

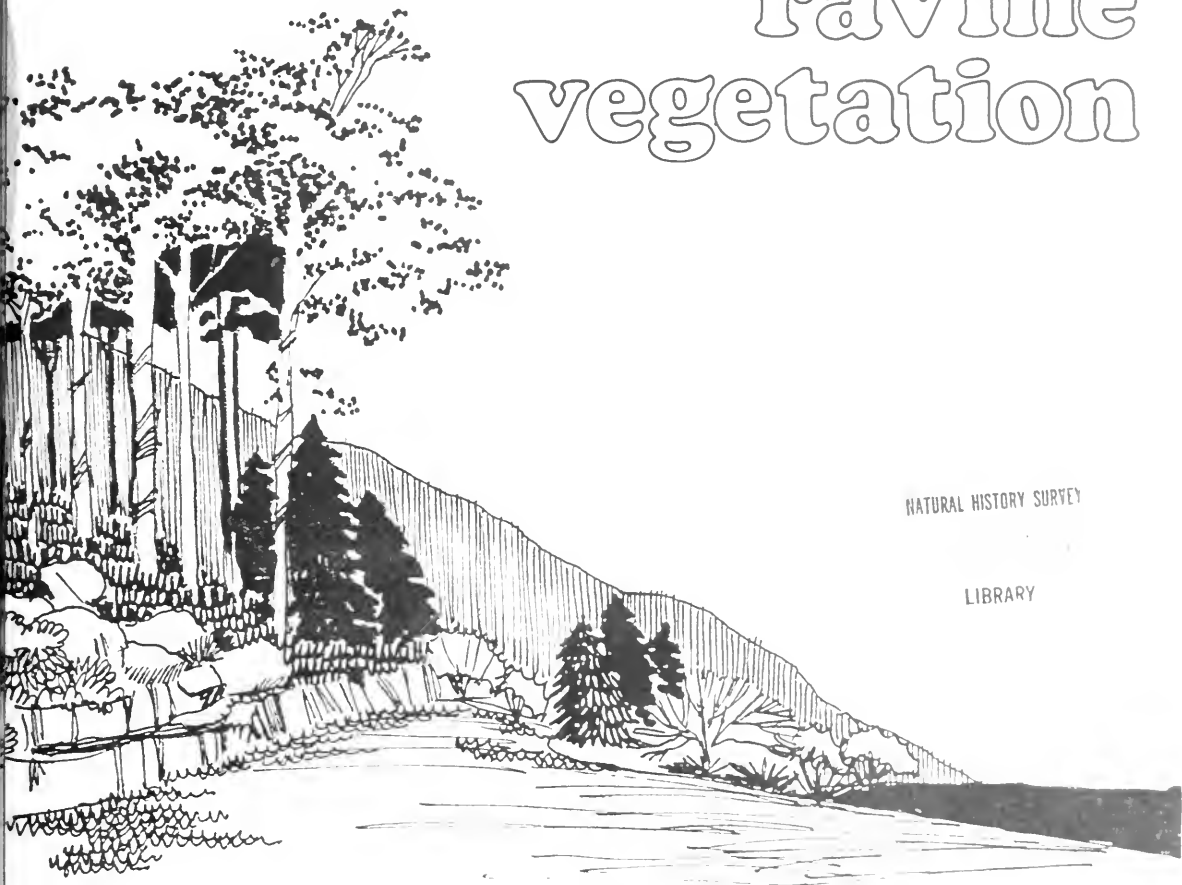
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THE PRESERVATION AND MANAGEMENT OF VEGETATION
IN RAVINES IN HIGHLAND PARK, ILLINOIS

A Report Prepared by
Kenneth R. Robertson
and
E. B. Himelick
of the
Illinois Natural History Survey
Urbana, Illinois

With the Assistance of the
Public Works and Community Development
Departments
City of Highland Park, Illinois
July 1977



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THE PRESERVATION AND MANAGEMENT OF VEGETATION
IN RAVINES IN HIGHLAND PARK, ILLINOIS

Kenneth R. Robertson¹ and E. B. Himelick²

INTRODUCTION

Vegetation is a very important component of the ravines in Highland Park, both from aesthetic and erosion-control points of view. Much of the beauty of the ravines is due to the lovely woods with their spectacular display of spring wildflowers. The plants also significantly retard the rate of erosion in the ravines. To make these comments more graphic, try to visualize the ravines if they were totally denuded of vegetation. Not only would they be unsightly gulches, but erosion would proceed uncontrolled.

It should be remembered that the ravines have been formed by the process of erosion. This has been a very gradual development, however, and the present ravines are the result of hundreds, or even thousands, of years of erosion. There is no way to totally halt this natural process, short of lining the ravines with concrete. It seems clear that man's activities in the past 50 to 100 years has substantially increased erosion in the ravines to the point where it is a serious problem. Proper conservation practices and adequate attention given to the preservation and management of the vegetation can aid in bringing erosion rates down to more acceptable levels.

¹Assistant Taxonomist and Curator of the Herbarium and ²Plant Pathologist, Illinois Natural History Survey, Urbana, Illinois 61801.

The vegetation serves as a good indicator of erosion in the ravines. A ravine, or portion of a ravine, with a good mature woods that contains large trees and an abundance of wildflowers has only minimal erosion. The lack of this kind of vegetation indicates that either active erosion is occurring or that there has been some kind of severe disturbance in the past that makes revegetation difficult.

ECOLOGY OF THE RAVINES

Plant ecologists call the plant association found in the ravines in Highland Park "maple-basswood woods" because of the prevalence of these kinds of plants; the woods on the tablelands above the ravines are quite different and are called "oak-hickory woods." The ravine woods have several vertical layers with different kinds of plants in each layer. These layers are 1) the tree canopy; 2) the understory tree layer; 3) the shrub layer; and 4) the herb layer. These are discussed below (also see Fig. 1).

Tree canopy.--This layer contains the tall trees that reach heights up to 70 or even 100 feet and that effectively intercept most of the direct sunlight. The common trees in this layer are sugar and black maples, American basswood, red oak, American ash, Norway maple (seedling-in from trees cultivated in yards and parks), white oak, cottonwood, black locust, willow, and paper birch. The last four species are found primarily toward the Lake Michigan end of the ravine.

Understory tree layer.--This layer is composed of trees that are smaller than those in the canopy and that do not receive much direct sunlight. The trees in this category include ironwood, black cherry, box elder, blue beech, shadbush, and hawthorn.

Shrub layer.--The small-to-large woody shrubs that grow under the trees are in this layer. These include witch hazel, several dogwoods and

viburnums, staghorn sumac, choke cherry, elderberry, and barberry.

Herb layer.--Included in this layer are all herbaceous plants that grow on the floor of the woods. There are a great number of species in this category, the most common being bloodroot, trillium, dog-tooth violet, Virginia bluebell, Jack-in-the-pulpit, May-apple, and wild geranium.

Each of these layers play an important role in the stability of the woods (and, hence, erosion control), and any revegetation project should take them all into account.

CAUSES OF EROSION IN THE RAVINES

Quite simply, the erosion is caused by too much water flowing too quickly through the ravines. There are three basic types of erosion in the ravines: 1) vertical cutting along the bottom channel, which will eventually result in a wider ravine at the top as the side slopes seek their natural angle of repose, 2) horizontal cutting along the sides of the channel, which increases the effective angle of the ravine slope, and 3) slumping or sloughing of the surface of the face of the slopes, which is caused by surface and ground waters lubricating the interface between weathered and unweathered soil materials. The latter situation is quite common along the upper few feet of the slope that is just below the tableland, where there is a relatively impermeable soil layer below a more permeable top soil layer. As a result, water penetrates the upper few feet of soil and moves laterally as it encounters the less permeable layer. Eventually, this subsurface water seeps out of the sides of the ravines. This is a serious problem in the ravines, and if a property owner detects a seepage layer in his portion of a ravine, a consulting engineer and/or landscape contractor (preferably both) should be brought in to see if some kind of drainage system or terrace/retaining wall should be constructed to stabilize the area. Vegetation cannot effectively control slumping.

THE USE OF VEGETATION IN EROSION CONTROL

Vegetation acts in the following ways to control erosion:

1) the precipitation is intercepted by leaves, which reduces the direct impact of rain on bare soil, 2) the rate of runoff is retarded, especially by grasses and ground covers, 3) small soil particles are filtered and retained, 4) the soil is mechanically reinforced by roots, 5) deep roots may penetrate unstable soil layers, and 6) excess soil moisture can be reduced by plants through the process of transpiration (Fig. 2).

Most previous work on the use of vegetation for erosion control has concentrated on highway slopes and construction sites such as dams. These areas receive full sunlight, and consequently, the plants used there are not suitable for use in heavily wooded ravines. To our knowledge, no experimental plantings have ever been done in wooded situations in the Midwest to ascertain which plants are most effective in controlling erosion. Therefore, the recommendations of this report are the best that can be given with the present state of knowledge, but they should not be considered definitive solutions to the erosion problems in the ravines. The basic premise of our recommendations is that when the ravine vegetation is mature and healthy, erosion is at a minimum; any changes to such vegetation would not reduce the erosion rate. The plants recommended for planting in the ravines are those that occur naturally or that have been successfully planted in the past.

MAINTENANCE OF RAVINE VEGETATION

It is often said that ravine vegetation can take care of itself. This is true only to a certain degree. Over long periods of time, the vegetation in ravines changes. The amount of change depends on many factors, such as physical environment and the changes attributable to man's activities. The plants that survive and reproduce in ravines do so because of their

ability to withstand the many stresses placed on them, such as the struggle for nutrients, water, and light. Old plants eventually die and this brings about a regeneration of young plants that eventually fill the open spaces.

Ravine maintenance never ends--it requires constant vigilance. Financially, it is cheaper to maintain than repair. The homeowner should continually watch for problems in ravines on his property, such as the beginnings of active erosion, minor excavations, soil fill, and the dumping of clippings, leaves, and other debris. Other problems to watch for include insect pests, diseases, falling trees, and fire.

Before disturbing a ravine in any way, the homeowner should seek professional advice. This is particularly true when beginning some kind of construction that could injure or kill large trees. Root systems are severely injured during excavating operations, and many trees and shrubs will not tolerate soil fill, which prevents adequate penetration of moisture and air into the root zone. Remember that one mature tree is more helpful in controlling erosion than a number of young ones.

In the spring and early summer of 1977, a survey was made of the trees in the Highland Park area for serious insect pests or diseases. Only minor insect problems were observed at that time, none of which require control measures. In some years, it is known that the fall cankerworm, a defoliating insect, can be a problem. When protection is warranted, such as for some of the older, more prominent trees, this insect can be controlled by spraying. Oak wilt was the only disease observed during the survey that could be of importance in the ravines. This disease was evident in a few scattered upland areas and along the ridges of some ravines. Oak wilt is a vascular disease that primarily affects red oak, but occasionally white and burr oaks are attacked. Infected red oaks will die in one growing season, whereas white and burr oaks may have only a few branches die in one

year. A laboratory test is necessary to determine the presence of the oak wilt fungus. Any oak trees exhibiting wilt symptoms should be brought to the attention of the city arborist. If new trees continue to die, control measures should be undertaken immediately to prevent spread to healthy trees.

Old white oak trees exhibiting various stages of decline are more frequently observed on the tablelands around homes rather than in the ravines. Many of these trees have been weakened by the fall cankerworm, construction injury, excessive soil moisture, as well as drought. Selective pruning out of weakened branches and a program of watering and fertilizing would be beneficial.

The dumping of grass clippings and leaves over the edges of the ravines is common practice in Highland Park. However, instead of being beneficial, this is HARMFUL, as the debris retains surface moisture, which can cause slumping, and prevent the establishment of new vegetation. Dead trees, especially large ones, should be felled, leaving the stump and roots in place. This will reduce or prevent damage to nearby healthy trees that would occur if the dead trees were felled naturally, such as during a wind storm. Whenever possible, dead trees should be felled so that the trunks fall across the slope of the ravine, rather than up and down the slope. When the latter occurs, the trunks tend to channelize water and rapidly lead to the formation of a small gully. Young trees can be planted to replace the dead one.

WHAT TO DO BEFORE PLANTING

It should be emphasized that, while vegetation is useful and even necessary in a total plan to control erosion, vegetation alone cannot be expected to halt major erosion. In the ravines in Highland Park, the most serious erosion problem has been slumping or sloughing of the upper part of

the slopes. Minor slumping can be controlled by properly constructed terraces or retaining walls. The slumping is often severe enough that some type of drainage system is needed to remove the excess subsurface water. A combination of terraces/retaining walls and drainage systems would appear to be the best solution for the more seriously eroded upper slopes. As noted previously, a consulting engineer and/or landscape contractor should examine the situation on any given property to ascertain what solutions are best for that particular situation. In any case, the planting of new trees, shrubs, or herbs is done only after the CAUSE of the erosion has been ascertained and corrected. When a property owner discovers an area barren of vegetation in his part of a ravine, there is often the temptation to immediately plant something in that area. However, to repeat, the CAUSE of this bare area should be determined, the cause rectified, and only then should a revegetation program begin.

Before planting, it is suggested that a soil analysis be made to determine the acidity or alkalinity of the soil where planting is to be done. A soil sample can be sent to a local garden center or testing laboratory, or inexpensive kits are available at garden centers to make this analysis at home. Soil charts for the area indicate that the uppermost few feet of soil is acidic while the remainder of the soils are neutral or slightly alkaline. This affects the kinds of plants that can be grown in the soil.

Due to the steepness of the slopes in the ravines, it is seldom practical to do much soil preparation prior to planting. Generally speaking, it is recommended that topsoil NOT be hauled into the ravines. For purposes of erosion control, it is desirable to have the roots of plants grow into the potentially unstable soils found on the slopes. When a layer of topsoil is added over the original soil, the roots tend to grow primarily in the topsoil and not penetrate the lower layers.

PROCEDURES FOR ESTABLISHING NEW VEGETATION

When it is necessary to do planting in the ravines, the following procedures will aid in the establishment of a new vegetative cover. It should be emphasized that it is of the utmost importance to immediately begin a revegetation program after there has been any kind of construction work, such as the installation of drainage systems or terraces/retaining walls, that has disrupted the vegetation in the ravines. To delay planting encourages the erosion of soil left bare by the construction or invasion of the area by rank weeds.

Grass and ground covers.--It is nearly impossible to establish permanent grass cover in the dense shade of mature ravines, but construction often opens up enough of the tree canopy to allow the planting of the more shade-tolerant grasses that will give some temporary cover. See your local garden center for suitable grass mixtures. There are some ground-cover plants that do tolerate the shade in the ravines. Most of these are not native to the ravines or to the eastern United States, and the property owner should decide whether or not to plant exotic species. Wild ginger, Asarum canadense, is a native plant that is recommended for planting as a ground cover in the ravines. Perhaps the most frequently planted ground cover in the ravines is goutweed or bishop's weed, Aegopodium podagraria. This is a very aggressive plant that will crowd out native wildflowers, so it should be planted with discretion. It does tolerate shade and forms a thick mass of coarse leaves. Common periwinkle or creeping myrtle, Vinca minor, or wintercreeper, Euonymus fortunei, have also been planted in the ravines. All of these ground covers are planted as young plants, which spread by creeping stems.

Wildflowers.--To maintain a naturalistic effect in the ravines,

to improve the stability of the soil, and to reduce the growth of weeds, it is strongly recommended that wildflowers be replanted in the ravines where they have been disturbed due to erosion, construction, or other kind of disturbance. Almost any of the wildflowers listed in the section "Plants Found in the Ravines," which is located at the end of this report, can be used in the ravines. The more common species are listed below, and these will all grow well on the slopes of the ravines. While wildflowers can be started from seed, it is usually more practical to plant young plants, bulbs, or underground storage stems, depending on the species. See the section on "Sources of Plant Materials."

<u>Scientific name</u>	<u>Common name</u>
<u>Allium tricoccum</u>	Wild leek
<u>Anemone virginiana</u>	Thimbleweed
<u>Aralia nudicaulis</u>	Wild sarsaparilla
<u>Arisaema triphyllum</u>	Jack-in-the-pulpit
<u>Caulophyllum thalictroides</u>	Blue cohosh
<u>Erythronium albidum</u>	White trout lily
<u>Erythronium americanum</u>	Yellow trout lily
<u>Geranium maculatum</u>	Wild geranium
<u>Hepatica nobilis</u>	Hepatica or liverleaf
<u>Mertensia virginica</u>	Virginia bluebells
<u>Mitella diphylla</u>	Mitrewort
<u>Phlox divaricata</u>	Blue phlox
<u>Podophyllum peltatum</u>	May apple
<u>Polygonatum commutatum</u>	Solomon's seal
<u>Sanguinaria canadensis</u>	Bloodroot
<u>Smilacina racemosa</u>	False solomon's seal
<u>Taenidia integerrima</u>	Yellow pimpernel
<u>Thalictrum dioicum</u>	Early meadow rue
<u>Trillium grandiflorum</u>	Large-flowered trillium
<u>Uvularia grandiflora</u>	Bellwort
<u>Viola sororia</u>	Hairy wood violet
<u>Zizia aurea</u>	Golden alexanders

Trees and shrubs.--The species recommended for planting (Table 1) vary in the ease with which they may be transplanted from a nursery into the ravines, some are very easy, others require some care, and some are rather difficult. Those species rated as easy to transplant may be purchased as bare-root plants. The more difficult species should be bought with a root ball covered with burlap, especially if the stem is larger than 1 inch in diameter. As a general rule, the ball of soil on a transplanted plant should be 1 foot in diameter for each inch of trunk diameter. Thus, for a tree with a 2-inch trunk, the root ball should be at least 2 feet in diameter. Because of the difficulty in transporting trees with heavy soil balls, it is recommended that trees no larger than 2 inches in trunk diameter be transplanted into the ravines (Fig. 3).

Small 1- and 2-year-old seedlings can be planted on ravine slopes using a spade to either dig individual holes or by making a slit, slipping the seedling into the slit, and closing the hole with either the spade or the heel of the foot. Planting either seedlings or larger bare-root or balled-and-burlapped trees is best done in the spring, between mid-March and mid-May. Orders for plant materials should be placed in the late fall or early winter to assure that material will be available at the nursery for early planting.

CARE AFTER PLANTING

Newly planted trees and shrubs should be pruned before or immediately after planting. One-fourth to one-third of the leaf-bearing wood should be removed to compensate for root loss from transplanting. Weak, injured, interfering, and poorly located branches should also be removed.

Following planting, a few maintenance procedures are recommended. A cup of fertilizer, such as 12-12-12, can be distributed in the back-fill at the time of planting, or it can be broadcast over the surface of the

ball. This can be done for 1 or 2 years after planting. The plant should be supplied with enough water to soak the soil around the root system, and should be watered every 10 to 14 days until it is established. A soil dike built around the planting hole will make water distribution more even. A wood-chip mulch 2 to 4 inches deep over the planting hole will improve air and water percolation in the soil and aid in moderating soil temperature. Bracing or guying of small trees is usually not necessary, however, if the newly planted tree tends to lean after settling, it can be straightened by attaching a soft rope, which has been run through a piece of hose, from the tree to one or two stakes in the ground.

Table 1. Trees and shrubs recommended for planting in ravines.

Scientific and common name	Ease of trans- planting*	Preferred loca- tion in ravine	Size of ma- ture plants
<u>DECIDUOUS PLANTS</u>			
<u>Acer nigrum</u> (black maple)	2	slopes or bottom	canopy tree
<u>Acer rubrum</u> (red maple)	1-2	upper slopes	canopy tree
<u>Acer saccharum</u> (sugar maple)	2-3	slopes or bottom	canopy tree
<u>Amelanchier arborea</u> (<u>canadensis</u>) (shadbush)	2	slopes	understory tree
<u>Betula papyrifera</u> (paper birch)	1-2	slopes, especially toward Lake	canopy or understory tree
<u>Carpinus caroliniana</u> (ironwood, blue beech)	3	slopes	understory tree
<u>Cornus alternifolia</u> (alternate-leaved or pagoda dogwood)	2	slopes	understory tree or shrub
<u>Cornus stolonifera</u> (red osier dogwood)	1	slopes, especially toward bottom	shrub
<u>Fagus grandifolia</u> (American beech)	3	slopes	canopy tree
<u>Fraxinus americana</u> (white ash)	1-2	slopes	canopy tree
<u>Hamamelis virginiana</u> (common witch hazel)	2	slopes	understory tree or shrub
<u>Juglans nigra</u> (black walnut)	3	slopes, especially toward bottom	canopy tree
<u>Ostrya virginiana</u> (hop-hornbeam)	2	slopes	understory tree
<u>Populus deltoides</u> (cottonwood)	1	bottom, especially toward Lake	canopy tree

Table 1 cont'd

<u>Prunus serotina</u> (black cherry)	2	slopes	canopy or understory tree
<u>Prunus virginiana</u> (chokecherry)	2	slopes	understory tree
<u>Quercus alba</u> (white oak)	2-3	upper parts of slopes	canopy tree
<u>Quercus rubra</u> (red oak)	2	lower parts of slopes	canopy tree
<u>Robinia pseudoacacia</u> (black locust)	1	Lake front	canopy tree
<u>Salix alba</u> (white willow)	1	bottom	canopy tree
<u>Sambucus canadensis</u> (elderberry)	1	slopes	shrub
<u>Tilia americana</u> (American basswood)	1	slopes	canopy tree
<u>Viburnum acerifolium</u> (mapleleaf viburnum)	1	slopes	shrub
<u>Viburnum dentatum</u> (arrowwood viburnum)	1	slopes	shrub
<u>Viburnum trilobum</u> (American cranberry- bush viburnum)	1	slopes	shrub
<u>EVERGREEN PLANTS</u>			
<u>Pinus strobus</u> (white pine)	1	upper parts of slopes	canopy tree
<u>Taxus canadensis</u> (Canadian yew)	2	slopes	shrub
<u>Thuja occidentalis</u> (arbor-vitae)	1-2	upper parts of slopes	tree or shrub
<u>Tsuga canadensis</u> (Canadian hemlock)	1-2	slopes	canopy tree

* 1=easy; 2=moderate; 3=difficult

SOURCES OF PLANT MATERIALS

Most of the plants recommended in previous lists are native to the ravines, and, for some reason, native plants are always more difficult to obtain from commercial nurseries than exotic species. All the recommended plants are available, however, and it is felt that it is worth the extra effort to locate these species since they have a better chance of establishment in the ravines than more readily available introduced species. The nurseries listed below have been selected because their catalogs indicate that they carry some or many of the recommended species. The inclusion of a company in the list does not imply any recommendation or endorsement of that company or the quality of their merchandise.

Trees, shrubs, and ground covers.--Local garden centers and nurseries may carry some of the recommended species in stock or can obtain them from wholesale growers. The following nurseries each have available some of the recommended species.

Charles Fiore Nurseries, Inc.
Route 22
Prairie View, Illinois 60069
Phone: 312-634-3400

John Fiore & Sons, Inc.
840 S. Waukegan Road
Lake Forest, Illinois 60045
Phone: 312-234-0476

D. Hill Nursery
Route 31
West Dundee, Illinois 60118
Phone: 312-426-3451

Hinsdale Nurseries, Inc.
7200 S. Madison Road
Hinsdale, Illinois 60521
Phone: 312-323-1411

Hook's Nursery
P. O. Box 455
Lake Zurich, Illinois 60047
Phone: 312-438-7190

Charles Klehm & Son Nursery
Arlington Heights & Algonquin Rd.
Arlington Heights, Illinois 60005
Phone: 312-437-2880

LaFayette Home Nursery, Inc.
Route 17, (Stark County) Phone: 309-995-3311
LaFayette, Illinois 61449
(Has many native species, many
of Illinois origin.)

Ralph Synnestvedt & Associates, Inc.
3602 Glenview Road Phone: 312-724-1300
Glenview, Illinois 60025

Burr Oak Nursery
Division of Synnestvedt
Illinois Route 120 and Phone: 312-546-4700
Fairfield Road
Round Lake, Illinois 60073

Wildflowers.--Wildflowers are rather difficult to obtain from
local garden centers, but they can be readily ordered, at moderate cost,
by mail.

LaFayette Home Nursery, Inc.
Route 17, (Stark County) Phone: 309-995-3311
LaFayette, Illinois 61449
(Specializes in prairie wild-
flowers, but have a few
species suitable for
ravines.)

Lounsberry Gardens
P. O. Box 135 Phone: 217-635-5645
Oakford, Illinois 62673
(35 miles west of Springfield,
Illinois.)

Midwest Wildflowers
Box 64
Rockton, Illinois 61072
(Sells seeds only)

Orchid Gardens
6700 Splithand Road Phone: 218-326-6975
Grand Grapids, Minnesota 55744
(Catalog 35c)

Strand Nursery Company
Osceola, Wisconsin 54020 Phone: 715-294-2435

PLANTS FOUND IN THE RAVINES

The ravines along Lake Michigan are unique ecological habitats within Illinois, and they contain a large number of species of plants. The following lists, the first of trees, shrubs, and woody vines and the second of wildflowers and other herbaceous plants, contain all species of gymnosperms (cone-bearing plants) and flowering plants known to occur in the ravines in Highland Park or that are likely to be found there. The lists are arranged alphabetically by scientific name and contain the following information-- scientific name; common name; indication of whether the plant is native or introduced from elsewhere; habitat within the ravines where the species occurs; relative abundance in the ravines; and, when possible, months when the species is in flower.

A substantial amount of field work has been done in the ravines this spring and summer, and most of the species in the lists have been observed during these studies. Those species marked with an asterisk (*) were not seen during the field work, but they have been reported to occur in ravines along Lake Michigan in Illinois; field work will continue through the fall to try to establish the presence of these species in Highland Park.

Trees, Shrubs, and Woody Vines

Acer negundo. Box-elder. Native. Slopes, especially toward Lake. Common.

Acer nigrum. Black Maple. Native. Slopes. Common in some ravines, very similar to Sugar Maple.

Acer platanoides. Norway Maple. Introduced from Europe. Seeding into ravines from trees cultivated in yards and parks.

Acer rubrum. Red Maple. Native. Infrequent toward top of slope.

Acer saccharum. Sugar Maple. Native. Slopes. Common.

Amelanchier arborea. Shadbush, Juneberry, Serviceberry. Native. Slopes. Occasional. April-May.

Berberis thunbergii. Japanese Barberry. Introduced from Asia. Slopes and bottom. Common.

Betula lutea. Yellow Birch. Native. Slopes. Rare.

Carpinus caroliniana. Ironwood, Blue Beech, American Hornbeam. Native. Slopes. Frequent.

- Carya ovata. Shagbark Hickory. Native. Mostly on tablelands, sometimes on slopes.
- Cornus alternifolia. Alternate-leaved Dogwood, Pagoda Dogwood. Native. Slopes. Infrequent. May-June.
- Cornus racemosa. Gray Dogwood. Native. Slopes. May-July.
- Cornus stolonifera. Red-osier Dogwood. Native. Slopes, especially toward Lake. Frequent. May-September.
- Crataegus species. Hawthorns. Several species occur on slopes and tablelands. Frequent. April-May.
- Fagus grandifolia. American Beech. Native. Slopes. Seen in only 2 ravines.
- Fraxinus americana. White Ash. Native. Slopes. Frequent.
- Hamamelis virginiana. Witch-hazel. Native. Slopes. Common. September-December.
- Lonicera dioica. Red Honeysuckle. Native. Slopes and tablelands. Occasional. May-June.
- Lonicera species. A number of introduced species of Honeysuckle have been planted in the ravines and along the bluffs facing Lake Michigan. These include: Lonicera maackii, Amur Honeysuckle; Lonicera morrowii, Morrow's Honeysuckle; and Lonicera tatarica, Tatarian Honeysuckle.
- Juglans nigra. Black Walnut. Native. Bottom. Infrequent.
- Menispermum canadense. Moonseed. Native. Slopes. Frequent.
- Morus alba. White Mulberry. Introduced from China. Slopes. Infrequent.
- Ostrya virginiana. Hop-hornbeam. Native. Slopes. Common.
- Parthenocissus quinquefolia. Virginia Creeper. Slopes and bottoms, sometimes climbing trees. Common. Native.
- Philadelphus species. Mock-orange. Introduced. Commonly cultivated and either planted and persistent or escaped in the ravines.
- Pinus strobus. White Pine. Native, but most plants presently in the ravines probably deliberately planted.
- Populus deltoides. Cottonwood. Native. Mostly in bottoms, sometimes on slopes, especially toward Lake. Common.
- Prunus pennsylvanica. Pin or Fire Cherry. Native. Slopes. Infrequent. April-June.
- Prunus serotina. Black Cherry. Native. Slopes. Common. May-June.
- Prunus virginiana. Choke Cherry. Native. Slopes. Common. April-June.
- Quercus alba. White Oak. Native. Mostly on tablelands, sometimes on upper slopes. Common.
- Quercus rubra. Red Oak. Native. Lower slopes and bottoms. Common.
- Rhamnus cathartica. Common Buckthorn. Introduced from Eurasia. Common. May.
- Rhus radicans. Poison-ivy. Native. Throughout. Very Common.
- Rhus typhina. Staghorn Sumac. Native or possible introduced from farther east. Slopes, especially toward Lake. June-July.

- Ribes americanum. Wild Black Current. Native. Edge of stream in bottom. Scattered. April-June.
- Ribes sativum. Red Current. Introduced from Europe. Edge of stream in bottom. Infrequent.
- Robinia pseudoacacia. Black Locust. Introduced from farther south and east. Slopes, especially toward Lake. Common. May-June.
- Salix alba. White Willow. Introduced from Eurasia. Bottoms. Occasional.
- Sambucus canadensis. Elderberry. Native. Slopes. Common. June-August.
- Thuja occidentalis. Arborvitae. Native, but most plants presently in ravines probably deliberately planted.
- Tilia americana. Basswood, American Linden. Native. Slopes and bottoms. Common. June-July.
- Ulmus americana. American Elm. Native. Once common, but most trees killed by Dutch Elm disease.
- Viburnum opulus. European Highbush-cranberry. Introduced from Europe. Commonly cultivated and escaping into the ravines. June-July.
- Viburnum rafinesquianum. Downy Arrowwood. Native. Slopes. Occasional. May-June. Very similar is Viburnum dentatum, Arrowwood, which is planted in the ravines. May-June.
- Viburnum trilobum. Cranberry-bush. Native, but most plants in the ravines probably deliberately planted. May-July.
- Vitis riparia. Riverbank Grape. Native. Slopes and bottoms. Frequent.

Wildflowers and other Herbaceous Plants

- Actaea pachypoda. White Baneberry, Dolls-eyes. Native. Slopes and bottom. Frequent. May-June.
- Aegopodium podagraria. Goutweed, Bishops-weed. Introduced from Eurasia. Slopes. Often planted as a ground cover and rapidly spreading, crowding out native wildflowers. However, a very effective ground cover plant in dense shade.
- Agrimonia gyrosepala. Tall Agrimony. Native. July-September.
- Alliaria officinalis. Garlic-mustard. Introduced from Europe. Everywhere. A rapidly spreading weed that crowds out other vegetation. April-July.
- Allium tricoccum. Wild Leek. Native. Common. The leaves appear in earliest spring, disappearing by the time the flowers appear in May or June.
- *Amphicarpa bracteata. Hog-peanut. Native. August-September.
- Anemone quinquefolia. Wood Anemone. Native. Mostly tablelands. Infrequent. April-May.
- Anemone virginiana. Tall Anemone, Thimbleweed. Native. Slopes. Common. June-Aug.
- *Anemonella thalictroides. Rue Anemone. Native. March-June.
- Antennaria plantaginifolia. Pussy-toes. Native. April-June.

- Aquilegia canadensis. Wild Columbine. Native. Only one plant seen during study. April-July.
- Arabis laevigata. Smooth Bank-cress or Rock-cress. Native. Slopes and bottoms. Frequent. April-August.
- Aralia nudicaulis. Wild Sarsaparilla. Native. Slopes. Frequent. May-July.
- Arctium minus. Common Burdock. Introduced from Eurasia. Disturbed areas. Common. July-September.
- *Arisaema dracontium. Green-dragon. Native. Said to occur in Lake County.
- Arisaema triphyllum. Jack-in-the-pulpit. Native. Slopes, especially toward bottom. Common. April-July.
- *Asarum canadense. Wild Ginger. Native. Reported to occur in ravines in Highland Park, but wild plants not seen during this study. April-June.
- Asclepias exaltata. Poke Milkweed. Native. June.
- *Asclepias purpurascens. Purple Milkweed. Native. June-July.
- *Aster sagittifolius. Arrow-leaved Aster. Native. August-November.
- Barbarea vulgaris. Yellow Rocket, Winter-cress. Introduced from Europe. Bottom and stream bed. Infrequent. April-July.
- Caulophyllum thalictroides. Blue Cohosh. Native. Slopes, especially toward the bottom. Locally frequent. April-May.
- Circaea quadrisulcata var. canadensis. Enchanters' Nightshade. Native. July-August.
- Claytonia virginica. Spring Beauty. Native. Slopes. Infrequent. March-June.
- *Conopholis americana. Cancer-root. Native. May-July. A parasite on oak roots.
- Cryptotaenia canadensis. Honewort. Native. Common. May-September.
- *Dentaria laciniata. Toothwort, Pepperroot. Native. Slopes. March-May.
- Erigeron annuus. Annual or Daisy Fleabane. Native. Common. A weedy plant in disturbed areas. May-November.
- Erythronium albidum. White Dog-tooth-violet, White Trout-lily. Native. Slopes. Common. March-early May.
- Erythronium americanum. Yellow Dog-tooth-violet, Yellow Trout-lily. Native. Slopes. Restricted to certain ravines, but common there. April-early May.
- Eupatorium purpureum. Purple Joe-Pye-weed. Native. July-August.
- Eupatorium rugosum. White Snakeroot. Native. July-October.
- Fragaria virginiana. Wild Strawberry. Slopes. Frequent. April-June.
- Galium aparine. Annual Bedstraw. Native. Slopes and tablelands. Frequent. April.
- Geranium maculatum. Wild Geranium, Wild or Spotted Cranesbill. Native. Slopes. Common. April-July.
- Geum canadense. White or Wood Avens. Slopes. Frequent. June-September.
- Glechoma hederacea. Ground-ivy, Creeping Charlie. Introduced from Eurasia. Sometimes planted as a ground cover in moist, shady areas, but rapidly spreading and becoming a troublesome weed. April-August.

- Helianthus divaricatus. Woodland Sunflower. Native. July-October.
- Hepatica nobilis. Liverleaf, Hepatica. Native. Slopes. Frequent. March-May.
- Heracleum maximum. Cow Parsnip. Native. Slopes. Occasional. May-July.
- Hesperis matronalis. Dames' Rocket. Introduced from Europe. Formerly frequently cultivated, now escaped into the ravines. May-July.
- Hydrophyllum virginianum. Virginia Waterleaf. Native. Slopes. Occasional. May-June.
- Impatiens capensis. Spotted Touch-me-not, Orange Jewelweed. Native. Bottoms, moist situations. Common. July-September.
- *Inula helenium. Elecampane. Introduced from Europe. Occasionally escaped from cultivation. July-August.
- *Isopyrum biternatum. False Rue-anemone. Native. April-June.
- Maianthemum canadensis var. interius. Canada Mayflower, Wild Lily-of-the-valley. Native. Mostly tablelands. Infrequent, but often in large colonies when found. May-June.
- Mertensia virginica. Virginia Bluebells. Native. Slopes. Common. April-May.
- Mitella diphylla. Mitrewort, Bishops-cap. Native. Slopes. Frequent. April-June.
- Osmorhiza longistylis. Smooth Sweet Cicely, Anise-root. Native. Slopes. Common. May-June.
- Podophyllum peltatum. May-apple. Native. Slopes, especially toward bottom and flat areas above stream bed. Common. May-June.
- Phlox divaricata. Blue or Woodland Phlox. Native. Slopes. Frequent. April-June.
- *Polemonium reptans. Jacob's-ladder. Native. April-June.
- Polygonatum commutatum. Solomon's-seal. Native. Slopes. Common. May-July.
- Polygonum cuspidatum. Japanese Knotweed or Fleece-flower. Introduced from Japan. Colonies seed in bottoms of 2 ravines. This plant spreads rapidly and is nearly impossible to eradicate.
- Prenanthes alba. White-lettace, Rattlesnake-root. Native. Slopes. Common. August-September.
- Ranunculus abortivus. Small-flowered Buttercup or Crowfoot. Native. Bottoms and edges of streams. Frequent. April-July.
- Ranunculus septentrionalis. Swamp Buttercup. Native. Bottoms. Common. March-June.
- Rumex obtusifolius. Bitter Dock. Introduced from Europe. Frequent in disturbed sites. June.
- Sanguinaria canadensis. Bloodroot. Native. Slopes. Common. March-May.
- Sanicula gregaria. Common or Clustered Black Snakeroot. Native. Slopes. Common. May-August.
- Scilla siberica. Siberian Squill. Introduced from Eurasia. Locally spreading on slopes from deliberately planted plants. April.

- Smilacina racemosa. False Solomon's-seal. Native. Slopes. Common. April-June.
- Smilacina stellata. Starry False Solomon's-seal. Native. Seen in only one ravine, common in Illinois Beach State Park. April-June.
- Smilax ecirrhata. Upright Carrionflower. Native. Lower slopes and bottoms. Frequent. May-June.
- Solanum dulcamara. Bittersweet Nightshade. Introduced from Eurasia. Common weed in ravines; fruits and young leaves poisonous. May-September.
- *Solidago flexicaulis. Broad-leaved Goldenrod. Native. August-September.
- *Solidago ulmifolia. Elm-leaved Goldenrod. Native. July-November.
- Taenidia integerrima. Yellow Pimpernel. Native. Slopes. Common. April-June.
- Thalictrum dioicum. Early Meadow-rue. Native. Slopes. Common. April-May.
- Trillium grandiflorum. Large-flowered Trillium. Native. Slopes. Common. April-June.
- Trillium recurvatum. Red Trillium, Wake-robin. Native. Slopes. Infrequent in ravines, but common elsewhere in Chicago region. April-June.
- Uvularia grandiflora. Bellwort, Big Merrybells. Native. Slopes. Common. April-June.
- Vinca minor. Periwinkle, Creeping Myrtle. Introduced from Europe. Often planted as a ground cover and spreading. April-May.
- *Viola conspersa. Dog Violet. Native. April-May.
- *Viola pallens. Smooth White Violet. Native. April-May.
- Viola pensylvanica. Yellow Violet. Native. Slopes. Frequent. April-May.
- Viola sororia. Hairy Wood Violet. Native. Slopes. Frequent. April-June.
- Zizia aurea. Golden Alexanders. Native. Slopes. Common. April-July.

LIST OF DO'S AND DON'T'S FOR RAVINES IN HIGHLAND PARK

Do's

- Do remember that the ravines were formed by the process of erosion, which is a natural process that cannot be totally halted.
- Do remember that the major erosion problems in the ravines are caused by too much water flowing too quickly through the ravines.
- Do take all vertical layers of the woods (canopy trees, understory trees, shrubs, and herbs) into account when planning a revegetation program.
- Do consult a professional consulting engineer and/or landscape contractor (preferably both) when there is a serious erosion problem.
- Do have a maintenance program for the vegetation in the ravines and keep watch for problems before they become serious.
- Do try to preserve large trees in the ravines, especially when any construction is being done; one mature tree is more helpful than many small ones.
- Do cut down dead trees, cutting them so that the trunk falls across rather than up or down the slope. Leave the base of the trunk and roots in place.
- Do establish some kind of temporary cover on areas left barren by construction.
- Do follow this temporary planting with a revegetation program that includes trees, shrubs, and herbs.
- Do seek professional advice in the planting and proper maintenance of new plants.
- Do use native species whenever possible.
- Do look at your neighbor's situation; if he has no problems and you do, why? If you both have similar problems, try to coordinate a solution.
- Do build stairs or properly terraced paths where access into the ravines is necessary; bare footpaths soon become eroded.

Don't's

- Don't plant until the CAUSE of active erosion is determined and, if necessary, corrected by the proper installation of drainage systems and/or terraces.
- Don't expect vegetation alone to control major active erosion.
- Don't dump leaves, grass clippings, or other debris over the edge of a ravine; this is VERY detrimental to vegetation and soil on the slope.
- Don't water lawns near the edge of the ravine, especially if there are seepage areas in the ravine.
- Don't disturb soil on the ravine slopes or add a new layer of top soil.
- Don't allow rank weeds to become established on bare areas.

REFERENCES

For additional information, see the following publications. All of these are either currently in the Highland Park Public Library or have been ordered by the Library. Also see the subject headings of "Botany" and "Plants" in the Library's card index.

Plant identification and ecology

- Courtenay, B. and J. Zimmerman. Wildflowers and weeds. Van Nostrand and Reinhold. New York. 1972. [Contains many colored photographs.]
- Illinois Natural History Survey. Fieldbook of Illinois wild flowers. Urbana. 1936.
- Jones, G. N. Flora of Illinois. Third edition. American Midland Naturalist Monograph No. 7. University of Notre Dame, Notre Dame, Indiana. 1963.
- Mohlenbrock, R. H. Guide to the vascular flora of Illinois. Southern Illinois University Press, Carbondale. 1975.
- Mohlenbrock, R. H. Forest trees of Illinois. Department of Conservation, Division of Forestry, Springfield. 1973. [Photographs and illustrations of common trees.]
- Mohlenbrock, R. H. The illustrated flora of Illinois. Southern Illinois Press, Carbondale. [Six volumes have been published thus far, covering the ferns and most of the monocotyledons (Except for some sedges).]
- Peterson, R. T. and M. McKenny. A field guide to wildflowers of northeastern and north-central North America. Houghton Mifflin Company, Boston, Massachusetts. 1968. [A good book for the amateur.]
- Rickett, H. W. Wild flowers of the United States. Volume 1. The northeastern states. New York Botanical Garden and McGraw Hill, New York. 1966.
- Swink, F. Plants of the Chicago region. Second edition. Morton Arboretum, Lisle, Illinois. 1974. [Contains much useful ecological information.]

Plant culture

- Bruce, H. How to grow wildflowers and wild shrubs in your own garden. Alfred A. Knopf. 1976.

- Carter, J. C. Illinois trees: selection, planting, and care. Illinois Natural History Survey Circular 51. Urbana, Illinois. 1966.
- Crockett, J. U. The Time-Life Encyclopedia of Gardening. 12 volumes. Time-Life Books, Chicago, Illinois. 1972. [See particularly the volumes on "Trees", "Flowering Shrubs", and "Lawns and Ground Covers."]
- Dirr, M. A. Manual of woody landscape plants. Their identification, ornamental characteristics, culture, propagation, and uses. Revised edition. Stipes Publishing Company, Champaign, Illinois. 1977.
- Pirone, P. P. Tree maintenance. Fourth edition. Oxford University Press, New York. 1972.
- Wyman, D. Wyman's gardening encyclopedia. MacMillan Publishing Company, New York. 1971. [Contains much basic horticultural information.]

Fig. 1. Cross-section of ravine in winter. Note the canopy layer, the under-story tree layer, and the shrub layer (the herbaceous layer absent in winter).

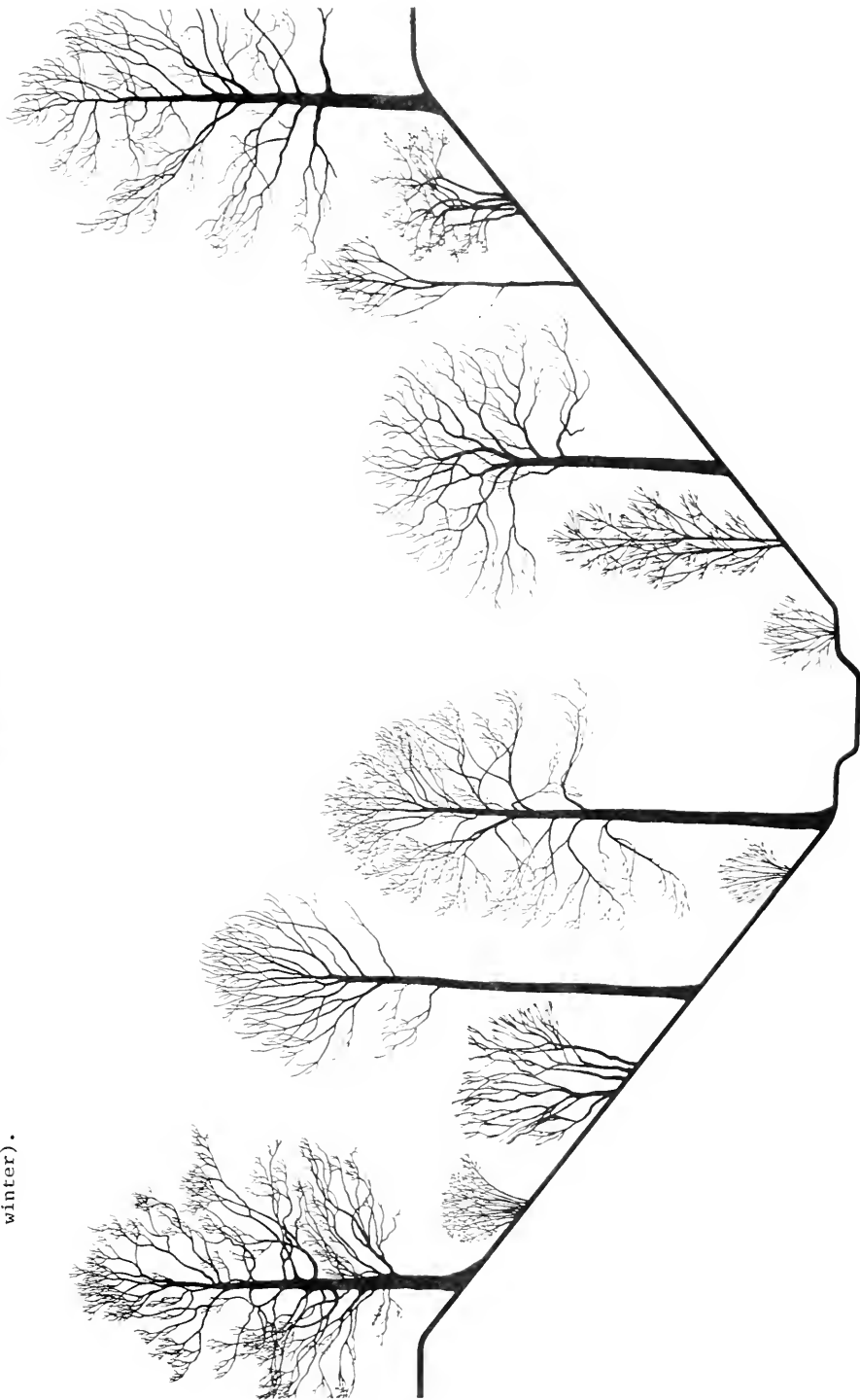


Fig. 2

HOW A TREE HOLDS THE SOIL

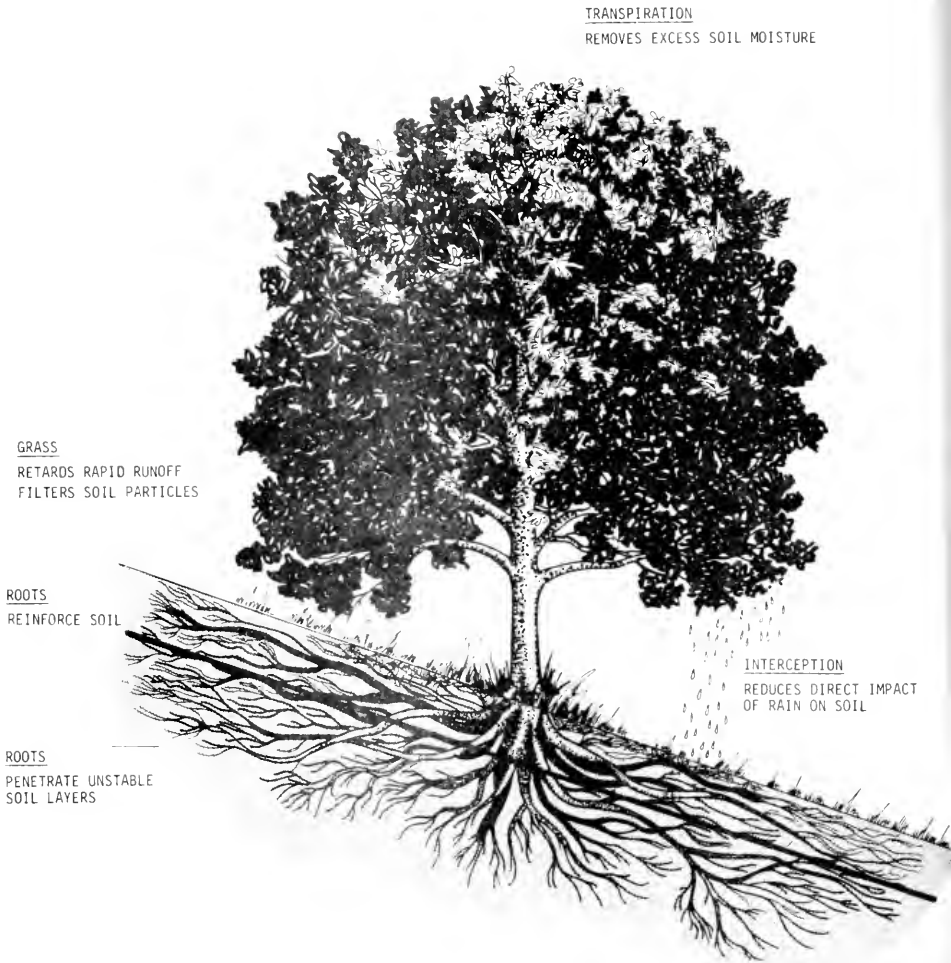


FIG. 3. HOW TO PLANT A TREE OR SHRUB



1. **Bare-root plants.** Dig hole about twice diameter of root mass and one and one half its depth. Protect roots from drying by covering with wet straw or burlap or by placing in a container of water.



2. Put layer of top soil in bottom of hole, making a slight mound if plant does not have a taproot. Trim off any broken roots and spread remaining roots into natural positions. Place plant so that it is at the same depth it grew in the nursery (old soil line often marked by difference in coloration of bark).



3. Hold trunk vertical. Work top soil by hand around and between roots so that no air pockets remain. Firmly pack soil with your feet, being careful not to break any roots. Fill hole nearly to top with top soil.



4. Use remaining soil to make a low dike or saucer around plant to hold water. Water thoroughly. Mulch area around plant with straw or wood chips to prevent weeds.



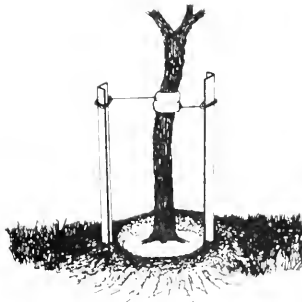
5. If immediate planting of bare-root plant is not possible, temporarily heel it into the ground and cover roots with moist soil to prevent roots from drying out.



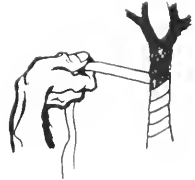
6. **Balled and burlapped plants.** Dig hole twice diameter of root ball and as deep as ball is tall. Place ball in hole so that top of ball is just below level of surrounding soil. Remove twine, turn back burlap, and backfill with firmly packed top soil. Make a dike or saucer and mulch as above. Water thoroughly.



7. To compensate for loss of roots during transplanting, prune out top third of plant, taking care to preserve basic form of plant.



8. If necessary, support plant with stakes. Note use of pieces of old garden hose to protect stem from wire loops.



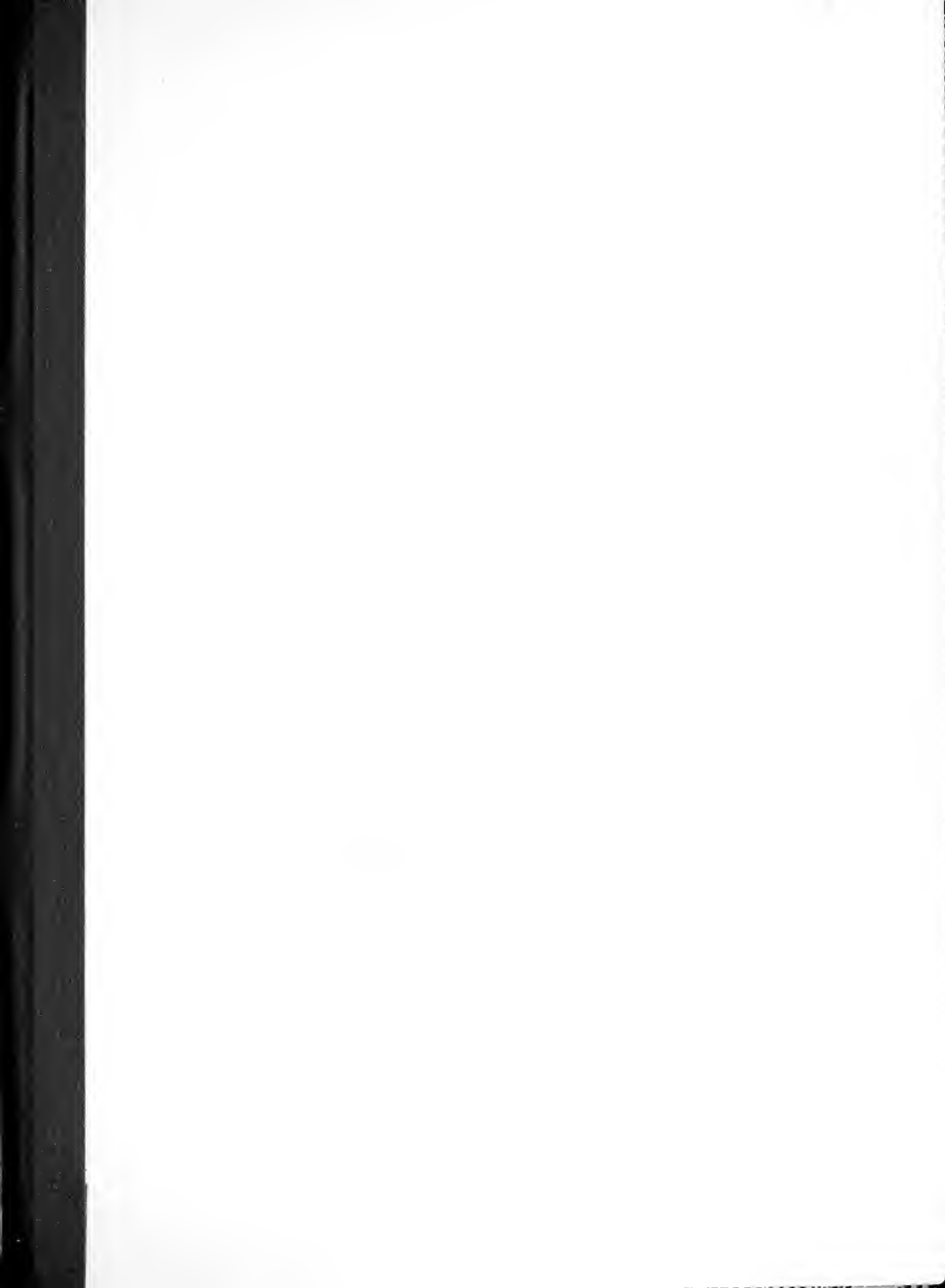
9. Wrap base of stem with special tree wrap to conserve moisture and protect it from wind, the sun, insects, and rodents.



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