

Trees for Ornamental Planting

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The purpose of this bulletin is to furnish brief descriptive notes on deciduous and coniferous trees more commonly used for ornamental purposes throughout Canada. It does not contain any botanical classification from which trees can be identified nor deal with their forestry value. Those wishing information on the culture of trees should see bulletin No. 994 "Culture of Ornamental Trees for Canadian Gardens".



Trees for Ornamental Planting

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¹ Retired in 1962

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NOTES ON DECIDUOUS TREES HARDY AT OTTAWA

The following trees are considered the most useful for ornamental purposes of the many species and varieties tested at the Central Experimental Farm at Ottawa since 1888. Many are not sufficiently hardy to be recommended, though several of these are hardy in the Niagara peninsula and Lake Erie districts of Ontario and in southern British Columbia. Others are not sufficiently attractive.

All names are from Rehder's *Manual of Cultivated Trees and Shrubs*. Wherever these differ from the name that has been more commonly used in the past, the latter is given in brackets as a synonym.

Acer ginnala, Maxim. Amur Maple. Usually resembles a shrub more than a tree but is one of the most useful ornamental small trees. Leaves always turn red at Ottawa, and while the season of color is short, these trees are so effective at that time that they should be used extensively for color effects. Attractive throughout summer as relatively small leaves give it a pleasing look. Developing seeds have a rosy appearance adding ornamental value.

Acer Negundo, L. Box Elder, Manitoba Maple. Box elder may be considered a weed among ornamental trees, springing up where not needed nor wanted, growing very readily from seed. Because of rapid growth has been planted much more extensively than it should have been as it is very subject to insect pests, which render it unsightly by disfiguring the leaves and causing them to wither and fall prematurely. While the box elder may be planted in the colder parts of Canada because of the few kinds of trees that can be successfully grown, there is no need for it in most of Eastern Canada, where there are so many better trees available.

Acer nigrum, Michx. Black Maple. Closely related to sugar maple, but not so ornamental. Leaves downy, of a duller green, and do not color so highly in autumn but turn a pleasing shade of yellow.

Acer pennsylvanicum, L. Striped Maple or Moosewood. Very interesting small tree, white stripes on green bark of trunk make it conspicuous. Large bright-green leaves also add to attractiveness. Succeeds best in partial shade or associated with other trees rather than individually in open.

Acer platanoides, L. Norway Maple. Much planted in Eastern Canada, often it would have been better to plant sugar maple. No advantage over latter, is less useful being less hardy. Unless very carefully pruned when young, Norway maple likely to be low headed and to have bad crotches. These, with winter injury, result in a breaking down of the trees when they are making fine large specimens. Leaves never turn red, always yellow, and, except for contrast with red leaves of other maples, this also makes them less desirable. Grows rapidly, however, and makes ornamental tree of considerable size. The many varieties of this maple differ mainly in the color of foliage. Variety *Schwedleri* the most ornamental, with bright red leaves in spring turning dark green later. Variety *rubrum* (*Reitenbachii*) has duller red leaves that retain their color throughout the summer.

Acer rubrum, L. Red Maple. For low ground, where sugar maple does not succeed well, it makes an excellent substitute. Usually colors more highly and earlier than sugar maple, useful where color effect with large trees is desired.

Brilliant color makes fine contrast with evergreens in autumn. For planting in the colder parts of Canada, trees should be propagated from specimens near the northern limit of their range, otherwise they are liable to winter injury.

Acer saccharinum, L. (*A. dasycarpum*) Silver Maple. Very rapid growing species, reaches a larger size than either the sugar or the red maple. Moisture-loving, usually reaches its greatest size on bottom land or near edges of streams. Next to box elder, the hardiest of the Canadian tree maples. On the prairies trees should be grown from Manitoba stock. Most graceful of the maples; deeply cut leaves give it a lighter look than the others. A pendulous form, the Wier maple, *Acer saccharinum Wieri*, is one of the most satisfactory large ornamental trees in Eastern Canada.



FIGURE 1.—*Acer saccharinum* variety Wieri. Weir's cut leaf weeping maple.

Acer saccharum, Marsh. Sugar Maple. Best all-round ornamental tree hardy at Ottawa. Attractive form, though there are trees more graceful in habit: gives impression of strength and fitness both for planting in avenues and for single specimens or groups on the lawn. Foliage suffers little from diseases or insects; autumn tints very effective. Does best in well-drained sandy loam soil.

Acer tataricum, L. Tatarian Maple. Not so graceful as the Amur maple, and leaves not so deeply cut, but is even hardier, though the latter is usually hardy except in the coldest parts of the Prairie Provinces, where it is sometimes considerably injured. Tatarian maple is, therefore, more useful for the coldest places and, as the leaves color highly, it is a valuable small ornamental tree where the number of hardy species is limited.

Aesculus glabra, Wild. Ohio Buckeye. A fine attractive tree at Ottawa. Has reached a height of about forty feet. Flowers not so ornamental as horse chestnut, but tree much hardier; leaves healthier; fruits abundantly, and is altogether a desirable small ornamental tree.

Aesculus hippocastanum, L. Horse Chestnut. Not hardy enough to be satisfactory at Ottawa. Some trees do very well when young, but seldom reach a great age. Very handsome in bloom; worth trying in protected situations on a large place, not recommended where space limited.

A few hybrid buckeyes form good trees at Ottawa and are hardier than *A. hippocastanum*; the best are *carnea* (*rubicunda*) and *hybrida* (*Lyonii*), the former with red flowers, the latter with red and yellow.

Amelanchier laevis, Wieg. Allegheny Shadbush, Shadblow, Juneberry, Service Berry, Saskatoon. Best species of those that take tree form; useful from early bloom when few trees are in flower; is covered with white flowers before leaves open. Downy shadbush, *Amelanchier canadensis*, also of tree form, blooms freely, but not so graceful.

Betula papyrifera, Marsh. Canoe Birch. Native and familiar birch. White and yellow paper-like bark of trunks and branches against the green of the evergreens is very pleasing. Not especially desirable as a single specimen; frequent dropping of small dead twigs litters the lawn and makes their removal necessary, as is the case also with the cut-leaf weeping birch. Its hardiness makes it particularly valuable in the colder parts of Canada.

Betula pendula, Roth. (*Betula alba*). European White Birch. Very useful tree of graceful habit; branches somewhat pendulous with the secondary ones distinctly so. Tree has many varieties, the most useful are:

Betula pendula gracilis, Rehd. (*B. alba laciniata gracilis pendula*). Cut-leaf weeping birch. Effective as specimen on lawn; deeply cut leaves and pendulous branches give it light and graceful appearance. Very hardy and succeeds in most places where tried in Canada. Where bronze birch borer is troublesome it renders the trees unsightly. There is no practical remedy for this pest once tree is badly infested: if branches affected are removed and burned as soon as noticed, the borer may be checked.

Betula pendula Youngii, Schneid. Young's Weeping Birch. Very attractive form of weeping birch; more spreading and lower growing than cut-leaf weeping birch.

Betula lutea, Michx. Yellow birch. Useful only where plenty of room for large trees. Bark on young trees silvery yellow and effective among the dark green of pines. As the bark shreds off on old trees, they become too untidy looking for a small place.

Carya ovata, K. Koch. Shagbark Hickory. Slow-growing but makes eventually a very handsome specimen; general appearance suggests strength or toughness of wood. Glossy, deep-green foliage gives clean appearance. Adds to appearance of home grounds and appreciated for its nuts. Some trees incapable of fertilizing themselves produce only shrivelled kernels; advisable to procure grafted trees of known parentage.

A hybrid of the shagbark and bitternut known as *C. Laneyi* has nuts of fine quality and is apparently a little hardier than *C. ovata*.

Catalpa hybrida, Spaeth. Tea's Catalpa. A hybrid between the common and the Japanese catalpas; at Ottawa as hardy as the Japanese; flowers more ornamental. May be grown in preference to it; would seem more reliable for planting than *C. speciosa*.

Catalpa ovata, Don. (*C. Kaempferi*) Japanese Catalpa. Not so ornamental in bloom as the western catalpa, the flowers being yellowish and relatively small; has the large conspicuous leaves of the catalpa, making it a striking specimen on the lawn. Has proved hardier than the western catalpa at Ottawa.

Catalpa speciosa, Warder. Western Catalpa, Hardy Catalpa. Some specimens hardy at Ottawa, others more or less injured by winter, much depending on the source of stock. The hardiest stock should be procured. A very striking-looking tree of rapid growth; the large, showy, white-and-purple flowers appear the latter part of June.

Celtis occidentalis, L. Hackberry. A native tree not well known. Grows wild as far west as Manitoba. Makes a spreading tree of attractive form when given room; leaves somewhat like those of the elm, but oblique at the base.

Cercidiphyllum japonicum, Sieb. and Zucc. Katsura Tree. Attractive; hardy at Ottawa until the winter of 1933-34. Closely related to the magnolias, though flowers not conspicuous. Leaves heart-shaped, rather small, giving the tree a very light appearance, unlike many large trees. Of broadly pyramidal habit and much branched. An interesting tree, the only species in the genus.

Cladrastis lutea, K. Koch. Yellow Wood. Surprisingly this small graceful tree is little planted in Eastern Canada. Hardy for many years at Ottawa. Blooms latter part of June with long, loose, drooping panicles of white flowers that are very effective. Bright green foliage attractive also. Tree somewhat suggestive of a white-flowered laburnum.

Crataegus rotundifolia, Moench. (*C. coccinea* Sarg.) Hawthorn. Many species are hardy at Ottawa, those with attractive flowers, foliage, and fruit are among the most desirable. A native species, useful for mixed plantations; easily obtained.

Crataegus crus-galli, L. Cockspur Thorn. Glossy leaves especially attractive; very thorny; makes a good hedge plant.

Crataegus Oxyacantha, L. English Hawthorn. Double pink-and-red flowered varieties very attractive. Not quite hardy at Ottawa; if planted in protected place, some flowers may be obtained.

There are several native hawthorns and innumerable hybrids found in Canada. Some very useful, particularly forms used as shrubs or small trees on the prairies.

Elaeagnus angustifolia, L. Russian Olive. Small tree with narrow grayish or silvery foliage. Desirable for giving variety in ornamental planting.

Euonymus atropurpurea, Jacq. Burning Bush. Grows either as large shrub or small tree. Particularly useful for fall effect due to color and interest of unusual fruits and the autumn color of foliage.

Fagus grandifolia, Ehrh. American Beech. Excellent lawn specimens where room and climate permit proper development. Smooth gray trunks and ascending branches. Unfortunately the European beech and its purple and copper foliated varieties are not hardy at Ottawa.

Fraxinus americana, L. White Ash. The most ornamental species of ash; shapely; foliage attractive throughout the growing season, in autumn has a pleasing purplish tint. A good street tree except that the leaves come out late and fall early.

Fraxinus pennsylvanica var. *lanceolata*, Sarg. (*F. lanceolata*). Green Ash. Hardier than the white, though both succeed well at Ottawa. Glossy, bright-green foliage; useful and attractive for mixed plantation, but not as an individual specimen, if better shaped trees will grow. In west and north sufficiently hardy for use where maples and oaks will not grow.

Ginkgo biloba, L. Maidenhair Tree. Coniferous tree but leaves not ever-green. Medium sized desirable tree of ascending habit of growth. Leaves light green, fan-shaped, very attractive.

Gymnocladus dioica, H. Koch. Kentucky Coffee Tree. A distinctive species; useful where plenty of room is available and a great variety of tree forms desired. One of the more southern trees that is hardy at Ottawa. Makes few small branches, and when foliage is off has rather unattractive appearance; very striking when in leaf. Long conspicuous seedpods add interest. Leaves come late and fall early.

Gleditsia triacanthos, L. Honey Locust. Scarcely hardy enough for Ottawa but fine feathery looking foliage makes it useful on large properties where it can be grown. Extremely sharp branched thorns useful where an impenetrable hedge is desired.

Juglans cinerea, L. Butternut. Attractive-looking tree when young, later not leafy enough as individual specimen. More suitable on large grounds; nuts can scarcely be surpassed in flavor.

Juglans nigra, L. Black Walnut. Not a species for small places, but attractive tree; succeeds well in the warmer and well-drained soils at Ottawa. Where desired for nuts, grafted trees of the better commercial varieties should be planted. Thomas, Ohio, and Ten Eyke are all good varieties.

Juglans Sieboldiana, Maxim. Japanese Walnut. Very rapid-growing spreading tree; fine lawn specimen, but leaves come late and fall early. On large grounds, this species is desirable; more attractive than either the black walnut or butternut because of more abundant foliage. Nuts not so good as butternut. Variety *cordiformis*, Mak, the Japanese heartnut, suitable for commercial nut culture.

Larix decidua, Mill. European larch. Tall ornamental tree with horizontally spreading branches with pendulous branchlets. Attractive habit with pale green new foliage in spring, turning yellow in fall. Looks well against a background of darker pine or spruce. Needles of all larches are deciduous, although the trees are classed as conifers.

Larix laricina, K. Koch. Native tamarack or American larch. Not so ornamental as the European but commonly used in similar situations. Two other larches are hardy at Ottawa but useful only for the sake of variety as they are very similar to the above; they are:

Larix leptolepis, Murr (*L. Kaempferi*) the Japanese larch and *Larix Gmelini*, Pilger (*L. dahurica*), the dahurian larch.

Liriodendron tulipifera, L. Tulip Tree. Fine tree, native of southwestern Ontario; not very satisfactory at Ottawa, killing back in severe winters. Foliage ornamental, however, and where there is room may be planted in fairly sheltered place to add variety.



FIGURE 2.—Rosybloom Crab, variety Rosseau.

Magnolia acuminata, L. Cucumber Tree. If grown in Canada stock should be secured from near its northern limit as its hardiness is doubtful. Greenish yellow flowers rather inconspicuous; only interesting features are large leaves and fact that it is the only magnolia that will grow at Ottawa.

Malus baccata, Borkh. (*Pyrus baccata*). Siberian Crab. Great hardiness and freedom of bloom make this a valuable ornamental tree. If one of the cultivated varieties of crabapples is desired for culinary purposes, Transcendent and Hyslop are among the best. Useful and highly ornamental in flower and fruit.

Malus ionesis plena, Rehd. (*Pyrus angustifolia*) Bechtel Crab. One of the most beautiful, hardy small trees when in bloom. Flowers later than most crabapples or apples, being at its best during the last week of May to early June at Ottawa. Flowers large, double and of a delicate shade of pink, with exquisite perfume. Among the most charming of flowers. Not particularly ornamental after blooming, hence should be planted where it will be inconspicuous after flowering but where it will be most effective when in full bloom. Does not set any fruit.

Malus pumila Niedzwetzkyana, Schneid. Redvein Crab. This remarkable apple or crabapple hardy at Ottawa; a desirable ornamental tree. Leaves reddish purple, flowers pinkish purple; apples deep purplish red. Form of the tree not very good so plant where foliage and flowers will be seen and the tree be inconspicuous.

Malus pumila Niedzwetzkyana × *M. baccata* have been introduced by the Central Experimental Farm as "Rosybloom Crabs". Much superior to their seed parent in form, flowers, and fruit. Small trees of varying habit; exceptionally fine flowers varying from light pink to deep rose red according to variety. Most are good for jelly making. The smaller fruited varieties are very ornamental with clusters of small purplish-red fruit borne well on in the fall. The foliage also has varying degrees of red.

The following varieties are among the best:—

Early:	Late
Cowichan	Baskatong Sissipuk
Medium:	For fruit:
Arrow	Cowichan
Makamik	Geneva
Rosseau	Okanagan Scugog

Phellodendron amurense, Rupr. Amur Cork Tree. Hardy at Ottawa; interesting and fairly attractive in appearance, somewhat suggesting a black walnut in leaf.

Phellodendron japonicum Maxim. Cork Tree. A more attractive looking tree than the Amur cork tree at Ottawa, desirable for planting when one is making a collection of hardy species.

Platanus occidentalis, L. Buttonwood. American Plane. Kills back somewhat at the tips, but fairly hardy. Colorado form especially has developed into a striking looking tree of considerable size. Leaves large; about the last tree to leaf out at Ottawa. Natural peeling of the bark adds to interest. The European plane tree, much used for street planting in some of the large British and European cities and in some parts of the United States, is not hardy at Ottawa.

Populus alba, L. White Poplar. Large irregularly shaped tree. Lobed leaves with downy white undersides give a pleasing contrast in a large-tree group. Bark smooth, greenish gray; young trees particularly have a clean, light appearance.

Populus angustifolia, James. Narrow-leaf Cottonwood. This native poplar makes an attractive lawn specimen. The narrow leaves give it an unusual appearance.

Populus canadensis (*P. balsamifera* × *nigra*) var. *Eugenei*, Schelle, Hybrid cottonwood; strong-growing leafy tree much used in Eastern Canada where fast growth desired. Useful to interplant with American elm to give early effects; later the cottonwood can be taken out to leave the elms room to develop. A more useful tree than the Eastern cottonwood—*P. balsamifera* L. (*P. deltoides* var. *monilifera*).



FIGURE 3.—*Populus nigra italica*—Group of Lombardy Poplar.

Populus nigra italica, Muench. Lombardy Poplar. A most useful tree for accentuating certain effects in the landscape; tall, upright form conspicuous wherever grown. Gives character as center of a group or as a single specimen behind or at the end of a building to give a tower-like effect. Useful for screening uninteresting walls and chimneys.

Populus Petrowskyana, Schneid. Russian Poplar. The most satisfactory of the many Russian species and varieties tried; very hardy, rapid grower, makes an attractive, clean-looking tree.

Prunus Maackii, Rupr. Amur Cherry. Very hardy, looks like large specimen of choke cherry; flower clusters also suggestive of the choke cherry. Very conspicuous when in flower. Useful tree on large grounds where striking effects with bloom are desired. Bright-colored flaky bark also attractive.

Prunus Padus. European Bird Cherry. Attractive and hardy; much like native choke cherry, but trees larger with more abundant flowers. One of the best varieties at Ottawa known as Albert's bird cherry. Another variety is *commutata*, sometimes known as *Prunus Grayana* of horticulture. This is frequently confused with *P. Grayana*, Maxim, which is not so hardy.

Prunus pennsylvanica, L. The wild red cherry or pin cherry, and *P. virginiana*, L., choke cherry, are both small trees useful in the East in natural plantings and on the Prairies due to their extreme hardiness.

There are numerous "Flowering" plums and almonds most of which are more shrubby than the above. These are discussed in another publication.

Quercus alba, L. White Oak. The native oaks should be more commonly planted. While not rapid growers they form trees of good habit and attractive appearance.

Quercus borealis, Michx. (frequently but incorrectly known as *Q. rubra* which is a southern species). Red Oak. Very satisfactory tree; relatively fast grower compared with some oaks; about as rapid as sugar maple. Makes a spreading tree of attractive form. Foliage ornamental during the summer months; in autumn turns very effective shades of red. Leaves remain on the trees a month or more after most other trees. One of the most desirable trees to plant where a large ornamental tree is desired, good as a street tree also, but must have abundance of space.

Quercus imbricaria, Michx. Shingle Oak. A small tree at Ottawa, and usually hardy. Foliage entire, not dentated or cut as most oaks, glossy, attractive green. An interesting lawn specimen, should prove especially valuable where shrubby suggestive of laurel is wanted. Makes a good hedge plant.

Quercus macrocarpa, Michx. Burr or Mossy Cup Oak. Probably the hardiest of our oaks which forms a large attractive tree. Branches sometimes have corky irregularities or wings; large acorns have a mossy fringe around the edge of the cup which distinguishes it from the others.

Quercus palustris, L. Pin Oak. Not so hardy as the red, or burr oaks but of very attractive form. Trunk usually continues straight without dividing, branches horizontal with pendulous tips so that young trees particularly have a pyramidal form. Foliage smaller than that of other oaks, giving the tree a lighter appearance.

Quercus robur, L. (*Q. pedunculata*). English oak. Not so hardy as the native oak but succeeds well at Ottawa and forms a magnificent broadly spreading tree in milder districts.

Rhus typhina, L. Staghorn Sumac. Usually seen in shrub-like form as it suckers very freely and does not, as a rule, live long as a tree. Useful for planting in dry or rough places for ground cover. Attractive in summer; early in autumn leaves take on brilliant hues, making a particularly effective feature in the landscape. The cut-leafed variety *laciniata* is very ornamental.

Robinia pseudoacacia, L. Common Locust. An attractive tree in form, foliage, and flower; grows rapidly. Thorny, very subject to borers and many

seedlings are likely to grow from seed scattered over a wide area, making it a nuisance. Suckers are sometimes troublesome. Not recommended for general planting.

Salix alba, L. White willow. Many varieties used ornamentally. The more common are:—

Var. *sericea*. Gaud. (*S. argentea*, *S. regalis* of horticulture), leaves silky beneath.

Var. *vitellina*, Stokes. Bark golden yellow, leaves narrow and slightly silky.



FIGURE 4.—Niobe weeping willow.

Var. *chermesina*, Hartig (*S. vitellina bitzensis*) with bright red bark. This and the above are the two most useful varieties.

Var. *tristis*, Gaud. (*S. vitellina pendula*). The most valuable weeping willow at Ottawa. Forms a large tree; the weeping golden branches very attractive. Resembles the Niobe willow grown at Ottawa, the latter being a hybrid of *S. alba* × *fragilis*.

Salix blanda, Anders. Wisconsin Weeping Willow. Satisfactory at Ottawa but not so attractive as the golden weeping willow or the Niobe willow.

Salix pentandra, L. (*S. laurifolia*) Laurel Willow. Rapid growing, ornamental tree; very useful on large grounds; becomes a large tree. Leaves deep green, glossy, and suggestive of laurel. One of the most attractive looking willows. Occasionally red spiders disfigure it at Ottawa.

All the willows are fast growing trees, useful particularly in planting moist situations. The highly colored bark attractive in winter on large properties.



FIGURE 5.—*Sorbus aucuparia*, European mountain ash.

Sorbus aucuparia, L. European Mountain Ash. Rowan Tree. One of the most ornamental small trees. Hardy, rapid growing, graceful in form; when in bloom and fruit, particularly attractive. Berries, unless eaten by birds, remain ornamental well up to winter. Where one has room for very few small trees this should be one of them. Sometimes affected by borers, by fire blight, and by sapsuckers, but even with these enemies it is well worth planting.

Sorbus americana, Marsh. American Mountain Ash.

Sorbus decora, Schnied. Showy Mountain Ash. These two of the three native species of *Sorbus* form trees at Ottawa. The third, *S. sambucifolia*, is

a shrub. *S. decora* is the most ornamental and compares favorably with the European species. The fruit ripens earlier and is usually picked off by birds in migration so that its attractive period is shorter. Hardier than the European species which makes it more useful on the Prairies.

Sorbus discolor, Hedl. (*S. pekinensis*). Chinese Mountain Ash. A small tree usually hardy at Ottawa. Its only attraction is the peculiar white or pinkish fruit in contrast to the scarlet fruited species.



FIGURE 6.—*Syringa japonica*—Japanese tree lilac.

Syringa japonica, Decne. Japanese Tree Lilac. A very satisfactory small tree or shrub as it blooms late. Tall, and effective on the lawn when it is in bloom about the end of June. Produces a mass of creamy-white flowers, which, however, have not the perfume of the common lilac. The Manchurian lilac, *Syringa amurensis*, is much like it, but usually grows as a shrub and is not so tall.

Tilia glabra, Vent. American Linden. Basswood. A large, spreading native tree, effective on extensive grounds. In limited space its spreading habit is not so desirable. Foliage often disfigured by insects.

Tilia cordata, Mill. Little Leaf European Linden. Small leaves and graceful form make this the most attractive of the European lindens. Hardy at Ottawa.

Tilia platyphyllos, Scop. Big Leaf European Linden. Has grown well at Ottawa, but no more desirable than the native American basswood, and may not live so long. The variety *vitifolia* is a more attractive form than the species.

Tilia vulgaris, Hayne. Common Linden. Succeeds very well at Ottawa as a relatively young tree, may not reach a great age. It is safer to depend on the American linden.

Ulmus, European Elm. European elms have not proved too satisfactory at Ottawa. They continue growing too late in the season and are split by frosts or killed back. The Camperdown weeping elm, however, does fairly well.

Ulmus americana, L. American Elm. Fine, graceful tree well known throughout Eastern Canada and the United States. For best effect as an avenue tree should be at least 50 feet apart in the row. Grows rapidly and when planted more closely than this the trees will meet in comparatively few years. Should not be planted on narrow streets nor near houses as the roots extend for long distances and are likely to damage buildings.

Ulmus pumila, L. Dwarf Elm. A small tree with much smaller leaves than the American elm. Useful chiefly as a hedge.

Ulmus racemosa, Thomas. Rock Elm. Not so attractive as the American white elm. Characterized by tall erect growth with rather pendulous lower branches and corky bark.

NOTES ON CONIFERS HARDY AT OTTAWA

Many species and varieties of conifers have been tested at the Central Experimental Farm, Ottawa, since the first planting was done. Of the number tested a large proportion are hardy. Unfortunately, the graceful Lawson's cypress, of which there are many attractive varieties, is not hardy in Eastern Canada, nor the cedar of Lebanon, deodar cedar, redwood, sequoia, and many fine spruces and firs that succeed so well in the coastal climate of British Columbia. However, there are many fine ornamental trees in the following list of best conifers hardy at Ottawa:—

Abies balsamea, Mill. Balsam Fir. Deep green, glossy foliage; attractive under twenty years; later becomes ragged-looking, and eventually unsightly. Useful as a temporary tree among other trees.

Abies concolor, Lindl. and Gord. Colorado or silver fir. Though sometimes losing its terminal buds during cold winters, succeeded well at Ottawa until the severe winter of 1933-34 when almost all specimens were killed. More attractive and softer appearance than blue spruce which it resembles.

Abies lasiocarpa, Nutt. Alpine Fir. More compact than the balsam fir, and from experience at Ottawa remains attractive for a longer time. Native of the Rocky Mountains and varies considerably in hardiness. Plant trees from a source where climatic conditions are most like those in Eastern Canada.

Abies sibirica, Ledeb. Siberian Fir. Like balsam fir more attractive when young than later on. Hardy and more distinctive in appearance; well worth planting as a temporary tree in a collection of evergreens.

Of the other firs that do well in the western mountain and coast region the only one satisfactory in the East is *Abies Nordmanniana*, Spach., a tall, attractive tree.

Chamaecyparis, Spach. Genus formerly known as *Cupressus* and *Retinospora*. Contains a large number of very ornamental conifers of various habits of growth, usually pyramidal. Lawson cypress is the most highly prized where it can be grown. Most species too tender for Ottawa; while those mentioned may be used in sheltered locations, the first is the only really satisfactory one.

Chamaecyparis pisifera filifera, Beiss. Sawara Cypress (*Retinospora filifera*). The hardiest form tried at Ottawa; a low spreading pyramidal tree with rather pendulous branches; should not be allowed to exceed fifteen feet as the mature tree is open and straggly. The golden form of *C. pisifera* is usually browned badly during winter, as are the various forms of *C. pisifera plumosa* though these are worth while on sheltered sites. Variety *squarrosa* is

injured even more and cannot be recommended except in very well sheltered places and then only as a rarity.

Chamaecyparis thyoides, Brit. The true white cedar is not a very attractive shrubby conifer but the variety *ericoides*, Sudw., seems perfectly hardy and is interesting from a collection viewpoint. The fine glaucous foliage turns purplish-brown in winter.



FIGURE 7.—*Abies concolor*, silver fir.

Juniperus chinensis L. Chinese Juniper. Only a few of the many cultivated forms are sufficiently hardy to survive at Ottawa; variety *Pfitzeriana*, paeth most commonly used. Spreading or broadly pyramidal in form, with loose nodding grayish foliage. A golden tipped variety of this is called Pfitzers

golden. Var. *Sargentii*, Henry, a prostrate form with ascending branches makes a ground cover but is often killed back to the snow line. On young plants the foliage is bright grass green; on older plants it turns dark blue.

The variety *Hetzii* has become popular very quickly. Good steel blue color; horizontal habit. The two hybrid forms recently received from Ramlosa, Sweden, are similar very superior forms.

Juniperus communis, L. Common Juniper. Many varieties but *depressa*, native of Eastern Canada, the most satisfactory. This, like Savin's juniper, is low-growing, and useful for covering banks or for planting on rough, dry, stony ground, where an evergreen cover is desired. A golden-leaved variety, *aureo-spica*., Rehd, makes a rather attractive contrast. If they are hardy at Ottawa, the upright forms of the common juniper, the Irish, *Juniperus communis hibernica*, Gord., and the Swedish, *Juniperus communis suecica*, Ait., would be desirable as they are very attractive, but the tips of the previous years' growth winter-kill so often and disfigure the plants so much that they are not satisfactory. The Swedish juniper is a little hardier than the Irish.

Juniperus horizontalis, Moench. Creeping juniper. Native to Canada and useful as a ground cover and in large rock gardens. The variety *Douglasii*, Rehd., commonly called Waukegan juniper, has attractive steely blue foliage and an interesting habit of creeping closely over rock surfaces. The variety *plumosa*, Rehd. (*J. depressa plumosa*, Hort.) is another attractive form to bring variety of color to evergreen plantings. Foliage becomes distinctly purplish in fall and winter.

Juniperus rigida, Sieb. and Zucc. Needle Juniper. Japanese Juniper, One of the most graceful species; upright growth but tips of branches are pendulous; foliage yellowish-green; whole tree distinctive in appearance.

Juniperus Sabina, L. Savin's Juniper. Useful juniper; low-growing spreading species, several varieties are especially valuable for planting on banks or massing in other situations. Varieties *cupressifolia* and *tamariscifolia* two of best; vary in height from a few inches to three or four feet.

Juniperus scopulorum, Sarg. Western Red Cedar. The forms of this juniper are not much used except in the West.

Juniperus squamata, Buch.-Ham. variety *Meyeri*, Rehd. A dense shrub form with ascending branches. Foliage set in tight gray tufts, gives the plant an attractive and distinctive appearance.

Juniperus virginiana, L. Red Cedar. A native tree, foliage of the type, dull in color, and hence not very satisfactory for ornamental purposes. Variety *elegantissima* has yellow tips to the foliage, which make it quite attractive; more graceful form than the type. Another good variety is *Schottii*, with leaves of brighter green than the species.

Both are upright columnar forms. A low spreading form with glaucous foliage is known as *tripartita*.

Larix (see section on deciduous trees, page 9).

Picea Abies, Karst. (*Picea excelsa* Link.) Norway Spruce. For many years the most popular spruce for planting in Ontario either for ornament or for windbreaks. Rapid grower and with this characteristic and its graceful form, soon makes a very attractive object on the lawn, and quickly gives protection when used as a windbreak. Variety *pyramidata* of pyramidal form, makes a handsome tree more compact than the type; desirable as an individual tree on the lawn. Pendulous varieties attractive when young, but likely to become

ragged after a time. Some of the best of the dwarf or semi-dwarf varieties, of which there are quite a number, are *compacta*, *Remontii*, *Clanbrasiliana*, *nana* and *Maxwellii*.

Picea Englemanni, Engelm. Engelmann Spruce. Looks somewhat like both Colorado spruce and white spruce. More pleasing form than former, being of distinctly pyramidal shape. Some of the bluer forms compare favorably with the latter. While young, this tree, like the Colorado spruce, is well clothed with branches to the ground; later the branches may die from the ground up even though the trees are in full sunlight.

Picea glauca, Voss. (*Picea alba*, Link, *Picea canadensis*, B.S.P.) White Spruce. Very wide adaptability in Canada, found wild from the Atlantic coast west to the Rocky Mountains. Varies greatly in color of foliage, some forms being very blue, almost equalling the Colorado spruce; more pleasing habit than that variety. Particularly valuable in the Prairie Provinces where the number of species of hardy evergreens is limited. Very subject to attacks from the spruce gall louse and budworm, which make it unsightly unless they are kept under control.

Picea mariana, B.S.P. (*Picea nigra*) Black spruce. Not very ornamental but useful because of its hardiness and preference for wet situations. Forms rather thinly furnished tree smaller than *P. glauca*. Variety *Doumetii* attractive small conical tree with compact habit and glaucous foliage.

Picea omorika, Purkyne. Serbian Spruce. Not well known in Canada, but one of the most ornamental hardy species; where one is planting several kinds, it should not be omitted. Rather slow grower. Contrast in color between the different sides of the leaves makes it attractive. One side of the leaf is dark green and glossy, the other side has lines of white.

Picea pungens. Englm. Colorado Spruce. The blue forms of this spruce have made it popular. Not of very attractive form, rather stiff, but the steely-blue leaves of the variety *glauca* and the form known as *Kosteriana* are attractive to most people. At Ottawa this tree looks very well for twenty-five or thirty years after planting, when the foliage of most of the trees begins to die from the ground up, and after a few years they become too unsightly to leave. This should be taken into consideration when planting, so that when removed, a tree will not make too great a gap. This species does well in the Prairie Provinces. When buying this spruce, ask for the blue form as there is a large proportion of green ones among seedlings.

Picea Schrenkiana, Fisch and Mey. Schrenk Spruce. Although the foliage is rather dull in color, this is an attractive, hardy species that should be planted where one has a collection of evergreens as it is quite distinctive.

Pinus Banksiana, Lamb. Jack Pine. This tree is not considered an ornamental except in areas where the better pines are not hardy.

Pinus Cembra, L. Swiss Stone Pine. A slow-growing species; very attractive; foliage much like the white pine, but an upright grower. Suitable where an evergreen that will not take up too much space is desired.

Pinus koraiensis Sieb. and Zucc. Korean Pine. Has done well at Ottawa; hardy; suggestive of white pine but foliage darker; of more compact habit and a slower grower. Attractive in appearance; should be more extensively planted for ornament.

Pinus mugo, Turra. Mountain pine. Variable in habit, forming a tree sometimes to fifteen or twenty feet but usually a low spreading shrub. The

variety *mughus* is the one usually found in the trade as mugo pine or dwarf mountain pine.

Pinus nigra austriaca, Aschers. and Graebn. (*P. austriaca*). Austrian Pine. Next to the white pine the most ornamental hardy pine. Not so graceful as white pine nor are the leaves so attractive in color, but makes an excellent single specimen or group on the lawn. One of the easiest pines to transplant; does well under very trying, dry conditions or poor soil.



FIGURE 8.—*Pinus Cembra*, Swiss stone pine.

Pinus ponderosa, Dougl. Western Yellow Pine or Bull Pine. Even more attractive than the Austrian pine, especially while young; glaucous green and somewhat twisted leaves, borne three in a cluster. Has a massive look both when young and later; is well worth planting where one has room for several pine trees. A native of the dry districts of British Columbia.

Pinus resinosa, Ait. Red Pine. A native species somewhat resembling the Austrian pine, but not so ornamental, becoming too open in habit after the first few years.

Pinus strobus, L. White Pine. One or more pines should be on every home grounds where the area is large enough to have a few trees; this native species cannot be surpassed by any hardy enough to grow in Eastern Canada. Better known as a timber tree but when it has sufficient space for the side branches to develop well it becomes one of the most graceful evergreens. Its leaves, a lively green, do not become so dull in winter as some others.

Pinus sylvestris, L. Scots Pine. Hardy, rapid-growing but not so attractive in form as either the white or Austrian pines. Where there is room for many evergreens it should be planted, as the color of its foliage and habit of growth are distinct from other pines.

Pseudotsuga mucronata, Sudw. Douglas Fir. (*Abies Douglasii*, Lindl. *P. Douglasii*, Carr, *P. taxifolia*, Brit.) Native of Western Canada; has done well at Ottawa, and, after thirty-five years continues to be one of the most attractive evergreen trees. Makes a stately tree, more graceful in habit than most of the spruces and other hardy firs. Desirable to get trees from the colder, and drier parts of its range. Individual trees vary much in color of leaves, some having a much more bluish tint than others.

Taxus canadensis, Marsh. Canada Yew. A low-growing hardy species, may be used with good effect for covering banks in shady places or as an under-cover among tall trees.

Taxus cuspidata, Sieb. and Zucc. Japanese Yew. The English yew, so common in Great Britain, is not hardy in Eastern Canada, but Japanese yew is a splendid substitute perfectly hardy at Ottawa. May be used with good effect for massing, as single specimens, or for hedge purposes.

Thuja occidentalis, L. American Arborvitae. Valuable both as an ornamental tree and for hedge purposes. Makes the best evergreen hedge at Ottawa. Very common native tree in Eastern Canada, easy to procure at little or no cost. Ordinary form attractive, but some of horticultural varieties are of more striking habit and give greater variety in the landscape. Many have been tested at Ottawa during the past years but some have been injured occasionally. The following are varieties most satisfactory at Ottawa:—

Variety *Columbia*: a columnar form of loose habit with silver tipped foliage, not thoroughly hardy at Ottawa.

Variety *Douglasii pyramidalis*: hardier than the more commonly grown pyramid form *fastigiata*, though not quite so columnar in form. Has compact fan-like foliage.

Variety *Ellwangeriana*: this is a juvenile form with two types of leaves that give the foliage a soft open look. Forms a low spreading cone and is quite hardy.

Variety *fastigiata*: the commonest pyramidal form. Specimens here thirty feet in height are only six feet in diameter. (*Pyramidalis*, *columnaria*, *stricta*.)

Variety *globosa*: a very hardy dwarf globe form. One specimen forty-five years planted is only seven feet high. (*Speelmanni compacta*, "Tom Thumb," *Froebeli*.)

Variety *Hoveyi*: dwarf globe or egg-shaped form with flattened branches forming vertical "hands" of bright green almost golden foliage.

Variety *lutea*: rather broad columnar form with golden foliage (*elegantissima*, George Peabody).

Variety *pumila*: very low compact globe type (Little Gem).

Variety *Riversii*: more compact pyramid and smaller than *lutea*, foliage tipped with gold.

Variety *robusta*: compact conical type grows rounded at maturity Hardier than the typical species doing well on the prairies. The foliage is light green with a bluish tint particularly on young plants. (*Wareana*, *sibirica*).

Variety *Rosenthalii*: compact columnar form with lustrous dark green leaves.

Variety *Vervaeana*: smaller than the type with more slender branches and finer rather yellow green foliage turning bronze in winter.

Thuja plicata, Don (*T. gigantea*) Giant Arborvitae. Native west of the Prairies; little planted in Eastern Canada. A beautiful species, more graceful than the American arborvitae and the foliage is brighter green. Success in growing this tree will depend on the source of the stock as, if obtained from the milder parts of Canada or the United States, it is almost sure to winterkill or be badly injured.

Tsuga canadensis, Carr. Canada Hemlock. Native of Eastern Canada, one of the finest evergreen trees. Very graceful in habit, the small foliage is a pleasing shade of green. Although it eventually makes a large tree, it grows slowly and it is a rather long time before it becomes very conspicuous on a lawn. When grown in the open also it is likely to be injured by winter. Does best in partial shade of other trees or on banks with northern or eastern exposure. Variety *gracilis* is a charming tree with smaller foliage and of slower growth than the species.

TREES FOR VARIOUS PURPOSES AND SITES

The following tables give information of a more definite nature. They are intended to help the prospective planter in the selection of trees for special purposes and sites.

Due to the wide range of soil and climate throughout Canada, a table of this sort is limited in its usefulness. The height to which trees grow varies with the temperature, soil, and amount of precipitation of the district in which they are planted. For instance the tulip tree in southern Ontario reaches a height of 75 feet whereas at Ottawa it makes an unsatisfactory shrub that kills to the snowline almost every year. Climate also affects habit of growth, the winter injury to the leader frequently causing a conical tree or one of ascending habit to become round or spreading.

In selecting a tree for a particular site or use, its ultimate height will depend on the scale of the surroundings. Habit of growth will be governed by the skyline, or shape of the foliage mass we wish to produce. The accompanying illustration depicts the terms used to denote the habit of growth.

Color of foliage will depend on whether the tree is to be used as a mass plant or as a point of emphasis. As a general rule light colors are emphatic and contrast should be used sparingly. Much better effects will result from matched or gradually blended greens than from the too common use of variegated, purple and gold foliage.

The abbreviations used in the color of foliage column are as follows: LG-light green; G-midgreen; DG-dark green; GG-gray green, usually the gray effect being produced by the underside of the leaf being grayish white; YG-yellow green; BG-blue green; etc., a small "s" signifies that the leaf is shiny.

Texture in trees means the impression they give of lightness or mass rather than their closely studied appearance. This depends largely on the size of their leaves and twigs. As a general rule, trees of fine texture should be placed in the foreground with coarser ones farther away. Occasionally, however, a coarse tree such as the catalpa or plane tree used in a prominent position creates a bold note that is very pleasing. Also the reverse of the rule may create an illusion of greater distance or depth to the picture, but such things must be done skilfully or a disastrous mistake may result.

Where single specimens are used, the soil may be altered to suit the tree; hence soil becomes an important factor only where many trees are to be planted. Almost any tree responds favorably to a deep, rich, sand loam. Some trees will grow satisfactorily on poor or wet soils, clay, or sand, where others will not. Under the heading of soil the word "loam" means that the tree needs good average soil that is well drained. The other words are self-explanatory; they do not mean necessarily that the tree prefers "wet" soil or "poor" soil, but that it will grow under such conditions where others will not.

The same applies to the column headed "light". All trees prefer full sunlight to develop into well-shaped, ornamental specimens. Shade makes them tall and spindly and causes the lower branches to die. Some trees, however, will stand partial shade better than others and these are marked "p shade."

The last column gives the uses to which the tree is fitted under general conditions. In some sections of Canada where species are few, due to severe climate, a tree that is generally used for mass planting such as the green ash may become the very best for use as a shade specimen or street tree.



FIGURE 9.—Habit of growth of deciduous trees: (1) Dome (2) Columnar (3) Conical (4) Round (5) Vase (6) Spreading (7) Ascending (8) Oblong.

DECIDUOUS TREES OVER 70 FEET TALL AT OTTAWA

Name	Habit of Growth	Foliage		Rate of growth	Soil	Light	Remarks	Uses in landscape composition
		Texture	Color					
<i>Acer saccharinum</i>	Spreading Columnnar Oblong Vase	Medium	BG	Rapid	Wet Any Moist Moist	Sun	Weak wood Short lived Open foliage	Avenue, general Accent, windbreak Mass, dominant in large group Avenue, specimen, general on large properties
<i>Populus nigra italica</i>		Medium	YG	Rapid		Sun		
<i>Tilia glabra</i>		Coarse	DG	Medium		Sun or shade		
<i>Ulmus americana</i>		Medium	MG	Medium		Sun		

DECIDUOUS TREES 50-70 FEET TALL AT OTTAWA

<i>Acer saccharinum</i> , Wieri.....	Pendulous Ascending Conical Dome Conical Ascending Conical Ascending Spreading Oblong	Fine	GG	Rapid	Wet Loam Sandy Loam Loam Wet Wet Any Moist loam Loam Wet sand Gravelly	Sun	Open foliage Dense foliage White bark Edible nuts Edible nuts Coniferous Bark peels Greenish bark Olive twigs Mass	Specimen General, excellent Specimen Specimen, mass on large properties Specimen, mass on large properties Mass Accent General General Mass, background Mass
<i>Acer saccharum</i>		Coarse	MG	Medium		Sun		
<i>Betula pendula</i>		Fine	MG	Medium		Sun		
<i>Carya ovata</i>		Coarse	YG	Slow		Part shade		
<i>Juglans cinerea</i>		Coarse	MG	Slow		Part shade		
<i>Larix decidua</i>		Fine	LG	Rapid		Sun		
<i>Platanus occidentalis</i>		Coarse	YG	Medium		Sun		
<i>Populus alba Bolleana</i>		Fine	DG & W	Rapid		Sun		
<i>Quercus alba</i>		Coarse	BG	Slow		P. shade		
<i>Quercus macrocarpa</i>		Coarse	BG	Slow		P. shade		
<i>Salix pentandra</i>		Medium	Gs	Rapid		P. shade		
<i>Ulmus racemosa</i>		Medium	MG	Medium		Sun		

DECIDUOUS TREES 40-50 FEET TALL AT OTTAWA

<i>Acer Negundo</i>	Spreading Round Spreading Ascending Round Oblong Spreading Conical Ascending Dome Conical	Coarse	YG	Rapid	Any Loam Wet Sand Loam Wet Lime Loam Loam Sandy Moist	P. shade	Weak Wood Spring foliage Fall color White bark Unusual foliage Nuts Unusual foliage Coarse branches Fall color Open foliage	General where other trees not hardy Avenue, general Avenue, general Specimen, avenue in cold districts Specimen Mass, avenue in cold district Specimen Specimen, will stand smoke Specimen General General
<i>Acer platanoides</i>		Coarse	MG	Medium		Sun		
<i>Acer rubrum</i>		Coarse	RG	Medium		P. shade		
<i>Betula papyrifera</i>		Fine	MG	Medium		P. shade		
<i>Cercidiphyllum japonicum</i>		Fine	LG	Medium		Sun		
<i>Fraxinus penn' lanccolata</i>		Medium	MG	Medium		Sun		
<i>Fagus grandiflora</i>		Medium	BG	Slow		Sun		
<i>Ginkgo biloba</i>		Fine	LG	Slow		P. shade		
<i>Gymnocladus dioica</i>		Fine	G	Medium		Sun		
<i>Quercus borealis</i>		Coarse	RG	Slow		P. shade		
<i>Quercus palustris</i>		Fine	YGs	Slow		P. shade		

DECIDUOUS TREES 40-50 FEET TALL AT OTTAWA—Concluded

Name	Habit of Growth	Foliage		Rate of growth	Soil	Light	Remarks	Uses in landscape composition
		Texture	Color					
<i>Quercus robur</i>	Conical	Coarse	BG	Slow	Loam	P. shade	Dense foliage	Specimen
<i>Salix alba</i>	Spreading	Fine	LGs	Rapid	Wet	P. shade	Gold or red twigs	Massed
<i>Salix fragilis</i> (Viobe).....	Pendulous	Fine	GGs	Rapid	Wet	P. shade	Gold twigs	Specimen
<i>Sorbus aucuparia</i>	Spreading	Fine	LG	Medium	Moist	Sun	Red berries	Specimen, general, very hardy
<i>Tilia cordata</i>	Spreading	Medium	MG	Medium	Loam	Sun	Dense foliage	General
DECIDUOUS TREES 30-40 FEET TALL AT OTTAWA								
<i>Aesculus hybrida</i>	Oblong	Coarse	YG	Slow	Loam	Sun	Yellow and red flowers	Specimen
<i>Amelanchier laevis</i>	Ascending	Medium	BG	Medium	Various	P. shade	White flowers	Specimen, interest in tree groups
<i>Catalpa</i> all species.....	Ascending	Coarse	G	Medium	Sand	Sun	Flowers	Specimen
<i>Cladrastis lutea</i>	Irregular	Medium	YG	Medium	Loam	Sun	Flowers	Specimen
<i>Elcagnus angustifolia</i>	Irregular	Fine	GG	Rapid	Dry	Sun	.....	Mass for contrast of foliage
<i>Magnolia acuminata</i>	Ascending	Coarse	G	Slow	Loam	Sun	Odd fruits	Specimen, only useful because odd
<i>Prunus padus</i>	Round	Medium	G	Medium	Sandy	Sun	Flowers	Specimen
<i>Sorbus americana</i>	Spreading	Fine	YG	Medium	Sandy	Sun	Red fruit	Specimen
DECIDUOUS TREES 20-30 FEET TALL AT OTTAWA								
<i>Acer tataricum</i>	Irregular	Fine	YG	Slow	Sand	Sun	Fall foliage	Mass
<i>Celtis occidentalis</i>	Vase	Medium	G	Medium	Any soil	Sun	.....	General
<i>Crataegus</i> species.....	Round or dome	Medium	G	Slow	Clay	Sun	Flowers and fruit	Specimen, general
<i>Malus baccata</i>	Spreading	Medium	G	Medium	Loam	Sun	Flowers and fruit	Specimen, general
<i>Prunus virginiana</i>	Ascending	Medium	G	Medium	Clay	Sun	Suckers	Mass
<i>Quercus imbricaria</i>	Dome	Coarse	DGs	Slow	Loam	Sun	Attractive foliage	Specimen
<i>Syringa japonica</i>	Round	Coarse	DG	Medium	Sandy	Sun	Flowers	Specimen
<i>Ulmus pumila</i>	Oblong	Fine	G	Medium	Sandy	Sun	.....	General
<i>Acer ginnala</i>	Spreading	Fine	G	Medium	Dry, Sandy	Sun	Fall color	General
<i>Euonymus atropurpureus</i>	Irregular	Medium	RG	Medium	Loam	Sun	Odd fruits	Mass
<i>Malus pumila</i> <i>hyb.</i> Kosy bloom	Round or ascending	Medium	RG	Medium	Loam	Sun	Flowers and fruits	Specimen
<i>Crab</i>	Irregular	Medium	RG	Medium	Dry gravelly	Sun	Odd fruits	Mass
<i>Rhus typhina</i>								

CONIFERS FOR VARIOUS PURPOSES AND SITES

The table for conifers differs in certain respects from that for deciduous trees. The height to which the trees grow depends on many factors as in the case of deciduous trees, with this difference: deciduous trees which are past their maximum from an ornamental standpoint usually die off from the top, whereas conifers lose their lower limbs first and frequently become unsightly long before they have reached their ultimate height. This is particularly the case where the trees have been planted too close together and a semi-forest growth induced. The height under which trees are classified in the table is the average height of trees at their maturity from an ornamental point of view. For instance, there are specimens of *Chamaecyparis pisifera filifera* (Sawara Cyprus) at the Central Experimental Farm that are over twenty feet in height, but these have become so open and misshapen that they are no longer ornamental though still growing. *Picea pungens glauca* has reached 70 feet and is still growing lustily but is bare of limbs for the lower 20 feet and so is useless except as a background or accent point in a large tree mass.

Habit of growth corresponds to the shapes as outlined in the illustration. Frequently the shape alters so definitely with maturity and added height that from a landscape point of view the species might as well be two plants; such a plant is *Thuja occ' robusta* which when young, to a height of eight to ten feet, has a distinctly broad conical form, but above that height usually becomes first oval and then almost round at its mature height of about twenty feet. For this reason some species appear under two or more height classifications.

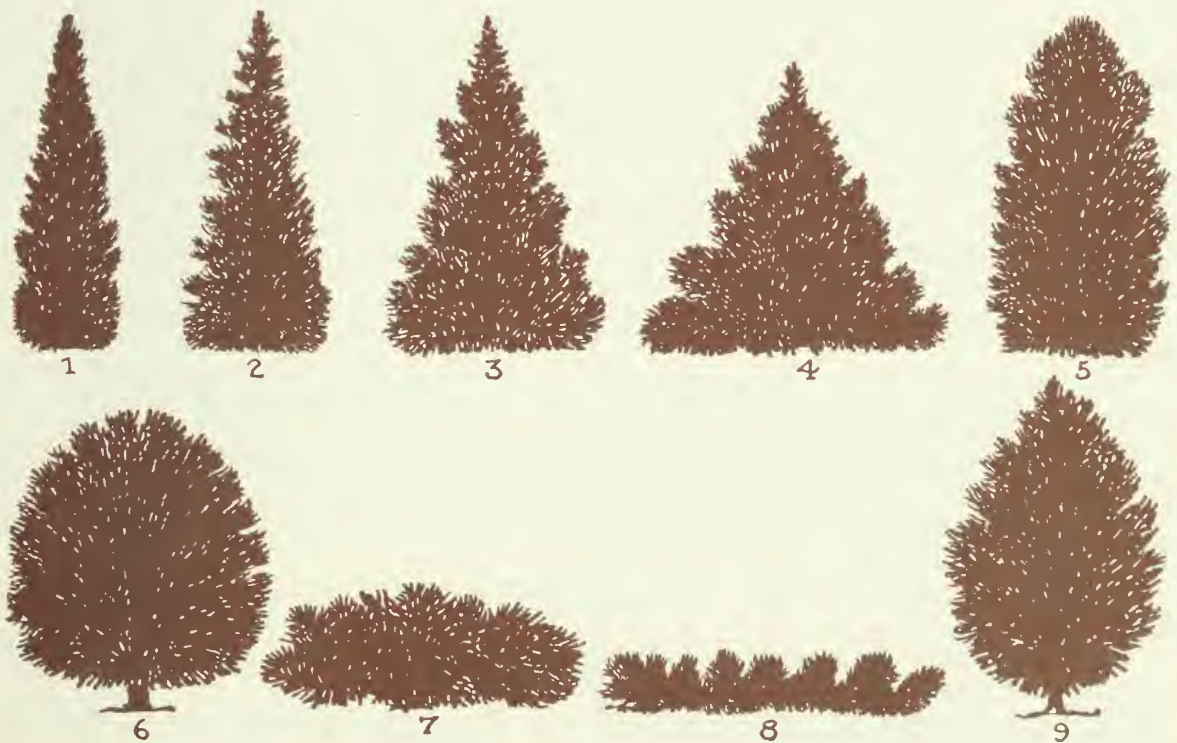


FIGURE 10.—Habit of growth of conifers: (1) Columnar (2) Narrow cone (3) Cone (4) Broad cone (5) Oblong (6) Round (7) Spreading (8) Trailing (9) Oval.

Texture in evergreens depends mainly on density of the foliage, though the length and texture of the needles often influences this. Most of the cedars for instance are of medium texture because of denseness in spite of the fact that their individual scale-like leaves are very small. Probably the best way to describe texture is the impression of solidity given by the individual.

The column headed "site" is descriptive of both soil moisture and light. Typically conifers prefer a well-drained sandy soil with plenty of light. If such conditions are necessary, the word average is used. Where the plant will tolerate other types of soil and conditions of light and moisture these are mentioned.

SUPPLEMENTARY LIST OF RECOMMENDED TREES

Acer platanoides 'Crimson King'. A rather slow growing tree that retains its red foliage throughout the summer.

Acer platanoides 'globosum'. Globe Norway Maple. A compact globose tree that grows to 20 feet.

Aesculus hippocastanum 'Baumanii'. Double-flowered Horse Chesnut. More useful than the single type for it does not produce seeds. Hardy in southern Ontario.

Betula pendula 'purpurea'. Purple European Birch. Has purplish foliage.

Corylus colurna. Turkish Hazel. A tree that always has a perfect pyramidal form.

Crataegus phaenopyrum. Washington Thorn. A very shapely tree with an abundance of white flowers in mid-June, showy red fruits in early fall and good fall coloring.

Euonymus alata. Winged Spindle Bush. A good, hardy small tree with leaves that turn crimson in early fall.

Euonymus europaea. European Spindle Tree. A shapely small tree when kept to a single stem.

Euonymus nikoensis. Nikko Spindle Tree. A good dwarf tree with pink fruits produced in early fall.

Fraxinus excelsior 'aurea'. Golden European Ash. A good form with bright-yellow foliage.

Fraxinus holotricha 'Moraine'. Moraine Ash. A patented tree of good habit, that will definitely be hardy in southern Ontario and will most likely prove hardy at Ottawa. Experience after three years shows that it suffers winter injury until well established.

Gleditsia triacanthos 'Moraine'. Moraine Locust. A form of honey locust with no thorns and no seeds. This tree needs staking in the early stages of development.

Gleditsia triacanthos 'Sunburst'. Sunburst Locust. Has bright-golden foliage in early spring and summer.

Laburnum watereri. Waterer's Golden Chain Tree. A hybrid that appears to be hardier than the common laburnum. Hardy in southern Ontario.

Malus coronaria 'Charlotte'. Charlotte Crab Apple. Has large double flowers, similar to the Betehtel's crab apple, but said to be more resistant to attack by disease.

Malus hybrids. Among the newer hybrid crab apples worthy of note are Almey, Hopa, Hillieri, Lizet and Red Tip.

Morus alba 'pendula'. A rather interesting small pendulous tree that meets the need for small gardens.

Prunus sargentii. Sargent's Cherry. A good single cherry with interesting cherry bark. The only Japanese cherry really hardy at Ottawa.

Quercus robur 'fastigiata'. Upright English Oak. An excellent pyramidal tree for areas with a climate milder than Ottawa.

LARGE CONIFERS OVER 50 FEET

Name	Habit of growth	Texture	Foliage		Rate of growth	Site	Remarks	Uses in landscape composition
			Type	Color				
<i>Larix decidua</i>	Conical	Fine	Needle	LG	Rapid	Wet	Deciduous	General
<i>Picea Abies (excelsa)</i>	Conical	Medium	Needle	G	Rapid	Moist	Large cones	Specimen, general
<i>Picea pungens</i>	Conical	Medium	Needle	BG	Slow	Moist	Distinct blue	General
<i>Picea pungens glauca</i>	Conical	Medium	Needle	GBG	Slow	Moist	.....	Specimen, general
<i>Pinus nigra austriaca</i>	Oval	Coarse	Needle	DG	Medium	Average	Often broadly conical	General
<i>Pinus resinosa</i>	Oval	Medium	Needle	DG	Medium	Average	Divided top	General
<i>Pinus strobus</i>	Oval	Medium	Needle	G	Medium	Average	Very fine	Specimen, general
<i>Pinus sylvestris</i>	Oval	Coarse	Needle	BG	Rapid	Clay	.....	Mass
<i>Pseudotsuga mucronata</i>	Conical	Medium	Needle	DG	Rapid	Any	.....	General

CONIFERS 40-50 FEET

<i>Picea Abies pyramidalis</i>	Narrow Conical	Medium	Needle	DG	Rapid	Moist	.....	Specimen
<i>Picea glauca (canadensis)</i>	Conical	Medium	Needle	BG	Medium	Moist	Small cones	General

CONIFERS 30-40 FEET

<i>Abies balsamea</i>	Conical	Medium	Needle	G	Medium	Moist	Short life	General
<i>Abies concolor</i>	Conical	Medium	Needle	GG	Slow	Average	Buds often kill	Specimen
<i>Abies lasiocarpa</i>	Conical	Medium	Needle	BG	Medium	Average	Very dense	Specimen, general
<i>Picea pungens, Koster's</i>	Conical	Coarse	Needle	GG	Slow	Average	Distinct blue	Specimen, accent
<i>Pinus Banksiana</i>	Oval	Medium	Needle	LG	Rapid	Any	Very hardy	Not useful except in cold districts
<i>Pinus (embra)</i>	Oblong	Medium	Needle	DG	Slow	Any	Very narrow	Accent, specimen
<i>Pinus mugo (montana)</i>	Round	Coarse	Needle	DG	Slow	Any	Not attractive	Odd specimen
<i>Pinus ponderosa</i>	Round	Coarse	Needle	DG	Slow	Average	Long needles	Odd specimen
<i>Thuja occidentalis</i>	Oblong	Medium	Scale	G	Medium	Moist	.....	Mass, hedge
<i>Tsuga canadensis</i>	Conical	Medium	Needle	LG	Slow	Shade	Leader often divided	Specimen, general

CONIFERS 20-30 FEET

Name	Habit of growth	Texture	Foliage		Rate of growth	Site	Remarks	Uses in landscape composition
			Type	Color				
<i>Juniperus virginiana</i>	Oblong	Fine	Scale and needle	BG	Medium	Average	Needs shelter	Specimen, accent to 20 feet, mass
<i>Picea Abies Remontii</i>	Conical	Medium	Needle	G	Slow	Average	Very dense	Specimen
<i>Picea mariana</i>	Conical	Medium	Needle	G	Slow	Moist	Dense	Mass
<i>Picea pungens Koster's</i>	Narrow conical	Coarse	Needle	GG	Slow	Average	Distinct blue	Specimen, accent
<i>Thuja occ' fastigiata (pyramidalis)</i> .	Very narrow conical	Medium	Scale	G	Medium	Moist	.....	Specimen, accent

CONIFERS 10-20 FEET

<i>Picea mariana Doumettii</i>	Conical	Medium	Needle	DG	Slow	Moist	Very dense	Specimen
<i>Taxus cuspidata</i>	Conical	Medium	Needle	DG	Very slow	Shade	Not often so tall	Specimen
<i>Thuja occ' Douglasii pyr'</i>	Oblong	Medium	Scale	YG	Medium	Moist	Gold tipped	Specimen
<i>Thuja occ' fastigiata</i>	Oblong	Medium	Scale	YG	Medium	Moist	Gold tipped	Specimen
<i>Thuja occ' robusta (Wareana)</i>	Oval	Medium	Scale	G	Medium	Moist	Very hardy	All used as specimens, form changes with age, best to 12 feet
<i>Thuja occ' lutea</i>	Oblong	Medium	Scale	TG	Medium	Moist	Gold tipped	
<i>Thuja occ' Ellwangeriana</i>	Oval	Fine	Scale	G	Medium	Moist	Rather open	

CONIFERS 5-10 FEET

All in this class are suitable for foundation planting provided they are removed when too tall.

<i>Chamaecyparis pis' flifera</i>	Broad conical	Fine	Scale	G	Medium	Moist	Rather open	General
<i>Chamaecyparis pis' plumosa</i>	Broad conical	Fine	Scale	G	Rapid	Moist	Compact	Specimen
<i>Chamaecyparis pis' plumosa aurea</i>	Broad conical	Fine	Scale	Y'G	Rapid	Moist	Gold tipped	Specimen
<i>Juniperus comm' suecica</i>	Columnar	Fine	Needle	GG	Slow	Average	Not hardy Ottawa	Specimen accent
<i>Taxus cuspidata</i>	Conical	Medium	Needle	DG	Very slow	Shade	Dense	Specimen accent if lightly trimmed
<i>Thuja occ' fastigiata</i>	(See above)							
<i>Thuja occ' Douglasii pyr</i>	(See above)							
<i>Thuja occ' Hoveyi</i>	Oval	Medium	Scale	Y'G	Medium	Moist	Distinctive	Specimen
<i>Thuja occ' lutea</i>	Cone							
<i>Thuja occ' Ellwangeriana</i>	Broad cone		(See above)					
<i>Thuja occ' robusta</i>	Broad cone							
<i>Thuja occ' globosa</i>	Round	Medium	Scale	G	Medium	Moist	Trim lightly	Specimen

CONIFERS UNDER 5 FEET

<i>Juniperus comm' depressa</i>	Spreading	Medium	Needle	GG	Medium	Rocky	Turns brown	Banks, mass
<i>Juniperus comm' depressa aurea spica</i>	Spreading	Medium	Needle	Y'G	Medium	Rocky	Rather open	Banks, mass
<i>Juniperus chinensis Pfitzeriana</i> ..	Spreading	Fine	Scale	G	Rapid	Any	Sometimes open conical	Banks, rock garden
<i>Juniperus horizontalis</i>	Trailing	Fine	Scale	BG	Medium	Any	Several forms	Banks, rock garden
<i>Juniperus Sabina</i>	Spreading	Fine	Scale	DG	Medium	Any	Very graceful	Specimen, foundation
<i>Juniperus Sabina humilis</i>	Flat spreading	Fine	Scale	DG	Slow	Any	Very graceful	Specimen, foundation, rock garden
<i>Picea Abies</i> , dwarf varieties....	Varied, usually broad cones	Medium	Needle	G	Very slow	Dry	Compact	Rock garden, foundation
<i>Taxus canadensis</i>	Spreading	Medium	Needle	DG	Slow	Shade	.....	Mass
<i>Thuja occ' globosa pumila</i>	Round	Medium	Scale	G	Slow	Moist	Compact	Rock garden, foundation

COMMON NAMES OF TREES

DECIDUOUS TREES *	SCIENTIFIC NAME	PAGE
Allegheny.....	<i>Amelanchier laevis</i>	7
Shadbush.....		
Shadblow.....		
Juneberry.....		
Service Berry.....		
Saskatoon.....		
American Plane (see Buttonwood)		
Ash.....	<i>Fraxinus</i> species.....	9
Beech, American.....	<i>Fagus grandifolia</i>	9
Basswood (see Linden)		
Birch.....	<i>Betula</i> species.....	7
Buckeye, Ohio.....	<i>Aesculus glabra</i>	7
Burning Bush.....	<i>Euonymus atropurpurea</i>	8
Buttonwood.....	<i>Platanus occidentalis</i>	11
Butternut (see Walnut)		
Catalpa.....	<i>Catalpa</i> species.....	8
Cherry.....	<i>Prunus</i> species.....	13
Chestnut, Horse and Hybrids.....	<i>Aesculus hippocastanum</i>	7
Ginkgo (see Maidenhair)		
Cork Tree.....	<i>Phellodendron</i> species.....	11
Cottonwood (see Poplar)		
Crab.....	<i>Malus</i> species.....	10-11
Cucumber Tree.....	<i>Magnolia acuminata</i>	10
Elm.....	<i>Ulmus</i> species.....	16-17
Hackberry.....	<i>Celtis occidentalis</i>	8
Hawthorn.....	<i>Crataegus</i> species.....	8
Hickory, Shagbark.....	<i>Carya ovata</i>	8
Katsura Tree.....	<i>Cercidiphyllum japonicum</i>	8
Kentucky Coffee Tree.....	<i>Gymnocladus dioica</i>	9
Larch.....	<i>Larix</i> species.....	9
Lilac, Japanese Tree.....	<i>Syringa japonica</i>	16
Linden.....	<i>Tilia</i> species.....	16
Locust, Common.....	<i>Robinia pseudoacacia</i>	13-14
Locust, Honey.....	<i>Gleditsia triacanthos</i>	9
Maidenhair Tree.....	<i>Ginkgo bilboa</i>	9
Maple.....	<i>Acer</i> species.....	5-7
Mountain Ash.....	<i>Sorbus</i> species.....	15-16
Oak.....	<i>Quercus</i> species.....	13
Poplar.....	<i>Populus</i> species.....	11-13
Russian Olive.....	<i>Elaeagnus angustifolia</i>	8
Sumac.....	<i>Rhus typhina</i>	13
Tulip Tree.....	<i>Liriodendron tulipifera</i>	10
Tamarack (see Larch)		
Walnut.....	<i>Juglans</i> species.....	9
Willow.....	<i>Salix</i> species.....	14-15
Yellow Wood.....	<i>Cladrastis lutea</i>	8

CONIFEROUS TREES	SCIENTIFIC NAME	
Arborvitae.....	<i>Thuja</i> species.....	22-23
Cedars		
True White Cedar (see Cypress)		
Red "Cedar" (see Juniper)		
Common and Ornamental "Cedars"		
(see Arborvitae)		
Cypress.....	<i>Chamaecyparis</i> species.....	17-18
Douglas Fir.....	<i>Pseudotsuga mucronata</i>	22
Fir.....	<i>Abies</i> species.....	17
Hemlock.....	<i>Tsuga canadensis</i>	23
Juniper.....	<i>Juniperus</i> species.....	18-19
Larch.....	<i>Larix</i> species.....	9
Pine.....	<i>Pinus</i> species.....	20-22
Spruce.....	<i>Picea</i> species.....	19-20
Tamarack (see Larch)		
Yew.....	<i>Taxus</i> species.....	22

*Also, see supplementary list page 28.

CONVERSION FACTORS FOR METRIC SYSTEM

Imperial units	Approximate conversion factor	Results in:
LINEAR		
inch	x 25	millimetre (mm)
foot	x 30	centimetre (cm)
yard	x 0.9	metre (m)
mile	x 1.6	kilometre (km)
AREA		
square inch	x 6.5	square centimetre (cm ²)
square foot	x 0.09	square metre (m ²)
acre	x 0.40	hectare (ha)
VOLUME		
cubic inch	x 16	cubic centimetre (cm ³)
cubic foot	x 28	cubic decimetre (dm ³)
cubic yard	x 0.8	cubic metre (m ³)
fluid ounce	x 28	millilitre (mL)
pint	x 0.57	litre (L)
quart	x 1.1	litre (L)
gallon	x 4.5	litre (L)
WEIGHT		
ounce	x 28	gram (g)
pound	x 0.45	kilogram (kg)
short ton (2000 lb)	x 0.9	tonne (t)
TEMPERATURE		
degrees Fahrenheit	(°F-32) x 0.56 or (°F-32) x 5/9	degrees Celsius (°C)
PRESSURE		
pounds per square inch	x 6.9	kilopascal (kPa)
POWER		
horsepower	x 746 x 0.75	watt (W) kilowatt (kW)
SPEED		
feet per second	x 0.30	metres per second (m/s)
miles per hour	x 1.6	kilometres per hour (km/h)
AGRICULTURE		
gallons per acre	x 11.23	litres per hectare (L/ha)
quarts per acre	x 2.8	litres per hectare (L/ha)
pints per acre	x 1.4	litres per hectare (L/ha)
fluid ounces per acre	x 70	millilitres per hectare (mL/ha)
tons per acre	x 2.24	tonnes per hectare (t/ha)
pounds per acre	x 1.12	kilograms per hectare (kg/ha)
ounces per acre	x 70	grams per hectare (g/ha)
plants per acre	x 2.47	plants per hectare (plants/ha)

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