — Hypericaceae

This group of evergreen and deciduous herbaceous and woody plants comprises about 200 species scattered throughout the temperate and subtropical regions of the northern hemisphere; a few species grow in the southern hemisphere. The woody kinds, for the most part, are low and creeping types that are ideal for ground covers in sunny and shady locations. They receive extra attention because of their habit of flowering in July and August when few shrubs are in bloom.

H. densiflorum Pursh DENSE ST. JOHN'S-WORT

Zone 5

A species closely allied to *H. prolificum*, but differing in that its flowers are in terminal corymbs rather than axillary cymes, as in the other species. The flowers of this species, too, are much smaller and consequently less prominent. It grows from New Jersey to Florida, Missouri, and Texas.

var. ***lobocarpum*** (Gatt.) Svens.

Zone 4

A larger, looser, and more vigorous shrub than the others, with erect-angled branches. Its flowers are small and are produced in dense, leafy cymes in August and September. Like *H. kalmianum* it has five-celled fruits, but it differs from that species by having paler green, larger leaves, a coarser habit, and smaller but more numerous flowers in dense cymes. It grows in North Carolina and Tennessee.

H. kalmianum L. KALM ST. JOHN'S-WORT

Zone 3

A native species that inhabits the edges of rivers and lakes in Ontario and Quebec, although not in abundance. Having large flowers and glaucous green leaves, it is the most shapely and desirable of the hardy St. John's-worts. The flowers are produced both as terminal cymes and in the axils of the leaves. It is distinguished from *H. prolificum* by having five styles instead of three. It is handsome in flower and is useful for creating a mass of blooms in normal soils or moist locations where flowers are needed in July. Its range is from Quebec and Ontario to Michigan and Illinois.

H. lobocarpum see ***H. densiflorum*** var. ***lobocarpum***

H. prolificum L. SHRUBBY ST. JOHN'S-WORT

Zone 5

This species has formed dwarf, compact bushes 1 m high, with gnarled, thick main stems. The shrubs seem to thrive in the hot, dry position in which they have been planted in the Arboretum, and they should be admirably suited where midsummer flowers are desired, or for covering a sandy bank. The

flowers are showy, about 2.5 cm in diameter, and last for 2 months; they are followed by a large crop of fruits. The species ranges from New Jersey to Iowa and Georgia.

IDESIA — Flacourtiaceae

A genus that consists of one species, *I. polycarpa*, a small deciduous tree with dark green leaves and deep red berries.

I. polycarpa Maxim.

var. *vestita* Diels

Zone 7

Of the original seven plants set out in 1949, only one rather weak specimen has survived. This plant is killed to ground level each year, but produces more shoots from which grow large, heart-shaped leaves. Obviously, the beauty and charm of this lovely tree are lost in the Ottawa area, for it will never make a large specimen nor will it produce its magnificent fruits. The variety *vestita* has downier leaves than the species and has brick-red fruits; it comes from western China.

ILEX — Aquifoliaceae

A large genus of deciduous and evergreen trees and shrubs, most notable of which is *I. aquifolium* L., the English holly. The species most prominent in Eastern Canada is the common winterberry, *I. verticillata*. The group also contains some excellent evergreen shrubs that are used lavishly in foundation plantings in climates a little milder than at Ottawa. The interest shown in the various species and forms was so great that an American Holly Society was formed to satisfy the demand for more knowledge.

I. crenata Thunb. JAPANESE HOLLY

'Mentor Glossy'

Zone 6

This small-leaved cultivar of the Japanese holly has survived 15 winters with little or no injury in a sheltered part of the Arboretum. It has formed a bush 1 m high.

I. laevigata (Pursh) A. Gray SMOOTH WINTERBERRY

Zone 5

A deciduous shrub that grows 2.5 m high; it has pale green, glossy leaves and orange-red fruits. It is closely allied to *I. verticillata*, but differs in that it has larger, orange fruits, shorter leaf stalks, and more glabrous leaves. Found from Maine to Pennsylvania and Virginia.

I. serrata Thunb. JAPANESE WINTERBERRY

Zone 5

At its best, this holly presented a fine picture of vivid red berries in at least 2 years out of the 8 years it survived. The species is probably hardy in the Ottawa area, because these fine plants only succumbed after they had to be moved in 1967 to a poorly drained area. This holly is deciduous, similar to Canada's native *I. verticillata*, but smaller in every part except the berries, which are showy. It comes from Japan.

I. verticillata (L.) A. Gray WINTERBERRY, BLACK-ALDER

Zone 3b

This native holly can produce a vivid fall effect if planted in groups in a fairly moist soil. The plants in the Arboretum are growing in ordinary loam and are not very vigorous or healthy, but in the nearby native woodlots they thrive with no attention and produce an abundance of bright red fruits, which remain on the plants well into the winter. The species grows from Eastern Canada to Florida, west to Wisconsin and Missouri.

INDIGOFERA — Leguminosae

A large genus of leguminous herbs and shrubs with pinnate leaves and pea-shaped flowers. Most of the shrubby species have been tried in the Arboretum; all except one were killed during the first winter. The surviving species, *I. gerardiana* R. C. Grah., was planted in 1939 as part of the foundation planting of Service Building 72. It grew well there although it was killed to ground level each year. In 1952 the specimens were removed along with some plants that had grown too large for the location.

ITEA — Saxifragaceae

A small group of woody plants allied to *Escallonia*.

I. virginica L. VIRGINIA SWEETSPIRE

Zone 6

This small shrub has not only survived for more than 60 winters but, more remarkably, has resisted the yearly onslaught of horse mowers, power mowers, and scythes. Even now, the plant is barely high enough to escape the equipment, but it has managed to do so all through the years. It is a pretty little shrub, and given good soil and ample water, it should prove attractive enough for planting in home gardens where July-flowering shrubs might be desirable. Its range is from New Jersey and Pennsylvania to Florida and Louisiana.

JUGLANS — Juglandaceae

The walnuts and the butternut, which make up this genus, are closely allied to the hickories; they are, however, easily distinguished by their laminated pith, noticeable in the young shoots, and by their unbranched male catkins. The hickories all have solid pith and branched male catkins. The hickories, walnuts, and butternut do have one thing in common; they all recover very slowly if transplanted when they are too large. They should be set out in their permanent quarters within a year after germination, or grown from seed directly where they are to remain. The plants can recover from transplanting, but the rate of growth is less than one-half that of a specimen grown directly from seed. This should be borne in mind when heights and ages are compared in the planted specimens described here.

J. ailanthifolia Carrière

var. *cordiformis* (Maxim.) Rehd. HEARTNUT

Zone 4b

This taxon is now given in *Hortus Third* in place of the earlier names *J. sieboldiana* Maxim., *J. cordiformis*

Maxim., *J. sieboldiana* var. *cordiformis* (Maxim) Mak., and *J. cordiformis* var. *ailanthifolia* (Carrière) Rchd. The difference between Siebold's walnut (*J. ailanthifolia*) and the heartnut (*J. ailanthifolia* var. *cordiformis*) has always been remote, except for the shape of the nuts themselves. Those of the heartnut are heart shaped as the common name suggests, whereas those of Siebold's walnut are more round and have much thicker shells. The leaves on the Arboretum plants are very large, measuring 70 cm in length; the leaflets are 25 cm long by 5 cm wide. The two specimens have reached a height of 10.5 m and have a spread of 6 m. The species comes from Japan.

J. cathayensis Dode
CATHAY WALNUT, CHINESE WALNUT

Zone 6

The trees in the Arboretum have grown to heights of 7.5 m and spreads of 6 m, each tree with three or four main trunks. They appear to be hardy and have no history of frost injury, but are obviously very slow growing. They have produced few fruits in the past 20 years, which, economically, is no great loss because those produced have such thick shells that it hardly seems worth the effort to break them open to secure the very small kernels within. The species is a native of central and western China.

J. cinerea L. BUTTERNUT

Zone 3

The larger of the two trees in the Arboretum has reached a height of about 22.5 m, has a spread of 18 m, and a trunk diameter of 1 m. The other, planted in 1889, has a diameter of not more than 30 cm, is 12 m high, and has a spread of about 6 m. The large tree is growing to the southeast of the Ornamental Gardens where, it is said, a nursery once existed. If this tree was grown from seed, it would be an excellent example of the effect that freedom from transplanting has upon this genus. However, it may be a native tree that was already growing in the area, and it may have existed for several decades before the Central Experimental Farm was established.

The butternut does not make as handsome a tree as the black walnut (*J. nigra*), but it has a wider spread and provides deeper shade. Like *J. nigra*, it has large compound leaves, 30 cm or more long, with 11–17 leaflets. These species are easily distinguished from each other because the butternut has very hairy leaflets, twigs, and fruit husks, whereas *J. nigra* has little hairiness. The bark of the butternut is ashen gray and has broader furrows and ridges that are conspicuously flattened on top. In *J. nigra* the bark is narrowly furrowed and blackish gray. The butternut is found from New Brunswick to Georgia, west to the Dakotas and Arkansas.

J. cordiformis var. ***ailanthifolia*** see ***J. ailanthifolia*** var. ***cordiformis***

J. mandshurica Maxim. MANCHURIAN WALNUT

Zone 3b

A picturesque small tree from Manchuria, rather like *J. ailanthifolia* var. *cordiformis* and *J. stenocarpa*, which are in the same group. It differs from the former in that its fruits are in short racemes instead of long ones and its leaflets are often glabrescent; it differs from the latter in that its leaflets are more uniform. The tree at the Arboretum is 7.5 m high, with a 9 m spread.

Black walnut (*Juglans nigra*)

J. nigra L. BLACK WALNUT

Zone 3b

These are graceful pyramidal trees 18 m high, with spreads of 7.5–9 m. They have large compound leaves that throw a light shade, allowing a good lawn to be maintained underneath. The species is allied to *J. cinerea*, the butternut, under which heading the two are compared. The species is native to eastern North America.

J. stenocarpa Maxim.

Zone 4b

The specimen in the Arboretum stands in the shade of a large white ash, but it has grown 15 m high and has a spread of 7.5 m. The species is close to *J. mandshurica*, but differs in that the terminal leaflet is obovate and distinct from the side leaflets, which are oblong; it does not have the somewhat prominent band of hairs just above the leaf scars, a character of species in the *J. mandshurica* group. It also is a native of Manchuria.

J. ×*vilmoriniana* Carrière VILMORIN WALNUT

Zone 5

This walnut is a natural hybrid (*J. nigra* × *regia* L.) with long leaves composed of nine to thirteen leaflets. It is a small, globose tree with graceful pendulous branchlets. No flowers or fruits have been observed on the tree, perhaps because of its hybrid origin. It was obtained from Vilmorin's nursery in

France in 1890 as a budded plant, which may account for its slow-growing habit; most *Juglans* are not amenable to transplanting when they grow to beyond the seedling stage.

KALMIA — Ericaceae

Because local soils are alkaline, beautiful displays of the mountain-laurel in the Ottawa area are not feasible unless the soil is kept sufficiently acid to grow ericaceous plants at their best.

K. angustifolia L. SHEEP-LAUREL

Zone 1

These plants were collected locally, in Carleton County, and planted in the garden of native plants and in the ericaceous plots. They grew well in both places. The species differs from most others because its flowers are arranged laterally along the stem instead of in terminal clusters. The flowers are deep rose and about 8 mm in diameter. The species name, *angustifolia*, meaning narrow leaves, is only true by comparison with the wide- and large-leaved mountain-laurel, *K. latifolia* L. The plant grows from Newfoundland and Hudson Bay to Michigan and Georgia.

K. polifolia Wangenh. BOG-LAUREL

Zone 1

A low shrub with purplish rose flowers, produced in flat terminal clusters in early spring. It differs from sheep-laurel in that it has terminal flower umbels instead of axillary clusters. Found from Labrador and Hudson Bay to Pennsylvania and Minnesota.

KALOPANAX — Araliaceae

The genus *Kalopanax* is composed of only one species, *K. pictus*, native to eastern Asia. It is a deciduous tree that at first glance, because of its formidable spines, looks like an overgrown aralia, from which it is distinguished by its palmately lobed rather than compound leaves. It grows into a large tree with a single trunk and with palmately lobed, serrulate, and long-petioled leaves. The inflorescence is not showy although it consists of many racemes, with two to eight slender-stalked umbels. It has not proved hardy at Ottawa, but the following geographical variety is promising.

K. pictus (Thunb.) Nakai

var. ***maximowiczii*** (van Houtte) Hara

Zone 5

A Japanese variety that appears to differ only in its leaves, which are much deeper-lobed than those of the species and pubescent beneath.

KERRIA — Rosaceae

K. japonica (L.) DC. JAPANESE KERRIA

Zone 5

A deciduous shrub noted for its showy yellow flowers in spring and bright green bark in winter. It does not thrive in the Ottawa area unless given a sheltered location; otherwise, it is killed back to ground level in most winters and forms a weak, straggly shrub. In more southern areas of the province, where some forms grow, the double-flowered cultivar 'Pleniflora' or the beautiful variegated forms 'Aureo-variegata', 'Aureo-vittata', and 'Pieta' are often preferred. The species comes from China.

KOLKWITZIA — Caprifoliaceae

K. amabilis Graebn. BEAUTYBUSH

Zone 5b

A beautiful deciduous shrub that grows to a height of 3–3.5 m and has a spread of 2–2.5 m when allowed to develop as a specimen. It has distinct, heavily textured leaves and shiny, abelia-like, pink blossoms. As a specimen it makes a graceful plant with arching branches. It seems to grow better in sheltered positions where it is protected from the prevailing winter winds. It originated in China.

'Rosea'

Zone 5b

When the flowers of this cultivar are in the bud stage they are a much deeper rose color than those of the beautybush. When the blooms expand, the color is much the same as in the species.

LABURNUM — Leguminosae

L. alpinum (Mill.) Bercht. & J. Presl SCOTS LABURNUM

Zone 6b

This specimen was finally winter-killed in 1962; it had been killed to ground level each year and was only 3 m high at that time. Since all the laburnums have been tried without success, one can assume this species to be hardier than the others, but not hardy enough for the climate of the Ottawa area. It grows in the mountains of Europe.

L.* ×*watereri (Kirchn.) Dipp.

Zone 6

Although this hybrid does not thrive in the Arboretum, one specimen grew to a height of 1 m and appeared hardier than *L. alpinum*. The plant will never be thoroughly hardy at Ottawa, but in milder areas may have a greater certainty of success. It is a natural hybrid, *L. alpinum* × *anagyroides* Medic., and retains the longer racemes of *L. alpinum*.

LEDUM — Ericaceae

A small genus of ericaceous plants with alternate short-stalked leaves and white flowers, mostly found in boggy areas and swampy land.

L. groenlandicum Oedr. LABRADOR-TEA

Zone 1

An evergreen shrub that is growing successfully in a wet area of the native garden. The plant there is 1 m high and produces white flowers in terminal clusters in May. These shrubs are hardy and attractive, with fragrant leaves that incurve at the margins. It grows in northern North America and Greenland.

L. palustre L. WILD ROSEMARY

Zone 1

A dwarf evergreen similar to *L. groenlandicum*, but with mueh narrower leaves and more stamens in the flower. It is an ubiquitous species, found wild in the northern and Aretie regions of Europe, Asia, and America.

LEITNERIA — Leitneriaceae

L. floridana Chapm. CORKWOOD

Zone 6

This shrub has survived for about 20 years with little or no winter injury, although in 1968 it was damaged by a power mower. Before then, it had grown to a shrub 2 m high with three stems. The leaves are 10–15 em long, alternate, tapered at both ends, and eovered with short hairs above and a gray downy felt beneath. It is a native of Missouri and Florida, where it grows in swamps.

LESPEDEZA — Leguminosae

A genus with many speeies; some are semiherbaceous and die to ground level eaeh year, others are woody, and some are weedy. They are noted for their purplish, pea-like flowers, produced in midsummer, and are highly valued by beekeepers because they provide a late crop of honey.

L. bicolor Turcz. SHRUB BUSH-CLOVER

Zone 4

A graceful, bushy deciduous shrub with small trifoliate leaves, which produees an abundanee of purplish flowers in July and August when few other shrubs are in bloom. The plants in the Arboretum remain woody although the new shoots are sometimes killed back 30 cm or more eaeh year. The species comes from northern China and Japan.

L. thunbergii (DC.) Nakai
THUNBERG'S BUSH-CLOVER

Zone 5

Similar to the preceding species, but more showy and later flowering. This plant dies down to ground level eaeh winter and has not yet grown more than 1 m high. It would, perhaps, be safer to plant it in the perennial border where one is aeeustomed to stems dying baek. In the shrub border of the Arboretum, where many of the speeimens are growing, it is likely to be dug out in early spring during the forking and eleaning operations. A native of northern China and Japan.

LIGUSTRUM — Oleaceae

A group of shrubs that with one exeeption are native to China or Japan; only the common privet (*L. vulgare*) is of European origin. Although the shrubs in the collection are not espeeially showy, they are useful as hedge plants and the golden types are exeellent where eolor is desired in a shrub border. Many speeies are injured to varying degrees eaeh winter, but most are root-hardy.

L. amurense Carrière AMUR PRIVET

Zone 5

The Amur privet, from northern China, is the one usually ehosen as a hedge in the Ottawa area. Exeept for an oeeasional winterkill during very severe winters, from whieh it reeovers rapidly, it is quite hardy. It is somewhat similar to *L. ovalifolium* Hassk., whieh is tender at Ottawa, but differs because its leaves are larger and aeute at the ends, and it has pubeseent branehlets. It is distinguished from *L. vulgare*, the common privet, beeause its eorolla tubes are longer than the lobes instead of smaller, and beeause it has pubeseent braneh-lets, and hairs on the midrib or main vein underneath.

L. obtusifolium Siebold & Zuec. BORDER PRIVET

Zone 5b

This speeies, like most of the others, is subject to winter-kill during severe winters, but always reeovers to produee a good plant the following year. It is a Japanese speeies, with luxuriant oval leaves 2.5–5 em long and 2.5 em wide, tapered at the apex. In milder areas it is a good ornamental shrub, beeause it produces showy flowers and the subsequent purplish to blaek fruits make a fine display. It is similar to *L. ovalifoli-um*, but it has downy twigs and some pubeseenee on the midrib of the leaves.

var. *regelianum* (Koehne) Rehd. REGEL'S PRIVET

Zone 5b

A geographical variety from Japan, similar to the type but less hardy and with a dense habit and braneh es that spread horizontally. The leaves are very hairy underneath and the flowers and fruits are mueh smaller than those of the type. It is a graeeful plant.

L. quihoui Carrière

Zone 5b

This species forms a rounded bush, 1.5 m high, distin-guished from the others by its sessile, fragrant, white flowers produeed much later in the season, usually in September. It has mueh value for its graee and for its late blooming habit. It eomes from China.

L. tschonskii Deene. SHARPLEAF PRIVET

Zone 5

A hardy, graeeful shrub, particularly useful as a hedge plant; it is similar to the Amur privet but has leaves with a sharp point.

L. ×*vicaryi* Rehd. VICARY GOLDEN PRIVET

Zone 6

This hybrid (*L. ovalifolium* 'Aureum' × *vulgare*) has given rise to a fine golden form that has deep golden leaves and is as hardy as the eommon privet. It is similar to, but more vividly golden than, *L. vulgare* 'Aureum'.

L. vulgare L. COMMON PRIVET

Zone 5b

The eommon privet behaves rather strangely in the Ottawa area; it survives for 15–20 years, and then deteriorates rapidly and soon beeomes a victim of winterkill. This has led to the belief that eertain strains and types introduced as hedge plants are hardier than the speeies. It is a useful plant for damp and shady plaees and for a short-lived, quiek-growing hedge. In Ottawa it is deeiduous, losing its narrow oval leaves soon after the first frost. It differs from other privets in that it has four or five pairs of indistinet veins, braneh es that are at first eovered with minute hairs, a short eorolla tube, and pedieelled flowers. It is a native of Europe.

'Argenteo-variegatum'

Zone 5b

Leaves occasionally variegated with white; the variegation is not particularly noticeable, however, because it does not occur on all parts of the plant.

'Aureum' GOLDEN COMMON PRIVET

Zone 5b

In early spring and until the middle of July, this cultivar is particularly striking with its golden leaves. Later, the leaves are burned by the strong sun and take on a rather untidy appearance. The branchlets should be trimmed back in early spring each year to induce new growth and present the best effect. If it is planted in the shade, the color is less brilliant.

'Chlorocarpum'

Zone 5b

A cultivar with greenish fruits.

'Lodense'

Zone 5b

The cultivar name is an almost unforgiveable nomenclatural offence. It is a fusion of two words, low and dense, that describe the habit of the plant. The cultivar is a good form for use as a low hedge and suitable for planting in the Ottawa area, although the tops are sometimes killed during severe winters.

LINDERA — Lauraceae

L. benzoin (L.) Blume SPICEBUSH

Zone 5b

A neat deciduous shrub that grows to 1.5 m high at Ottawa and occasionally is killed back to within 30 cm or more of the ground. It is noted for its large, aromatic leaves, which change to light yellow in the fall. The effect of light yellow and green at this time is dramatic. Since only one specimen of this deciduous plant is growing in the Arboretum, it has never produced its red, juicy fruits. The shrub grows wild in southeastern USA.

LIQUIDAMBAR — Hamamelidaceae

A small genus of trees belonging to the hamamelis family but with leaves similar to those of the maples. The leaves, however, are arranged alternately, and not opposite as in the maples.

L. styraciflua L. SWEET-GUM

Zone 7

This species is root-hardy in the Ottawa area but is killed back during most winters. It has, nevertheless, formed a bush 1 m high and 1.5 m wide and is attractive in the fall with its brilliant scarlet color. It grows in eastern USA.

LIRIODENDRON — Magnoliaceae

L. tulipifera L. TULIPTREE, YELLOW-POPLAR

Zone 5b

Despite the fact that one of the two trees in the Arboretum is well over 15 m high and has a trunk diameter of 30 cm, the tuliptree cannot be recommended for planting in the Ottawa district. The other specimen represents the most probable behavior of the species for the area, because it is killed back nearly to ground level every year. The larger tree has a strange history. Planted in 1897, it was killed back to ground level nearly every winter. Then, in 1920, a branch arose from the base and survived the next winter and all subsequent ones, to form the present trunk of the tree. It flowers profusely each year and appears undamaged despite the frequent injury that occurs to the other specimen located in another part of the Arboretum.

The tuliptree is easily recognized by its unusual leaves, which appear to have been chewed off squarely at the ends. Its flowers, resembling tulips, are greenish white with an orange disk at the base. The species is native to Ontario, where it is sparsely distributed through the hardwoods of southern areas. Its distribution in the USA is from Massachusetts to Wisconsin, south to Florida and Mississippi.

'Aureo-marginatum'

Zone 5b

A form with yellow variegated leaves. The plant at the Arboretum is behaving in the same way as the species, just surviving the winters in its initial years. It is doubtful that a good tree will ever arise from its foundation.

LONICERA — Caprifoliaceae

Many honeysuckles that can be grown as bushes are hardy in the Ottawa area, and they flower and fruit profusely. The climbing species are allowed to intertwine and form neat bushes, of which there are some fine examples in the circular area of the Arboretum. They may be able to withstand the winters better when growing in this way than when allowed to twine on a pergola.

L. alpigena L. ALPS HONEYSUCKLE

Zone 5

A shrub 1 m high and 1.5 m thick, with long flower stalks, large, drooping, cherry-like red fruits, and leaves that are larger than average. Its flowers are yellow, tinged with red, but not particularly showy. It grows in the mountains of southern and central Europe.

'Nana' DWARF ALPS HONEYSUCKLE

Zone 5

A dwarf form of the above species, and one that might be considered desirable as a dwarf shrub. Its flowers are no more showy than those of the species, but when it produces an abundance of its cherry-red fruits it is most attractive.

L. ×*americana* (Mill.) K. Koch
PURPLESTEM HONEYSUCKLE

Zone 6

One of the twining types of honeysuckles, this plant grows as a bush in the Arboretum and has formed a mound about 1 m high and 2 m wide. It is most beautiful when in full flower during June. The parents of this hybrid (*L. caprifolium* × *etrusca* Santi) are both considered tender in the Ottawa area. The individual flowers of the hybrid are 5–7.5 cm long and 4 cm in diameter from lip to lip, yellowish inside and purplish outside the corolla, and noticeably fragrant. The plant resembles *L. caprifolium* in growth and foliage and is often confused with that species, but its flowers are in whorls and

are not entirely axillary. As a climber for trellises and pergolas it should be grown much more often than it is, because it is superior to the other species used for this purpose.

L.* ×*amoena Zab. GOTHA HONEYSUCKLE

Zone 3b

A hybrid (*L. korolkowii* × *tatarica*) that produces an unusual profusion of pinkish white flowers on slender stalks.

'Arnoldiana' ARNOLD GOTHA HONEYSUCKLE

Zone 3b

A selection from the Arnold Arboretum with blush-white flowers in great abundance and with graceful, arching branches. Apart from its flowers and habit it differs from the hybrid in that it has more oblong-lanceolate leaves, similar to *L. tatarica*. This cultivar is a good selection and one of the best bush-type honeysuckles for growing in small home gardens.

L.* ×*bella Zab. BELLE HONEYSUCKLE

Zone 2

A hybrid (*L. morrowii* × *tatarica*) with pinkish flowers, which like those of *L. morrowii*, change to yellow as they fade. Its leaves, however, are more like those of *L. tatarica*, being rounded or slightly heart-shaped.

'Atrorosea' PINK BELLE HONEYSUCKLE

Zone 2

One of the most attractive bush-type honeysuckles in the collection, surpassing the Tatarian honeysuckle in beauty and profusion of bloom. It has large, white flowers tipped and edged with pink, a beautiful color combination; with its large graceful bush shape and early summer fruits, it is an attractive plant most of the year.

'Candida' WHITE BELLE HONEYSUCKLE

Zone 2

Similar to 'Atrorosea' in vigor and grace but with pure white flowers.

'Dropmore' DROPMORE BELLE HONEYSUCKLE

Zone 2

A selection raised at Dropmore, Man.; it is similar to the cultivar 'Atrorosea' in habit, but has deeper pinkish flowers. It is apparently hardy in Manitoba, where *L. morrowii*, one of its parents, is usually winter-killed.

'Rosea' ROSY BELLE HONEYSUCKLE

Zone 2

A cultivar with deep-pink flowers and robust habit.

L.* ×*brownii (Regel) Carrière

Zone 6

'Dropmore Scarlet Trumpet'
DROPMORE SCARLET HONEYSUCKLE

Zone 2b

A cultivar similar to 'Plantierensis', but with flowers that are more orange-scarlet than coral-red. It originated in Dropmore, Man., where it is said to be perfectly hardy. At the Arboretum, after several winters, it has grown very well and is seldom without at least one whorl of showy flowers during the summer and early fall.

'Plantierensis' CORAL BROWN'S HONEYSUCKLE

Zone 3b

A hybrid (*L. hirsuta* Eat. × *sempervirens*). This plant grew for 40 years in the Arboretum as *L. sempervirens* L., which it resembles closely. It is, however, considerably hardier than that species, which has failed to become established in the Ottawa area despite several attempts to grow a reputedly hardy shrub. The cultivar is a twining vine and produces abundant flowers, colored coral-red with orange lobes. It differs from *L. sempervirens* in that its two-lipped corolla is gibbous at the base. It is an extremely useful plant for twining over stone walls, trellises, and pergolas, where a profusion of coral-red flowers fits in with the landscape plan.

L. canadensis Bartr. AMERICAN FLY HONEYSUCKLE

Zone 3

A loose shrub 1.2 m high, with nodding, yellowish white flowers on slender stalks. Not particularly attractive and rarely grown as an ornamental shrub. Its native range is from Quebec to Saskatchewan, south to Pennsylvania, Michigan, Wisconsin, and Minnesota.

L. caprifolium L. SWEET HONEYSUCKLE

Zone 6

A twining shrub or vine with glabrous leaves, glaucous beneath. The uppermost leaves are united around the stem, forming a cup. The flowers appear in whorls in the axils of the leaves. The species itself is a beautiful, fragrant honeysuckle.

'Pauciflora' PURPLE SWEET HONEYSUCKLE

Zone 6

This cultivar is identical except for the flowers,which have a purplish tinge instead of being yellowish white.

L. chrysantha Turcz. CORALLINE HONEYSUCKLE

Zone 3b

A vigorous shrub 2.5–3.5 m high, with oval, pointed leaves 5–10 cm long and half as wide. The pale yellow flowers are borne in pairs and provide a fair show of bloom, although not on a par with the forms of *L.* ×*amoena* and *L.* ×*bella*. Its coral-red fruits are attractive and ripen a little later than in most of the species, which might give it additional value. It comes from Siberia, northern China, and Japan.

var. ***latifolia*** Korsh.
TURKESTAN CORALLINE HONEYSUCKLE

Zone 3b

This variety, as its name suggests, has broader leaves, but these are only sparingly pilose beneath, whereas the veins and undersides of the leaves of the species itself are thickly pilose. It originated in Turkestan.

var. ***longipes*** Maxim.

Zone 3b

More sparsely pubescent and with longer hairs. A native of northern China and Japan.

'Villosa'

Zone 3b

A cultivar in which the leaves are villous beneath, particularly along the veins.

LONICERA

L. caerulea L. SWEETBERRY HONEYSUCKLE

Zone 2

A neater shrub than most honeysuckles, it grows up to 1 m high and has stiff glabrous branchlets and flaky bark. Its yellowish white twin flowers are produced in profusion, making the plant showy in spring. Its dark blue bloomy fruits distinguish it from most other honeysuckles and provide a further attraction. A characteristic that places this species apart from the others is that it appears to have a single berry instead of the usual two. In reality, there are two free ovaries enclosed in a fleshy cupula, which is an upgrowth of the bractlets. Its range is from northern and central Europe and northern Asia to Japan.

var. ***edulis*** Regel

Zone 2

A variety with larger oblong fruits and bluish foliage. Its blue berries are said to be sweeter than those of the species, and perhaps more palatable. Its more compact growth makes it better for ornamental planting. It is found in Tibet and eastern Siberia.

L. deflexicalyx Batal.

Zone 4

A shrub with a graceful habit and branches that are either horizontal or pendulous. Its yellow flowers are produced in sufficient numbers to make it showy, more so because they are on the upper edge of long, feather-like branches. It is a native of China and Tibet.

L. dioica L. LIMBER HONEYSUCKLE

Zone 3

A twining shrub with glaucous leaves, native to the Ottawa area. Its flowers, which are yellow and tinged with purple, have no special beauty, but the plant forms a spreading shrub with striking leaves and for this reason might be regarded as a useful ornamental. It ranges from Quebec to Saskatchewan, south to North Carolina, Ohio, and Iowa.

L. discolor Lindl.

Zone 5

A shrub of no particular merit, but of interest because its habitat is Afghanistan and Kashmir, an area represented by few plants in the Arboretum. This species is closely related to *L. orientalis*; it has yellowish white rather than pink flowers, but has similar black fruits.

L. flava Sims YELLOW HONEYSUCKLE

Zone 5

A handsome, slightly twining vine with long orange-yellow flowers produced in terminal whorls. It is best treated as a shrub and the twining branchlets allowed either to intertwine or to hang gracefully from the bush. In the Arboretum it has never reached greater dimensions than 1 m high and 1 m thick. It is extremely desirable as a specimen plant in a border or for accent. It grows from North Carolina to Missouri, Arkansas, and Oklahoma.

L. glaucescens (Rydb.) Rydb. DONALD HONEYSUCKLE

Zone 3b

A species very closely related to *L. dioica*, from which it is distinguished by its leaves; they are pubescent beneath and glaucous above. Its native range is from Quebec to Alberta, south to Virginia, Ohio, and Nebraska.

L. heterophylla Decne.

var. ***karelinii*** (Bunge) Rehd.

Zone 5

This geographical variety from central Asia is rare in cultivation, although the species, native to the Himalayas, is not. The leaves of the species are irregular, lobed, and glabrous, whereas those of the variety are not usually lobed at all.

L. involucrata (Richardson) Banks ex K. Spreng BEARBERRY HONEYSUCKLE

Zone 1

A loose, straggly, native shrub of no unusual beauty; it has conspicuous fruits, but never in such abundance as to be considered ornamental. The fruits are globose, purple-black berries, surrounded by enlarged bractlets and reflexed, reddish bracts. It grows from Quebec to Alaska and in the Rocky Mountains south to Mexico.

L. korolkowii Stapf. BLUELEAF HONEYSUCKLE

Zone 2b

One of the most striking shrubs in the Arboretum. The oldest plant is almost 3 m high and 2.5 m thick, and presents a lovely effect with its graceful habit and bluish green leaves. It also produces pale rose flowers in great abundance, and in the early fall it is covered with bright red fruits. A native of Turkestan.

'Bytown'

Zone 2

A seedling of *L. korolkowii* var. ***zabelii*** with much darker flowers; it was originated by Percy Wright, Saskatoon, Sask.

'Red Giant'

Zone 2b

A cultivar with large, reddish crimson flowers.

var. ***zabelii*** (Rehd.) Rehd. ZABEL'S HONEYSUCKLE

Zone 2b

A crimson or very deep rose variety of the species, with broad ovate, glabrous leaves. It grows 1.5–2 m high, is graceful and floriferous, and produces an abundance of red berries in July and August. This is one of the most desirable honeysuckles and should be the first to be considered for landscaping where a neat shrub is needed.

'Zabelii Crimsona'

Zone 2b

A fine crimson cultivar of var. *zabelii* that makes a similar bush, but has larger and lighter crimson flowers.

L. maackii (Rupr.) Maxim.

Zone 2b

This asian species is one of the tallest honeysuckles; it grows to 4.5 m high and has fragrant, white flowers produced later in the year than those of other honeysuckles.

f. ***podocarpa*** Franch. ex Rehd.

Zone 2b

This form, which comes from China, flowers even later than the species and retains its leaves later in the fall. The bright red fruits of both the species and the form remain on the plant until late in October.

L. maximowiczii (Rupr.) Maxim.

Zone 2b

A large, vigorous shrub with deep purplish rose flowers, and oval leaves 4–9 cm long and 4 cm wide. The reddish, ovoid fruits of this species are attractive, but otherwise it possesses no special merit as an ornamental plant. The species is native to Manchuria and Korea.

var. ***sachalinensis*** Friedr. Schmidt
SAKHALIN HONEYSUCKLE

Zone 2b

The variety has more conspicuous flowers than the species, and the plant receives more acclaim as an ornamental because of their deep purple color. It makes a neat, attractive bush and has an abundance of fruits. In early spring, as the reddish leaves are unfolding, this honeysuckle stands out among the other taxa in the collection. Found in Sakhalin and Korea.

L.* ×*minutiflora Zab. BUNCHBERRY HONEYSUCKLE

Zone 4b

A hybrid (*L. morrowii* × *xylosteoides*) with small, oblong, glabrous leaves and very small flowers. Interesting for its small leaves and flowers, but not an outstanding ornamental shrub.

L. morrowii A. Gray MORROW HONEYSUCKLE

Zone 4

A distinctive, large shrub with a spreading habit, beautiful when in flower and fruit, but not as striking as some of the hybrids of which it is a parent. Useful for planting when groups of large, vigorous shrubs are desired, because it seems to like any soil conditions. It has creamy white flowers which change to yellow as they age and are followed by dark red fruits. It comes from Japan.

L.* ×*muendeniensis Rehd. MUENDEN HONEYSUCKLE

Zone 3

A shrub (*L. bella* × *ruprechtiana*) similar to forms of *L.* ×*bella* and equal to most of the other forms in ornamental value.

L. myrtillus Hook. f. & J. Thoms.

Zone 6

A neat shrub of dense, compact habit similar to a privet's. Its leaves are dark green above, glaucous beneath, and glabrous on both sides. The flowers are pinkish white and fragrant, although not freely produced in the Ottawa area. Like most of the honeysuckles, it occasionally suffers winter injury. The shrub would probably make a fine hedge in the Toronto or Hamilton area. It grows from Afghanistan to Sikkim.

L.* ×*notha Zab. RUTARIAN HONEYSUCKLE

Zone 2b

A hybrid (*L. ruprechtiana* × *tatarica*) with pinkish flowers fading to yellow, and ovate to oblong, acuminate leaves. It is similar to *L. ruprechtiana* in habit and to *L. tatarica* in flower, but not better than either for ornamental use.

L. orientalis Lam.

Zone 4b

L. orientalis itself has never been introduced into cultivation, but is known chiefly for its Caucasian variety, *L. orientalis* var. *caucasica* (Pall.) Rehd., the buckthorn honeysuckle.

var. ***longifolia*** (Dipp.) Rehd.

Zone 4b

The variety *longifolia*, as it grows in the Arboretum, has lanceolate leaves and reddish flowers, followed by black fruits. It has no particular ornamental value. It originated in Kamchatka.

L. periclymenum L. WOODBINE

Zone 6

A twining shrub that, when growing wild in more moderate climates, scrambles over hedgerows and bushes. Its yellowish white and red flowers are noted for their rich honeysuckle fragrance. The flowers are produced in a series of whorls at the end of the shoots, forming a terminal stalked inflorescence. The species appears to have great possibilities as a ground cover, because in the Arboretum it is trailing along the ground, in and around other honeysuckles, and it establishes itself firmly by rooting into the soil wherever it touches. It comes from Europe, North Africa, and Asia Minor.

L. praeflorens Batal.

Zone 4b

A dwarf shrub from Korea and Manchuria that produces its flowers before the leaves. The flowers are short-stalked and light yellow with purple anthers. It has an odd, branching habit and forms a thickset bush at the Arboretum.

L. prolifera (Kirchn.) Rehd. GRAPE HONEYSUCKLE

Zone 4b

No other shrub in the Arboretum attracts quite as much attention as one of these specimens, which stands in the circular area near the driveway. Formed by intertwining its branchlets, it is a perfectly globose plant 1.5 m high and 1.5 m thick, with striking silvery leaves, more noticeable during a slight breeze when the undersides are revealed. In the Ottawa area the species sets abundant fruits in clusters like grapes at the apex of the two uppermost leaves, which are fused to form a disk; thus, the red fruits appear to be on a silver platter. Its flowers are yellow and not showy, but they have a longer corolla than those of *L. dioica*, which is a closely related species. It ranges from Ohio to Tennessee, Missouri, Iowa, and Wisconsin.

L.* ×*pseudochrysantha A. Braun

Zone 3

A hybrid (*L. chrysantha* × *xylosteum*) that is similar to *L. chrysantha*, but has broad ciliate bractlets about half as long as the ovaries. The plant is of no particular merit.

L.* ×*purpusii Rehd.

Zone 5

A hybrid (*L. fragrantissima* Lindl. & Paxt. × *standishii* Jacques) that should not be hardy at Ottawa, because neither parent has proved so. However, this plant has been growing well for more than 15 years and is to be recommended for its white, fragrant flowers, glistening white stamens, and bright

yellow anthers. It is very early, flowering sometimes before the mild weather arrives.

L. quinquelocularis Hardw.
MISTLETOE HONEYSUCKLE
Zone 5

A large shrub with large, oval leaves, of particular merit for its abundant production of distinctive, white, transparent fruits. It flowers freely and is an excellent subject where a large shrub is desired and where its interesting berries may be observed. It grows from the Himalayas to Afghanistan.

L. ruprechtiana Regel MANCHURIAN HONEYSUCKLE
Zone 3

Another rather coarse species similar to *L. morrowii*, with large flowers, at first white but later changing to yellow. About the only difference between it and *L. morrowii* is that this species has acuminate instead of acute leaves, small, almost glabrous bractlets, and the upper lip of the corolla divided about halfway instead of all the way to the base. It is a native of Manchuria and northern China.

var. *calvescens* Rehd.
Zone 3

A variety with almost glabrous and much shorter leaves, and dull, dark red fruits.

L. ×*salicifolia* Zab. WILLOWLEAF HONEYSUCKLE
Zone 5

A hybrid (*L. ruprechtiana* × *xylosteoides*) with narrow acuminate leaves and small pinkish flowers.

L. spinosa Jacquem. ex Walp.
Zone 3

The species itself is a thorny bush and apparently is not in cultivation.

var. *alberti* (Regel) Rehd.
ALBERT THORN HONEYSUCKLE

A graceful shrub with arching branches and blue-green, narrow leaves. Its spreading habit makes it one of the most attractive honeysuckles and suitable for foundation planting. Where coniferous evergreens are difficult to grow, it is often better to plant a shrub such as this along with cotoneasters. The variety has fragrant, rosy lilac flowers, followed by purplish red berries, and despite its common name it does not have thorns. It is found in Turkestan.

L. syringantha Maxim.

var. *wolfii* Rehd. WOLF'S LILAC-HONEYSUCKLE
Zone 5b

A beautiful and distinctive honeysuckle with dark green glabrous leaves and beautiful, fragrant, carmine-pink, lilac-like flowers. Unfortunately the flowers are seldom borne in abundance, but the deep green thickset foliage of the shrub makes it useful for planting around the home. It does not appear to be perfectly hardy in the Ottawa area, for it is often killed back to within 30 cm or more of the ground. As a result, it forms an attractive dark green mound, from which arises an occasional truss of carmine-pink blossoms. If it behaved consistently this way, it would be most desirable for planting in front of small homes near the foundations. The variety differs from the species in having carmine-pink blossoms and prostrate branches. It grows in central China.

L. tatarica L. TATARIAN HONEYSUCKLE
Zone 2

The honeysuckle most commonly grown in Canada. A vigorous and extremely hardy shrub that seems tolerant of all soils and grows in nearly every location, from deep shade to full sun. The shrub is large but has an almost bushy habit, and it can always be relied upon to produce its variable flowers and yellow-red fruits. It is distinct from the other species because of the following characteristics: hollow branchlets; an upright habit; peduncles longer than the petioles; pink, white, or rosy red flowers that do not change to yellow; bractlets distinct or nearly so, not joined at their base; and the two outer lobes of the upper tip of the corolla divided to the base of the limb. There are many varieties and selections of this species, which originated in southern Russia to the Altai Mountains and Turkestan.

'Alba'
Zone 2

A cultivar with pure white flowers.

'Arnold Red'
Zone 2

An excellent bush-type honeysuckle with dark red flowers.

'Carleton'
Zone 2

A cultivar that was developed at the Central Experimental Farm; it has large crimson and white flowers that are produced in great abundance.

'Hack's Red'
Zone 2

A good selection, not as dark as 'Arnold Red' but as floriferous.

'Latifolia'
Zone 2

Has rosy red flowers and much larger leaves than the species.

'Lutea'
Zone 2

Has yellow fruits.

'Rosea'
Zone 2

Flowers are rosy pink outside and light pink inside. This is the most beautiful of the Tatarian honeysuckles in the Arboretum.

L. ×*tellmanniana* Hort. Späth
Zone 4b

This hybrid (*L. sempervirens* L. × *tragophylla* Hemsl.) is a deciduous climber with large elliptic-ovate leaves, the upper ones forming a collar round the stem as in many other climbing honeysuckles. The long-tubed, orange-yellow flowers are borne in clusters of 8–12 blooms, 5 cm long and 2.5 cm wide. It is hardier than most climbing honeysuckles and easily the most striking.

L. tenuipes Nakai

Zone 5

A fairly large shrub up to 2 m tall. The dark green leaves are pilose above and densely pilose beneath, with brownish hairs. The flowers are reddish but not produced in profusion. At the base of each set of opposite branchlets, large bracts completely encircle the stem; these appear to become progressively smaller toward the tip of the branch. The plant has a good stiff habit and with careful pruning would be most desirable for home planting. It comes from Tibet.

L. ×***xylosteoides*** Tausch VIENNA HONEYSUCKLE

Zone 5

A hybrid (*L. tatarica* × *xylosteum*) with rhombic-ovate, bluish green leaves and pinkish flowers; not, however, better than either of its parents.

'Clavey's Dwarf' CLAVEY'S DWARF HONEYSUCKLE

Zone 5

A dwarf shrub up to 1 m high with creamy white flowers and large, red berries.

L. xylosteum L. EUROPEAN FLY HONEYSUCKLE

Zone 2

A large, deciduous shrub with yellowish white flowers, occasionally tinged with red. The flowers are not showy, however, and the beauty of the shrub lies in its bright red fruits. Its range is from Europe to the Altai Mountains.

'Mollis'

Zone 2

A cultivar with leaves that are pubescent on both sides, whereas those of the species are almost glabrous above.

LYCIUM *Solanaceae*

A genus of solanaceous plants somewhat resembling the belladonna (*Atropa belladonna* L.). Because of their straggly habit, they are not usually cultivated as ornamental shrubs, but when laden with fruits they can be quite decorative.

L. chinense Mill. CHINESE BOXTREE

Zone 5b

A rambling shrub with long, arching or pendulous branches, occasionally spine-tipped. The flowers are in pairs or threes, each on a slender stalk, with purple, short-tubed corollas. The plant is noted for its scarlet, oblong or egg-shaped berries, and is said to tolerate coastal conditions. A native of China.

LYONIA **Ericaceae**

A genus of evergreen and deciduous shrubs with a wide distribution over eastern Asia, the Himalayas, North America, and the West Indies. However, only a few species are hardy in the Ottawa area.

L. ligustrina (L.) DC.

var. ***pubescens*** (Gray) Bean HAIRY MALEBERRY, DOWNY HUCKLEBERRY

Zone 5

This plant has been in the Arboretum for a long time, but not under the conditions necessary for perfect health. It is growing in full sun in a sandy, alkaline soil and has formed a small shrub not more than 75 cm high and 60 cm thick. With a good, peaty, slightly acid soil the plant would thrive in the Ottawa area. A new planting has been established in the ericaceous beds at the north end of the Arboretum.

The species has white flowers with five small, reflexed teeth at the nearly closed mouth. The variety *pubescens* appears grayer because of its greater pubescence. It grows from Canada to Florida, west to Tennessee and Texas.

MAACKIA **Leguminosae**

Small trees belonging to the legume family and allied to *Cladrastis*, but distinct from this genus because its leaf buds are solitary and not hidden by the leaf stalk; the leaflets of the pinnate leaves are opposite; and the flowers more densely packed.

M. amurensis Rupr. & Maxim. AMUR MAACKIA

Zone 3b

A small tree that has not grown more than 7.5 m high since it was planted. It has six main trunks, a state said to be common to this species wherever it grows unless proper attention is given to pruning in the early stages. It produces creamy, pea-shaped flowers on erect racemes, which, although not very ornamental, do not detract from the tree itself. The large, pinnate leaves and yellowish bark make it attractive for planting in small gardens as a shade tree. It comes from Manchuria.

Amur maackia (*Maackia amurensis*)

MACLURA — Moraceae

M. pomifera (Raf.) C. K. Schneid. — OSAGE-ORANGE

Zone 6

None of the tree specimens in the Arboretum will ever make shapely trees, but they have formed large shrubs with long branches and shiny, deep green leaves. They are killed back to within about 30 cm of the old stems each year, but make tremendous growth, as much as 2.5–3 m in 1 year. One plant produces fruits each year. The tree is of no special merit in the Ottawa area as an ornamental, and its utilitarian aspect has not been fully explored. It might make an insurmountable barrier if planted thickly enough, but it would need pruning each spring to cut out dead wood. The thorns are brutal and would provide an impenetrable screen. However, the plants might fail to survive a severe winter. The fruits are about the size of a large orange, light yellow, and heavily wrinkled. The plant is a native of south-central USA.

MAGNOLIA — Magnoliaceae

A group of deciduous and evergreen trees and shrubs from Asia and eastern USA, noted for their showy flowers, large, glossy leaves, and in some species, their ornamental fruits. A few species are hardy in the Ottawa area and more specimens would be grown if they were not associated so closely with the "Deep South" and if their needs were better understood. Magnolias have fleshy roots that break off easily when they are transplanted; if the plants are moved while the roots are inactive, a decay sets in that ultimately affects the whole plant. Therefore, they should be moved during the growing season so that root injuries heal quickly. The best time for moving deciduous magnolias in the Ottawa area is in late April and early May, when they are in full flower.

M. acuminata (L.) L. — CUCUMBERTREE

Zone 5b

This specimen, planted near the William Saunders Building at the Central Experimental Farm, is 12 m high with a spread of 6 m and a trunk diameter of 30 cm. Although the tree appears to have suffered occasionally during the winters, it has grown into a fine specimen. However, one would not recommend the species for planting in the Ottawa area unless the location was sheltered from the prevailing winter wind. The flowers of this species are inconspicuous, greenish yellow, and 5–7.5 cm long. The fruits are deep salmon-pink and showy when ripe. The tree is a native of eastern USA.

M. denudata see ***M. heptapeta***

M. heptapeta (Buc'hoz) Dandy — YULAN MAGNOLIA

Zone 6

One of the most showy of magnolias, but the specimen at the Arboretum suffers more from the winters than the others. It has large leaves, 12.5–15 cm long and 5 cm wide, oval to obovate with an abrupt point at the apex. The flowers are pure white with petals 7.5 cm long. It is distinguished from most others mainly by its petals and sepals, which are identical, and by its flowers, which are produced before the leaves. It differs from *M. stellata* in that it has fewer but larger petals. It originated in central China.

M. kobus DC. — NORTHERN JAPANESE MAGNOLIA

Zone 5

The species was planted in 1944 and grew vigorously for 7 years, to a height of 2 m. Although it had survived without injury, it had to be transplanted in the fall because of building extensions and then died within 2 years.

var. ***borealis*** Sarg.

Zone 5

This variety of *M. kobus* is probably the hardiest magnolia in the Ottawa area. The young plant is growing vigorously and has so far survived the winters with no sign of injury. It has produced none of its creamy white, obovate flowers to date, probably because of its shy flowering habit rather than its age. The variety is a native of Japan (Hokkaido and northern Honshu).

M. ×***loebneri*** Kache — LOEBNER'S MAGNOLIA

Zone 5b

A hybrid (*M. stellata* × *kobus*) with 12 petals.

'Merrill'

Zone 5b

A white-flowered magnolia similar to 'Loebneri' but with many more petals.

var. ***stellata*** see ***M. stellata***

M. ×***soulangiana*** Soul.-Bod. — SAUCER MAGNOLIA

Zone 5

This hybrid (*M. heptapeta* × *quinquepeta* (Buc'hoz) Dandy) is perhaps the best known and most beautiful of all hardy magnolias. Although for many years no plants of the hybrid itself existed either in the Arboretum or on the grounds of the Central Experimental Farm, it should be considered hardy in Ottawa if given good care when first planted. At least three trees approximately 40 years old are growing in Ottawa, two 4.5 m and one 6 m high. All the trees produce an

Flower of saucer magnolia (*Magnolia* ×*soulangiana*)

abundance of their pinkish white blooms in late April or early May. During most winters they are subject to tip-killing while young, but they appear to develop a resistance in later years. Fluctuating temperatures that occur in the Ottawa area during April often cause considerable loss of blooms, but after a consistently cold March and April the plants flower magnificently.

'Alba Superba' WHITE SAUCER MAGNOLIA

Zone 5

This cultivar with glistening white flowers is growing well in the Arboretum, where it has formed a small tree 1.5 m high. It has produced a fair crop of blooms each year since it was planted. As with *M.* ×*soulangiana* and the other forms of the hybrid, it appears to have flower buds at various stages of development, some more advanced than others; thus, if a severe frost kills off the larger and more precocious buds, the retarded ones survive and develop into good blooms a few days later.

'Alexandrina'

Zone 5

A larger-flowered selection with flowers that are rose-purple on the outside and white on the inside.

'Brozzonii'

Zone 5

Bears the largest flowers of all saucer magnolias, white with light purplish markings at the base of the outer side of the petals and with deep purple filaments rather than light rose ones. Petals are 6.5 cm wide and 12.5 cm long, more rounded than in the species. Flowers are from 20–25 cm in diameter.

'Lennei'

Zone 5

This dark rosy purple cultivar was only recently planted in the Arboretum, but a few large specimens may be seen in a number of private gardens in Ottawa.

'Lennei Alba'

Zone 5

A cultivar with large, white blooms that flowers later in the season than the species.

'Liliputin'

Zone 5

A much smaller tree than the species, with flowers of the same size but with pointed petals.

M. stellata (Siebold & Zucc.) Maxim. STAR MAGNOLIA

Zone 5b

A beautiful magnolia that has fragrant, pure white flowers with 12–18 narrow, strap-shaped petals. There are no larger specimens in this area, so it may be less hardy than is generally supposed. This specimen has bloomed well, with 18 large blossoms on a plant scarcely more than 60 cm high. The species is native to Japan.

M. tripetala L. UMBRELLA MAGNOLIA

Zone 5b

The umbrella magnolia in the Arboretum has behaved similarly to the tuliptree (*Liriodendron tulipifera*). In 50 years it has produced at least five trunks, 7.5–12.5 cm in diameter,

which have ultimately been killed to ground level. The sixth is now 25 cm in diameter and shows signs of withstanding all future severe winters. This species is noted for its very large leaves, 60–90 cm long, and its large, white flowers followed by ornamental red fruits. Its flowers are usually produced near the apex of the branches and are covered by the larger terminal leaves. They are not, however, as conspicuous as the red fruits that follow them; these stand out prominently against the glaucous green leaves. Its range is from Pennsylvania to Alabama, west to Arkansas and Mississippi.

×MAHOBERBERIS — Berberidaceae

An intergeneric hybrid of *Mahonia aquifolium* and *Berberis vulgaris*. The hybrid resembles *Mahonia* in its lower branchlets, its solitary, net-fascicled leaves on the shoots, and the occurrence of three-foliate or pinnate leaves. The influence of *Berberis* is shown by the presence of simple leaves, thinner and serrulate on other branches and thicker and more coriaceous in the newer shoots.

×***M. neubertii*** (Hort. ex Lem.) C. K. Schneid.

Zone 5b

This plant has proved to be hardy in a somewhat sheltered area of the Arboretum. It fits the general description of the hybrid genus above and is more interesting for its origin than for its beauty.

MAHONIA — Berberidaceae

Although nearly all the species of *Mahonia* from the various temperature zones have been tested, only *M. aquifolium* and *M. repens* appear to be hardy in the Ottawa area. The hardiest of the rest survived for 1 or 2 years and were ultimately winter-killed.

M. aquifolium (Pursh) Nutt. OREGON-GRAPE

Zone 5

The leaves of this species are usually considered evergreen in tender climates. In the Ottawa area they turn purplish in the fall and become brown and unsightly where they are exposed to wind and sun. In spring, however, new growth quickly replaces the old and the plant becomes attractive. It produces an abundance of yellow flowers in erect racemes, followed by large, bluish black fruits. In spring when the new growth has just formed, no other shrub has such rich delicacy of leaf. It is used in the Ottawa area as a large ground cover under tall trees that allow some sunlight to penetrate, or as a cover on shady sides of buildings where the soil is rich enough to support good growth. It grows from British Columbia to Oregon.

'Atropurpurea'

Zone 5

Its new leaves are purple as they unfold, later turning to dark green.

M. repens (Lindl.) G. Don CREEPING OREGON-GRAPE

Zone 3

A much more dwarf shrub than *M. aquifolium*, with smaller pinnate leaves and dull, bluish foliage.

MALUS

MALUS — Rosaceae

The genus *Malus* contains only 25 or 30 species, but so many hybrids have been produced by intercrossing species and cultivars that this genus is probably the largest group of trees represented in the Arboretum collection. Many hybrids belong to the Rosybloom group, growing in rows that extend the length of the Arboretum on either side of the highway. These Rosybloom crab apples originated at the Central Experimental Farm from open-pollinated crosses made by Miss Isabella Preston in 1920 and 1921 with *M. pumila* 'Niedzwetzkyana' as the pistil parent, and also from the known crosses *M. sieboldii* × *pumila* 'Niedzwetzkyana' and *M. pumila* 'Niedzwetzkyana' × *baccata* varieties.

The crab apples in the Arboretum provide a splendid display in early spring, but the spectacle is short-lived. If the weather turns warm at flowering time, as it often does, the bloom of many forms may not last more than 3 days. In selecting cultivars for planting as ornamentals, therefore, one must consider foliage and fruits as well as flowers.

For convenience, many cultivars are listed here in alphabetical sequence within the genus, rather than under the species with which they have closest affinity. To avoid confusion, however, double-flowering and variegated forms of an individual species are included with that species.

M.* ×*adstringens Zab.

Zone 2b

A name given to a group of hybrids (*M. baccata* × *pumila*) that includes such clones as 'Hopa', 'Hyslop', and 'Transcendent'. The specimens under the name *M.* ×*adstringens* in the Arboretum were at one time called *M. baccata*, but their distinctive ornamental qualities warrant giving them a separate name. The group is mentioned here to point out its distinction from the true *M. baccata* specimens. However, clones such as 'Hopa' are listed in alphabetical order with the rest of the *Malus* plants. Thus, to find *M.* ×*adstringens* 'Hopa', look under *M.* 'Hopa'.

M. 'Albright'

Zone 2b

Single pink flowers followed by dark red fruits, which persist all winter.

M.* ×*aldenhamensis see ***M.* ×*purpurea*** 'Aldenhamensis'

M. 'Almey' ALMEY CRAB APPLE

Zone 2b

A large-flowered, purplish rose crab apple that retains its fruits long into the winter. Its bright red fruits are shaped like Northern Spy apples and not rounded like the fruits of most cultivars. The plants in the Arboretum vary in habit from an almost weeping specimen to vigorous, upright trees, depending on the stock on which they were grafted.

M. 'Almata'

Zone 2b

Whitish pink flowers arising from a very woolly stem.

M. 'Arctic Dawn'

Zone 2

A very hardy cultivar with light pink flowers. It originated at Beaverlodge, Alta., from seedling stock received from the Experimental Station at Morden, Man., in 1941. It is one of the few crab apples hardy at Beaverlodge and so it is valuable for that area. The tree is not distinctive enough in color and habit to be of great value elsewhere, but it should be useful for breeding.

M.* ×*arnoldiana (Rehd.) Rehd. ARNOLD CRAB APPLE

Zone 5

A beautiful hybrid (*M. baccata* × *floribunda*) that originated at the Arnold Arboretum in 1883. It has pink flowers that, like those of *M. floribunda*, fade to white. The ruby red buds are as attractive as the flowers themselves. Long, arching, pendulous, reddish branchlets give the tree a graceful appearance. Its leaves are three lobed, as are those of *M. floribunda*, but they are consistent in shape and more like the leaves of *M. sargentii*, but narrower. The plant bears greenish yellow fruits every 2nd year.

M. 'Arrow'

Zone 2b

A Rosybloom crab apple with dark flowers followed by deep red, small fruits, which persist until late in the winter. It flowers later than most cultivars and its fruits are produced annually in abundance.

M. 'Athabasca'

Zone 2b

An early flowering Rosybloom crab apple with large, rosy pink flowers and attractive carmine fruits, which fall earlier than those of others in the Rosybloom group. A biennial bearer of fruits that are useful for jelly.

M.* ×*atrosanguinea (F. L. Späth) C. K. Schneid. CARMINE CRAB APPLE

Zone 5

A beautiful hybrid (*M. halliana* Koehne × *sieboldii*) with rosy purple flowers that do not fade to white as do those of the *M. floribunda* group. Its light red fruits persist over a long period and are particularly striking against a carpet of snow.

M. baccata (L.) Borkh. SIBERIAN CRAB APPLE

Zone 2b

These specimens have made attractive, rounded, wide-spreading trees from 6–9 m high with spreads of 3.5–6 m. They all produce a profusion of white flowers in spring and small bright red and yellow fruits in the fall. These fruits persist well into the winter and entice many species of birds during January and February. The Siberian crab apple is distinguished from other *Malus* because its leaves are convolute in bud and always undivided, and the deciduous calyxes have lobes longer than the tube. It makes an excellent tree for planting in small gardens because of its profusion of bloom, its fruits, and its attraction to birds. It grows from northeastern Asia to northern China.

'Columnaris'

Zone 2b

A notably slender, fastigiate tree with large, white flowers and small, yellow fruits.

'Gracilis'

Zone 2b

A graceful, pendulous form, which can always be relied upon to produce abundant bright red and yellow fruits in the

***Malus baccata* 'Gracilis'**

fall. In its 60 years at the Arboretum, it has grown only 4.5 m high, with a spread of 2.5 m. Curiously enough, 90% of its seedlings are pendulous when small, and present an incongruous appearance in the nursery. This plant was received from the Arnold Arboretum as *Pyrus malus pendula* in 1903, apparently 7 years before it was introduced elsewhere.

var. ***mandshurica*** (Maxim.) C. K. Schneid.
MANCHURIAN CRAB APPLE

Zone 2b

A geographical variety that blooms earlier than the Siberian crab apple and has slightly larger reddish yellow fruits and more fragrant flowers. Its native range is from central Japan to the Amur River region and central China.

M. 'Baskatong'

Zone 2b

A second-generation Rosybloom crab apple, which resulted from a cross of *M.* 'Simcoe' and *M.* 'Meach'. Like most of the second-generation hybrids, its foliage remains purplish throughout the summer.

M. 'Big River'

Zone 2b

Reddish purple foliage and large, purplish flowers; a very hardy crab apple.

M. 'Black Beauty'

Zone 2b

A cultivar with large, light pink flowers.

M. brevipes (Rehd.) Rehd. NIPPON CRAB APPLE

Zone 5

A showy little tree with a dense growth habit and white flowers that open from deep pink buds. The leaves are small and the fruits globose and yellow-crimson. The origin of the species is unknown.

M. 'Cameron'

Zone 5b

This hybrid (*M.* 'Arrow' × 'Dorothea') has large, 4.5 cm, double flowers arranged neatly, opening flat. The color is bright purplish red on the outside with a clear pink center. The specimen flowers profusely every year. The leaves are bronzy and the abundant fruits are 1.5 cm in diameter, purple, and attractive to birds. This tree is the best double-flowering red crab apple tested in the Arboretum. The tree is vigorous and forms an oval shape with moderately wide-angled branches.

M. 'Carmine Queen'

Zone 5

An excellent cultivar with large, light rose flowers edged with carmine. Good foliage and growth habit. The first part of the name, Carmine, probably refers to its brilliant carmine fruits, which are very attractive.

M. coronaria (L.) Mill. WILD SWEET CRAB APPLE

Zone 3

A distinctive crab apple with large, silvery leaves rather like those of the whitebeam (*Sorbus aria*). It produces large, fragrant, bluish white flowers in great profusion, followed in the fall by round, green crab apples. Whoever gave this common name to the tree could not have tasted the fruits, for they are bitter and not in the least palatable. It grows wild from New York to Alabama, and west to Missouri.

'Charlottae'

Zone 3

A cultivar with large, semidouble flowers and large, green, flattish fruits. The young tree in the Arboretum is flowering well and can be fairly attractive. It does not rate as high as Betchel's crab apple (*M. ioensis* 'Plena'), which it resembles, because its flowers appear when the leaves are fully open, whereas the blooms of the other cultivars have already started to fade before the leaves are fully expanded. Bechtel's crab apple is said to be more susceptible to disease, but this has not been apparent in the Ottawa area.

M. 'Cowichan'

Zone 2b

Said to be the best early-flowering Rosybloom crab apple, and one that can be relied upon to produce flowers and fruits annually. The fruits of this cultivar produce one of the best-colored and best-tasting jelly of all crab apples. Its foliage and fruits are brilliant in the fall, so the tree has beauty of foliage, fruits, and flowers.

M. 'Crimson Brilliant'

Zone 4

The flowers of this crab apple are carmine and white; the fruits are dark purple.

M. 'Dartmouth'

Zone 2b

An apple crab with fairly large, red fruits.

M. 'Dorothea'

Zone 4

One of the best double-flowering types and one of the few that produces fruits. It has attractive, pink flowers rather like

Flowers of *Malus coronaria* 'Charlottae'

those of *M.* ×*scheideckeri* in form, and similar yellow-orange fruits.

M. 'Eve'

Zone 2b

A biennially bearing cultivar with huge rosy pink flowers and red fruits.

M. 'Elsie Rathke'

Zone 5

A curiously twisting and pendulous crab apple with purplish leaves; it flowers sparsely.

M. 'Flame'

Zone 5

Blush-white flowers, pink buds, and green foliage; not much better, if at all, than *M. pumila.*

Flowers of *Malus* 'Dorothea'

M. floribunda Siebold ex Van Houtte
JAPANESE FLOWERING CRAB APPLE

Zone 5b

A distinctive species that every spring produces a profusion of pink flowers, which later fade to white. Of the two plants set out in the Arboretum in 1947 only one remains, the other having been winter-killed. Because no older trees are in the Arboretum or grounds of the Central Experimental Farm, this species may not be as hardy as most others. When mature, the tree has a broad, roundish outline and can be relied upon to produce flowers and fruits abundantly each year. The remaining specimen is 3.5–4.5 m high and is one of the most beautiful in the present collection. The tree was introduced from Japan.

M. 'Garry'

Zone 2b

A splendid crab apple that has deep rose flowers with a white star at the center. Both the rose and white are strong, clean colors. The foliage is purplish all summer and the fruits are rounded, 1.5 cm long, and a bright, glossy red.

M. 'Geneva'

Zone 3

Not particularly ornamental compared with the other Rosybloom types; this plant was originally selected for its large fruits, which were thought to have economic value. It is not better, however, than 'Hyslop', 'Dolgo', or any of the other commercial types.

M. 'Golden Hornet'

Zone 4b

Of English origin, from *M.* ×*zumi* var. *calocarpa.* The fruits are brilliant gold, lasting on the tree well into winter and shining brilliantly against the early winter snow. The floral effect produced by its white flowers is moderate and its foliage is green.

M. 'Helen'

Zone 4b

A moderate producer of purple-rose flowers followed by purplish red or red fruits.

M. 'Henrietta Crosby'

Zone 4b

A striking deep red-rose cultivar with a triangular mark at the base of each petal, forming collectively an interesting 15 point star. Foliage is small and green, and the back of the leaf has a red central vein.

M. 'Hillier'

Zone 4b

This cultivar, also known as *M.* 'Hillieri', suffered frequently from winter injury during the nursery stage, but appears to have outgrown its susceptibility. It is said to be excellent for forcing. The white flowers arise from deep pink buds and are formed all round the branch like a bottlebrush. The small fruits are yellow and orange.

M. 'Hopa'

Zone 2b

One of the best ornamental crab apples for the Ottawa area. It has rose-colored flowers, produced in profusion, and

fairly large orange-red and red fruits that are useful for jelly. It has an excellent growth habit and beauty of foliage, flowers, and fruits, and is thus ideal for planting in small home gardens.

M. hupehensis (Pamp.) Rehd. TEA CRAB APPLE

Zone 4b

A shapely tree that always produces a profusion of pinkish white flowers all along its branches. The young tree in the Arboretum is handsome in the spring and is distinctive. The species belongs to the *M. baccata* group, which has undivided leaves, convolute buds, and deciduous calyxes. It comes from China and Assam.

M. ioensis (A. Wood) Britt. IOWA CRAB APPLE

Zone 4b

A species similar to *M. coronaria* but differing because its branches are much more downy, its calyx is tomentose, and its leaves are tomentose underneath. Its fruits are of as little value as those of *M. coronaria,* but seem smaller and less glutinous. In late spring it produces large, single, pink flowers, 5 cm in diameter; they occur in fair profusion, but do not entirely cover the tree as in the double form. The species grows from Minnesota and Wisconsin to Nebraska, Kansas, and Missouri.

'Plena' BECHTEL'S CRAB APPLE

Zone 4b

A lovely double form of *M. ioensis* with large, fragrant, pink flowers, 6 cm in diameter or larger, borne in profusion each year. This form blooms later than most crab apples and its flowers last over a longer period. Its foliage is not attractive and is said to be susceptible to juniper rust, a condition not noticeable in the collection. It is a good cultivar for those who care only for a glorious display in the spring, and it is recommended for planting in small home gardens where this beauty is desired. Also, crab apple fruits are sometimes considered a menace in a neighborhood where small children are likely to eat them. This form is best suited to such areas because fruits are seldom seen on the trees.

'Prairie Rose'

Zone 4b

A cultivar with the same fully double flowers as 'Plena', but with a deeper pink color that does not fade as much.

M. 'Joan'

Zone 3

A clone of *M. ×robusta* with pink and white flowers. It bears in alternate years, but like *M. ×robusta* it has attractive yellow foliage in the fall and bright red fruits.

M. 'Katherine'

Zone 5b

A derivative of *M. ×hartwigii* Koehne, with large, double flowers as big as those of *M. ioensis* 'Plena', but with pointed petals. Its pink flowers are similar to those of 'Plena', but it produces an abundance of red fruits, which are decorative. Although one cannot consider 'Katherine' to be an alternate bloomer, it flowers better one year than the next.

M. 'Kobendza'

Zone 3

One of the crab apples that originated at Kornik, Poland. A Rosybloom type with typical purple foliage, it has medium rose flowers and purplish fruits.

M. 'Lady Northcliffe'

Zone 4b

The buds of this cultivar are deep purplish rose; they open into large, white flowers tinged with rose, which stand out well from the green leaves.

M. 'Lemoinei'

Zone 5

An excellent cultivar with dark red flowers, purplish foliage, and dark purple fruits.

M. 'Liset'

Zone 5

One of the most beautiful crab apples in cultivation. It has purple-red, semidouble and single flowers that stand out more prominently from the purplish foliage than many with similar hues. The flowers are followed by abundant purplish fruits.

M. ×magdeburgensis Hartwig

Zone 4b

A hybrid (*M. pumila* × *spectabilis*) with large, single and semidouble flowers that are deep rose outside and paler toward the base and on the inside. The fruits are globe shaped, yellowish, and about 2.5 cm in diameter, but they are not attractive.

M. 'Makamik'

Zone 2b

A little later in flowering than the other Rosybloom crab apples, but regarded as the best because of its floral display and its autumn fruits. The fruits, however, are too bitter to be of value for preserves.

M. 'Mary Currelly'

Zone 2b

An old crab apple from the Central Experimental Farm. It was developed by Dr. W. T. Macoun and named after the wife of Dr. C. T. Currelly, Curator of the Royal Ontario Museum. It has single, pink flowers and large, red fruits that are good for making jelly. It bears flowers and fruits in alternate years.

M. 'Mary Potter'

Zone 4b

A delightful crab apple that produces a profusion of clear white flowers with rose pink buds. It has showy red calyxes and long, red pedicels that add considerably to its beauty. It is an apomictic clone that tends to breed true from open-pollinated seeds. It was named in honor of one of the daughters of Prof. Charles S. Sargent, first director of the Arnold Arboretum.

M. 'Maybride'

Zone 5b

This cultivar has large, semidouble and double flowers, 5 cm in diameter, opening to a flat formal arrangement; the pink buds open to pure white. It blooms annually a few days later than 'Almey' and 'Makamik'. The fruits are 2 cm in diameter, greenish, overlaid with dull red on the sunny side. Introduced by the Ottawa Research Station, Central Experimental Farm, Ottawa, it was originated by D. F. Cameron.

M. ×*micromalus* Mak. MIDGET CRAB APPLE

Zone 4

A hybrid (*M. baccata* × *spectabilis*) with pinkish, fragrant flowers produced in abundance on a dense, small tree of upright habit. In general appearance it is much nearer to *M. spectabilis* than to *M. baccata*, but it differs from the former in its leaf shape and its reddish fruits, which are impressed at the base. When in bloom it is remarkably beautiful, because its flowers entirely cover the dense, thick branches. It originated in Japan.

M. 'Montreal Beauty'

Zone 2b

A very old cultivar. One of the first, if not the first, cultivar of ornamental plants to originate in Canada. It was grown before 1833 by Robert Cleghorn of Montreal. Its large, pure white flowers with many petals and yellow stamens, combined with a great profusion of bloom, good growth habit, and decorative green and red fruits, make it a desirable crab apple even by today's standards.

M. 'Morton'

Zone 3

Similar to *M. coronaria*, with pink buds opening to large, light pink, single blooms produced later than those of other cultivars.

M. 'Namew'

Zone 2b

According to records, only one specimen of this Rosybloom crab apple remains in the Arboretum at the Central Experimental Farm; the form is one of many that were named and later discarded for lack of merit.

M. 'Neville Copeman'

Zone 4b

A form with large, white and carmine flowers and fairly large, red fruits covered with bloom. Very attractive flowers, fruits, and purplish foliage.

M. 'Oakes'

Zone 2b

A cultivar that originated in Manitoba at the Glenelm nursery from seeds received from the Experimental Station at Morden, Man. 'Oakes' has purplish leaves and light purple flowers, but it is valuable mainly for its hardiness in the area where it was introduced.

M. 'Oekonomierat Echtermeyer'

Zone 3

A somewhat pendulous form with purplish red flowers and bright reddish fruits produced in fair abundance annually. It originated at Spaeth's nursery in Germany in 1914.

M. 'Okanagan'

Zone 2b

A crab apple much like *M. pumila* 'Niedzwetzkyana' in appearance, but with fruits of good flavor that are excellent for making jelly. The flowers are attractive, but are not sufficiently abundant to give a good display.

M. 'Oporto'

Zone 5

One of the *Malus* ×*purpurea* group, with dark reddish gray foliage and deep rose flowers.

M. 'Pink Beauty'

Zone 2b

Similar to 'Royalty' but not as outstanding. The flowers are lighter and more conspicuous against the purple foliage.

M. 'Pink Giant'

Zone 2b

A cultivar from North Dakota with large (5 cm), light pink flowers and large, brownish red fruits.

M. 'Pioneer Scarlet'

Zone 2b

An attractive cultivar with light rose blooms that measure 6 cm in diameter. It has broad, oval, greenish leaves with reddish hairy stems. The young leaves are downy.

M. 'Prince Charming'

Zone 4b

A hybrid (*M.* 'Katherine' × 'Makamik') with purplish red, saucer-shaped, semidouble flowers that fade in the center to white, giving a two-toned effect. The petals are delightfully frilled at the margins and the red veins retain their color after the flowers fade. The deep purple fruits are 1.5 cm in diameter, but are not freely produced. The leaves are bronzy for most of the summer, turning to orange and red in the fall.

M. 'Prince Georges'

Zone 5

A seedling that was developed by seeds collected from the Arnold Arboretum by the Division of Plant Exploration and Introduction of the U.S. Department of Agriculture. It is believed to be a hybrid of *M. angustifolia* and *M. ioensis* 'Plena'. The blooms are similar to those of 'Plena' but have more petals, and the leaves are narrow like those of the other parent. Prince Georges is an area near Washington, D.C.

M. 'Profusion'

Zone 4

A prolific flowering crab apple that blooms a little later than most others. The flowers are dark rosy red, fading later to light rose. The leaves are purple at first but later turn to green; the fruits are brownish red and about 1.5 cm long.

MALUS

M. prunifolia (Willd.) Borkh. PLUM-LEAVED APPLE

Zone 4

This specimen has formed a fairly large tree, nearly 6 m high, with a spread of 3.5 m; it somewhat resembles the common apple, to which it is closely related. The specimen bears out Rehder's remark in his *Manual of cultivated trees and shrubs*, that the fruits persist over a very long period. It has a dense, branching growth habit and so is a good, small, shade tree. It produces white flowers and yellow or red ovoid fruits in fair quantities. It comes from northeastern Asia.

'Edulis'

Zone 4

The form of the species that has edible fruits; it is said to have been used in eastern Asia for its fruits long before the introduction of the cultivated apple from Europe. It has large, sweetish, yellow fruits. As in var. *rinkii* and the species, they hang from the lower sides of the branches. Originated in eastern Asia.

var. ***rinkii*** (G. Koidz.) Rehd.
CHINESE PEARL CRAB APPLE

Zone 4

This variety has larger flowers and fruits than the species and is planted more commonly. It is definitely superior to the species and could be used effectively where a good shade tree for a small home is desired. Originated in China.

M. pumila Mill. COMMON APPLE

Zone 4b

This small tree, which each year produces an abundance of white flowers, is attractive and compares favorably with the other *Malus* specimens at flowering time. It has no diversity of foliage, however, and its fruits are not unusually attractive. A native of Europe and western Asia.

'Niedzwetzkyana'

Zone 4

An attractive cultivar with deep red-purple flowers and large, red fruits in which the red extends into the flesh. The wood is reddish and the leaves purplish for most of the year. A good ornamental tree; its flowers, fruits, and foliage are more beautiful than those of many hybrids derived from it and named as separate cultivars. The fruits are very acid and completely inedible.

M. 'Purple Wave'

Zone 4

A cultivar with dark purplish green foliage, carmine buds and flowers, and purplish red fruits.

M. ×***purpurea*** (Hort. Barbier) Rehd.

'Aldenhamensis'

Zone 3b

A hybrid (*M.* ×*atrosanguinea* × *pumila* 'Niedzwetzkyana') that in leaf, flower, and fruit, is one of the most attractive crab apples in the Arboretum. Its flowers are the nearest to red of any cultivars, have more petals than most, and last for a longer period. The two trees in the Arboretum have rounded growth habits, but are not large enough to be considered valuable for small gardens. However, they may ultimately acquire the habit of *M.* ×*purpurea* 'Eleyi', which they closely resemble.

'Jay Darling'

Zone 3b

A cultivar that is often considered to be identical with *M.* ×*purpurea* 'Eleyi', but it differs in that it has medium rose flowers with a small, clear white center, and smaller, more globose fruits.

M. 'Radiant'

Zone 4

An attractive crab apple with deep rose flowers, not as deep or as bright as those of *M.* ×*purpurea* 'Aldenhamensis', but similar to the blooms of *M.* 'Liset'; it has the same purplish leaves as 'Liset'.

M. 'Redflesh'

Zone 3

More notable for its large (5 cm), red-fleshed, red-skinned fruits than for its light rose flowers. Yet it is a prolific flowering tree and has large, rosy red apples for fall decoration. It is worth considering for garden use.

M. 'Red Jade'

Zone 3

A pendant tree that is loaded in the fall with small, red fruits, which remain on the tree for most of the winter. Its flowers are not as showy as some and its foliage is green. It is noted chiefly for its very marked pendulous branches that hang to the ground, usually covered with fruits.

M. 'Red Splendor'

Zone 2b

An excellent cultivar with light pink flowers contrasting well with the purple foliage. The reddish purple fruits are 4 cm in diameter.

M. 'Red Tip'

Zone 4

Named for its red-tipped young leaves, which give the tree much distinction. The pink flowers are single and medium sized, and the 4 cm yellow-green fruits are ornamental.

M. ×***robusta*** (Carrière) Rehd. CHERRY CRAB APPLE

Zone 3

A hybrid (*M. baccata* × *prunifolia*) with white flowers and reddish yellow fruits, but not outstanding as an ornamental tree. Seedlings of these trees have been selected for their superior hardiness and used as dwarfing stocks for cultivated apples at the Central Experimental Farm. Several clones have been established, of which *M. robusta* No. 5 is the best known.

M. rockii Rehd.

Zone 3

A species closely related to *M. baccata* but with wider, more ovate leaves and larger fruits. The yellow-red fruits have the size and appearance of sweet cherries. A native of western China.

M. 'Rosseau'

Zone 2b

Equal to the best of the Rosybloom crab apples, it has rose-pink flowers and rose-red fruits, which it produces in abundance annually.

MALUS

M. 'Royalty'

Zone 2b

Well worth growing as a foliage tree beeause it has bright red-purple leaves all summer. It might be trained as a hedge to replaee *Berberis vulgaris* 'Atropurpurea', which harbors a menace to eereal crops. The purplish flowers are not eonspieuous amid the foliage, nor are the purple fruits.

M. 'Rudolph'

Zone 2b

Produces a great profusion of magnolia-rose flowers and medium-sized fruits.

M. sargentii Rehd. SARGENT'S CRAB APPLE

Zone 5

A beautiful small crab apple with a profusion of pure white flowers, then deep red fruits. Although too small to be considered a shade tree, it make an excellent dwarf specimen. Its width is much greater than its height. It might be useful for planting near large, low bungalows. The speeies comes from Japan.

'Rosea'

Zone 5

A form with rosier flowers than the speeies, particularly when they are in the bud and half-opened-bud stages.

M. ×***scheideckeri*** F. L. Späth ex Zab.
SCHEIDECKER CRAB APPLE

Zone 5

A hybrid (*M. floribunda* × *prunifolia*). The two specimens in the Arboretum are extremely attraetive in spring; their lovely carmine-striped, whitish, semidouble flowers grow in bottlebrush fashion around each stem. One plant is bushier than the other. Their small, yellow fruits are not produced as abundantly as the flowers; thus, most flowers are probably sterile.

M. 'Selkirk'

Zone 2b

An exeellent cultivar producing a profusion of large (6 em) flowers of medium pink fading to light pink with a white eenter. The large leaves remain purple for most of the summer. The 2 cm fruits are oval and bright searlet.

M. sieboldii (Regel) Rehd.

var. ***arborescens*** Rehd. TORINGO CRAB APPLE

Zone 3

Although these two trees in the Arboretum were originally received from Japan in 1904 as *Pyrus toringo* Siebold, a synonym of *M. sieboldii*, they were later identified as *M. sieboldii* var. *arborescens*. Both trees are 4.5–6 m high and produce a remarkable show of blooms eaeh year. Their dense branches grow in the same plane, which gives the trees the beautiful appearance often assoeiated with Japanese trees. Blossoming somewhat later than the other kinds, this variety is worthy of a plaee where shapely trees of formal outline are desired. Native to Japan and Korea.

M. 'Sissipuk'

Zone 2b

The leaves and large, rose-eolored flowers of this Rosybloom erab apple appear later than on others, and so extend the season of bloom of the crab apples. Its oxblood-red fruits are very bitter and persist on the tree all winter.

M. 'Snoweap'

Zone 2b

A cultivar named and introduced by the Researeh Station, Beaverlodge, Alta. It has pure white flowers and persistent red fruits.

M. ×***soulardii*** (L. H. Bailey) Britt.
SOULARD CRAB APPLE

Zone 5

A hybrid (*M. ioensis* × *pumila*) resembling *M. ioensis* in habit. Flowers are pink, 3.5 cm across, and are followed by yellowish fruits 5 cm in diameter.

M. 'Schafer'

Zone 3

Another Polish eultivar from Kornik. It blooms abundantly, with light rosy purple flowers and purplish foliage.

M. spectabilis (Ait.) Borkh.
CHINESE FLOWERING APPLE

Zone 5

A small, roundish tree produeing blush-white flowers nearly 5 em in diameter. Akin to *M. baccata* and *M. prunifolia*, but with much larger fruits and flowers. It eomes from northern China.

M. 'Strathmore'

Zone 2b

A hybrid with upright branches forming a wide pyramidal tree. It has deep rose flowers, and its foliage, whieh is reddish all summer, turns to scarlet in the fall. A highly desirable variety.

M. 'Sundog'

Zone 2b

In its young state at the Arboretum, this crab apple promises to be an exceptionally good ornamental tree. It bears large, pink flowers in great profusion and has an attractive upright habit.

M. 'Tanner'

Zone 2b

This form has deep pink buds opening to pearl white, 5 cm flowers on loose panieles or cymes; one of the earliest crab apples to flower. It is extremely ornamental and has special value for its small fruits that last until eaten by birds. The leaves are green and narrow.

M. toringoides (Rehd.) Hughes CUTLEAF CRAB APPLE

Zone 5

For its ornamental fruits, this species is superior to nearly all other erab apples. The speeies only bears fruit during alternate years, but when it does the effeet of the abundant pear-shaped yellow and red crab apples is most attractive. Its small, white blooms are single, borne on slender downy stalks, and its leaves are very deeply lobed with three to seven lobes. A native of western China.

M. 'Van Eseltine'

Zone 2b

A remarkable, narrow, fastigiate tree that is useful for accent planting. It bears large, semidouble and double, light pink blooms and small, yellow and red fruits.

M. 'Wabiscaw'

Zone 2b

A Rosybloom crab apple with an upright habit, reddish foliage, and both single and semidouble flowers. Its floral beauty is fair to average but it does not produce many fruits, and is therefore not attractive in the fall.

M. 'Wakpala'

Zone 2b

A fairly good crab apple introduced by Dr. N. E. Hansen of North Dakota. It has single, white flowers that arise from deep pink buds. Its red fruits are up to 9 cm in diameter.

M. 'Winter Gold'

Zone 3

Grown mainly for its abundant golden fruits; the flowers are single and white.

M. 'Wisley Crab'

Zone 5

An English crab apple with light lavender-rose, single flowers, fully 5 cm in diameter, borne on woolly pedicels. Its leaves are rosy tinted and the fruits are red.

M.* ×*zumi (Matsum.) Rehd. ZUMI CRAB APPLE

Zone 4

A small tree (*M. baccata* var. *mandshurica* × *sieboldii*) of broad pyramidal habit. It has oval leaves, averaging 6 cm long and 3 cm wide, and glabrous when young. The flowers are pink when in bud and white when open, are 2.5 cm wide, and are produced in clusters of four to seven blossoms. The globe-shaped, small, red fruits are 1.5 cm in diameter. The tree originated in Japan.

var. ***calocarpa*** (Rehd.) Rehd.

Zone 4

A variety that produces an abundance of orange and orange-red fruits that remain on the tree for most of the winter. The tree is considered to bear fruits in alternate years, but the specimens in the Arboretum produce a number of fruits each year, though more during alternate years. The single flowers have deep red buds and pinkish white flowers that present a good display in spring. The variety comes from Japan.

MENISPERMUM — Menispermaceae

A genus allied to *Cocculus*, containing two species; both are growing in the Arboretum and appear hardy.

M. canadense L. MOONSEED

Zone 2b

A deciduous twining vine with large, ivy-like foliage and black berries that resemble small grapes. Its common name is derived from the single crescent-shaped seed contained within each berry. The plant could be used for covering old stumps or ground in waste areas, but it grows suckers too freely and can become a weed in cultivated gardens. Its wood is soft and in the Ottawa area the plant behaves much like a perennial, being killed to the ground each winter. Its greenish yellow flowers are borne in loose panicles. It grows from Quebec and Manitoba to Georgia and Arkansas.

M. dauricum DC. DAHURIAN MOONSEED

Zone 3

Similar to the common moonseed, but with smaller leaves and fruit clusters. It differs also in that it has glabrous, young leaves that are distinctly peltate. Its range is from Siberia to China.

MORUS — Moraceae

All older specimens of the mulberry family are grouped together directly east of the Arboretum Building 74 in the circular area of the Arboretum, which is mostly confined to conifers. Among the mulberries are some interesting trees that are useful for ornamental planting in small gardens, although they lack autumn coloration. When in fruit they attract a considerable number of birds, mostly robins, which gives them added interest.

M. alba L. WHITE MULBERRY

Zone 3

All four specimens of the white mulberry have formed shapely, round-topped trees, 10.5–15 m high, with spreads of 3.5–7.5 m. All have multiple trunks, which add to their picturesque beauty. The white mulberry has large leaves, up to 20 cm long and 15 cm wide; sometimes three-lobed and broad, ovate kinds grow on the same tree. Its fruit clusters are about 1.5 cm long and whitish pink. The white mulberry is native to China, and the silkworm feeds on the leaves of this species and its cultivars.

'Pendula' WEEPING MULBERRY

Zone 3

The weeping mulberry is an attractive tree and worthy of a place in any garden, particularly near a bird bath or sundial. One specimen, a dwarf tree about 1 m high, has about 30 cm of solid, gnarled trunk with many curving and twisting branches arising from it. The other, with a 1 m trunk, is a better specimen. Both trees have pendulous branches, which sweep the grass and spread no more than 1.5 m. They are unusually attractive, especially in winter when a snow covering accentuates their odd shapes.

'Tatarica' TATARIAN MULBERRY

Zone 3

According to most writers, this form is supposedly hardier than the species. However, in Ottawa it has the same degree of hardiness as the species, as shown by Arboretum notes on their long history of survival. Both suffered winter injury when young, especially during the first 2 years after planting. This probably accounts for the multiple stems in all specimens of both types. The Tatarian mulberry trees, however, have not grown as large as the species; they are not more than 6–7.5 m high. The leaves and fruits of this form, too, are much smaller than those of the white mulberry itself.

M. rubra L. RED MULBERRY

Zone 6

This specimen has never exceeded 3.5 m in height before being killed to within 60 cm of ground level. In 1957 it produced a fair crop of fruits, but was killed back rather severely the following winter. It stands out among other mulberries in the collection in the fall, because its leaves still remain on the tree long after those of others have fallen. It grows from Massachusetts to Florida, and west to Michigan, Nebraska, Kansas, and Texas.

MYRICA — Myricaceae

A genus of shrubs that should receive more consideration for planting in small home gardens and public parks. The hardy species, *M. pensylvanica*, grows partieularly well along seashores and the other, *M. gale*, along riversides in sandy areas.

M. gale L. SWEET GALE

Zone 2

A shrub 0.5–1 m high, with wood and leaves that are fragrant when crushed, a quality that has contributed to its popularity in European gardens. Its fruits are composed of closely set resin-dotted nutlets. The species has a very wide range, extending from Europe to northeastern Asia and in North America as far south as Virginia, Michigan, and Washington. In the Ottawa area fine specimens may be found along the shores of the nearby rivers.

M. pensylvanica Loisel. BAYBERRY

Zone 2

This interesting species, like the wax myrtle (*M. cerifera* L.), bears gray berries that are covered with wax and are used in making bayberry candles. The fruits are conspicuous in winter. The leaves are oblong lanceolate and golden dotted underneath; they have a bay-rum odor when crushed. The bayberry grows from Newfoundland to Florida and Alabama.

NEILLIA — Rosaceae

A genus of shrubs closely related to *Physocarpus* and *Stephanandra*, from which it is distinguished by the flowers in long racemes instead of clusters. Only one of the species tested at the Arboretum has proved hardy, but all plants were grown from seed or cuttings and many were not large enough or had insufficient roots at the start of winter to survive. *N. affinis* was planted in 1904 and has not yet been damaged by winter. *N. sinensis* D. Oliver may also be hardy, and a new test with larger plants will be carried out.

N. affinis Hemsl.

Zone 5

A medium-sized shrub with solitary, dense racemes of pink flowers and bell-shaped calyx tubes, two characters that distinguish it from the other species. It originated in western China.

NEMOPANTHUS — Aquifoliaceae

N. mucronatus (L.) Trel. MOUNTAIN HOLLY

Zone 3

This deciduous shrub has not been happy with the conditions that prevail in the Arboretum and has never survived for more than 8 years. Twelve plants were collected locally and grown in different soil conditions at widely separated locations in the Arboretum. The individuals varied in vigor, but eventually all died. This species, if planted in groups of three to five plants, produces ornamental red fruits in summer. It is closely related to the deciduous hollies (*Ilex*), but differs in that its flowers have strap-shaped petals free from the stamens. It is found from Nova Scotia to Ontario, Wisconsin, and Virginia.

NYSSA — Nyssaceae

A genus of deciduous trees sometimes placed in the *Cornus* group, but bearing little resemblance to them except in its fruits.

N. sylvatica Marsh. TUPELO, BLACK GUM

Zone 5b

If the species were not so difficult to transplant, the specimen would have been moved long ago from its present location. In more than 60 years of existence it has grown only about 3.5 m high; it has a spread of 2.5 m. Its growth may be stunted because of the close proximity of a silver maple, whose branches extend beyond and over it. On the other hand, the protection the tupelo receives from this large tree may have helped it struggle through the winters. The specimen has never produced the brilliant red and yellow autumnal effect for which the species is noted, because it is growing almost continually in the shade. This native species ranges from Maine, Ontario, and Michigan to Florida and Texas.

OSTRYA — Betulaceae

A genus comprising about ten species of deciduous trees belonging to the birch family and noted for their hop-like involucral bracts. Three of the species are represented in the Arboretum; one of them, *O. virginiana*, also grows wild in the woodlands.

O. carpinifolia Scop. EUROPEAN HOP HORNBEAM

Zone 6

The single specimen has grown into a shrubby tree with multiple branches, probably because it was killed back in its early stages. It is root-hardy, however, and if one of its small trunks withstands a few more winters it may develop into a tree. This species differs from *O. japonica* because it has nearly glabrous leaves and spindle-shaped nutlets. It comes from southern Europe and Asia Minor.

O. japonica Sarg. JAPANESE HOP HORNBEAM

Zone 6

Like *O. carpinifolia*, this plant has not developed into a tree but is made up of several small branches arising from a gnarled stump. The new shoots have appparently been killed back to the stump each winter. A native of Japan, northeastern Asia, and China.

O. virginiana (Mill.) K. Koch
IRONWOOD, AMERICAN HOP HORNBEAM
Zone 3

The specimen in the collection is growing in the open and has developed into a shapely small tree not more than 7.5 m high. Its perfect, broad, pyramidal outline and small stature make this species desirable for planting along streets where small trees are required. In the woodlands of the Arboretum the ironwood is growing in close harmony with the blue beech (*Carpinus caroliniana*) in the shade of large hickories, elms, basswoods, and American beeches. Of all the specimens growing at Ottawa, none has the round head described in some textbooks. Those in the woodlands, of course, tend to stretch upward, but the specimen planted in the open is also pyramidal. The tree resembles a small elm, but the bark has narrow flakes and the bundle scars of the twigs are not sunken. It grows from Cape Breton, Ontario, and Minnesota to Florida and Texas.

OSTRYOPSIS — Betulaceae

The genus is composed of two species of deciduous shrubs native to western China. They are similar to *Ostrya* and *Corylus*, but differ from the former because their seeds are not enclosed in a bladder-like bag, and from the latter because their smaller nuts are enclosed by tubular involucres.

O. davidiana (Baill.) Decne.

Zone 6

A rounded, bushy shrub that has reached a height of about 1 m and has a spread of 1.5 m. It has many twiggy branches arising from the base. Its leaves resemble those of a hazel, but they have sessile, red glands on the undersides. The fruit of this species is a conical nut enclosed in an outer covering, which is also narrowly conical and terminates in three narrow points. The plant has no ornamental value in Canada; it is of interest only from a botanical viewpoint.

PARROTIA — Hamamelidaceae

P. persica (DC.) C. A. Mey. PERSIAN PARROTIA

Zone 7

The rugged Ottawa winters have allowed this plant to grow only 1 m high, but it has a spread of 3.5 m formed by many branches arising from its base. It has never produced a flower or fruit in the 60 or more years of its existence. In milder climates the tree is noted for its beautiful fall colors, orange, scarlet, and gold, and for its myriad red stamens in spring, which give the plant a reddish, misty effect. It grows from northern Iran to the Caucasus.

PARROTIOPSIS — Hamamelidaceae

P. jacquemontiana (Decne.) Rehd.

Zone 7

The specimen is behaving much like its near relative *Parrotia persica* by forming a low ground cover rather than a tall, 6 m shrub. This stunting, of course, is because of the severe winterkill it suffers each year. It comes from the Himalayas.

PARTHENOCISSUS — Vitaceae

A group of vines closely allied to *Vitis* and *Ampelopsis*, but differing because they have tendrils with viscous disks at the tips, leaves divided into three or seven leaflets, and petals that are separated and expanded. Only the Virginia creeper, *P. quinquefolia*, and its varieties are represented in the Arboretum. Boston ivy, *P. tricuspidata* (Siebold & Zucc.) Planch., was tried several times during the early years of the Arboretum's history, but did not survive in the open locations where it was planted. However, in the Ottawa district, plants growing on north-facing walls are hardy, whereas those growing in more exposed locations, such as on west walls, are killed back each winter. There are plants in the city growing on the western sides of houses that have branched out low and spread to the northern side. These branches have survived and have reached a great height, whereas those on the western side, even though on the same plant, have been killed back.

P. quinquefolia (L.) Planch. VIRGINIA CREEPER

Zone 2b

A large vine that climbs by tendrils, used widely in home plantings for covering posts, stumps, stone piles, and old walls. It has large leaves composed of five leaflets and clings to its supports by means of disks at the end of each branchlet of the tendril. This species is similar to Boston ivy, but the latter has variable leaves, simple, trifoliate, or three-lobed, and disks terminating the tendrils instead of at the end of each branch. Virginia creeper grows wild from southwestern Quebec and New England to Florida and Mexico, and westward to Ohio, Illinois, and Missouri.

'Hirsuta' HAIRY VIRGINIA CREEPER

Zone 4b

A clone in which the inflorescence and the undersurface of leaflets are reddish and pubescent, especially when young. Found from New England to Mexico.

'Murorum'

Zone 5

Having tendrils with shorter branchlets and broader leaflets than the species. A southern form.

PAULOWNIA — Bignoniaceae

P. tomentosa (Thunb.) Steud.
PAULOWNIA, PRINCESS TREE

Zone 7

The plants were grown from seed collected from a tree near Taughannock Falls, N.Y. They come the nearest to being hardy of any paulownia tested at the Arboretum. In previous trials, plants from other sources were root-hardy for a few years before being completely killed, but the latest specimens survived for 3 years and started to form stems before succumbing to a bad winter. With careful selection, it might be possible to produce a hardy strain that would grow at least in the Hamilton area. A native of China.

PAXISTIMA — Celastraceae

The genus contains two species of low, evergreen shrubs, both of which are native to North America. Of the two, *P.*

canbyi is the hardier; the other, *P. myrsinites*, was planted in 1961 and has withstood the winters since then.

P. canbyi A. Gray — CANBY PACHYSTIMA

Zone 2b

A low-growing, neat dwarf shrub about 45 cm high with narrow oblong leaves about 1.5–2.5 cm long. Its main ornamental use is as a ground cover in semishaded locations. Of six plants tried, only one has survived; the others were planted in more open locations. It is therefore assumed that a sheltered spot facing east is best for this species in the Ottawa area. The shrub is found in the mountains of Virginia and West Virginia.

P. myrsinites (Pursh) Raf. — OREGON BOXWOOD

Zone 6

Except in sheltered areas, this plant has not proved hardy in the Arboretum. It is much lower growing than the other species and has broader, longer leaves. A native of western North America.

PERAPHYLLUM — Rosaceae

P. ramosissimum Nutt.

Zone 5

A medium-sized, deciduous, rosaceous shrub allied to *Amelanchier*, but with entire leaves, rounded petals, and a larger calyx tube. It appears to be hardy and has some ornamental quality because of its shapely, single, pink flowers with prominent stamens. It comes from northwestern North America, and from Oregon to California and Colorado.

PERIPLOCA — Asclepiadaceae

P. graeca L. — SILK VINE

Zone 6

The two plants in the Arboretum are root-hardy and are growing well, but cannot be expected to grow 6–9 m high because each year they are killed back to within about 30 cm of the ground. They are growing, however, in very heavy, poorly drained soil and should be moved to a better location. This plant has dark green, lustrous leaves and curious greenish yellow flowers. It is from southern Europe and western Asia.

PHELLODENDRON — Rutaceae

A small genus of trees distinguished from others in the Arboretum by its corky bark, its opposite, pinnate leaves swollen at the base, and its black, juicy, aromatic berries.

P. amurense Rupr. — AMUR CORK TREE

Zone 3

Said to be the best species for ornamental planting because of its picturesque habit and corky bark. In the Arboretum it differs in appearance from the others because its bark is a brighter, lighter brown with much more intricate markings, and its leaves are glaucous beneath. The largest specimen has reached a height of 15–18 m and has a spread of 9 m. It has a short (1 m) main trunk from which arise five large main branches, one almost at right angles. The other two trees are smaller, have only two main branches, and are more upright. A native of northern China, Manchuria, and Japan.

***Phellodendron amurense* 'Globe'**

'Globe'

Zone 3

In the test garden are two perfect globe-shaped trees on 2.5 m stems, which came from the Princeton nursery, New Jersey. Correspondence with Mr. W. Flemer III indicated that they were seedling trees, and that this form occurs naturally from time to time among his seedlings. The two trees are alike in silhouette, with round, dense heads, but they differ slightly in shape and texture of the leaves.

P. japonicum Maxim. — JAPANESE CORK TREE

Zone 3

The two trees are smaller than the other species. They have not grown higher than 7.5–9 m, and have spreads of 4.5 m. The bark is as attractive as that of *P. lavallei* and seems almost as corky. The main distinguishing character between the two species, however, is said to be the thickness of the bark. In the Arboretum, the bark of *P. japonica* is at least 2.5 cm thick in places and 1.5 cm in others; these measurements are the same for *P. lavallei* and vary with the part of the trunk tested. In mid-November at the Arboretum, the fruits of both

Japanese cork tree (*Phellodendron japonicum*)

species are still on the tree, whereas those of *P. amurense* have fallen. *P. japonicum* comes from central Japan.

P. lavallei Dode LAVALLE'S CORK TREE

Zone 3

This specimen has grown into a large tree with a trunk diameter of 50 cm. As big as the largest Amur cork tree, it is 10.5 m high and has a spread of 6 m. Its corky bark is dark grayish to deep brown. It differs from *P. japonicum* chiefly because of the shape of its leaflets, which are broadly cuneate instead of truncate at the base. It also originated in central Japan.

P. sachalinense (Friedr. Schmidt) Sarg.

Zone 3

The specimen of this tree on the grounds of the Central Experimental Farm is the finest and handsomest of the cork trees. However, this tree with its glabrous leaves, lustrous above, and its light gray, corky bark fits the description of *P. amurense* better that that of *P. sachalinense*, and the Amur cork trees sold by nurserymen better fit the description of *P. sachalinense*. Observation of trees at the Arnold Arboretum, Jamaica Plains, Mass., shows that the same problem exists there. Therefore, it is suggested that trees sold as *P. amurense* in the trade are *P. sachalinense*, and that the much superior specimen in the Arboretum (called *P. sachalinense*) is the true *P. amurense*. *P. sachalinense* is a native of northern Japan, Korea, and western China.

PHILADELPHUS Saxifragaceae

A large group of deciduous shrubs between 1 and 4 m tall, commonly known as either mock orange or syringa, although the latter is the generic name for the lilac. The lack of definite distinguishing characters and the ease with which hybrids can be produced from species and cultivars make this group one of the most difficult to identify. The fact that many plants now established in the Arboretum were obtained from seeds received from botanical gardens has increased this difficulty. The entire collection of *Philadelphus* in the Arboretum was transplanted in 1946 to another location. At that time there were some very large plants more than 50 years old, all of which survived and are still flourishing.

P. 'Audrey'

Zone 4

A striking mock orange, with slightly scented flowers composed of a row of four true petals and many petaloid stamens that together form semidouble flowers.

P. 'Beauclerc'

Zone 3

The hardiest of the group of cultivars that have flowers flushed with rose or have a central disk of rose. The middles of the flowers of this hybrid are not so prominently marked as some, but they are distinct.

P. brachybotrys Koehne

Zone 4

A species with an upright habit and cream-colored flowers that are small but produced in great profusion. A native of China and closely related to *P. pekinensis*.

P. 'Burkwoodii'

Zone 6

A selection from the cross *P. purpureomaculatus* 'Etoile Rose' × 'Virginal'. The flowers are narrow petaled and, as in so many hybrids from *P. purpureomaculatus*, have a rosy purple spot at the base. The selection originated at the nurseries of Burkwood and Skipwith in England in 1929. Like the other hybrids of this cross, it is killed back half way to ground level during severe winters.

P. caucasicus Koehne CAUCASUS MOCK ORANGE

Zone 4

A species closely related to the sweet mock orange (*P. coronarius*), but its leaves are pubescent beneath and the calyx is only slightly hairy. A native of the Caucasus.

P. confusus Piper PIPER'S MOCK ORANGE

Zone 4

A species closely related to *P. lewisii* but distinguished by its yellowish or gray close bark and ovate acute sepals. It grows in Washington.

P. coronarius L. SWEET MOCK ORANGE

Zone 3

The two specimens show a small percentage of double flowers identical to those of the cultivar 'Duplex'. Their growth is globose and neat, again like 'Duplex'. The sweet mock orange, one of the oldest shrubs in cultivation, was grown as long ago as 1560 by Gerard, who noted its heavy odor. It has yellowish white flowers about 2.5 cm in diameter on terminal racemes of five to nine blooms. It grows in southern Europe, Italy, and the Caucasus.

'Aureus' GOLDEN MOCK ORANGE

Zone 3

A form with yellow foliage that retains its color all summer.

'Duplex' DOUBLE SWEET MOCK ORANGE

Zone 4

A semidouble form with a low branching habit.

'Primuliflorus' PRIMROSE SWEET MOCK ORANGE

Zone 4

A double form with broad petals.

'Zeyheri' ZEYHER'S MOCK ORANGE

Zone 3

A hybrid with large, cup-shaped, pure white, scentless flowers and a low spreading habit. The flowers are not freely produced and are seldom in sufficient number to give a good floral effect.

P. ×***cymosus*** Rehd. CYMOSE MOCK ORANGE

Zone 4

A hybrid of *P. lemoinei* and probably *P. inodorus* var. *grandiflorus* or some closely related form. It has peeling bark and either double or single flowers in three- to nine-flowered cymes or racemes.

***Philadelphus* ×*cymosus* 'Bouquet Blanc'**

'Bouquet Blanc'

Zone 4

An unusually beautiful cultivar admirably adapted to the small home garden, either for use as a lawn specimen or for foundation planting. The plants at the Arboretum form perfectly symmetrical mounds 1 m high and 1.5 m wide. In June their short branchlets are heavily laden with pure white, glistening, single flowers well distributed over the entire plant.

'Voie Lactee'

Zone 4

A cultivar belonging to the *P.* ×*cymosus* group with single flowers in three- to nine-flowered cymes 3 cm in diameter, pure white, and leaves that are denticulate and pubescent beneath.

P.* ×*falconeri Sarg. FALCONER'S MOCK ORANGE

Zone 4

A hybrid of unknown parentage with light brown peeling bark and 2.5–4 cm fragrant flowers with long, narrow petals. Of graceful habit, it forms a mass of slender arching branches on a very tall plant.

P.* ×*floribundus Schrad. ex DC.

Zone 4

A hybrid of *P. coronarius* and perhaps *P. lewisii*; it is considered in *Hortus Third* to be synonymus with *P.* ×*cymosus*. However, it has peeling bark, coarsely toothed leaves that are hairy underneath, and slightly fragrant flowers 2.5 cm in diameter, borne in five- to seven-flowered racemes.

P. floridus Beadle BEADLE MOCK ORANGE

Zone 4

A large shrub much like *P. inodorus* var. *grandiflorus*, but with leaves that are densely pubescent underneath and more or less glabrous on top. It produces its very large flowers

***Philadelphus* 'Galahad'**

in one- to three-flowered racemes and in such abundance that it is spectacular when in bloom. The shrub grows into a tall, wide-spreading yet shapely plant with unusually dense foliage. It grows in Georgia.

P. 'Galahad'

Zone 4

One of the showiest mock oranges tested. The shrub itself is neat and of medium size, with long branches so heavily laden with single, white blooms that they hang pendulously. This cultivar which was developed at Dropmore, Man., has made the most showy, unpruned informal hedge.

P. hirsutus Nutt. HAIRY MOCK ORANGE

Zone 5

A straggly shrub with few scentless flowers produced earlier than in most of the other species. It is easily identified by its projecting buds, united styles, and very hairy leaves. It is botanically related to *P. purpureomaculatus*, but its flowers are not purple spotted. It grows from North Carolina and Tennessee to Georgia and Arkansas.

P. incanus Koehne GRAY MOCK ORANGE

Zone 5

About the last species to flower in the Arboretum and for that reason alone it is worthy of cultivation, because it helps to extend the season of bloom into July. It has medium-sized, white, round-petaled flowers produced on racemes containing from five to nine blooms. A thick pubescence on the underside of the leaves gives the shrub a grayish appearance. It comes from Hupeh and Szechwan, China.

P. inodorus L.

var. ***grandiflorus*** (Willd.) A. Gray
BIG SCENTLESS MOCK ORANGE

Zone 5

A large, vigorous shrub in the Arboretum, with flowers up to 5 cm in diameter, produced mostly singly but occasionally in threes. As its common name states, the flowers are scentless, but they are produced in such profusion that the wide-spreading plant is a remarkable sight toward the end of June. This species is distinguished from related ones by its dull, dark green denticulate leaves and by its almost four-

cornered flowers. Its range is from North Carolina and Tennessee to Florida and Alabama.

var. ***laxus*** (Schrad.) S. Y. Hu

Zone 5

A medium-sized, spreading shrub about 1 m high with deep brown peeling bark and elliptic oblong, oval denticulate leaves. The variety belongs to the group that usually produces from one to three flowers on a cyme; it has three. It is found in Georgia.

P. ×insignis Carrière SUMMER MOCK ORANGE

Zone 5

Another late-flowering kind with large, many-flowered panicles and grayish brown bark. The individual, slightly fragrant flowers are cup shaped with overlapping petals. It makes a fine shapely shrub and each year is laden with flower buds. The name *P.* 'Souvenir de Billiard' used to be given to this hybrid.

P. kansuensis (Rehd.) S. Y. Hu

Zone 4

A species from northwestern China. It should be hardier than the closely related species *P. pekinensis*, although this characteristic has not been observed in the Ottawa area. Its leaves are not glabrous like those of its relative, but have a few hairs on upper and lower surfaces. It is distinguished from *P. brachybotrys* by having a more spreading habit.

P. ×lemoinei (Hort.) Lemoine

Zone 4

Although there are no correctly identified specimens of this original hybrid (*P. coronarius* × *microphyllus*) in the Arboretum, there are many lovely horticultural forms that derive from it. The hybrid was introduced by M. Lemoine of Nancy, France, in 1883. The cross was a remarkable achievement and, as it was the progenitor of a new and different race of summer-flowering shrubs, it probably represents one of the greatest modern advances in ornamental plant breeding. The hybrid itself is still regarded by many as a worthy garden plant because it is fairly dwarf in habit and has pure white fragrant flowers that are produced in racemes of five to seven blooms.

'Avalanche'

Zone 4

A beautiful form with flowers 2.5 cm across produced in abundance on a shrub 1.5 m high and 1 m wide. The fragrant flowers, small leaves, and arching habit make it an outstanding member of the medium-sized group.

'Dame Blanche'

Zone 4

In its setting in the rock garden, this cultivar is outstanding. No other has such a mass of bloom so beautifully arranged in symmetrical outline. In early summer, the shrub is covered with flowers from the top of its 1.5 m height, to the ground, and for its full 1.5 m width. Of all the mock oranges currently viewed, 'Dame Blanche' is by far the best all-round form. It is similar to *P. ×cymosus* 'Bouquet Blanc', but has reddened stems instead of green.

'Erectus'

Zone 4

A sturdy, compact, erect shrub with small leaves and branches. Neither of the two specimens exceeds 1 m in

***Philadelphus ×lemoinei* 'Frosty Morn'**

height, and both produce their 2.5 cm flowers in great profusion. This form blooms almost a week earlier than the others and appears to have a stronger fragrance.

'Frosty Morn'

Zone 4

One of the newest acquisitions, and one of the most promising. It has become a shapely dwarf shrub, 1 m high and 1 m wide, with fully double, pure white flowers that are well formed and have no stamens showing.

'Innocence'

Zone 4

Another beautiful cultivar. All specimens are symmetrical, rather upright shrubs, 2 m high and 1 m wide. They are covered with blooms during the flowering season. The individual blooms are 4 cm in diameter and form a "bottlebrush" on racemes all around the branchlets. Each raceme has from seven to nine fragrant blossoms. From observations made, it seems that this plant produces a spectacular effect only once every 2 or 3 years, because of its inability to produce sufficient new wood.

'Manteau d'Hermine'

Zone 4

About the best form in the collection for its dwarf stature, although 'Silberregen', a new dwarf recently acquired, appears to have a more compact and neater habit. This mock orange has creamy white flowers, which in the specimens at the Arboretum have reverted to almost single blossoms with a few petaloid stamens. Regardless of their age, all specimens have only reached the dimensions of 1 m by 1 m. Its small leaves and branchlets make the shrub attractive even when it is not in flower. The creamy flowers, however, do not stand out from the yellowish leaves.

'Silberregen'

Zone 5

A compact bush, up to 1 m high, with dark green leaves and large, single flowers dotted among the leaves. It does not bloom as abundantly as many of the others, but it is more compact and more suitable for a trim, unpruned hedge.

PHILADELPHUS

P. lewisii Pursh LEWIS MOCK ORANGE

Zone 2b

A large floriferous species with a graceful, pendulous habit and medium-sized, single, scentless flowers. It is similar to its variety *gordonianus*, but it has glabrous leaves that are entire on the flowering shoots instead of denticulate as in the variety. It is also distinguished by its peeling yellowish bark. It grows from Montana to Washington and Oregon.

subsp. ***californicus*** (Benth.) Munz
CALIFORNIA MOCK ORANGE

Zone 3b

An attractive shrub with pendulous, peeling branches. It differs from *P. lewisii* by having a leaf stalk that does not hide the axillary bud as it does in the species. Its scentless flowers are produced in panicles composed of as many as 20 blooms. This must have been about the first shrub planted in the Arboretum, but it still survived transplanting in 1946. This plant was identified by Alfred Rehder when he was Curator of the Herbarium at the Arnold Arboretum. In his book *Manual of cultivated trees and shrubs* he only gives this subspecies a hardiness rating as far north as Philadelphia. This subspecies comes from California.

var. ***gordonianus*** (Lindl.) Koehne
GORDON MOCK ORANGE

Zone 3

A western American species discovered by David Douglas more than 100 years ago, it is now included with *P. lewisii* in *Hortus Third*. However, the plants in the Arboretum are distinct. The specimens are shapely and wide spreading, 3.5 m high and up to 3 m wide. The leaves are large and coarse and the flowers, 4 cm in diameter, are in racemes of from seven to nine blooms. The shoots of this species are said to have been used by the native Indians as arrow shafts. It is native to British Columbia, Idaho, and northern California.

'Waterton' WATERTON MOCK ORANGE

Zone 2b

Forms a bushy plant with small leaves and single, white flowers 2.5–4 cm in diameter. It is more valuable for its neat habit than for its profuse flowering, but it is attractive when in bloom. Perhaps it has more appeal for those who prefer elegance to massiveness, as its flowers are well spaced over the bush and not bunched. It is one of the hardiest cultivars.

P. ×***magnificus*** Koehne

Zone 4

A hybrid (*P. inodorus* var. *grandiflorus* × *pubescens*) that forms a vigorous spreading shrub with large leaves and flowers. It has from three to five flowers in a raceme so that it is closer to *P. pubescens* than to *grandiflorus*, but it has not the hairiness of the former. It has no special ornamental merit that would place it above other species.

P. 'Marjorie'

Zone 4

A cultivar with sweetly scented, round-petaled, single flowers produced abundantly; it has six to ten flowers on a terminal stem.

P. microphyllus A. Gray LITTLELEAF MOCK ORANGE

Zone 4

A shapely shrub with a dense bushy habit and slender but rigid branchlets. It has shiny brown, peeling bark and small, creamy white flowers that have a slight pineapple fragrance. It can be easily distinguished from other species by its small leaves, which are not more than 2 cm long and 1.5 cm wide, and by its low, compact habit. Its range is from Colorado to New Mexico and Arizona.

P. ×***monstrosus*** (Späth) Schelle.

Zone 4

A hybrid (*P. lewisii* var. *gordonianus* × *pubescens*) with large, single, scentless flowers evenly placed over the whole plant. It differs from the other species of mock oranges in that it has much shorter stigmas, which are narrower than the anthers.

P. ×***nivalis*** Jacques SNOWBANK MOCK ORANGE

Zone 4

A hybrid (*P. coronarius* × *pubescens*) with small, single flowers in five- to nine-flowered racemes. The leaves of *P.* ×*nivalis* are not as hairy underneath as the leaves of *P. pubescens*, which is also a neater shrub. The specimens in the collection stand out from the other mock oranges because of their distinct grayish appearance, which seems to extend to the leaves, branchlets, and flower stems alike. However, they are not showy shrubs as they have large, coarse leaves.

P. pekinensis Rupr. PEKING MOCK ORANGE

Zone 3

A distinctive species that has deep creamy yellow flowers and grayish leaves with purple stalks. The plants have formed spreading shrubs 1.5 m high and about 2 m wide. The flowers are no more than 2 cm in diameter and are not produced in great abundance. The species ranges from northern China to Korea.

P. ×***pendulifolius*** Carrière

Zone 3

This hybrid (*P. pubescens* × *laxus*) differs from other mock oranges in that it has large, green, pendent leaves and a dwarf, thick habit. No blooms have as yet been observed on either of the two specimens, so it is assumed to flower infrequently.

P. ×***polyanthus*** Rehd. POLYANTHUS MOCK ORANGE

Zone 5

A hybrid (*P. insignis* × *lemoinei*) with peeling bark. Its leaves are about 5 cm long, entire, and pubescent beneath.

'Atlas'

Zone 5

A cultivar that has large, single flowers produced in abundance. It is a tall, upright shrub, with peeling bark on the branches.

'Favorite'

Zone 5

A cultivar with large, coarsely toothed leaves, 6 cm in width and length. The specimens have formed large bushes 2.5 m high and 1 m wide. In some years they produce their large flowers in profusion, but in others they are not attractive at all. 'Favorite', like 'Innocence' and 'Enchantment', needs 2 or 3 years to produce enough new growth for abundant blooms.

PHILADELPHUS

Flowers of *Philadelphus* ×*polyanthus* 'Atlas'

'Mont Blanc'

Zone 5

A form with single, white, heavily scented blooms 3 cm in diameter. It forms a good mounded shape, but does not have such a pleasing inflorescence as some of the others because its petals are spaced farther apart and its flowers droop slightly and are borne only three to five in a raceme.

'Norma'

Zone 5

This cultivar has large, single, white flowers borne in threes or fives. The shrub is larger and more vigorous than the type and has larger flowers and leaves. It is a little too coarse for planting in ordinary home gardens.

'Pavillon Blanc'

Zone 5

Appears to flower much later than the other mock oranges. It has deep green leaves about 4 cm long and 2 cm wide, and many medium-sized, single, scentless flowers, freely produced. In the collection the specimens are 2 m high and 1 m wide. It cannot be recommended for its height, but it is useful in that it extends the mock orange season.

P. pubescens Loisel. HOARY MOCK ORANGE

Zone 4

The specimens are large, coarse shrubs, some growing as high as 4.5 m and almost as wide. They have grayish, nonpeeling shoots and large leaves, decidedly pubescent underneath. The flowers are 4 cm in diameter and up to nine are borne on a raceme. *P. pubescens* is probably most appropriately used as a large specimen plant to form a screen, because it produces its flowers in profusion and has a neat habit when growing by itself. It is found from Tennessee to Alabama and Arkansas.

var. ***verrucosus*** (Schrad.) S. Y. Hu
WARTY MOCK ORANGE

Zone 4

A variety that is much like *P.* ×*nivalis*, but without its grayish appearance. It produces only a few small scentless flowers. Observations have failed to reveal any characteristic that might have suggested its varietal name, as it appears to be no more verrucose than the others. It is a native of Illinois.

P. purpurascens (Koenne) Rehd.
PURPLECUP MOCK ORANGE

Zone 4

A graceful shrub with fragrant, white flowers that are made more distinctive by the purple color of the calyx, although this characteristic is apparently not as marked in some specimens as in others. The species comes from northwestern China.

P. ×***purpureomaculatus*** Hort. Lemoine

Zone 4

A hybrid (*P. coulteri* × *lemoinei*). There is no specimen of the original hybrid in the Arboretum, but several cultivars bearing close affinity are in the collection. *P. coulteri* has imparted a rosy-tinged center to the hybrid and its selected offspring, but it has also handed down some of its tenderness, a character that appears in the specimens.

'Belle Etoile'

Zone 5b

Of the two cultivars resulting from this cross growing in the collection, 'Belle Etoile' is the more vigorous and probably the hardier but less floriferous. It has large, white flowers with the merest suggestion of a rosy marking in the center.

'Nuage Rose'

Zone 5b

Although the weaker of the two, this cultivar produces a striking effect with its abundant rosy white flowers. The rose color, although chiefly concentrated in the center of each flower, spreads to the outer petals, giving them a blush-white appearance. In milder climates, 'Nuage Rose' would make a beautiful plant.

P. satsumanus Siebold ex Miq.
SATSUMA MOCK ORANGE

Zone 5

Large, erect shrubs 3 m high and 2 m wide, with dark green leaves and nonpeeling bark. The flowers are small, only slightly fragrant, and produced too sparsely to make the plant of significant value in the garden. It is a native of Japan.

var. ***nikoensis*** Rehd.

Zone 5

A variety in which the young branchlets and the undersides of the leaves are more or less pubescent. Said by Krüssmann to be identical to the species.

P. schrenkii Rupr. SCHRENK MOCK ORANGE

Zone 3

The two specimens have not been growing long enough for proper assessment of their hardiness or ultimate size. This

PHILADELPHUS

species is supposed to be one of the hardiest mock oranges and able to impart this hardiness to its offspring. It is an early flowering type but has no other advantage over other species. It occurs from Manchuria to Korea.

P. sericanthus Koehne SILK MOCK ORANGE

Zone 4

A free-flowering species with large, dark green, more or less glabrous leaves and medium-sized scentless flowers in racemes containing up to 11 blooms. It is mainly distinguished from the others by the stiff, depressed, silky white hairs on its calyx. It comes from Hupeh and Szechuan provinces in China.

P. tenuifolius Rupr. & Maxim.

Zone 4

The two old specimens have formed good-sized spreading bushes; they have large, thin leaves and slightly fragrant flowers, 2 cm in diameter, with pubescent pedicels. The shrub grows from Manchuria to Korea.

P. tomentosus Wallich WOOLLYLEAF MOCK ORANGE

Zone 4

Easily distinguished because its leaves have a tomentose undersurface, which looks and feels like grayish felt. It is said to be closely related to *P. coronarius*, but its flowers are not as sweetly scented and are a purer white, and the styles are as long as the stamens, not shorter. Also, it does not have the well-formed habit of that species. A native of the Himalayas.

P. ×virginalis Rehd.

Zone 3b

A large hybrid shrub (?*P. nivalis* 'Plenus' × *lemoinei*) with semidouble and double flowers in three- to seven-flowered racemes. A little too coarse for small home gardens, but an excellent type for cut flowers. The following, however, are good, closely related cultivars of this group.

'Albatre'

Zone 4

A smaller and more shapely form than most of these hybrids and better suited for the home garden because it seldom grows more than 1.5 m high. Its pure white flowers are fully double, about 3 cm in diameter, and are produced in racemes of three to five.

'Argentine'

Zone 5b

Despite their 40 years in the Arboretum, these plants have never grown into shapely specimens. After severe winters they are invariably killed to ground level and the new shoots that arise do not produce flowers until the following season. This is unfortunate because when the shoots escape winter injury and the shrub flowers abundantly, it is a remarkable cultivar. Its flowers are 6 cm in diameter, completely double, pure white, and one to three in a raceme.

'Enchantment'

Zone 4

A graceful shrub similar to *P. ×virginalis* 'Glacier' but with larger individual flowers, which are not so closely bunched; its blooms are fully double and have fringed petals.

***Philadelphus ×virginalis* 'Enchantment'**

'Fleur de Neige'

Zone 4

A medium-sized shrub, 1.5 m high and 1 m wide, with 5 cm blooms produced more sparingly than those of some of the other similar, and consequently better, kinds.

'Glacier'

Zone 4

A medium-sized cultivar with double flowers 4 cm across. It is more upright in habit than *P. ×cymosus* 'Bouquet Blanc' and less symmetrical, but its pure white double flowers are produced in similar fashion.

'Minnesota Snowflake'

Zone 3b

A cultivar with large, green leaves and fully double flowers 4–5 cm in diameter. The inner petals are not as large as those of 'Argentine', but there are eight to ten flowers in a raceme. The specimens at the Arboretum formed bushes 2 m high and 1 m wide. The plant is a little too coarse for the small home garden, but worth growing as a specimen lawn shrub if smaller plants can be used to hide the naked stems it will eventually show.

'Mrs. Thompson'

Zone 4

A large vigorous cultivar that has grown to a height of 3.5 m and is 2.5 m wide. It flowers a little earlier than most other kinds and has large, coarsely toothed, dark green leaves, some of them measuring 9 cm by 12.5 cm. Its fragrant, single flowers are from 2.5–4 cm in diameter.

'Patricia'

Zone 4

This cultivar has thick, leathery, dark green leaves and fragrant flowers, which, although abundant, do not produce a showy effect because they lack size and brilliance. The general appearance of the shrub when not in bloom, however, makes it rate higher than most cultivars, because it possesses a thick branching habit and foliage of good substance.

'Purity'

Zone 3b

A striking cultivar 1.5 m high and about 2.5 m wide, with pure white, four- or five-petaled flowers, seven to a raceme. Its dark green leaves are thick but completely hidden by the abundant bloom when the plant is in flower. A fragrant type that rates extremely high.

'Silvia'

Zone 3b

As it grows in the Arboretum, this mock orange is a shapely plant with pendulous branches. It has double, pure white flowers on short racemes containing eight or nine blooms. The flowers are 4 cm in diameter and are not marred by protruding stamens as are so many double forms.

'Thelma'

Zone 4

A shapely shrub 1 m high and 1 m wide, with small scentless blossoms produced sparsely in racemes containing up to six flowers. It does not appear to be as good as many others that are hardy in the Ottawa area, but it might be desirable for growing where more severe winters prevail.

'Virginal'

Zone 3b

The well-known virginal mock orange, which has been planted too often in gardens. Although the most commonly grown type, it is being superseded by cultivars with similar flowers but a more dwarfed and neater habit. It is of use only at the back of the shrub border, where its lovely semidouble, pure white flowers show to advantage and may be used for cutting.

PHOTINIA — Rosaceae

This genus of shrubs from northern Asia is closely allied to *Sorbus* and *Aronia*.

Flowers of *Philadelphus* ×*virginalis* 'Silvia'

P. villosa (Thunb.) DC. — ORIENTAL PHOTINIA

Zone 5b

A shapely shrub with thick, leathery, dark green leaves that turn to brilliant red in the fall, and bright red fruits that persist well into the winter. Its flowers, as well as its fruits, closely resemble those of the hawthorn and appear more attractive than hawthorn flowers against the background of dark green leaves. The specimens in the collection have reached a height of only 1.5 m and a width of 2 m in their 60 or more years of growth. The shrub is a native of Japan, Korea, and China.

f. ***maximowicziana*** (Levl.) Rehd. — VEINYLEAF PHOTINIA

Zone 5b

A form with leaves that are rounder and shorter pointed and have slightly more prominent veins.

PHYSOCARPUS — Rosaceae

Plants of this species are large, quick-growing shrubs allied to the spiraeas, but distinguished from them by their shiny seeds and by having leaves without stipules.

P. amurensis (Maxim.) Maxim. — AMUR NINEBARK

Zone 3b

A large shrub 2–2.5 m high, resembling the common ninebark (*P. opulifolius*) but with larger leaves and more downy seed pods, which remain green and are consequently less attractive. It originated in Manchuria.

P. bracteatus (Rydb.) Rehd.

Zone 5

A large, shapely shrub that should be grown more often than it is. As a specimen plant it equals the snowhill hydrangea in its floral effect; even though its flowers are smaller, they are produced on a symmetrical shrub that forms a solid mound and is especially attractive when displaying its fine foliage in early spring. This plant was received from the Arnold Arboretum in 1911, a few years after its introduction into cultivation as *Spiraea ramaleyi*, the name by which it was then known. It comes from Colorado.

P. capitatus (Pursh) O. Kuntze — WESTERN NINEBARK

Zone 4b

Similar to *P. opulifolius*, but distinguished by the leaves, which are more pubescent beneath, and by the pear-shaped seeds. It is, in fact, a western form of that species. It grows from British Columbia to Idaho and northern California.

P. opulifolius (L.) Maxim. — COMMON NINEBARK

Zone 2b

A tall-growing, common shrub that has found a place in gardens and seems to thrive in any soil. It has beauty of foliage in early spring when its unfolding buds are as yellow as most forsythias flowering at that time. In June its pinkish white flowers have some attraction, and they are followed by seed pods that turn to crimson in summer and provide good material for floral arrangements. All winter the graceful, arching, peeling branches produce further interest. It is native from Quebec to Virginia and Tennessee.

var. ***intermedius*** (Rydb.) C. K. Schneid.
ILLINOIS NINEBARK

Zone 5

A smaller shrub than the common ninebark, growing up to 1.5 m high and having pubescent seed pods that are nearly twice as long as the sepals. Its white flowers are in dense umbels and are showy. Its range is from southern Ontario and western New York to Illinois, Missouri, Arkansas, Colorado, and South Dakota.

'Luteus' GOLDLEAF NINEBARK

Zone 3

This cultivar extends the early spring golden color for a longer period than the species, especially if grown in full sun; later, however, it changes to bright green and is almost indistinguishable from the common ninebark.

'Nanus'

Zone 2b

A useful little shrub that grows no more than 1 m high and has less deeply lobed, dark green leaves than the species.

f. ***parvifolius*** DWARF ILLINOIS NINEBARK

Zone 5

A much more desirable form for home gardens than the type. It becomes a dense bush, with smaller and more refined leaves than most other kinds, and produces small, white flowers in abundance. Later, its leaves and bark combine to give a good fall and winter effect.

P. stellatus (Rydb.) Rehd. ALABAMA NINEBARK

Zone 3b

A species related to *P. opulifolius* var. *intermedius*, but differing in that its branchlets and leaves are covered with stellate hairs. The umbels of this specimen are large and loose. It is found from South Carolina to Alabama and Georgia.

PICRASMA **Simaroubiaceae**

P. quassioides (D. Don) Bennett

Zone 7

The old specimen planted in the Arboretum has persisted through the years as a shrub with a gnarled and knotted stump. Sometimes during its history it has survived a few winters as a large branch, which is later killed and cut back to form yet another part of the already large bole. A tree more of interest for its botanical affiliation than for ornamental reasons. It is native to Japan, China, the Himalayas, and Java.

PLATANUS **Platanaceae**

A genus of large trees with maple-like leaves, which, however, are arranged alternately. The fruits of this tree are distinct from the maples because they are in the form of large balls that hang from the branches, sometimes solitarily and sometimes in groups of two, three, or six.

P.* ×*acerifolia (Ait.) Willd. LONDON PLANE

Zone 6

The specimen in the Arboretum came to us as *P. orientalis* L., a name often given to it by nurserymen. In its 3rd decade, it has grown into a specimen 15–18 m high with a 7.5

London plane (*Platanus* ×*acerifolia*)

m spread, and it has only recently begun to bear fruits. It has a beautiful shape and is handsome with its large leaves and flaking bark. The main differences between this and the oriental plane (*P. orientalis*) are that it has one or two fruit heads, whereas the other species has three or more, and it has leaves that are more deeply lobed. This species is the tree one sees mutilated on the streets of London, England; the new shoots are cut back to the trunk each year to restrict growth, an operation known as pollarding.

The London plane is believed to be a hybrid of *P. occidentalis* and *P. orientalis*. A great many plants sold by nurserymen are probably obtained from seeds, and some of the seedlings may have inherited a greater degree of hardiness

Bark of buttonwood (*Platanus occidentalis*)

from *P. occidentalis* than others. This may be why some specimens are not hardy in the Ottawa area and others, such as the present specimen, come through the winters unscathed. It is significant that no other specimen of *P.* ×*acerifolia* exists in the Arboretum although many others have been planted; however, a very large specimen more than 60 years old stands near the Macoun Memorial Garden in the Ornamental Gardens.

P. occidentalis L. BUTTONWOOD

Zone 5

The specimens have grown into large trees, up to 22.5 m high, with a spread of well over 30 m. They have large limbs and bear ugly black scars where other branches have long since been removed. This species differs from the London plane in that its fruit heads are solitary and the lobes of the leaves are broader than they are long. It grows from Maine to Ontario and Minnesota, and south to Florida and Texas.

POPULUS Salicaceae

A group of large, vigorous trees. The male and female flowers, produced in catkins in early spring, are borne on separate trees.

Members of this genus have rambling roots that can clog drains and sewers and heave concrete walks and foundations. Because of these and other undesirable characteristics, most of them are not recommended for use on city streets or in small gardens. Their wood is extremely brittle and breaks easily with the weight of snow and ice in winter, and the trees are likely to lose their large branches during heavy storms in summer.

P.* ×*acuminata Rydb.

Zone 5

This tree (*P. angustifolia* × *sargentii*) has a sturdier and more compact habit than either parent. It bears diamond-shaped, bright green leaves, shiny green on both sides but a little paler beneath, and with shorter leaf stalks.

P. alba L. WHITE POPLAR

Zone 2

A distinctive poplar because of the white woolly undersurfaces of its leaves, which the slightest breeze reveals as shining silver. When the tree is mature, the main trunk is dark gray and beautifully fissured, but the extending large branches are almost as white as those of the canoe birch (*Betula papyrifera*). The specimens in the Arboretum are 18 m high and 12 m wide; they have an open, irregular, wide-spreading habit. Their leaves are dark green above when mature but grayish green when young because of the soft down, which later drops off. The undersides of the leaves are intensely woolly at first and although this pubescence also sheds, they remain a bright silvery gray. On young vigorous shoots the leaves are almost maple-like, with five pronounced lobes. The species ranges from central and southern Europe to western Siberia and central Asia.

'Nivea' SILVER POPLAR

Zone 2

A beautiful form of the white poplar, the leaves having more intense silvery undersides. The specimen is 22.5 m high, has a spread of 15 m, and is conspicuous among the other trees nearby, especially when the early morning sunlight catches the silvery leaves and white bark. The trunk of this specimen, like that of the species, is dark gray and deeply fissured. The tree looks exactly like the specimen of *P. canescens* standing next to it, except that its younger branches are white, whereas in the other all the branches are dark gray.

'Pyramidalis' BOLLEANA POPLAR

Zone 4

A symmetrical, columnar poplar with a habit similar to the Lombardy poplar (*P. nigra* 'Italica') but with a more beautiful trunk and slightly less bunched habit. Its young branches, like those of the Lombardy poplar, arise almost parallel to the trunk, but they are much less brittle and are not so likely to litter the ground. In fact, the Bolleana poplar is a more refined Lombardy type, less prone to disease and more desirable for planting. Unlike the white poplar, this form has leaves with green undersides, which do not give the same silvery effect.

'Richardii' RICHARD'S GOLDEN POPLAR

Zone 5

The upper surfaces of the leaves of this cultivar are bright golden yellow; the undersides and the young shoots are covered with white felt.

P. angustifolia James WILLOW-LEAVED POPLAR

Zone 2

A small poplar that is unlike most of the other species in habit, shape of its leaves, and vigor. The specimen has grown to a height of only 7.5 m and has a smooth trunk with a diameter of 25 cm. As its common name suggests, its leaves are much like those of the narrow-leaved willows; however, they are green beneath and have an odor of balsam when crushed. If grown in good soil and well tended, this species would make a distinctive and desirable specimen for small home gardens. It grows from Assiniboine to Nevada, Arizona, and New Mexico.

P. 'Bachelieri'

Zone 4

A hybrid (*P. angulata* × *trichocarpa*) with a uniform narrow habit and ovate, slender, pointed leaves. All the trees are male, which should be an advantage over less desirable types.

P. balsamifera L. BALSAM POPLAR

Zone 1

The leaves of this tree are ovate, tapering to a long point, and have fine serrate teeth. It is the only native species in which the leaf stalks are round. It grows wild from Labrador to Alaska, and south to Nebraska and Colorado.

var. ***subcordata*** Hyl. BALM OF GILEAD

Zone 1

The leaves of this tree resemble those of the species, but they are more heart shaped and have larger teeth. Its branches are more spreading and its leaf stalks and young shoots are downy. Botanists are uncertain as to the origin of the tree; some think it is a native of North America, whereas others prefer to consider it of Asiatic origin. The specimen in the Arboretum is 22.5–30 m high, with a spread of about 3.5 m. It has gray-white, smooth bark, except for about 4.5 m of its trunk, which is fissured. There are roundish black markings on the larger branches.

P. ×***berolinensis*** Dipp. BERLIN POPLAR

Zone 2

A large columnar hybrid (*P. laurifolia* × *nigra* 'Italica') that grows well on the prairies where the winters are very cold and the summers are hot. All three specimens are at least 22.5 m high and have spreads of less than 3 m. The trunk is a darker gray than in other poplars and fissured to a height of 4.5 m, above which it appears smooth and whitish gray. This hybrid seems to have some of the qualities of both parents. Its leaves are finely toothed, broad ovate, bright green above, and slightly grayish beneath.

P. ×***canadensis*** Moench HYBRID BLACK POPLAR

Zone 3b

A hybrid (*P. deltoides* × *nigra*) that originated in France about 1750. The specimens in the Arboretum are 22.5–30 m high with spreads of 6 m. The leaves are like those of *P. deltoides*, that is, more or less triangular or deltoid and about 7.5 cm in diameter.

Despite the name *P.* ×*euramericana* Guinier, sometimes given for the *P. deltoides* ×*nigra* hybrids, Boom, Krüssman, and *Hortus Third* have retained the name *P.* ×*canadensis* Moench for this group, which they claim is sufficiently distinct because of a lack of glands on the leaves. If the name *P.* ×*canadensis* is not accepted, they state that the next species in line is *P.* ×*marilandica* Bose ex Poir, and it would cause considerable confusion if the group of hybrids were included in that species, because the name is used for a particular cultivar within the group.

'Aurea' VAN GEERTE POPLAR

Zone 3b

A cultivar with yellowish leaves in spring and early summer; not as vigorous as the species.

Populus* ×*canadensis

'Erecta'

Zone 3b

A cultivar with a loose columnar habit. The specimen has grown 22.5 m high in more than 60 years since it was planted.

'Eugenei' CAROLINA POPLAR

Zone 2

A large, coarse tree of broad columnar habit. The specimens are from 22.5–30 m high and have a good appearance. The trees are not, however, recommended for planting in gardens because not only do their roots become a menace to sewers and drains, but at various seasons of the year they spread floss, bud scales, and twigs over lawns and flower beds. Their wood is extremely brittle and can cause considerable damage during windstorms and after heavy snow. The hybrid originated in the nurseries of Simon Louis et Metz, France, in 1832; the trees in the Arboretum came from this source 60 years later.

'Gelrica'

Zone 3b

P. ×*canadensis* 'Gelrica' has a narrow pyramidal shape but is slighty broader than the Lombardy poplar.

'Marilandica'

Zone 3b

A large, wide-spreading tree with a corrugated trunk and diamond-shaped leaves. The catkins produced are always female, about 10–15 cm long. These poplars, like many others, strew their cottony seeds all over the lawn and grounds after the spring clean-up has been completed.

'Robusta' FALSE LOMBARDY POPLAR

Zone 4

A hybrid (*P. deltoides* 'Cordata' × *nigra* var. *elegans*). The two specimens have made shapely trees of loose columnar habit, 18 m high and 3 m wide. The hybrid is quick growing and vigorous, and might replace the Lombardy poplar as a good screen. It does not have the same snug habit but is neater in every way. Its leaves are reddish when young and almost truncate at the base.

'Serotina' BLACK ITALIAN POPLAR

Zone 4

A large tree with wide-spreading and ascending branches. It differs from the others by having brownish yellow new branchlets and truncate leaves. The trees in the collection are about 21 m high and 6 m wide and have light gray bark fissured to the top of the trunk.

P. ×***canescens*** (Ait.) Sm. GRAY POPLAR

Zone 4

The specimen (*P. alba* × *tremula*) has formed a wide-spreading tree 18 m high and 12 m wide, with beautiful, light gray, furrowed bark. Its leaves are roundish and at first covered with white felt, but this soon disappears. The hybrid is often confused with *P. alba*, but it is easy to tell them apart. In *P. alba* the leaves remain silvery white on the undersides, whereas in the gray poplar the undersides are light gray at first but later shiny green. This natural hybrid is found in western Europe.

P. deltoides Bartr. ex Marsh. COTTONWOOD

Zone 2b

Large, wide-spreading trees up to 30 m high and 18 m across. The triangular leaves, which distinguish this species from most other poplars, have two to three glands at the base and curving teeth. The species grows from Quebec to North Dakota, Kansas, Texas, and Florida.

var. ***missouriensis*** (A. Henry) A. Henry
SOUTHERN COTTONWOOD

Zone 3

The specimens have formed beautiful trees in the 25 years since they were planted; they are 9 m high and of perfect pyramidal shape down to ground level. Although *Hortus Third* includes this variety with the species, it differs in that it has more strongly angled branchlets, broader leaves, and petioles with three or four glands at the apex. Its range is from Vermont to Ohio, Missouri, Mississippi, and Florida.

P.* ×*generosa A. Henry

Zone 2b

A vigorous hybrid of *P. deltoides* 'Corelada' × *trichocarpa* raised at Kew. Its young shoots are glabrous, shiny gray-green, and slightly angled; the leaves are triangular ovate, truncate, or almost heart shaped at the base. The margins are translucent with incurving, gland-tipped teeth. The male catkins are 10–12.5 cm long and have reddish stamens with white stalks; the female catkins are longer than the male ones and have three stigmas.

P. 'Griffin'

Zone 2b

A hybrid poplar with pale green leaves and a more or less narrow columnar habit.

P. grandidentata Michx. LARGE-TOOTHED ASPEN

Zone 2b

As its botanical name suggests, the most distinctive character of the species is the large, wavy or looped margins of its leaves, with prominent and irregular, large teeth. When the green leaves unfold they are tomentose and grayish but later they turn to light green. The trees in the Arboretum are 22.5 m high and 6 m wide. They have yellowish gray, smooth bark and light triangular scars. The species grows from Nova Scotia to Ontario and Minnesota, and south to North Carolina, Tennessee, Illinois, and Iowa.

P. koreana Rehd. KOREAN POPLAR

Zone 3b

The beautiful specimen, planted about 10 years ago, is worth mentioning for its large leaves with silvery undersides and red midribs; the leaves are 15–23 cm long and 7.5–10 cm wide and appear leathery and reticulated on the upper surface. They become stained when they are bruised by high winds, a character that mars the tree's beauty. At the Arboretum, the tree has withstood many severe winters without damage, so it is probably hardy. Like most poplars, it is easy to propagate; long shoots thrust into the soil in November are rooted by mid-June. The tree is 10.5 m high and has a broad columnar habit. The species comes from Korea.

P. laurifolia Ledeb. LAUREL POPLAR

Zone 4

A distinct species that has large, oval-lanceolate leaves, shiny green above and whitish beneath, with minute glandular-tipped teeth. This specimen has a beautiful shape, light gray, cork-like bark, and has not exceeded 15 m in height. The large, laurel-like leaves of this species are attractive, and it may be one of the better trees for planting on small estates. It is a native of Siberia.

P. maximowiczii A. Henry

Zone 5

A species with leaves that are deep green on top and silvery underneath, with a prominent, vivid red midrib. They are 15–20 cm long and curiously twisted at the apex. The species is similar to *P. koreana* but not as large and its leaves do not bruise as easily. It ranges from northeastern Asia to northern Japan.

P. nigra L. BLACK POPLAR

Zone 4

The trees are 18 m high and 12 m wide, with large, spreading branches. Their trunks have fissured bark for the first 3 m and then more or less smooth, flaky, light gray bark to the top and on the larger branches. The leaves are translucent at the margins, rhombic-ovate, and cuneate at the base but with no basal glands or marginal hairs, which are present on other closely related species. It grows in Europe and western Asia.

var. ***betulifolia*** (Pursh) Torr. BIRCH-LEAVED POPLAR

Zone 4

A variety with downy, young shoots, petioles, midribs, and flower stalks. Found in Europe.

var. ***elegans*** L. H. Bailey

Zone 4

More upright in habit than the species; not as slender as the Lombardy poplar, but with pubescent and reddish petioles.

'Italica' LOMBARDY POPLAR

Zone 4

The well-known Lombardy poplar is easily distinguished by its erect branches that are parallel to the trunk. The young plants grow rapidly and for this reason are often planted as windbreaks or screens. If used in this way, the poplars should be interplanted with spruce or similar evergreens so that they may be replaced eventually. The Lombardy poplar is planted much too frequently. At least one other similar kind, the Bolleana poplar, is more desirable; it is not so vulnerable to disease, nor has it the rather untidy habit of shedding small branchlets and becoming ragged with age.

var. ***thevestina*** (Dode) Bean
ALGERIAN POPLAR, THEVES' POPLAR

Zone 4

A geographical variety from Asia and North Africa similar to the Lombardy poplar, but with whitish bark on the trunk and grayish bark on the older branches. Because it is less prone to disease than the Lombardy poplar, it is replacing that species in many areas.

P. sargentii Dode GREAT PLAINS COTTONWOOD

Zone 2b

Similar to *P. deltoides* in habit and leaf shape. It differs, however, because it has pubescent buds and more coarsely dentate leaves. The specimen at the Arboretum has grown 18 m high and has a spread of 12–15 m. It has dark gray, fissured bark with flat furrows. It is found from Saskatchewan and Alberta to Nebraska, New Mexico, and western Texas.

P. simonii Carrière SIMON POPLAR

Zone 2b

The Simon poplar is easy to tell from the others by its pendulous branchlets and its obovate leaves, which are dark green above and light green beneath. The specimen is 15 m high and appears to have reached the limit of its life span, for several large branches have had to be removed in recent years. Its large trunk, at least 75 cm in diameter, is light gray, mildly fissured, and flat furrowed. Its branches are whitish gray and smooth and have dark gray to black markings and scars. It comes from northern China.

'Fastigiata' PYRAMIDAL SIMON POPLAR

Zone 2b

A form of the above species that is distinct in habit and leaf shape. It has upright branches and an almost columnar habit. It is not as compact as the Lombardy poplar, but is a good substitute in areas where severe winters prevail. The leaves of this form are different from those of other poplars; they are obovate, rather like those of a *Cotinus*, with the broadest part of the leaf above the middle. The bark of the young trees is light gray and smooth.

P. tremuloides Michx.
ASPEN POPLAR, TREMBLING ASPEN

Zone 1

The oldest plants of this species, which were set out in 1890–1910, nearly all died recently and have been replaced with new specimens collected locally. This tree has an open, loose habit and light gray bark. Its leaves are roundish, smooth, and about 1.5–5 cm long and wide. The petioles are flattish and do not support the leaves against even the slightest breeze; hence, they always appear to be trembling. This native species ranges from Labrador to Alaska, and south to Pennsylvania.

POTENTILLA ROSACEAE

The shrubby potentillas, or cinquefoils, are becoming popular for ornamental planting in Canada. They are useful as shrubs in foundation plantings because they withstand clipping well and can be pruned to any shape, yet they still flower profusely and continue to bloom intermittently all summer. They endure long periods of drought and survive the hot conditions that often prevail near the walls of homes. They are also useful as small hedges, from 45–90 cm high, and some forms fit in well as plants for the rock garden.

The nomenclature of the shrubby potentilla is in a chaotic state and, although a few recent revisions of the genus have been made and some cytological observations have appeared in the literature, there is still a definite need for a detailed study. For convenience the taxa here are named according to H. J. L. Rhodes, who was responsible for gathering most clones and who identified them as represented.

P. davurica Nestl.

'Beesii'

Zone 2

A gray-leaved cultivar with bright yellow flowers; the two plants in the collection did not flourish and were short-lived.

'Snowflake'

Zone 2

A tall shrub with prominent, semidouble, white flowers. A good shrub for dry places and one that produces flowers periodically all summer.

'Veitchii'

Zone 2

An erect shrub with light yellow, single flowers that, unlike those of other derivatives of *P. davurica*, seldom produce extra petals.

'Vilmoriniana'

A cultivar with creamy white flowers.

P. ×*friedrichsenii* F. L. Späth

Zone 1

A variable hybrid (*P. davurica* ×*fruticosa*) with flowers from pale yellow to white. The clonal specimens at the Arboretum are extremely vigorous and have large, pale yellow flowers. Rhodes refers to them as a cultivar, which he names 'Berlin Beauty'.

P. 'Friesengold'

Zone 1

This cultivar forms a shapely rounded shrub 75 cm high and 75 cm wide; it has light yellow flowers.

P. fruticosa L. SHRUBBY CINQUEFOIL

Zone 1

A large shrub with erect stems and ovate to oblong leaflets, usually five. Its flowers are bright yellow but not produced as freely as in many of the cultivars. This species has a wide distribution throughout the northern hemisphere, but all the plants collected in North America by botanists of the Central Experimental Farm were observed to be diploid, whereas collections from northern Europe and cultivated plants believed to be of European origin were tetraploid.

'Coronation Triumph'

Zone 1

A neat bush that grew 90 cm high and 1 m wide in 4 years at the Arboretum. The star-shaped, narrow-petaled, light yellow blooms are borne profusely. It was originated by Mr. John Walker, former Superintendent of the Tree Nursery at Indian Head, Sask.

'Hallman's Dwarf'

Zone 2

An extremely dwarf selection, not more than 20 cm high with a spread of 30 cm in 5 years of growth. Its low-spreading habit might make it desirable for use in rock gardens. Its flowers are not freely produced in the test garden.

'Micandra'

Zone 2

An attractive form with large, grayish green leaves and light yellow flowers. The plants in the Arboretum are dis-

***Potentilla fruticosa* 'Coronation Triumph'**

tinct from the others because of their much larger leaves and their symmetrical, rounded form. They have now grown to a height and spread of 1 m.

'Mount Everest'

Zone 3

A cultivar with white blooms, not more impressive than the other white ones. It is a tall-growing plant 1 m high, with pale green leaflets. As in many of the more recently introduced cultivars, its calyxes remain green after the flowers fade and drop, so that it retains a fresher appearance than the older types.

'Primrose Beauty'

Zone 3

A cultivar characterized by its broad, green leaflets and saucer-shaped, dark cream flowers with darker centers.

***Potentilla fruticosa* 'Micandra'**

'Sutter's Gold'

Zone 3

A fine, shapely, compact bush, 105 by 75 cm, with light yellow flowers and large, deep green foliage.

'Tangerine'

Zone 3

A cultivar introduced mainly for its orange flowers, which would be an impressive color break if they were produced as stated. The orange on the specimen can be faintly detected in half-opened flowers, and this only in cool weather. In Europe, where the cultivar originated, the flowers might stay orange longer, but at Ottawa where the summers are unusually warm they are no better than or slightly inferior to other yellow blooms.

'Tenuiloba'

Zone 2

A form with deep yellow flowers and fine, narrow foliage. The younger plants growing here have a neat, upright habit.

P. parvifolia Lehm.

Zone 2

This species differs from the others in that it has fine foliage and leaves that hide the fruiting stalks. Botanically, it differs because its style is filiform instead of club shaped, and its inflorescence is shorter. It comes from eastern Asia.

'Gold Drop' ('Farreri')

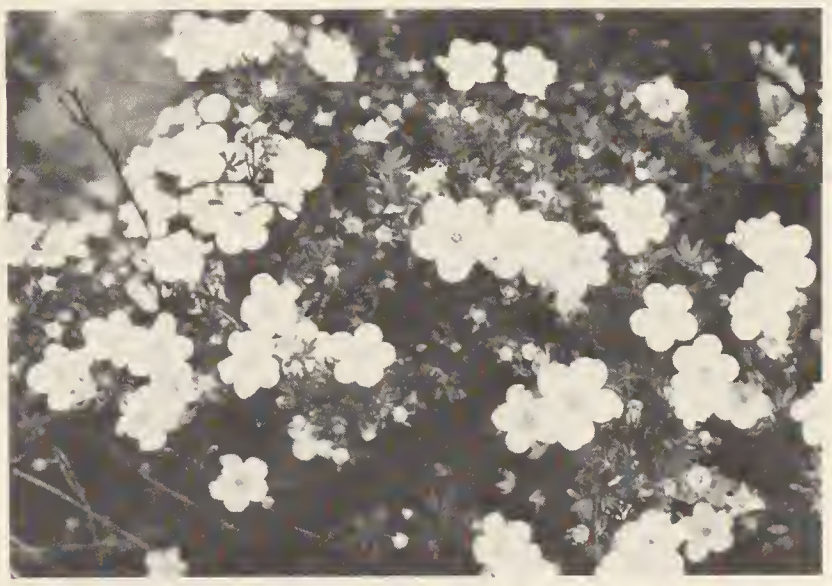
Zone 2

In the collection of shrubby potentillas, no plants excel these in beauty of flower and form. In May they are covered with deep golden flowers for a long period, and they bloom intermittently throughout the summer. The shrubs have an excellent rounded or mounded form and fine textured foliage.

P.* ×*rehderana Hand.-Mazz.

Zone 2

A hybrid (*P. parvifolia* × *davurica*) with calyx lobes that are reddish on the back and with sulfur-yellow flowers.



Flowers of *Potentilla* ×*rehderana*

P. salessowiana Stephan

Zone 4b

A distinct species with coarse stems, large, dark green, pinnate leaves, and white flowers. It appears to be hardy at Ottawa, but has no special ornamental merit because of its somewhat straggly habit. It is found in southeastern Siberia and northern China.

PRINSEPIA — Rosaceae

Only three species of this genus are usually cultivated. Two of these, *P. sinensis* and *P. uniflora* Batal., are reasonably hardy and the third, *P. utilis* Royle, from the Himalayas, is of doubtful hardiness. *P. uniflora*, the white-flowered species, has not been grown with much success at the Arboretum, so it is probably tender in the Ottawa region.

P. sinensis (D. Oliver) D. Oliver ex Bean
CHERRY PRINSEPIA

Zone 2

The only species hardy at Ottawa, but not particularly ornamental as a shrub except for its bright green leaves. The inconspicuous flowers are yellow and the fruits reddish purple. In the hedge collection at the Central Experimental Farm, it is one of the most interesting shrubs to use for this purpose. The plants make a thick hedge, and some people consider the lush, reddish purple, abundant fruits an added attraction. However, such a hedge may be undesirable if children are in the neighborhood, because although the fruits are edible they are not palatable. As a hedge for the prairies the plant appears to have merit, and it is sold for this purpose by some nurserymen. Botanically, *Prinsepia* is closely related to *Prunus*, but differs mainly in that it has lamellate pith instead of solid pith as in *Prunus*. It is a native of Manchuria.

PRUNUS — Rosaceae

A family of trees and shrubs distinguished by their fruits, which are mostly one-celled, one-seeded drupes. The genus contains many of Canada's most ornamental native and exotic plants.

P. alleghaniensis T. C. Porter — ALLEGHANY PLUM

In the collection, this specimen has formed a large, spreading bush 1.5 m high and 3 m wide, with long, ovate leaves. It has no particular merit as a garden plant. It grows from Connecticut to Pennsylvania.

P. armeniaca L.

var. *mandshurica* Maxim. — MANCHURIAN APRICOT

Zone 5

Flowers before the leaves appear, with an abundance of bluish white, single blooms with reflexed red calyxes. A hardy floriferous tree with excellent possibilities as a tree for streets and small home gardens. The specimen in the Arboretum produces fruits that fall before they mature. Also native to Korea and Manchuria.

P. avium (L.) L. — GEAN, MAZZARD

Zone 4b

An old tree received as *P. subhirtella* 'Autumnale' has been identified as *P. avium*. It is one of the most handsome rosaceous trees in the Arboretum, mainly because of its deciduous bark and its neat, single, white flowers with reddish stamens. Its nearest relative, *P. cerasus*, is not represented in the Arboretum because no specimen has survived, despite repeated trials. *P. avium* is much more showy for it grows into a tree, whereas *P. cerasus* is more often shrubby. It comes from Europe and western Asia.

P. besseyi L. H. Bailey — WESTERN SAND CHERRY

Zone 2b

The western sand cherry has been used extensively for fruit tree breeding work. Many selections that fruit extremely heavily under prairie conditions have been made. The specimen in the Arboretum is 1 m high and 1.5 m wide, and in early spring is attractive with its masses of white bloom borne around the stem. It is found from Manitoba to Wyoming, and south to Kansas and Colorado.

P. ×*blireiana* André

'Moseri'

Zone 6

Two plants of this hybrid (*P. cerasifera* 'Atropurpurea' × *mume*) are growing well at the Arboretum but have received several severe setbacks from winter injury. It is unlikely that they will ever produce shapely small trees, as the hybrid does in milder climates. However, when planted as shrubs they are interesting for their dark purple foliage and semi-double, pink flowers.

P. cerasifera J. F. Ehrh. — CHERRY PLUM, MYROBALAN

Zone 5b

This purple-leaved form of the cherry plum does not fit the description of any purple-leaved form of *P. cerasifera* in the literature. It is significant that the species itself and other forms have never proved reliably hardy at Ottawa. However, this plant, which arose from a batch of seedlings obtained from Berlin Dahlem under the dubious name of *P. cerasifera* subsp. *myrobalana*, has withstood even severe winters. The specimen has formed a shapely small tree 3 m high and 2 m across, and with foliage as dark as *P. cerasifera* 'Atropurpurea' but not as large. The species is native to the Balkans, the Caucasus, and western Asia.

'Trailblazer'

Zone 5

An excellent ornamental tree that is hardy at Ottawa. It has bluish white flowers that stand out from the bronzy green foliage. It also produces a fair crop of edible fruits every year.

P. ×*cistena* (N. E. Hansen) Koehne
PURPLELEAF SAND CHERRY

Zone 4

The lovely little purple-leaved hybrid (*P. cerasifera* 'Atropurpurea' × *pumila*) was introduced by Dr. N. E. Hansen of South Dakota around 1910. In the collection it has grown into an attractive small tree that is 2.5 m high and has a rounded head on a clean strong stem. Its single, white flowers with prominent purple anthers stand out conspicuously in early spring. There are many good specimens planted in front of homes in Ottawa, where they serve a useful ornamental purpose.

P. davidiana (Carrière) Franch. DAVID'S PEACH

Zone 5

An early flowering peach with white flowers, 2.5 cm in diameter, produced singly on short stalks. The plant has not yet borne fruit at the Arboretum; the fruits should be spherical, 3 cm in diameter, yellowish, and not especially useful because the fleshy part is very thin. The species comes from China.

P. glandulosa Thunb. DWARF FLOWERING ALMOND

Zone 5

This species and its cultivars are valuable low shrubs for planting under windows or at the front of shrub borders. They flower profusely each year, making a spectacular display, especially when the flowers are borne freely around long shoots. It is difficult to evaluate their hardiness, because this factor seems to depend on whether or not the plants are grafted. All the grafted plants originally obtained from nurseries have long since died; the plants described here are from cuttings taken from the original grafted specimens. The shrub is found in central and northern China.

'Alboplena'

Zone 5

A floriferous cultivar with double, white flowers.

'Sinensis'

Zone 5

Has double, pink flowers produced in abundance.

P. 'Hally Jolivette'

Zone 6

A hybrid (*P. subhirtella* × *yedoensis* Matsum.) with clear, semidouble, white flowers arising from pinkish buds. The specimens at the Arboretum have formed shrubby growth because of winterkill during their early stages, a condition they apparently overcame in the first 2 years.

Prunus glandulosa **'Alboplena'**

P. ×hillieri HILLIER'S CHERRY

Zone 6

An excellent hybrid cherry (*P. incisa* Thunb. × *sargentii*), producing single, pale pink, almost white flowers, at the time the leaves are unfolding. It is not especially floriferous but hardy. The petals of the flowers are notched, and the calyx is not reflexed. The parent species are *P. incisa* and *P. sargentii*, both of which are hardy at Ottawa.

'Spire'

Zone 6

A fine tree that seems to be developing a narrow pyramidal shape. Its tip is winter-killed at the Arboretum, so the plant probably is not hardy enough for a street tree in the Ottawa region. However, farther south in the Toronto and Hamilton areas, and in British Columbia, it should prove to be a valuable tree for planting on narrow streets or where narrow cylindrical trees are needed.

P. japonica Thunb. JAPANESE BUSH CHERRY

Zone 3b

The plants have formed small bushes, scarcely 1 m high, and have branches arising from the base. A few pinkish white flowers have appeared in early spring, but not in sufficient quantities to produce any ornamental effect. The plant is hardy, but as the fruits have also been scarce it is hard to assess its ornamental quality. It comes from central China and eastern Asia.

P. ×juddii E. Anderson JUDD'S CHERRY

Zone 5

In the short time it has been growing in the Arboretum, this hybrid (*P. sargentii* × *yedoensis*) has proved remarkably vigorous and hardy. It has formed a shapely tree 3.5 m high and 2.5 m wide, with deep brown bark and dark green leaves. It produces an abundance of single, pinkish flowers in spring, larger than those of *P. sargentii* and consequently more showy. It should prove to be an admirable hardy cherry for this climate and is probably the only reliable, fast-growing one suitable for city streets.

P. 'Kursar'

Zone 6

A hybrid (*P. kurilensis* × *sargentii*) that has striking, soft rose, semidouble flowers with three rows of petals. The blooms have no fragrance and appear when the leaves are half unfolded. The flower buds above the snow line are often frozen, but the trees would probably not be hardier in a less exposed area. Its leaves are reddish and slightly hairy.

P. maackii Rupr. AMUR CHOKECHERRY

Zone 2b

Of value chiefly because of its peeling, light brown bark. This chokecherry appears to be extremely hardy and at maturity should form an attractive tree 6 m high. The specimens at the Arboretum have already grown 4.5 m high and have stems 7.5 cm in diameter. The bark distinguishes the species from other chokecherries, as do the flower buds, which are formed on the previous year's growth. The white flowers are in racemes. The species is native to Korea and Manchuria.

P. maximowiczii Rupr. MIYAMA CHERRY

Zone 5

The specimen has reached a height of 7.5 m and a spread of 9 m, and although not particularly attractive in flower or fruit, it is brilliant in the fall. It is distinguished from other cherries by the large, conspicuous, leafy bracts on the inflorescences; these persist until the fruits ripen. Found in Korea, Manchuria, and Japan.

P. 'Muckle' MUCKLE PLUM

Zone 2b

A hybrid (*P. nigra* × *tenella*) that makes a small tree or vigorous bush with an abundance of single, pink flowers produced early in the spring. Its flowers and leaves are similar to those of *P. tenella*, but larger. It might be best described as a larger, more robust Russian almond with distinctive and more glaucous blue leaves.

P. nigra Ait. CANADA PLUM

Zone 4b

Small trees, heavily laden each year with tasty red fruits; in the spring the beautiful effect of their slightly tinted, rosy white flowers is always assured. The tree is most often confused with the American red plum, but may be easily recognized by its glandless leaf stalks. It grows from New Brunswick to Assiniboine, and south to New York, Ohio, and Wisconsin.

P. padus L. MAY DAY TREE, EUROPEAN BIRD CHERRY

Zone 2

An excellent small tree with long racemes of fragrant, white flowers followed by bitter, black fruits. The tree is superior to most bird cherries and differs from *P. serotina*, its nearest rival, because it has deciduous calyxes and from *P. virginiana* because it has a calyx tube that is pubescent inside and much larger flower racemes. The bark of this tree emits a strong acrid odor. Its range is from Europe and northern Asia to Japan.

May Day tree, or European bird cherry (*Prunus padus*)

'Aucubaefolia'

Zone 2

Leaves spotted much like those of *Aucuba japonica*, the Japanese laurel.

'Watereri'

Zone 4b

A much improved and more floriferous form with racemes as large as 20 cm, compared with a maximum of 15 cm for the species.

P. pedunculata (Pall.) Maxim.

'Prairie Almond'

Zone 2b

A medium-sized shrub with solitary, pinkish flowers and small, glossy leaves. Not particularly ornamental, but the clone 'Prairie Almond', developed at the Research Station at Morden, Man., has semidouble and double, light pink flowers and is a desirable ornamental. It is actually a hybrid (*P. triloba* 'Multiplex' × *pedunculata*). Most hybrids of this type would be welcomed almost anywhere.

P. pensylvanica L.f. PIN CHERRY, WILD RED CHERRY

Zone 1

A comparatively short-lived, common, native tree that grows rapidly and eventually attains a height of 4.5–6 m. The specimen at the Arboretum, however, after almost 30 years' growth, is only 2 m high. Although it is showy when in flower in May, and again later when it is laden with red fruits, the only reason for planting it would be to provide a quick display at the corners of the garden where a group may be transplanted from a nearby bush area. It is a good tree for bird food during the summer, but the birds are likely to spread the fruits throughout the neighborhood and if chance seedlings are allowed to mature, the tree might ultimately become a weed. It grows from Newfoundland to British Columbia, and south to North Carolina and Colorado.

P. pumila L. SAND CHERRY

Zone 5

The specimens have made low shrubs, 90 cm high and 1 m wide. Although they produce a fair amount of bloom each year and could be considered attractive, they are usually lost among the many spring-flowering trees and shrubs that deservedly receive greater acclaim as ornamentals. The sand cherry is distinguished from other dwarf cherries by the leaves, which are broadest above the middle, and by their lustrous, instead of bloomy, black fruits. It is found from western New York to Wisconsin and Illinois.

P. sargentii Rehd. SARGENT'S CHERRY

Zone 5

This Japanese cherry does not receive the acclaim it deserves. It is a splendid species, one that survives in the Ottawa area; it should grow well farther south and perhaps even farther north. In the Arboretum it produces an abundance of light pink flowers each year, and although its beauty is fleeting, it lasts as long as that of the crab apples. After flowering, the trees produce bronzy leaves, which remain bronze for several weeks and are fairly attractive, although

Bark of Sargent's cherry (*Prunus sargentii*)

they eventually turn green. In the fall the leaves turn to crimson and give an even more colorful effect. The beautiful bark is of interest in summer and winter alike, but against the snow it shines and stands out more prominently in the landscape. The trees at the Arboretum have never produced an abundance of fruit, and in 44 years have only grown to a height of 6 m. They are planted in a favored location and in good loamy soil, so that their growth is probably normal, and in the Ottawa area they may not grow much higher than 9–10.5 m. This height is considerably less than they attain in their native islands of Japan and Sakhalin.

'Ezo Sakura'

Zone 5

A fairly hardy cultivar that was developed in Japan, with brighter and pinker flowers than the type. It is a great improvement over *P. sargentii* and will supersede the species when it is made more readily available.

'Rancho'

Zone 5

A compact, twiggy, upright form with the same kind of flowers and foliage as the type.

P. serotina J. F. Ehrh. BLACK CHERRY

Zone 2b

A good, reliable, medium-sized tree that could be used more commonly than it is for planting in small home gardens. It has long, dark leaves, a little broader and longer than those of the peach, but otherwise similar; in spring it has small, white flowers produced in racemes 10–12.5 cm long and later it bears black-red fruits. The trees in the Arboretum have grown into specimens 6–7.5 m high; they have spreads of 5.5–6 m with graceful, almost pendulous branches and dense foliage. Its native range is from Ontario to North Dakota, Texas, and Florida.

Black cherry (*Prunus serotina*)

'Asplenifolia'

Zone 2b

A more refined form of the black cherry, with deeply and irregularly cut leaves.

P.* ×*skinneri Rehd.

'Baton Rouge'

Zone 2b

A small shrub (*P. japonica* × *tenella*) with deep rose flowers similar to those of *P. tenella* but even more free flowering. It has thin shoots arising from the base similar to the Chinese bird cherry (*P. japonica*), but it produces a much prettier floral effect.

***P.* 'Spearfish'**

Zone 2b

A cultivar that originated at the Research Station at Morden, Man., with larger and more abundant blooms, but in the trial at the Arboretum it was more shrubby than originally described.

P. subhirtella Miq.

'Autumnalis' AUTUMN HIGAN CHERRY

Zone 6

The specimen has suffered setbacks from winter injury, but it has grown into a large robust shrub, 2.5 m high, with at least a dozen stems arising from the base. It has not bloomed. The soft rose flowers of this beautiful cherry are semidouble; they are produced partly in spring, a little more abundantly in fall, and where the climate permits, even during the winter. According to Dr. E. Wilson, it does not

***Prunus* 'Spearfish'**

produce a tree even in Japan, so that the specimen in the Arboretum may be growing normally. However, Collingwood Ingram states that if grafted on *P. avium* it forms an attractive small tree. It originated in Japan.

P. tenella Batsch — DWARF RUSSIAN ALMOND

Zone 2

Because it blooms so early, this shrubby almond is outstanding in the Arboretum wherever it is planted. In 60 years of existence the specimens have made neat, dwarf, bushy shrubs 1 m high, and they have spread to 3 m. Their deep rosy red blossoms are attractive in early May. The species grows from southern Europe and western Asia to eastern Siberia.

'Fire Hill'

Zone 5b

A cultivar with a better, upright, compact growth habit than the species and with rosy carmine flowers. For some reason the two specimens in the Arboretum died after 5 years, perhaps because of incompatability of the graft or from the effects of several severe winters. The winter injury was apparent through all the years it was growing and the plant died after the buds seemingly survived the 5th winter.

P. tomentosa Thunb. — MANCHU CHERRY

Zone 2

The Manchu cherry is variously used in the Arboretum plantings and in the Ornamental Gardens. It is planted as a hedge, in which capacity it excels; it is also planted as a clipped, formal, cylindrical shrub at the corner of a building, where it blooms profusely each spring; and in the Arboretum, left to grow naturally and gracefully, it forms a perfect specimen shrub. The flowers of this cherry are light rose, later fading to white; they are followed by bright red, edible cherries. The cherry is found in northern and western China, Japan, and the Himalayas.

P. triloba Lindl. — FLOWERING ALMOND

Zone 2b

Planted in a group of three near the rock garden, this species is showy in early spring when covered with its single, pinkish blossoms. The single form is not often grown, however, because the double-flowered cultivar is much showier and lasts longer in bloom. The species originated in China.

Manchu cherry (*Prunus tomentosa*)

'Multiplex' — DOUBLE FLOWERING ALMOND

Zone 2b

This cultivar is the *P. triloba* of garden catalogs, which, because of its common name, is often confused with *P. glandulosa* 'Sinensis' and related cultivars. This form, a great improvement over the species, has large, bright, rosy pink flowers produced in abundance. It is often grafted on 2–2.5 m stems to form a specimen tree.

P. virginiana L. — RED CHOKECHERRY, CHOKECHERRY

Zone 2

A small native tree, the largest in the Arboretum being no more than 3 m high and 2 m wide. It is useful for planting in larger gardens but is inferior to the European bird cherry (*P. padus* and cultivars). It is native to Canada from Newfoundland to Saskatchewan, and south to Kansas.

'Glauca'

Zone 2

A cultivar in which the young foliage has a bluish tinge, particularly on the underside.

var. ***melanocarpa*** (A. Nels.) Sarg.

Zone 2

Of the two trees planted in 1946 and 1947, the second is nearly twice as large in girth and much higher than the first. The 1947 tree is 6 m high and has a spread of 2 m; the other tree is 3 m high and the same width. The leaves of this form are smaller than those of the species and the petals of the flowers have no glands. The fruits, as the varietal name implies, are blackish.

'Shubert' — SHUBERT CHOKECHERRY

Zone 2

One of the most promising new trees introduced in recent years. Those who admire the slow-growing 'Crimson King' maple and the more tender purple-leaved plum (*P. nigra*

'Pissardii') would be well advised to look into the possibilities of 'Shubert'. It follows the good form and habit of *P. virginiana* and makes a good, dense shade tree 7.5–9 m high but with the advantage of possessing purplish red leaves. This hybrid is extremely effective and outstanding among the other small rosaceous trees in the collection. The leaves are deep purplish red, almost the color of the purple-leaved smoke bush (*Cotinus coggygria* 'Purpurea'), but with more prominent crimson veins.

PTELEA — Rutaceae

A genus of small trees with aromatic, trifoliate leaves and thin, flat-winged seeds rather like those of an elm, borne in fruits similar to those of the hop.

P. trifoliata L. — HOP TREE

Zone 3b

A small tree of ornamental value because of its odd, disk-like fruits and its attractive foliage. None of the trees in the Arboretum exceed 3.5 m in height but they are shapely, and the species might be useful for planting in front of small homes where a rounded or spreading type of small tree is required. Its odd fruits resemble hops and are said to be as bitter. Like other members of the family Rutaceae, when its leaves are held up to the light they are seen to be dotted with oil glands. It grows from Ontario and New York to Florida, and west to Minnesota.

'Aurea'

Zone 3b

A cultivar with light yellow leaves. It is distinct from the species, even to its degree of hardiness, because it seems to be frozen back almost to ground level in some winters.

var. ***pubescens*** (Pursh) Voss

Zone 3b

A variety that grows alongside the type in its native habitat. Its leaves are pubescent beneath and fully green above. However, its branchlets, petioles, and inflorescence are glabrous. It is easy to tell the difference between this variety and other forms in spring when the leaves are just starting to unfold, because its pubescence is much more pronounced.

PTEROCARYA — Juglandaceae

P. rhoifolia Siebold & Zucc. — JAPANESE WINGNUT

Zone 5b

An unusual tree, it has suffered from the vagaries of Ottawa winters to some extent and yet has grown to be a shapely specimen 9 m high and 4.5 m wide. The tree is made more interesting and beautiful by its long, pendulous racemes of fruits in summer. It is a native of Japan. On Mount Hakkoda it grows 30 m high and is said to be the largest tree in that region.

Epaulette tree (*Pterostyrax hispidus*)

PTEROSTYRAX — Styracaceae

P. hispidus Siebold & Zucc. — EPAULETTE TREE

Zone 6

One of the many borderline plants growing in the Arboretum. It has never preferred the Ottawa area and has most likely reached its maximum size, which is 3 m high and about 2 m wide. Nearly every year, however, it has produced pendulous racemes of curious, creamy white flowers, which, although interesting in themselves, do not make as spectacular a display as one might expect farther south. The tree comes from Japan.

PYRACANTHA — Rosaceae

P. coccinea M. J. Roem.

'Lalandei'

Zone 6

The two specimens in the Arboretum have survived the winters very well up to 90 cm above ground level and have formed shapely, large, wide-spreading shrubs 2 m in diameter. Above this height they are winter-killed. Although never abundant in fruit, they produce a few clusters and at times are showy.

'Orange King'

Zone 6

Has abundant, orange fruits when grown in milder climates.

PYRUS — Rosaceae

Not many pear trees are hardy in the Ottawa area. The groups that are present in the Arboretum are fairly hardy and could provide material for further breeding.

P. calleryana Decne.

'Bradford' BRADFORD PEAR

Zone 5b

The Bradford pear, like the species, has not yet proved hardy in trials. However, f. *tomentella* is hardier and has survived the winters since 1929 when it was planted.

f. ***tomentella*** Rehd.

Zone 5

Dr. Wyman of the Arnold Arboretum says that this pear is not as susceptible to fire blight as the others and, therefore, might be considered in pear-breeding programs. It is not particularly ornamental, but has grown into a tree 3.5 m high, with many main branches, extending to 3.5 m in width. The form *tomentella* is distinguished by its densely pubescent branchlets, which apparently become glabrous in their 2nd year. A native of China.

P. salicifolia Pall.

'Pendula' PENDULOUS WILLOW-LEAVED PEAR

Zone 5

This small tree has survived 25 winters and has grown into a striking specimen, with pendulous branches and willow-like, silvery leaves. It is not yet mature enough to have lost any of its lustrous beauty, for even the fruits are covered with silvery down. It should make a good tree for accent planting or small home gardens. It comes from southern Europe and western Asia.

P. toringo see ***Malus sieboldii*** var. ***arborescens***

P. ussuriensis Maxim.

Zone 2b

This specimen has now reached a height of 6 m but is barely 2 m wide. It has produced fruit for several years and each year sees a more abundant crop. It is not particularly attractive because its white flowers are not produced profusely at any time.

QUERCUS **Fagaceae**

The largest and most picturesque oak trees in the Arboretum are located at the extreme south end and in the area near the Service Building 72.

Q. alba L. WHITE OAK

Zone 4

The specimens in the Arboretum have grown 15 m in 60 years and are both splendid trees. The white oak is easily distinguished from the others by its blunt, oblong, lobed leaves, its grayish bark, and its thick, woody cup scales. It is native to eastern USA and Canada, and west to Minnesota and Texas.

Q. aliena Blume

var. ***acuteserrata*** Maxim.

Zone 5

A tree that ultimately grows to 15 m. In 30 years at the Arboretum it has grown 7.5 m high. It has slightly warted young shoots with oblong leaves, pointed or rounded at the apex, tapered at the base, and coarsely toothed. The acorns are stalkless, solitary, 1.5–2.5 cm long, and the enclosure covers one-third to one-half of the acorns. The variety has more pointed leaves, often ending in a distinct, abrupt point. It is similar to *Q. prinus* but is easily distinguished by its stalkless fruits. It is found in Japan and central China.

Q. ×***bebbiana*** C. K. Schneid. BEBB'S OAK

Zone 4b

This hybrid (*Q. alba* × *macrocarpa*) is the largest oak tree. About 22.5–30 m high, with a spread of 30 m, the specimen has the largest spread and greatest girth of all oaks in the collection. This stately tree was collected from nearby woodlands in 1898 and planted at the south end of the Arboretum. It is much like bur oak (*Q. macrocarpa*), but its leaves have less unequal lobes and its cups are considerably less mossy. It is a natural hybrid, found with its parents from Nova Scotia to Pennsylvania, and west to Minnesota and Texas.

Q. bicolor Willd. SWAMP WHITE OAK

Zone 4b

The swamp white oaks have formed trees as high as 18 m. Although they resemble the common white oak in most respects, their leaves are not nearly so deeply lobed, tend to be triangular, and are also velvety to whitish tomentose beneath. The leaves of the white oak are glaucous on the undersides. The species grows from Quebec to Georgia, and west to Michigan and Arkansas.

Q. borealis see ***Quercus rubra***

Q. coccinea Muenchh. SCARLET OAK

Zone 4

There seems to be no reason why the scarlet oak should not grow in the Ottawa area. The problem appears to be one of securing correctly named specimens. The two largest trees received under this name are specimens of the red oak (*Q. rubra*), a species that they closely resemble. The native range is from Maine to Florida and Missouri.

Bebb's oak (*Quercus* ×*bebbiana*)

'Splendens'

Zone 4

An improved form of *Q. coccinea,* with more brilliant fall coloring.

Q. dentata Thunb. DAIMYO OAK

Zone 6

Not impressive trees except for their tremendous leaves. Both specimens are multiple branched and not more than 3.5 m high. During winter their large leaves persist, but unlike those of the English oak they deteriorate rapidly and look so unsightly all winter that one is prompted to cut them off individually. The large leaves, 25–30 cm long, are a ready means of identification. The tree grows in Japan, Korea, and northern and western China.

Q. ellipsoidalis E. J. Hill NORTHERN PIN OAK

Zone 3

These trees all started from seeds obtained from the Arnold Arboretum in 1939. They are healthy and have grown 6 m high since that time. However, the tree's chief value in the Arboretum is to supplement the collection, for it has no greater merit than *Q. coccinea* and *Q. borealis,* which it closely resembles. Its range is from southern Michigan to Manitoba and Iowa.

Q. gambelii Nutt. SHIN OAK

Zone 5

Of all oaks these appear the most graceful, because of their light, airy foliage. The largest of the three trees has grown 10.5 m high and has a spread of 3.5 m. Because of its small, deeply lobed leaves, the shin oak does not throw a dense shade and might prove of considerable value for small home planting and for suburban streets or such places where a good lawn must be grown under it. It is found from Colorado to Utah and New Mexico.

Q. glandulifera Blume KONARA OAK

Zone 5

This plant, like *Q. ellipsoidalis,* was grown from seeds received from the Arnold Arboretum in 1939. It has reached a height of 6 m and has a spread of 2.5 m. The species is easily distinguished by its recurving gland-tipped teeth and, if the specimen is true to type, its almost cherry-like bark. It has proved to be hardy at Ottawa and is a useful addition to the oak collection. It grows from Japan and Korea to western China.

Q. imbricaria Michx. SHINGLE OAK

Zone 4b

This distinctive oak has long, narrow, strap-shaped, entire leaves, deep green and glossy above, downy beneath. It forms a shapely, handsome tree, even the comparatively small specimen in the Arboretum, which is a perfect pyramid 10.5 m high and 4.5 m wide. A hedge or screen of shingle oaks is even more striking because the leaves persist through the winter and instead of being unsightly, as one might expect, they take on a glaucous, dark brown hue that shines like copper in the winter sun and against the winter snow. The hedge in the hedge collection is 3.5 m high and is almost as thick at the base. It is, no doubt, the best-known hedge or screen plant in the Agriculture Canada hedge collection. Photographs of it have often appeared in dendrological and horticultural books from many countries. The species is native to southeastern and central USA.

Shingle oak (*Quercus imbricaria*)

Q. lyrata Walt. OVERCUP OAK

Zone 5

As its common name suggests, the acorns of this species are usually completely enclosed by the cups. This distinguishing character, and the pinnately divided leaves, pubescent at the base, make this one of the easiest oaks to identify. The specimens at the Arboretum are 4.5–6 m high and have spreads of 2–3 m. They are not particularly dense in habit, but attractive. The tree grows from New Jersey to Florida, and west to Missouri and Texas.

Q. macrocarpa Michx. BUR OAK

Zone 2

This large, stately, native oak with its tall trunk and spreading branches has not often been cultivated, probably because its horizontal spread makes it unsuitable for street and roadside plantings. It has a definite use in public parks, where it provides shade over a large area. When the tree is in fruit it is easy to identify the mossy cups, which almost enclose the acorn. The leaves are deeply lobed and the bark deeply furrowed and scaly. The oldest of the nine specimens, planted near the Arboretum greenhouses (building 73), is 18–21 m high and has a spread of 18 m. The tree's range is from Nova Scotia to Pennsylvania, and west to Manitoba and Texas.

Q. mongolica Fisch. ex Turcz.

var. ***grosseserrata*** (Blume) Rehd. & E. H. Wils.

Zone 3

This variety is the only representative of the Mongolian oak in the Arboretum. It has smaller leaves than the type

and the scales of its cup are not fringed. Even so, its leaves are larger than those of most other oaks and because of this they give a subtropical appearance to the tree. The specimen is 15 m high, with a spread of 7.5 m, and represents one of the most interesting trees in the collection. It differs from *Q. dentata* because its branchlets are glabrous instead of pubescent, and its leaves are smaller. At first glance, however, it might appear to be *Q. dentata* because its leaves are clustered at the end of the branchlets much as they are in that species. The variety is native to Japan and Sakhalin Island.

Q. muehlenbergii Engelm. CHINQUA PIN OAK, YELLOW CHESTNUT OAK

Zone 4b

Another tree grown from seeds obtained from the Arnold Arboretum in 1939, and like the others planted at that time, it has formed a tree 7.5 m high and 4.5 m across. This species is one of the chestnut oaks, so called because their leaves resemble those of the sweet chestnut (*Castanea dentata*). The leaves of this species, long with coarse teeth, yellowish green above and tomentose beneath, distinguish it from the others in the same group. It grows from Vermont to Virginia, and west to Nebraska, New Mexico, and Texas.

Q. palustris Muenchh. PIN OAK

Zone 4

The pin oaks in the collection have had bad luck during the past 30 years. They have grown well and withstood the winters, but they always seem to have been planted in areas destined for the erection of buildings or other purposes related to development of the Central Experimental Farm. In the Arboretum, the lone specimen planted in 1898 was removed in 1940 to make way for a building extension, and in the grounds of the Central Experimental Farm, fine specimens had to be removed to make way for a parking lot. However, records show that they suffered little from the winter. The beautiful, deeply grooved leaves of this species throw a checkered shade, a factor that makes this oak desirable as a tree for the street or for shade on a lawn. Like a few of the other oaks, its acorns take 2 years to mature. It grows faster than most, a character that increases its desirability for street planting. It is found from Massachusetts to Delaware, and west to Wisconsin and Arkansas.

Leaves of *Quercus mongolica* var. *grosseserrata*

Q. prinus L. BASKET OAK, CHESTNUT OAK

Zone 5

The fine specimen of the basket oak has grown 15 m high and has a spread of 7.5 m. It is indeed, as William Jackson Bean states in his *Trees and shrubs hardy in the British Isles,* "a handsome and striking oak." The species is closely allied to the yellow chestnut oak but has wider leaves and blunter teeth, which are not gland tipped. Its acorns, unlike those of the yellow oak, are supported by a short stalk. Many writers comment on the rich crimson color of the leaves in the fall. In more than 20 years of observation, however, the tree in the Arboretum has never appeared as interesting as others at that time of year. Its coloring is mediocre in its location at Ottawa. The species ranges from Delaware to Florida, and west to Indiana, Missouri, and Texas.

Q. robur L. ENGLISH OAK

Zone 5

This species, surprisingly enough, has the largest representation of any oak in the Arboretum plantings; the number in the collection expands continually as unidentified trees flower and fruit. The species is easy to identify by its stalkless or short-stalked leaves with two lobes at the base. However, herbarium specimens are necessary before a positive identification can be made; hence the need for flower and fruit. The leaves remain on the tree until early spring, shining with a rather coppery hue in the sun and not looking as untidy as one might expect. The tree is native to Europe, North Africa, and western Asia.

'Hybrid'

Zone 4b

Next to *Q. bebbiana* this is the largest oak specimen in the Arboretum planting, and it is the most interesting. It grew from a seed included with some acorns collected by a traveler in Russia. The other trees turned out to be *Q. alba* but this one was entirely different, having the appearance of an English oak. Dr. Rehder was sent some specimens and identified the oak as *Q.* ×*macrorobur*, a hybrid of *Q. robur* and *Q. macrocarpa*, but he never substantiated this identification by publishing it. Consequently, it has never received any other name but the one that appears here. The specimen tree, now 22.5 m high, has a 21 m spread and a tremendous girth.

Q. rubra L. RED OAK

Zone 3

The red oak for a brief period was known botanically as *Q. borealis* Michx., but the name has been eliminated in favor of its former one, *Q. rubra*. Much confusion still exists as to what constitutes the true red oak. If this species is ordered from Europe, it is advisable to include the botanical name *Q. rubra*. The older specimens in the collection have grown into beautiful trees with large, green leaves, distinguished from those of other oaks by their triangular or ovate shape and pointed teeth; all four trees are 15 m high with spreads of 6–9 m. The species grows from Nova Scotia to Pennsylvania, and west to Minnesota.

'Aurea' GOLDEN RED OAK

Zone 4

In spring, the two specimens are the most outstanding trees in the Arboretum and may be seen close to Highway 16 at the south end of the Arboretum. They stand 9 m high and are more or less pyramidal, having a spread of no more

Red oak (*Quercus rubra*)

than 2.5–3 m. Their leaves are brilliant golden yellow in spring and stand out distinctly from the deep green leaves of other nearby oaks. Later the leaves turn green and the trees are less conspicuous.

Q. ×***schuettei*** Trel.

Zone 5

A large tree, 15 m high with a 12 m spread; a hybrid (*Q. bicolor* × *macrocarpa*) with leaves intermediate between the two parents and the acorn cup much shorter fringed than that of the bur oak. According to Rehder it was introduced into cultivation in 1916, but the specimen at the Arboretum was planted many years earlier than that date. It came from Spaeth's nursery in Germany in 1897 as *Q. prinus acuminata* but keys out identically with Trelease's *Q.* ×*schuettei*. It may have found its way to Germany as a seedling transported from the American woods at that time.

Q. shumardii Buckl. SHUMARD'S RED OAK

Zone 5

Although only a small tree, the specimen has grown fairly quickly to a height of 3 m and has suffered no injury from the winters it has experienced, so it may be hardy. Its appearance is much like that of *Q. borealis* but the leaves are more deeply lobed. The species ranges from Kansas and southern Michigan to North Carolina, Florida, and Texas.

RHAMNUS — Rhamnaceae

A large group of trees and shrubs of little ornamental value except for some species that may be used for hedges and

screens, or for shrub borders where bright green foliage is desired. Cognizance, however, should be taken of the fact that many species harbor wheat stem rust, and are not only undesirable in rural areas but are prohibited in many sections of Canada.

R. alpina L. ALPINE BUCKTHORN

Zone 5

A shrub 2 m high by 1 m wide; the alternate leaves are rounded at the base, and have 8–12 pairs of veins. The young branchlets are grayish brown and glabrous. The plant comes from southern Europe.

R. cathartica L. EUROPEAN BUCKTHORN, COMMON BUCKTHORN

Zone 5

The specimens have become shapely little trees with bright green leaves. In the fall, they are fairly attractive with their branches bearing black fruits. However, this species is not better than other trees of similar stature with more attractive flowers and better fall foliage. It is distinguished from other buckthorns by its large, broad, ovate leaves, 6 cm long and 5 cm wide, with small teeth at the margins. It grows in Europe and Asia and has escaped from cultivation to grow wild in North America.

'Pubescens'

Zone 5

A cultivar with leaves pubescent beneath.

R. crenata Siebold & Zucc.

Zone 3b

The large leaves, 7.5 cm long and 4 cm wide, make this shrub stand out from the others. However, it is not particularly beautiful except for its fruits, which are reddish rather than blackish. It has been recommended for use as a hedge plant and may be acceptable in that capacity. It ranges from Japan and Korea to China.

R. davurica Pall. DAHURIAN BUCKTHORN

Zone 3b

Despite its 60 years of growth, this species is not more than 3 m high and 1.5 m wide. It is similar to *R. cathartica* but has longer leaves with two more pairs of veins. The leaves of specimens in the Arboretum are a lighter green than those of that species, and also have undulated margins. It comes from Siberia, northern China, and Mongolia.

R. frangula L. ALDER BUCKTHORN

Zone 3b

This small tree has a trunk girth of no more than 10 cm and is 2 m high and 1 m wide. Its lustrous leaves are oval, 5 cm long, 2.5 cm wide, and dark green changing to bright yellow in the fall. Its purplish fruits make this species more ornamental than the others. A hedge in the collection is making good progress and is considered to be among the best. The species has escaped from cultivation and grows naturally nearby, although it is native to Europe and West Africa.

'Angustifolia'

Zone 3b

Has narrow, lanceolate-oblong to elliptic leaves, the margins of which are uneven.

'Elliptica'

Zone 3b

A cultivar identified by Rehder as a form with elliptic leaves. It has made a thick shrub, 2.5 m high and 2 m wide.

R. japonica Maxim. JAPANESE BUCKTHORN

Zone 3

A large shrub with bright green leaves. Bean and Rehder state that it has slightly fragrant flowers, but all species in flower at the time these notes were written were definitely fragrant. This particular species is akin to *R. cathartica* and *R. davurica* but differs because of its oblong-obovate leaves, which are produced at the ends of short spurs. It is found in Japan.

R. koraiensis C. K. Schneid.

Zone 4b

A Korean species that forms a shrub not more than 1.5 m high, with elliptic leaves.

R. purshiana DC. CASCARA BUCKTHORN

Zone 5b

One specimen, planted near the northeast lookout in the Arboretum, has managed to survive despite severe setbacks during the past 60 years. In most winters it is killed to ground level, but it recovers sufficiently to form a presentable little shrub with dark green leaves all summer and a few of its purplish black fruits in fall. Its main distinguishing characters are its naked winter buds, the umbel-like cyme of its flowers, and its elliptic to ovate-oblong leaves with 8–15 pairs of veins. It grows from British Columbia to Montana and northern California.

R. saxatilis Jacq. ROCK BUCKTHORN

Zone 3b

A spiny shrub up to 1.5 m high and 2.5 m wide, with small glabrous leaves and top-shaped black fruits. A native of central and southern Europe.

R. tinctoria Waldst. & Kit. DYER'S BUCKTHORN

Zone 3

A neat tree 3 m high and 3 m wide. Its hairy leaf stalk is an excellent means of identification; otherwise it could easily pass for its near relatives, *R. infectoria* L. and *R. saxatilis*. Found in southeastern Europe.

R. utilis Decne.

Zone 5

A tree 3 m high and 3 m wide. The light green, glabrous leaves with lighter green veins and yellowish pubescence give it a yellowed appearance and make it stand out from the others in the collection. It comes from central and eastern China.

RHODODENDRON — Ericaceae

Growing rhododendrons in the Ottawa area is a challenging project, not only because of the climate but because of the alkaline soil. However, if soil amendments are used to produce acidity and a sheltered location is selected, cultivation of these beautiful plants has encouraging possibilities. Many broad-leaved rhododendrons are obviously not hardy in the Ottawa area, but many kinds may be winter-hardy but have not been given correct soil preparation and mulches to bring them through the winter. From some successes achieved so far, it is fairly certain that, given the right conditions and aspect, a larger number of deciduous evergreens as well as rhododendrons can be grown. In the Arboretum there are some plants of a yellow cultivar of azalea planted in 1942. They have grown into large shrubs, 1 m high and 90 cm wide, and each year they produce a mass of yellow blooms. As yet unidentified (but most likely *R. luteum* Sweet), they originated from cuttings received from the Arnold Arboretum in 1939. Other kinds that are growing well are *R.* ×*fraseri* W. Wats., *R.* ×*altaclarense* Lindl., and *R. smirnowii* Trautv., all planted in 1952. In 1966 a more intensive study was started; many hardier cultivars were collected and planted in a lathe structure. Most of them are thriving and many have been replanted in specially prepared beds at the north end of the Arboretum, where they provide a good display of flowers each spring.

RHODOTYPOS — Rosaceae

R. scandens (Thunb.) Mak.

Zone 6

A shrub closely allied to *Kerria* but distinguished from it because it has opposite leaves, four petals, and white flowers. Its flowers are showy, but the whole plant is so straggly and susceptible to winter injury in the Ottawa area that it is best disregarded as an ornamental shrub. It comes from Japan and central China.

RHUS — Anacardiaceae

R. aromatica Ait. FRAGRANT SUMAC

Zone 3

A prostrate shrub with fragrant leaves and branches. It is useful in a shrub border; its yellow flowers are conspicuous in early spring and it presents a flamboyant effect in the fall when its leaves turn orange and scarlet. It is easily distinguished from other sumacs by its ternate leaves, which are hairy. It grows from Vermont and Ontario to Minnesota, and south to Florida.

R. copallina L. SHINING SUMAC

Zone 5

Another shrub of unusual fall beauty with its rich reddish purple leaves and scarlet fruits. It has pinnate leaves, like those of the staghorn sumac (*R. typhina*), but these are entire and borne on a winged leaf stalk. Found from Maine to Ontario and Minnesota, and south to Florida and Texas.

R. cotinus see ***Cotinus coggygria***

R. glabra L. SMOOTH SUMAC

Zone 2b

A small shrub 90 cm high with pinnate leaves and branches, similar to those of *R. typhina*; the leaves, however, are glabrous. It differs from *R. copallina* because of its toothed leaflets. Like the other shrubby kinds it is useful for its autumn coloring and brilliant scarlet fruiting panicles. It ranges from Maine to British Columbia, and south to Florida and Arizona.

'Laciniata' CUTLEAF SMOOTH SUMAC

Zone 2b

A beautiful form of the smooth sumac with deeply cut feathery leaves that turn to a striking crimson in autumn.

R. trilobata Nutt. SKUNKBUSH, ILL-SCENTED SUMAC

Zone 3b

Similar in appearance to *R. aromatica* but more upright and with less conspicuous flowers, which emit a disagreeable odor. Its leaves, unlike those of *R. aromatica*, are glabrous and have a few rounded teeth.

R. typhina L. STAGHORN SUMAC

Zone 3

One specimen, planted at the north end of the Arboretum, has formed the most perfect ornamental small tree one could imagine. It has a straight trunk 2.5 m high, topped by a beautiful rounded head to make a total height of 5 m. Its long pinnate leaves are subtropical in appearance. In summer it has ornamental crimson fruits and in fall its scarlet to orange leaves present a brilliant display. Its zigzag branches in winter are also ornamental. Furthermore, it never seems to be prone to insect attack and can grow, as evidenced by one on a nearby street, almost out of the sidewalk. Two other specimens at the Arboretum have formed shapely trees and all are highly desirable for their fine autumn coloring. The species grows from Quebec to Ontario, and south to Georgia, Indiana, and Iowa.

'Laciniata'

Zone 3

The large leaves of this form of sumac are spectacular because of their finely cut segments.

Staghorn sumac (*Rhus typhina*)

RIBES Saxifragaceae

Although this group contains many plants of economic importance, such as gooseberries and red, white, and black currants, it does not provide many of ornamental value. Most species and forms are attractively shaped and have good fall color, but, except for a few kinds, they lack valuable flowers.

R. alpinum L. ALPINE CURRANT

Zone 2

This species has its use as an ornamental shrub for the shade or as an undergrowth, but its main function in gardens in the Ottawa area is as a clipped boundary hedge. It has long been accepted as the best deciduous hedge for the region. The pistillate form has attractive glowing-red berries in late summer and fall and should definitely be considered for ornamental planting. For a hedge, perhaps the staminate type is more desirable since the fruits are not palatable and might prove objectionable where there are small children. Furthermore, as Dr. Donald Wyman of the Arnold Arboretum states, the staminate form has proved immune to the white pine blister rust, a serious disease of white pine that is carried by many species of *Ribes*, particularly *R. nigrum*. The alpine currant is easily distinguished from the others by its compact, bushy habit and small, roundish-ovate or truncate, three-lobed leaves. It is native to Europe.

'Aureum'

Zone 2

A form with yellowish leaves in early spring.

'Pumilum' DWARF ALPINE CURRANT

Zone 2

An excellent form with smaller leaves and a dwarfer, more compact habit. It is possible that this form is sufficiently distinct to make it desirable for low hedges 45–60 cm high.

R. americanum Mill. AMERICAN BLACK CURRANT

Zone 2b

This species, with its large, three- to five-lobed, cordate leaves margined with coarse, irregular teeth, is not unlike the European black currant (*R. nigrum*). It differs from that species, however, in its flowers, which are larger, more funnel shaped and creamier. This species is found from Nova Scotia to Virginia, and west to Manitoba and Colorado.

R. aureum Pursh GOLDEN CURRANT

Zone 2

The most attractive of the species hardy in the Ottawa area. It can be recommended to homeowners as a good shrub for growing in sun or shade, where it will produce its showy, fragrant, golden flowers in abundance during early spring. Its distinguishing characters are flowers with both stamens and pistil occurring in racemes, and with tubular calyxes; three-lobed, wedge-shaped leaves; and smooth black fruits. Its range is from Washington to Saskatchewan, Montana, New Mexico, and California.

R. ×***culverwellii*** Macfarl.

Zone 3b

A hybrid (*R. nigrum* × *uva-crispa*) with flowers similar to those of *R. nigrum*, but with glandless leaves and inflores-

RIBES

cences that resemble those of *R. uva-crispa*. Its fruits are red and hairy, similar to those of the gooseberry.

R. cynosbati L. PASTURE GOOSEBERRY

Zone 4b

A native North American species with edible, but prickly, purplish globose fruits. It is of no special ornamental value, but as a parent in breeding work it might assist in producing hardy gooseberries. It is closely allied to the European gooseberry but has prickly fruits instead of glandular ones. It occurs from New Brunswick to Manitoba, and south to North Carolina, Alabama, and Missouri.

R. diacanthum Pall.

Zone 3

Similar to *R. alpinum*, but with prickly branches and more lustrous, wedge-shaped leaves. It is not any hardier and certainly not as ornamental. A native of northern Asia.

R. divaricatum Dougl.

Zone 3b

A medium-sized shrub, in the gooseberry group, with brownish bristly branches, heart-shaped to almost truncate five-lobed leaves, with crenate lobes. The flowers are greenish purple and the fruits are black or dark purple and about 1 cm across. It grows from British Columbia to California.

R. fasciculatum Siebold & Zucc.

Zone 5

As the specific name suggests, the flowers of this species are clustered in fascicles or umbels, a character that distinguishes this species from other *Ribes*. Its scarlet fruits and persisting leaves give it some value as an ornamental, although it is seldom grown. It comes originally from Japan and Korea.

R.* ×*gordonianum Lem.

Zone 5

A hybrid (*R. odoratum* × *sanguineum*) but without the beauty of either parent. If the cross were further pursued by plant breeders, a more attractive and yet hardy plant might develop. It is obviously hardy and is intermediate between its two parents, even to the flowers, which are reddish outside and yellowish within. The beautiful *R. sanguineum* and its horticultural varieties have not proved hardy in the Ottawa area; thus, there is a need for a similar type that could withstand the winters.

R. hirtellum Michx.

Zone 3b

An important, hardy, native, edible gooseberry with cuneate leaves and nonprickly fruits. It has been crossed with the common gooseberry to give varieties such as Downham and Houghton and there is an improved form, which is sold under the name Pale Red. It has little ornamental value. It ranges from Newfoundland to Pennsylvania, and west to Virginia, South Dakota, and Manitoba.

R.* ×*holosericeum Otto & F. Dietr.

Zone 2b

A hybrid (*R. rubrum* × *petraeum* var. *caucasicum*) with leaves pubescent on the lower surfaces, reddish-brown flowers, and blackish fruits.

R. leptanthum A. Gray

Zone 3b

The most ornamental of all the *Ribes* species. Although its attractive white flowers are not spectacular, they do provide a show of blooms in July, when flowers are scarce. Its most outstanding qualities, however, are its beautiful close-knit habit and its fresh, deep green leaves. The species is excellent for foundation planting in the shade or where a small thick impenetrable hedge is desired, for it is extremely spiny. Apart from its outstanding habit, it is distinguished by its glabrous style and calyx-tube interior and by its smooth black fruits. It grows from Colorado to New Mexico and Utah.

R. multiflorum Kit.

Zone 4

A species that does not live up to its name in the Ottawa area because it is not showy. Although its yellowish green flowers are produced each year, they are not abundant. It is distinguished by its exserted stamens, which are as long as its recurved sepals, and by having crowded racemes of flowers. A native of eastern Europe.

R. nigrum L. BLACK CURRANT

'Heterophyllum'

Zone 5

R. nigrum is not represented in the Arboretum, probably because improved varieties are grown in the small fruit section of another Institute. This cultivar has upright growth and distinctive, deeply cut leaves with irregular, incised lobes. It could be grown as an ornamental shrub because of its interesting leaves and because it would increase the number of shrubs available for shady areas.

R. niveum Lindl.

Zone 5

An attractive gooseberry in early spring, when it produces its small, white flowers in abundance, but not a highly ornamental shrub. It ranges from Idaho and Washington to Nevada.

R. oxyacanthoides L. NORTHERN GOOSEBERRY, HAWTHORN-LEAVED GOOSEBERRY

Zone 1

A low shrub with reclining branches, which are bristly and possess very stout spines. It could be used as an impenetrable ground cover, but maintenance would be a problem until the shrub grew thick enough to destroy weed growth. It is extremely hardy and grows in sun or shade from Hudson Bay to British Columbia, and south to Michigan, North Dakota, and Montana.

R. petraeum Wulfen

Zone 3b

Not an especially attractive species. Its red fruits are acidic and unpalatable. It has dense racemes of red or pinkish flowers and roundish three-lobed leaves. It originated in the mountains of central Europe.

R. rubrum L. NORTHERN RED CURRANT

Zone 4b

A species with somewhat acid, red fruits. Varieties of this species are used in Scandinavia for culinary purposes. Its

horizontal or axillary racemes distinguish the species from the common garden currant. A native of central and northern Europe and northern Asia.

'Pubescens'

Zone 4b

With leaves pubescent on lower surface and the young branchlets slightly pubescent.

R. sativum (Rchb.) Syme GARDEN CURRANT

Zone 4b

The common garden currant is a well-known species in its cultivated form in European gardens. It is of little interest as an ornamental because its attractive pulpy fruits seldom get a chance to fully mature before the birds eat them. Its pendulous racemes of juicy berries are the best means of identification. It originated in western Europe.

R. uva-crispa L. EUROPEAN GOOSEBERRY

Zone 3b

A low shrub with pubescent leaves and branchlets, and small, yellow, hairy fruits. Although considered by some to be synonymous with the common gooseberry, this species is distinct as it grows at the Arboretum with its small, yellow flowers and dwarf habit. The species and its variety are native to Europe.

var. ***reclinatum*** (L.) Berland. (***R. grossularia*** L.) COMMON GOOSEBERRY

Zone 3b

The parent of the cultivated gooseberries. Distinguished by its bristly, young wood, its down calyx, and hairy ovary. The fruits of the cultivated varieties vary greatly in color and in density of hairiness; some are smooth, whereas others are glandular hairy.

R. warczewiczii Jancz.

Zone 3b

A species allied to *R. rubrum* but with pinkish flowers and blackish purple fruits and a more or less prominent elevated ring at the base of the receptacle. A native of eastern Siberia.

ROBINIA — Leguminosae

This genus contains fast-growing trees and shrubs that have pinnate leaves and pea-shaped flowers. All species have the same prohibitive characters: brittle wood, which breaks easily during ice storms and heavy snowfalls, and a habit of putting out suckers over a wide area. They are beautiful in flower and have attractive foliage. Their brittleness is somewhat overcome by their fast growth, which soon replaces any fallen branches. If planted as specimens on lawns and not too near flower borders, their sucker shoots are easily controlled.

R. ×***ambigua*** Poir.

var. ***bella-rosea*** (Nichols.) Rehd.

Zone 4

This variety is one of the most beautiful of all flowering trees when it is in full bloom. It has large, pink blossoms borne on short trusses and produced on an umbrella-shaped, fast-growing tree. The species is a hybrid of *R. pseudoacacia* × *viscosa* Venten.

'Decaisneana'

Zone 4

A handsome form with bright purplish rose flowers, the keels of which are white flushed rose with greenish markings. It is extremely vigorous and has grown to 9 m.

R. boyntonii Ashe

Zone 5

A shrubby species with purple or rose-purple flowers with white keels. The leaves have no prickles, but the seed pods are very hispid or bristly. It is native to North Carolina and Tennessee, south to Georgia and Alabama.

R. elliottii (Chapm.) Ashe

Zone 5

A small shrubby species. It has dark rose flowers and bristly flower stems, but with less bristles on the leaf stems and branches. The species grows from North Carolina to Georgia.

R. fertilis Ashe

'Monument' MONUMENT LOCUST

Zone 4

This beautiful cultivar has been received under the names *R. hispida* and *R. fertilis*. Except for its much larger leaves and flowers and a milder hispid stem, it is almost identical to *R. hispida*. Because it does not set seed, it could be regarded as closer to *R. hispida* than to the species. The specimens were grafted onto *R. pseudoacacia* and are forming splendid trees with beautiful lavender mauve flowers. Although they present a neat, tree-like appearance, sucker growths at the base and stem of the parent stock could soon overshadow the original specimen unless they are removed as soon as they appear.

R. hispida L. ROSE ACACIA

Zone 5

The specimens have grown no more than 1 m high. Their branches curve toward the ground, and because the trees are growing in the grass, which is kept neatly trimmed, no suckers are apparent. Specimens should be top grafted on 2 m stems, so that their drooping habit would show to better advantage. *R. hispida* is distinct from other species because it has gland-tipped bristles that cover the branches, wide oval leaflets that have short bristle-like tips, and large, showy, rose-colored flowers. Rose acacia grows from Vermont and Kentucky to Georgia and Alabama.

R. ×***holdtii*** Beissn.

Zone 5

A lovely hybrid (*R. luxurians* (Dieck) C. K. Schneid. × *pseudoacacia*) with light rose colored flowers. This attractive species was at one time located in a prominent place, but it became so badly damaged during ice storms that it often presented a bedraggled appearance, and so it was removed to a less conspicuous area. It quickly recovered from winter damage, regained its handsome form, and flowered abundantly the following year. As far as frost damage is concerned, this tree is perfectly hardy and should grow in all areas suited to the growth of the black locust.

'Britzensis'

Zone 5

A cultivar with pale flushed rose flowers, 17–18 on a stem.

Flowers of black locust (*Robinia pseudoacacia*)

R. kelseyi Kelsey ex Hutch.

Zone 6

A large shrub or small tree with bright rose flowers produced in small clusters at the base of the young twigs. The pods are 5 cm long with reddish gland-tipped bristles. It is native to southeastern USA.

R. pseudoacacia L. BLACK LOCUST

Zone 4

The black locust grows rapidly in Ottawa's climate and soon forms a shapely tree with graceful pinnate leaves and showy, white, pea-shaped blossoms. Except for its suckering habit and extremely brittle branches and branchlets, it would be an ideal tree for the impatient homeowner who seeks something that grows fast to 9 m and then stops. Older trees appear to produce much less brittle wood as they mature, because records from the Arboretum show that no damage has occurred during the past 15 years. The species is easily identified by its glabrous branches, creamy-white fragrant flowers, and smooth seed pods. Its range is from Pennsylvania to Georgia, and west to Iowa, Missouri, and Oklahoma.

'Bessoniana'

Zone 4

An ovoid-shaped tree that does not grow as quickly as the species. It has fewer but larger leaflets.

'Coluteoides'

Zone 4

A more floriferous form with small leaflets rounded at the apex.

***Robinia pseudoacacia* 'Coluteoides'**

'Frisia'

Zone 4

A cultivar with bright golden yellow foliage that appears more brilliant in early spring and fall.

'Monophylla' see ***R. pseudoacacia*** 'Unifoliola'

'Pyramidalis'

Zone 4

A slender columnar tree with spineless and erect branches that resemble a smaller and narrower Lombardy poplar.

'Tortuosa'

Zone 4

A slow-growing form with twisted and curved branches.

Mop-headed black locust (*Robinia pseudoacacia* 'Umbraculifera')

'Umbraculifera' MOP-HEADED BLACK LOCUST

Zone 4

A small tree that forms a completely formal, compact, round or globe-shaped head.

'Unifoliola'

Zone 4

A form with one large terminal leaflet and two to seven other leaflets. Two of the specimens have grown to 9 m, have spreads of 7 m, and girths of 27.5 cm. This form has also been described as *R. pseudoacacia* 'Monophylla'.

ROSA — Rosaceae

Lack of space in the Arboretum and the similarities among many species account for a partial representation of the genus. There are many hardy native and exotic species that could be included for a more representative collection. Discussion of the thousands of cultivars of the hybrid teas, hybrid perpetuals, polyanthas, floribundas, and grandifloras has been omitted because they are usually winter-killed within 1–3 years. The hybrid perpetuals are the only lasting species. However, cultivars of shrub roses are included in alphabetical sequence, except hybrids of *R. rugosa,* which are included under the species.

R. acicularis Lindl. PRICKLY ROSE

Zone 1

A widely distributed species with bright rosy pink flowers 6 cm in diameter, followed by large, 2.5 cm long, pear-shaped fruits, each with a distinct neck. It grows from Alaska to Wyoming, Michigan, and New York, and also in northeastern Asia.

R. 'Algonquin'

Zone 4b

A seedling of a selection from *R. rubrifolia* Vill. × *rugosa.* It has yellow-green foliage, flat, single, purplish rose flowers shading to white in the center, and long, pear-shaped, bright red fruits. A Central Experimental Farm introduction.

R. 'Alice Aldrich'

Zone 3b

A hybrid of *R. rugosa* × 'Caroline de Sassal' with large, double, bright pink flowers produced intermittently throughout the summer.

R. 'Anais Segalis'

Zone 3b

A dwarf bush with large, double, rosy red flowers.

R. 'Assiniboine'

Zone 3b

A hybrid of the prairie rose *R. arkansana* T. Porter var. *suffulta* (Greene) Cockerell × 'Donald Prior', a floribunda hybrid. A hardy shrub rose with some double, bright red flowers.

R. 'Aylsham'

Zone 3b

A fine hybrid (*R. nitida* × *spinosissima* var. *altiaca*) originated by Percy Wright of Saskatchewan. It has deep, double, rose-colored flowers and glossy leaves.

R. 'Beauty of Dropmore'

Zone 3

A shrub rose that grows 1 m high and has fully double, white fragrant flowers from the end of June to mid-July.

R. 'Belle Isis'

Zone 5

A hybrid (*R. gallica*) with double, bright pink flowers.

R. 'Betty Bland'

Zone 3

An introduction by Dr. F. L. Skinner of Dropmore, Man. It is a seedling of *R. blanda* × 'Garden Rose' that grows 1.5–2 m high and produces an abundance of double, light pink flowers. Its bright red branches are also attractive when the shrub is not in flower.

R. 'Blanche Moreau'

Zone 5

A fine moss rose, which was raised in 1880 from a cross of moss and damask types. It is a vigorous thorny shrub growing up to 2 m, and it produces bunches of dark green moss. It has small, creamy white, double flowers that are cupped and then flattened.

R. blanda Ait. MEADOW ROSE

Zone 3

A hardy rose that produces large, rose pink flowers in great profusion. These are followed by pear-shaped, red fruits with erect and persisting sepals. In cultivation it produces a mass of 2 m canes with few spines. Its range is from Newfoundland to Pennsylvania, Missouri, North Dakota, and Manitoba.

R. 'Burnett'

Zone 2b

A fragrant, double, white cultivar of *R. spinosissima.*

R. 'Butterball'

Zone 3b

A hybrid of *R. spinosissima* var. *altaica* with large, creamy white flowers on a bush 2 m high.

R. canina L. DOG ROSE

Zone 4

These large shrubs have grown to 2 m in height. They have large, scattered, hooked prickles, five to seven leaflets, and clusters of fragrant pinkish flowers. Although not a particularly attractive rose and of value mainly in the historic or wild garden, it has a nostalgic beauty to the Briton and is often grown for this reason. For many years it was the main stock plant on which hybrid roses were budded and is still used by some discriminating Irish and Dutch nurserymen. It has now been superseded as a stock by strains of *R. multiflora,* which are easier to grow on an assembly line and form large bushes that reach a saleable size in much less time than those budded on *R. canina.* In the Ottawa area, however, *R. canina* is much hardier than *R. multiflora* and should be used more often by Canadian nurserymen and those who bud their own roses. A native of Europe in hedgerows and waste places.

ROSA

R. 'Cardinal de Richelieu'

Zone 5

This cultivar is one of the earliest Dutch roses originated by van Sian, after whom it was originally named; it was, however, introduced to the trade by Laffay in 1840 as 'Cardinal de Richelieu'. It has large, double, deep purple-crimson flowers that are not produced profusely.

R. 'Carmen'

Zone 2b

A shrub rose derivative of *R. rugosa* 'Rosea' × 'Princess de Bearn' with extremely vivid, deep crimson colored, single flowers. Twenty-five yellow stamens give a finishing touch to the overall effect. Unfortunately, the specimens in the Arboretum are nonrecurring.

R. 'Carmenetta'

Zone 3

A large shrub rose, 2.5–3 m high, with leaves like those of *R. rugosa* but more reddish, and pale pink flowers borne in clusters. It is a hybrid of *R. rubrifolia* × *rugosa* that originated at the Central Experimental Farm.

R. 'Celeste'

Zone 3

A cultivar of *R. alba* with semidouble, uniform, soft pink flowers and grayish leaves. It is of ancient origin, most likely being introduced toward the end of the eighteenth century.

R. centifolia L.

'Cristata'

Zone 5

This cultivar came to us as *Rosa* 'Crested Moss', a name by which it is generally known. It differs from *R. centifolia* by having crested or moss-like excrescences at the edge of the sepals. The flowers are not as globular as those of *R. centifolia* but they present the same beautiful effect in bud and have clustered, fragrant, red, cabbage-like flowers. The parent plant was said to have been discovered in 1820 in the crevices of an old wall at Fribourg in Switzerland.

R. damascena Mill. DAMASK ROSE

Zone 5

The flowers of *R. damascena* are variable, ranging from blush white to red; thus, it is possible that the two separate selections growing as "Blush" and "Crimson" may be variants of the species. The flowers are double, produced in corymbs on slender, glandular-hispid, prickly pedicels. The fruits are pear shaped, about 2.5 cm long, and bristly. The species was introduced from Asia Minor in the 16th century.

'Versicolor' YORK-AND-LANCASTER ROSE

Zone 5

This cultivar has beautiful clusters of blush white, double flowers. Some individual blooms are spotted with white and rose and others are bicolored in large patches; both white and rose-colored flowers may be found on the same bush. This famous rose was named in 1551, and it is the rose that played so prominent a part in the Temple Gardens brawl between the Yorkists and Lancastrians. Apparently, the emblems of these two factions were later changed to *R. alba* 'Maxima' and *R. gallica* 'Officinalis'.

R. 'Dr. E. M. Mills'

Zone 4

A hybrid (*R. hugonis* Hemsl. × *spinosissima* var. *altaica*) with large, pale, primrose yellow, semidouble flowers. It is vigorous and much hardier than *R. hugonis* but has most of the characteristics of that species.

R. 'Dr. Merkeley'

Zone 5

A rose closely related to *R. cinnamomea* L., with fragrant, double, pink flowers. According to Dr. F. L. Skinner, who introduced it into cultivations, it was brought from Siberia after World War I by a Canadian soldier who gave it to a Dr. Merkeley of Winnipeg, in whose honor it was named.

R. 'Duchesse d'Angouleme' WAX ROSE

Zone 5

A hybrid of *R. gallica*, the French rose, with smooth, light green leaves, smooth wood, and few thorns. The transparent petals of its nodding flowers are pale blush pink tipped with crimson, and they form a globular rose of soft coloring.

R. 'Duchesse de Buccleugh'

Zone 5

A variety of *R. gallica* with almost thornless, luxuriant foliage, and large, flat, purplish flowers, each with a button eye and a tiny green center.

R. 'Duchesse de Verneuil'

Zone 5

A hardy rose, similar to *R. canina* but with much more glaucous foliage. Native to Europe and western Asia.

R. dumalis Bechst.

Zone 5

A shiny shrub rose allied to *R. canina* with red, single flowers and bluish green leaves. Twenty-five sepals are lobed, upright, and persist for a long time.

R. ecae Aitch. AFGHAN ROSE

Zone 5

This species has small, buttercup yellow flowers, which are borne singly on short pedicels. It has a slender, arching habit of growth and produces small, red fruits in the fall. It was discovered by Major J. E. T. Aitchison, an officer of the British Army, who collected it on the rocky hills of Afghanistan about 1880. Its name was derived from the initials of Mrs. E. C. A. Aitchison.

R. eglanteria L. BRIER ROSE, SWEETBRIER, EGLANTINE

Zone 5

The branching habit of this plant is more likely to produce a good rose hedge than any other species. It has bright pink flowers and orange-red fruits. However, it is usually grown for its dark green foliage with a heavy fragrance particularly after a heavy dew or light rainfall. Early writers have stated that the leaves when dried in the shade and prepared as a tea make a pleasing beverage. A native of Europe.

R. 'Ekta'

Zone 5

A hybrid (*R. gallica* L. × 'American Beauty') with single, pink, nonrecurrent blooms. It was raised by Dr. N. E. Hansen of South Dakota in 1927.

R. 'Erfurt'

Zone 5b

A hybrid rose that often is killed to ground level, yet when it produces its blooms, it is one of the most showy roses in the collection.

R. 'Eugene Verdier'

Zone 5

A fine moss rose with fully double, fragrant, deep red flowers.

R. foetida J. Herrm. AUSTRIAN BRIER

'Persiana' PERSIAN YELLOW ROSE

Zone 4

A cultivar of the Austrian brier with globular, fully double, buttercup yellow flowers. It is of particular interest because, at the time of its introduction in 1838, only one other double yellow rose was known, the sulfur rose (*R. hemisphaerica* Herrm.). The Persian yellow rose remains one of the most striking of its form and it is well worth growing in gardens. Another attraction is its dark green, rounded leaflets and smooth, brown twigs with gray, thin bark.

R. 'Fruhlingsgold'

Zone 5b

This cultivar is much hardier than the 'Fruhlingsmorgen' for it survived the severe winter of 1960–61 entirely without injury. It has large, single, golden yellow, fragrant flowers borne on a vigorous bush 2 m high.

R. 'Fruhlingsmorgen'

Zone 5b

A hybrid of *R. spinosissima* with single blooms, which are cherry red at the edges and soft yellow in the center and have prominent maroon stamens. This cultivar and others introduced by Wilhelm Kordes and Sons, Sparrieshoop, Holstein, Germany, are the result of crossing hybrid tea cultivars with *R. spinosissima* var. *altaica*.

R. gallica L. FRENCH ROSE

Zone 5

A medium shrub with solitary, single, pink or red flowers. Originally a native of central and southern Europe and western Asia, this species has been cultivated for centuries and is probably one of the oldest ancestors of garden roses.

R. 'George Will'

Zone 3

A hybrid (*R. rugosa* × *acicularis* × garden rose) growing about 1 m high, with clusters of medium-colored, deep pink roses all summer.

French rose (*Rosa gallica*)

R. 'Haidee'

Zone 3

A hybrid rose (*R. laxa* × *spinosissima*) raised by Dr. F. L. Skinner of Dropmore, Man. It has large, clear pink, double flowers, somewhat lighter in the center. Its spiny, vigorous habit resembles that of *R. spinosissima* but it has larger and more fully double blossoms.

R. ×***harisonii*** Rivers HARISON'S YELLOW ROSE

Zone 2

The beautiful semidouble, golden yellow blossoms of this rose create a spectacular effect at the Central Experimental Farm in June. Many home gardeners in Ottawa are impressed by its beauty and have made their own plantings. A hybrid between the Austrian brier (*R. foetida*) and the Scotch brier (*R. spinosissima*), it originated in the garden of a New York city attorney, Mr. George Harison. It was distributed by the Prince Nursery of Flushing, N.Y., in 1830, and soon almost every known nurseryman carried the plant, for at that time it was the first truly dependable variety of yellow rose, being both hardy and a reliable flowerer.

R. 'Harison's Lemon'

Zone 2

A lighter-colored form of Harison's yellow rose, derived from open-pollinated seedlings.

R. 'Hebe's Lip'

Zone 4

A derivative of *R. damascena*, sometimes known as *R. damascena* 'Rubrotincta'. It resembles the damask rose but has large, semidouble flowers composed of white petals, often edged with pink.

ROSA

R. inodora Fries.

Zone 3

A speeies related to *R. eglanteria* L., with elliptie rather than orbiculate glandless leaflets and seentless pink or white flowers. A native of Europe.

R. 'Isabel Skinner'

Zone 3

Bearing large, full, double, pink flowers in June and again in August and September.

R. 'Kazanlik'

Zone 5

The Kazanlik rose is said to be the rose that grows around Kazanlik, Bulgaria, and the one from which fragrant rose oil is obtained. This eultivar, with semidouble, red flowers, is said to be a form of *R. damascena* 'Trigentipetala', but the two are most likely identical.

R. 'Lady Hamilton'

Zone 5

A low-growing Seoteh brier hybrid, with large, semi-double, ereamy white blossoms, oecasionally rose-tinted.

R. 'La Noblesse'

Zone 5

A beautiful cultivar of *R. centifolia*, with fragrant, elear pink, cabbage-type flowers and with bluish gray leaves. At Ottawa it flowers abundantly and is worthy of a plaee in any garden.

R. laxa Retz.

Zone 2b

A hardy, vigorous species, with small, single, white flowers and small, ovoid fruits. Because of its hardiness it has been used as an understock for budding rose hybrids, but it does not produce the vigorous plants obtained by budding on *R. multiflora* selections. A native of Turkestan.

R. 'Maiden's Blush'

Zone 5

An ancient, double, blush white rose of *R. alba* origin.

R. majalis J. Herrm.

Zone 4

A vigorous bush rose with ereet stems and pairs of hooked prickles at the base of the leaf stalks and scattered along the stems. It produees sparse elusters of reddish flowers. The speeies originated in Europe and northern and western Asia.

R. malyi A. Kern.

Zone 5

An exeellent shrub rose that blooms early in the season. It has deep crimson, single flowers that change to light rose as they fade. It is floriferous and could possibly be reeommended for use as a hedge plant. It is native to Dalmatia.

R. maximowicziana Regel.

var. ***jackii*** (Rehd.) Rehd.

Zone 3b

A large, straggly species, similar to *R. multiflora* but with entire stipules and flowering 2 weeks later. *R. maximowiczziana* var. *jackii* has stems without bristles. Because the speeies is much hardier than *R. multiflora* and yet similar in habit, it may be used as an understock for eultivated roses. It probably inereases easily by hardwood cuttings in the same way as *R. multiflora* and eould be budded and grafted similarly. In any event, its hardiness warrants a trial. The variety originated in Korea.

R. 'Micmae'

Zone 2b

A hybrid (*R. rubrifolia* × *rugosa*) with small, single, white flowers in elusters set against a eontrasting purplish red foliage. It forms an attraetive, neat, large shrub, whieh has a useful plaee in the garden as an accent or speeimen shrub even when not in flower. Originated by Miss Isabel Preston at the Central Experimental Farm, Ottawa, in 1930.

R. ×***micrugosa*** H. Henkel

Zone 3b

An upright, prickly shrub, with small leaflets and larger, single, pale pink flowers. It is a hybrid of *R. rugosa* and *R. roxburghii* Tratt. and is possibly intermediate between these two.

R. 'Millicent'

Zone 2b

A hybrid (*R. rubrifolia* × *harisonii*) that was introdueed by the Central Experimental Farm. It has eoral red flowers fading to pink with a yellowish reverse. It blooms in June on tall plants with dark green leaves and reddish veins.

R. multiflora Thunb. ex J. Murr JAPANESE ROSE

Zone 6

It is doubtful if any of the eight specimens planted in the Arboretum may be called true *R. multiflora*. They are probably forms of *R. multiflora*, because they have the main characteristies of the species but each one differs in minute details. None of the speeimens can be called truly hardy for they suffer damage each winter, the extent of damage depending on the severity of the weather. All speeimens have formed wide-spreading bushes with spiny branehes and flowers varying from white to pink. All have the characteristic *R. multiflora* stipules with long comb-like teeth and paired prickles. The species originated in northern China, Korea, and Japan.

R. 'Mossman'

Zone 5

A hardy, pale pink, moss-type rose with heavily musk-scented double flowers. Possibly a hybrid of *R. blanda* × *rugosa*.

R. 'Nevada'

Zone 4

A hybrid ('La Giralda' × *R. moyesii* Hemsl. & E. H. Wils.) with large (10 em), single, creamy white blossoms on a fairly large bush.

R. nitida Willd.

Zone 2

An extremely attractive, neat, dwarf speeies. It has glossy, bright green, narrow leaflets that turn erimson in the fall, red-tinted stems, and bright, rosy red, 5 cm, single blossoms. Its range is from Newfoundland to Conneeticut.

R. 'Orinda'

Zone 2b

An open-pollinated *R.* ×*harisonii* seedling, which originated at the Central Experimental Farm in 1922. It has semidouble, cream-colored flowers produced in abundance on a large plant with good foliage.

R. pendulina L.

Zone 4

A vigorous alpine shrub with branches almost entirely devoid of thorns. Planted many years ago, it is perfectly hardy and would most likely produce some interesting progeny, particularly because of its thornless branches. Although it is not an unusually attractive shrub, it does have deep pink flowers and imparts reddish purple and violet hues to many of its natural hybrids.

R. 'Petite de Hollande'

Zone 5

An exquisitely formed miniature cabbage rose (*R. centifolia*), but of more bushy habit, with leaves similar but smaller and coarsely toothed. It produces small, rose pink, double flowers on a dwarf bush.

R. 'Pike's Peak'

Zone 5b

A lovely hybrid of *R. acicularis* and an unknown hybrid tea. It has perfectly formed, deep yellow, hybrid tea shaped flowers in bud that open to wide, semidouble, light yellow flowers in bloom. Apparently this variety is extremely fertile and merits use in hybridization work.

R. 'Poliarchus'

Zone 2b

Another derivative of *R.* ×*harisonii* with large, single, salmon pink flowers, which originated at the Central Experimental Farm, Ottawa, in 1924.

R. 'Prairie Wren'

Zone 2b

An introduction of the research station at Morden, Man. It is a complex hybrid involving an old hybrid tea 'Ophelia', a hybrid *rugosa*, and a wild prairie rose. It has semidouble, pale pink blossoms.

R. 'Prairie Youth'

Zone 2b

A beautiful rose resulting from a complicated cross that used *R. spinosissima* var. *altaica, R.* 'Dr. W. van Fleet', *R. arkansana,* and a *rugosa* seedling. The flowers are semidouble, salmon pink, and fading to white in the center. It is one of the loveliest of all shrub roses and flowers intermittently throughout the summer. The plants at the Arboretum grew 2–2.5 m high.

R. 'Randall'

Zone 5

A cultivar with double, pink, fragrant flowers that are produced in June. A derivative of *R. gallica.*

R. rubrifolia Vill. REDLEAF ROSE

Zone 2b

A member of the *Caninae* (dog rose) section of the rose family, with red-tinged, bluish green foliage, almost thornless stems, and small, starry, deep rose-red blossoms followed by bright red fruits. All these factors make it an extremely valuable garden shrub. It originated in central and southern Europe.

R. rugosa Thunb. RUGOSA ROSE

Zone 2b

A thorny, bushy shrub, with deep green or yellowish green leaves and single, white or pink flowers. The species is inferior to most of its beautiful hybrids, except for those chance seedlings that develop from time to time. It originated in northern China, Korea, and Japan.

'Agnes'

Zone 2b

This beautiful shrub rose was developed in 1900 by the late Dr. William Saunders from a cross of *R. rugosa* and *R. foetida* 'Persiana'. It has fragrant, double, golden to deep yellow flowers of medium size and small, light green, glossy foliage. Although it has been widely planted in Ottawa, it is not well known. In recent years it has been listed in nursery catalogs from southern Ontario and on the Prairies.

'Alba'

Zone 2b

A cultivar with single, white flowers.

'Albo-plena'

Zone 2b

A cultivar with double, white flowers.

***Rosa rugosa* 'Agnes'**

'Apple Blossom'

Zone 2b

A hardy recurrent bloomer with loose, double, cup-shaped flowers of light rosy pink. It grows to 0.5 m.

'Blanc Double de Coubert'

Zone 2b

More or less everblooming, with large, semidouble, fragrant, white flowers. A hybrid (*R. rugosa* × 'Soubriel') originated by Cochet-Cochet in 1892.

var. ***chamissoniana*** C. A. Mey.

Zone 2b

Branchlets having no bristles, and leaflets narrower, smaller, and less rugose than the type.

'Conrad Ferdinand Meyer'

Zone 2b

A large, double-flowered *rugosa* hybrid (*R. rugosa* hybrid × 'Gloire de Dijon') with fragrant, silvery pink flowers. It has some of the characters of 'Gloire de Dijon' and the hardiness of *R. rugosa*. It flowers intermittently on vigorous bushes 3 m high.

'Delicata'

Zone 2b

A large, flowered, semidouble, soft lavender rose.

'F. J. Grootendorst'

Zone 2b

A vivid rose with small, bright red, fringed flowers borne in clusters from June to September, although sparingly after July. It is a cross between *R. rugosa* 'Rubra' and a baby rambler of polyanthus rose, made by De Goey in 1915 and introduced into commerce by F. J. Grootendorst and Sons, Holland, in 1918. This rose is often used as a hedge plant, and in that capacity produces an effective rose hedge, especially if carefully pruned during winter or before the leaves form in early spring.

'Frau Dagmar Hastrup'

Zone 2b

A cultivar with single, silvery pink flowers produced from June to September.

'Georges Cain'

Zone 2b

A vigorous hybrid with large, deep magenta flowers. It was originated in 1909 by Dr. Muller in Germany.

'George Will'

Zone 2b

A beautiful hardy shrub rose originated by Dr. F. L. Skinner of Dropmore, Man. It has clusters of deep pink flowers produced on a neat, 1 m shrub. It is a cross between (*R. rugosa* × *R. acicularis*) × a garden rose.

'Grace'

Zone 2b

A light creamy counterpart of *R. rugosa* 'Agnes'.

'Grootendorst Supreme'

Zone 2b

A sport of 'F. J. Grootendorst', with the same habit and leaves but with deeper crimson flowers.

'Hansa'

Zone 2b

One of the showiest of all hybrid rugosa roses, with large, double, clove-scented, reddish violet flowers. Its peak flowering is in early July, but it continues to produce its large flowers sparingly until the fall.

'John McNab'

Zone 2b

A profuse-blooming, double, pink rugosa hybrid that originated from a cross of *R. rugosa* 'Kamtschatica' and *R. beggerana* Schrenk, made by Dr. F. L. Skinner of Morden, Man., and introduced in 1938.

'Marie Bugnet'

Zone 2b

An excellent double, white rugosa hybrid with recurrent blooms.

'Mme Georges Bruant'

Zone 2b

An historic rose, it was introduced by Bruant in 1887. It represents the first worthwhile hybrid rugosa variety to be introduced in Europe. It has pointed buds, which later form large, loose, waxy white flowers in clusters.

'Max Graf'

Zone 2b

An interesting shrub rose that clings to the ground and consequently is often used as a ground cover. It has pretty, single, bright pink flowers with gold centers. Apart from its useful growth habit, it is also significant as one of the parents of *R.* ×*kordesii*, which has given rise to some excellent vigorous varieties with everblooming habits.

'Mrs. John McNab'

Zone 2b

A lovely, hardy shrub growing to 1.5 m in height. It produces an abundance of double, white flowers in July and again in the early fall. Its foliage is dark green and wrinkled, like that of *R. rugosa*, but it has fewer thorns on the stems.

'Nova Zembla'

Zone 2b

A white sport of 'Conrad Ferdinand Meyer', with double, pink blooms.

'Pink Grootendorst'

Zone 2b

A lovely light pink variation of 'F. J. Grootendorst', that, like 'Grootendorst Supreme', is identical to the original cultivar except for color.

'Plena'

Zone 2b

A deep purple, double form.

'Raubritter'

Zone 2b

A low bush with trailing branches and clear pink globular-shaped flowers in large clusters.

'Regina Badet'

Zone 2b

A nice shrub with an extremely bushy habit, producing an abundance of large, double, fragrant, deep pink flowers.

'Rose à Parfum de l'Hay'

Zone 2b

A large, fully globular, fragrant, deep carmine rose on a large 2 m bush. This hybrid is said to be the most fragrant of all roses, but the specimens are not particularly fragrant.

'Rose Apples'

Zone 2b

With large, semidouble, rose-colored flowers on a vigorous bush.

'Roseraie de l'Hay'

Zone 2b

A variation of *R. rugosa* f. *rosea*, with large, full, fragrant, red to rosy red flowers.

'Sarah van Fleet'

Zone 2b

With large, semidouble, extremely fragrant rose pink flowers, which are cupped and produced in fair abundance during July and again later. It has foliage like that of *R. rugosa* and is also vigorous, for it has now grown to a height of 1.5 m.

'Schneezwerg'

Zone 2b

A lovely variety with semidouble, snow white flowers enhanced by deep yellow stamens. Typically *R. rugosa* in habit, leaves, and in the abundance of small, red fruits.

'Sir Thomas Lipton'

Zone 2b

This vigorous, large-growing hybrid rugosa was originated by van Fleet in 1900. It has cupped, double, white flowers, which are produced in profusion at the end of June to early July and continue less abundantly until the fall.

'Tetonkaha'

Zone 2b

A lovely hybrid rugosa that was originated in 1912 by Dr. N. E. Hansen of South Dakota who crossed a wild local prairie rose collected near Lake Tetonkaha with *R. rugosa*. It has semidouble flowers, deep rich pink, and fragrant. The bush at the Arboretum is 1–1.5 m high.

'Therese Bugnet'

Zone 2b

Perhaps this is not a true hybrid rugosa and yet it has enough *R. rugosa* parentage to warrant its inclusion under this heading. It has conical, dark red buds opening to large, pale pink, double, fragrant flowers, but the foliage is like that of *R. acicularis,* but larger. It was originated by Mr. Georges Bugnet of Legal, Alta., and introduced into commerce by Mr. Percy H. Wright in 1950.

'Wasagaming'

Zone 2b

This is one of the most delightful shrub roses in the collection. It produces an abundance of lavender pink, cabbage-type, double roses. It is hardy and dependable and makes a fine display of blooms in the early part of the rose season. The habit of this cultivar is neat but widespreading; the specimens at the Arboretum are 1 m high by 1.5 m thick and rounded.

'Will Alderman'

Zone 2b

The flowers are clear rose pink and more like those of the hybrid perpetual in shape, fragrance, and continuity of bloom.

R. setigera Michx. PRAIRIE ROSE

Zone 3

A rambling shrub with stems about 1 m long and short hooked prickles. It has trifoliate leaves with large leaflets and deep rose flowers in corymbs. It is one of the most beautiful of North American roses and particularly valuable because it flowers in late July and August. It grows from Ontario to Florida, and west to Kansas and Texas.

var. ***tomentosa*** Torr. & A. Gray

Zone 3

A variety with leaves that are tomentose instead of glabrous beneath and with smaller flowers.

R. spinosissima L. SCOTCH ROSE, BURNET ROSE

Zone 4b

A dwarf, prickly species with white, pale pink, or yellow, solitary flowers. It has five, seven, or nine round or oval leaflets, deep green and glabrous. Its fruits are dark brown to black, globose, and crowned with the calyx. It is a native of Europe and western Asia.

var. ***altaica*** (Willd.) Rehd. ALTAI ROSE

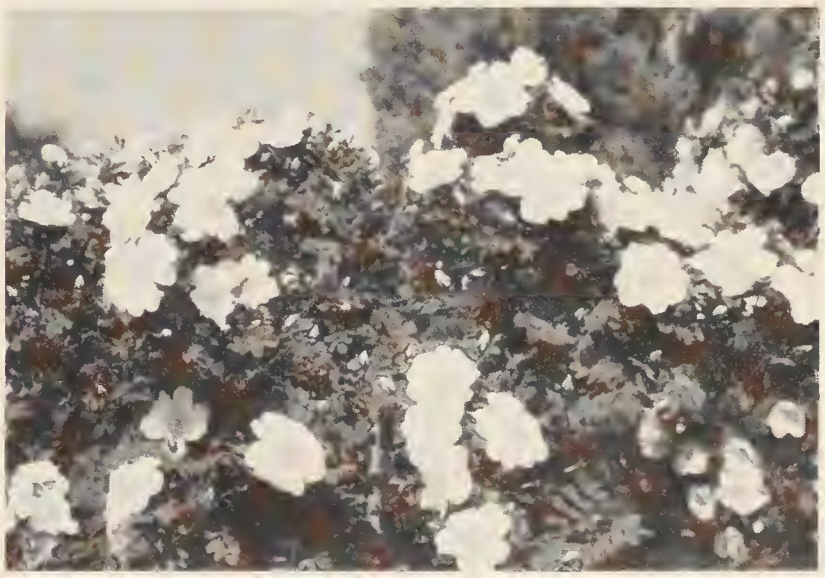
Zone 4

A geographical variety from the Altai mountains with large, white, single flowers on more vigorous but less spiny plants.

R. 'Suzanne'

Zone 3

An *R. laxa* hybrid from Dr. F. L. Skinner of Morden, Man., with double, coral pink flowers on a plant 1 m high.



Altai rose (*Rosa spinosissima* var. *altaica*)

R. 'Sylvander'

Zone 3

A meritorious shrub rose that was introduced by the Central Experimental Farm in Ottawa. It forms a shapely bush not more than 1 m high and covered in June with large, light yellow, single blooms that are larger than those of its parents *R.* ×*harisonii*.

R. 'Tour de Malkoff'

Zone 3

A large bush of loose habit, having extremely beautiful magenta flowers with a lilac pink reverse to the petals. It is a typical cabbage or Provence rose, of interest throughout its flowering stages for it produces many varying shades of magenta and light pink at the same time on the same bush.

R. 'Tuscany'

Zone 3

This is one of the oldest *R. gallica* roses and is probably the "Old Velvet Rose" of Parkinson's *Paradisi in Sole, Paradisus Terrestris*, written in 1629. The semidouble, maroon-crimson flowers with vivid yellow stamens are produced on a bush plant 1 m high.

R. 'U. P. Hedrick'

Zone 3

A hybrid of *R. spinosissima* var. *altaica* originated by Miss Isabella Preston at the Central Experimental Farm and introduced into cultivation in 1926. It has large, single, rose pink flowers in June on a vigorous bush with brownish red stems and dark yellow green leaves.

R. 'Victory Year'

Zone 3

A hybrid of *R. blanda* with semidouble, slightly fragrant, clear pink flowers on a vigorous, upright bush with leathery, deep green foliage. This cultivar was introduced in 1951 by Percy H. Wright of Saskatoon, Sask. It flowers profusely in June and appears to be thoroughly hardy.

R. villosa L. APPLE ROSE

Zone 3

The apple rose is so called because of its distinctive, large, subglobose, rich red, bristly fruits. It makes a good, dense shrub 2–2.5 m high, with large, gray-green, hairy leaves and single, pink flowers. It comes originally from central Europe to Iran.

'Duplex' WOOLEY DOD'S ROSE

Zone 3

A cultivar with semidouble flowers.

R. 'William Lobb'

Zone 3

This ancient (1857) moss rose has unusual coloring. The fully opened semidouble blooms have petals of deep crimson-purple with pale lilac reverses, which fade to a uniform lavender-gray and lightening to nearly white at the bases. The green mossed buds are borne in large clusters on strong shoots.

R. 'Yatkan'

Zone 3

A hybrid shrub rose originated by Dr. N. E. Hansen. It forms a large, rounded bush 2.5 m high and almost as wide, with a mass of large, single to semidouble, rose pink flowers in July.

RUBUS — Rosaceae

Although the number of *Rubus* species is large, only a few are growing in the Arboretum collection. Because of their rambling habit they are costly to maintain and special structures are necessary to display them to good advantage. The few species in the collection, however, are good ornamental and desirable types.

R. coreanus Miq.

Zone 5

One of the more handsome species, grown chiefly for its ornamental stems, which are blue-white, and its graceful pinnate foliage. It produces small, pinkish flowers in corymbs and red or black fruits. A native of Korea and China.

R. deliciosus Torr. BOULDER RASPBERRY

Zone 3b

The specific name of this plant is misleading because it does not apply to the fruits, which are not at all delicious. However, it is a graceful shrub, unlike most *Rubus* species, and produces large, solitary, white blooms, rather like exquisite single roses, on slender arching branches as long as 2 m. It is one of the better and more refined shrubs and should be grown more often in gardens. It occurs in Colorado.

R. flagellaris Willd. NORTHERN DEWBERRY

Zone 3b

A species with prostrate, long, glabrous stems and a few recurved prickles. Its prickly leaves have three to five leaflets, hairy above and pubescent on the veins beneath. Its thimble-shaped, black, glabrous fruits are edible and some improved forms are in commerce. Its range is from Maine to Minnesota, Missouri, and Virginia.

R. spectabilis Pursh

Zone 5

A species with purplish rose flowers produced in early May and egg-shaped, orange-yellow fruits. It is a rapidly spreading plant and needs to be bounded or it will form thickets of erect thorny stems 1–1.5 m high. It grows in western North America.

SALIX — Salicaceae

No botanist or horticulturist who has written about this genus has failed to observe the difficulties encountered in the identification of the different species. This difficulty is chiefly because the dividing line between one species and another is sometimes so obscure that species of near affinity appear to merge one with another. In addition, the sexes are separate, with male catkins on one tree and female ones on another. Easy hybridization by species also adds to the confusion. Many of the native willows absent from the collection at the Arboretum are now being sought. Many beautiful Canadian

species should be useful as ornamentals, particularly some of the dwarf silvery kinds that could be used as ground covers.

*S. **alba*** L. WHITE WILLOW

Zone 4

Both staminate and pistillate types of this species are present in the Arboretum collection. The trees are all large with wide-spreading branches, which are pendulous at the tips. The young shoots are gray, have silky down, and grow at an acute angle from the branches; the lanceolate leaves are finely toothed, tapered at both ends, and covered beneath with silky down. A native of Europe and northern Africa to central Asia.

var. ***calva*** G. F. Mey. CRICKET-BAT WILLOW

Zone 2b

This variety was formerly known as *S. alba* 'Coerulea' and *S. coerulea* Sm. It is a beautiful tree, which differs from the white willow by its basically pyramidal shape and erect branches, and the blue effect of its leaves after they have shed their whitish pubescence. The origin of the tree is uncertain; some think it is a geographical variety and others that it is a hybrid between *S. alba* and *S. fragilis*.

var. ***chermesina*** T. Hartig REDSTEM WILLOW

Zone 3

A variety with bright red branchlets, usually grown as a large shrub for its winter effect. In this case, branches are cut back close to the main stem each spring to induce new highly colored shoots. This cultivar is also known in the trade as *S. alba* 'Britzensis' and *S. vitellina* 'Britzensis'.

var. ***sericea*** Gaudin SILVER WILLOW

Zone 2

This beautiful silvery form of *S. alba* is conspicuous because of the dense silver hairs on the undersides of the leaves. It is not as robust a tree as the white willow but is worth planting for its attractiveness.

Cricket-bat willow (*Salix alba* var. *calva*)

var. ***tristis*** (Ser.) Gaudin NIOBE WILLOW

Zone 4

Most of the beautiful weeping willows in the collection were received as *S.* 'Niobe' and later identified as *S.* ×*sepulcralis*. However, since Dr. Donald Wyman of the Arnold Arboretum published the results of his thorough investigation into the *S.* 'Niobe' complex, the golden weeping willows have been identified as *S. alba* var. *tristis*. Some of these plants sweep the ground with their long pendulous branches.

var. ***vitellina*** (L.) J. Stokes YELLOWSTEM WILLOW

Zone 3

A variety with yellow twigs in its shrub form.

S. ×***blanda*** Anderss. WISCONSIN WEEPING WILLOW

Zone 4

A hybrid (*S. babylonica* × *fragilis*) that forms a large tree with a widespread head and pendulous branches. It is not as ornamental as some of the other weeping willows from which it is distinguished by its glabrous leaves.

*S. **caprea*** L. GOAT WILLOW

Zone 5

One of the best of the ornamental pussy willows because of its large, bright yellow catkins, which are conspicuous in early spring. The pistillate form is much prettier than the staminate, although both bear large catkins. The specimen in the collection is pistillate and has formed a shrub 3 m high and 2.5 m wide. Its range is from Europe to northeastern Asia and northern Persia.

*S. **cinerea*** L. GRAY WILLOW

Zone 5

A shrubby willow, 2 m high, covered with gray silky hairs. It is similar to *S. caprea* but has narrow leaves, smaller catkins, and gray downy buds. It occurs from Europe to Kamchatka and northern Persia.

'Variegata'

Zone 5

This cultivar has leaves dotted with yellow and white. It is unusual, but of no great ornamental value except for its very young leaves and shoots, which are red.

*S. **daphnoides*** Vill. VIOLET WILLOW

Zone 2b

A shapely tree 15 m high, with a violet cast to its leaves and twigs. To get a nice colorful winter effect it is necessary to cut the branches back severely in spring and force new vigorous growth. Its catkins are extremely showy and look much like those of the goat willow, although they are not as large. It grows from Europe to central Asia and the Himalayas.

S. ×***erdingeri*** J. Kern.

Zone 5

A hybrid (*S. caprea* × *daphnoides*) with large, showy, silvery gray catkins in early spring that make it superior to both parents. Unlike *S. daphnoides* it forms a shrub of many branches, 2 m high and 3 m wide.

*S. **exigua*** Nutt. COYOTE WILLOW

Zone 3b

A large suckering shrub or small tree with narrow, densely hairy, silvery white leaves. A good ornamental plant but its

Violet willow (*Salix daphnoides*)

use is limited unless grafted onto a nonsuckering species; then it is valuable where a silver accent is needed. The plants at the Arboretum are grafted onto *S. alba* var. *vitellina* and have made fine small trees.

S. fragilis L. CRACK WILLOW

Zone 3b

A large bushy-headed tree with a rough, corrugated trunk. As its common name suggests, it has brittle wood that snaps when bent. It is similar to *S. alba* but has wider angles to its branching and larger, glabrous, gray leaves. Many of the large willows growing in woodlands in the Ottawa area are

SALIX

Shining willow (*Salix lucida*)

suspected of being this species. It originated in Europe and western Asia and has escaped into the USA.

S. lucida Muhlenb. SHINING WILLOW

Zone 1

A beautiful native willow with large lanceolate leaves. It is similar to the bay willow (*S. pentandra*), but differs by having narrower leaves with long drawn-out points. In nearby woodlands, it reaches a height of 10.5–12 m and is handsome enough to be considered for home planting. It is preferable to the large weeping willows, which are so menacing to sewer and drain pipes and outlets. Its range is from Newfoundland to the

Crack willow (*Salix fragilis*)

Peking willow (*Salix matsudana*)

Northwest Territories, and south to New Jersey, Kentucky, and Nebraska.

S. matsudana G. Koidz. PEKING WILLOW

Zone 5

This handsome tree was sent in 1931 from the Morton Arboretum and was labeled *Salix sargentii*. It has now grown to a height of 9 m and has formed a shapely, pyramidal tree. The species originated in northern China, Manchuria, and Korea.

S. nigra Marsh. BLACK WILLOW

Zone 4

A tree growing to 9 m, with rough dark brown scaly bark and narrow, glabrous, lanceolate, finely toothed leaves rounded at the base. The leaves and the large, heart-shaped, persistent stipules are distinguishing characters. It grows from New Brunswick to western Ontario, Florida, and California.

S. nigricans Sm.

Zone 5

A shrubby species with dark green, almost round leaves, 2.5–4 cm wide. A distinctive willow, but not especially useful unless used as a hedge. It grows in Europe and western Asia.

S. pentandra L. LAUREL WILLOW, BAY WILLOW

Zone 1b

A handsome willow 6–9 m high, with dark, lustrous, green, oval leaves and shiny brown twigs. It produces golden yellow catkins in spring and might be considered desirable for home planting; in fact, it is much more desirable than the weeping types for it does not grow as fast or as large. It ranges from Europe to the Caucasus.

S. purpurea L. PURPLE OSIER

Zone 4

A shrubby species with thin, graceful branches. Its young shoots are glabrous, glossy, and purple. It is often used in basket making where fine twigs are needed. For this use the shrub is pollarded, that is, the branches are cut back each spring to induce the growth of long, thin wands. As a shrub, it is useful for providing color in the summer, and when cut back yearly, its showy purple twigs produce a good winter effect. A native of Europe and northern Africa.

'Gracilis' ARCTIC WILLOW

Zone 4

A slender-twigged form now used a great deal for making medium-sized hedges, for which it is admirably suited. The name arctic willow is somewhat misleading because it is not hardier than the species and probably originated in the same general area.

S. sachalinensis Friedr. Schmidt

'Sekka' SEKKA WILLOW

Zone 3

This cultivar is one of the oddest forms of any tree or shrub. It has curiously twisted and contorted branches that are completely flattened and deformed at the ends, forming a kind of curved boomerang effect. Used in floral arrangements, they can create almost any form desired. A native of Japan.

Arctic willow (*Salix purpurea* 'Gracilis')

S.* ×*sepulcralis Simonk SALAMON WILLOW

Zone 4b

Most of the specimens in the collection previously identified as this species are, in fact, *S. alba* var. *tristis*. It is a hybrid (*S. alba* × *babylonica* L.) and first appeared in the garden of Baron de Salamon in the Alps. The name Salamon willow is often erroneously given as Solomon's willow. It is similar to *S. alba* var. *tristis* but the pendulous branches are not as long and they are brownish, not yellow.

S.* ×*seringeana Gaudin

Zone 4

A hybrid (*S. elaeagnos* × *caprea*) with tomentose branchlets. The lanceolate-serrulate leaves resemble those of *S. ela-*

Sekka willow (*Salix sachalinensis* 'Sekka')

eagnos Scop. but they are grayish tomentose beneath, whereas the leaves of *S. elaeagnos* are white tomentose. The specimen at the Arboretum is large and shrubby and has reached a height of 10.5 m with a spread of 6 m. It is attractive but, compared with other willows, is of no special merit.

S. ×***smithiana*** Willd.

Zone 3b

A hybrid (*S. caprea* × *viminalis*) that has resulted in a beautiful willow. It is perhaps more showy in early May when it is covered with catkins. The specimen in the collection is a shrub 3.5 m high with 2.5 m spread.

S. ***viminalis*** L. COMMON OSIER

Zone 5

This particular specimen does not key out exactly to the common osier and is considered to be a possible hybrid. It has formed a shrub 5.5 m high and 3.5 m wide, has linear leaves tapering to a point, and gray tomentose branchlets. A native of Europe, north Africa, Asia, and the Himalayas.

SAMBUCUS **Caprifoliaceae**

The elders are much neglected as ornamental plants and yet the genus contains many species and varieties with extremely refined and distinctive foliage, some with beautiful flowers, and others with attractive fruits. Furthermore, they are easy to propagate and will grow well in shade, partial shade, or full sun and in a variety of soils. Most of the cultivated elders belong to the American *Sambucus canadensis* group and to the European *S. nigra* and *S. racemosa* groups. All are good ornamental plants, but the larger number of varieties in the European groups provides a greater selection.

S. ***canadensis*** L. AMERICAN ELDER

Zone 3

The older specimens have formed shapely shrubs 3 m high and 2 m wide. Each summer they are extremely showy with their large, flat clusters of flowers, and in fall they produce an abundance of showy fruits. This species differs from *S. nigra* by having seven pairs of leaflets instead of five, and by its purple rather than black fruits. It ranges from Nova Scotia to Manitoba, Florida, and Texas.

'Aurea' GOLDEN AMERICAN ELDER

Zone 3

A highly ornamental form, with extremely large flower clusters that extend to more than 30 cm in diameter; its leaves are also large, up to 45 cm long, and formed of at least 11 leaflets.

'Maxima'

Zone 3

A vigorous plant with large leaves up to 20 cm long with 11 leaflets to a leaf. Its flower clusters are 25–45 cm in diameter. A splendid improvement over the species and useful where large foliage is desired.

S. ***kamtschatica*** E. Wolf KAMCHATKA ELDER

Zone 4

A species closely related to *S. racemosa* but not as large. It is also distinguished from that species by having more finely serrated leaves and flat inflorescence. A native of Kamchatka.

S. ***nigra*** L. EUROPEAN ELDER

Zone 4

A large shrub growing to 3 m high and 2.5 m wide. In its native habitat it sometimes grows into a small tree 9 m high, although its more usual form is a shrub 6 m high. It has large, pinnate leaves, usually composed of five leaflets. Although cultivated since ancient times in Europe, it is now considered more a weed than an ornamental plant. Its seeds are widely and plentifully distributed by birds, and the resultant shrubs soon overshadow original plants. It has become better known for its use in the manufacture of homemade wines and as a home remedy for colds than for its esthetic value. However, there are many beautiful forms that are used ornamentally and that will continue to find a use in specialized plantings. The species originated in Europe, northern Africa, and western Asia.

'Albo-variegata'

Zone 4

A handsome cultivar often sold as *S. nigra* 'Argentea variegata'. Its leaves are bordered with white and arise from long, slender branches, which are often killed back during winter but grow so rapidly the following summer that the beauty of the shrub is rarely affected.

'Aurea' GOLDEN EUROPEAN ELDER

Zone 4

An excellent golden-leaved shrub, which will form a distinctive, large mound of yellow if pruned regularly. It is often planted in front of farm homes in Ontario, where it stands out luminously in summer and provides an attraction well into fall.

'Aureo-variegata'

The leaves of this form are variegated with yellow.

'Laciniata' PARSLEY-LEAVED ELDER

Zone 4

An unusually beautiful, cut-leaved cultivar with each leaflet being divided into long, narrow, pointed lobes. In flower, it is the best of all the ornamental elders.

Golden European elder (*Sambucus nigra* **'Aurea'**)

S. pubens Michx. RED-BERRIED ELDER

Zone 3

A native species that grows wild locally and is widespread over a large part of North America. It is closely allied to *S. racemosa,* but can be distinguished from that species by its brown rather than white pith, and by its flowers, which open later and are in a loose rather than compact panicle. *S. racemosa* flowers in May, whereas this species does not flower until July. It occurs from New Brunswick to Minnesota, and south to Georgia and Colorado.

S. racemosa L. EUROPEAN RED ELDER

Zone 3

A shrub to 2 m with light brown branches and glabrous leaves. Its large, scarlet fruits produced in late summer distinguish it from other elders. This species, like *S. nigra,* has given rise to a large number of cut-leaved, golden, and variegated varieties, of which only one to date is represented in the collection. It originated in Europe and western Asia.

'Plumosa Aurea'

Zone 3

One of the most attractive of all golden-leaved shrubs. It has bright, golden, feathery foliage. The plumose effect of its leaves is produced by the teeth, which extend almost to the midrib. A further ornamental attraction is its bright red fruits produced in July that are prominent against the golden background of leaves.

SECURINEGA Euphorbiaceae

S. suffruticosa (Pall.) Rehd. SPOIL-AX

Zone 4

Most botanists and horticulturists find this shrub to have no particular beauty of flower or fruit. It is sometimes planted for its green foliage or its graceful habit. The shrubs in the Arboretum are the only representatives of the Euphorbiaceae and are well worth growing because of their graceful branches and distinctive foliage. One specimen has grown 2 m high and looks much like a miniature weeping willow. This habit is only obtained after it has reached a fair size, for smaller plants in the Arboretum bear little resemblance to the large specimen. A native from northeastern Asia to central China.

SHEPHERDIA Elaeagnaceae

The two more common members of this genus are often mistaken for *Elaeagnus* and have, in fact, been sold under that name. However, it is easy to distinguish *Shepherdia* from the two other members of Elaeagnaceae, *Elaeagnus* and *Hippophae. Shepherdia* has opposite leaves, whereas the two other genera have alternate leaves.

S. argentea (Pursh) Nutt. SILVER BUFFALOBERRY

Zone 1

One of these specimens has orange fruits, whereas the other one has the scarlet fruits usually associated with this species. These are small deciduous shrubs, about 1.5 m high and 1 m wide, with lovely silvery leaves and branches. Although usually not considered ornamental, the specimen planted in a rock garden is rather attractive. This plant is not accompanied by any other member of the same species, but each year it produces abundant scarlet fruits, which are extremely showy against the silvery foliage. *S. argentea* differs from its near relative the russet buffaloberry (*S. canadensis* (L.) Nutt.) by having leaves that are silvery on both sides. The leaves of the russet buffaloberry are silvery on the underside only and green and glabrous above. The silver buffaloberry is found from Minnesota and Manitoba to Saskatchewan, Kansas, and southern Nevada.

SORBARIA Rosaceae

The false spireas form huge shrubs with large compound leaves and leaflets and conspicuous creamy white flower clusters. They are of little use in a small garden unless it is in a partly shaded corner where the large foliage mass can be used to advantage.

S. aitchisonii (Hemsl.) Hemsl. ex Rehd.
KASHMIR FALSE SPIREA

Zone 4

The most ornamental of all the false spireas, blooming in July and August. The huge, pyramidal, branching panicles, up to 60 cm long and 23–40 cm wide, arise from a mass of large pinnate leaves composed of 11–23 leaflets. The plants in Ottawa have grown 2 m high and have spreads of 1.5–2 m. This species is slightly lower growing than the more robust *S. sorbifolia* and has simply serrate rather than doubly serrate leaves. It is interesting from an Arboretum point of view because of its Kashmirian and Afghanistan origin.

S. arborea C. K. Schneid.

var. ***subtomentosa*** Rehd.

Zone 5

This hairy-leaved variety of *S. arborea* is, like the type, extremely beautiful while in flower. It has wide panicles of white spirea-like blooms up to 30 cm long. It grows much larger than the Kashmir false spirea and makes an even larger and more spectacular display of bloom. Similar to the other species, it presents an untidy appearance as the flowers fade. Native to western China.

S. assurgens Vilm. & Bois

Zone 4

This species has upright, dense panicles, which are almost too crowded together to present a graceful appearance. It is similar to *S. sorbifolia,* but differs botanically from that species by having fewer stamens, 20 instead of 40–50, and more veins to each leaflet. It is believed to be a native of China.

S. sorbifolia (L.) A. Braun URAL FALSE SPIREA

Zone 2

Ural false spirea is similar to *S. assurgens,* but is much dwarfer and more compact, and for that reason is more desirable for planting in gardens. It is the hardiest of all the species in the collection and is popular as a specimen shrub in colder areas. The species originated in northern Asia from the Ural Mountains to Japan.

×SORBARONIA — Rosaceae

A generic name given to a group of hybrids (*Aronia* × *Sorbus*).

×***S. hybrida*** (Moench) C. K. Schneid.

Zone 3b

This large shrub is believed to be a hybrid (*Aronia arbutifolia* × *Sorbus aucuparia*). It is showy, with its white flowers arranged in small corymbs and its black purple, globose fruits. However, in home gardens it is not as attractive as many other trees and shrubs of similar habit.

×SORBOCOTONEASTER — Rosaceae

The name given to progeny of the cross between *Cotoneaster* and *Sorbus*.

×***S. pozdnjakovii*** Pojark

Zone 4

A natural intergeneric hybrid of *Cotoneaster melanocarpa* × *Sorbus sibirica* that has some characteristics of each species. Its leaves are pinnate, pinnate and half-lobed, or lobed, and thick and hairy like a cotoneaster. Its fruits are red and mealy, perhaps more like a cotoneaster in formation, but the color of a *Sorbus* species. The hybrid was collected in Yakutskland, eastern Siberia.

SORBUS — Rosaceae

A large group of deciduous trees and shrubs once regarded as belonging to the *Pyrus* section of Rosaceae. These trees are, for the most part, excellent for ornamental use in the Ottawa area, although during late summer they will often show rust on their leaves, especially if they are in an area where the host plants (*Juniperus* spp.) of Gymnosporangium are present. In addition, *S. aucuparia* and hybrids with this species as a parent seem much more susceptible to fireblight disease and should be avoided for home use until a cure is found. However, if the plants are properly sprayed this disease is not likely to prove serious. Some species may be burned by the hot summer sun and should be planted where they are shaded during the early part of the day. Most of the hybrids listed are Lombarts hybrids that originated from crosses made between *S. aucuparia, S. discolor,* and *S. prattii* Koehne.

S. alnifolia (Siebold & Zucc.) K. Koch KOREAN MOUNTAIN ASH

Zone 4b

This lovely tree was introduced into Canada by the Dominion Arboretum as early as 1901, just nine years after it was first introduced from Japan by Mr. Spaeth of Berlin. Dr. William Saunders, who was responsible at that time for the introduction of plants into the Arboretum, did not lose much time in getting new species of trees.

This species is one of the best of all mountain ashes and might be regarded as one of the best flowering trees. Its flat clusters of white flowers are produced abundantly during early June; its bright green, lustrous leaves and its fine, rounded shape make it attractive all summer; its bright orange fruits are particularly showy in early fall, and its autumn color is equal to many trees grown for coloring alone.

The original tree planted in 1901 has now reached 7.5 m and has attained a crown spread of 6 m. This species may be distinguished from all others by its simple leaves with no leaflets at the base, shallow lobes unevenly serrate, and the undersides of the leaves almost completely devoid of hairs. The species originated from central China to Korea and Japan.

S. americana Marsh. AMERICAN MOUNTAIN ASH

Zone 3

This species is somewhat similar to the European mountain ash (*S. aucuparia),* but differs by having fairly sticky buds without hairs and compound leaves with leaflets 4–10 cm long. Its flowers and fruit clusters are also without hairs and its fruits are 4–6 mm in diameter. It is found in eastern North America.

'Belmonte'

Zone 3

A form selected from *S. americana* plants in the Belmont Arboretum at Wageningen in the Netherlands, because of its dense, oval crown formed by ascending branches. The small orange-red fruits are upright on the tree, not hanging down.

'Apricot Queen'

Zone 3b

This cultivar has peach-colored berries produced early in the fall.

S. aria (L.) Crantz WHITEBEAM

Zone 4

A beautiful small tree, which has not reached more than 4.5 m in height with a 3 m spread. Its main beauty is in its leaves, which show their silvery undersides in the slightest breeze. When heavily laden with its bright red fruits, which stand out luminously from the leaves, it presents an extremely attractive autumn picture. Later, the leaves change to dull red and, although they are not vivid, they make the tree as picturesque as it is in summer. It differs from other simple-leaved mountain ashes by having finely double-toothed leaf blades, with 8–12 veins on each side of the midrib. A native of Europe.

'Lutescens' GOLDBEAM

Zone 4

This variety could become extremely popular, because the golden undersides of the leaves give it an even more distinctive appearance than the whitebeam. Apart from this distinguishing character, its symmetrical growth gives it a good appearance.

'Magnifica'

Zone 4

A striking form with large, abundant fruits in large clusters.

'Majestica' DECAISNE MOUNTAIN ASH

Zone 4

A cultivar much superior to the type, with larger leaves and much larger fruits. It is sometimes referred to as 'Decaisneana'.

S. aucuparia L. EUROPEAN MOUNTAIN ASH, ROWAN

Zone 3

The most popular mountain ash in cultivation, it is easy to grow and fast growing, but does not form an overly large tree.

SORBUS

Fruits of European mountain ash, or rowan (*Sorbus aucuparia*)

The specimens at the Arboretum are not more than 9 m high, have spreads of 4.5–6 m, and are shapely. Their beautiful pinnate foliage is interesting all summer and again in fall when their bright red berries and crimson leaves make a beautiful effect. In the Arboretum area, the birds leave the fruits untouched until late February so the trees are attractive for most of the winter. This species and its varieties can easily be distinguished from *S. americana* and *S. decora* by their silky, almost woolly winter buds. A native of Europe, western Asia, and Siberia.

'Dirkenii'

Zone 4

A cultivar with leaves that are pale yellow when they first appear in spring.

'Edulis' MORAVIAN MOUNTAIN ASH

Zone 4

A geographic form from northern Austria and Czechoslovakia. It has much larger fruits than the type and the fruits are often used for preserves in Germany and Austria.

'Fastigiata' UPRIGHT MOUNTAIN ASH

Zone 3

An erect-branching, almost columnar form raised in Ireland. It is useful for planting along narrow streets, where its fruits and foliage show to advantage.

'Pendula' WEEPING MOUNTAIN ASH

Zone 3

A weeping form of the mountain ash that will form a creeping twisting mound at ground level unless grafted high up the stem. An old tree on the main lawn of the Central Experimental Farm is an example of this form.

'Rossica' RUSSIAN MOUNTAIN ASH

Zone 3

A form similar to 'Edulis' but with larger and more serrate leaflets.

'Rossica Major'

Zone 3

A form of the Russian mountain ash with larger fruits.

'Sheerwater Seedling'

Zone 4

This plant was first grown by Jackman and Sons nurseries in Woking, England, who were the originators of *Clematis* ×*jackmanii*. It is a vigorous cultivar with large, dark green pinnate leaves and deep red fruits.

'Xanthocarpa'

Zone 3

A form with yellow fruits.

S. austriaca Hedl.

Zone 4

The species is closely related to *S. intermedia* but has broader leaves with more pointed, pinnate lobes on the margins. Its fruits are red.

S. 'Brilliant Yellow'

Zone 4b

A Lombard hybrid with bright yellow fruits, more brilliant and with larger trusses than *S. aucuparia* 'Xanthocarpa'.

S. caloneura (Stapf) Rehd.

Zone 5

A small tree with glabrous branches, elliptic to oblong, double, serrate leaves, and brown-dotted, pear-shaped fruits. Botanically it is classed with *S. alnifolia*, *S. folgneri*, and others because its calyx quickly falls away from the fruits leaving a naked apex.

S. 'Chamois Glow'

Zone 4

A cultivar with buff-colored fruits.

S. 'Chamois Glowing Pink'

Zone 4

This cultivar has similar buff-colored fruits but with a rosy overtone.

S. 'Chamois Pearl'

Zone 4

A cultivar with yellowish buff fruits.

S. commixta Hedl.

Zone 3b

This species has a slender, almost columnar habit, which is exhibited fairly well by the two specimens in the Arboretum. Apart from its growth habit, it is similar to *S. americana*, but has smaller leaves and looser corymbs. It originated in Japan and Korea.

S. 'Copper Glow'

Zone 4

The fruits of this cultivar are more brownish red than buff and are described as coppery gold.

S. 'Coral Beauty'

Zone 4b

A cultivar with large, apricot-colored fruits.

S. decora (Sarg.) C. K. Schneid. SHOWY MOUNTAIN ASH

Zone 2

This species is closely allied to the American mountain ash (*S. americana*), but has much larger and more showy bright red fruits, and consequently is of much greater ornamental value. It also differs from the American mountain ash by having sparse rusty brown hairs on its buds, leaflets that are hairy beneath, and clusters of hairy flowers and fruits. The leaflets of *S. americana* are hairy when young but these hairs do not persist. There have been several cases of an escaped European mountain ash being collected and mistaken for *S. decora*, which is a much more desirable species. The species ranges from Labrador to Minnesota, New York, and Vermont.

S. discolor (Maxim.) Maxim.

Zone 3b

A small tree that grows not more than 9–12 m high with small, white flowers and egg-shaped, milk white fruit. Its greatest beauty lies in its vivid red autumn coloration that surpasses all others. A native of northern China.

S. esserteauiana Koehne

Zone 4

This species is one of the introductions by Dr. E. H. Wilson from western Szechwan, China. It is similar to the European mountain ash, but has more silky buds, and veins that are deeply impressed above. This tree in the Arboretum has grown 4.5 m high and has a trunk 10 cm in diameter.

S. folgneri (C. K. Schneid.) Rehd.

Zone 4b

This species varies in the whiteness of the undersides of its leaves. Some plants are elegant, with arching branches. It is allied to *S. alnifolia* and *S. caloneura* in that its calyx is deciduous and the fruits do not end in calyx teeth but are pitted at the apex. Found in China.

S. hupehensis C. K. Schneid.

Zone 4

A handsome species of mountain ash related to *S. discolor* but with white fruits tinged with yellow rather than rose. Its foliage is also vivid in the autumn. Its buds differ by being glabrous, and its stipules are deciduous rather than persisting as in *S. discolor*. It comes from central and western China.

var. ***obtusata*** C. K. Schneid.

Zone 4

A geographical variety from western China with 9–11 leaflets, which is a smaller number than the species.

S. ×***hybrida*** L. OAK-LEAF MOUNTAIN ASH

Zone 4

A natural hybrid (*S. aucuparia* × *intermedia*) that produces leaves of odd shapes, between simple and compound, as one might expect from a cross between these two species. The leaf is pinnate only toward the base, whereas the upper part is lobed and serrate; sometimes almost the whole leaf is lobed and not at all pinnate. It is found growing wild in Scandinavia with the parent species and is also reported as growing naturally on the Isle of Arran. Both specimens in the Arboretum have formed beautiful trees; their beauty is especially evident when they are covered with their coral red berries. They are erect trees, 4.5–6 m high with spreads of 3–3.5 m.

'Gibbsii'

Zone 4

A selected form with bright red fruits.

S. intermedia (J. F. Ehrh.) Pers. SWEDISH WHITEBEAM

Zone 4

An excellent simple-leaved species similar to the whitebeam but with thick gray felt, instead of white pubescence, at the base of the leaves, and with leaves that are lobed rather than sharply or doubly serrate. These trees have formed shapely specimens, often 5–6 m high and with spreads of 3–3.5 m. The tree planted in 1946 was obtained from seed sown that year; it is now 4.5 m high, and has a spread of 2 m, and a girth of 15 cm. Although hardy and beautiful, the Swedish whitebeam is not as impressive as the common whitebeam (*S. aria*) because the silvery undersides of the leaves of the common whitebeam make a much more spectacular show than the dull gray undersides of this species leaves. Found in northern Europe.

S. 'Kirsten Pink'

Zone 4b

A selection with salmon pink berries.

S. koehneana C. K. Schneid. KOEHNE'S MOUNTAIN ASH

Zone 5

This species is more of a shrub than a tree and is particularly worthy of cultivation for its fruits, which are glistening white with a reddish spot on the calyx end and not pure white, as suggested by translations of Schneider's description. These fruits, which shine like porcelain beads, are extremely attractive, particularly when the shrub turns crimson in the fall. Its pinnate leaves place it in the *aucuparia* group of *Sorbus* and near to *S. vilmorinii* C. K. Schneid., a species that has rosy red fruits. The plants in the collection are 2 m high and have a spread of 1 m. Found in Hupeh and Shensi in China.

S. 'Old Pink'

Zone 4b

A selection with medium pink berries.

S. 'Orange Parade'

Zone 4b

A selection with orange-yellow fruits.

S. ×***paucicrenata*** (Ilse) Hedl.

Zone 5

An interspecific hybrid (*S. aria* × *decipiens*) that looks more like *S.* ×*latifolia*, which is another hybrid with *S. aria* as the pollen parent. The flowers of the specimen in the Arboretum look much like flowers of the pear and are not produced until September. Consequently, the fruits have never developed because of Ottawa's early winters.

S. 'Pink Queen'

Zone 4b

A selection with light pink fruits.

S. pluripinnata (C. K. Schneid.) Koehne

Zone 5

An elegant, small, western Chinese species with large leaves containing as many as 25 leaflets, which are deep green and glabrous above and pale green and woolly beneath.

S. pohuashanensis (Hance) Hedl.
PO-HUA MOUNTAIN ASH

Zone 3b

This tree is described as small, but the specimens in the Arboretum do not bear this out, for they have attained an average height of 7.5 m in 15 years. They appear likely to outgrow the common mountain ash, which is similar to this species but does not have large persistent stipules below the inflorescence. A native of northern China.

S. 'Red Copper Glow'

Zone 4

A cultivar that produces abundant fleshy pink fruits.

S. reflexipetala Koehne

Zone 5

A species that resembles *S. commixta*, but with reflexed petals. It originated in Japan.

S. rehderiana Koehne REHDER'S MOUNTAIN ASH

Zone 4

A species closely related to *S. discolor*, but with whitish to reddish fruits instead of pure white fruits and with 15–19 leaflets. The tree in the collection is 6 m high, which suggests that it will belie its frequent description as a dwarf tree. Native to western China.

S. 'Rose Elegance'

Zone 4

A cultivar with light rose pink fruits.

S. 'Rowancroft Pink Coral'

Zone 4

A pink-fruited form that was introduced by Rowancroft nurseries, Meadowvale, Ont. It originated from seed collected by Miss Isabella Preston from *S. aucuparia* in the Arboretum and sent to Meadowvale.

S. rufoferruginea (C. K. Schneid.) C. K. Schneid.
RED-VEINED MOUNTAIN ASH

Zone 4b

A species with pinnate leaves, allied to *S. commixta*, but distinguished by its dark red-brown hairs, which cover the midrib and veins of the undersides of the leaves, the main stalk, and the flower stalks. The plants in the collection are vigorous, having grown to 7.5 m in 15 years, and they will probably become comparatively large for mountain ash trees. The species is native to Japan.

S. 'Salmon Queen'

Zone 4

The bright salmon-colored berries of this cultivar are extremely attractive.

S. scalaris Koehne

Zone 4

A small shrubby tree, 3.5 m high. Its pinnate leaves are similar to those of *S. koehneana*, but it is distinguishable by its bright red fruits, large persistent stipules, and 23–29 leaflets. Originating in western China.

S. 'Scarlet King'

Zone 4

A cultivar with bright green leaves that show off its scarlet fruits.

S. serotina Koehne

Zone 3b

Another *Sorbus* allied to *S. commixta*. This species differs by having reflexed petals, a smaller number of leaflets (usually 13) and smaller red fruits. Grows in Japan.

S. ×thuringiaca (Ilse) Fritsch

Zone 5

A hybrid (*S. aria* × *aucuparia*) with leaves partly pinnate and partly simple. The influence of *S. aucuparia* is more obvious in this species than in *S. ×hybrida*, a hybrid with similar parentage. S. ×*thuringiaca* shows the influence of *S. aria* in the grayish down beneath the leaves and in the upper leaflets. It is a tree that may be worth further attention when its full beauty is explored.

'Fastigiata'

Zone 5

A narrow upright-growing tree with bright red fruits. It is suitable for planting on narrow streets and in small home gardens.

'Leonard Springer'

Zone 5

This cultivar has grown well and deserves meritorious attention. It is a handsome tree with dark green leaves that are not pinnate but deeply lobed, much like oak leaves. The fruits are vivid bright orange and hang upon the tree well into March.

S. 'Upright Yellow'

Zone 4

An erect-branching cultivar with bright yellow fruits. Aptly described by its name.

S. 'Vermilion'

Zone 4

A form with deep vermilion red fruits.

S. 'White Wax'

Zone 4

A cultivar having pure white shiny fruits produced early in the season in great abundance.

SPIRAEA — Rosaceae

An extremely interesting genus of shrubs and herbs containing some excellent ornamental plants, nearly all of which are hardy in the Ottawa area. A few species are so well known in that area that they are almost regarded as native. *S.* ×*vanhouttei,* the bridal wreath spirea, is probably the most widely grown shrub in Canada.

S. albiflora (Miq.) Zab. JAPANESE WHITE SPIREA

Zone 5

A dwarf, compact shrub, with white flowers in rounded or flat clusters. It is similar to the Japanese spirea (*S. japonica*) and was at one time considered a variety. However, it differs from that species by having downy-ribbed young shoots, angled rather than terete branchlets, and white rather than pink flowers. Native to Japan.

S. ×*arguta* Zab. GARLAND SPIREA

Zone 3

One of the best of all flowering shrubs, although it does not have the same beautiful arching effect of the bridal wreath spirea (*S.* ×*vanhouttei*). It blooms 2 weeks earlier than that species and thus helps to extend the flowering season of spirea. Its showy white cascades of flowers often give a perfect background to late-flowering tulips in the Ottawa area. It is a hybrid of *S. thunbergii* and *S.* ×*multiflora* Zab., the latter species being a hybrid of *S. crenata* and *S. hypericifolia.*

When in flower it can easily be distinguished from *S.* ×*vanhouttei* by its earlier flowering period and by its flowers, which are arranged closely all along the top sides of the branches instead of being separated into small circular umbels. The leaves of *S.* ×*arguta* are thin and narrow; those of *S.* ×*vanhouttei* are rhombic and sometimes lobed.

Left, **garland spirea (*Spiraea* ×*arguta*);** ***right, Spiraea* ×*arguta*** **'Graciosa'**

'Compacta'

Zone 3

A shapely, dwarf, compact form of the garland spirea, which is probably of greater value for home gardens. At first sight it could be regarded as a dwarf *S.* ×*vanhouttei,* because of its similar but dwarfer habit. It is referred to as S. ×*cinerea* in Krüssman's *Handbook der Laubgeholze*, but that species has a much creamier floral effect.

'Graciosa'

Zone 3

A floriferous form with 18–20 flowers on a cyme, rather than 6–8 as in *S.* ×*arguta.* The flowers are not as brilliantly white as those of the species, but they are formed on more or less pendulous branchlets, packed along the branches, and present an extremely striking spectacle. The anthers are dark and the flowers more pleasantly fragrant than those of the species. The leaves of this cultivar are entire and similar to *S.* ×*cincerea* in that they are not dentate along the upper half as in *S.* ×*arguta.*

S. ×*billiardii* Hérincq BILLIARD SPIREA

Zone 4

This hybrid (*S. douglasii* × *salicifolia*) is an attractive shrub, with branches that extend from the ground and terminate in long, rosy panicles. It is similar to *S. latifolia,* which is native to the Ottawa area, but is much more showy and its blossoms are a deeper rose color. It differs, too, from the native species by having leaves that are pubescent and tomentose underneath.

'Macrothyrsa'

Zone 4

This delightful hybrid was added to the collection in 1905 and came from Spaeth's nursery in Germany as *S. bethlehemensis* Hort. var. *rubra.* It produces bright pink flowers in dense panicles on a strong erect bush. This form is a hybrid of *S. douglasii* and *S. latifolia* and has the compact habit of the former and the bright pink blooms of the latter species.

Spiraea* ×*arguta **'Graciosa'**

S. blumei G. Don

Zone 4

A native of Japan and Korea and said to be rare in cultivation. This specimen, obtained from the Dendrological gardens, Pruhonice, Czechoslovakia, keys out entirely to this species and has been identified as such.

Like *S. trilobata* and *S. ×vanhouttei,* it is a small shrub growing up to 1 m high. It has gracefully arching branches and white flowers, with rounded petals, in small umbels. Its leaves are similar to those of *S. ×vanhouttei,* being rhombic-ovate but obtuse instead of acute. It is mainly of botanical interest, as several closely related species are preferable from a horticultural viewpoint.

S. ×brachybotrys J. Lange

Zone 4

A vigorous hybrid (*S. canescens* D. Don × *douglasii*) with graceful arching branches. It is probably the best panicled-type spirea and should be grown more often, if only for its summer flowers. The bright pink flowers are in panicles up to 9 cm long and just as wide. It is like *S. ×billiardii,* except for its broader and more showy panicles and its habit of flowering on twigs arising from branches formed the previous year; thus the floral effect is considerably increased. Flowers of *S. ×billiardii* and other types in the same group bloom at the end of the long new shoots that arise from the base of the plant.

S. ×bumalda Burv.

'Froebelii' PINK SPIREA

Zone 2b

The specific name *bumalda* is given to a group of hybrids of *S. japonica* and *S. albiflora,* of which *S. ×bumalda* 'Froebelii' is one form. It is an extremely useful shrub, valuable for its early-spring crimson foliage and its flat clusters of crimson flowers that bloom in late July and continue intermittently for a long period. It is similar to, but much taller and more vigorous than, *S. ×bumalda* 'Anthony Waterer', a form that is popular in the horticultural trade.

S. chamaedryfolia L. GERMANDER SPIREA

Zone 4

An erect shrub, with angular zigzag shoots. The leaves are dark green, ovate, and irregularly double toothed. Its flowers are white and produced in corymbs or corymbose racemes 3 cm across. A species similar to *S. media,* but differing by having angled instead of terete shoots. A native of northeastern Asia.

S. ×cinerea Zab.

Zone 5

A showy hybrid (*S. hypericifolia* × *cana* Waldst. & Kit.) but more ornamental than either parent, possessing a neater habit and extremely graceful, arching branches. It could be described as an improved and more compact *S. ×vanhouttei* and should be more widely used. Its creamy white flowers are in sessile umbels and its leaves are oblong and entire, which differs from those of the bridal wreath spirea, which it resembles when in flower.

S. crenata L.

Zone 4

A fairly vigorous May-blooming species, with small, white flowers in umbels on leafy stalks. It is rather like *S. ×arguta* and *S. hypericifolia,* but these species have their flowers on stalkless, leafless umbels. Another distinguishing character is the leaves, which have three veins that run the entire length. It occurs in southeastern Europe to Caucausas and Asia.

S. douglasii Hook. DOUGLAS SPIREA

Zone 4

A native western North American species allied to *S. menziesii, S. ×billiardii,* and *S. tomentosa,* with large, erect panicles of purplish rose flowers. It differs from *S. ×billiardii* by being much more compact and by having leaves that are obtuse rather than acute at the ends. Because it spreads readily by suckers, it should be kept compact by being divided occasionally if planted in home grounds. It ranges from British Columbia to California.

S. gemmata Zab.

Zone 3b

A small bush with white flowers produced in corymbs, which are not more than 2.5 cm in diameter. It is similar to *S. ×cinerea* but smaller in every detail and has oblong leaves and buds that are longer than the petioles. It is best described as a pretty shrub, not as spectacular as some species, but useful in a shrub or herbaceous border where larger plants would be out of place. A native of northwestern China.

S. hypericifolia L.

var. ***acuta*** Ser.

Zone 4

The two specimens in the collection, with oblanceolate leaves and small, yellowish white flowers, key out to this variety rather than the true *S. hypericifolia.* The true species has white flowers and oblong-obovate leaves. The yellowish flowers of the variety make it outstanding in the collection and present the possibility that the plant might be used in breeding. The species grows from southeastern Europe to Siberia and central Asia.

S. ×inflexa K. Koch

Zone 3b

A hybrid (*S. crenata* × *cana* Waldst. & Kit.) with three-veined leaves similar to those of *S. crenata*; however, the species has a pubescent inflorescence and leaves that are pubescent beneath.

S. japonica L.f.

Zone 3b

var. ***fortunei*** (Planch.) Rehd. FORTUNE'S SPIREA

This variety is taller than the species and has pink flowers in much more compound flat corymbs. A good ornamental shrub similar to the *S. ×bumalda* cultivars, but varying by having a wider habit and taller growth. It also has pink rather than crimson flowers, but these are produced in the same larger flat corymbs.

S. latifolia (Ait.) Borkh.
BROAD-LEAVED MEADOWSWEET

Zone 4

The common native spirea, which grows in sandy areas around Ottawa and extends farther north, east into Newfoundland, and southward to North Carolina. It has reddish or purplish stems, dark green, elliptic, coarsely toothed leaves, and conical panicles of flowers smaller than those of other

similar cultivated species. Its pinkish flowers, glabrous inflorescence, and elliptic leaves distinguish it from other narrow-panicled types.

*S. **lucida*** Dougl. ex Greene
SHINY-LEAVED MEADOWSWEET

Zone 2b

An upright, loose-growing shrub 1 m high with broad, oval, coarsely serrate or doubly serrate leaves and white flowers produced in dense flat corymbs. The species grows from British Columbia to Saskatchewan, South Dakota, Wyoming, and Oregon.

*S. ×**margaritae*** Zab.

Zone 5

A beautiful complex hybrid (*S. japonica* × *superba*) involving several species. It has bright pink flowers in large, compound, flat corymbs and, because of its dwarf habit and its showy rosy pink flowers, must be regarded as one of the best spireas. Like other related species, it will flower again freely in September if the old blooms are cut off as soon as they fade.

*S. **media*** Franz Schmidt

var. ***glabrescens*** Simonk.

Zone 2

The *S. media* specimen, obtained from Spaeth's nurseries in 1898, is the glabrous-leaved form; otherwise it is identical to the type. The plants have formed upright shrubs not more than 1 m high, with ovate leaves coarsely toothed toward the apex. The flowers are white and produced in long-stalked racemes, but are not especially beautiful compared to other species with more compact habits and brighter flowers. Native to eastern Europe.

var. ***sericea*** Req.

Zone 2

A geographical variety with silky pubescent leaves that are sometimes glabrous. Originating in northeastern Asia.

*S. **menziesii*** Hook. MENZIES' SPIREA

Zone 2

This species is a western counterpart of *S. latifolia*, although distinctive and with more showy, deep rosy purple spires of bloom. It makes an extremely attractive bush, especially if pruned back to within 5 cm of its previous year's growth in early spring. It also differs from *S. latifolia* by having leaves that are coarsely serrate above the middle and obtuse instead of acute. It ranges from Alaska to Oregon.

*S. **miyabei*** G. Koidz.

Zone 5

An upright shrub that grows to 0.5 m high and 0.5 m wide, with white flowers in pubescent corymbs. Its height would seem to make it a good garden plant, but it is not free flowering in the Ottawa area. Its loose habit makes it suitable as a foliage plant only. Native to central China.

*S. **nipponica*** Maxim.

var. ***rotundifolia*** (Nichols.) Mak.
ROUND-LEAVED NIPPON SPIREA

Zone 4

This graceful, showy spirea has been growing a long time in the Arboretum, yet its beauty has never been fully recognized. In habit it is better than the common *S. ×vanhouttei*, because it does not grow as large. The specimens in the Arboretum are 1.5 m high and about as wide, compact, and with graceful arching branches. The flowers of this round-leaved form, like those of the species, are pure white, but they are larger and arranged in conical clusters. The leaves are also larger and more rounded. The so-called clone 'Snowmound' is identical with this variety.

var. ***tosaensis*** (Yatabe) Mak. TOSAE SPIREA

Zone 4

Two of these specimens were received as *S. nipponica* in 1905 but they have since proved to be this geographical variety, which according to Rehder was not in cultivation before 1935. The variety differs from the species by having smaller flowers in dense umbels and entire oblong-obovate to oblanceolate leaves; a few of the leaves, however, have some serration. This variety, like var. *rotundifolia* and the species, is an extremely handsome and graceful shrub. It originated in Japan.

*S. ×**pikoviensis*** Bess. POLISH SPIREA

Zone 3b

A natural hybrid (*S. crenata* × *media*) found growing wild in Poland. It is similar to *S. crenata* but has more oblong and slightly larger leaves, which are occasionally entire and glabrous. The shrub is more upright than its parents.

S. 'Rosabella'

Zone 3b

This hybrid (*S. betulifolia* Pall. × *bumalda* 'Anthony Waterer') raised by Dr. F. L. Skinner of Dropmore, Man., forms a neat, dwarf bush 45 cm high and bears flat corymbs of bright pink flowers in summer.

*S. **salicifolia*** L. WILLOWLEAF SPIREA

Zone 4

An upright shrub that grows 1 m high, with long, sharply pointed, willow-like leaves, doubly toothed and glabrous on both sides. Its light whitish rose-colored flowers are formed in slender, pyramidal, pubescent panicles. This attractive shrub is on a par with *S. ×billiardii*. Grows from southern Europe to northeastern Asia and Japan.

var. ***paniculata*** Ait.

Zone 4

This is an American geographical form of the willowleaf spirea with white, or sometimes rose-tinted, flowers in leafy pyramidal panicles. It is said to be a better shrub than the species but in the collections it is of about the same value. In the panicled-type spireas, the flowers, although beautiful, tend to fade to a dirty brown color and always look untidy after their first flush of bloom. They are best reserved for naturalizing in sandy areas. This variety is described by Rehder as a separate species, *S. alba*, but in the collections the synonym above is given priority.

*S. ×**sanssouciana*** K. Koch

Zone 4

An exceptionally fine, dwarf, compact shrub, which is suitable and desirable for planting in small homes, especially in areas where sandy soil prevails. Its leaves are oblong, irregularly toothed, downy on the veins above, and covered with grayish down on the undersides. The species is a hybrid between *S. douglasii* and *S. japonica*, and resembles the

SPIRAEA

former beeause of its pyramidal panieles, whieh are as broad as long and sometimes a little broader.

S. sargentiana Rehd. SARGENT'S SPIREA

Zone 4b

Sargent's spirea has ereamy white flowers produeed in round elusters on long arehing braneh es. It is closely related to *S. canescens*, which it resembles exeept for its elliptie leaves, its rounded buds with several outer seales, and its smooth unribbed stems. *S. canescens* has oval leaves, flattened buds with two outer seales, and ribbed stems. This shrub is worth cultivating, but it is no more outstanding than others of similar habit and graceful form. Native to western China.

S.* ×*schinabeckii Zab.

Zone 3b

This hybrid (*S. chamaedryfolia* × *trilobata*) was identified in 1946 as *S.* ×*vanhouttei* and the botanieal resemblanee is remarkable. After general observation in the field, however, it is seen to differ from that species by the eolor of its flowers, which in the appearanee of the umbels are dullish white, and by the leaves, which are deeidedly different in shape and size. Although beautiful, *S.* ×*schinabecki* is no better than the more popular *S.* ×*vanhouttei.*

S. 'Snowhite'

Zone 2b

A hybrid (*S. trichocarpa* × *trilobata*) with flowers slightly larger than those of *S.* ×*vanhouttei,* which it resembles. In the Ottawa area, this shrub had no merits over *S.* ×*vanhouttei,* but beeause *S.* 'Snowhite' is hardier than that species in Manitoba it is extremely valuable for prairie planting. It was raised by Dr. F. L. Skinner of Dropmore, Man.

S. 'Summer Snow'

Zone 2b

A hybrid (*S. betulifolia* × *media*) with flat panieles of white bloom produced in summer from June until August. It grows to 1 m high and is useful in providing bloom later in the season when few other shrubs are flowering.

S.* ×*superba (Froeb.) Zab. ex Dieck STRIPED SPIREA

Zone 5

A hybrid of *S. albiflora* × *corymbosa.* A dwarf shrub distinguished by its braneh es, whieh are marked with dark brown stripes. Its light rose flowers in flat terminal eorymbs are showy, but its ehief value as an ornamental is its neat, dwarf habit.

S. thunbergii Siebold ex Blume THUNBERG'S SPIREA

Zone 3

Although this spirea has survived for many years, it has not grown into an excellent speeimen. It produees its small, white, elustered blooms early in the spring, just before *S.* ×*arguta* blossoms, but never in such abundanee as to warrant its inelusion in gardens where other spireas flourish. Its leaves are narrow and more serrate than those of *S.* ×*arguta,* but otherwise, exeept for the weak growth habit of *S. thunbergii,* the plants are similar. The speeies originated in Japan and China.

S. tomentosa L. HARDHACK SPIREA

Zone 4

This spirea has rosy pink flowers in pyramidal panicles and is partieularly useful for naturalizing, although it is said to grow naturally in damp loeations. Its nearest relative is *S. douglasii,* from whieh it differs by having a thicker brownish yellow down beneath the leaves, whieh are toothed nearer the base. The follicles of this speeies are also pubeseent, whereas other similar speeies with pubeseent leaves have glabrous follicles. It ranges from Nova Seotia to Georgia, and west to Manitoba and Kansas.

S. trichocarpa Nakai KOREAN SPIREA

Zone 3

A beautiful spirea, related to and similar to *S. nipponica.* At Ottawa, it does not grow into as shapely a bush as the *S.*

***Spiraea* 'Snowhite'**

Korean spirea (*Spiraea trichocarpa*)

nipponica form described earlier and is not as showy as *S.* ×*vanhouttei,* which it also resembles. However, *S. trichocarpa* is said to be much hardier than *S.* ×*vanhouttei* and for that reason is recommended in areas where the bridal wreath does not survive. It differs from *S. nipponica* by having longer and less oval leaves and more hairy follicles. Native to Korea.

'Density'

Zone 5

An upright form of the Korean spirea; it is much dwarfer and more compact than the species but similar in every other respect. The plants in the collection are compact but produce few flowers. It is probably best developed as a dwarf hedge.

S. trilobata L. THREE-LOBED SPIREA

Zone 2

This species is one of the parents of *S.* ×*vanhouttei* and differs from this hybrid by its three-lobed, more obtuse, suborbicular leaves. Its small, white flowers have glabrous stalks and are close together in numerous umbels, each of which has a short, leafy twig at the base. It originated from northern China to Siberia and Turkestan.

'Fairy Queen'

Zone 4

A hybrid of *S. trilobata* that is much like *S.* ×*vanhouttei* but smaller, growing not more than 1 m high. It is also much hardier than the species.

'Swan Lake'

Zone 2

Probably a fancy name for the species. The specimens are identical to the type.

S.* ×*vanhouttei (C. Briot) Zab. BRIDAL WREATH

Zone 4

Before recommending any spirea, most writers compare the particular species with the bridal wreath. This hybrid (*S. cantoniensis* Lour. × *trilobata*) is without doubt the best of all spireas for the Ottawa area and some authorities consider it the best of all shrubs. However, it has become so overplanted that it has lost some of its appeal and is often considered too commonplace. Its perfect shape, with its large arching branches laden with bloom, is still breathtaking in spring and that is why it has been overplanted.

S. veitchii Hemsl. VEITCH SPIREA

Zone 5

A vigorous, handsome shrub with large, flat clusters of pure white flowers produced on long shoots. When the plants in the collection are in bloom, they have erect and then gracefully arching shoots extending 2.5–3 m above the main shrub. Botanically the Veitch spirea is near to *S. henryi* and *S. wilsonii,* but it differs from these by having entire leaves. Native to central and western China.

S. wilsonii Duthie WILSON SPIREA

Zone 4b

This beautiful spirea resembles *S.* ×*vanhouttei* because of its pure white flowers produced in dense corymbs all along its arching branches. The specimen in the Arboretum is much neater than *S.* ×*vanhouttei* and is much hardier than *S. henryi,* from which it also differs by having a globose inflorescence. This species is also native to central and western China.

STAPHYLEA **Staphyleaceae**

The family Staphyleaceae was named after this genus. It is distinguished from other genera by its interesting inflated membranous capsules and trifoliate or quinquefoliolate leaves.

S. trifolia L. AMERICAN BLADDERNUT

Zone 5

Although not the most ornamental species of the genus, it is the only hardy one in the Ottawa area and differs from the others by having trifoliate, downy leaves and short, 4 cm

***Spiraea* 'Fairy Queen'**

Flowers of American bladdernut (*Staphylea trifolia*)

capsules, which contain one or occasionally three yellowish seeds. Its white flowers with green sepals are in nodding panicles, or sometimes in umbel-like racemes; they are not at all showy and the plant is seldom seen in cultivation, although it is found locally in the wild. Its range is from Quebec to Ontario and Minnesota, and south to Georgia and Missouri.

STEPHANANDRA — Rosaceae

This Asiatic genus of shrubs belongs to the rose family and is allied to the spirea, from which it differs by having stipules and by having much larger seeds with two to a follicle. The seeds of the spirea are small and each follicle contains a large number.

S. incisa (Thunb.) Zab. — LACE SHRUB

Zone 5

A shapely mound-type shrub, 1 m high and 1 m wide. It has particularly attractive fern-like foliage, which in fall is crimson colored; later, when the leaves have fallen, the handsome effect produced by its bright brown branches becomes apparent. Its flowers are produced in abundance, and although considered inconspicuous, they have a graceful beauty much like that of the perennial baby's-breath (*Gypsophila paniculata*). It would make an admirable subject for the front of the shrub border or in foundation plantings, where a mound type of plant is extremely useful. It does get killed back somewhat in severe winters but never to ground level. In any event, it recovers and soon regains its formal shape. It originated in Japan and Korea.

SYMPHORICARPOS — Caprifoliaceae

A small group of shrubs particularly useful because of the graceful foliage, red, pink, or white berries, and tolerance of shade.

S. albus (L.) S. F. Blake — THIN-LEAVED SNOWBERRY, BLAKE WAXBERRY

Zone 2

A shrub about 1 m high, with oval to ovate, oblong leaves. It is noted for its snow white, pulpy berries. This species is seldom grown except by those who want the truly local native plant, for the closely related species *S. rivularis* is more showy and is used extensively as an ornamental shrub. The species grows from Nova Scotia to Alberta, and south to Minnesota and Virginia.

S.* ×*chenaultii Rehd. — CHENAULT CORALBERRY

Zone 5b

A hybrid (*S. microphyllus* HBK × *orbiculatus*) with handsome, dark rose fruits and graceful foliage. This extremely pretty shrub grows as well in the shade as in the sun, and although it is occasionally tipped back when planted in the open ground, it appears to be hardy and fruits well in a spot where it is given protection. It has the annoying habit of throwing up suckers, but these are usually near the plant itself and do not present problems.

'Hancock' — HANCOCK CORALBERRY

Zone 5

This cultivar, introduced by the late Mr. Leslie Hancock of Mississauga, Ont., is a form with a lower growing habit but with the same attractive small leaves and reddish berries of the species. It was recommended by Mr. Hancock for use as ground cover, for which it proves very suitable. In the 10 years since it was planted, it has remained unaffected by the winter and might prove hardier than *S. chenaultii* itself.

S.* ×*doorenbosii Krüssm.

'Mother of Pearl'

Zone 5

A striking and distinct cultivar with large, pinkish white fruits. It is a hybrid of *S. rivularis* × *chenaultii*.

S. 'Erect'

Zone 5

An upright-growing cultivar that is excellent for use as a hedge plant. It has red berries similar to, but larger than, those of *S. orbiculatus*, found mostly on top of the plant.

S. 'Magic Berry'

Zone 5

A cultivar with a bushy habit and fruits like *S.* ×*chenaultii* but more purplish red and much larger.

S. occidentalis Hook. — WESTERN SNOWBERRY, WOLFBERRY

Zone 5

Because of its dull and smaller white fruits and its more straggly habit, this species is inferior to the common snowberry (*S. rivularis*). It differs from all other species by having companulate pinkish flowers, exserted styles and stamens, and a deep-lobed corolla. Its range is from Michigan to British Columbia, south to Illinois, Colorado, Kansas, and New Mexico.

S. orbiculatus Moench — CORALBERRY

Zone 2b

An attractive and distinct member of the genus, with red fruits and short flower spikes. The fruits are produced abundantly in this area, and with the fine colors displayed by its changing leaves in the fall, the plant might be considered a good ornamental shrub. It suckers freely and is said to be suitable for covering banks. It also grows well in the shade. The species is found from New Jersey to South Dakota, and south to Texas and New Mexico.

'Variegatus'

Zone 2b

A form with variegated yellow and green leaves. The variegation is not distinct enough to make this shrub stand out from the others, so it has no greater merit than the species.

S. rivularis Suksd. — SNOWBERRY

Zone 2

This species is the one commonly grown in gardens. It has much larger fruits and longer terminal spikes than the waxberry. The plant is also much taller; it grows to 1.5 m and has a spread of 2 m. It is the western counterpart of *S. albus* and is found growing wild from Alaska to California, and east to Montana and Colorado.

S. 'White Hedge'

Zone 5

A dense, upright shrub with small, white berries borne on the top of the young shoots. The dark green leaves and the berries on the new wood make this a highly desirable hedge.

SYRINGA — OLEACEAE

Since many speeies and varieties of *Syringa* will withstand temperatures of at least −47°C and still produee an abundanee of flowers with exquisite etheral beauty, it follows that this genus eontains the most popular trees and shrubs in Canada. Large collections have been assembled both in the Arboretum and in the Ornamental Gardens of the Central Experimental Farm, and a program of breeding for other earlier- and later-flowering types to extend the season has been started. In 1920, Dr. W. T. Macoun launched a program that eventually led to the development of a beautiful new and later-flowering race known collectively as the *S.* ×*prestoniae* hybrids and named after Miss Isabella Preston, who was responsible for this work. Many earlier-flowering hybrids were also developed by Miss Preston, who used an old Lemoine interspecifie hybrid, 'Lamartine', in eonjunction with *S. vulgaris* 'Negro'. A few years later, Dr F. L. Skinner of Manitoba effeeted the same *S.* ×*prestoniae* eross but seleeted some deeper colors that eontrasted favorably with the lighter tones of the Preston eultivars.

S. ×***chinensis*** Willd. — ROUEN LILAC

Zone 2b

A hybrid of the Persian lilac (*S. persica*) and the eommon lilac (*S. vulgaris*) said to have been raised by M. Vanier in the Rouen Botanic Garden sometime between 1775 and 1780. It is a good ornamental shrub, with loose panicles of lilae-purple flowers; the specimens in the Arboretum have a more twiggy and shrubby appearance than the eommon lilae.

'Saugeana'

Zone 2b

A cultivar with light purple flowers.

S. ×***henryi*** C. K. Schneid.

'Luteee'

Zone 2b

S. ×*henryi* is the name accepted for a group of hybrids of *S. josikaea* × *villosa,* of which 'Lutece' was the original. This handsome lilac has pale purple-violet flowers in panieles similar to but larger and looser than those of *S. villosa.*

S. ×***josiflexa*** Preston

Zone 2b

S. ×*josiflexa* is a name given to a group of hybrids of *S. josikaea* × *S. reflexa.* The flowers are similar to those of *S. reflexa* but are more slender and slightly nodding. This interspeeifie cross was made by Miss Isabella Preston in 1920. Only one seedling grew from the eross and it was named 'Guinevere'. This was open pollinated and produced an interesting group of pinkish-flowered seedlings similar to *S. reflexa* in form and habit but with greater hardiness and more diverse eoloring. Several of the seedlings were named and are in eommeree.

'Bellieent'

Zone 2b

The best of the 'Guinevere' seedlings, with a more graeeful habit and distinetive pinkish flowers.

'Elaine'

Zone 2b

This eultivar is a later seeond-generation seedling of *S.* ×*josikaea* 'Guinevere'. It is a tall, vigorous, erect-growing shrub, and its eoarse leaves set it apart from the other eultivars in this group.

'Enid'

Zone 2b

A eultivar with an upright habit and panieles of pink flowers.

'Guinevere'

Zone 2b

A eultivar with purple-lilac flowers, which fade to pinkish lilac.

'Kim'

Zone 2b

This cultivar has purplish flowers and a habit more resembling *S. josikaea* than *S. reflexa.*

'Lynette'

Zone 2b

A cultivar with slightly mottled leaves, pinkish flowers, and an upright habit of growth.

'Royalty'

Zone 2b

A cultivar with dark purple flowers.

S. ***josikaea*** Jaeq. f. ex Rchb. — HUNGARIAN LILAC

Zone 2

A lilae similar to *S. villosa* but not as striking when in flower. It differs from that speeies botanically by its funnelform, rather than eylindrical, corolla tubes and by having mueh denser panieles of deeper lilac blossoms. Although it is not as attraetive as many other species, it is eonsiderably more useful than the others for growing as a screen plant 3–4.5 m high. In this capacity it also surpasses all other large shrubs in density and speed of growth. A native of Hungary.

S. ***komarowii*** C. K. Sehneid. — KOMAROW'S LILAC

Zone 2

This speeies, with deep rose-pink flowers, was hardy in Ottawa for 20 years. Beeause of eonstruetion, it had to be removed, along with most of the lilae eollection; it was one of the few that failed to survive transplanting. Komarow's lilac is similar to *S. reflexa* but it has more eompaet and more cylindrie panieles of flowers, which are purple-pink inside and lighter outside. It originates in western China.

S. ***microphylla*** Diels. — SMALL-LEAVED LILAC

Zone 5

As its common name suggests, this species has smaller leaves than the others, but it also forms a more shapely and graceful bush with distinet orbiculate leaves. Its pale pinkish-lilae, extremely graeeful flowers, and its widespread habit and

SYRINGA

small leaves make it useful for landscape planting. Native to northern China.

S.* ×*nanceiana McKelv.

'Floreal'

Zone 5

An intergeneric hybrid (*S. henryi* × *sweginzowii*). This selection has fragrant lavender or bluish purple flowers.

S. oblata Lindl.

var. ***dilatata*** (Nakai) Rehd. × ***S. vulgaris***

Zone 2

This is a group of hybrids, developed by Dr. F. L. Skinner of Manitoba, that has not yet been given a satisfactory botanical name. Miss McKelvie groups derivatives of this cross and those of *S. oblata* var. *giraldii* × *vulgaris* under the botanical name *S.* ×*hyacinthiflora*, but this classification does not seem to be botanically sound because *S. oblata* var. *dilatata* is a distinct geographical variety and is far removed from *S. oblata* var. *giraldii*. The following cultivars, resulting from this cross, are growing in the Arboretum and on the grounds of the Central Experimental Farm.

'Assessippi'
'Charles Nordine'
'Daphne'
'Evangeline'
'Mount Baker'
'Nokomis'
'Pocahontas'
'Sister Justina'

***Syringa oblata* var. *dilatata* × *S. vulgaris* 'Charles Nordine'**

***Syringa oblata* var. *dilatata* × *S. vulgaris* 'Mount Baker'**

***Syringa oblata* var. *dilatata* × *S. vulgaris* 'Gertrude Leslie'**

***Syringa oblata* var. *giraldii* × *S. vulgaris* 'White Hyacinth'**

'Excel'
'Gertrude Leslie'
'Laurentian'
'Minnehaha'
'Swarthmore'
'The Bride'
'Tom Taylor'

var. ***giraldii*** (Hort. Lemoine) Rehd. × ***S. vulgaris***

Zone 2b

Another group of lilacs of which 'Lamartine' is the type. The leaves resemble *S. oblata* var. *giraldii* in that the hairs are glandular tipped and the plants are tall and vigorous. The following cultivars were developed from this cross.

'Alice Eastwood'
'Berryer'
'Blue Hyacinth'
'Buffon'
'Catinat'
'Clarke's Giant'
'Esther Staley'
'Grace'
'Kate Sessions'
'Lamartine'
'Maureen'
'Mirabeau'
'Missimo'
'Montesquieu'
'Muriel'
'Necker'
'Norah'
'Patricia'
'Peggy'
'Vauban'
'White Hyacinth'

S. patula (Palib.) Nakai (***S. velutina***) KOREAN LILAC

Zone 2

A large shrub with soft pubescent leaves and twigs. The fragrant flowers open at the end of May and are composed of small florets, lilac on the outside of the corolla and white inside, with purple anthers that reach as far as or near to the corolla opening. A native of Korea and northern China.

S. pekinensis Rupr. PEKING LILAC

Zone 3b

A small tree, similar to *S. reticulata* but with more slender branchlets, smaller leaves, and smaller, loose panicles. In the collection, however, its panicles are freely borne and the graceful, creamy white blossoms provide a good spectacle in June. As a tree, it does not have the same pleasing habit of the Japanese lilac, but it is worth growing for its abundant, graceful flowers. Native to northern China.

S. ×***persica*** L. PERSIAN LILAC

Zone 3b

A good, graceful shrub, rather like the common lilac but with smaller, three- to seven-lobed, lance-shaped leaves and small, loose panicles. Its flowers are light purple and are produced freely on small shrubs. The origin of this species is given as western China, although botanists cannot offer definite proof. It has been cultivated for centuries and many collected plants came from gardens of Persia. Some botanists consider it a hybrid of *S. afghanica* C. K. Schneid. × *laciniata* Mill.

S. persica 'Alba' × ***oblata*** var. ***dilatata***

'Grace Mackenzie'

Zone 3b

A botanical name does not appear to have been given to this interspecific hybrid, which was raised by Dr. Skinner of Manitoba in 1942. It has an interesting historic origin and is valuable for use in further breeding work, but does not appear to have good possibilities as an ornamental plant. However, its flowers are graceful. 'Grace Mackenzie' is a bluish-lilac cultivar selected from seedlings of this cross; it is better than others of the same cross but is still lacking in ornamental qualities.

S. ×***prestoniae*** McKel·. PRESTON LILAC

Zone 2

A group name for hybrids of *S. reflexa* × *villosa*, named in honor of the late Miss Isabella Preston, formerly of the staff of the Central Experimental Farm, Ottawa. Miss Preston made the first crosses that produced this new race in 1920. The group is characterized by large and luxuriant foliage and showy, more or less pendulous panicles of blooms varying in color from coral to pinkish lilac, produced just when the *S. vulgaris* cultivars have finished flowering. The form chosen by Mrs. Susan Delano McKelvey (in her monograph 'The Lilacs') to represent the type was 'Isabella', one of the first crosses to be selected by Miss Preston.

'Alice'

Zone 2

A dark-colored variety, with panicles 23 cm by 15 cm, cone shaped, and with drooping tips. It is one of the darkest-colored specimens in the collection and blooms later than most of the other Preston hybrids.

'Audrey'

Zone 2

Full-flower panicles 23 cm by 23 cm, loosely arranged with long, lower-branching panicles and drooping tips. Purplish lilac flowers fading to white.

'Celia'

Zone 2

Long, loose panicles of pale lilac blossoms, with slight fragrance.

'Coral'

Zone 2

This cultivar rates higher than many of the more popular varieties of the common lilac (*S. vulgaris*). It produces pleasing, almost pure pink flowers in abundance on shrubs that are extremely well balanced and appealing. It originated in 1940 at the Experimental Station at Morden, Man.

'Desdemona'

Zone 2

A Preston origination, with small flower panicles tapering to semipendulous tips, and a wide, loose, branching habit. It produces pale pinkish lilac flowers later than most of the other hybrids in this group.

'Donald Wyman'

Zone 2

A cultivar that rates almost as high as 'Coral', because of its splendid branching habit and graceful reddish purple blooms. These specimens have all formed good branching shrubs and are very floriferous, standing out prominently among the plants in the regular lilac collection. This cultivar is one of Dr. Skinner's best selections from several hundred of his *S. reflexa* × *villosa* progeny.

'Elinor'

Zone 2

A prolific flowering cultivar with pale violet flowers on long conical panicles.

'Fountain'

Zone 2

A cultivar with light pink pendulous panicles of bloom.

'Handel'

Zone 2

A cultivar with deep lilac-rose flowers and a habit similar to 'Hiawatha'; it was introduced by Dr. Skinner of Manitoba in 1932.

'Hiawatha'

Zone 2

An attractive cultivar, particularly in the bud stage before the rich reddish purple color changes to the pale pink of the blooming flowers. It blooms earlier than most Preston hybrids and appears to be less vigorous. This cultivar is another of Dr. Skinner's hybrids introduced in 1932.

'Isabella'

Zone 2

The cultivar chosen as the type form of *S.* ×*prestoniae*. It has deep purplish wine-lilac flowers in long clusters, sometimes 30 cm long and 30 cm broad at the base. The foliage is bright green and glabrous above, paler and pubescent beneath.

'Jessica'

Zone 2

A cultivar with large, fragrant, purple panicles of bloom 25 cm long and 27.5 cm wide, conical shaped, and often with four lateral spikes of flowers. One of the darkest and latest flowering of these hybrids.

'Miranda'

Zone 2

A cultivar with pale pink buds, which open to pale violet flowers in panicles 25 cm long and 23 cm wide and broad at the base. It cannot be considered among the best Preston hybrids and yet it is still worthy of a place in the garden.

'Nocturne'

Zone 2

Another of the good western *S. prestoniae* hybrids, with lilac-blue flowers. It originated at the Morden Experimental Station in Manitoba in 1936.

'Oberon'

Zone 2

A second-generation seedling, with small, whitish flowers on fair-sized trusses.

'Redwine'

Zone 2

Another Morden cultivar, with fragrant, deep wine-red flowers.

'Romeo'

Zone 2

A second-generation seedling in this group, with attractive pink flowers on shrubs that are more upright than some of the others.

'Ursula'

Zone 2

A cultivar with large panicles of pinkish lilac, funnel-shaped flowers.

'Virgilia'

Zone 2

One of the better selections in the Preston group because of its medium-sized panicles of loose, graceful, pale lilac blossoms, produced on neat, shapely shrubs.

'W. T. Macoun'

Zone 2

A cultivar with light purple flowers that fade to pink.

*S. **reflexa*** C. K. Schneid.

Zone 3

A large shrub with coarse foliage and slim pendulous trusses of densely packed pinkish florets formed of reflexing petals. Found in Hupeh, in central China.

This species, together with its variety *mandschurica* and the species *S. pekinensis*, represents a group that leans toward the privet (*Ligustrum*) and is known as the Ligustrina section of Syringa. The group differs from the true lilacs by having a short corolla tube and stamens that protrude beyond the mouth. The leaves and general appearance are similar to the common lilacs but the flowers are like the more massive and showy privets.

*S. **reticulata*** (Blume) Hara (*S. **amurensis*** Rupr. var. ***japonica*** (Maxim.) Franch. & Sav.)

JAPANESE TREE LILAC

Zone 2b

The specimens have grown into attractive, shapely trees, 4.5–6 m high. This species is one of the best trees for growing in small gardens. It has a graceful shape and throws a heavy shade; its flowers, although not scented, are attractive, and its nicely marked, bright brown bark is attractive in winter. The silhouette of this small tree is considered typically Japanese in that the branches radiate in a horizontal plane from the main stem. This Japanese species differs from the following variety by having a better, tree-like habit, larger and more profuse flowers, and downy rather than hairless undersides of the leaves.

var. ***mandschurica*** (Maxim.) Hara (***S. amurensis***)

AMUR LILAC

Zone 2

The Amur lilac forms a shrubby tree, up to 3 m high, with creamy white flowers produced shortly after the true lilacs have flowered.

S. ×***swegiflexa*** Hesse

Zone 3

An interspecific hybrid (*S. reflexa* × *sweginzowii*) with large, dense trusses of deep red flowers that later fade to pink.

S. sweginzowii Koehne & Lingelsh.

Zone 3

A Chinese species that has fragrant pink flowers and a graceful habit similar to *S. villosa*, but with thinner, smaller leaves, more slender corolla tubes, and no protruding anthers.

Japanese tree lilac (*Syringa reticulata*)

S. tomentella Bur. & Franch.

Zone 4

A medium-sized shrub with slightly pubescent leaves and pale lilac flowers that are white inside and have a lilac-like fragrance.

S. villosa Vahl LATE LILAC

Zone 2

A large, vigorous shrub growing up to 4.5 m high with dull, coarsely textured leaves and flowers that are pale pink to blue at first but later change to a dull gray. It blooms later than most lilacs, a character that it imparts to its more showy hybrids. It differs from the *S. vulgaris* group by forming a true terminal bud and by flowering on the shoots of the current year. Its dull textured leaves are distinct from the shiny leaves of the more common species.

Late lilac (*Syringa villosa*)

***Syringa vulgaris* 'Maud Notcutt'**

S. vulgaris L. cultivars COMMON LILAC

Zone 2

The collection of *S. vulgaris* cultivars at the Arboretum and the Experimental Farm grounds is one of the best in North America. The following complete list gives the name of each plant, originator, year of origin, color, and rating.

The color and inflorescence symbols are from *Lilacs for America*, John C. Wister, American Nurserymen's Association, 1941 and 1953, and are interpreted as follows:

I = white
II = violet
III = bluish
IV = lilac
V = pinkish
VI = magenta
VII = purple and deep purple
S = single
D = double

***Syringa vulgaris* 'Saint Joan'**

SYRINGA

The rating given in the last column is the author's and is based on observations taken in 1968. The rating is out of a possible 100 and covers factors such as amount of flower, period of bloom, scent, flower size, resistance to fade, and intensity of color.

Name	Originator	Year	Color	Rating
'Abel Carrière'	Lemoine	1896	D III	65
'A. B. Lamberton'	Dunbar	1916	D VIII	75
'Adelaide Dunbar'	Dunbar	1916	D VIII	70
'Alice Harding'	Lemoine	1938	D I	85
'Ami Schott'	Lemoine	1933	D III	84
'Belle de Nancy'	Lemoine	1891	D V	75
'Boule Azurée'	Lemoine	1919	S III	no blooms
'Candeur'	Lemoine	1931	S I	78
'Capitaine Baltet'	Lemoine	1919	S VI	90
'Capitaine Perrault'	Lemoine	1925	D V	65
'Carmen'	Lemoine	1918	D V	85
'Charles Baltet'	Lemoine	1893	D IV	65
'Charles X'	Audibert	prc 1830	S VI	80
'Christophe Colomb'	Lemoine	1905	S IV	83
'Comte Adrien de Montebello'	Lemoine	1910	D IV	75
'Comte de Kerchov'	Lemoine	1899	D VI	80
'Condorcet'	Lemoine	1888	D V	75
'Congo'	Lemoine	1896	S VI	75
'Cora Brandt'	Clarke	1947	D I	80
'Crépuscule'	Lemoine	1928	S III	60–75
'Danton'	Lemoine	1911	S VII	80
'Decaisne'	Lemoine	1910	S III	83
'de Louvain'		pre 1859	S VI	75
'de Saussure'	Lemoine	1903	D VII	60
'Diplomate'	Lemoine	1930	S III	85
'Doyen Ketelcer'	Lemoine	1895	D IV	75
'Duc de Massa'	Lemoine	1905	D III	80
'Edith Cavell'	Lemoine	1916	D I	80
'Edmond About'	Lemoine	1908	D VI	60
'Emile Gentil'	Lemoine	1915	D III	80
'Ethiopia'	Brand	1946	S VII	80
'Etna'	Lemoine	1927	S VII	80
'Etoile de Mai'	Lemoine	1905	D VI	80
'Firmament'	Lemoine	1932	S III	80
'Frank Paterson'	Paterson	1961	S VII	75
'Georges Bellair'	Lemoine	1900	D VI	75
'G. J. Baardse'	D. E. Maarse	1943	S VI	80
'Godron'	Lemoine	1908	D III	65
'Helen Schloen'	Paterson	1962	S VII	
'Henri Martin'	Lemoine	1912	D IV	70
'Henri Robert'	Lemoine	1936	D II	85
'Henry W. Longfellow'	Dunbar	1920	D VI	75
'Hippolyte Maringer'	Lemoine	1909	D IV	80
'Hugo De Vries'	Keesen	1927	S VII	80
'Jacques Callot'	Lemoine	1876	S IV	70
'Jean Macé'	Lemoine	1915	D V	75
'Jeanne d'Arc'	Lemoine	1902	D I	60
'Jules Ferry'	Lemoine	1907	D V	78
'Jules Simon'	Lemoine	1908	D III	65–80
'Julien Gérardin'	Lemoine	1916	D IV	75
'Katherine Havemeyer'	Lemoine	1922	D V	85
'La Mauve'	Lemoine	1893	D V	70
'Le Nôtre'	Lemoine	1922	D II	65
'Léon Gambetta'	Lemoine	1907	D IV	60
'Leon Mathieu'	Stepman	1908	S VII	70
'Léon Simon'	Lemoine	1888	D VI	75
'Linné'	Lemoine	1890	D VI	50

Name	Originator	Year	Color	Rating
'Lucie Baltet'	Baltet	pre 1888	S V	80
'Ludwig Spaeth'	Spaeth	1883	S VII	80
'Madame Charles Souchet'	Lemoine	1949	S II	80
'Madeleine Lemaire'	Lemoine	1928	D I	75–80
'Marceau'	Lemoine	1913	S VI	65
'Marc Michel'	Lemoine	1898	D V	65
'Maréchal de Bassompierre'	Lemoine	1897	D VI	60
'Maréchal Foch'	Lemoine	1924	S VI	75
'Maréchal Lannes'	Lemoine	1910	D II	60
'Marengo'	Lemoine	1923	S IV	75
'Marie Finon'	Lemoine	1923	S I	70
'Marie Legraye'	Legraye	1840-1879	S I	75
'Maud Notcutt'	Notcutt	1956	S I	85
'Masséna'	Lemoine	1923	S IV	84
'Maurice Barrès'	Lemoine	1917	S III	80
'Michel Buchner'	Lemoine	1885	D IV	80
'Mme Abel Chatenay'	Lemoine	1892	D I	70
'Mme Antoine Buchner'	Lemoine	1909	D V	75–80
'Mme Casimir Périer'	Lemoine	1894	D I	80
'Mme Florent Stepman'	Stepman	1908	S I	75
'Mme F. Morel'	Morel	1932	S VI	80
'Mme Lemoine'	Lemoine	1890	D I	75
'Mme Léon Simon'	Lemoine	1897	D IV	72
'Monge'	Lemoine	1913	S VII	80
'Monique Lemoine'	Lemoine	1939	D I	80
'Mons. J. de Messemaeker'	Stepman	1908	S VII	65
'Mons. Maxime Cornu'	Lemoine	1886	D V	70
'Mons. van Aerschott'	Stepman	pre 1923	S IV	50
'Montaigne'	Lemoine	1907	D V	80
'Mont Blanc'	Lemoine	1915	S I	85
'Monument'	Lemoine	1934	S I	80
'Mrs. Edward Harding'	Lemoine	1922	D VI	80
'Mrs. Harry Bickle'	Rolph	1956	S V	80
'Mrs. W. E. Marshall'	Havemeyer	1924	S VII	85
'My Favourite'	Klager	1928	D VI	80
'Nouveau'	Unknown	Unknown	D V	65
'Olivier de Serres'	Lemoine	1909	D III	85
'Patrick Henry'	Dunbar	1923	D IV	80
'Paul Deschanel'	Lemoine	1924	D VI	75
'Paul Thirion'	Lemoine	1915	D VI	70
'Perle von Stuttgart'	Pfitzer	1910	D VI	60
'Planchon'	Lemoine	1908	D VI	65
'Pierre Joigneaux'	Lemoine	1892	D IV	65
'Prodige'	Lemoine	1928	S VII	80
'Président Carnot'	Lemoine	1890	D IV	65
'Président Fallières'	Lemoine	1911	D IV	75
'Président Grévy'	Lemoine	1896	D III	80
'President Lincoln'	Dunbar	1916	S II	70
'Président Loubet'	Lemoine	1901	D VI	80
'Président Poincaré'	Lemoine	1913	D VI	85
'Président Viger'	Lemoine	1900	D III	75
'Primrose'	Maarse	1949	S I	80
'Prof. E. H. Wilson'	Havemeyer	1943	D I	80
'René Jarry-Desloges'	Lemoine	1905	D III	85
'Rochambeau'	Lemoine	1919	S VII	75
'Ronsard'	Lemoine	1912	S III	60
'Ruhm von Horstenstein'	Wilke	1921	S VI	
'Saint Joan'	Blacklock	1953	D I	85
'Saturnale'	Lemoine	1916	S III	75
'Siebold'	Lemoine	1906	D I	60
'Souvenir de Simone'	Bruchet	pre 1923	D I	60
'Taglioni'	Lemoine	1905	D I	65
'Thunberg'	Lemoine	1913	D IV	60
'Tombouctou'	Lemoine	1910	S VII	75

Name	Originator	Year	Color	Rating
'Toussaint-Louverture'	Lemoine	1898	S VII	80
'Turenne'	Lemoine	1916	S VII	70
'Vestale'	Lemoine	1910	S I	60
'Victor Lemoine'	Lemoine	1906	D IV	80
'Viscountess Willingdon'	Lemoine	1906	D VII	75–80
'Viviand-Morel'	Lemoine	1902	D IV	75
'William Robinson'	Lemoine	1899	D VI	75

S. wolfii C. K. Schneid. WOLF LILAC

Zone 2b

Small shrubs to about 2 m high, erect and branching, with light airy clusters of lilac flowers. This species is closely allied to *S. villosa*, but there is considerably more blue in the flowers than in those of *S. villosa*. It is perhaps closer to the Hungarian lilac (*S. josikaea*), but its leaves are longer and grayish green rather than glaucescent beneath. The main difference, as Mrs. McKelvey points out, is the general appearance of the plants. *S. wolfii* makes a much more pleasing specimen. The species originates in Manchuria and Korea.

TAMARIX Tamaricaceae

An interesting group of shrubs with light, feathery, scale-like leaves resembling somewhat the leaves of some junipers and juvenile forms of *Thuja*. The flowers are extremely small and are abundantly produced in dense racemes. Because they seem to withstand the salt sea air, most species are used extensively as hedges and sand binding plants in areas near the sea.

T. parviflora DC.

Zone 4

An early-flowering tamarisk with light pink flowers produced in great abundance from early June until July. It grows in Turkey, Greece, Crete, Yugoslavia, and Albania.

T. ramosissima Ledeb. (*T. pentandra* Pall.; *T. odessana* Steven ex Bunge) FIVE-STAMEN TAMARISK, AMUR TAMARISK

Zone 3

A vigorous species with light, almost bluish green foliage and bright pink, diminutive flowers. It is considered the hardiest of all *Tamarix* species, although there are two unidentified but hardier plants, which have been growing in the Arboretum since 1895 and which appear to be nearer to *T. tetrandra* or *T. parviflora*. A native of southeastern Europe and central Asia.

'Rubra'

Zone 4

A shapely and equally vigorous form with darker and larger flowers, which originated in the Orleans, France, nursery of Barbier and Sons. 'Summer Glow' obtained from the Wayside nurseries, Mentor, Ohio, 3 years ago is identical to this cultivar.

T. tetrandra Pall.

Zone 4

A species noted for its glabrous, almost black, arching branches. Its flowers, produced on the previous year's wood, are small, rose colored, and arranged in straight cylindrical racemes. It differs from nearly all others by flowering on its old wood and by having only four stamens, instead of the usual five. The species originated in southwestern Europe and western Asia.

TILIA Tiliaceae

The lindens, or basswoods, are among the best of the shade trees and are widely used on city streets. Sometimes they become untidy when honeydew, excreted by aphids on the leaves, gets covered with dust. Some species, at flowering time, have such rich nectar that they stupify bees who then cling to the clothing of people passing under or near the trees.

T. americana L. AMERICAN LINDEN

Zone 2b

Nearly all these specimens have grown 15 m high and have spreads of 15–18 m. Those in the woodlands are much taller. This species is distinguished by its large, coarsely toothed, broad-ovate leaves, glabrous and glossy green beneath and dull dark green above. It ranges from New Brunswick to Manitoba, south to Virginia and Alabama, and west to North Dakota, Kansas, and Texas.

'Macrophylla'

Zone 2b

A cultivar with much larger and broader leaves.

T. cordata Mill. LITTLELEAF LINDEN

Zone 3

The littleleaf lindens in the collection are beautiful and shapely trees forming almost perfect pyramidal specimens, with much smaller leaves than the other taxa and a more dense habit. In early July they produce a great abundance of blooms, which are showy but particularly noticeable because of the strong fragrance the flowers emit and the large number of bees that surround the trees at this time. Because the bees are so fond of its blossoms, it may be reason enough for not planting this species on streets or lawns. However, the bees are not stupified by its flowers in the same way as they are by the nectar of some other lindens.

T. cordata has much faster growth than is usually attributed to the lindens. The specimen planted in 1940 is now 9 m high; the others are 13.5 and 15 m and have reached their maximum size. Apart from its smaller glabrous leaves, this

species differs from most other speeies because the undersides of its leaves are glaucous and the tertiary veins are not as prominent and beeause its fruits are thin shelled. Found in Europe.

'Glenlevan'

Zone 3

A seleetion from the Sheridan nurseries, Oakville, Ont., that grows faster than the speeies and has a much more uniform shape and a straighter trunk.

'Greenspire'

Zone 3

A seleetion with dark green, thiek foliage and a more oval-shaped head than the species.

'Raneho'

Zone 4

An upright linden with elosely set braneh es.

T. dasystyla Steven

Zone 4

This lone speeimen, now 15 m high with a spread of 10.5 m, has no reeord of winter injury. This suggests that it is mueh hardier than some Ameriean textbooks would indieate. It is distinguished by its red, glabrous braneh lets and its rounded leaves, whieh are abruptly aeuminate, sharply serrate with aristate teeth, and lustrous dark green above and bright green beneath. The axillary tufts of hair in this speeies are whitish rather than brownish as in *T. ×euchlora,* whieh was derived from a eross between this speeies and *T. cordata.* It is found in southeastern Europe, from the Caueasas to northern Persia.

T. ×euchlora K. Koeh CRIMEAN LINDEN

Zone 5

The most beautiful and useful of all lindens. It has glossy, bright green leaves and a graeeful, somewhat pendulous, habit. After 10 years of observation, both speeimens have shown no signs of winter injury and are now 6–7.5 m high. Strangely, although this linden was introdueed to the trade in 1860, no speeimen found its way into the eollection, either as *T. ×euchlora* or one of its synonyms, until 1952. It should prove hardy in the Ottawa area and, therefore, it should be used more in eity streets. It is assumed by most botanists to be a hybrid of *T. cordata × dasystyla.*

Leaves and fruits of Crimean linden (*Tilia ×euchlora*)

T. ×europaea L. EUROPEAN LINDEN

Zone 4

This species, sometimes called the European lime, often grows more than 30 m high and is popular for streets, gardens, and parks in Europe. In Ottawa it has grown to 18 m and has formed a tree of rather loose, open habit with several main trunks. The burrs, whieh form thiekets of young growth and are said to be a character of this tree, are not apparent on the speeimens in the eolleetion. Its leaves, like those of most lindens are broad-ovate, but in this speeies they are nearly truneate and sharply serrate. It is a hybrid of *T. cordata × platyphyllos.*

'Pallida'

Zone 4

Three of the older trees, one reeeived as *T. grandifolia,* one as *T. parvifolia*, and the other as *T. vulgaris* have sinee been identified as this form, whieh has large leaves, yellowish to bluish green beneath.

T. ×moltkei F. L. Späth MOLTKE'S LINDEN

Zone 3

This specimen eame from Spaeth's nursery in Germany, where it originated in 1883. It is a hybrid of *T. americana × petiolaris* DC., and bears some resemblanee to both these speeies. Its dull green leaves are much like those of *T. americana*, but they are downy and grayish on the undersides, a eharaeter that eomes from *T. petiolaris.* Its pyramidal habit does not suggest affinity to either parents but its slightly pendulous branchlets are akin to those of *T. petiolaris.*

T. mongolica Maxim. MONGOLIAN LINDEN

Zone 3b

A small tree like *T. cordata* but smaller in stature and with maple-like leaves supported by red stalks. The lobed leaves in the young trees become less lobed as the tree ages. Native to northern China and Manchuria.

T. neglecta Spaeh QUEBEC BASSWOOD

Zone 3

The largest linden in the collection, exeept for a few native basswoods growing naturally in the woodlands. This specimen has now reaehed a height of 24 m and has a spread of 18 m and a trunk diameter of 1 m. It resembles *T. ×moltkei* in general appearanee but its leaves, although similar, have tufts of hairs in the axils of the veins beneath. Its braneh lets are more aseending or spreading and have no tendeney to droop. It ranges from eastern Canada to North Carolina, and west to Minnesota and Missouri, and as far south as Ohio and Texas.

T. platyphyllos Seop. BIGLEAF LINDEN

Zone 4

These speeimens are 15 m high with spreads of 6–7.5 m. The speeies is noted for its rounded head of braneh es and its large leaves, 12.5 by 12.5 em. These leaves taper to a long point and are sharply toothed, dark green, and slightly downy above and they have dense, simple, unbraneh ed hairs beneath. Found in Europe.

'Laeiniata'

Zone 4

A cultivar with irregular-lobed, raggedy leaves often eut deep into the midrib into three or more long, narrow, and deep divisions.

***Tilia platyphyllos* 'Laciniata'**

'Orebro'

Zone 4

A fine, fast-growing linden selected at the Lindstrum nurseries near Orebro, Sweden. It has a broad columnar habit formed by upright branches. The specimen has yellowish young branchlets.

'Rubra' RED-BRANCHED BIGLEAF LINDEN

Zone 4

This cultivar with red branchlets has now grown into a tree 15 m high with an 8.5 m spread.

'Vitifolia' GRAPE-LEAVED LINDEN

Zone 4

A linden with three-lobed leaves that sometimes look like the leaves of the common grape (*Vitis vinifera*). It has grown to the same proportions as *T. platyphyllos* 'Rubra' and, except for its leaves and bark, is similar in every respect.

ULMUS Ulmaceae

Ottawa, like so many eastern Canadian cities, is noted for its stately elms planted along wide streets. These beautiful trees with slender twigs and dark green leaves are threatened with extinction by the ravages of diseases, particularly the Dutch elm disease. The various measures employed by arborists within the city to combat this disease are having little long-term effect on the eventual outcome, a city without elms.

U. americana L. AMERICAN ELM

Zone 2

As might be expected, the collection contains more American elms than plants of any other species of any other genus. This abundance is partly because of an avenue that forms part of the National Capital Commission Driveway system that ends in the Arboretum, and partly because of the large native population in the woodland area.

This remarkable vase-shaped tree is easily distinguished by its form and height, in summer and winter. It stands out in the landscape during winter particularly because of its wide, arching branches and the graceful curving pattern of its branchlets. Botanically it is distinguished by the ciliate margins of its fruits, which are deeply notched at the apex, and by its leaves, which are widest at the middle, rough on top, and almost glabrous beneath. Its range is from Newfoundland to Florida, and west to the foot of the Rocky Mountains.

'Columnaris'

Zone 2

A form with upright branches forming a wide, columnar head.

U. carpinifolia Ruppius ex Suckow
SMOOTH-LEAVED ELM

Zone 5

The specimens have formed shapely trees with a height of 10.5 m, a spread of 7 m, and a trunk diameter of approximately 30 cm. The particular features of this species are the smooth, glossy green leaves with 10–12 pairs of veins and globose oval fruits, notched at the tip, and with the seed close to this notch. Because this species is variable, trees intended

American elm (*Ulmus americana*) in winter

American elm (*Ulmus americana*) in summer

for home gardens should probably be propagated and disseminated as clones. The species originates in Europe, northern Africa, and western Asia.

'Christine Buisman'

Zone 5

This cultivar does not differ greatly from the species. It has been said that this cultivar is resistant to both phloem necrosis and Dutch elm disease. If true, the tree would be considered highly desirable. The specimen is still healthy after 25 years of growth, but this fact is not adequate criterion.

'Koopmanii' KOOPMAN ELM

Zone 5

An interesting, round-oval form with dense foliage. The specimen has a definite trunk 2 m high, which makes it unlike most specimens of the type. It does, however, possess corky branchlets.

var. ***suberosa*** (Moench) Rehd. CORKY-BARKED ELM

Zone 5

The larger of the two specimens is now 10.5 m high and has a spread of 8 m and a trunk diameter of 30 cm. Its corky-winged, stiff branchlets and smaller leaves are probably what prompted Dr. G. H. M. Lawrence of Cornell University, Ithaca, N.Y., to identify this species as the corky-barked elm. It is a geographical variety that grows in forests of Central Europe. According to *Hortus Third,* this variety is now included with the species.

U. davidiana Planch.

var. ***japonica*** (Rehd.) Nakai JAPANESE ELM

Zone 3b

After 30 years the two specimens of the Japanese elm have grown to only about 10 m tall. While reputedly resistant to Dutch elm disease they lack the characteristic shape of the American elm.

U. glabra Huds. SCOTCH ELM, WYCH ELM

Zone 4b

The largest of these specimens has reached a height of 18 m and has a spread of 10 m and a trunk diameter of 40 cm. The other two specimens are 9–15 m high. They are wide-spreading, open trees with rough leaves and young branches, which are smooth for several years and then become corky. The fruits have fine hairs at the slightly notched end, are oval,

Smooth-leaved elm (*Ulmus carpinifolia*)

Koopman elm (*Ulmus carpinifolia* 'Koopmanii')

and contain the seed in the middle. It does not reach the proportions of the American elm and, therefore, might be more desirable for planting in smaller gardens. Found in northern and central Europe and western Asia, from Great Britain to Siberia.

'Cornuta'

Zone 4b

A small tree 12 m high and 9 m wide with leaves that have three to five acuminate lobes at the end and with hairy, reddish brown branchlets.

'Horizontalis' TABLE-TOP ELM

Zone 4b

A strange looking, gnarled, flat-topped old elm with pendulous branches. This cultivar and the Camperdown elm are the most picturesque trees in the Arboretum and probably the largest specimens in the country. This tree is 6 m high and has a spread of 4.5 m.

U. ×hollandica

'Wredei'

Zone 5

A fine golden form of the pyramidal *U. ×hollandica* 'Dampieri'.

U. laevis Pall. EUROPEAN WHITE ELM

Zone 4b

The larger specimen is now 12 m high and 7.5 m wide with a trunk diameter of 30 cm. It resembles the American elm in botanical characteristics, but certainly not in growth in the Ottawa area. The main difference appears to be its long and pointed rather than rounded buds, and its leaves, which are widest above the middle instead of at the middle. Found in central Europe to western Asia.

U. parvifolia Jacq. CHINESE ELM

Zone 5

This species has grown into one of the loveliest small trees in the collection and contributes a great deal to the autumn coloration in the area in which it is planted. It has small, leathery leaves, is now 3 m high, and has a spread of 2 m. It differs from most elms by having small, bright green leaves and by producing seeds in the fall instead of spring. Native to northern and central China, Korea, and Japan.

U. procera Salisb. ENGLISH ELM

Zone 6

There is no specimen of the true English elm in the collection at the present time. All the specimens grown under this name were later identified as *U. glabra* and *U. carpinifolia.*

'Marginata'

Zone 5

A fine small tree not more than 9 m high and 3 m wide with small, white-margined leaves.

U. pumila L. SIBERIAN ELM

Zone 3b

Because some nurseryman decided that the term 'Chinese elm' had more appeal than 'Siberian elm', this species is known almost universally in the trade as 'Chinese elm', a common name that belongs to *U. parviflora.*

***Ulmus procera* 'Marginata'**

All the specimens have formed good shapely trees; the tallest has attained a height of 15 m and a spread of 6–7.5 m. Because of its winterhardiness, medium height, and ability to withstand drought, it is often recommended as a tree for city and suburban streets or as a screen in place of the Lombardy poplar. Its greatest notoriety comes from its use as a hedge. Millions of plants are sold annually for this purpose. They grow extremely fast from seeds and so they are profitable to grow and sell. Once established as a hedge, however, it needs constant clipping, and finally with age it develops into a thin hedge composed of nearly all trunk.

Siberian elm (*Ulmus pumila*)

This species differs from the other elms by its leaves. They are smaller and simply serrate; both sides are nearly equal at the base and the petioles are small. The mature trees are more pyramidal than round headed, as has been suggested.

'Dropmore' DROPMORE ELM

Zone 2

This clone was introduced from Manchuria by Dr. F. L. Skinner and recommended for windbreaks in the Dropmore, Man., area. It appears likely that it is going to grow into a tree form. Apart from its apparent hardiness, there is little that distinguishes it from the specimens of *U. pumila*.

'Park Royal'

Zone 3b

A selection from the Sheridan nurseries, Oakville, Ont., with a good symmetrical head and a fast growth rate.

U. rubra Muhlenb. SLIPPERY ELM

Zone 3b

These trees have now attained a height of 24 m, spreads of about 18 m, and trunk diameters of 0.5 m. The common name is derived from its mucilaginous inner bark. It is identified by its orange reddish twigs with large buds covered with rusty down, its ciliate-ovate leaves, and fruits that have reddish downy seeds in the middle. Its range is from Quebec to Florida, and west to South Dakota and Texas.

U. thomasii Sarg. CORK ELM

Zone 4

A native elm known better perhaps as *Ulmus racemosa* and easily distinguished by its corky-winged branchlets and shallowly notched, hairy fruit. It grows from Quebec to Tennessee and Nebraska.

Camperdown elm (*Ulmus* ×*vegeta* 'Camperdownii') in summer

Camperdown elm (*Ulmus* ×*vegeta* 'Camperdownii') in winter

U.* ×*vegeta

'Camperdownii' CAMPERDOWN ELM

Zone 4b

This particular specimen is a smooth-leaved form of the Camperdown elm; otherwise it has the characteristic round-headed shape with pendulous branches. This tree is now 6 m high and has a spread of 9 m.

VACCINIUM — Ericaceae

Soil, site, and aspect are perhaps much more important than hardiness for this genus. Many species are perfectly hardy and yet barely survive under normal conditions; however, one species, the highbush blueberry (*V. corymbosum*), has survived in the open ground at the Arboretum for almost 30 years. None of the others planted at the same time has grown for more than 2 years.

It is certain that this genus contains some interesting and useful shrubs, of particular merit for the beauty and texture of their leaves, particularly in the fall, and for planting in low, wet areas. The requirements for their successful cultivation are not as rigid as those for many ericaceous plants but they do need a poor soil that is fairly acidic. It is hoped that new beds will be prepared in the near future for ericaceous plants, so that many more taxa will be under cultivation.

V. corymbosum L. HIGHBUSH BLUEBERRY

Zone 4

Because of its good foliage, which turns scarlet in the fall, and its red twigs in winter, this is one of the most ornamental members. Commercial blueberry growers have made many large-fruited selections from this species. Despite the fact that the natural habitat is in swampy and moist soils, the plant in the Arboretum is growing in dry, sandy loam. However, one could not state that the specimen is in perfect health, and a change in environment would, no doubt, benefit it to a great extent. The species ranges from Maine to Minnesota, and south to Florida and Louisiana.

Flowers of highbush blueberry (*Vaccinium corymbosum*)

V. oxycoccos L. SMALL CRANBERRY

Zone 3b

This evergreen creeping plant with red berries is perhaps better known as *Oxycoccos palustrus*. This species and the large cranberry (*V. macrocarpon* Ait.) differ from other *Vaccinium* plants by having deeply cleft, four-parted corollas and evergreen leaves. The plants appear to be growing well in the native garden of the Arboretum, where they are planted in moist, acid soil. It grows from Newfoundland to British Columbia, and south to Michigan and North Carolina; it is also found in northern Asia, northern Europe, and Britain.

VIBURNUM — Caprifoliaceae

An extremely large genus containing shrubs and one or two species that grow into small trees. With the introduction of so many new species from eastern Asia, India, and Europe in the past 50 years, it has become one of the most interesting groups of shrubs in the Arboretum. As the current breeding programs progress, the genus will indeed become vastly more interesting.

*V. **alnifolium*** Marsh. HOBBLEBUSH

Zone 3b

These plants were collected locally and planted in the native garden area. The hobblebush is a good plant for growing under trees and in the shade, where its vivid fall color will be appreciated; however, its flat flower clusters are not striking and the fall show of reddish purple berries is not outstanding. It is placed in the *Pseudotinus* group of viburnums but has larger leaves than most others in this class, and except for its sterile marginal flowers, it is nearly identical to *V. lantana*.

*V. ×**bodnantense*** Aberc.

Zone 7

An interspecific hybrid (*V. farreri* × *grandiflorum* Wallich) that has survived the Ottawa winters for many years although suffering winterkill at the tips occasionally. It produces a few clusters of fragrant rose-flushed flowers much like *V. farreri* but larger during the first warm spell of spring. The fruits, like those of *V. farreri*, are black and soon devoured by birds. This shrub and the following selection should be hardy where *V. farreri* grows.

'Dawn'

Zone 7

The specimens are still growing well with little or no winter injury. This deep pink form was highly acclaimed in England when it received an award of garden merit in 1960.

*V. **bracteatum*** Rehd.

Zone 4b

A species similar to *V. rafinesquianum* Schult., but with larger ellipsoid fruits and with larger leaves pubescent only on the veins beneath. It is found wild only in Georgia.

*V. **buddleifolium*** C. H. Wright

Zone 5

A medium-sized shrub belonging to the *Lantana* group but differing from the type itself by having long, narrow, oblong leaves, which are shallowly toothed. A native of central China.

*V. ×**burkwoodii*** Hort. Burkw. & Skipw.

Zone 6

This species is a hybrid (*V. carlesii* × *utile* Hemsl.) with thick, semievergreen leaves that change to bright orange or red in fall.

'Chenault'

Zone 5b

This cultivar is similar to the species but has more compact growth, finer textured leaves, and pink flowers in clusters. One of its best virtues is that it flowers later than *V. carlesii* or *V. juddii*, both of which are similar.

*V. ×**carlcephalum*** Hort.

Zone 6

A wide-spreading, open-branched hybrid (*V. carlesii* × *macrocephalum* Fort.). It has larger, more shiny foliage and showier flower heads than *V. carlesii*. One of the main differences between *V. carlesii* and *V. ×carlcephalum* is that the latter has no red or pink on the flower buds, but it has protruding stamens, a shorter corolla, and larger flowers.

*V. **carlesii*** Hemsl. FRAGRANT VIBURNUM

Zone 5b

In the right location, this beautiful viburnum is perfectly hardy, but it does need protection from the prevailing winds and seems to prefer shelter given by other shrubs. Its glistening white flowers have an extremely sweet fragrance that adds considerably to its value. The only other hardy viburnum that is near to it in beauty of flower is *V. juddii*, a hybrid that actually surpasses it in beauty and hardiness in the Ottawa area. It is native to Korea.

VIBURNUM

Flowers of *Viburnum carlcephalum*

V. cassinoides L. WITHE ROD

Zone 2b

A shapely bush of rounded form, with creamy white flowers in peduncled cymes. It has dull green, denticulate leaves and flaky young shoots, leaf stalks, and flower stalks, which distinguish it from the smooth withe rod (*V. nudum* L.). Its fruits are showy, especially in the nearly mature stage when they are changing from pink to blue.

V. cassinoides belongs to the *Lentago* section of *Viburnum*, the members of which have no marginal sterile flowers. It grows from Newfoundland to Manitoba and Minnesota, and south to North Carolina.

V. dentatum L. ARROWWOOD

Zone 4

A vigorous, rapid-growing, upright shrub with glabrous branches and broad-ovate, coarsely toothed leaves that are glossy green and glabrous above and downy in the vein axils beneath. It grows from New Brunswick to Minnesota, Georgia, and Florida.

V. dilatatum Thunb. LINDEN VIBURNUM

Zone 5

A free-flowering species with large, rounded, linden-like leaves and fine red fruits, which persist for several weeks almost into winter. Its five-rayed cymes of pure white flowers are all fertile and are produced on hairy stalks. A desirable species that appears to be hardier than the somewhat similar *V. wrightii* Miq., which arborists have not yet been able to establish in the Ottawa area. A native of eastern Asia.

V. farreri Stearn

'Nanum'

Zone 6b

A small compact shrub obtained from Dr. Egolf of the Washington Arboretum while he was at Cornell University. It keys out to *V. farreri* by its leaves and twigs, but the final determination cannot be given until the plant has flowered. However, it is mentioned here to bring attention to a plant that will be worthy of cultivation if it is a dwarf form of *V. farreri*, as it appears to be, and if it withstands the Ottawa winters.

V. ×*juddii* Rehd. JUDD'S VIBURNUM

Zone 5

A hybrid (*V. bitchiuense* Mak. × *carlesii*) that is one of the best hardy flowering shrubs introduced in the past 50 years. It is superior to *V. carlesii*, because it produces larger flowers on a more vigorous bush and is more adaptable to the Ottawa winters and growing conditions. The hardiness factors of many clones of trees and shrubs are sometimes ignored by botanists and dendrologists who, because of no evident botanical differences, often combine the hardy with the more tender types. One writer, at least, has suggested that this clone is just another specimen of *V. carlesii*.

Judd's viburnum (*Viburnum* ×*juddii*)

Flowers of Judd's viburnum (*Viburnum* ×*juddii*)

V. lantana L. WAYFARING TREE

Zone 2b

A large shrub with oval or roundish hairy leaves and white flowers in flat clusters. It is one of the earliest viburnums to bloom, and the individual clusters of flowers could be considered attractive. However, it is a vigorous shrub of use only in large collections particularly where berries are required for attracting and feeding birds. A native of Europe.

'Rugosum'

Zone 2b

A cultivar with larger wrinkled leaves and much larger flower cymes.

V. lentago L. NANNYBERRY

Zone 2

These specimens have formed small shapely trees 4.5 m high with spreads of 3 m. In June their showy flat clusters of white flowers and glossy green leaves make them very attractive. Later on, their blue-black fruits and striking fall coloring add considerably to their beauty. It is not a difficult species to identify. It has deep green wavy leaves, white flowers in sessile cymes, and no sterile marginate flowers. The species is found from Hudson Bay to Manitoba, and south to Georgia and Mississippi.

V. mongolicum (Pall.) Rehd.

Zone 3b

A hardy species with a widespread loose habit, broad dentate leaves, slightly pubescent above and below, few-flowered cymes, and black fruits. Apart from its ability to withstand shade, it is not superior to other similar species. Found originally in Siberia and northern China.

V. opulus L. EUROPEAN CRANBERRY BUSH

Zone 2b

A vigorous shrub or small tree bearing flat clusters of flowers with a marginal border of larger sterile blooms. Its leaves are lobed and not unlike those of the red maple. This species is often sold by Canadian nurserymen as the high bush-cranberry (*V. trilobum*), which is native to Canada. This is unfortunate, because the berries of the high bush-cranberry are used for preserves, whereas the fruits of the European species are much too tart for this purpose. A large number of plants of the European cranberry bush labeled as the high bush-cranberry are sold for hedges, giving the mistaken idea that one can grow a hedge of these plants and produce berries for preserves at the same time. Since *V. trilobum* will also make a fair hedge and will grow well from cuttings, it would not be a great problem to correct this error. Unlike *V. trilobum*, *V. opulus* has a petiole with large disk-like glands and a narrow groove. Native to Europe, northern Africa, and northern Asia.

'Aureum'

Zone 2b

It is the author's opinion that this is the most beautiful of all viburnums in the collection, particularly in August when its bright red berries stand out prominently from its deep golden foliage. This cultivar for years was labeled *V. opulus* 'Variegatum' having been identified as such in 1946. This shrub is the only one with bright golden foliage that withstands the sun without burning and is rugged enough to take all kinds of soil conditions.

'Nanum' DWARF EUROPEAN CRANBERRY BUSH

Zone 2b

A dwarf form with a more or less globose shape that produces few if any flowers and no fruits. Its dense habit renders it extremely useful as a small hedge.

'Roseum' SNOWBALL TREE

Zone 2b

A form with showy sterile flowers, so compact that they make neat globose heads, hence the common name. It is one of the most beautiful shrubs but its usefulness is often marred by aphids, which will curl and destroy all the leaves and completely disfigure the entire shrub unless proper spraying precautions are taken.

'Xanthocarpum'

Zone 2b

The fruits of this cultivar are yellow.

V. plicatum Thunb. DOUBLEFILE VIBURNUM

'Lanarth'

Zone 6

A shrub with showy sterile flowers facing upward from horizontal branches and larger leaves.

'Rotundifolium'

Zone 6

This cultivar of the doublefile viburnum is similar to the Japanese snowball (*V. plicatum* 'Sterile'), but has more rounded and broader leaves and it blooms 2 weeks earlier.

'Sterile' JAPANESE SNOWBALL

Zone 6

Both these specimens have survived the past 6 winters with little or no injury but are not yet large enough for proper assessment. The Japanese snowball is not usually considered hardy in this area and no mature specimens have been found, even in sheltered private gardens. This cultivar is, of course, the *V. tomentosum* 'Sterile' of the trade, noted for its pure white, sterile flowers that form beautiful snowy globes of bloom. The species and all its forms are also noted for their unique, trim, horizontal branching habit.

Snowball tree (*Viburnum opulus* 'Roseum')

*V. **prunifolium*** L. BLACK HAW

Zone 3

A tall, vigorous shrub or small tree, allied to *V. lentago* but distinguished from it by sessile cymes and sharply serrate leaves, which are long, taper pointed, and have winged stalks. Black haw has no special beauty of flower but its large, dark blue fruits are sweet and edible and often used for preserves. Its range is from Connecticut to Florida, and west to Michigan and Texas.

*V. ×**rhytidophylloides*** Suring.

Zone 6

A hybrid (*V. lantana* × *rhytidophyllum*) with large, thick, long, ovate leaves similar to *V. rhytidophyllum* Hemsl. but broader and less rugose.

*V. **sargentii*** Koehne SARGENT'S CRANBERRY

Zone 3b

A large shrub with thick, green, lobed leaves, much like those of *V. opulus* and *V. trilobum*. This species differs by having longer middle lobes especially in the upper part of the shrub, stems that are slightly corky at the back, and flowers that have purple anthers. It is a striking shrub in flower and fruit, and its vivid crimson coloring is especially beautiful in fall. A native of northeastern Asia.

var. ***calvescens*** Rehd.

Zone 3b

A form with leaves that are glabrous beneath.

'Flavum'

Zone 3b

A cultivar with yellow berries

*V. **sieboldii*** Miq.

Zone 4

A large shrub that, like *V. lantana* and *V. lentago*, can be grown on a single stem as a good small tree about 4.5 m high. It is mainly distinguished from the others by its prominent-veined obovate leaves that have a strong odor when crushed, its creamy white flowers in paniculate cymes, and its oval, blue-black fruits. The shrub originated in Japan.

*V. **trilobum*** Marsh. HIGH BUSH-CRANBERRY

Zone 2

The high bush-cranberry is best described as an American form of *V. opulus* but with much more vigor and the ability to grow in wet swampy areas. Its main characters are described under *V. opulus*. Its native range extends from New Brunswick to British Columbia, and south to New York, Michigan, South Dakota, and Oregon.

'Compactum' DWARF HIGH BUSH-CRANBERRY

Zone 2

A compact form of *V. trilobum* with a much dwarfer habit and smaller leaves. It grows more upright than *V. opulus* 'Nanum', which is otherwise similar, and may have excellent possibilities as an ornamental shrub or hedge plant. It produces few flowers or fruits.

Dwarf high bush-cranberry (*Viburnum trilobum* 'Compactum')

'Garry Pink'

Zone 2

A selection that produces sterile flowers that are white at first but after a day or so change to pink.

'Manitou Pembina'

Zone 2

A plant introduced by the Research Station at Morden, Man., with much larger fruits produced in greater abundance. This species serves as an ornamental shrub and as a source for pie-making berries.

VITEX — Verbenaceae

This large genus of shrubs belongs to the Verbena family, containing mainly tropical and subtropical species. Plants received as *V. agnus-castus* L., *V. agnus-castus* 'Macrophylla', and *V. negundo* grew in the Arboretum for a few years, but finally succumbed to Ottawa's winters. However, *V. negundo* var. *heterophylla* has remained root hardy for many years.

*V. **negundo*** L.

var. ***heterophylla*** (Franch.) Rehd.

Zone 5b

The two specimens are killed to ground level each year, but persistently send up new shoots and behave in the same way as garden perennials. They produce an abundance of violet-blue flowers in long panicles during September and October and might be considered graceful and useful. The leaflets of this variety vary from incisely serrate to deeply pinnatifid with narrow segments. It is perhaps better known in the trade as *V. negundo* var. *incisa*. It originated in northern China, Mongolia, and Korea.

VITIS — Vitaceae

Probably many more *Vitis* species than are listed here could be grown in the Ottawa area, but the Arboretum has no

suitable area to accommodate them. Those planted in the collection may not have proved completely hardy if they had been trained on a trellis or post; as far as space allows, they are planted in open lawn and allowed to run and intertwine.

V. ×***acerifolia*** Raf. MAPLE-LEAVED GRAPE

Zone 5

This hybrid was formerly known as *V. longii* W. Prince and is assumed to be a natural hybrid between *V. rupestris* Scheele and *V. arizonica* Engelm. It would appear to be much closer to *V. arizonica* than to the other species, especially in its leaves, which are orbicular with large, angular teeth. It is native to Oklahoma, northwestern Texas, New Mexico, and southern Colorado.

V. aestivalis

var. ***argentifolia*** (Munson) Fern. BLUE GRAPE

Zone 5

A vigorous climber with large three- to five-lobed leaves, 15–25 cm wide and long. The leaves are glabrous on both sides, but vividly silvery bluish white beneath and light green above. This vine is outstanding for the beauty of its leaves and also for its bluish white, young shoots, which with the old leaves give it a shiny white and green effect. The species ranges from New England and Illinois to North Carolina and western Tennessee.

V. amurensis Rupr. AMUR GRAPE

Zone 3b

A strong-growing vine with reddish young shoots and large leaves to 25 cm in diameter, five-lobed, the middle lobe being deep and of broad-ovate shape; the undersides of the leaves are downy. It is one of the best wild grapes for colored foliage in the fall and should be a better choice for planting over an arch or trellis than the more rampant vines often used. The species is found in the Amur region, Korea, and northern China.

V. coignetiae Pulliat GLORY VINE

Zone 5

As its common name suggests, this species is truly a glorious grape vine. It has the largest leaves of any *Vitis* in the collection, some measuring up to 30 cm in diameter. The leaves are rounded and are three- to five-lobed and sometimes without lobes. The upper sides are covered with thick rusty brown felt. It is a vigorous species and one that will cover a pergola in a short time. Although beautiful in summer with its large, dark green leaves, it reaches its peak of beauty in the fall when these leaves change to vivid crimson. A native of Japan.

V. labrusca L. FOX GRAPE

Zone 4b

Another vigorous grape with three-lobed or unlobed leaves, which have a dark green, glabrous upper surface and a whitish or rusty-colored lower surface. It is distinct among the true vines in having a tendril or an inflorescence at every joint. It is the parent of many cultivated American grapes. It grows naturally from New England to Georgia, Tennessee, and southern Indiana.

V. monticola Buckl. SWEET MOUNTAIN GRAPE

Zone 4

The sweet mountain grape is a smaller-leaved climber with slender, angular, and slightly hairy branchlets. The leaves are not more than 7.5–10 cm in diameter and are heart shaped at the base; both surfaces are shiny. It is similar to *V. riparia* except that it has pubescent branchlets and unlobed or slightly lobed leaves. The species originates in Texas.

V. riparia Michx. RIVERBANK GRAPE

Zone 2b

A species particularly noted for its handsome, lustrous, bright green leaves and the fragrance of its staminate flowers. It is the hardiest of the true grape species and perhaps, because of its ornamental foliage as a vine, should be more often grown for covering pergolas. Its leaves are 7.5–12.5 cm long, usually three-lobed, coarsely toothed, with triangular acuminate teeth. Its fruits are black and covered with thick bloom. It is native to Nova Scotia, from New Brunswick to Manitoba, and over a large area of the United States.

V. vulpina L. FROST GRAPE

Zone 5

A grape vine with smaller and thinner leaves than most of the others and with coarse irregular teeth. Its thick black fruits are said to be edible only after frost, hence its common name. It is often confused with *V. riparia*, the riverbank grape; the main difference is in the basal sinus of the leaves of *V. vulpina*, which is narrower than that of *V. riparia*. *V. vulpina* has thick diaphragms at the nodes of the branches, whereas those of other *Vitis* species are thin. It is found from Pennsylvania to Florida, eastern Kansas, and Texas.

WEIGELA Caprifoliaceae

These deciduous shrubs are closely allied to the honeysuckles, but are distinguished chiefly by their dry seed capsules. In Ottawa, most of the cultivars succeed fairly well once they are established, but during cold snowless winters they may be killed down to ground level.

Cultivars of this genus are of such mixed origin that many cannot be affixed to a definite species, and are listed in alphabetical order.

W. 'Avalanche'

Zone 5

This white cultivar has *W. praecox* as a parent. However, the cultivar that was received under this name, obtained from Wayside nurseries, Mentor, Ohio, is the hybrid 'Candida'.

W. 'Ballet'

Zone 5

A cultivar with deep pink flowers that are unusually large.

W. 'Boskoop Glory'

Zone 5

A selection with large, salmon pink flowers.

W. 'Bouquet Rose'

Zone 5

A floriferous, early-flowering, carmine-rose cultivar introduced by Lemoine in 1899.

WEIGELA

***Weigela* 'Boskoop Glory'**

W. 'Bristol Ruby'

Zone 5

This cultivar is one of the most impressive of all weigelas. It has large, deep rose flowers shaped much like trumpets; they are produced abundantly in May and then periodically all summer until fall. The history of the plants at the Arboretum shows that the severe winter of 1956 killed back a few shoots, but that the plants still produced blossoms.

W. 'Candida'

Zone 5

A white cultivar belonging in the *W. coraeensis* Thunb. × *florida* group. When it first flowers it is extremely showy; after a few days, however, the old flowers turn brown and remain on the shrub, presenting an untidy appearance.

W. 'Desboisii'

Zone 4

This plant has deep pink flowers changing to deep rose.

W. 'Esperance'

Zone 5

A late-blooming cultivar with light pink flowers.

W. 'Eva Rathke'

Zone 5

A popular shrub with dark crimson flowers and white anthers.

W. 'Eva Supreme'

Zone 5

A vigorous cultivar with bright rosy red flowers that are rosier than those of 'Eva Rathke' and considerably brighter.

W. 'Feerei'

Zone 5

The large, light pink flowers are produced in profusion.

W. floribunda (Siebold & Zucc.) K. Koch

Zone 5

A robust species up to 2 m high with branchlets that are covered with soft down. It produces dark crimson sessile flowers and is the species responsible for such dark-flowered hybrids as 'Eva Rathke'. A native of Japan.

W. florida (Bunge) A. DC.

Zone 5

This specimen was among the first consignment of shrubs planted in the Arboretum; it came with a collection from Sebire of France that also included other *Weigela* species and several other taxa of shrubs. *W. florida* differs from other weigelas by having calyxes divided to the middle and seeds that are not winged, which is similar to *W. praecox*. However, *W. praecox* has leaves that are pubescent on both sides, whereas the leaves of *W. florida* are glabrous. The species comes from northern China and Korea.

'Variegata'

Zone 5

A dwarf, variegated shrub usually sold under the name *W. rosea* 'Nana Variegata'. Because *W. rosea* is a synonym of *W. florida* this cultivar is better placed here. It is an extremely showy variegated plant with light green leaves that have a narrow edge of yellow. It does produce very pale pink and white flowers, but its main attraction is its leaves.

var. ***venusta*** (Rehd.) Nakai

Zone 5

A geographical variety from Korea, with smaller leaves and rose-pink flowers in dense clusters with small, oval-lobed leaves at their base.

W. 'Groenewegenii'

Zone 5

The flowers are deep rose outside and pale inside, with yellow lines.

W. 'Manchurian Pink'

Zone 4b

A vigorous cultivar with deep lavender-pink, wide-opened flowers. It originated at Morden, Man., and appears to be hardy, which makes it worthwhile as a parent where hardiness is sought.

W. japonica Thunb. CHINESE WEIGELA

var. ***sinica*** (Rehd.) L. H. Bailey

Zone 5

These specimens grew from seeds received from the Botanic Garden at Oslo, Norway, under the name *Diervilla koraeensis*, but have since been identified as *W. japonica*. This large shrub produces two types of flowers, white and red, and yellow and red, on the same bush, a character that distinguishes it from the other species. Native to central China.

W. middendorffiana (Trautv. & C. A. Mey.) K. Koch

Zone 4

This species is distinct from all other weigelas in having yellow flowers and two-lipped calyxes. The specimens are medium-sized shrubs to 1.5 m high. The flowers are not prominently displayed, being mostly hidden in the yellowish

foliage. However, it is worth growing in the collection for the part it might play in future breeding programs. The shrub originates in Manchuria, northern China, and Japan.

W. 'Mme Couturier'

Zone 5

A cultivar with yellowish white flowers flushed with pink.

W. 'Mme Lemoine'

Zone 5

These prominent shrubs are about 2 m high and 3 m wide and produce abundantly each year pale pink blossoms that later change to deep rose. In 1960, these shrubs were removed to make way for a bed of *Chamaecyparis*.

W. 'Newport Red' see *W.* 'Vanicek'

W. praecox (Hort. Lemoine) L. H. Bailey
EARLY WEIGELA

Zone 4

A profuse, early-flowering weigela and one of the most beautiful in the collection. It has large, trumpet-shaped, deep rose flowers with a slight yellowish cast in the throats. It can be distinguished not only by its early blooming, but also by its leaves, which are pubescent on both sides, and its calyxes, which are divided to the middle like those of *W. florida*. The species was originally from Korea.

W. 'P. Duchartre'

Zone 5

One of the old varieties that has survived for many years. It has deep red flowers, so dark as to be somber rather than vivid.

W. 'Vanhouttei'

Zone 5

Although one of the original Arboretum varieties, not many others surpass it in beauty. It has delicate blush white flowers, which later change to soft pink.

W. 'Vanicek'

Zone 5

A deep red selection similar to 'Bristol Ruby' but with the flowers not as bright. It does, however, form a much neater bush and flowers profusely. There is much confusion regarding the naming of this cultivar; it may be found listed as 'Vanicek', 'Vanicekii', or 'Newport Red'.

XANTHORHIZA — Ranunculaceae

A genus containing only the one species listed here.

X. simplicissima Marsh. YELLOW ROOT

Zone 5

This valuable, low-growing shrub could be utilized as a ground cover in light shade. Its small, brownish flowers, similar to a small *Epimedium*, are inconspicuous, but its shiny green leaves are showy in summer and turn to a brilliant orange in the fall. The plant is growing in a restrictive area and has, without special treatment, grown to 2 m × 1.5 m in area and 45 cm high. It grows wild from New York to West Virginia, Florida, and Alabama.

YUCCA — Agavaceae

A genus of liliaceous trees and shrubs usually confined to subtropical and tropical countries. Some of the species, however, can be grown much farther north, and one, at least, is hardy in the Ottawa area.

Y. filamentosa L. ADAM'S-NEEDLE

Zone 4

This specimen is in the perennial border in the Ornamental Gardens, where many others were once planted but have now been removed. In the Arboretum a bed was set aside for

Adam's-needle (*Yucca filamentosa*)

Soapwort yucca (*Yucca glauca*)

these plants but had to be taken out when a road was widened. This particular species is hardy in the Ottawa area and prominent during July with its large spikes of creamy white flowers. When not in flower, its stiff, sharply pointed leaves give a desert-like effect to the area. Most of the other species mentioned by Rehder as probably being hardy in the Ottawa area, were not successful at the Arboretum. The species is found from North Carolina to Mississippi and Florida.

Y. glauca Nutt. ex J. Fraser SOAPWORT YUCCA

Zone 3

A hardy species with narrow, rapier-like leaves and prostrate, short-stemmed or acaulescent flowers of creamy white. It is native from the Great Plains of South Dakota to New Mexico and has been found growing wild in southern Manitoba.

ZANTHOXYLUM **Rutaceae**

None of the species in this genus are especially ornamental and have no merit over other shrubs except perhaps as hedge plants where their prickles may prove a barrier to animals.

Z. americanum Mill.

PRICKLY-ASH, TOOTHACHE TREE

Zone 4

A spreading, round-headed shrub to 2.5 m high with brownish, downy, young shoots that become grayish as they age. Its pinnate leaves are 15–20 cm long and have 5–11 leaflets.

The shrub is given the common name of toothache tree because of the bark and seed capsules, which have a pungent acrid taste, and have been used to alleviate the pain of toothache. This particular species is distinguished from the others by the downy undersides of its leaves. It is native from Quebec to North Dakota, and south to Florida, Alabama, and Oklahoma.

Part Two

Coniferous Trees and shrubs and Ginkgo

ABIES

ABIES — Pinaceae

A group of not more than 40 species of evergreen trees, native to Europe, North Africa, northern Asia, and North America.

A. alba Mill. — SILVER FIR

Zone 7

Compared to most firs this species is slow growing, having now reached a height of only about 1.5 m. The author's view is consistent with Rehder who states that the species does not grow satisfactorily in the eastern United States. It is identified by its pectinate leaves, 1.5–2.5 cm long, shallow-notched at the apex, dark green and grooved on the upper surfaces, and with two white bands of stomata on the undersurfaces. The tree originated in the mountains of central and southern Europe.

A. balsamea (L.) Mill. — BALSAM FIR

Zone 1

The three specimens are about 7.5 m high and do not appear to be flourishing under the soil conditions in the Arboretum. This fir is native to the Ottawa region, and a few kilometres away good healthy vigorous specimens may be observed. It is easily distinguished by its leaves, which are rounded or notched at the apex, glossy green and bearing a few stomata near the apex on the upper surfaces, and with tiny bands containing six to eight lines of stomata on the undersurfaces. More crudely, perhaps, it can easily be distinguished by the way its leaves snap clean when bent, just like a tender dwarf culinary bean. This clean break does not occur with the leaves of any of the other firs growing in the Arboretum. The species grows from Labrador to West Virginia, and west to Minnesota and Iowa.

A. cephalonica Loud. — GREEK FIR

Zone 5

After 20 years this species has grown into a handsome tree 2.5 m high. The sharp prickles at the tips of its leaves differentiate it from all other firs except *A. bracteata* (D. Don) D. Don ex Poit., a Californian species that would not survive in the Ottawa area. The young branchlets of this species are red brown and glabrous. The long stiff leaves are shiny deep green above and have white bands beneath. In general appearance it excels most of the hardy firs because of its thick, densely set branches and leaves. A native of Greece.

A. concolor (Gord.) Lindl. ex Hildebr. — COLORADO FIR, WHITE FIR

Zone 4

The older of the specimens is 15 m high and presents a lovely spectacle with its silver gray foliage and more or less cylindrical habit. The younger specimen has a base spread of 2.5 cm and gradually tapers to a height of 4.5 m. It should be planted more often in home gardens and public parks for its extremely beautiful habit and color. Its leaves are distinctive apart from their bluish green color in that they are irregularly arranged and curve upward, and some forward, along the branchlets. The tree grows from Colorado to southern California, northern Mexico, and New Mexico.

A. homolepis Siebold & Zucc. — NIKKO FIR

Zone 5

Specimens in the collection have not yet been tested thoroughly, but should prove hardy in the Ottawa area. The species is a good dwarf fir with dark green leaves and purplish cones, distinguished from other firs by its deeply grooved glabrous branchlets and internal resin ducts. It originated in Japan.

A. koreana E. H. Wils. — KOREAN FIR

Zone 4

This delightful, small, slow-growing fir has an extremely compact, bushy, pyramidal habit. Its short leaves, dark green above and silver white beneath, seem to curve backward on most of the branches, revealing more of the silvery undersurface than would normally be seen. This species would be an excellent small evergreen for house planting as it provides a pretty sight when loaded with violet and purple cones in the fall. Native to Korea.

A. lasiocarpa (Hook.) Nutt. — ALPINE FIR

Zone 2b

The plants in the Arboretum grew 15 m high in 50 years and formed lovely specimens, but were removed in 1950. After 30 years of growth tip-killing was noted, which eventually resulted in the loss of the leading shoots and in unsightly trees. More specimens were planted and now form part of a new collection. The tree is growing from Alaska to Oregon, Utah, and New Mexico.

'Compacta'

Zone 2b

A dwarf, broadly conical, densely branched evergreen, with silvery blue, crowded leaves. An excellent slow-growing ornamental that adapts well to many home garden conditions.

A. mariesii M. T. Mast. — MARIE'S FIR

Zone 6

This species has survived for 3 years in excellent shape. It was obtained as a plant from the National Arboretum, Washington, DC, which in turn received the seed from the Tehoku Forest Tree Improvement State Takisawa, Morioka, Japan. The seeds were collected at an altitude of 975 m on Mount Iwate, Iwate Prefecture, Japan. This species eventually forms a tree up to 25 m high of compact pyramidal habit. The plants are too small yet for observation on peculiar traits. It originated in Japan.

A. nordmanniana (Steven) Spach — NORDMANN FIR

Zone 6

The specimen has had a rough time in severe winters, having completely lost its leading shoot a few years after planting. It has survived, however, grown a new leader, and is now beginning to form a tree of better appearance. Injuries, however, have slowed the growth of the specimen to 1.5 m. When growing normally, this species forms a handsome tree, with large, dark, glossy green, wide leaves and fine conical habit. Its native range includes the Caucasus and Asia Minor.

A. sachalinensis (Friedr. Schmidt) M. T. Mast — SAKHALIN FIR

Zone 4b

A fine pyramidal fir similar to *A. veitchii* and *A. sibirica* but with larger leaves. It differs from *A. sibirica* by having leaves with seven or eight lines of stomata underneath, instead of four or five. The branchlets of *A. sachalinensis* are slightly grooved, whereas those of the other species are not grooved.

The species originates in Japan, Sakhalin, and the Kuril Islands.

A. sibirica Ledeb. SIBERIAN FIR

Zone 2

One specimen growing in front of Heritage House 60 at the Central Experimental Farm, planted in 1952, is now 9 m high and 2 m wide at the base. This species is one of the fastest-growing firs and has soft, slender, light green leaves, mostly facing in a forward direction. Its range is from northern Russia to Kamchatka, and south to Turkistan and Manchuria.

A. veitchii Lindl. VEITCH FIR

Zone 5

A fir much like the Korean fir and one that should prove hardy and valuable in the Ottawa area. It is distinguished from *A. koreana* by having resinous buds, brownish instead of yellowish branchlets, and green instead of purple, young cones. Native to Japan.

CEDRUS — Pinaceae

The only species of true cedar that withstood any winters in Ottawa was the cedar of Lebanon (*C. libani* A. Rich.). Seedlings of a hardy strain of this species were secured from a tree in the Arnold Arboretum, Jamaica Plains, Mass. The seedlings grew for 7 years before being winter-killed. They were protected by the snow until the 7th winter when the snowfall was lighter than usual. Further tests with *C. libani* from Turkey had similar results, but one of these plants survived for 12 years. Eventually, it was killed by a lawn mower, not the climate.

CHAMAECYPARIS — Cupressaceae

This small genus of evergreen plants is distinguished by small, rounded cones and flattened branchlets. At one time most of the forms with juvenile foliage were included with similar forms of *Thuja* in the genus *Retinospora*, and many nurserymen still carry this name in their catalogs. As many of the characteristics of the species and forms are extremely obscure, identification is often difficult.

C. nootkatensis (D. Don) Spach NOOTKA CYPRESS

Zone 6

This species, together with *C. thyoides*, is distinguished from the others of this genus by having leaves that are not marked with white on the undersides. It is also easily recognized by the pungent odor it produces when the leaves are crushed. Native from southwest Alaska to Oregon, the original plant was discovered by Menzies in 1793, and introduced into cultivation in 1853. It is on the borderline of hardiness in the Ottawa area and would need a sheltered location to develop into its true pyramidal shape.

'Pendula' PENDULOUS NOOTKA CYPRESS

Zone 5

This beautiful plant has an erect trunk, horizontal branches, and leaf-bearing branchlets that are pendulous in straight vertical lines and present a striking cascade effect. It must be considered hardier than the species, as the specimen in the Arboretum has now reached a height of 8 m in 25 years.

C. obtusa (Siebold & Zucc.) Endl. HINOKI CYPRESS

Zone 5

A good ornamental evergreen that has grown as high as 6 m in the Ottawa area. It is better to plant it away from the house as an ornamental tree rather than, as it often is, near to a house wall. The trees at the Arboretum all have four to six trunks arising from near the base, but are ornamental with the large, frond-like leaves slightly darker at the tips. It is distinguished from the other species by its unequal, blunt leaves with distinctive white markings on their undersides. These markings are clearly defined on all the specimens as being in the shape of a perfect X or Y. Native to Japan.

'Aurea' GOLDEN HINOKI CYPRESS

Zone 5

A form with golden yellow young shoots that are intermingled with green shoots. It is not as striking as *C. pisifera* 'Plumosa Aurea', which is used more for ornamental purposes; however, young plants are more golden than the older ones and might prove ornamental during the first few years.

'Juniperoides'

Zone 5

A miniature globose form not more than 30 cm high and 25 cm wide. It is a smaller plant than 'Nana Gracilis' but more dense and compact. The foliage is dark green.

'Kosteri'

Zone 5

A dwarf pyramidal form with ascending branchlets and decurving tips. It is intermediate between 'Nana' and 'Pygmaea' and has a soft, light green foliage.

'Nana Gracilis'

Zone 5

This more commonly cultivated form is often wrongly named as 'Nana' or 'Nana Compacta'. A dwarf plant that is compact and bushy when young, but becomes broad and pyramidal with age. The plants often revert to *C. obtusa* unless the terminal growths are removed to encourage the production of juvenile foliage.

'Spiralis'

Zone 5

An upright form with noticeably cup-shaped branchlets that twist around in a spiral fashion. A distinct and interesting form.

C. pisifera (Siebold & Zucc.) Endl. SAWARA FALSE CYPRESS

Zone 4b

The specimens planted in 1903 have formed trees to 4.5 m high, with reddish brown bark that scales off in long thin strips. It is similar to *C. obtusa* but has sharply pointed, spine-tipped leaves, with the lateral pair boat-shaped and the facial pair flattened. Actually, once enough material of the two species has been handled, *C. pisifera* can be identified easily by feeling its prickly, feathery leaves. Although its lumber is not as valuable as that of the Hinoki cypress, it is used by the Japanese for general carpentry. The species originated in Japan.

'Cyanoviridis' BOULEVARD FALSE CYPRESS

Zone 5

An outstanding small conifer known to the trade as the boulevard false cypress, or *C. pisifera* 'Boulevard'. Although

some browning occurs on its shoots after a severe winter, it is generally hardy and forms a showy conical bush with bright silvery gray leaves, which although oval shaped, curve inward and are not prickly to touch.

'Filifera' THREADLEAF CYPRESS

Zone 4b

This selection has grown into the largest specimen of all the *Chamaecyparis* in the collection. Two of the trees now stand 18 m high and the rest are about 6 m high. The smaller ones are graceful trees, 4.5 m wide, gradually tapering to the apex, and would be extremely useful for planting near large buildings to provide an interesting contrast to other plants. This cultivar forms one of the best hedges in the hedge collection.

'Filifera Aurea' GOLDEN THREADLEAF CYPRESS

Zone 4b

One plant of this cultivar is in the rock garden of the Ornamental Gardens and is the brightest and most graceful of all the *Chamaecyparis* species that are hardy in the Ottawa area. Its thread-like golden yellow foliage hangs down and glistens in the sun brighter than any golden form of any other evergreen and hence, is highly recommended for foundation plantings. Many other types have gold foliage but it appears more or less as a color deficiency rather than an advantageous form.

'Filifera Nana' DWARF THREADLEAF CYPRESS

Zone 4b

A dwarf, neat, compact form of the threadleaf cypress.

Threadleaf cypress (*Chamaecyparis pisifera* 'Filifera')

'Plumosa' PLUME CYPRESS

Zone 4b

The three plants may have started out as the golden form and reverted to the green-foliaged form. It is a juvenile form of *C. pisifera*, that sometimes bears adult foliage. In general, however, it forms a dense conical bush with oval-shaped, spreading leaves intermediate in habit between those of *C. pisifera* and 'Squarrosa'. All specimens at the Arboretum are hardy and stand 4.5–6 m high, with foliage from top to bottom completely covering the multiple stem within the shrub.

'Plumosa Aurea' GOLDEN CYPRESS

Zone 4b

A golden form of the feathery 'Plumosa'. These small plants are more golden than the larger ones and are extremely beautiful for landscaping around the home. They are hardy but need shelter from the drying sun in winter.

'Plumosa Flavescens'

Zone 4b

Two specimens of this cultivar were planted in 1900. The points of the young shoots are pale yellow; otherwise they are identical to 'Plumosa'.

'Squarrosa' MOSS CYPRESS

Zone 5

Two of the specimens are 6–7.5 cm feet high. One of them has a conical-shaped arrangement of branchlets and foliage above a long, bare, slender trunk. The smaller specimens are graceful shrubs with silvery linear leaves in alternately opposite pairs or whorls of four, with prominent white markings on the upper and lower surfaces of the leaves.

C. thyoides (L.) BSP

Zone 5

This plant was grown from seeds supplied by the Morton Arboretum, Lisle, Ill. Being slow in growth, it has only

Moss cypress (*Chamaecyparis pisifera* 'Squarrosa')

reached a height of 1 m and has slim branches. It is easily distinguished from other species by the conspicuous glands on the back of each leaf. Its range is from Maine to Florida and Mississippi.

GINKGO — Ginkgoaceae

G. biloba L. — MAIDENHAIR TREE

Zone 4

The maidenhair tree stands unique in dendrological history as being the sole survivor of one of the most interesting families of trees widely distributed in temperate regions in early geological times. By certain essential characters it is related to the pine and yew families of conifers, and by other characters, such as its flattened leaves and motile sperms, it is allied to the cycad and fern families.

One of the specimens planted in 1895 fruited for the first time in 1958. This plant was sent from Lemoine's Belgian nursery as *G. biloba* 'Fastigiata' and, although fastigiate to a certain degree, it does not form the expected narrow pyramidal or columnar head. If this specimen is the true fastigiate form, it contradicts the belief that this form occurs only in male trees. It originated in eastern China.

JUNIPERUS — Cupressaceae

The first junipers in the Dominion Arboretum were planted in 1896, 9 years after the Central Experimental Farm was established and an area had been set aside for a collection of woody plants. Of those set out that year, the following are still growing: *J. chinensis* 'Pfitzeriana', *J. communis* 'Upright Form' (received as *J. davurica* Pall. from Russia), *J. rigida, J. sabina, J. sabina* 'Cupressifolia', *J. virginiana* 'Elegantissima', and *J. virginiana* 'Reptans'.

Low temperatures are mainly responsible for restricting the number of junipers that will survive the winter, but rapid fluctuations of temperatures caused by bright winter sunshine and strong winds can also cause a browning of the leaves of many cultivars. Some, such as *J. communis* 'Suecica' and *J. communis* 'Hibernica', are so affected that they are eliminated from the list of junipers considered hardy in the Ottawa area. If the foliage is shaded with burlap during the winter, some of these types will survive and present a green appearance in spring. No such protection, however, is given plants in the collection.

The junipers are perhaps the most difficult of all conifers to identify. This problem is evident from the conflicting descriptions of several species and the confused botanical names appended to many cultivars by botanists and horticulturists alike. There appears to be no set characteristics by which one can be guided authentically. One botanist may imply that a character such as a recurving fruiting stalk is peculiar to a particular species or group; another may mention glands and glandular depressions as though these might distinguish one plant from another, whereas upon investigation, the recurving stalks or glands are found to be present in most species but not clearly visible in some individual specimens.

Trees and shrubs of the genus *Juniperus*, like those of other genera in the family Cupressaceae, have scale-like and needle-like leaves, sometimes on separate plants, but often on the same plant. The scale-like or adult leaves are easy to observe because they are all more or less closely pressed against the stem and are four ranked. The needle-like leaves often termed awl-shaped, aciculate, or linear in a single descriptive work, are common to the juvenile stage and are nearly always sharp pointed.

The whitish, black, or deep blue, fruits, composed of fleshy berry-like, cone scales, take 1–3 years to ripen.

J. chinensis L. — CHINESE JUNIPER

Zone 4b

The Arboretum specimen is a pyramidal tree with mostly adult foliage. The scale-like leaves are in opposite pairs, closely pressed to the stem, overlapping and blunt at the apex, and convex on the outer surfaces; though predominantly bluish green, they have a paler margin marked with a glandular depression on the underside. The juvenile leaves are awl shaped, sharp pointed, and mostly in whorls of three, though occasionally in opposite pairs, with each pair at right angles to the other; on the upper side they have two glaucous bands that are separated by a green midrib. The ripe fruits of the specimens are mostly black and contain two to five seeds, usually three or five, which are deep brown with whitish marks, rather like fruits of the horse-chestnut. The main distinguishing characters of this species appear to be the bluish and rather squat triangular adult leaves and ternate juvenile leaves. The species is native to China, Mongolia, and Japan.

'Ames' — AMES JUNIPER

Zone 5

A cultivar almost identical to *J. chinensis* 'Pyramidalis', the spiny Greek juniper of nurseries, but one that is much hardier. Although growing right beside the other plant, 'Ames' has escaped winter injury for the 3 years since it was planted.

'Blaauw' — BLAAUW'S CHINESE JUNIPER

Zone 5

A lovely upright form with thick, bluish green adult foliage. Although upright in growth, its branches spread slightly at the tips, giving it a long vase-shaped effect.

'Fairview' — FAIRVIEW JUNIPER

Zone 5

A trim little pyramidal evergreen with closely-set branches bearing scale-like leaves and black fruits.

'Iowa' — IOWA JUNIPER

Zone 5

An extremely attractive, compact, blue-green form that keeps its pyramidal shape without pruning. Its foliage is composed equally of juvenile and adult leaves.

'Japonica' — JAPANESE JUNIPER

Zone 5

The plant is 1 m high with thick-set plumosa branchlets growing horizontally from the main stem. It should prove a useful form for home planting.

'Leeana'

Zone 5

A cultivar that has been unknown in the Arboretum for many years because of a mistake in spelling. The plants have been called *J. reana*, a spelling mistake that has made these clones difficult to trace. However, the plants are obviously *J. chinensis* 'Leeana' for the description fits the clones exactly. This cultivar is an upright male form 0.5–1 m high, and densely branched with bright gray-green leaves above and below.

'Maney' MANEY JUNIPER

Zone 5

An upright, bushy type with steel blue juvenile foliage like that of *J. squamata* 'Meyeri'.

'Mas' MALE JUNIPER

Zone 4

Planted in 1908, this beautiful, small, densely compact tree is now 4.5 m high. The 2 m spread at the base gradually tapers to a point at the top. It has mostly scale-like leaves at the tips and juvenile leaves toward the inner part of the tree. It is hardy at Ottawa and worth growing as an accent plant in formal gardens.

'Monarch'

Zone 5

A fast-growing, loose, pyramidal cultivar with juvenile gray-green leaves. The plants have reached 2.5 m high with spreads of 1.5 m in 4 years.

'Mountbatten' MOUNTBATTEN JUNIPER

Zone 5

A broad, conical type with mostly juvenile foliage.

'Obelisk' OBELISK JUNIPER

Zone 5

A good, fairly slow growing, pyramidal tree, with long, prickly, awl-shaped, grayish green juvenile foliage. The specimens are seldom injured by sun or frost in winter.

'Old Gold'

Zone 5

This cultivar has similar growth habits to 'Pfitzeriana', but is more compact and has bronzy gold leaves.

'Pfitzeriana' PFITZER JUNIPER

Zone 2b

One of the older plants in the Arboretum, this specimen has become interesting, spreading over an area of about 90 m. Some branches have grown in an erect manner to a height of 2.5 m and horizontal subsidiary branches have spread from them. Although some doubt has existed as to the identity of these plants, they are fairly easily established as Pfitzer junipers because they have characteristically large, long, spear-shaped branches clothed with slightly glaucous adult foliage. The leaves of this form, like those of *J. chinensis*, are closely pressed against the stem and have depressed glands that are much more obscure than those of *J. sabina* and *J. virginiana* 'Hetzii'.

'Pfitzeriana Aurea' GOLDEN PFITZER JUNIPER

Zone 2b

This is one of the most popular junipers and has golden-tipped branchlets.

'Pfitzeriana Compacta'

Zone 2b

A bushy compact sport of *J. chinensis* 'Pfitzeriana' with mostly awl-shaped leaves. A splendid cultivar that is little known although introduced in 1930 by Bobbink and Atkins of Rutherford, N.J.

'Plumosa' PLUME JUNIPER

Zone 4

These fairly low-growing plants have a branching habit similar to that of *J. communis*, with all branches arising at an angle of 90° from the base. The feathery branchlets have scale-like leaves typical of *J. chinensis* that are rounded and closely pressed together. These are attractive plants and should prove useful for home gardens where plants reaching about 1 m high are wanted.

'Plumosa Aurea' GOLDEN PLUME JUNIPER

Zone 4

A bright golden form with branches more closely set than in the plume juniper and making a much neater shrub.

'Plumosa Aureovariegata'

A dwarf form with gold-tipped adult leaves.

'Pyramidalis' SPINY GREEK JUNIPER

Zone 5

This cultivar is the spiny Greek juniper of catalogs, where it is usually given the botanical name of *J. excelsa* 'Stricta', a plant that is hardy only slightly north of Virginia. Perhaps to overcome this confusion, the name *J. chinensis* 'Stricta', found in den Ouden's *Coniferen*, is appended to it in Dutch catalogs. However, the author prefers to follow the nomenclature used by Rehder.

var. ***sargentii*** A. Henry SARGENT'S JUNIPER

Zone 2b

A beautiful prostrate evergreen with ascending branchlets rising to not more than 15–23 cm. It forms a silvery, compact mass, which is excellent for a ground cover on slopes or to tie in formal paintings. A native of northern Japan.

'Spartan'

Zone 5

An upright pyramidal juniper with deep green foliage composed of both juvenile and adult leaves.

J. communis L. COMMON JUNIPER

Zone 2b

This species is variable, mostly shrubby, and has prickly, ternate, awl-shaped leaves that taper from a swollen base to a spiny point. The leaves have a broad band of stomata on the concave upper surfaces and on the bluntly keeled lower surfaces. This species is native to North America, Europe, and Asia.

var. ***depressa*** Pursh PROSTRATE JUNIPER

Zone 2b

This geographical variety occurs in eastern North America; the plants were collected at Bells Corners near Ottawa. It forms a low shrub with narrow stems, each ascending from a procumbent base. Its leaves are shorter and somewhat broader than the type.

'Depressa Aurea' GOLDEN PROSTRATE JUNIPER

Zone 2b

A form with yellow young shoots. It is showy but is not well enough known to be readily available from nurseries.

'Hornibrookii' HORNIBROOK JUNIPER

Zone 2b

A neat, graceful, spreading form of *J. communis*, with smaller leaves and longer internodes than the type. It makes a foliage mass less than 30 cm high, spreading to several metres in diameter.

var. ***saxatilis*** Pall. MOUNTAIN JUNIPER

Zone 2b

A spreading, prostrate shrub with branches that rise to a height of 60 cm in cultivation at the Arboretum, but seldom more than 30 cm when growing wild in the mountainous regions of Europe and North America. It has much stouter, thicker, and denser branchlets and shorter leaves than the type.

'Sentinal'

Zone 2b

This newly introduced cultivar, called 'Pencil Point' by Sheridan nurseries, Oakville, Ont., is a narrow, yet compact, almost pencil-like evergreen. It withstands the Ottawa winters most years without turning brown and is a valuable addition to the collection.

J. horizontalis Moench CREEPING JUNIPER

Zone 2

Although there is no planting of this species, five of its forms are growing at the Arboretum. It is a handsome juniper, which has often been confused with *J. sabina*, its European counterpart; it differs from that species, however, by having prostrate instead of erect branches and bluish green leaves and fruits on recurved stalks. The scent of its leaves when crushed is said to be pleasantly odorous instead of, as with *J. sabina*, disagreeably odorous. *J. horizontalis* is native to North America from the coast of Maine to British Columbia, ranging south to Massachusetts, New York, Illinois, and Montana.

'Bar Harbor' BAR HARBOR JUNIPER

Zone 2

A cultivar similar to the species but which has glaucous blue foliage that does not change color in winter.

'Douglasii' WAUKEGAN JUNIPER

Zone 2

A creeping form with long branches clothed with blue-green leaves that turn purplish in the winter. This cultivar is an extremely good piant for use as a ground cover on banks and open spaces, because it grows close to the ground and the branches root when in contact with the soil. It originated many years ago at the Douglas nursery, Waukegan, Ill.

Waukegan juniper (*Juniperus horizontalis* 'Douglasii')

'Plumosa' ANDORRA JUNIPER

Zone 2

A low-growing shrub with spreading branches that form a flattened top and upright, spreading leaves that are tinged with purple in fall and winter. These sharp-pointed, scale-like, linear leaves, 2–6 mm long, appear to constitute the main difference between the Andorra juniper and the Waukegan juniper. The leaves are narrower, longer, and much wider spread out from the branchlets in the Andorra juniper. The plumose type of branchlet should immediately suggest the correct identity. The plants at the Arboretum also bear fruits regularly, although not abundantly, which is unusual because some botanists have stated that the cultivars of *J. horizontalis* bear no fruits. Again, the leaves of the plants are, for the most part, adult scale-like leaves and not awl shaped, which is also stated in some botanical textbooks. The long, narrow, linear leaves of the Andorra juniper are perhaps the best character that easily distinguishes this form from the others.

'Wapiti' WAPITI JUNIPER

Zone 2

A more vigorous clone than is usual with forms of *J. horizontalis*. 'Wapiti' is fast growing and has deep green leaves turning to brownish green in the fall. It was introduced by the Agriculture Canada Research Station at Beaverlodge, Alta., in 1959.

'Wiltonii' BLUE RUG JUNIPER

Zone 2

A prostrate cultivar that clings to the soil like a carpet, growing not more than about 10 cm high. The foliage is glaucous blue and the whole plant forms a mat with trailing branches. It has also been sold in the trade as 'Blue Rug' and 'Wilton Carpet'. Actually the name 'Wiltonii' was derived from the South Wilton nurseries, Vinal Haven, Me., where it originated.

J. rigida Siebold & Zucc. NEEDLE JUNIPER

Zone 4b

Plants of this species have formed interesting small trees 3–4.5 m high, easily distinguished by their pendulous branchlets. The specific name *rigida* applies to its rigid leaves, which persist for many years. The leaves of this species are acicular and usually in threes, sulcate above, with confluent white bands narrower than the green margin. The drooping branchlets give the trees a graceful pendulous effect, which should make them desirable for ornamental planting in specific locations. The species occurs in Japan, Korea, and northern China.

J. sabina L. SAVIN JUNIPER

Zone 2

There appear to be two distinct forms of *J. sabina* planted in the Arboretum, one with adult foliage and the other with juvenile foliage, but both with the same characteristic form. The largest of these specimens, a tree 2.5–3 m high, still has some of its juvenile foliage at the base. From these shoots, most likely, have arisen the juvenile forms planted in the collection.

The savin juniper is characterized by its low, spreading habit, upright branches, and the supposedly disagreeable odor

Savin juniper (*Juniperus sabina*)

of its crushed leaves. However, the author found the odor rather woodsy and refreshing, and could not distinguish it from the so-called aromatic or less strong odor of *J. horizontalis*, but perhaps the tests taken in November were untimely.

The fruits of *J. sabina* and *J. horizontalis* are both on scaly, recurving branchlets, in the same position as those of a few other junipers, such as the *J. virginiana* cultivars, *J. scopulorum*, and some of the *J. chinensis* forms.

J. sabina is native to the mountains of southwestern and central Europe, to the Caucasus, and western Asia to Siberia.

'Arcadia'

Zone 2

A spreading, compact type with light green leaves. It seems to be intermediate between *J. sabina* var. *tamariscifolia* and the type.

'Blue Danube'

Zone 2b

A beautiful blue green spreading juniper with a habit that resembles the Pfitzer juniper.

'Cupressifolia'

Zone 2b

A low-growing, compact bush, with spreading branches clothed with scale-like leaves. It is light glaucous green and has a habit much like var. *tamariscifolia*, but it tends to creep more along the ground and does not rise as high from its main branches. From the tamarix junipers, however, it differs mostly by having scale-like leaves.

'Hicksii'

Zone 2

Similar to 'Arcadia' but with deeper green leaves and a less prostrate habit.

var. ***tamariscifolia*** Ait. TAMARIX JUNIPER

Zone 2

This beautiful shrub has shoots that arise from the ground, then branch off horizontally, and finally become pendulous, giving a mound effect. The oldest specimen of this group in the Arboretum, despite its 75 years, is no more than 1 m high and has a spread of 1.5 m. The tamarix juniper has acicular or awl-shaped bright green leaves, which are in opposite pairs and are slightly spreading. According to some textbooks, some of the leaves may be arranged in threes on the older branches, although this is not so in all the specimens examined in the Arboretum. This plant is often listed as a cultivar.

'Von Ehren' VON EHREN JUNIPER

Zone 2

The specimen has now grown into a huge plant, 2 m high and 4.5 m wide, with large branches arising from the base at a 45° angle. The branches are covered with scale-like, dark green leaves arranged in the form of a large, long arrowhead. Some catalogs refer to 'Hicksii' as the Von Ehren juniper. These two forms, however, are given distinctive names in den Ouden and Boom's *Manual of cultivated conifers* and originated from different nurseries in different countries.

J. scopulorum Sarg. WESTERN RED CEDAR

Zone 2

The plants in the Arboretum vary in size and form. Some were collected and sent from various parts of British Columbia and others, presumably nursery specimens, were received from Dr. F. L. Skinner of Manitoba. One specimen from British Columbia is much admired by nurserymen and other visitors. It is pyramidal in outline and has extremely dense branchlets and a beautiful silvery blue coloration.

J. scopulorum differs from its close ally, *J. virginiana*, by its fruits, which are larger and ripen the 2nd year instead of the 1st season, and by its staminate flowers, which have 6 stamens instead of 10–12.

A spreading variety, var. *patens* Fassett, collected in British Columbia by Mr. J. A. Calder of the Central Experimental Farm, appears to be identical with the cultivated form of *J. virginiana* 'Grey Owl'.

Western red cedar ranges from Alberta to British Columbia, and south to western Texas, northern Arizona, and Oregon.

'Moonlight'

Zone 2

A silvery blue pyramidal form with a somewhat loose habit.

'North Star'

Zone 2

The deep green foliage and neat branchlets make this pyramidal form desirable.

'Silver Column'

Zone 2

A narrow, compact, columnar juniper with silvery awl-shaped leaves. This form has been planted in the rock garden at the Ornamental Gardens of the Central Experimental Farm since 1953 and has always created interest because of its symmetrical shape and bright color. It came from a plant growing in a valley near Smithers, B.C., selected by Dr. M. B. Davis, who was formerly the Dominion Horticulturist. It has proven to be hardier and more drought resistant than other juniper cultivars of similar habit.

'Springbank'

Zone 2

An introduction from London, Ont. It has bright bluish leaves and a fine pyramidal habit with loose feathery foliage.

J. squamata Buch.-Ham. ex Lamb. NEPAL JUNIPER

Zone 5

The specimen in the Arboretum came from Holland as *J. squamata* 'Meyen', but is a dwarf spreading bush to 45 cm high and about 1 m in diameter. The plant appears to fit the description of *J. squamata* rather than the procumbent form 'Prostrata' and for this reason the author has so named it. Actually, this species is much better than any other for planting where a good mound type of plant is required. Its beautiful glaucous green foliage and rather slow growing habit make it an admirable subject for tying in with other evergreens.

This species is easy to tell from the others by its awl-shaped, loosely appressed, ternate leaves, its green branchlets, and its one-seeded fruits. The species is found in the Himalayas, western and central China, and Formosa.

'Loderi'

Zone 5

A dense, dwarf, narrow, conical form not more than 1 m high with ascending branchlets and short, awl-shaped leaves that are blue above and green beneath. It was named after its originator, Sir Edmund Loder.

'Meyeri' MEYER JUNIPER

Zone 5

An erect, many-branched shrub with short, straight branchlets. Those planted in 1937 are becoming a little straggly now and the branches at the base are brown. A young specimen is still a handsome shrub. This cultivar was introduced from China where it may have originated in the wild.

'Prostrata' CREEPING NEPAL JUNIPER

Zone 5

A low-growing, prostrate shrub that hangs close to the ground; its branchlets are shorter than those of the type. The height of the plants growing in the Arboretum does not exceed 25 cm, whereas the specimen of *J. squamata* is 60 cm high and much less sprawling.

'Wilsonii' WILSON JUNIPER

Zone 5

An erect shrub with short, crowded branchlets recurved at the tips. This cultivar is a little more open at the top than 'Meyeri' and its leaves are shorter and broader. It comes from western China.

J. virginiana L. EASTERN RED CEDAR, RED CEDAR

Zone 3

The oldest specimen in the Arboretum, now a tree 4.5 m high, has dark green scale-like leaves. Three younger plants selected from the Kingston, Ont., area have broad, pyramidal shapes and vary in looseness of foliage. One of these specimens has deep green leaves and compact branchlets; the others vary from light green to bluish gray and are less compact. All three types are highly desirable.

J. virginiana is distinguished from other junipers chiefly by its glaucous blue, erect or nodding fruits that contain one to two seeds, its male flowers with 10–12 stamens, and its reddish brown, shredding bark. Its scale-like leaves are free at the apex and less closely appressed to the stem than those of *J. chinensis*, and, of course, more pointed at the tips of the leaves. The species ranges from Canada to Florida, and west to the Rocky Mountains.

'Blue Mountain'

Zone 3

An upright type with blue-green foliage. It looks like 'Glauca' but has a more compact pyramidal form.

'Burkii' BURK RED CEDAR

Zone 3

The two specimens have now attained a height of 3.5 m and have spreads of 2.5–3 m feet. They are not as handsome as they were during the first 10 years, when they formed neat, compact, pyramidal shrubs with steel blue foliage. Now their foliage is more greenish and their habit is much more straggly.

'Canaertii' CANAERT RED CEDAR

Zone 2b

After 15 years of growth, this tree does not have the compact pyramidal form described by some authors, but a loosely pyramidal shape. It has dark green leaves and an abundance of glaucous blue fruits, which make it extremely attractive and one of the best forms of the red cedar.

'Elegantissima' GOLDTIP RED CEDAR

Zone 3

Received from Spaeth's nursery as *J. chinensis* 'Pendula', this beautiful pyramidal form has yellow-tipped branchlets that are more particularly noted in younger plants.

'Glauca' SILVER RED CEDAR

Zone 3

An erect tree, loosely pyramidal, with glaucous silvery leaves, which are particularly attractive in summer but marred by a brownish tinge in the late fall.

'Grey Owl'

Zone 2b

A beautiful, spreading form, with long branches covered with brilliant silvery foliage and contrasting, large, glaucous blue berries. This cultivar appears to be more akin to *J. scopulorum* because of its larger berries and its resemblance to *J. scapulorum* var. *patens*, but as the author has not yet been able to determine the number of stamens in its male flowers, or whether the fruits have taken one or two years to ripen, it is not certain which species this plant belongs to. In November it has both immature and mature fruits; thus, it might be possible that this particular plant is *J. scopulorum* var. *patens*. Regardless of its correct affinity, it is a beautiful, fast-growing form.

'Grey Rock'

Zone 2b

A loose, upright form similar to 'Glauca' but differing in that it keeps its glaucous sheen through the most severe winters.

'Hetzii' HETZ JUNIPER

Zone 2b

Most textbooks place this cultivar under *J. chinensis*. Although in general appearance this cultivar resembles *J. chinensis* 'Pfitzeriana', judging from plants in the collection, which come from two sources, they cannot justifiably be placed in the *chinensis* group. The leaves, fruits, and seeds are so similar to those of 'Grey Owl' and 'Glauca' that it does not seem possible for these specimens to belong to any other group than *virginiana*. Its fruits are large and identical to those of 'Grey Owl' and contain two flattened, grooved, straw-colored seeds that are also the same as those of 'Grey Owl'. Of 50 fruits examined, one had three seeds, but this occurrence is not sufficient reason for placing it in the *J. chinensis* group. The stamens of this cultivar have not yet been examined by the author.

'Hetzii' is a beautiful, spreading, silver juniper with large, blue berries. It is more upright and perhaps a little more vigorous than 'Grey Owl'. Like 'Grey Owl', it is easy to grow from cuttings and is now used a great deal as a stock upon which to graft *J. virginiana* cultivars.

'Hillii' HILL'S DUNDEE JUNIPER

Zone 2b

A closely branched, pyramidal juniper with fine foliage. The specimens are 4.5 m high and 2 m in diameter. They have formed perfect pyramidal trees with thickly set branches and may be considered the hardiest and best of the pyramidal *J. virginiana* cultivars.

Hill's Dundee juniper (*Juniperus virginiana* 'Hillii')

'Kosteri'

Zone 2b

A dwarf yet wide-spreading juniper with broad feathery branchlets composed of adpressed convex leaves of grayish blue that later assume a purplish tint. A fine juniper for a robust ground cover, neater than 'Hetzii' and the Pfitzer juniper, but having fast-growing spreading branches.

'Reptans' CREEPING RED CEDAR

Zone 2b

A low-growing form with widely spreading, pendant branches and green leaves.

'Skyrocket'

Zone 2b

The most successful of all the thin fastigiate or narrow columnar junipers set out in the test garden. It is perfectly hardy even in the most exposed areas and gracefully beautiful with its thread-like branches and silver-green leaves.

LARIX — Pinaceae

A group of deciduous trees widely distributed in the colder regions of the northern hemisphere, commonly called larches or tamaracks. Their use in ornamental plantings has been sadly neglected, probably because of reported attacks of several pests and some fungus infestations, which have not occurred in the Ottawa area to any great extent. The good features of the larches include a neat pyramidal habit, which does not deteriorate after 20 years as in spruce, pendulous branches in many of the species and forms, and soft, open textured leaves that give a light shade in summer. The striking appearance of their budding and leafing branchlets in spring and their good colorful effect in fall can also be regarded as positive features. The larch is the only reliable coniferous plant in the area that gives an evergreen appearance in summer and

***Juniperus virginiana* 'Skyrocket'**

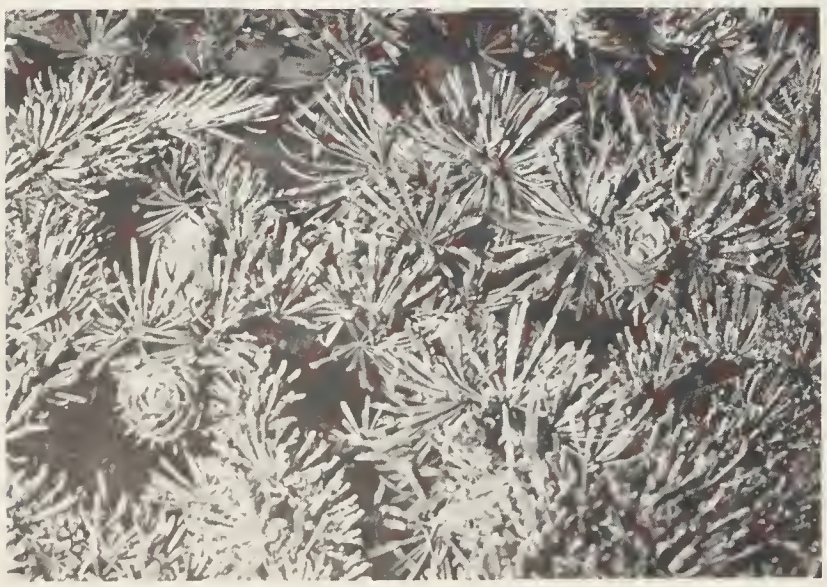
allows the light to penetrate during the winter when its leaves have fallen.

L. decidua Mill. EUROPEAN LARCH

Zone 3b

In the collection there are two large specimens reaching 18 m high, with spreads of 12–15 m. They have brown fissured bark that sheds in small plates in the base. The European larch is a handsome tree, with upward curving horizontal branches from which hang smaller branchlets; the soft green foliage that covers these small branchlets is extremely graceful and beautiful in early spring. The species might be distinguished from the others by its ovoid cones, bracts that do not exceed the scale in length, winter buds that are pointed and brown, and leaves that are 3 cm in length. It originates in northern and central Europe.

European larch (*Larix decidua*)



Cones of Kurile larch (*Larix gmelinii* var. *japonica*)

L. gmelinii (Rupr.) Rupr. ex Kuzen.

var. *japonica* (Maxim. ex Regel) Pilg. KURILE LARCH

Zone 2b

An odd larch, distinct in its habit and growth. Like the symbolic Japanese tree, its branches rise in a complete horizontal plane. The apex of the tree is cut short so that it presents a somewhat windswept effect. Its dense branch system, with spear-like branchlets, shorter leaves, and smaller cones, distinguishes it from *L. gmelinii*, the Dahurian larch, which is distinguished from the others by its glabrous young shoots, leaves that differ in length and width, and scales with striate or slightly recurved margins. The Kurile larch is a native of Sakhalin and Kurile Islands.

L. kaempferi (Lamb.) Carrière JAPANESE LARCH

Zone 2b

This beautiful larch should be planted more often in large gardens and public parks, especially in groups of four or five where its beauty, particularly in spring, is more evident. The singular beauty of its reddish inner bark, revealed by the shedding plates of older bark, is in itself an ornamental characteristic that stands it in good favor. Its glaucous shoots, wide blue-green leaves, and thick branches are its main distinguishing features, but its beautiful cones with backward-rolled bracts like carved wooden roses are also highly ornamental. Many enthusiasts of dried and dyed flower arrangements use these cones to advantage in their designs. The specimen planted in 1952 was from seeds sown in 1948. When measured in 1960, it had grown to a height of 9 m with a spread of 3.5 m and a girth of 45 cm. The species originated in Japan. It is often listed in catalogs under its old name *L. leptolepis*.

L. laricina (Du Roi) K. Koch

TAMARACK, AMERICAN LARCH

Zone 1

The tamarack, or American larch, is easily distinguished from other larches in the Arboretum by its small cones, which are from 8–16 mm and 12 mm wide, with the scales enclosing the bracts. Its triangular or three-sided leaves are 1.5–3 cm long, slender, and blunt. The more or less mature plants in the Arboretum are easily identified by shoots that proliferate from the center of the cone. Although this species is said to thrive in dry as well as wet soils, the two specimens planted in the dry location on the top of the hill are not as healthy as they would be if planted in a moister area. It ranges from Alaska and Canada, south to Minnesota, Illinois, and Pennsylvania.

L. occidentalis Nutt. WESTERN LARCH

Zone 5

In its native habitat this species must be considered the most magnificent of all larches for it attains a height of 30–60 m. In the Arboretum its main beauty is manifest in the spring when its long, soft, green leaves have just attained their full length and the exquisite, pinkish, newly formed cones provide pleasing contrast. The tree now measures 18 m high and has a trunk diameter of 30 cm. The western larch has a counterpart in *L. lyallii* Parl., which, though similar in most respects, differs by having densely felted shoots, four-sided leaves, and long-pointed cone bracts. *L. lyallii* has often been regarded as a mountain form of *L. occidentalis*, but these characteristics separate it easily from the species. Western larch grows from British Columbia to Montana and Oregon.

Western larch (*Larix occidentalis*)

L. ×***pendula*** (Soland.) Salisb. WEEPING LARCH

Zone 2b

This hybrid larch (*L. decidua* × *laricina*) does not at all belie its common name for it is the most pendulous of all species. From an ornamental viewpoint the author believes it is the choicest of species for planting in small home gardens because of its thick pendulous habit and conical outline. The largest of these two specimens is now 15 m high with a spread of 9 m; it stands out from the others because of its perfect symmetrical shape and its glaucous, pale green leaves. This hybrid seems to be intermediate between its two parents with variable cones that are all smaller than those of both parents and leaves like *L. decidua* but blunter.

L. sibirica Ledeb. SIBERIAN LARCH

Zone 2

The Siberian larch is closely related to the common or European larch (*L. decidua*); in fact, it was considered for years by botanists to be a geographical variety of it. The leaves and young shoots are similar to that species, but the cones are ovoid and have fewer scales, which are four sided and slightly incurved. The trees in the collection at the Arboretum are 12–15 m high, with spreads of 9 m. The species is native to northeastern USSR and western Siberia.

Cones of weeping larch (*Larix* ×*pendula*)

METASEQUOIA Taxodiaceae

M. glyptostroboides H. H. Hu & Cheng DAWN REDWOOD

Zone 7

The dawn redwood tree, originally discovered in 1945 by Mr. T. Wang, was introduced into cultivation by Dr. Wan-Chun Cheng of the National Central University of Nanking, China, and his assistant Mr. C. J. Hsueh who led an expedition into Wan-Hsien, Szechuan, in 1947. This expedition was financed by the Arnold Arboretum, Mass., and resulted from a previous expedition in 1946 when half the specimens had been sent to Dr. Merrill of that institution. From this 1947 expedition seeds were distributed by the Arnold Arboretum to botanic gardens all over the world.

Cone and young shoots of Siberian larch (*Larix sibirica*)

This historic and unique tree was originally introduced into the Dominion Arboretum from the Montreal Botanic Gardens, which sent plants in 1954 that were grown from the Arnold Arboretum seeds. From these plants, 25 cuttings were taken in August of 1954 from the new wood made that year and inserted in sand in the greenhouse. All cuttings rooted and were subsequently planted in various places in the Arboretum and in the nursery. From this planting all but the two specimens succumbed during the winter of 1958.

The two surviving specimens have grown well, but they are not regarded as reliably hardy. The rapid growth they make in summer is always killed back in the following winter. The habit of this tree and the frost resistance it has would suggest that it would be useful as an ornamental plant in the Hamilton or Niagara areas where it would be hardy. A further plant received from Beaconhill Park, Victoria, B.C., and planted near Maple Drive has not been as badly affected by winterkill. Possibly because of the shelter given by large trees close by, this plant has reached a height of 2.5 m, whereas those in a more exposed location in the Arboretum are killed back to the snow line each winter.

The tree resembles the swamp cypress (*Taxodium distichum*) more than any other tree, which is rather surprising because its Chinese common name, shui-sa, translates almost to swamp spruce or swamp fir. Its cones are not unlike those of the larch or hemlock and its leaves are similar to those of the swamp cypress. Its leafless branches also appear similar to the larch. The whole plant is, however, more like the subtropical genus *Glyptostrobus*, as the specific name suggests.

'National'

Zone 6

A selection made by the U.S. National Arboretum and planted in Ottawa in 1964. It would seem to be hardier than the species because, although it is only a few metres from one of the Arboretum plants, it is already twice the height. It is unlikely that it will ever form a narrow pyramidal tree because most of the new growth is killed each year, but in a more sheltered location it could possibly grow well.

PICEA — Pinaceae

The spruces are evergreen, usually pyramidal trees found in the northern hemisphere. The leaves are needle shaped, mostly four sided, and arranged spirally on the shoots; the undersides of the leaves are usually twisted and appear to arise from the upper side of the twig. Pendulous cones and peg-like protuberances that bear the leaves easily distinguish a spruce from a fir (*Abies*). In Canada the spruce is used extensively for lumber.

P. abies (L.) Karst. — NORWAY SPRUCE

Zone 2b

The Norway spruce is a hardy tree in the Ottawa area and grows more rapidly than the native species (*P. glauca*), from which it may be distinguished by its reddish brown branchlets, prominent petioles, longer (10–12.5 cm) cones, and glabrous but not glaucous young shoots. Its habit appears considerably more drooping than *P. glauca* and the individual leaves, which end in a blunt horny point, have two or three lines of stomata on each side. The Norway spruce is found in northern and central Europe.

'Aurea' — GOLDEN NORWAY SPRUCE

Zone 2b

A cultivar with shiny, yellowish white leaves that are golden in early spring.

'Barryi' — BARRY NORWAY SPRUCE

Zone 2b

Conical bush type, with thick branches and widely spaced branchlets.

'Cinncinnata'

Zone 2b

A cultivar with drooping branchlets and long, broad leaves that curve upward and are spirally twisted.

'Clanbrasiliana'

Zone 2b

Compact, roundish, flat-topped bush, about 2 m high, with short, crowded, thin, white branchlets bearing lustrous, light green leaves.

'Compacta' — GLOBE NORWAY SPRUCE

Zone 2b

A roundish, dense form, with slender branchlets and acute leaves.

'Cupressina' — CYPRESS NORWAY SPRUCE

Zone 2b

A large tree with upright, dense branches, forming a thick, broad column.

'Gregoryana' — GREGORY'S DWARF SPRUCE

Zone 2b

A dwarf, conical form, not more than 0.5 m high, with short, crowded branches and crowded, thin, whitish branchlets, which are pubescent in the grooves.

'Highlandia'

Zone 2b

A low, dome-like form, with branches that ascend at the ends and bear lustrous, dark green leaves.

'Inversa' — DROOPING NORWAY SPRUCE

Zone 2b

A pendulous form, with densely divided branches closely pressed to the stem. The leaves are thick and lustrous. One specimen is 2.5 m high, and its flat head and pendulous branchlets make it resemble the Camperdown elm (*Ulmus ×vegeta* 'Camperdownii').

'Maxwellii' — MAXWELL'S SPRUCE

Zone 2b

A low, dense, flat form, with bright green, radially arranged, rigid leaves. The branches of this form often bear clustered branchlets.

'Merkii'

Zone 2b

A low, rounded bush, with yellowish white branchlets and thin, grass-green leaves.

PICEA

Drooping Norway spruce (*Picea abies* 'Inversa')

'Monstrosa' SNAKE BRANCH SPRUCE

Zone 2b

One of the old specimens appears to have reverted almost to type; the other is a tall columnar tree, with a few branches and rigid, dark green leaves.

'Nidiformis' NEST SPRUCE

Zone 2b

A dense, branched form, with a top like an inverted cone or bird's nest.

'Ohlendorffii' OHLENDORFF SPRUCE

Zone 2b

There are two plants in the rock garden that have grown into large, shapely specimens; one is nearly mound shaped and measures 2 × 2.5 m, whereas the other specimen forms a conical pyramid measuring 2.5 × 2 m. They are both the same cultivar even though the outline is different.

'Pendula' WEEPING NORWAY SPRUCE

Zone 2b

A cultivar with pendulous branches and branchlets.

'Procumbens' PROSTRATE NORWAY SPRUCE

Zone 2b

A prostrate form, with horizontal branches, short, bright yellow branchlets, and light green, pointed leaves.

'Pumila'

Zone 2b

A dwarf, dense form, with red brown, thick, stiff branchlets. The leaves are dark lustrous green to bluish green, thin, short, and tapering to a blunt point.

'Pyramidata' PYRAMIDAL NORWAY SPRUCE

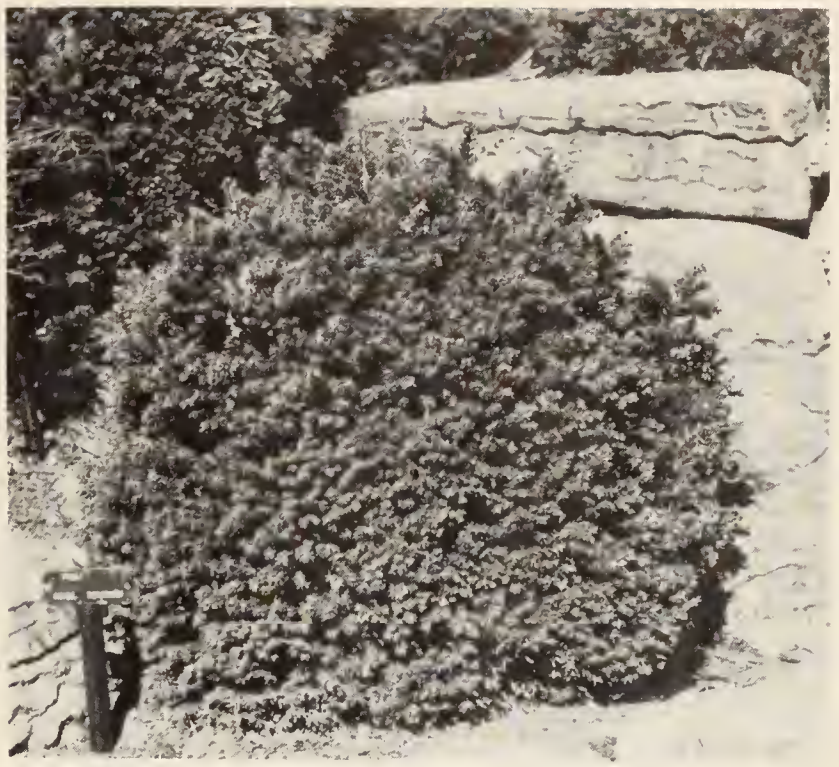
Zone 2b

With branches ascending at a sharp angle to the trunk; almost fastigiate.

'Remontii' REMONT NORWAY SPRUCE

Zone 2b

A broad, pyramidal or ovoid tree, with sharp, dense, yellowish branchlets and radially spreading, bright green leaves.



Remont Norway spruce (*Picea abies* 'Remontii')

'Repens' CREEPING NORWAY SPRUCE

Zone 2b

A dwarf, wide-spreading tree, with almost prostrate branches and crowded leaves.

'Tabuliformis' TRAILING NORWAY SPRUCE

Zone 2b

A prostrate plant, with slender, horizontal branches and thin, yellow branchlets spaced wide apart. The yellow-green, thin leaves point upward and forward.

P. asperata M. T. Mast. DRAGON SPRUCE

Zone 5

A small tree to 15 m, resembling the Norway spruce but much more glaucous blue, with winter buds that are resinous and yellowish to brown branchlets. Its stiff needles remain on the tree for several years, giving the tree a dense habit. Native to western China.

P. engelmannii Parry ex Engelm.

'Glauca' BLUE ENGELMANN SPRUCE

Zone 3

A more glaucous form of the Engelmann spruce. The true Engelmann spruce is not in the Arboretum, probably because the more glaucous form was favored at the time of introduction. This species resembles *P. glauca* in the peculiar odor of its foliage, but the latter species has glabrous, sharper, and more rigid leaves. Engelmann spruce is similar to *P. pungens*, but the leaves on that species are more prickly and have shoots without down.

P. glauca (Moench) Voss WHITE SPRUCE

Zone 1

A large tree in its native habitat but growing slowly in cultivation. The specimens are 4.5–6 m high and up to 2.5 m in diameter. The tree is usually easily recognized by its foliage, which is bluish and has a disagreeable smell when bruised. It is distinguished from *P. mariana* and *P. rubens*, which resemble

Fruits of white spruce (*Picea glauca*)

it closely, by its hairless shoots and larger cones. It is a very hardy spruce and ornamental when young. Its dense habit makes it popular for use as a Christmas tree. It ranges from Labrador to Alaska, and south to Montana, Minnesota, and New York.

var. ***albertiana*** (S. Br.) Sarg. ALBERTA SPRUCE

Zone 1

A geographical variety of the white spruce, with a narrower pyramidal habit and shorter, broader, dark-colored cones with stiffer scales. The undersides of the leaves and stems are much greener than those of the white spruce; its branchlets have more prominent leaf stalks and its buds have entire, deeper brown scales, which are slightly resinous. In its native habitat it is said to be a tree of much more vigorous growth than the species, growing to 4.5 m high in western North America, particularly in Alaska, British Columbia, and Montana. It was introduced to Europe by Mr. H. J. Elwes, who obtained seeds from Ottawa in 1906 and distributed small plants to various growers in Britain. These seeds were probably from Arboretum trees that had been obtained from Banff in 1900.

'Conica' DWARF ALBERTA SPRUCE

Zone 1

A perfect pygmy conical form, originally found by Mr. J. Jack in Alberta in 1904. It was found among seedlings of *P. glauca* var. *albertiana* that he sent to the Arnold Arboretum, Jamaica Plains, Mass. The plant, now 27 years old, has grown to a height of 2 m and a diameter of 1 m. It is necessary to protect it from the winter's sun by placing a screen of burlap around the whole plant. The screen is kept at least 30 cm away from the nearest twig.

'Caerulea'

Zone 1

This cultivar is of dense habit and much more glaucous than the type.

'Densata' BLACK HILLS SPRUCE

Zone 1b

A slow-growing, compact tree, with bright green to bluish green leaves. The cones are like those of the species, 4–5 cm long and covered with scales. It originated in South Dakota.

P. jezoensis (Siebold & Zucc.) Carrière YEDDO SPRUCE

Zone 4

The two trees are now 2 and 1.5 m in diameter, with pale shoots and dark green leaves. The leaves are flattened and overlapping on the upper parts of the shoots, and the lower ones are spreading horizontally. They are 1.5–2.5 cm long, short pointed, and without stomata above; the lower surfaces

Dwarf Alberta spruce (*Picea glauca* 'Conica')

Black hills spruce (*Picea glauca* 'Densata')

are blue-white and almost covered with stomata lines. The cones are cylindrical, 5–7.5 cm long, and crimson when young. The species originated from Manchuria, Sakhalin, and northern Japan.

var. ***hondoensis*** (Mayr) Rehd. HONDO SPRUCE

Zone 4

A geographical variety from central Japan, with light reddish brown branchlets and swollen leaf cushions. The leaves are shorter, more curved, obtuse, and dull green on the upper surfaces.

P. koyamai Shiras. KOYAMA'S SPRUCE

Zone 5

A small, narrow, pyramidal tree, with grayish bark. It is distinguished from other Japanese species by its resinous, conical buds and glandular, hairy shoots. The leaves of this species are broader than long and have about twice as many stomata on the upper surfaces than on the lower ones. The leading shoots are glabrous and the lateral branchlets are pubescent. Native to Japan.

P. mariana (Mill.) BSP BLACK SPRUCE

Zone 2b

A native species, with slender pendulous branchlets and a narrow, somewhat irregular head. The bark, branchlets, and buds are similar to those of *P. rubens*, but *P. mariana* has blue-green foliage and persistent cones that are purple when young rather than green as in *P. rubens*. Black spruce grows from Labrador to Alaska and south to Wisconsin and Michigan and in the mountains to Virginia.

'Doumetii' DOUMET BLACK SPRUCE

Zone 2b

A dense, conical form, with crowded, thin, sharp-pointed leaves and ascending branches.

P. omorika (Panč.) Purk. SERBIAN SPRUCE

Zone 3b

A beautiful spruce, with a long, slender trunk and a spire-like crown. It grows to 30 m in its native habitat with a trunk of 1 m or less in girth. When the tree was removed in 1956, it was 15 m high, less than 2 m across at its widest part, and had a trunk diameter of 30 cm. The Serbian spruce has flattened leaves, with white bands above and either a broken row of stomata or none at all below. Serbian spruce is native to southeastern Europe.

'Nana'

Zone 2b

A dwarf form growing to a height of only 1–1.5 m, with such a spread that it can be made globe-shaped by judicious pruning. It is much slower growing than the type and an excellent subject for formal planting in small home gardens.

P. pungens Engelm. COLORADO SPRUCE

Zone 2

This species and its varieties are probably better known in cities than native species such as the white spruce. It has long been a favorite tree for planting on lawns in small home gardens. It is easily distinguished from other spruces by its spreading prickly leaves, glabrous shoots, and reflexed bud scales. The leaves are usually pricklier and more rigid than those of *P. engelmannii*, a species similar in general appearance. *P. engelmannii* also has branches that are pubescent, whereas those of the species are glabrous. Colorado spruce ranges from Colorado to New Mexico, Utah, and Wyoming.

'Argentea'

Zone 2

A tall, narrow tree, with silvery white leaves. The specimens are 15 m high and have spreads of 2.5 m.

'Endtz'

Zone 2

A cultivar similar in habit to 'Koster' but with silver-blue foliage and a slower rate of growth.

'Globosa'

Zone 2

A fine, silvery, dwarf, slow-growing spruce with flattish growth and vigorous leaders; therefore, it grows into a more or less broad, globe-shaped shrub.

'Koster' KOSTER BLUE SPRUCE

Zone 2

The oldest specimen was planted in 1898 as *P. pungens kosteri glauca* and was obtained from Spaeth's nursery in Germany. The Koster blue spruce is distinguished from other varieties by its bluish foliage and pendulous branches.

P. rubens Sarg. RED SPRUCE

Zone 4b

The red spruce does not possess the ornamental merits or adaptability of the other species and is therefore seldom found in cultivation. It requires a cool, moist soil and atmosphere and is useful for cultivation in swampy areas. It is distinguished from all other spruces by its crowded, incurved, green leaves, fissured red-brown bark, curious subulate bud scales, and

Koster blue spruce (*Picea pungens* 'Koster')

hairy shoots. It ranges from Nova Scotia to the high peaks of North Carolina.

P. sitchensis (Bong.) Carrière — SITKA SPRUCE

Zone 5

The Sitka spruce proved hardy in the Ottawa area for more than 40 years and then succumbed to the dry atmosphere. Although it grew, it never appeared to be in good health. In cooler, moister climates it presents a beautiful picture with its bluish green prickly leaves and spire-like habit. It grows from Alaska to California.

PINUS — Pinaceae

Most of the pines in the Arboretum collection are contained within the circular area formed by the driveway leading to the two lookouts. The pines, like the spruces and firs, have not been happy in the atmosphere and soil surrounding them in the Ottawa area. They seem to prefer their own ecological areas where the soil has been built up over the centuries to provide the necessary growth requirements. It is possible that these plants do not reach their potential growth in the Ottawa area because of a lack of mycorrhizal activity. The plants in the collection are growing as well as they usually do out of their native habitat, and many are growing into shapely, well-formed trees.

The genus is very large and of great economic importance. In Canada, the white pine (*P. strobus*) is still the most important tree used for lumber.

P. armandii Franch. — ARMAND PINE

Zone 6

In the Arboretum only one survivor remains of eight specimens received from the Ontario Forest Station at Maple, Ont. This tree appears to be in excellent health and perhaps receives a little more protection from the surrounding trees than the others did that were planted at the same time. It is 4.5 m high, with a spread of 3 m, and rather loose and straggly, but it has the light airy appearance of the white pine. In each of the past 3 years it has borne one cone, which has thick, broad, triangular scales 2.5 cm long. The leaves of this specimen are not noticeably bent at the base but its 10–15 cm leaves with stomata on the two upper surfaces, as well as its rapidly falling leaf sheaths and cones with wingless seeds, leave no doubt as to its identity. It is native to central and western China, Formosa, and Korea.

P. banksiana Lamb. — JACK PINE

Zone 1

The native jack pine is common in Eastern Canada. It cannot be considered useful as an ornamental tree for its habit is extremely untidy. It is easily recognized by its persistent cones, which are curved at the apex into a beak-like form. It grows from Hudson Bay to northern New York and Maine, and west to the Mackenzie River and Minnesota.

P. cembra L. — SWISS STONE PINE

Zone 2

A highly desirable ornamental pine, growing at the Arboretum to a height of 15 m, having a spread of 3–4.5 m, and forming a tree of compact habit. Its leaves are in clusters of five, 7.5–10 cm long, and have faint lines of stomata. It is easy to distinguish from nearly all other five-needled pines by its thick habit and the orange-brown pubescence on its young shoots. *P. koraiensis* Siebold & Zucc. is similar but the cones and seeds are different, and the serration of the leaf in the Korean pine is carried right to the tip. It is found in the alps of central Europe, northeastern Russia, and northern Asia.

Swiss stone pine (*Pinus cembra*)

var. ***sibirica*** Loud.

Zone 2

The Sibirian form of the Swiss stone pine. It has vigorous growth, a narrow habit, and somewhat shorter needles than the species.

'Stricta'

Zone 2

A slender form that gradually tapers from a 2 m spread to a point at a height of 12 m. It has light green foliage and a dense habit, and it is one of the most beautiful columnar trees.

P. contorta Dougl. ex Loud.

var. ***latifolia*** Engelm. ex S. Wats. — LODGEPOLE PINE

Zone 1

The beach pine (*P. contorta*), which is found from Alaska to California, does not appear to be hardy in the Ottawa area. However, this geographical variety has survived for at least 70 years.

The lodgepole pine is distinguished from the species by its more vigorous habit, larger cones, and broader leaves. Both the species and its variety are distinguished from other pines by their twisted branches, short-twisted leaves, and long buds encrusted with resin. They grow naturally in the Rocky Mountains.

P. densiflora Siebold & Zucc.

'Umbraculifera' JAPANESE UMBRELLA PINE

Zone 5

A low form with spreading branches forming an umbrella-like head. It has glaucous, silvery blue leaves in pairs, and long, slender, cylindrical winter buds with scales free at the tips. This plant makes an excellent specimen to use in place of the mugho pine (*P. mugo* var. *mugo*) and gives a thicker, more compact growth. Native to Japan.

P. jeffreyi Grev. & Balf. JEFFREY'S PINE

Zone 5

In size and appearance this species is similar to the western yellow pine (*P. ponderosa*), but its bark is not as dark brown, its young shoots are glaucous rather than yellowish brown, and it has nonresinous buds. In addition, its leaves are in threes, whereas those of *P. ponderosa,* although usually in threes, may be in twos or fives. In general, however, its pale bluish green, rather than dark green leaves, distinguish this species immediately.

P. mugo Turra MOUNTAIN PINE

Zone 2b

The old specimens have formed large, shrub-like, rounded plants, 4.5 m high, with spreads of 6 m and many trunks. All the specimens are most likely overgrown and outgrown specimens of the mugho pine (*P. mugo* var. *mugo*). The leaves of the mugho pine and its forms and varieties differ from those of other species by being in pairs, which persist for 5 or more years; the leaves are 2.5–7.5 cm long, curved, twisted, stiff, dark green, and pointed. Its cones, 2.5–6 cm long, have blunt-ending scales. All the varieties differ by having longer leaf sheaths. *P. mugo* is native to southern and central Europe.

P. nigra Arnold AUSTRIAN PINE

Zone 4

This species and its geographical subspecies, *P. nigra* subsp. *nigra* (*austriaca*) are identical.

Mountain pine (*Pinus mugo*)

Austrian pine (*Pinus nigra*)

The Austrian pines in the Arboretum have reached heights of 15 m and have formed somewhat narrow pyramidal trees with dense branching systems. The young shoots are without down, yellowish brown, and ridged. The stiff leaves are in pairs, 10–15 cm long, with minutely toothed margins. In October the winter buds are easy to distinguish by their woolly white appearance. The species is found in central and southern Europe, and Asia Minor.

var. ***caramanica*** (Loud.) Rehd. CRIMEAN PINE

Zone 4

This variety has rigid, broad, twisted leaves, with few resin canals and stomata in 12–14 lines. Native to the Crimea and Asia Minor.

P. parviflora Siebold & Zucc. JAPANESE WHITE PINE

Zone 5b

A distinctive tree that has grown to a height of more than 9 m in 60 years since it was sent from Japan by Dr. F. Rock. The small grass-like contorted leaves are in fives, with silvery lines of stomata on the inner surfaces giving them a bicolored appearance. The cones are egg shaped, nearly sessile, and spreading outward horizontally; they persist on the tree for several years. The species originated in Japan.

P. peuce Griseb. MACEDONIAN PINE

Zone 4

A decorative pine, narrowly pyramidal in outline. On young trees the bark is smooth, whereas on older trees the bark is fissured into thin flaky scales that reveal a red-brown color. Its leaves are in fives, erect on the branches, 7.5–10 cm long, with finely toothed margins. The cones are 10–12.5 cm long and 4–5 cm wide, usually three to four cones in a cluster.

The Macedonian pine differs from other species by having glabrous young shoots, ovoid winter buds, and convex cone scales. It forms a tree that looks like *P. cembra* or *P. koraiensis* in density and habit but differs by the preceding characteristics.

The trees produce an abundance of pollen each year and it is suspected that most of the *P. strobus* seeds sent out from the seed exchange in the past have been hybrids between the

PINUS

Macedonian and the white pine. Found growing in the Balkan Mountains.

P. ponderosa Dougl. ex P. Laws. & C. Laws.
PONDEROSA PINE

Zone 2b

A windbreak composed mostly of a mixture of *Picea glauca*, *Pinus resinosa*, *P. sylvestris* var. *rigensis*, and one specimen labeled *P. ponderosa* at one time skirted the whole north side of the Central Experimental Farm. As highways and new developments proceeded, the windbreak plants were taken out one by one until only the small area at the north end of the Arboretum remains. This stand is composed of trees that are obviously *P. jeffreyi* but which have been labeled *P. ponderosa* for years.

The main differences between these two species are discussed under *P. jeffreyi*. The two trees identified as *P. ponderosa* are not as vigorous as *P. jeffreyi* and because their leaves are not as glaucous or as long, they are perhaps not so striking. It ranges from British Columbia to Mexico, and east to South Dakota and Texas.

P. resinosa Ait. RED PINE

Zone 2b

The red pine is one of the fastest growing pines in the Ottawa area, growing as much as 7.5 m in 12 years from seeds. It closely resembles the Austrian pine (*P. nigra*) and the Scots pine (*P. sylvestris*). It is readily distinguished from the Austrian pine by its long basal sheaths, twice as long as those of *P. nigra*, and its brittle, dark green leaves that snap when bent. The Austrian pine has longer (9–16 cm), thicker, and stiffer leaves, whereas the red pine needles are seldom longer than 6 cm. The Scots pine is distinguished from both by its reddish bark, dull yellow branchlets and rigid, usually twisted, light green leaves, 3–6 cm long. The habit of cones falling in an imperfect condition is another character that distinguishes red pine from other species akin to it. It grows from Nova Scotia to Manitoba, and south to Pennsylvania, Michigan, and Minnesota.

P. rigida Mill. PITCH PINE

Zone 5

The two trees as they stand in the Arboretum are picturesque specimens, with their broad pyramidal outlines and interesting curving trunks.

The species can be distinguished from other three-needle pines by its persistent cones, which are beautifully symmetrical, with each scale ending in a recurved prickle. The leaves are stiff and about 7.5–10 cm long. Winter buds are cylindrical and sit in a rosette of recurving scales. The species is native from New Brunswick to Georgia, and west to Ontario and Kentucky. Its Ontario habitat is close to Ottawa in the Thousand Islands of the St. Lawrence River and northward.

P. strobus L. EASTERN WHITE PINE, WHITE PINE

Zone 2b

This species was introduced into England in 1705 and therefore has often been considered a native English tree and has been given the common name Weymouth pine.

It is a beautiful tree with soft glaucous needles borne in clusters of five. In summer, mature specimens present an attractive picture with their long blue-green cones.

Botanically it can be distinguished by its young shoots, which have a tuft of down extending downward from each leaf

Cone of eastern white pine (*Pinus strobus*)

cluster. Its winter buds are ovoid, with closely flattened scales. The nearest relatives to the species are *P. peuce*, which differs by having convex cone scales and ascending branches, and *P. monticola*, which has pubescent branchlets, stiff leaves, and longer cones. Its range is from Newfoundland to Manitoba, and south to Georgia, Illinois, and Iowa.

P. sylvestris L. SCOTS PINE

Zone 2

A tree easily identified by its reddish smooth trunks, especially at 2 m or more from the ground. Its twisted leaves are in pairs, grayish blue, very stiff, and not more than 7.5–10 cm long. This species is about the easiest pine to identify. Some of the oldest trees are now 12–15 m high, with spreads of 6–9 m. It is native from Europe to Siberia.

'Argentea'

Zone 2

The leaves of this cultivar are light bluish green or silvery.

Cones and flowers of Scots pine (*Pinus sylvestris*)

'Beuvronensis'

Zone 2

A dwarf, low-growing bush with the branchlets at right angles to the branch. The slow growth of the cultivar makes it more amenable for use in rock gardens than anywhere else.

'Fastigiata'

Zone 2

A cultivar with a columnar habit and ascending branches, similar to a Lombardy poplar.

'Nana'

Zone 2

A dwarf bushy form with straight rather than curving leaves that grow 5 cm long. The whole plant never grows more than 1 m high and is slow growing.

var. ***rigensis*** Loud. RIGA PINE

Zone 2

A variety with red bark and strong, tall stems. The leaves of this form do not turn yellow in winter, thus it is valuable as a Christmas tree. It is said to be found in Lithuania and other Baltic countries.

'Variegata'

Zone 2

A cultivar with some creamy white needles.

Pinus sylvestris **'Fastigiata'**

'Watereri'

Zone 2

A low, dense form with silvery blue foliage.

P. tabuliformis Carrière CHINESE PINE

Zone 6

This pine has withstood the Ottawa winters well but is sheltered by other pines nearby, a factor that may account for its survival. It is mainly distinguished by its young branchlets, which are covered with a light bloom, by its leaves in clusters of two or three on the same tree, and by its oblong, resinous winter buds. Its hardiness in Ottawa may be traced to its occurrence in northern China and Korea, as well as its more widespread distribution in western China.

P. thunbergii Parl. JAPANESE BLACK PINE

Zone 5

A picturesque tree with uneven horizontal branches, distinguished from other two-needle pines by its broad, gray-white buds, rigid leaves, and long filaments adhering to its leaf sheaths. This is said to be especially useful for planting in shelterbelts near the sea. The species described here was introduced into the Arboretum by Dr. J. Rock as *Pinus* sp. It originated from Japan.

P. uncinata Mill. ex Mirb.

Zone 3b

This large tree has asymmetrical, oblique cones directed downward. The scales are bent downward at their blunt apex. Found from the eastern Pyrenees to the Alps.

var. ***rotundata*** (Link) Ant.

Zone 1

The cones in this geographical variety are oblique and asymmetrical, conic or ovoid, either spreading or bent downward, with the lower scales ending in a blunt and reflexed apophysis (swollen part of the cone scales). This variety occurs at the eastern end of the species range.

PLATYCLADUS **Cupressaceae**

P. orientalis (L.) Franco CHINESE ARBORVITAE

Zone 6

Usually known as *Thuja orientalis*, the Chinese arborvitae is a much more refined and graceful plant than its western counterpart, but it is not reliably hardy in the Ottawa area. Plants will survive for a few years and eventually succumb to winter freezing. Fruiting specimens are easily distinguished from the western arborvitae by the hooked hump at the end of the cone scale. In addition, the branchlets of the Chinese arborvitae are more ascending, giving the leaves the appearance of being at right angles to the trunk with their edges all facing the outside. It originates in northern and western China and Korea.

PSEUDOLARIX **Pinaceae**

P. kaempferi (Ldl.) Gord. GOLDEN LARCH

Zone 6b

The golden larch is so nearly hardy that it is placed in the Arboretum in the hope that some day a specimen will survive.

It has been tried there many times since 1887, but its longest period of survival has been 6 years. The tree apparently does not grow well in limestone soils, a factor that may contribute to its demise in the Ottawa area. The golden larch, with its broad pyramidal habit and light feathery foliage that turns to a brilliant gold in the fall, is worthy of extra care and effort to help its survival. Its leaves are larger and longer than those of the true larch; in addition, it differs by having its staminate flowers clustered instead of solitary and its cone scales deciduous instead of persisting. Native to eastern China.

PSEUDOTSUGA — Pinaceae

Although there are five species of this genus found in America and Asia, only two are hardy in more temperate zones and only one geographical variety has proved hardy in Ottawa. This peculiar genus of the Coniferae is more closely allied to *Abies* than to the other genera. It differs by having pendulous instead of erect cones, with persistent instead of deciduous scales. The peculiar three-lobed bracts arising from the scales of the cones provide an easy means of identification of more mature specimens. The long, sharp-pointed leaves and buds are similar to those of the beech (*Fagus*) and distinguish the species as a Douglas fir.

P. menziesii (Mirb.) Franco — DOUGLAS FIR

Zone 7b

The Douglas fir is not hardy in the Ottawa area, but some forms are perfectly hardy, fast-growing, beautiful trees.

var. ***glauca*** (Beissn.) Franco — ROCKY MOUNTAIN FIR, BLUE DOUGLAS FIR

Zone 3

The Rocky Mountain or blue Douglas fir is distinguished by its shorter and more bluish green leaves and cone bracts, which in the latest stage of growth are reflexed particularly toward the apex of the cone. The branches of this geographical variety are more erect than those of the species. It is found growing in the Rocky Mountains.

'Glauca Pendula'

Zone 3

A cultivar with more pendulous branches than the species and with glaucous blue leaves.

TAXODIUM — Taxodiaceae

A genus comprising three species native to eastern North America and Mexico. Although its name suggests an affinity to *Taxus* (yew), it is completely different, being more closely allied to *Sequoia* and *Sciadopitys*. Unlike the yews, the seeds of which are half imbedded in a fleshy pulp, the seeds of *Taxodium* are enclosed in a dry cone and the leaves of the hardy species are deciduous, like those of the larch (*Larix*).

T. distichum (L.) L. Rich — BALD CYPRESS, SWAMP CYPRESS

Zone 5b

The bald cypress is usually associated with swampy areas of the southeastern United States, where it produces from the base of its trunk cylindrical or oval woody protuberances called "cypress knees." It is surprising that this tree survives as far north as Ottawa and on dry land. However, the tree does

Bald cypress, or swamp cypress (*Taxodium distichum*)

grow well in dry areas, provided the soil is fairly rich. The two trees in the Arboretum are not more than 4.5–6 m high, but are picturesque and would be admirably suited for the home grounds or to provide narrow formal avenues. Their exquisite feathery foliage, which turns golden in the fall before it drops to the ground, is ornamental.

Its botanical characters vary considerably; the leaf shape is similar to that of *Taxus*, but it has seeds in dry cones much like those of *Chamaecyparis* instead of seeds covered by a fleshy pericarp. Its leaves are spirally arranged on the branchlets and, as mentioned earlier, are deciduous. The lateral branchlets, too, are deciduous in this genus of plants, a peculiarity that sets it apart from *Sequoia, Metasequoia,* and *Sequoidendron,* which are closely related genera. Bald cypress grows from Delaware to Florida, and west to southern Illinois, Missouri, Arkansas, Louisiana, and Texas.

TAXUS — Taxaceae

Because of their lustrous, deep green foliage and their ability to withstand shade, the yews are perhaps the most widely used plants for home landscaping in the northern hemisphere. Although only eight species are known, there are literally hundreds of cultivars in varied forms obtainable from nurseries today. This number makes their identification extremely difficult and sometimes impossible when one has only the habit as a means of determination. So much variation occurs when some of these cultivars are grown outside the nurseries where they were originally selected that their identity is lost. Distinguishing characters of the various species of *Taxus* are vague and difficult to assess from herbarium specimens, a factor that is important in a climate such as that of Ottawa, where most species are not hardy and yet where cultivars of some of these same species will survive the Ottawa winters.

T. baccata L. — ENGLISH YEW

Zone 7

The English yew is not hardy in the Ottawa area, but two of its cultivars will grow there. There seems little doubt that *T.*

baccata 'Variegata', which has been growing in the Arboretum since 1896, has now been correctly identified.

'Repandens'

Zone 5

This cultivar has been growing in the Ornamental Gardens since 1937 and may be incorrectly named. It has leaves similar to those of the species, which have light green undersides and gradually narrow to a point, but its winter bud scales are acute and keeled, a character that removes it from *T. baccata* and places it into the *T. cuspidata* group.

The specimen of *T. baccata* 'Repandens' has softer, narrower, darker green leaves than those of *T. cuspidata* 'Nana', a cultivar which it closely resembles. The leaves, too, are light green instead of yellow underneath and where the midrib is most prominent, they are spirally arranged throughout and not in trough formation. Because there is no other *T. baccata* 'Repandens' in the Arboretum for comparison, further study will be necessary to determine the exact identity of this cultivar, but it is more compact and has a better color than the common dwarf Japanese yew. It is well worth growing.

'Variegata' VARIEGATED ENGLISH YEW

Zone 5

A form with variegated leaves, almost white when grown in full sunshine but variegated white and dark green at the tips when grown in the shade. The leaves on the top branchlets of this form are arranged in a V-shaped trough similar to the leaves of *T. cuspidata*, but the lower branches produce the inverted, flattened effect. This plant was received from Spaeth in Germany as *T. baccata* 'Albovariegata'. Its fruits, although not angled, bear a greater resemblance to those of *T. baccata* rather than to those of *T. cuspidata*. This original specimen is now 3.5 m high and has a spread of 7 m.

T. canadensis Marsh. CANADA YEW

Zone 2b

One large specimen, planted partly in the shade of a threadleaf false cypress (*Chamaecyparis pisifera* 'Filifera'), has grown into a spreading shrub 2 m wide and 1 m tall. In the fall, it is distinguishable from the others by its brownish leaves, but its smaller two-ranked, yellowish green leaves distinguish it at any time upon close examination. As an ornamental, this yew has no preference over the others unless one considers its reddish brown coloring in winter which gives it more seasonable appeal. It grows from Newfoundland to Virginia, Iowa, and Manitoba.

T. cuspidata Siebold & Zucc. JAPANESE YEW

Zone 4

The typical Japanese yew grows from 4.5–6 m high and has numerous branches arising from the ground. The specimens in the Arboretum are 5.5 m high and 7.5 m broad, with loose branches.

The main difference between *T. baccata* and *T. cuspidata*, as described by most authorities, lies in the winter bud scales, which in *T. baccata* are obtuse and not keeled and in *T. cuspidata* are acute and keeled. The leaves of the Japanese yew and its varieties are much thicker and stouter than those of the English yew, and they have a definite tawny yellow appearance on the undersides. The best way of quickly distinguishing the Japanese yew from the others is by the V-shaped arrangement of the leaves, which is noticeable on the species and its forms. The seeds of this species are compressed slightly and are partly covered by the aril. It originates in Japan, Korea, and Manchuria.

'Nana' DWARF JAPANESE YEW

Zone 4

Two of the plants, set out in 1909, have formed specimens at least 6 m broad but not higher than 1 m. This form has densely compact branchlets, shorter than those of the species, with the leaves appearing more spirally arranged when viewed from above and not so definitely grooved into a V-shape.

T.* ×*media Rehd.

Zone 5

An interspecific hybrid of *T. baccata* × *T. cuspidata*. Many forms have been selected from this cross, most of them bearing characters intermediate between the two species.

'Henryi'

Zone 5b

A fast-growing cultivar with larger than normal, deep green leaves.

'Hicksii' HICK'S YEW

Zone 6

A columnar form with radially spreading leaves that seem to have developed a mixture of characters of both species. Its hardiness, however, bears toward *T. baccata*. Although it will survive Ottawa's winters, when planted in full sunshine it becomes very badly desiccated and the outer branches and leaves are often killed. If planted in the shade, this browning does not occur. It is possible that the sudden changes in temperature, which are so disastrous to *Thuja* spp. when planted in sunny exposed locations, also affect this cultivar.

The Hick's yew has leaves that are green and not yellow underneath, rather like those of *T. baccata* except that they are tough, thick, and end abruptly in a hard point similar to the leaves of *T. cuspidata*.

'Hillii'

Zone 5b

A pyramidal form with densely set leaves.

'Kelseyi'

Zone 6

An erect, densely compact shrub with sharp-pointed leaves, dark green above and light gray beneath. The plant in the Arboretum suffers with burn after most winters.

'Wardii'

Zone 6

A broad, global form with dark green, fine foliage, which is subject to winter injury if exposed above the snow line.

THUJA CUPRESSACEAE

To this genus belongs the eastern white cedar (*T. occidentalis*), with its many varieties. The so-called western red cedar is *Juniperus scopulorum* while the eastern red cedar is *J. virginiana*. The true cedar is the cedar of Lebanon (*Cedrus libani*).

Species of *Thuja* are probably more confused with those of *Juniperus* and *Chamaecyparis* than with species of any

other group. Since junipers have fleshy cone scales, fruiting specimens offer no problems, because both *Thuja* and *Chamaecyparis* have woody cones. The cones of *Thuja* are more conical and have thin, tapering, pointed scales, the tips of which turn outward when mature. In *Chamaecyparis* the cones are rounded and the scales are four-sided, with a distinct hump in the middle. A good nurseryman can always tell the eastern cedar from the *Chamaecyparis* by the turpentine-like odor of the former which is lacking in the latter. *Chamaecyparis* species can also be distinguished by the white X or Y marking the leaves in many forms.

T. occidentalis L. EASTERN WHITE CEDAR, ARBORVITAE, WHITE CEDAR

Zone 3

Most of the older cultivated forms of this species, which were planted in the Arboretum from 1890 to 1900, are as high as 15 m and have outgrown their original juvenile form; however, young plants grown from cuttings of many of these trees have retained the original form.

The white cedar is easily recognized by its dark green, scale-like leaves, which are yellowish light green underneath and emit a turpentine-like odor when bruised, by its conspicuous resin glands, and by its oblong cones with eight to ten scales. It is found from Nova Scotia to Manitoba, and south to North Carolina, Tennessee, and Illinois.

'Alba'

Zone 3

A loose-growing tree with the tips of the shoots variegated with white. This form is also known as 'Albavictoria', 'Queen Victoria', and 'Albospicata'.

'Argentea'

Zone 3

The branches of this cultivar are variegated with silvery white.

'Aurea'

Zone 3

A broad tree with deep yellow foliage.

'Boothii'

Zone 3

A low, compact form with large leaves. The specimens are now about 2.5 m high and about 2 m broad.

'Buchananii'

Zone 3

A form with long, slender, whip-like branchlets, the lateral divisions of which are far apart, and with sparse, gray-green leaves. It is a graceful, narrowly pyramidal form, entirely distinct from the others.

'Columbia' SILVERTIP ARBORVITAE

Zone 3

This old plant is 6 m high, broadly columnar, and with leaves variegated silvery white. The variegation is particularly beautiful in young plants. This plant was received from Spaeth's nursery.

'Cristata'

Zone 3

A more-or-less dwarf pyramidal form, now 7.5 m high, with crowded branches. Final branch divisions are clustered into a mass resembling a cock's comb.

'Cristata Aurea'

Zone 3

A golden slow-growing form of *T. occidentalis* 'Cristata' with the same cocks comb-like leaves. This cultivar gets burned a little during early spring, but this discoloration disappears when the new leaves are formed.

'Douglasii Aurea' DOUGLAS GOLDEN ARBORVITAE

Zone 3

This tree is bronzy yellow during the late spring and summer and darkens a little during the winter.

'Ellwangeriana' ELLWANGER'S ARBORVITAE

Zone 3

A broadly pyramidal bush with spreading branches and slender curving branchlets. It is clothed with two kinds of leaves, the adult leaves and the junior, acicular, spreading leaves. The old trees in the Arboretum, planted in 1890, still show a few juvenile awl-shaped leaves.

'Erecta'

Zone 3

This pyramidal form was received from the Louis Frères nursery in 1901, and although it appears to be little different from the usual pyramidal cedar, it may have outgrown its original habit and color. The reference to it in Den Ouden's *Manual of cultivated conifers* describes it as a pyramidal form with dense growth and striking, lustrous, dark green leaves.

'Ericoides' HEATH ARBORVITAE

Zone 3

This plant has been purchased through the years under a profusion of names. It has been received as *Chamaecyparis*,

Heath arborvitae (*Thuja occidentalis* 'Ericoides')

Retinospora, and *Thuja* under such specific names as *Retinospora dubia*, *Chamaecyparis ericoides*, *Retinospora ericoides*, and even as a *Juniperus* species.

It is a dwarf, broadly pyramidal shrub with slender branchlets bearing needle-shaped, soft, spreading leaves, dull green above, grayish green bencath, and with a dull brownish underlying tint overall. In winter it turns more decidedly brown, which should perhaps distinguish it from *Chamaecyparis obtusa* 'Ericoides', a cultivar that appears to be almost identical. All specimens received under the name *C. obtusa* 'Ericoides' have always turned out to be the heath arborvitae.

The heath arborvitae is a good ornamental plant but it needs protection from heavy snowfalls; without this protection the branches soon get broken and thc plant loses its shape.

'Fastigiata' PYRAMIDAL ARBORVITAE

Zone 3

A narrowly columnar form with a compact habit brought about by its short, stunted branchlets. The pyramidal arborvitae is often sold under the botanical name of *T. occidentalis* 'Pyramidalis'.

'Filiformis' THREADLEAF ARBORVITAE

Zone 3

An odd-looking form with leaves remarkably similar to those of *Chamaecyparis pisifera* 'Filifera', a form that could be easily mistaken for this cultivar if it were not for the difference in the fruits. It has slender, rather drooping, ramified branchlets, nodding at the tips, four-angled, and clothed with sharply pointed, adpressed leaves.

'Globosa' GLOBE ARBORVITAE

Zone 3

A dwarf, rounded bush. The oldest specimen in the Arboretum still retains a rounded shape even though it is now 2 m high and 2 m wide.

Globe arborvitae (*Thuja occidentalis* 'Globosa')

'Hetz Wintergreen'

Zone 3

This cultivar is a fairly new introduction to the Arboretum and is similar in texture and shape to the pyramidal cedar, but it is supposed to remain green all winter. However, in winter the specimen turns as brown as other specimens of common cedar nearby. It is fast growing and has produced a specimen 3.5 m high in 8 years.

'Hollandica'

Zone 3

A conical, dense-growing form with upright branches bearing dark green leaves. It is a seedling of Ware's arborvitae (*T. occidentalis* 'Robusta'), which originated in Holland in 1904.

'Holmstrup'

Zone 3

A dense, compact, slow-growing, pyramidal form with dark green leaves. This cultivar should be extremely useful for planting in locations reserved for the pyramidal cedar.

'Hoveyi' HOVEY ARBORVITAE

Zone 3

Those who recognize *T. occidentalis* 'Hoveyi' as a dwarf, egg-shaped or ovate-globose bush would be astounded to see this large plant 7.5–9 m high. The old plant has not retained its "bechive" shape but has grown into a normal common arborvitae. Sufficient juvenile branches must still remain on the tree, however, because cuttings taken over the past 20 years from this plant havc always provided the oval dwarfish form.

'Little Champion'

Zone 3

A dwarf, rounded form, which retains its shape remarkably well without pruning.

***Thuja occidentalis* 'Holmstrup'**

'Lutea' GEORGE PEABODY ARBORVITAE

Zone 3

A pyramidal form with bright yellow leaves and growing 6–9 m high.

'Mastersii' MOSS ARBORVITAE

Zone 3

A pyramidal tree, darker and denser than the type, with short, rigid, much-flattened branchlets. The foliage is distinctly glandular, brownish dark green above and bluish green beneath. *T. occidentalis* 'Plicata' is an invalid synonym of this tree.

'Ohlendorfii'

Zone 3

A dwarf, bushy form with two kinds of foliage. The upper foliage is ramified and similar to that of *T. occidentalis* 'Filiformis', and the lower foliage has spreading acicular leaves like those of *T. occidentalis* 'Ericoides' but thicker in texture. Some of the leaves also resemble those of the ordinary white cedar.

'Pumila'

Zone 2b

A dwarf, compact, globose form with unusual fineness of foliage. Its growth is slower than most dwarf forms, making it suitable for rock garden plantings.

'Recurva Nana'

Zone 3

A dwarf form with recurved branchlets, obtained from Spaeth's nursery. This form and *T. occidentalis* 'Umbraculifera' have retained their dwarf habit through the years better than any of the others.

'Robusta' SIBERIAN CEDAR

Zone 3

A tree of compact pyramidal habit; the branches are sometimes vertical and the spray is neat and close. It is also known in the trade as *T. occidentalis* 'Wareana'. It is considered to be much hardier than most of the forms and is suitable for planting on the prairies.

'Robusta Luteseens' GOLDEN SIBERIAN CEDAR

Zone 3

A tree of compact, pyramidal habit, with neat, close branchlets and leaves that are golden when the plant is young.

'Rosenthalii'

Zone 3

A columnar form with lustrous dark green leaves. It is one of the most handsome of the dark green forms and is slower growing than the pyramidal arborvitae (*T. occidentalis* 'Fastigiata').

'Saundersii'

Zone 3

A dense pyramidal form that probably originated at the Central Experimental Farm during the early 1900s. It is distinct from all other pyramidal forms because of its fine, almost cristate, foliage and thick columnar habits. The author was not able to find a reference to this variety in the literature or trace its origin, but it was probably named by or for Dr. William Saunders who was Director of the Experimental Farms from 1886 to 1911.

'Smithiana' SMITH'S ARBORVITAE

Zone 3

A low, compact form with heavy, dark green foliage becoming almost purple in early fall. The specimen is not more than 1 m high with a spread of 2 m.

'Spiralis' SPIRAL ARBORVITAE

Zone 3

A compact form with upright branches and close-set, short branchlets. The branchlet systems are concave and twisted, suggesting a spiral arrangement if seen from above.

'Umbraculifera' UMBRELLA ARBORVITAE

Zone 3

This form is one of the easiest of the older arborvitaes to identify, for these shrubs are much like umbrella-shaped domes. The specimens stand about 1 m high and have spreads of about 2 m. The foliage is dark green or almost blue when young.

'Vervaeneana'

Zone 3

Of smaller habit than the common cedar, with branchlets more slender and yellowish foliage turning bronze in winter.

'Wagneri'

Zone 3

A loose, oval form with dark green foliage.

'Woodwardii'

Zone 3

A dense, globose form with deep green foliage.

T. orientalis see ***Platycladus orientalis***

T. standishii (Gord.) Carrière JAPANESE ARBORVITAE

Zone 4

A splendid small tree that should be grown more often than it is. It is much more of the spreading type than the native arborvitae, having one to four distinct trunks and a broad pyramidal outline. It is easy to distinguish from the other species by its leaves, which are glandless and have triangular white marks below. The leaves make it stand out in the Arboretum in winter because they remain green all the

Umbrella arborvitae (*Thuja occidentalis* 'Umbraculifera')

time, whereas other arborvitae leaves change to a dull brown. A native of Central Japan.

TSUGA — Pinaceae

The only hemlock that has survived at the Arboretum is the Canadian, or common, hemlock (*T. canadensis*). All available species have been tried at one time or another. *T. caroliniana*, planted in 1905, flourished well until it was winter-killed in 1915, and *T. diversifolia* (Maxim.) M. T. Mast., planted in 1903, survived the annual winter-killing of some of its branches until it finally succumbed in 1922.

The hemlock is an extraordinarily handsome tree, bearing graceful slender spray branches and two-ranked leaves. It is allied to *Abies* and *Picea*, but it is easy to distinguish from both by its small cones, which are less than 5 cm long, and its two-ranked leaves with two white lines underneath and a groove above.

T. canadensis (L.) Carrière
CANADIAN HEMLOCK, COMMON HEMLOCK

Zone 4

The specimens planted in 1947 have grown to a height of 8 m and are extremely robust. The older plants are now 15 m high and are somewhat ragged in appearance. The common hemlock is a fine tree for planting in gardens as a specimen, for its distinct foliage lends gracefulness to the area. It is sometimes used as a hedge in the Ottawa area, in which capacity it does extremely well. From most other hemlocks it can be distinguished by its serrulate leaves and pubescent branchlets. It can be distinguished from *T. heterophylla* (Raf.) Sarg. by its well-defined narrow bands of white and from *T. mertensiana* (Bong.) Carrière by its flat, grooved leaves instead of rounded, keeled leaves. It grows from Nova Scotia to Minnesota and Illinois, south on the mountains to northern Georgia and northern Alabama.

'Gracilis'

Zone 4

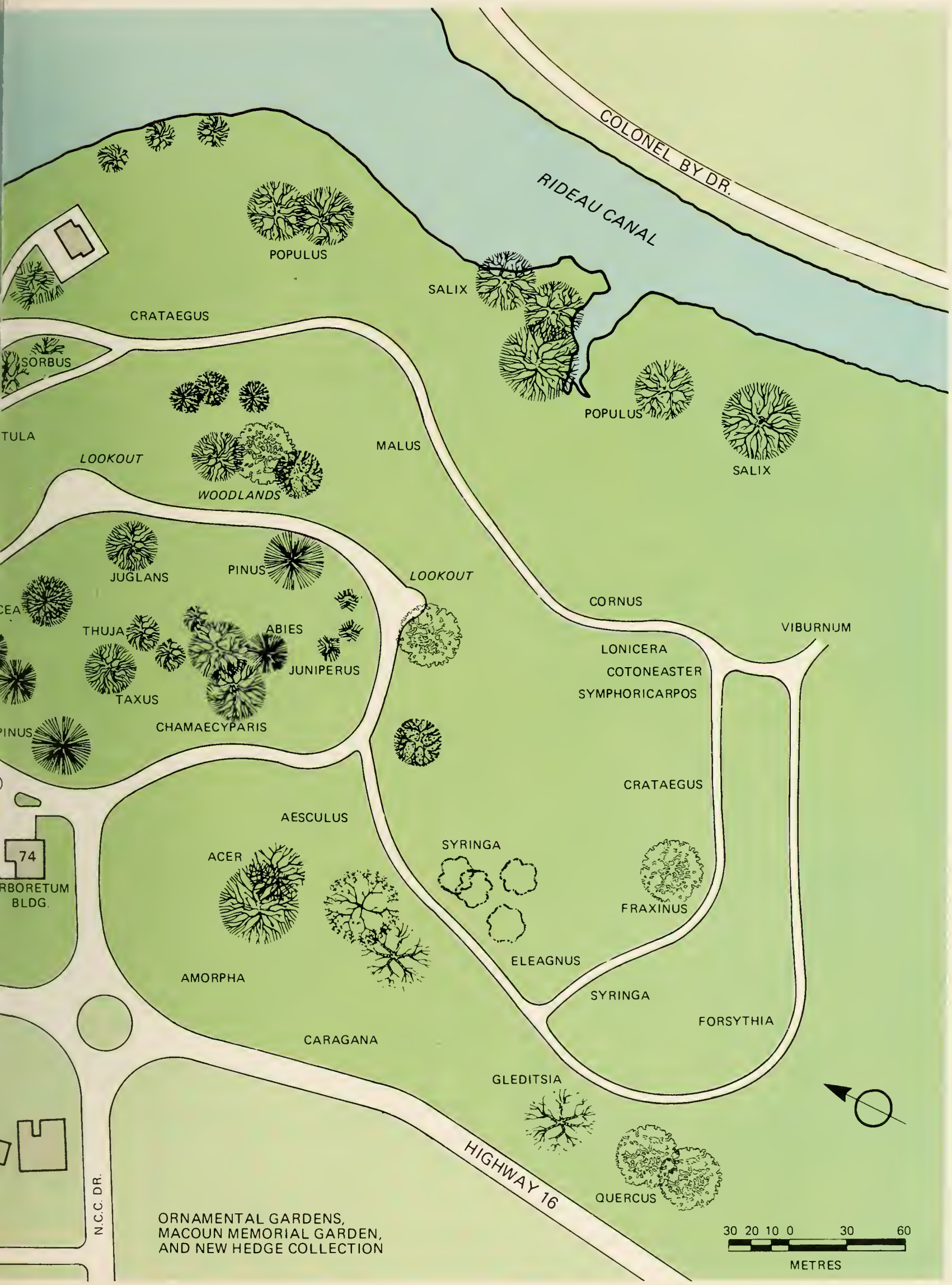
A slow-growing form with slender, spreading, ramified branches drooping at the ends. The leaves are also much smaller than those of the type. This specimen, although 65 years old, is only 4.5 m high and has a spread of less than 3 m.

T. caroliniana Engelm. CAROLINA HEMLOCK

Zone 6b

Although the Carolina hemlock planted in the Arboretum only survived 10 years, a tree planted on the campus north of Heritage House 54 in 1944 is still living, probably because it is planted close to a building and to several larger trees, which give it shelter.

MAP OF THE DOMINION ARBORETUM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RIDEAU CANAL
POPULUS
SALIX
CRATAEGUS
SORBUS
TULA
LOOKOUT
MALUS
WOODLANDS
POPULUS
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JUGLANS
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CEA
THUJA
ABIES
JUNIPERUS
TAXUS
CHAMAECYPARIS
PINUS
CORNUS
VIBURNUM
LONICERA
COTONEASTER
SYMPHORICARPOS
CRATAEGUS
AESCULUS
74
RBORETUM
BLDG.
ACER
SYRINGA
FRAXINUS
ELEAGNUS
AMORPHA
SYRINGA
FORSYTHIA
CARAGANA
GLEDITSIA
QUERCUS
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ORNAMENTAL GARDENS,
MACOUN MEMORIAL GARDEN,
AND NEW HEDGE COLLECTION
30 20 10 0 30 60
METRES

COLOR ILLUSTRATIONS

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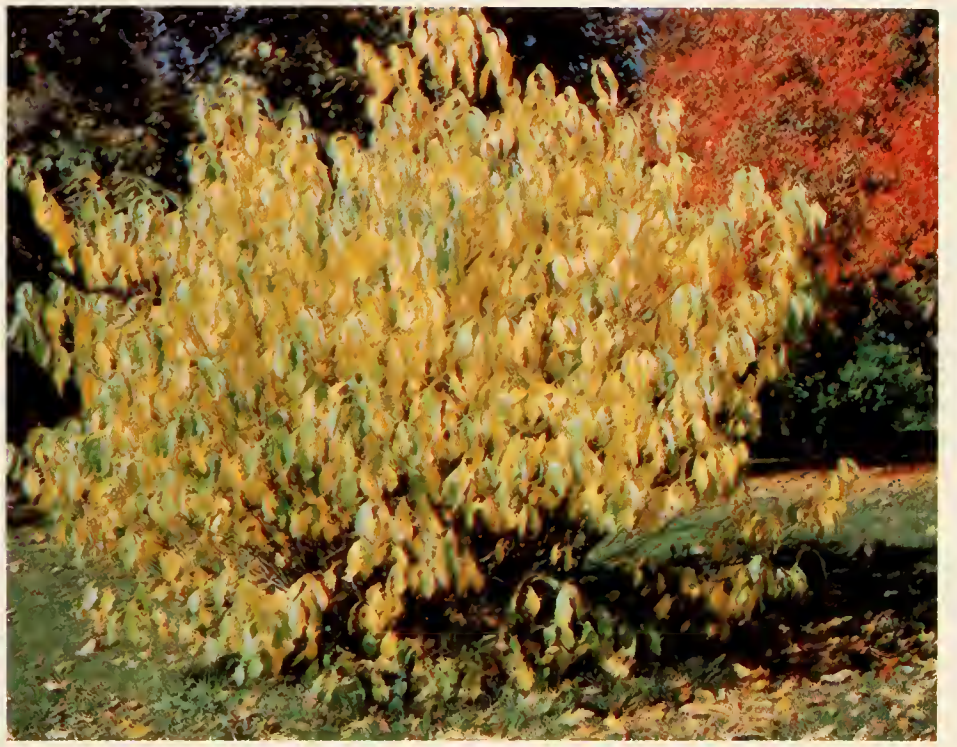

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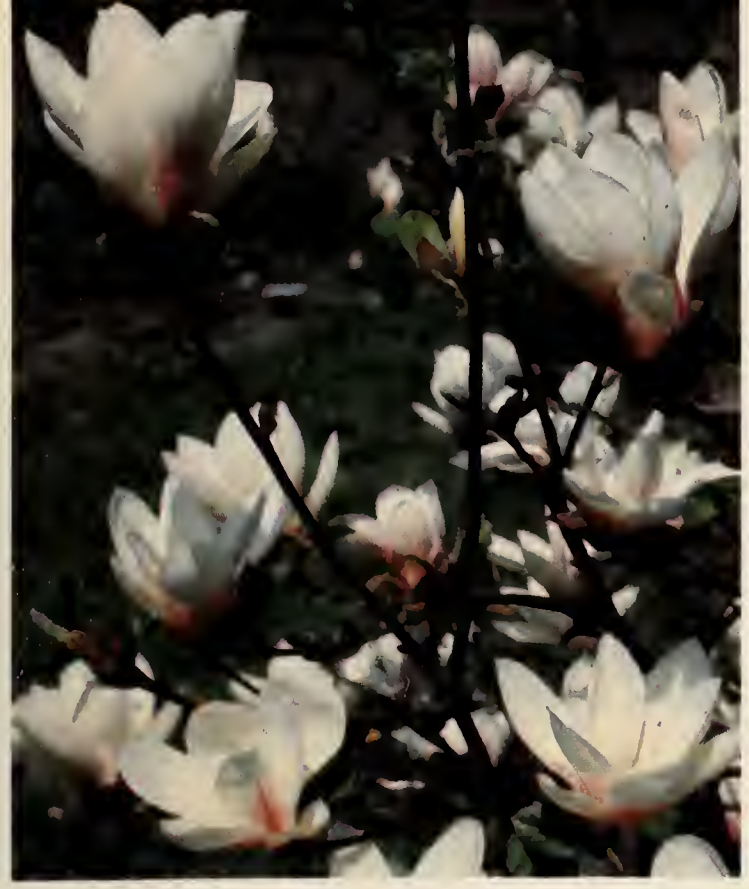

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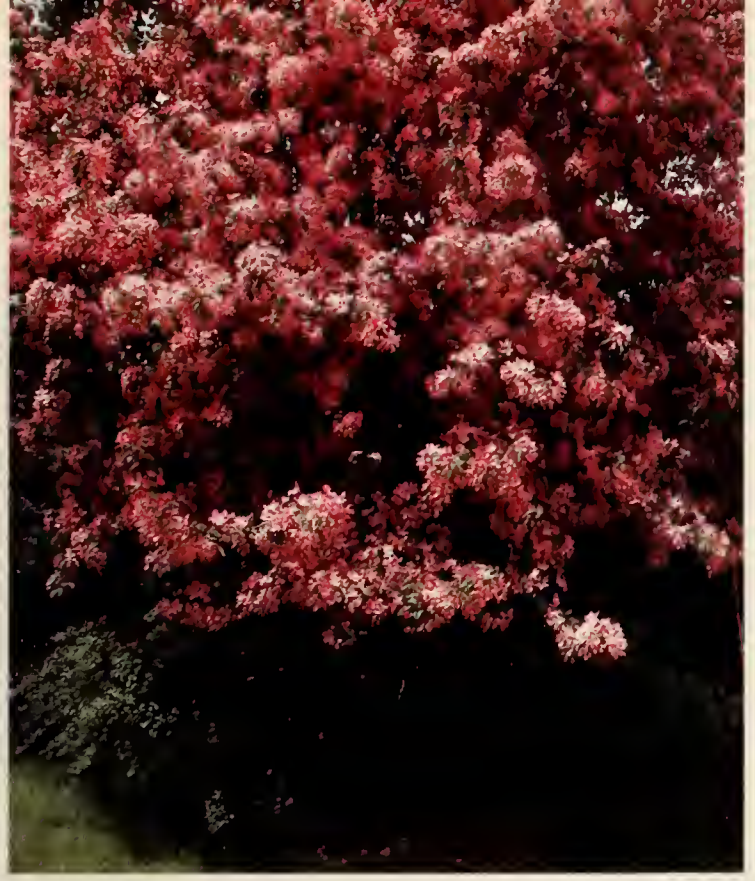

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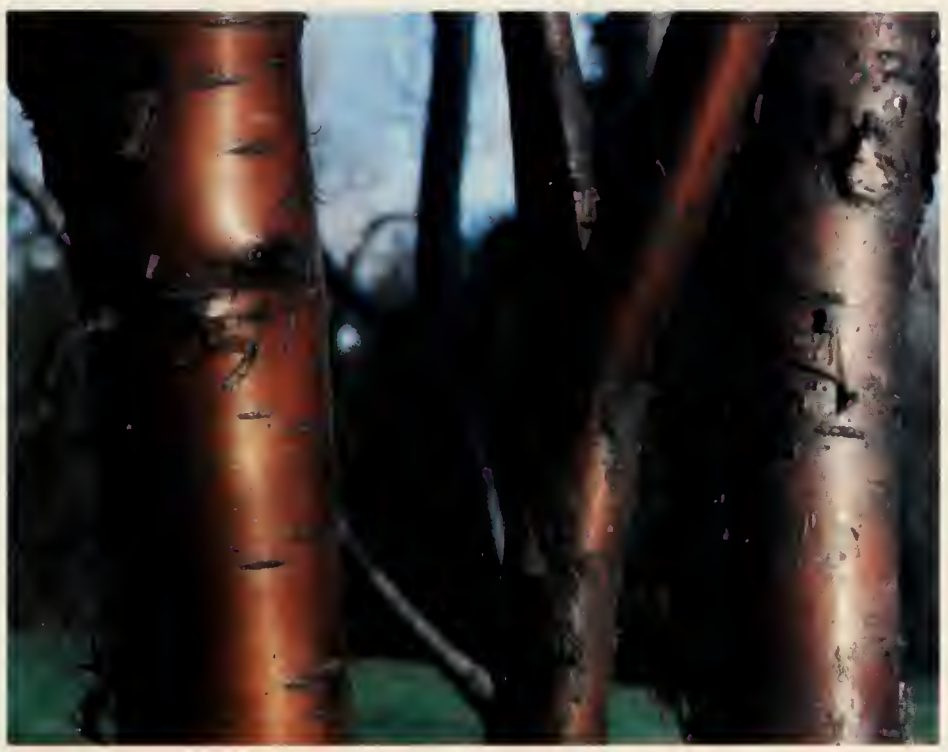

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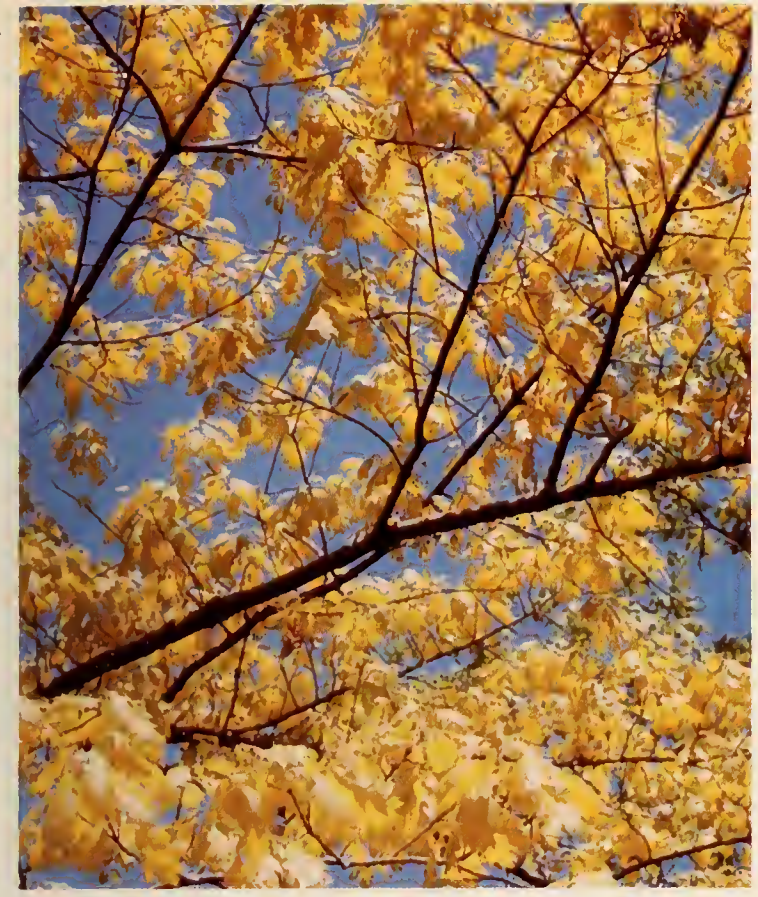

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Trees and Shrubs of the Dominion Arboretum

descriptions of the trees and shrubs of Canada's Dominion Arboretum in Ottawa — plants which can be grown throughout most of eastern North America