

The Morton Arboretum Quarterly

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COVER: Downy hawthorn, *Crataegus mollis*
Original drawing by Nancy S. Hart

From the era of the great Illinois prairie, the downy hawthorn, *Crataegus mollis*, is still one of our most common and characteristic native trees. The hawthorns at Thornhill, the site of founder Joy Morton's home, provide us with handsome remnants of our prairie heritage. With few prairies left to invade, this thorny member of the rose family is thriving in pastures and neglected open spaces. Its distribution is dependent upon seed dissemination by fruit-loving birds and mammals. The early pioneers enjoyed the taste of its $\frac{3}{4}$ to 1 inch apple-like fruit, fresh and in preserves. They referred to the tree as red haw or thorn apple. Haw is an Old English term for hedge.

While a few nurseries offer it for sale, the downy hawthorn is rarely planted intentionally because of its extreme susceptibility to cedar-hawthorn rust, an aesthetically disfiguring disease that can turn its foliage brown in late summer. However, cedar-hawthorn rust can easily be controlled, and attractive fall color results. Its long, sharp thorns, messy fall fruit, and slow growth habit all contribute to its dismissal as a valued plant. However, its magnificent, bold, contorted branches which spread up to 60 feet and its pleasing, medium height of about 20 to 30 feet are major reasons for reconsidering this tree as a landscape plant. Especially striking is its winter silhouette against a stark blanket of snow. Downy hawthorn is quite tolerant of the harsh urban landscape—a major consideration for the urban and suburban homeowner. T.G.

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PRESERVING

by Thomas Green

THE THORNHILL HAWTHORNS

Thornhill was the name chosen by Joy Morton for his estate. As the story goes, in 1909 Joy Morton helped extinguish a grass fire on a hill overlooking the East Branch of the DuPage River. With oak forest on three sides, the southern panorama revealed a grassy (though slightly charred) slope dotted with native hawthorns. Thornhill is a fitting name for this landscape.

Crataegus mollis, commonly known as downy hawthorn, is an Illinois native. Actually, its range extends from southern Ontario south to Virginia

and west to South Dakota and Kansas. Grassy unmown pastures and fencerows are the most favorable growing sites. Birds are rather efficient in seed distribution, but downy hawthorn's requirement for full sun favors germination and growth from seeds deposited in open areas over seeds landing in the forest.

Downy hawthorn tends to be a rounded to wide-spreading tree that grows to a height of 20 to 30 feet. It has varying degrees of thorniness. Unlike most other hawthorns, the branches, which

have a gray cast, grow horizontally but do not normally bend back to the ground. Legend has it that Joy Morton "trained" several of the Thornhill hawthorns so that their branches swept along the ground, producing spectacular looking specimens.

The young leaves are very downy when unfolding; hence the name "downy" hawthorn. During summer, the leaves are normally flat, medium green, and can turn bronze to bronze-red in the fall. In Illinois and throughout most of the Midwest, late spring leaves develop small yellow spots. As summer progresses, the yellow spots enlarge and reduce the amount of green area. By late summer, the yellow spots turn to orange and the leaves begin to turn brown. Fall color is rarely observed, because the leaves usually are shed long before the normal fall color period.

This premature leaf defoliation is the result of an attack by a fungal pathogen known as *Gymnosporangium globosum*, commonly referred to as Cedar-hawthorn rust. This fungus produces galls on juniper, the alternate host. *Juniperus virginiana* (eastern red cedar) and *J. scopulorum* (Rocky Mountain cedar) are the most susceptible. The disease first appears on junipers in spring with small reddish-brown galls which produce orange-brown, wedge-shaped spore horns. During the first warm rains of spring the spore horns expand to orange-colored, gelatinous, tongue-shaped structures. As they begin to dry, millions of spores are released to the air. The timing of the spore release coincides with leaf emergence on the hawthorns. The fungus colonizes leaves and sometimes twigs and fruit of hawthorns, apples (*Malus*), mountain ashes (*Sorbus*), pears (*Pyrus*), and serviceberries (*Amelanchier*). Both a juniper and one of these rosaceous hosts are required for the parasitic fungus to complete its life cycle. The fungal spores are carried by wind, so the hosts must be close to one another (within a mile).

At the Morton Arboretum, susceptible haw-

thorns don't stand a chance of escaping the spores. Our large juniper collection provides an ample supply of rust inoculum to guarantee infection at higher-than-usual levels.

In nature, eastern red cedar also invades open meadows and fencerows. Its seeds, also disseminated by birds, germinate and grow in open areas and make red cedar a natural associate of hawthorns. However, when grass fires are common, as they are in nature, they tend to reduce juniper populations, and rust inoculum levels are thus quite low as compared to that at the Arboretum, where the juniper population densities are much above normal.

Downy hawthorn grows very slowly; very old trees may have trunks with relatively small diameters. Premature loss of leaves each year can lessen the energy reserves of a plant. Chronic premature defoliation can even lead to decline and death.

The only effective control for rust on downy hawthorns is actual prevention of the disease. To prevent the disease, a protective fungicide must be sprayed on hawthorn leaves before or immediately following spore release from the juniper galls. Proper timing of spray is essential for control. Once the pathogen invades the leaf surface, most fungicide sprays are ineffective.

The Thornhill hawthorns are believed to be over 100 years old; many are slowly declining. Because of their age and historical significance to the Morton Arboretum, and because of annual defoliation due to leaf rust, we decided to spray with a fungicide to control the disease. This is one major stress factor that we can alleviate.

In 1984 the Thornhill hawthorns were sprayed with triadimefon (Bayleton ©). We sprayed on May 30, June 7, and June 13. Some trees received three applications, others two. Those receiving two applications showed very effective rust control. In 1984 spore release at the Arboretum occurred during the week of May 13 and May 20. The first

spray should have been applied during the week of May 20, since the most effective control is obtained at the time spores are released from the juniper galls, orange jelly-like structures that swell following rains. Spores are released to the wind during later periods of dry weather. The time to spray is the first dry period following spore release; the second spray, 7-10 days later. In very wet springs, a third spray 7-10 days after the second may be desirable.

Because the timing is so critical, homeowners are cautioned to consult a professional before embarking on a spray program for their home landscapes.* The most effective control of course is not

to plant susceptible junipers and rosaceous hosts in the same landscape. New housing or corporate developments should be planned so that these host are not planted within a mile of each other. This calls for close cooperation among landscape designers, contractors, and developers.

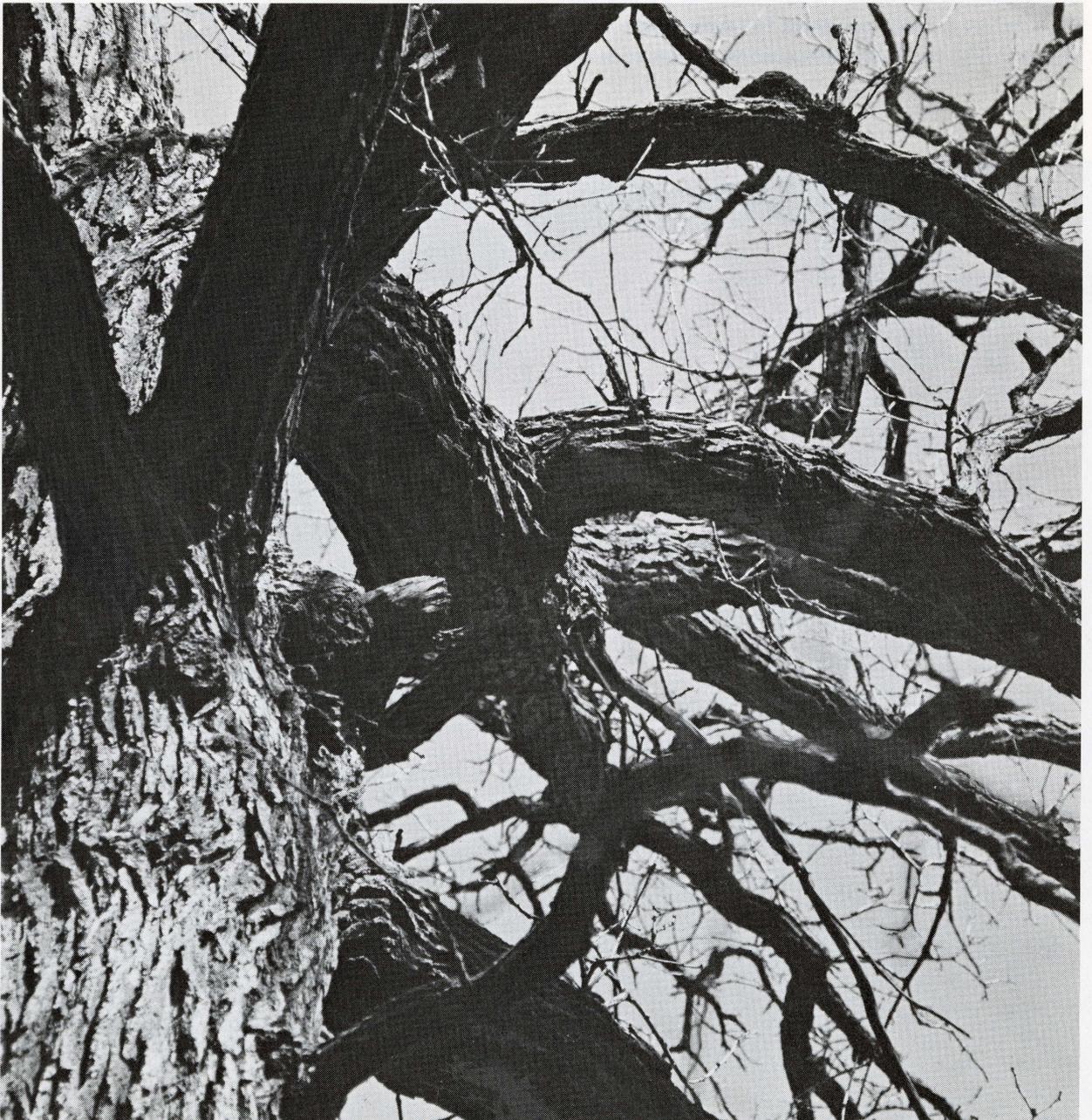
For the first time in anyone's memory, the Thornhill hawthorns were free of yellow spots and sported an attractive golden fall color. With continued intensive care, Joy Morton's hawthorns may be around for some years to come.

* Information Leaflet No. 10, offered through the Morton Arboretum's Plant Clinic, describes the rust cycle and suggests a treatment program for its control.



LARGE *NATIVE* TREES of the Morton Arboretum

by Webster R. Crowley, Jr.



“Of all man’s works of art, a cathedral is greatest.
A vast and majestic tree is greater than that.”
—Henry Ward Beecher (1870)



The distribution of native trees on the grounds of the Morton Arboretum reflects the activities of the early settlers of DuPage County. During the early settlement period, many of the Arboretum’s large trees, principally walnut, cherry, hickory, ash, and white and red oaks, were cut for building timber, fence posts, firewood, and farm implements. Some areas of the Arboretum were cut over as late as 1918–19. Early surveyors reported hickory on both the east and west sides of the East Branch of the DuPage River, but heavy cutting has left only a couple of small, isolated areas in the Arboretum where one can find native hickories. These trees were prized for wheels, wagons, and tool handles.

Also noteworthy are the number of 25” to 30” sugar maples in our woodlands on the far east end. Sugar maples of this size are considered large by state standards. One speculates that this fine timber tree was not heavily logged because the settlers from New England placed a high value on it for production of syrup and sugar.

Through the winter of 1983–84, Nancy Ralston, an Arboretum volunteer, and I surveyed the Arboretum to locate, measure, and mark the largest trees in a given taxon. The trees selected were from a listing of spontaneous trees produced in 1925 by Henry Teuscher, the Arboretum’s first botanist. There were 22 trees on Teuscher’s list, one of which, *Carpinus caroliniana*, has since disappeared from the native landscape. Measurements reported here are all dbh. (diameter breast high [4.5’]) and are recorded in inches. Almost 500 trees were measured; 237, including introduced species, were marked and located.

Some of the largest native trees on the grounds are located in remote areas accessible only to those visitors with the time, interest, and stamina to seek them out. Others, like those pictured here, are more easily accessible.

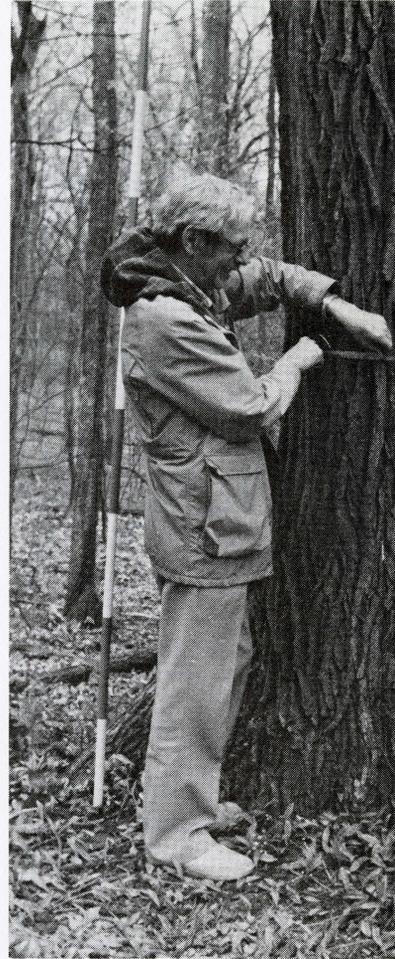
Large Spontaneous (Native) Trees of the Morton Arboretum

<i>Species</i>	<i>dbh (inches)</i> <i>Morton Arboretum</i>	<i>dbh (inches)</i> <i>Illinois average maximum*</i>
<i>Acer negundo</i>		
Box elder	29.0	48
<i>A. saccharinum</i>		
Silver maple	41	60
<i>A. saccharum</i>		
Sugar maple	35.6	36
<i>Carya cordiformis</i>		
Bitternut hickory	28.9	30
<i>C. ovata</i>		
Shagbark hickory	20.5	24
<i>Celtis occidentalis</i>		
Hackberry	19.5	60
<i>Fraxinus americana</i>		
White ash	34	48
<i>F. quadrangulata</i>		
Blue ash	23.8	36
<i>Juglans cinerea</i>		
Butternut	36.9	36
<i>J. nigra</i>		
Black walnut	39	60
<i>Ostrya virginiana</i>		
Ironwood	15.1	12
<i>Populus deltoides</i>		
Cottonwood	57.2	96
<i>P. grandidentata</i>		
Bigtooth aspen	15.4	18
<i>Prunus serotina</i>		
Black cherry	36.9	36
<i>Quercus alba</i>		
White oak	47.2	36
<i>Q. ellipsoidalis</i>		
Hill's oak	42.6	24
<i>Q. macrocarpa</i>		
Bur oak	49.1	60
<i>Q. rubra</i>		
Red oak	39.9	36
<i>Tilia americana</i>		
Basswood	33	24
<i>Ulmus americana</i>		
American elm	29.4	48
<i>U. fulva</i>		
Red elm	32.7	16

* Source: *Forest Trees of Illinois*, Illinois Department of Conservation, Division of Forestry, Springfield, Illinois.

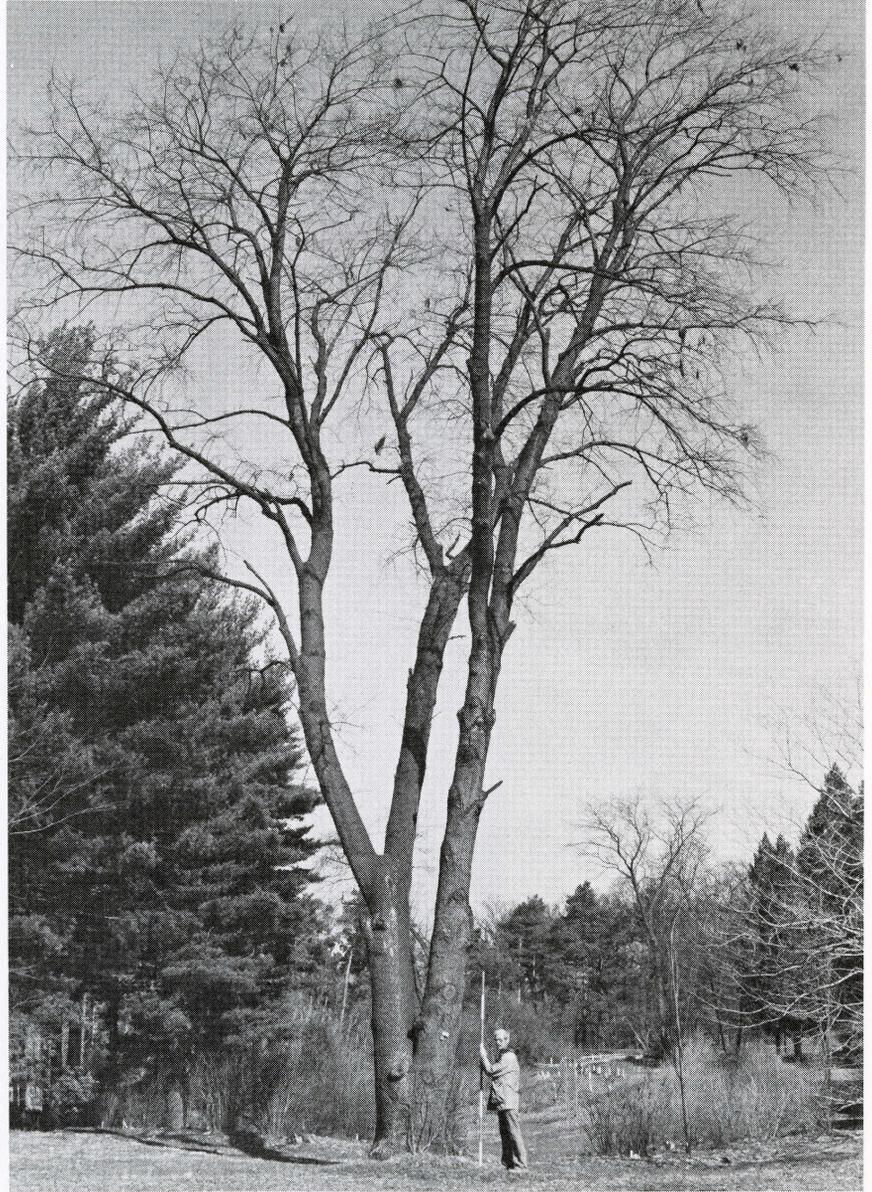


This red oak, Quercus rubra, located on the northeast side of Pine Hill on the Arboretum's west side, at 39.9 inches is above the average size for Illinois.



*Above left: Cottonwood, *Populus deltoides*, along the river on the east side; its diameter of 57.2 inches makes it the largest tree in the Arboretum. Center: Bur oak, *Quercus macrocarpa*, pictured also on page 52, at 49.1 inches is our largest oak. However, it is not large by State standards, where the average maximum diameter is 60 inches. It is located northeast of the ravine bridge on the third loop of the Illinois Trees Trail.*

Below right: Black cherry, Prunus serotina, located north of the wastewater treatment plant on the east side. This tree, at 36.3 inches, is also above the average size for Illinois.





White ash, Fraxinus americana, is located near the service entrance to the willow collection in the far east woods. Its diameter is 34 inches—a large tree, yet far below the average maximum for Illinois.



Silver maple, Acer saccharinum, located in the far east woods about 100 yards from the Fraxinus (opposite), on low ground which frequently floods. Its diameter is 41 inches, well below the average maximum.

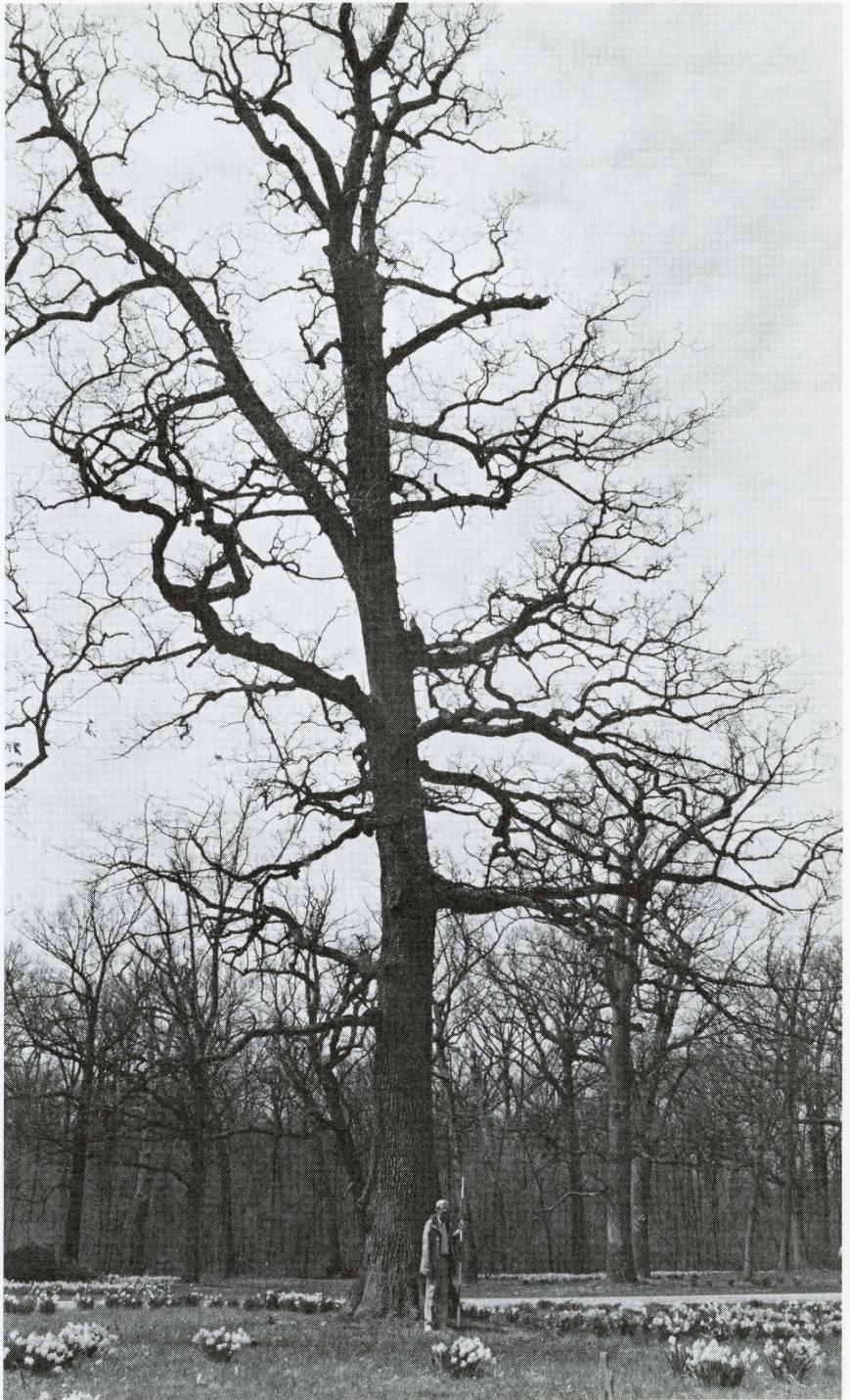


*Two views (right and opposite) of sugar maple, *Acer saccharum*, near the ravine bridge on the third loop of the Illinois Trees Nature Trail. Its diameter of 35.6 inches is quite large for this species in Illinois.*



The photograph captures a serene winter scene in a deciduous forest. The central tree, a large oak, stands as a prominent silhouette against the pale sky. Its branches are bare and intricate, mirroring the skeletal structure of the surrounding trees. The forest floor is a mix of fallen leaves and logs, adding texture to the scene. The overall atmosphere is quiet and still, characteristic of a dormant woodland.

This white oak, Quercus alba, stood on the west side along the road north of Lake Marmo until it was lost in a severe summer storm in 1984. Its diameter was 47.2 inches, well above the State average. It was over 300 years old based on a ring count. The current largest white oak is 42.4 inches in diameter, and is located in the same area.



The Myth of the TAPROOT



By George W. ...

A rough sketch of the ...
large tree in the photo. A ...
was a taproot 11 inches ...
in height and 3 feet in diameter ...
two or horizontal, spaced ...
was 2.5 feet.

The Myth of the TAPROOT

By George Ware



A severe windstorm in May, 1984, toppled several large trees in the Morton Arboretum. One of them was a tuliptree (*Liriodendron tulipifera*), 100 feet in height and 3 feet in diameter. The massive system of horizontal, splayed roots was no deeper than 2.5 feet.

The photograph dramatically illustrates the shallowness of rooting commonly prevalent on wind-thrown trees in the clay soils of the midwest. Contrary to the common conception of trees having taproots, in most situations, root systems of trees resemble those shown in the photograph.

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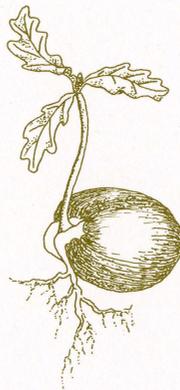


ILLUSTRATION SOURCES

Pages 49, 51, 55-64: Photographs by John Kohout
Page 52: Photograph by William S. Stickney
Page 53: Wood engraving by Alexander Anderson, 1775-1870
Inside back cover: Pen and ink drawing by Bobbie Lively-Diebold, from *The Morton Arboretum Quarterly*, Volume 9, Number 1



The Morton Arboretum was founded by Joy Morton in 1922 as "A privately endowed educational foundation for practical, scientific research work in horticulture and agriculture, particularly in the growth and culture of trees, shrubs, and vines by means of a great outdoor museum arranged for convenient study of every species, variety, and hybrid of the woody plants of the world able to support the climate of Illinois . . . to increase the general knowledge and love of trees and shrubs, and to bring about an increase and improvement in their growth and culture."

