Planting for Beauty

Shade Trees

STATE OF NEW JERSEY
DEPARTMENT OF CONSERVATION & ECONOMIC DEVELOPMENT
TRENTON, NEW JERSEY

This booklet is intended to help municipalities and their agencies, as well as individual residents, plan their tree planting programs to yield the greatest possible pleasure and beauty.

If additional information is desired or particular problems are present, assistance may be obtained from the members of the offices listed below.

N.J. Department of Conservation and Economic Development

Division of Planning and Development

Bureau of Forestry

Bureau of Planning

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Shade Trees

Nelson T. Kessler, *Assistant Chief*
Forest Management Section

Well selected and properly maintained shade trees are a visible reflection of community character. They provide beauty, shade and comfort to all, and can be a powerful influence in drawing new residents to the community. Yet sometimes towns and cities concentrate on man's material need for concrete and steel structures, neglecting the aesthetic values which are also important in his everyday life. Landscaped parks, playgrounds and well shaded streets and roadways are an integral part of healthy community life.

Careful planning is necessary for the proper planting and maintenance of street trees. Just any old tree will not do. Some trees will grow quite well on city streets while other species are not adapted to city conditions or are subject to attack by insects and disease.

New housing projects and the laying out of new streets require that sufficient space be provided for trees in order that they may grow and develop properly. It is therefore expedient that all shade tree development, planting and maintenance be placed under the control of a shade tree commission appointed by the mayor under the authority given him by the State shade tree laws. (Title 60:64-1 to 14.) The laws are available in pamphlet form from the N. J. Department of Conservation and Economic Development, Trenton 25, N. J.

Trees for Street Planting

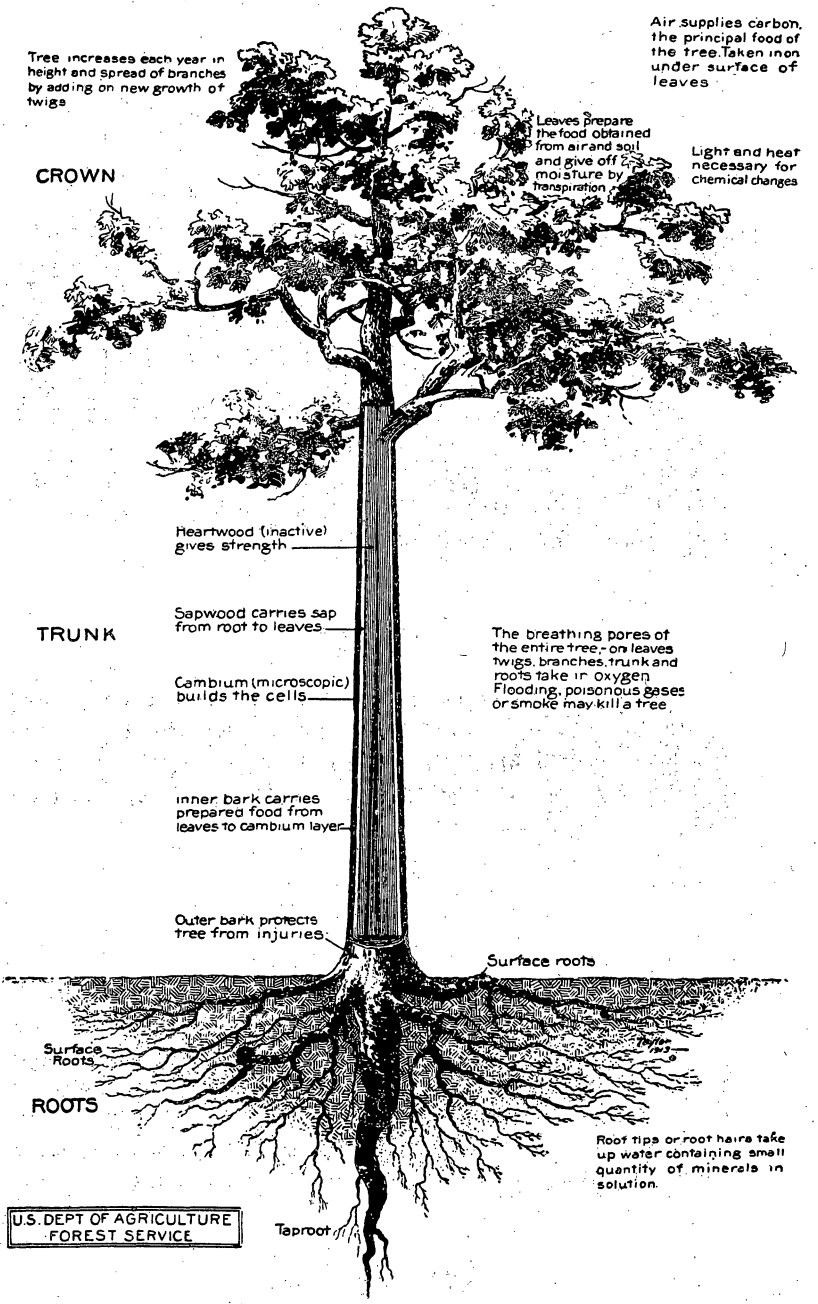
Many trees are not adapted to city streets. Some will not stand tight paving. Others are subject to insects and disease. Some, such as silver maple, poplar and willow are short lived, easily broken in storms and have a tendency to send roots into drains.

The following trees are recommended for street planting:

Red Oak	Red Maple
Scarlet Oak	Red Gum
Pin Oak	Ginkgo (male only)
Willow Oak	Hackberry
White Oak	Honey Locust (thornless)
Sycamore	Black Gum
Tulip Poplar	Small Leaf European Linden
Sugar Maple	Japanese Pagoda
Norway Maple	Sassafras

Oaks Are Recommended

The oaks are among the best trees for street planting, and contrary to popular belief, some of them compare favorably in growth rate with species which are less desirable in other respects. White oak, red oak, sycamore and tulip poplar grow to be very large trees and should be planted only in park-like areas or on very wide streets. Suitable for narrow streets are ginkgo, honey locust, small leaf European linden, sassafras and Japanese pagoda. Columnar varieties of some species also have a considerable value for planting on narrow streets.



HOW THE TREE GROWS

The buds, root tips and cambium layer are the growing parts of the tree. Water containing a small quantity of minerals in solution is absorbed by the roots carried up through the sapwood to the leaves and there combined with carbon from the air to make food. This food is carried by the inner bark to all growing parts of the tree even down to the root-tips.

Buy Trees from a Reputable Nursery

The tree to be planted will be more likely to thrive if it comes from a reputable nursery than if it grew wild, because nursery culture induces the development of compact root systems and lessens the risk of moving. The larger the mass of small feeding roots that are taken up, and the more earth that is moved with them, the quicker and better will the tree re-establish itself. Red gum, tulip poplar, sassafras, black gum, red and white oak are rarely planted successfully unless moved with a "ball" the same as an evergreen. A tree of any kind should be healthy, symmetrical, and, as a rule, have a breast-high diameter of between 2 and 3 inches and a height of about 12 feet.

Location

If conditions permit it, trees usually should be planted inside the sidewalk rather than close to the curb. There they are less subject to injury, their roots have more room, their crowns are less in contact with overhead wires, and they provide better shade for houses.

Spacing

Street trees usually are planted too close together. The proper distance will be determined to some extent by the species, the width of the sidewalk and the front width of the building lots. A safe rule is to space the trees so that their crowns will never interfere, and each will have considerable air and light. Fifty feet is a recommended minimum ground separation; 60 feet or more is better.

When To Plant

Trees can be planted at any time when they are not in leaf. They are most likely to succeed if planted in spring, as soon as the frost is out of the ground. A cloudy, quiet day is better than a bright or windy one.

How To Plant

Dig the hole before the tree arrives. If the local soil is poor make the hole at least 2 feet larger and 1 foot deeper than is required, replacing the poor soil with good rich loam. Cut off all broken roots but save as many as possible of the small fibrous ones. Be careful that roots do not dry out. Put enriched earth in the hole until the tree, when standing upon it, will be no more than 2 inches lower than it stood in the nursery. Hold the tree upright, fill in the mixed soil and fertilizer and compact it firmly about the roots.

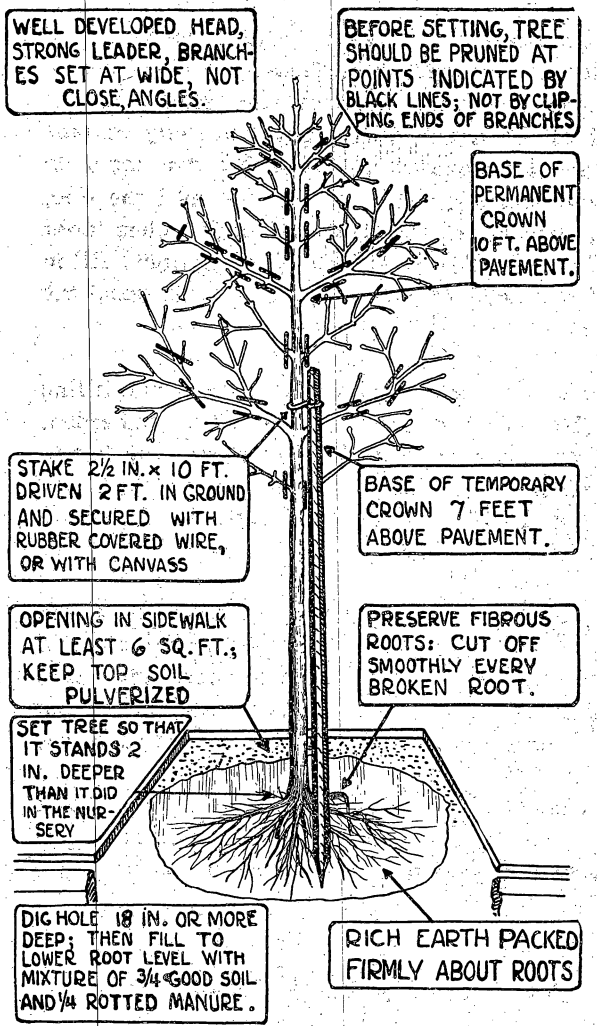
Use plenty of water to settle the earth while filling the hole and be sure that every root is firmly embedded. Many newly planted trees die because their roots are left in air pockets. When all is done, rake the surface to check evaporation. Successful tree planting depends upon care at every point.

A vigorous tree with plenty of good roots, an ample bed of good soil for root growth and careful planting are of prime importance. Then frequent watering, occasional cultivating and fertilizing at regular intervals will insure the best results. If these things are ignored a tree may live but will never thrive. If a young tree is exposed to winds or other strain, keep it firm and upright by means of a stout stake to which the stem is secured in such a fashion that it will not be rubbed. Do not allow a tree to support a guy wire.

How To Feed Shade Trees

Trees growing in the woods have a natural source of food material derived from decomposed leaves, twigs and other organic matter. This organic matter, in the intermediate stages of decomposition, is known as humus and its spongy texture has great water-holding capacity.

Street trees and trees growing on lawns have no natural source of food and water. Leaves are raked off and burned and water is rapidly dissipated. It is therefore



This diagram indicates important points in planting a street tree.

necessary to water and feed street and lawn trees at regular intervals to keep them healthy and vigorous and resistant to attack by wood boring insects.

Fertilizer should be applied once every two or three years, preferably in April, at the rate of 3 pounds of fertilizer per inch of tree diameter, measured at a point 4½ feet above ground. Thus a tree 12 inches in diameter will require 36 pounds of fertilizer. Ordinarily trees should not be fed in late summer, except as an emergency measure in the case of a tree in very poor condition. Small trees less than 4 inches in diameter should receive lesser amounts, not more than 1 pound of fertilizer per inch of tree diameter. Street trees with restricted root area should be fed small amounts of fertilizer annually.

Trees require plenty of nitrogen and therefore a fertilizer relatively high in nitrogen should be used, such as formula 10-8-6 or 10-6-4. A 10-8-6 fertilizer contains 10 percent nitrogen, 8 percent phosphorus and 6 percent potash.

Probably the easiest way for the average home owner to apply the fertilizer is by the crowbar method. Beginning at a point several feet from the trunk, make holes with a crowbar about 18 inches deep and spaced about 2 feet apart and covering the ground surface equivalent to the spread of the crown or branches. Place a few handfuls of fertilizer in each hole, until the required amount is evenly distributed and then water the tree thoroughly.

Water

Street trees require more water than roadside trees or those on lawns because their roots are apt to be restricted and because sun-heated pavements and buildings increase transpiration. A good rule is to see that the ground about a tree is soaked once a week, if rain fails. Use the hose or a pail. Sprinkling, though done frequently, is only a little better than nothing. Too frequent soaking will exclude the air and cause the roots to rot. When the ground has dried after a wetting, rake the surface to check evaporation. If the ground surface does not dry within an hour, too much water has been applied.

Dry Wells

An earth fill placed over the roots of a tree will almost certainly kill it, unless the soil is porous and the fill is very shallow. To counteract the effect of a fill, a dry well should be constructed around the trunk of the tree and several feet away from it, with a series of drain tile laid at the bottom of the fill and extending from the well to the limits of the fill. The lines of tile will appear as the spokes of a wheel, with the well as the hub. Cover the joints in the tile with heavy tar paper to prevent soil from clogging the tile. Then cover the tile with a layer of coarse crushed stone or rock and place soil to the finished grade. However, a dry well is an emergency measure and is no guarantee that the tree will live.

County Shade Tree Commission

Shade trees on county roads should be under the control of a County Shade Tree Commission appointed by the Board of Freeholders under authority given them by the State shade tree laws (Title 40:37 - 1 to 11)

Roadside Trees

Practically all of the species listed for street planting are suitable for roadside planting. A wider selection of species is permissible because conditions are more favorable than they are on city streets. Roadside trees should be not less than 2½ inches in diameter when planted, and should be securely fastened to a strong stake.

Along rural highways, trees do not necessarily have to be set in an unbroken straight line. It is often better to have them planted in groups. The grouping and choice of species should be made to harmonize with the surrounding landscape.

Natural Growth

Good results frequently can be obtained on roads where natural growth exists either on the right-of-way or along adjoining hedgerows and fences, by saving the best sprouts of good species to grow when brush is cut or hedgerows cleaned up. This costs practically nothing and needs only interest and average intelligence for the beginning of good shade. Owners and road supervisors can build up their roadside shade in this way if the possibility is pointed out to them. Where roads run through woodlands, an inexpensive thinning of a strip along the road will provide a park like area in young woods. This will shortly produce a cleaner more beautiful and safe roadside. Still later, even though the adjoining woods are removed, the shaded roadside will be left.

Seashore Trees

Whether on the streets or along roadside, trees near the ocean have to contend with poverty of soil, deficient soil moisture and strong winds. It is useless to attempt to maintain most species within 200 feet of high water and spray. Beyond that distance, it is necessary to choose hardy species and strengthen sterile soil.

Until it is firmly established, any tree exposed to strohg winds at the seashore must be firmly supported by a stout stake or by three or four wires secured to pegs.

For seashore planting, the choice of species is limited. Scarlet oak, sycamore, willow oak, hackberry, honey locust and red maple are recommended, although it is not advisable that too many of the same kind be used. On lawns, oak, blue spruce, pitch pine, Austrian pine, and red cedar with various hardy shrubs are to be preferred.

Pruning

Trees usually need to be pruned when they are transplanted to balance the inevitable loss of roots which results from the transplanting operation. This usually can be done by removing superfluous interior branches entirely instead of clipping the ends of all the branches, thus preserving the essential form of the tree.

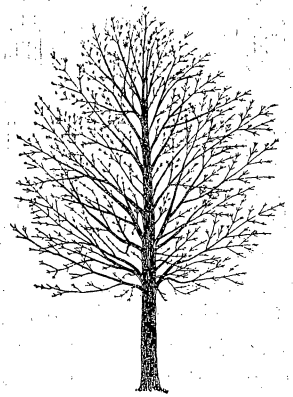
Some trees, particularly Norway maple, have a tendency to form an abnormally heavy crown, greater than the roots can supply in periods of dry weather. This condition can be overcome by judicious pruning of interior limbs and thus improving the health and form of the tree. Pruning may be done at any time, except late winter or early spring when bleeding is apt to occur.

Insects and Diseases

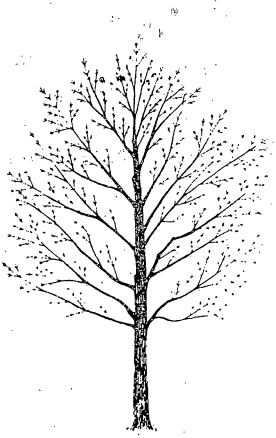
No attempt will be made in this publication to describe the insects and diseases to which trees are subject. This is a complicated technical field and there are so many insecticides and fungicides sold on the market under such a variety of trade names that recommendations for control would be somewhat confusing. Directions for use of these materials are given on the package.

However it may be helpful to state that insects are classified under three headings:

1. *Chewing Insects* - which chew leaves and require for control a stomach poison such as arsenate of lead.
2. *Sucking Insects* - such as the aphids or plant lice, which require a contact insecticide for control, such as nicotine sulphate, commonly called Black Leaf "40".
3. *Wood Boring Insects* - which may often be kept under control by feeding and watering trees to keep them in a healthy and vigorous condition.



The diagram above shows a Norway Maple with the very dense crown common to this species. The foliage produced makes a heavy draft upon the soil fertility and water and frequently leads to wilting.



This second diagram shows the same Norway Maple with superfluous branches removed by an interior pruning. This preserves the natural form of the crown and a frame that will produce as much foliage as is desirable.

Injuries

Every broken limb should be cleared away promptly by a cut, or succession of cuts that leave a wound which will heal quickly. Small limbs can be removed by a single cut. Larger ones require three cuts, the first made from underneath about 6 to 8 inches from the main stem and cut only part way through. The second cut will consist in sawing the limb completely off beyond the first cut. The third cut will consist in removing the stub which should be cut off as close to the main stem as possible. A stub should never be left on a tree, since it will not heal and eventually will form a cavity in the tree. All cuts larger than 1 inch in diameter should be coated with tree paint, but the cambium tissue at the margin of the wound first should be covered with shellac.

The lawn mower is a common offender in causing abrasions and wounds in the bark of trees. Such wounds open the way for attack by insects and diseases and should be avoided. Fire must not touch a valued tree. Even slight heat from a burning leaf pile may cause serious injury.

Gas Injury

It is seldom possible to save a tree affected by gas escaping from an underground pipe, unless the leak is slight and the break is discovered and repaired promptly. Usually however, the damage has been done by the time the leak is detected. If conditions are favorable, and the leak is slight, the tree may sometimes be saved by trenching around it and watering the soil heavily. If a gas leak is suspected it should be reported promptly to the gas company.

Cavities

Broken limbs which are not properly removed, and stubs left on trees by untrained tree workers in the course of slovenly pruning operations, are the most common causes of decay in trees, and of the cavities which are the inevitable result.

A large cavity, which is unsightly and will not drain, should be filled sectionally with concrete or some other suitable material. First clear out all the decayed wood, then point the outside of the cavity at top and bottom and trim the edges with a sharp chisel. The outside edges of the cavity should then be shellacked to protect the cambium, after which the filling may be placed.

A shallow cavity which will drain is usually better left unfilled. Merely clean out the dead wood, point the wound, shellac the edges and cover the exposed wood with a coat of tree paint.

Cavity work on a valuable tree requires the services of a technician with years of training and experience. To employ improperly trained persons for this work will only result in damage and dissatisfaction.

Certified Tree Experts

The diagnosis and treatment of many tree ailments, including those which are physiological in nature, may at times require the services of a tree expert. Under the terms of a legislative act (Chapter 100, P.L. 1940) there exists within the Department of Conservation and Economic Development a Bureau of Tree Experts empowered to examine applicants and to issue certificates to those found to be qualified tree experts. These men also hold identification cards issued by the Bureau stating that they are "Certified Tree Experts". A list of commercial operators so certified may be obtained from the Bureau of Tree Experts, N. J. Department of Conservation and Economic Development, Trenton 25, N. J.

Foresters of the Department of Conservation and Economic Development also will be glad to consult with and advise shade tree commissions and property owners on shade tree problems so far as available personnel will permit. Requests should be addressed to the State Forester, N. J. Department of Conservation and Economic Development, Trenton 25, N. J.