The Use of Some of the More Important Broadleaf and Conifer Trees of the United States for Landscaping

by

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Approved:

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Objective

The principal objective of this work has been to concentrate and examine the characteristics of each tree which makes it suitable for ornamental and shade use. These trees have been selected on the basis of their importance, beauty and practicability.
American ash.................Fraxinus americana

I. Appearance.

A. Foliage: finely textured, light green, turning yellow or purple in autumn (4).
B. Flowers: in loose panicles, appear in April and May before leaves.
C. Fruit: 1 to 2" samara, in clusters 6 to 8" long.
D. Form and size: crown broadly ovate, round-topped or pyramidal to oblong; attains a height of 70 to 80'.

II. Requirements.

A. Soil: requires a deep fertile soil.
B. Moisture: requires an abundance of soil moisture, will not grow in dry soils.
C. Space: should be spaced 45' apart when used as a street tree (4).
D. Light: intolerant of shade.

III. Resistance.

A. Insects and diseases: sometimes attacked by white rot and oyster shell scale.
B. Frost: frost resistant.
C. Wind: windfirm.
D. Air impurities: resistant to smoke injury (4).

IV. Miscellaneous characteristics.

A. Transplanting: easily transplanted (8).
B. Growth and age: a 3" sapling will attain a diameter of 12" in 20 years if conditions are favorable; reaches an average age of 200 years.
C. Root system: Widespreading with numerous, deep-seated laterals.

D. General desirability: moderately clean in habit.

V. Specific uses: adapted for avenue use on wide streets, also a desirable shade and lawn tree (16).

VI. Outstanding advantages.

A. Very hardy.

B. Has few insect enemies.

C. Easily transplanted.

D. Fast grower.

VII. Outstanding disadvantages—very exacting in soil and moisture requirements.
Basswood.....................Tilia glabra

I. Appearance.
   A. Foliage: Moderately coarse textured, dark green.
   B. Flowers: yellowish-white, fragrant, in cymes of 6 to 20 flowers, appear in June or July after leaves.
   C. Fruit: globose, nut-like, \( \frac{1}{2} \)" in diameter, one or more fruits being attached to a leafy bract.
   D. Form and size: crown dense, round-topped; average height about 70 to 90' high.

II. Requirements.
   A. Soil: prefers fertile soils, but will grow in poor soils.
   B. Moisture: known as a wet soil tree, but will grow in dry sites.
   C. Space: should planted 40' apart when used as a street tree (4).
   D. Light: moderately tolerant of shade.

III. Resistance.
   A. Insects and diseases: Subject to considerable insect injury and mature trees are usually hollow because of rot.
   B. Frost: quite frost hardy.
   C. Air impurities: resistant to injury from smoke (4).

IV. Miscellaneous characteristics.
   A. Transplanting: easily transplanted.
   B. Growth and age: a 3" sapling will reach a size of 17" in 20 years (4); grows to an age of 90 to 140 years.
   C. Root system: develops a widespread, deeply penetrating network of roots.
D. General desirability: one of the cleanest of street trees.

E. Commercial importance: honey produced from this tree is of finest quality (8).

V. Specific uses: street tree, also planted by apiarists, adapted for seaside plantings (4).

VI. Outstanding advantages.
   A. Produces beautiful fragrant flowers.
   B. Fast grower.
   C. Easily transplanted.

VII. Outstanding disadvantages: subject to rot and insect injury.
Beech..............................Fagus grandifolia

I. Appearance.
   A. Foliage: moderately coarse textured, dark green.
   B. Flowers: in globose heads 1" in diameter, yellow green, appear in April or May.
   C. Fruit: stalked bur, containing 2 to 3 edible nuts.
   D. Form and size: short-trunked with a broad, compact, rounded crown; average height is about 60 to 70 feet.

II. Requirements.
   A. Soil: prefers moist clays, but grows well in any type of soil except sand also adapted to limestone soils.(4).
   B. Moisture: requires abundant soil moisture (8).
   C. Light: quite tolerant of shade.

III. Resistance.
   A. Insects and diseases: free of insect injury but overmature trees are subject to heart rot.(8).
   B. Frost: often injured by late frosts.
   C. Wind: subject to windfall because of shallow root system.

IV. Miscellaneous characteristics.
   A. Transplanting: easy to transplant.
   B. Growth and age: grows slowly and persistently; reaches an age of about 300 to 400 years.
   C. Root system: very shallow and spreading.
   D. General desirability: quite clean and easily cared for.
E. Price: 4 to 5' stock, $3.50 apiece (1b).

F. Commercial importance: produces delicious edible nuts.

V. Specific uses: very important for winter beauty of steel-gray bark and also because it sometimes retains its leaves.

VI. Outstanding advantages.
A. Easy to transplant.
B. Longlived.
C. Persistent in dense shade.

VII. Outstanding disadvantages.
A. Slow of growth.
B. Requires abundant moisture.
Paper birch..................Betula papyrifera

I. Appearance.
   A. Foliage: finely textured, dark green above, lighter beneath.
   B. Flowers: brownish or greenish, appear in April or May.
   C. Fruit: cylindrical, long-stalked strobiles, one to two inches long, ripens in autumn.
   D. Form and size: has a broad, open crown; reaching a maximum height of 70'.

II. Requirements.
   A. Soil: grows well on poor or good soils.
   B. Moisture: grows under a variety of moisture conditions.
   C. Light: Intolerant of shade.

III. Resistance.
   A. Insects and diseases: quite free of insect or fungous attacks.
   B. Frost: its natural range seems to indicate frost hardiness.
   C. Wind: windfirm.

IV. Miscellaneous characteristics.
   A. Transplanting: very easy to transplant.
   B. Growth and age: makes rapid growth during youth, but grows slower as it matures; it reaches a maximum age of 100 years.(8).
   C. Root system: has a shallow, superficial root sys-
D. General desirability: this species is one of the cleanest ornamentals.

V. Specific uses: very desirable when planted along with conifers (8).

VI. Outstanding advantages.
   A. Foliage and light colored bark very attractive.
   B. Adapts itself to a variety of sites.
   C. Easily transplanted.

VII. Outstanding disadvantages: short-lived.
Boxelder: Acer negundo

I. Appearance.
   A. Foliage: medium textured, dark green, turning yellow in autumn (8).
   B. Flowers: yellow green, in 1½ to 2" pedicels, appear in April.
   C. Fruit: double samara, stays attached to tree until early spring.
   D. Form and size: bole is short with much branched, spreading, round-topped crown; total height about 50 to 60'.

II. Requirements.
   A. Soil: adapts itself readily to almost any type of soil (8).
   B. Moisture: grows quite well on dry sites, but somewhat slower than on moist sites.
   C. Light: moderately tolerant of shade (14).

III. Resistance.
   A. Insects and diseases: mature trees are subject to heart rot, but not seriously damaged by insects.
   B. Frost: frost resistant.
   C. Wind: because of the brittle branches this species is subject to wind breakage (8).

IV. Miscellaneous characteristics.
   A. Transplanting: the shallow root system and resistance to drought makes this species easy to transplant.
   B. Growth and age: growth is very rapid the first 20 years; attains an age of about 60 years.
C. Root system: usually has a shallow widespread root system which may be quite deep in deeper soils.
D. General desirability: the shedding of leaves in the summer and fruit in winter makes this tree quite unclean (8).

V. Specific uses: used mostly for background or shade (13).

VI. Outstanding advantages.
   A. Fast growth.
   B. Will grow in adverse sites.
   C. Easily transplanted.

VII. Outstanding disadvantages.
   A. Shortlived.
   B. Poor form.
   C. Sheds fruit and leaves irregularly.
   D. Easily damaged by storms.
Butternut.......................... Juglans cinerea

I. Appearance.

A. Foliage: medium coarse textured, appears in late spring and is shed in early fall, color turns to yellow in autumn. (8).
B. Flowers: appear in April or May.
C. Fruit: drupe 2 to 3" long, nut is light brown, edible, ripens in October or November.
D. Form and size: crown symmetrical, broad, low, round-topped; from 20 to 75' in height.

II. Requirements.

A. Soil: grows in a variety of soils, often found in swamps.
B. Moisture: grows under varying moisture conditions.
C. Light: very intolerant of shade, requires full light (14).

III. Resistance.

A. Insects and diseases: foliage is badly injured by defoliating insects.
B. Wind: windfirm, branches are sometimes broken by storms.
C. Heat: heat tolerant (12).

IV. Miscellaneous characteristics.

A. Transplanting: difficult to transplant.
B. Growth and age: makes rapid growth on good soils; maximum age about 75 years.
C. General desirability: shedding of fruit causes
considerable litter.

E. Commercial importance: nuts are edible and the husks produce dyestuffs. (14).

V. Specific uses: used mostly as a specimen or ornament tree (12).

VI. Outstanding advantages.
A. Grows on poor sites.
B. Grows very rapidly on good sites.
C. Produces edible nuts.

VII. Outstanding disadvantages.
A. Difficult to transplant.
B. Short-lived.
C. Attacked severely by defoliating insects.
Hardy Catalpa ............... Catalpa speciosa.

I. Appearance.

A. Foliage: coarse textured, heart-shaped leaves, 8 to 12" long, dark green above, turning black and shedding with the first frost in the fall (6).

B. Flowers: 5 to 6" long, purplish-white appear in June or July after the leaves.

C. Fruit: slender, 2-celled capsule 10 to 12" long, hanging on the tree all winter and shedding the seeds in the spring.

D. Form and size: short trunked with a broad, rounded crown; maximum height about 120'.

II. Requirements

A. Soil: requires fertile soil, also grows well in alkali soils (12).

B. Moisture: drought tolerant (12).

C. Space: should be spaced 30' apart when planted for street or highway use (4).

D. Light: rather intolerant of shade.

E. Heat: very heat tolerant (12).

III. Resistance.

A. Insects and diseases: this species is subject to attack by fungusous diseases, but is quite free of insect attack.

B. Frost: this species is easily injured by frost.

C. Wind: the branches are quite brittle and easily broken by windstorms.

IV. Miscellaneous characteristics.

A. Transplanting: fairly easy to transplant.
B. Growth and age: grows rapidly when conditions are right, a 3" sapling will attain a diameter of 16" in 20 years; matures at about 100 years.(4).

C. Root system: develops a deep, widespread root system.

D. General desirability: successive fall of flowers, fruit and leaves makes this species very untidy (8).

V. Specific uses: used mostly as a lawn or specimen tree for parks and estates, also used as a street tree for wide streets (4).

VI. Outstanding advantages.

A. Has large showy flowers.
B. Grows rapidly.
C. Withstands heat, drought and alkali.

VII. Outstanding disadvantages.

A. Subject to frost injury.
B. Subject to wind breakage.
C. Very unclean in habit.
Chestnut..................Castanea dentata

I. Appearance.

A. Foliage: coarse textured, dull green, turning to yellow and red in the fall (12).
B. Flowers: in erectments 6 to 8" long, yellow green, appearing in June or July after the leaves; this is one of the last trees to bloom in the summer (8).
C. Fruit: round thick burs about 2" in diameter, containing one to 5 edible nuts.
D. Form and size: broad, rounded crown, being one of the broadest crowned trees in the open; reaches about 100' in height (8).

II. Requirements.

A. Soil: requires deep soil, preferring loamy or sandy soils.
B. Moisture: requires well drained soils.
C. Space: requires a spacing of at least 50' when used as a street or highway tree (4).
D. Light: quite tolerant of shade.

III. Resistance.

A. Insects and diseases: very seriously damaged by insects and diseases mainly the chestnut blight which has killed off large areas of chestnut in the east.
B. Wind: windfirm.

IV. Miscellaneous characteristics.

A. Transplanting: very difficult to transplant.
B. Root system: always has a very deep, well developed taproot.
C. Growth and age: rapid growing; lives to an age of 200 years or more.
D. General desirability: the characteristic of the fruit of this species cause considerable litter.
E. Commercial importance: produces a large quantity of edible nuts.

V. Specific uses: used mostly as a street tree also very desirable for shade and lawn use (13).

VI. Outstanding advantages.
A. Has a very widespread crown.
B. Makes rapid growth and is long lived.
C. Will grow in a variety of soil and moisture conditions.

VII. Outstanding disadvantages.
A. Very difficult to transplant.
B. Not hardy to disease or insect attack.
Eastern Red Cedar..........Juniperus virginiana

I. Appearance.
   A. Foliage: leaves scale-like, very finely textured, persistent.
   B. Fruit: dark blue, berry-like cone, 1/2" in diameter.
   C. Form and size: narrowly pyramidal, compact, dense, crown with branches extending to the ground in the open; total height about 20 to 50'.

II. Requirements.
   A. Moisture: will grow in a variety of moisture conditions.
   B. Soil: grows in almost any type of soil, preferring limestone soils (12).
   C. Light: very tolerant of shade.

III. Resistance.
   A. Insects and diseases: this species is subject to quite serious injury from fungal diseases when young and when mature (17).
   B. Wind: subject to windthrow unless protected.

IV. Miscellaneous characteristics.
   A. Growth and age: very slow growing; lives to 300 years or more.
   B. Root system: shallow-rooted after the juvenile stage.
   C. Price: 3 to 4' stock: $3.00 apiece (18).

V. Specific uses: the fruit of this species makes it useful in attracting birds.

VI. Outstanding advantages.
   A. Long-lived.
   B. Will grow in adverse sites.
C. Fruit attracts birds (17).

VII. Outstanding disadvantages.

A. Slow growth.

B. Subject to disease when young.
Kentucky Coffeetree..............Gymnocladus dioicus

I. Appearance.
   A. Foliage: fine textured, leaflets 1 to 3" long, dark green above, pale yellow-green beneath.
   B. Flowers: white and greenish-white, in 3 to 4" corymbs and racemes 10 to 12" long.
   C. Fruit: pods 5 to 12" long.
   D. Form and size: crown narrow, open, irregular with no well-defined main axis, about 60 to 80' in height.

II. Requirements.
   A. Soil: requires rich, deep soil.
   B. Moisture: requires moisture, but also requires good drainage.
   C. Space: should be spaced 20' apart when used as a street tree (4).
   D. Light: very intolerant of shade, requires full sunlight at all times.

III. Resistance.
   A. Insects and diseases: quite free of insect and fungous attacks.
   B. Wind: windfirm.

IV. Miscellaneous characteristics.
   A. Transplanting: easily transplanted.
   B. Growth and age: rapid growing; matures at 150 years.
   C. Root system: has a deep wide-spread root system.
   D. General desirability: very neat and clean in habit (8).
V. Specific uses: specimen tree for lawn or park use (13).

VI. Outstanding advantages.
   A. Fast growing.
   B. Free of insects and diseases.
   C. Easily transplanted.

VII. Outstanding disadvantages.
   A. Requires exacting moisture conditions.
   B. Requires a large amount of space for root system.
Pacific Dogwood

Cornus nuttallii

I. Appearance.
   A. Foliage: finely textured, dark and shining green.
   B. Flowers: beautiful white or pink scales surrounding heads of very small flowers; flowers appear in early spring the first time and in early fall the second time.
   C. Fruit: shiny red or orange drupe occurring in clusters of 25 to 40, ripening in October.
   D. Form and size: short, narrow, rounded crown; total height about 30 to 40 feet.

II. Requirements.
   A. Soil: grows in rich forest loam and gravelly or rocky soils.
   B. Moisture: requires moist, but well-drained soils.
   C. Light: very tolerant of shade.

III. Resistance.
   A. Frost: not injured by frost.
   B. Air impurities: resistant to injury from smoke.

IV. Miscellaneous characteristics.
   A. Transplanting: very difficult to transplant, should be transplanted in early winter.
   B. Growth and age: grows quite slowly, but is long-lived.
   C. General desirability: moderately clean.

V. Specific uses: makes a very beautiful shade tree and the fruit is very helpful in attracting birds.
VI. Outstanding advantages.
   A. Bears beautiful flowers and fruit.
   B. Attracts birds.
   C. Longlived.

VII. Outstanding disadvantages.
   A. Difficult to transplant.
   B. Slow growing.
American elm.................. Ulmus americana

I. Appearance.
   A. Foliage: finely textured, dull green, turning yellow in autumn (4).
   B. Flowers: greenish or reddish brown, borne on slender peduncles, appear in March or April before the leaves.
   C. Fruit: one-seeded samara with wing surrounding the seed, ½" long, ripens in May of first season.
   D. Form and size: forms a short bole which breaks into a vase shaped crown which gives this species its distinctive appearance; maximum height about 120'.

II. Requirements.
   A. Soil: will grow in any type of soil.
   B. Moisture: requires a moderate amount of moisture in the surface layers of the soil.
   C. Space: should be spaced 50' apart when planted as a street tree (16).
   D. Light: intolerant of shade.

III. Resistance.
   A. Insects and diseases: this species is subject to serious damage from the elm leaf beetle and the Dutch elm disease, the latter of which can only be prevented by annual spraying (8).
   B. Frost: roots are affected by extreme cold.
   C. Wind: subject to windthrow and windshake.
   D. Air impurities: subject to injury from smoke (14).

IV. Miscellaneous characteristics.
A. Transplanting: very easy to transplant.
B. Growth and age: growth is quite rapid throughout development; lives to an age of 175 years.
C. Root system: shallow with widespread lateral growth.
D. General desirability: quite clean except in the spring when the fruit is shed.
E. Price: 6 to 8' stock; $1.25 apiece (18).

V. Specific uses: best suited for shade and street use, being best adapted to wide streets (16).

VI. Outstanding advantages.
A. Rapid grower.
B. Easily transplanted.
C. Has a distinctive vase shaped form.

VII. Outstanding disadvantages.
A. Very susceptible to insects and diseases.
B. Requires exacting moisture conditions.
Black Gum..................Nyssa sylvatica

I. Appearance.

A. Foliage: finely textured, very lustrous, dark green, partially turning bright scarlet in autumn (12).
B. Flowers: greenish, in slender downy peduncles, \( \frac{1}{2} \) to 1½" long, appear in April, May or June with the leaves.
C. Fruit: blue-black, ovoid drupe, \( \frac{1}{2} '' \) long, ripens in September or October.
D. Form and size: crown is short, cylindrical and flat-topped, average height about 60'.

II. Requirements.

A. Soil: will grow in any type of moist soil.
B. Moisture: requires abundant moisture the year around.
C. Light: moderately tolerant of shade.

III. Resistance.

A. Insects and diseases: mature trees are subject to fungous diseases, especially heart rot (8).
B. Wind: often windthrown.

IV. Miscellaneous characteristics.

A. Transplanting: easily transplanted.
B. Growth and age: grows fairly rapidly and matures at 120 to 150 years.
C. Root system: has a widespread root system with deep seated laterals and numerous superficial roots.
D. General desirability: causes a moderate amount of litter.
E. Price: 6 to 8' stock: $2.00 apiece.
V. Specific uses: used mostly as a specimen tree on estates and parks (8).

VI. Outstanding advantages.
   A. Rapid grower.
   B. Has beautiful autumn foliage.
   C. Easily transplanted.

VII. Outstanding disadvantages: requires abundant soil moisture.
Red Gum.....................Liquidambar styraciflua

I. Appearance.
   A. Foliage: leaves star-shaped, appearance coarse textured, bright green, turn red in autumn (12).
   B. Flowers: inconspicuous.
   C. Fruit: long-stalked, globular, spiny, stays on tree throughout the winter.
   D. Form and size: irregular, rounded at top of crown; average height about 90 to 125'.

II. Requirements.
   A. Soil: requires fertile soils.
   B. Moisture: requires abundant soil moisture.
   C. Space: should be spaced 35' apart when used as a street tree (16).
   D. Light: intolerant of shade.

III. Resistance.
   A. Insects and diseases: this species is quite free of insects and fungous injury.
   B. Frost: quite frost resistant (8).
   C. Wind: windfirm.

IV. Miscellaneous characteristics.
   A. Transplanting: easily transplanted.
   B. Growth and age: growth is rapid up to a diameter of 8": matures between 150 to 300 years.
   C. Root system: has a taproot on dry sites, but in moist soil the root system is shallow and spreading.
   D. General desirability: easy to keep neat and clean.

V. Specific uses: used as a street tree largely, being best suited for wide streets (16).
VI. Outstanding advantages.

A. Fast rate of growth.
B. Has brilliant autumn foliage.
C. Quite hardy.
D. Easily transplanted.

VII. Outstanding Disadvantages.

A. Requires abundant moisture.
B. Grows well only in fertile soil.
Eastern Hemlock ............. Tsuga canadensis

I. Appearance.
A. Foliage: quite dense and lacy, persistent with a drooping terminal spray.
B. Fruit: ½ to 3/4" cones, reddish brown.
C. Form and size: crown obtusely pyramidal, broad-based, branches extend to ground; total height about 60'.

II. Requirements.
A. Moisture: requires abundant moisture in order to grow.
B. Soil: will grow on any type of soil as long as it is moist.
C. Light: very tolerant of shade.

III. Resistance:
A. Insects and diseases: there are several diseases and insects that attack this species, but none are serious.
B. Frost: quite frost hardy.
C. Wind: subject to windthrow because of shallow root system.

IV. Miscellaneous characteristics.
A. Transplanting: rather difficult to transplant (17).
B. Growth rate: grows very slowly during the seedling stage but later grows more rapidly; it reaches an age of about 250 years.
C. Root system: has a very shallow root system.

V. Specific uses: most important use as hedges also desirable as a lawn tree (17).
VI. Outstanding advantages.
   A. Has a beautiful appearance (17).
   B. Quite hardy.
   C. Long-lived.

VII. Outstanding disadvantages.
   A. Difficult to transplant.
   B. Requires constant moisture.
Bigleaf hickory.............. Hicoria laciniosa

I. Appearance.
   A. Foliage: coarse textured, dull green.
   B. Flowers: in clusters 5 to 8" long, appear in May.
   C. Fruit: nut about 1½" in diameter, edible, ripening in September.
   D. Form and size: crown narrow and oblong; total height about 80'(8).

II. Requirements.
   A. Soil: requires fertile soil.
   B. Moisture: requires abundant moisture.
   C. Light: quite tolerant of shade (8).

III. Resistance.
   A. Insects and diseases: very seriously injured by insects.
   B. Wind: windfirm.

IV. Miscellaneous characteristics.
   A. Transplanting: quite difficult to transplant.
   B. Growth and age: slow growing; lives to an age of about 250 to 300 years.
   C. Root system: has a deep root system with a strong taproot.
   D. General desirability: drops considerable litter which makes it difficult to keep clean.
   E. Commercial importance: produces edible nuts of which there is a good market for.

V. Specific uses: used mostly as a park or estate tree in the eastern states (8).
VI. Outstanding advantages.
   A. Produces edible nuts.
   B. Longlived.

VII. Outstanding disadvantages.
   A. Requires exacting soil conditions.
   B. Slow in growth.
   C. Attacked by insects.
   D. Difficult to transplant.
Shagbark Hickory..............Carya ovata

I. Appearance.

A. Foliage: coarse textured, dull green.
B. Flowers: in amounts 4 to 6" long, appear in May or June (8).
C. Fruit: 1 ½" to 2½" long, husk containing a white edible nut.
D. Form and size: crown irregular, widespread and round-topped; maximum height is about 130'.

II. Requirements.

A. Soil: will grow in poor soil, but prefers deep, fertile soil.
B. Moisture: grows well in a variety of moisture conditions.
C. Light: very tolerant of shade (8).

III. Resistance.

A. Insects and diseases: injured by a number of insects and diseases; leaves are attacked by a number of leaf parasites which render the foliage very unsightly in late summer (14).
B. Frost: Young trees are quite susceptible to frost injury (8).
C. Wind: windfirm.

IV. Miscellaneous characteristics.

A. Transplanting: difficult to transplant.
B. Growth and age: grows very slowly; matures at about 150 to 200 years.
C. Root system: has a deep root system with a strong taproot.
D. General desirability: the fruit and husks cause a considerable amount of litter.

E. Commercial importance: produces large quantities of edible nuts.

V. Specific uses: used mostly as a park or estate tree.

VI. Outstanding advantages.
   A. Long lived.
   B. Develops a shapely form.

VII. Outstanding disadvantages.
   A. Susceptible to frost injury.
   B. Slow grower.
   C. Difficult to transplant.
   D. Subject to insect injury.
American holly..................Ilex opaca

I. Appearance.
   A. Foliage: persistent, finely textured, yellowish or dark green.
   B. Fruit: red, berry-like drupe, remains on tree throughout the winter.
   C. Form and size: short, tapering bole with symmetrical, pyramidal crown.

II. Requirements.
   A. Soil: grows best in sandy or gravelly soils also adapted to limestone soils (4).
   B. Moisture: grows well under varying moisture conditions.
   C. Light: very tolerant of shade.

III. Resistant.
   A. Insects and diseases: very resistant to insects and diseases.
   B. Frost: frost hardy.
   C. Air impurities: not injured by smoke(4).

IV. Miscellaneous characteristics.
   A. Transplanting: very easy to transplant in the early stages.
   B. Growth and age: grows slowly in all stages, reaches an age of about 100 years.
   C. General desirability: constantly sheds a few leaves, but easy to keep clean.
   D. Root system: has a deep taproot with numerous spreading laterals.
E. Commercial importance: the branches and twigs of this species are valuable in making Christmas decorations, and commercial tracts of holly bring in excellent returns.

V. Specific uses: this species is well adapted for use in rock gardens and seaside plantings (15).

VI. Outstanding advantages.
   A. Beautiful in winter because of red berries and evergreen foliage.
   B. Easily transplanted.
   C. Quite hardy.
   D. Grows in a variety of soil and moisture conditions.

VII. Outstanding disadvantages: slow growing.
Black Locust..................Robinia pseudoacacia

I. Appearance.
   A. Foliage: finely textured, dull dark green above, paler beneath, turning yellow in autumn (12).
   B. Flowers: in drooping racemes 4 to 6" long, blossoms are white and fragrant, appear in May or June after the leaves (8).
   C. Fruit: smooth dark brown pod about 2 to 4" long.
   D. Form and size: crown is narrow, open, oblong and irregular; total height about 50 to 75'.

II. Requirements:
   A. Soil: able to grow in very poor soils, also is alkali tolerant (12).
   B. Moisture: drought resistant, being naturally adapted to dry soils.
   C. Space: should be spaced 45' apart when used as a street tree (15).
   D. Light: very intolerant of shade, requiring light at all stages of development.

III. Resistance:
   A. Insects and diseases: this species is seriously injured by the locust borer, and also is attacked by various forms of fungi.
   B. Frost: resistant to frost.
   C. Wind: often blown over by wind after being riddled by locust borers.
   D. Heat: heat tolerant (4).

IV. Miscellaneous characteristics.
A. Transplanting: very easily transplanted.
B. Growth and age: grows very rapidly, up to pole size in fertile soils, but growth is slow in poor soils; attains a maximum age of about 90 to 100 years (8).
C. Root system: quite clean in habit, shedding its leaves and fruit in the fall.
E. Price: 6 to 8' stock; $1.00 apiece (18).

V. Specific uses: well adapted as a silhouette tree because of its thin foliage, also used for shade and background use (13).

VI. Outstanding advantages.
A. Very hardy except for insect attack.
B. Improves soil by producing nitrogen.
C. Easily transplanted.
D. Drought resistant.

VII. Outstanding disadvantages.
A. Sends up numerous suckers.
B. Severely injured by insects and fungi.
Honey Locust... C.leditsia triacanthos

I. Appearance.
   A. Foliage: very finely textured, dark green above, yellow green beneath, autumn foliage is a golden yellow (4).
   B. Flowers: in pea-like clusters of greenish color.
   C. Fruit: flattened, twisted pods 12 to 18" long.
   D. Form and size: has a narrow, open, ovate or flat-topped crown; average height about 75 to 90'.

II. Requirements.
   A. Soil: will grow on the poorest of soils and is alkali tolerant (4).
   B. Moisture: is drought resistant.
   C. Space: should be spaced 40' apart when used as a street tree (16).
   D. Light: very intolerant of shade, requiring full light in all stages (8).

III. Resistance.
   A. Insects and diseases: this species is one of the best pest resistant trees, being practically free of insects or diseases.
   B. Wind: windfirm.
   C. Air impurities: resistant to smoke injury (4).
   D. Heat: very heat tolerant (4).

IV. Miscellaneous characteristics.
   A. Transplanting: very easily transplanted.
   B. Growth and age: rapid growing; attains over 120 years of age.
   C. Root system: develops a deep, widespread root
system.

D. General desirability: because of the thin foliage and characteristics of the fruit, this species is quite clean in habit.

V. Specific uses: desirable for shade, background and avenue use, being best adapted for wide streets (15).

VI. Outstanding advantages.
A. Freedom of insects and disease.
B. Grows well in adverse soil and moisture conditions.
C. Easy to transplant.
D. Fast growing.
E. Very picturesque.
F. Very hardy.

VII. Outstanding disadvantages.
A. Very intolerant.
B. Requires considerable root space.
Oregon Maple..........................Acer macrophyllum

I. Appearance.
   A. Foliage: coarse textured, dark green, turning reddish yellow in autumn, leaves appear in early spring before flowers. (12).
   B. Flowers: in drooping clusters 4 to 6" long, bright yellow, very showy, appear in April or May after leaves.
   C. Fruit: double samara about 1½" long, ripens in autumn but stays on tree during winter.
   D. Form and size: short-trunked, with broad, dense, round topped crown; maximum height about 100'.

II. Requirements.
   A. Soil: prefers rich, gravelly, humous soils.
   B. Moisture: prefers an abundance of soil moisture.
   C. Light: quite tolerant of shade when in juvenile stage, becoming less tolerant as it matures (8).
   D. Space: requires a spacing of about 50' when used as a street tree (16).

III. Resistance.
   A. Insects and diseases: this species is quite free of insects and diseases.
   B. Frost: quite frost hardy.
   C. Wind: windfirm.
   D. Air impurities: tolerant of injury from smoke.

IV. Miscellaneous characteristics.
   A. Transplanting: very easy to transplant (8).
   B. Growth and age: grows rapidly; attains an age of 150 to 200 years.
C. Root system: has a shallow widespread root system.

D. General desirability: moderately clean of litter.

V. Specific uses: this species is best adapted for street use on wide streets (16).

VI. Outstanding advantages.

A. Easily transplanted.

B. Produces very showy flowers and autumn foliage.

C. Quite hardy.

D. Makes rapid growth.

VII. Outstanding disadvantages: requires abundant moisture.
Silver Maple.................Acer saccharinum

I. Appearance.
   A. Foliage: fine to coarse textured, leaves light green above, silvery white beneath, autumn color is pale to bright yellow (8).
   B. Flowers: small, yellowish-green, appear in "arch or April before the leaves.
   C. Fruit: double samara, ripens in April or May.
   D. Form and size: crown very wide with a broad-topped head.

II. Requirements.
   A. Soil: will grow in a variety of soils.
   B. Moisture: this species is adapted to wet soil conditions.
   C. Space: should be spaced 45' apart when used as a street tree (16).
   D. Light: moderately tolerant of shade.

III. Resistance.
   A. Insects and diseases: this species is subject to several fungous diseases, mature trees usually have heart rot.
   B. Frost: frost resistant.
   C. Wind: windfirm, but brittle branches and twigs make this tree subject to wind breakage.
   D. Air impurities: this species is resistant to smoke injury (4).

IV. Miscellaneous characteristics.
A. Transplanting: quite easily transplanted.
B. Growth and age: grows very rapidly the first 50 years; reaches from 100 to 150 years of age.
C. Root system: develops small taproot with numerous spreading laterals.
D. General desirability: characteristics of fruit makes this species a clean street or lawn tree.
E. Price: 6 to 8' stock; $1.25 a piece (18).

V. Specific uses: suitable as a street tree for narrow streets (16).

VI. Outstanding advantages.
   A. Fast grower.
   B. Grows in a variety of soils.

VII. Outstanding disadvantages.
   A. Subject to fungous diseases.
   B. Subject to windbreakage.
   C. Short-lived.
Sugar Maple: \textit{Acer saccharum}

I. Appearance.

A. Foliage: coarse textured, dark green above, light green beneath, turning yellow or red in autumn.

B. Flowers: yellowish-green, appear in April or May with the leaves.

C. Fruit: double samara, ripens in autumn.

D. Form and size: crown is broad compact, oval or oblong; total height about 70 to 90'.

II. Requirements.

A. Soil: grows well on most soils, but prefers well-drained loams or clay soils.

B. Moisture: grows in a variety of moisture conditions.

C. Space: should be spaced 45' apart when used as a street tree (16).

D. Light: very tolerant of shade, subject to sun scorch if planted in direct sunlight (3).

III. Resistance.

A. Insects and diseases: this species is attacked by numerous insects, the most serious being the maple borer.

B. Frost: susceptible to frost cracks.

C. Wind: windfirm.

D. Air impurities: this species is seriously injured by dusty and gaseous air (8).

IV. Miscellaneous characteristics.

A. Transplanting: young trees are very easily transplanted.

B. Growth and age: growth varies with soil conditions;
a 3" sapling will attain a diameter of 13" in 20 years; average age reached is about 300 to 400 years.

D. General desirability: drops very little litter.

E. Commercial importance: the sap produces a large quantity of sugar.

V. Specific uses: used mostly as a street and highway tree, suited best for wide streets (3).

VI. Outstanding advantages.

A. Hardy to frost kill and windthrow.

B. Crown is very symmetrical.

C. Easy to transplant.

VII. Outstanding disadvantages.

A. Requires pure air.

B. Susceptible to insect injury.
Red Mulberry................. Morus rubra

I. Appearance.
   A. Foliage: finely textured, dark bluish green, turning yellow in autumn (12).
   B. Flowers: in dense drooping spikes 1 to 2" long, which appear in May.
   C. Fruit: berry-like, composed of a compact adhering cluster of drupes, turning red and black, edible, ripen in June or July.
   D. Form and size: short trunked with a dense, broad, rounded crown; total height about 60'.

II. Requirements.
   A. Soil: grows on soils of varying fertility.
   B. Moisture: grows in dry soils, but prefers moist soils.
   C. Light: rather intolerant of shade.

III. Resistance.
   A. Insects and diseases: the leaves are destroyed by a number of defoliators and a few diseases attack this species (8).
   B. Frost: quite frost hardy (8).
   C. Wind: not seriously injured by wind.

IV. Miscellaneous characteristics.
   A. Transplanting: very easily transplanted.
   B. Growth and age: rapid growing especially in early ages, matures at about 90 years.
   C. Root system: shallow, compact or spreading root system.
D. General desirability: considerable litter is caused because of the fruit.

V. Specific uses: the fruit makes this species valuable as an attracting agent for birds (8).

VI. Outstanding advantages.
   A. Attracts birds.
   B. Fast growing.
   C. Easily transplanted.
   D. Quite hardy.

VII. Outstanding disadvantages.
   A. Small size.
   B. Short lived.
   C. Has irregular tendency of growth.
Black Oak .................. *Quercus velutina*

I. Appearance.
   A. Foliage: coarsely textured, dark shining green.
   B. Flowers: hairy catkins 4 to 6" long.
   C. Fruit: \( \frac{1}{2} \) to 3/4" acorn.
   D. Form and size: spreading, rounded or narrow, 
oblong crown; maximum height attained is about 150' (8).

II. Requirements.
   A. Soil: will grow in a variety of soil conditions, 
grows better than any other oak on poor soils (8).
   B. Moisture: grows in a variety of moisture conditions.
   C. Light: very intolerant of shade.

III. Resistance.
   A. Insects and diseases: quite free of insect injury, 
but usually affected by heart rot in old age.
   B. Wind: windfirm.

IV. Miscellaneous characteristics.
   A. Transplanting: very difficult to transplant.
   B. Growth and size: grows rather rapidly and reaches 
an age from 150 to 200 years.
   C. General desirability: moderately clean in habit.
   D. Root system: has a deep taproot in its initial 
growth which later becomes superficial.

V. Specific uses: used mostly for shade, background and fall 
accent (13).

VI. Outstanding advantages.
   A. Windfirm and insect resistant.
   B. Adapts itself to a variety of soil and moisture con-
ditions.

C. Rapid growing.

VII. Outstanding disadvantages.

A. Difficult to transplant.
Chestnut Oak: Quercus montana

I. Appearance.
   A. Foliage: moderate textured, yellow green.
   B. Flowers: hairy catkins 2 to 2 1/2" long.
   C. Fruit: shiny chestnut brown acorn 3/4 to 1 1/2" long.
   D. Form and size: crown is spreading and round topped with a short clear stem.

II. Requirements.
   A. Soil: grows on poor dry soils.
   B. Moisture: grows on drier sites than any of the oaks, requires good drainage (8).
   C. Space: requires 45' spacing when planted as a street tree (4).
   D. Light: fairly tolerant of shade.

III. Resistance.
   A. Insects and diseases: not seriously injured by insects or diseases.
   B. Wind: mature trees are usually badly affected by windshake (8).

IV. Miscellaneous characteristics.
   A. Transplanting: this is the easiest species of the oaks to transplant but still comparatively difficult.
   B. Growth and age: makes rapid growth even on poor soils; reaches about 200 to 300 years of age.
   C. Root system: chestnut oack has a deep root system, but grows on shallower soils than any other Quercus.

V. Specific uses: used largely as a street tree.

VI. Outstanding advantages.
   A. Rapid growth.
B. Crows on poor sites.
C. Hardy.
D. Long lived.

VII. Outstanding disadvantages: difficult to transplant.
Cow oak..................Quercus prinus

I. Appearance.
   A. Foliage: moderately coarse textured, bright green, rather sparse.
   B. Flowers: hairy anemone 2 to 4" long.
   C. Fruit: bright brown acorn 1 to 1½" long.
   D. Form and size: crown rounded, compact; 60 to 80' in height.

II. Requirements.
   A. Soil: requires fertile soil.
   B. Moisture: requires constant soil moisture.
   C. Light: fairly tolerant of shade.

III. Resistance.
   A. Insects and diseases: this species is quite free of insects and fungous attacks.
   B. Quite hardy within its range.

IV. Miscellaneous characteristics.
   A. Transplanting: very difficult to transplant because of its long taproot.
   B. Growth and age: this species is very slow growing throughout its life; it reaches 350 years or more in age.
   C. Root system: taproot with many deep laterals.
   D. General desirability: quite neat except in winter when foliage is shed constantly (8).

V. Specific uses: maybe used as a street or specimen tree.

VI. Outstanding advantages.
   A. Long lived.
   B. Quite hardy.
VII. Outstanding disadvantages.

A. Requires abundant moisture and fertile soil.
B. Slow growing.
C. Difficult to transplant.
Red Oak.......................... Quercus borealis

I. Appearance.
   A. Foliage: coarse textured, dark green, turning deep scarlet in the fall (12).
   B. Flowers: in hairy catkins 4 to 5" long, appear in May or June after the leaves are half grown.
   C. Fruit: 1" acorn which ripens in October or November of the second season (8).
   D. Form and size: forms a broad, dense, spreading crown; the total height is about 70'.

II. Requirements.
   A. Soil: adapted to wet, loamy soils.
   B. Moisture: requires abundant moisture.
   C. Space: should be spaced 45' apart when used as a street tree (4).
   D. Light: fairly tolerant of shade.

III. Resistance.
   A. Insects and diseases: subject to boring insects and heart rot.
   B. Frost: frost resistant.
   C. Wind: not injured by strong winds.

IV. Miscellaneous characteristics.
   A. Transplanting: difficult to transplant.
   B. Growth and size: this is the fastest growing oak, a 3" sapling will attain a diameter of 13" in 20 years (4).
   C. Root system: has a very deep taproot.
   D. General desirability: easily kept clean at all times.
   E. Price: 6 to 8' stock: $2.25 apiece (18).
V. Specific uses: well adapted for seaside planting; it is also a desirable park or campus tree.

VI. Outstanding advantages.
   A. Fast growth.
   B. Has a beautiful autumn foliage.

VII. Outstanding disadvantages.
   A. Difficult to transplant.
   B. Subject to insect and fungous.
White Oak..........................Quercus alba

I. Appearance.

A. Foliage: medium textured, dark green, often persistent on the tree throughout the winter (14').
B. Flowers: in hairy catkins 6 to 8" long, reddish, appear in May or June with leaves.
C. Fruit: 3/4 to 1" acorn.
D. Form and size: round-headed, spreading crown: reaches about 100' in height.

II. Requirements.

A. Soil: requires fertile soil and will not grow in sand.
B. Moisture: prefers moist, well drained soils, but will grow on dry soils.
C. Space: requires a spacing of 50' when used as a street tree (16').
D. Light: quite intolerant of shade.

III. Resistance.

A. Insects and diseases: not seriously injured by insects and diseases.
B. Wind: free of windthrow and wind breakage.
C. Air impurities: resistant to smokel injury (4').

IV. Miscellaneous characteristics.

A. Transplanting: very difficult to transplant.
B. Growth and size: very slow growing, a 3" sapling will attain a diameter of 11" in 20 years; it lives to an age of 500 to 600 years (4).
C. Root system: has a deep, well developed taproot.
D. General desirability: quite clean in habit except during the winter when the foliage is constantly being shed (8).

V. Specific uses: used mostly as a park or street tree, being especially adapted to wide streets (15).

VI. Outstanding advantages.
A. Long lived.
B. Very hardy.

VII. Outstanding disadvantages.
A. Difficult to transplant.
B. Requires exacting soil and moisture conditions.
Eastern White Pine..............Pinus strobus

I. Appearance.
   A. Foliage: quite dense, bluish green, whitened on the lower side of needles turning yellow and falling in the fall of the second season.
   B. Fruit: brown cone about 5 to 11" long, matures in August of the second season.
   C. Form: crown is conical with typical bluish-green spray; attains a height of about 90'.

II. Requirements.
   A. Moisture: Requires abundant and constant moisture.
   B. Soil: makes the best growth in heavy loam and clay soils of moderate drainage.
   C. Light: very tolerant of shade, being the most tolerant of the pines.

III. Resistance.
   A. Insects and diseases: this species is attacked quite seriously by the white pine weevil and white pine blister rust (5).
   B. Wind: subject to windfall.

IV. Miscellaneous characteristics.
   A. Transplanting: quite easy to transplant.
   B. Growth rate: grows moderately fast under cultivation; often attains an age of 300 years (17).

V. Specific uses: very desirable as a campus or estate tree.

VI. Outstanding advantages.
   A. Easy to transplant.
   B. Fairly rapid grower.
C. Grows in adverse sites.

VII. Outstanding disadvantages.

A. Has a low resistance to diseases and insects.

B. Requires abundant moisture.
Jack Pine ....................... Pinus banksiana

I. Appearance.
   A. Foliage: thin and lacy, grayish green, persistent.
   B. Fruit: 1½ to 2" cone, turning from green to purple and later to brown.
   C. Form and size: crown, open, pointed and oval shaped, branches extend to the ground.

II. Requirements.
   A. Moisture: quite drought resistant, but does well on all well drained sites.
   B. Soil: grows well in any soil that is well drained.
   C. Light: very intolerant of shade (17).

III. Resistance.
   A. Frost: quite frost hardy (17).

IV. Miscellaneous characteristics.
   A. Transplanting: very easy to transplant.
   B. Growth and age: grows rapidly the first few years and later grows very slowly; 125 to 150 years is the average age attained.
   C. General desirability: the characteristic of the fruit makes this species quite easy to keep clean.

V. Specific uses: the ability of this species to grow in very adverse sites makes it suitable as an ornament where most other species will not grow.

VI. Outstanding advantages.
   A. Quite hardy.
   B. Grows in adverse sites.
   C. Easy to transplant.
VII. Outstanding disadvantages: makes slow growth.
Ponderosa Pine...............Pinus ponderosa

I. Appearance.

A. Foliage: the leaves are in heavy brush-like clusters at the ends of bare branches, deep yellow-green, persistent.

B. Fruit: cones ranging from grass green to dark purple, 2 3/4 to 5 3/4" long, mature in August of the second year.

C. Form and size: the crown is long with branches extending to the ground if grown in the open; it reaches about 125' in height.

II. Requirements.

A. Moisture: this species requires very little soil moisture and cannot survive unless the soil is well drained.

B. Soil: this species will grow on almost any kind of soil as long as there is good drainage.

C. Light: very intolerant of shade;

III. Resistance.

A. Insects and diseases: this species is subject to injury by red rot, mistletoe, and bark beetles, especially the Dendroctonus (17).

B. Frost: frost and cold resistant.

C. Wind: Not seriously subject to windthrow.

IV. Miscellaneous characteristics.

A. Transplanting: quite difficult to transplant.

B. Growth and age: in fair sites this species is a very rapid grower; often attains an age of 350 to 500
years.

C. Root system: this species has a deep root system with a large number of lateral roots in later life.

V. Specific uses: park, campus and lawn use; very desirable as a beautiful ornamental conifer where the soil is dry.

VI. Outstanding advantages:
   A. Grows in adverse sites.
   B. Very nice form and appearance.
   C. Makes rapid growth and attains a large size.

VII. Outstanding disadvantages: subject to serious insect injury.
Red Pine

I. Appearance
   A. Foliage: needles 4 to 6" long, dark shining green, persistent.
   B. Fruit: 2" cones, light brown, seeds are shed in early autumn.
   C. Form and size: crown broad, irregular with branches extending to ground; reaches a height of about 60'.

II. Requirements
   A. Moisture: this species is very drought resistant and requires well drained sites (17).
   B. Soil: grows best on sandy soils because of the good drainage.
   C. Light: very intolerant of shade.

III. Resistance
   A. Insects and diseases: this is one of the hardiest pines in resisting insects and diseases.
   B. Frost: withstands frost quite well.
   C. Wind: windfirm.

IV. Miscellaneous characteristics
   A. Transplanting: very easy to transplant.
   B. Growth and age: rapid grower until it reaches its maximum height; lives to be 250 years of age.
   C. Root system: young trees have a short taproot, but older trees have a shallow narrow root system.

V. Specific uses: very desirable as a park tree (17).

VI. Outstanding advantages
   A. Rapid grower
B. Drought and frost resistant.
C. Handsome appearance.
D. Easily transplanted.

VII. Outstanding disadvantages: requires good soil drainage.
Redbud..........................Cercis canadensis

I. Appearance.
   A. Foliage: dark green, lustrous above, pale beneath, leaves 3 to 5" long.
   B. Flowers: red or purple, fascicled 4 to 8 together, appear in April before the leaves.
   C. Fruit: thin, flat pod.
   D. Form and size: crown, flat and spreading; maximum height about 30 to 40'.

II. Requirements.
   A. Soil: attains best development in rich soil.
   B. Moisture: requires abundant moisture, growing naturally in moist sites.
   C. Light: Tolerant.

III. Resistance.
   A. Frost: has the reputation of being frost hardy (8).
   B. Wind: not injured by wind.

IV. Miscellaneous characteristics.
   A. Transplanting: very easy to transplant.
   B. Growth and age: slow growing; attains an age of 150 years.
   C. Root system: roots are shallow and spreading.
   D. General desirability: easily kept clean at all times.
   E. Price: 4 to 5' stock: $1.25 apiece (18).

V. Specific uses: useful for its spring beauty and attractive when planted with conifers (8).

VI. Outstanding advantages.
   A. Has a beautiful appearance all seasons of the year.
B. Easily handled and is hardy.

VII. Outstanding disadvantages: grows slowly.
Sassafras..........................Sassafras variifolium

I. Appearance.
A. Foliage: fine textured, leaves of variable shapes, dull dark green, turns yellow orange or red in autumn.
B. Flowers: greenish-yellow, in 2" racemes, appears in May with leaves.
C. Fruit: dark blue berry 3/8" long, very eagerly sought by birds, ripens in September or October (8).
D. Form and size: short trunked, crown narrow, flat-topped; maximum height about 90'.

II. Requirements.
A. Soil: prefers rich sandy soils.
B. Moisture: prefers well drained sites.
C. Light: tolerant of shade.

III. Resistance: windfirm.

IV. Miscellaneous characteristics.
A. Transplanting: very easy to transplant.
B. Growth and age: slow growing; usually about 10 to 15' in height.
C. Root system: has a shallow, widespread root system.
D. General desirability: usually quite clean if the birds are plentiful enough to consume the fruit.

V. Specific uses: valuable in attracting birds and also for seaside plantings (4).

VI. Outstanding advantages.
A. Attracts birds.
B. Easily transplanted.
C. Fall foliage is beautiful and winter appearance is
outstanding because of dull green twigs.

VII. Outstanding disadvantages: slow growing and of small size.
White Spruce...Picea canadensis

I. Appearance.

A. Foliage: blue green with a whitish tinge, persistent (17).
B. Fruit: oblong, nearly sessile, pendulous cones, 1 to 2½ long, grass-green tinged with red when it matures.
C. Form and size: somewhat open, irregular, widely pyramidal, round-topped crown; reaches a total height of about 40'.

II. Requirements.

A. Moisture: requires moderate abundance of moisture and will not grow when the soil is too damp or too dry.
B. Soil: grows best on well drained, moist alluvial soils.
C. Light: tolerant of shade.

III. Resistance.

A. Insects and diseases: sometimes damaged by insects and diseases.
B. Frost: frost hardy (17).
C. Wind: windthrown quite easily.

IV. Miscellaneous characteristics.

A. Transplanting: very easy to transplant.
B. Growth and age: this species is quite slow growing; reaching 250 to 300 years of age.
C. Root system: the root system is shallow and spreading.

V. Specific uses: its shape and form make this species best
adapted for a specimen tree.

VI. Outstanding advantages.

A. Long lived.

B. Handsomely colored foliage and branches grow close to the ground (4).

C. Easy to transplant.

VII. Outstanding disadvantages: slow growing.
Sycamore (Oriental Plane) ..... Platanus orientalis

I. Appearance.
A. Foliage: coarse textured, bright green, turning yellow in autumn (8).
B. Flowers: dark red in short axillary peduncles.
C. Fruit: spherical head, 1" in diameter, ripens in October and stays on the tree throughout the winter.
D. Form and size: short boled, with a broad, open, irregular, spreading crown; total height about 80'.

II. Requirements.
A. Soil: grows in any type of soil.
B. Moisture: will grow in dry soils, but is best adapted to wet soils.
C. Space: should be spaced 45' apart when used as a street tree (4).
D. Light: very intolerant of shade.

III. Resistance.
A. Insects and diseases: mature trees are subject to butt rot and limbs are often attacked by fungus, but it is quite free of insects.
B. Frost: frost hardy.
C. Wind: windfirm and free of wind breakage.
D. Air impurities: this species is not affected by dust or smoke in the atmosphere (4).
E. Pruning: this species is able to withstand severe pruning (6).

IV. Miscellaneous characteristics.
A. Transplanting: easily transplanted.
B. Growth and age: this species is fast growing, a 3" sapling will attain a diameter of 18" in 20 years; lives to an age of 600 years (4).

C. Root system: shallow and widespread.

D. General desirability: sheds seed throughout the winter which causes an unclean condition at this time.

F. Price: 6 to 8' stock: $1.00 a piece (18).

V. Specific uses: mostly used for street and highway planting (1).

VI. Outstanding advantages.

A. Hardy and drought resistant.

B. Long lived.

C. Rapid grower.

D. Easily transplanted.

E. Bark is attractive because of mottled effect.

VII. Outstanding disadvantages: sheds seed constantly during the winter.
Tamarack..................Larix laricina

I. Appearance.

A. Foliage: leaves in clusters and scattered singly, 3/4" long, deciduous, very sparse.
B. Fruit: oblong, obtuse, chestnut brown cone, 1 to 3/4" long, maturing in autumn.
C. Form and size: narrow, sharply conical crown and slender horizontal branches; about 30 to 60' in height (17).

II. Requirements.

A. Moisture: requires an abundance of water at all times.
B. Soil: will grow on any type of soil that contains enough moisture.
C. Light: very intolerant of shade.

III. Resistance.

A. Insects and diseases: quite seriously injured by insects and fungi especially the larch sawfly (17).
B. Wind: subject to windthrow on some sites.

IV. Miscellaneous characteristics.

A. Transplanting: easy to transplant.
B. Growth and age: grows very rapidly up to 35 or 45 years and then slows up very noticeably; attains a maximum age of about 200 years.
C. Root system: in wet sites the root system is shallow and spreading, but somewhat deeper in drier sites.

V. Outstanding advantages.

A. Novel in being a deciduous conifer.
B. Grows rapidly in early life.
VI. Outstanding disadvantages.

A. Requires abundant moisture.

B. Small size usually.
Tulip Tree.....................Liriodendron tulipifera

I. Appearance.
   A. Foliage: coarse textured, leaves peculiarly notched at apex, dark green, turns clear yellow in autumn (8).
   B. Flowers: greenish yellow, 1½ to 2" long, tulip-like.
   C. Fruit: light brown cone 2½ to 3" long, fruit ripens in September or October.
   D. Form and size: crown is short, narrow and pyramidal; total height about 60 to 150'.

II. Requirements.
   A. Soil: will grow on all types of soil as long as there is moisture present.
   B. Moisture: requires abundant moisture.
   C. Space: should be spaced at 50' when used as a street tree (4).
   D. Light: very intolerant to shade.

III. Resistance.
   A. Insects and diseases: this species is quite free of insects and fungi.
   B. Frost: not seriously injured by frost.
   C. Wind: quite windfirm.
   D. Air impurities: resistant to smoke injury (4).

IV. Miscellaneous characteristics.
   A. Transplanting: transplanting is very difficult because of intolerance to root injury.
   B. Growth and age: rapid grower in early stages, a 3" sapling will attain an 18" diameter in 20 years (4); reaches a maximum age of 200 to 250 years.
C. Root system: develops a deep widespread root system.

D. General desirability: this species is comparatively easy to keep neat.

E. Price: 5 to 6' stock: $1.50 apiece (18).

VI. Outstanding advantages.

A. Attractive foliage and flowers.

B. Freedom from insects and diseases.

C. Rapid grower.

D. Long lived.

E. Grows in a variety of soils.

VII. Outstanding disadvantages.

A. Difficult to transplant.

B. Requires abundant moisture.
Black Walnut.................. Juglans nigra

I. Appearance.
   A. Foliage: finely textured, leaves are pinnately compound, appears in late spring and shed in early fall.
   B. Flowers: in aments 3 to 5" long, appear in April or May.
   C. Fruit: round, 1½" to 2" in diameter, nuts are dark brown, edible, ripen in October or November.
   D. Form and size: crown open, symmetrical and round-topped; average total height about 50 to 75'.

II. Requirements.
   A. Soil: requires fertile soil in order to develop.
   B. Moisture: requires a moist, but well drained soil.
   C. Light: quite intolerant of shade.

III. Resistance.
   A. Insects and diseases: the wood and foliage are injured by insects, but this species is quite free of fungus.
   B. Wind: windfirm.

IV. Miscellaneous characteristics.
   A. Transplanting: difficult to transplant.
   B. Growth and age: grows very fast in good soil conditions, but very slow in growth on adverse sites; often reaches an age of 250 years (8).
   C. Root system: deep and widespread.
   D. General desirability: quite difficult to keep clean because of the litter caused by the nuts.
E. Commercial importance: this species is very important as a nut producer; the value of the wood makes single trees valuable for sale.

V. Specific uses: nut production, shade, and ornament.

VI. Outstanding advantages.
   A. Produces edible nuts.
   B. Has been successfully grown in every state in the union. (6).
   C. Quite hardy.
   D. Forms a beautiful spreading crown.

VII. Outstanding disadvantages.
   A. Requires fertile soil and an abundance of moisture.
   B. Difficult to transplant.
Conclusion:

From this work it is evident that the following factors should be considered in the selection of ornamental and shade trees.

1. Climatic adaptability.

In selecting ornamental trees, it is very often true that trees that are not native to the locality in which they are to be used, therefore there is a great possibility of the selected species not surviving.

2. Hardiness and resistance.

Trees that are hardy and resistant to disease and insects are of higher value to the owner because of the expense and time required to care for them so that they will survive. An example of this is the American Elm which is a very beautiful ornamental tree and would be used much more widely if it were not for the fact that it has to be sprayed annually to prevent attacks by the Dutch elm disease.

3. Configuration and conformity.

A desirable ornamental tree must have a uniform and symmetrical figure while at the same time being able to fit in with the surroundings in which it is used.

4. Longevity.

This is an important factor for park, estate and street trees which would require considerable expense and effort to replace every 50 or 60 years.

5. Shade production.

Some trees have a very sparse foliage which limits their uses as an ornamental. When planning plantings for a residence, certain windows require shade during the hottest part of the
day. Situations such as this call for trees that produce dense foliage.


Muscilaginous fruit trees, nut trees and trees that shed their leaves at irregular intervals are undesirable because they require a large amount of effort in order to keep the area beneath them neat. Also street trees with muscilaginous fruits cause a certain amount of danger to pedestrians whom may easily slip and fall while treading on the fruit.

7. Aesthetic value.

Aesthetic value is modified by the shape and size of the crown, type of foliage, appearance at all seasons of the year and the characteristics of the flowers.

8. Commercial importance.

Several ornamental trees are commercially important for their fruit, honey production, decorating foliage, and soil improving qualities. These trees may have a commercial use while being used as an ornamental.
REFERENCE LIST


109, August 1938.


18. California Nursery Company Catalogue, Niles, California.