

Lithomount

THE AMERICAN ELM

Its Glorious Past

Its Present Dilemma

Its Hope for Protection

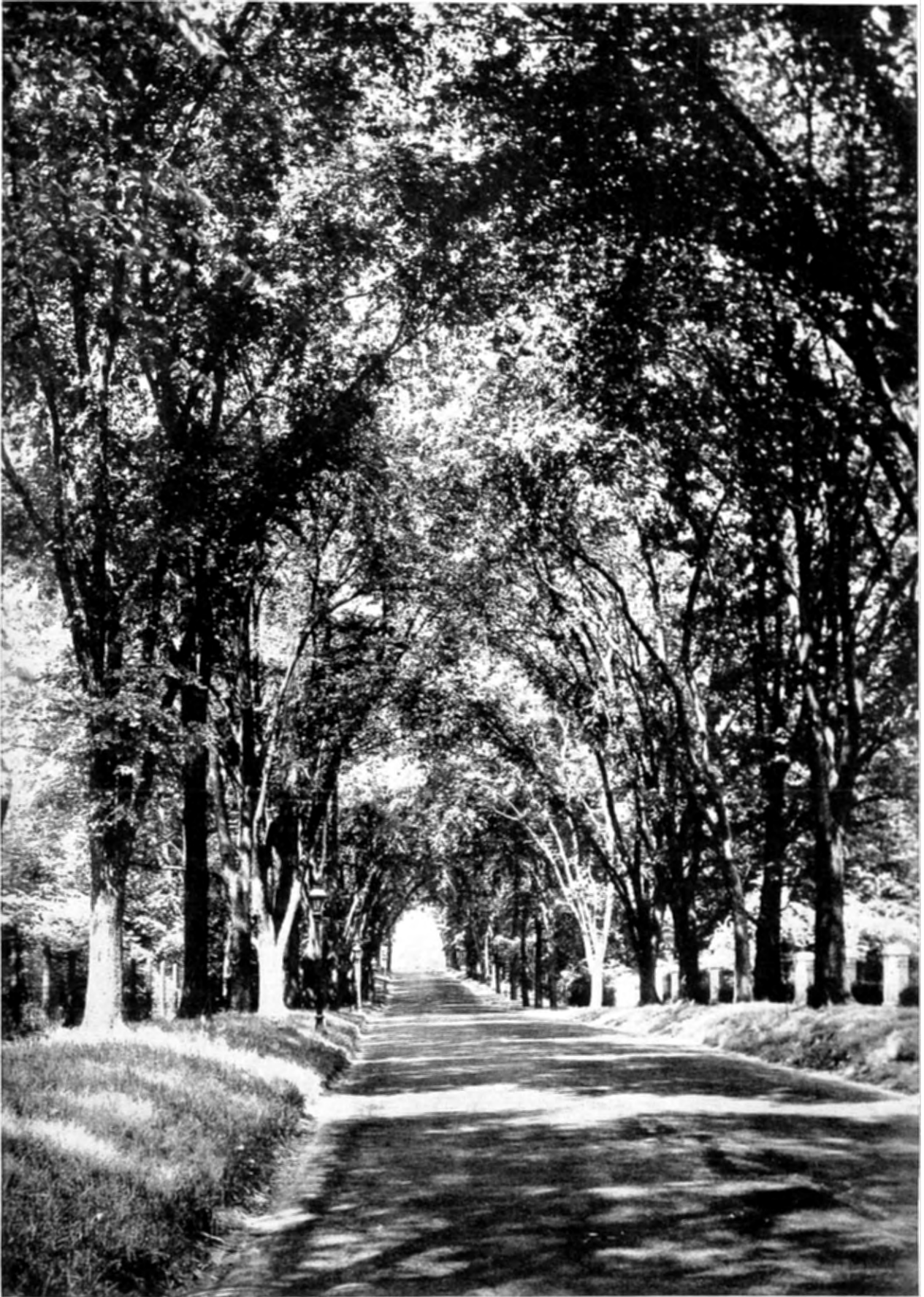
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Nature's Cathedral . . . an archway
of venerable elms in Cleveland, Ohio

THE AMERICAN ELM

ITS GLORIOUS PAST

The American elm stands preeminent among trees in the lives of American people. A wilderness tree when the first settlers landed, the elm straightway put aside its wild ways and made friends with the newcomers. Then and there on the rockbound coast of New England was founded a **friendship between tree and man that has endured for more than three hundred years.**

By nature a gentle, hospitable tree, the elm won the hearts of our forefathers. Its grace of outline, grandeur of size, its domestic nature supplied them with physical and spiritual comfort in a new world all too lacking in comforts. They built their homes under its spreading branches; where it was absent, they went to the woods and obtained **young elms to transplant at their doors, beside their windows, along the streets of their villages.** As years passed and the young elms took on the glory of clean growth and solid contentment, so, too, did the people who dwelt with them.

So deep became this companionship that when the settlers moved westward beyond the natural range of the elm, they took the tree with them to share their fortunes. Thus, three centuries of serene tradition have fused this tree with the lives of Americans and American homes.

ITS PRESENT DILEMMA

Side by side, the American pioneer and the American elm, moving westward, met and overcame all hardships. Insects, fungi, fire, drought, new conditions of soil and climate—these were the enemies of the elm. It met and conquered them all, maintaining always the glory of its form and the gentleness of its character. Patiently it multiplied its numbers and persistently it extended its shade until today a billion elms are rooted in American soil, from the Atlantic to the Pacific.

But now, at the crest of its glory, the American elm has met an arch enemy—the **Dutch Elm Disease, brought into this country in elm logs bearing a parasitic fungus from Continental Europe.** This disease is virulent and destructive. If the disease is not curbed, the elm will go the way of the chestnut; for the Dutch Elm Disease, once out of hand, spells **certain and rapid extinction of the tree.** That is the nature of the disease and that has been the experience of European countries where it was not promptly controlled or eradicated. This is the dilemma that today faces America's elms and challenges America's people.

ITS HOPE FOR PROTECTION

There is just one hope for the elm: that is to stop the spread of the Dutch Elm Disease from the few regions in which it has gained foothold and to eradicate it from these areas as swiftly and as surely as possible. Fulfillment of this hope is in the hands of the American people. They may ignore or minimize the disease: if they do, a few short years will write the elms from their lands and their lives. Or they may rally to the defense of this glorious tree by uniting in an expression of public opinion that will assure federal and state action to wipe out every incipient outbreak of the disease.

The federal and state agencies are the only ones that can deal with the Dutch Elm Disease as a national menace. In order to do so effectively they must have back of them public opinion demanding preparedness and action. This carries with it public support of adequate and continuing funds to eradicate existing infections and to stamp out promptly new outbreaks as they occur. The fact that elms now infected with the disease are confined to a few limited

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Spreading green canopies of shade across the land, America's elms appeal for help

areas should lull no one into a sense of false security. These infections, if not promptly dealt with, are as great a menace to elms a thousand miles distant as they are to elms in close proximity to the infection areas. The inescapable fact is that Dutch Elm Disease is in our country and, so long as it is permitted to remain, elms everywhere—from New England to California—are menaced. Public complacency is the ally of the disease; public action is its enemy.

That the people of America may better understand the situation and may be moved and inspired to intelligent action in defense of their most cherished tree, this publication is issued.

The American elm (*Ulmus americana* L.) is native to portions of all of the States east of the Great Plains. Within this region, occupying different yet overlapping areas, are five other native elms—slippery elm (*Ulmus fulva* M.), rock elm (*Ulmus racemosa* T.), wing elm (*Ulmus alata* M.), red elm (*Ulmus serotina* S.), and cedar elm (*Ulmus crassifolia* N.). All are trees of beauty, all have their distinct usefulness, and all are susceptible to the Dutch Elm Disease.

In the forests of the nation, the elms, usually mixed with other hardwoods, are estimated to include sixteen billion board feet of merchantable timber. This resource of growing trees is capable of supplying industry with yearly supplies of fifty million to two hundred million board feet of forest products. The value of this lumber in the log ranges from \$750,000 to \$3,000,000 a year. Its manufacture gives employment to thousands and the value of the finished products may be measured in millions of dollars.

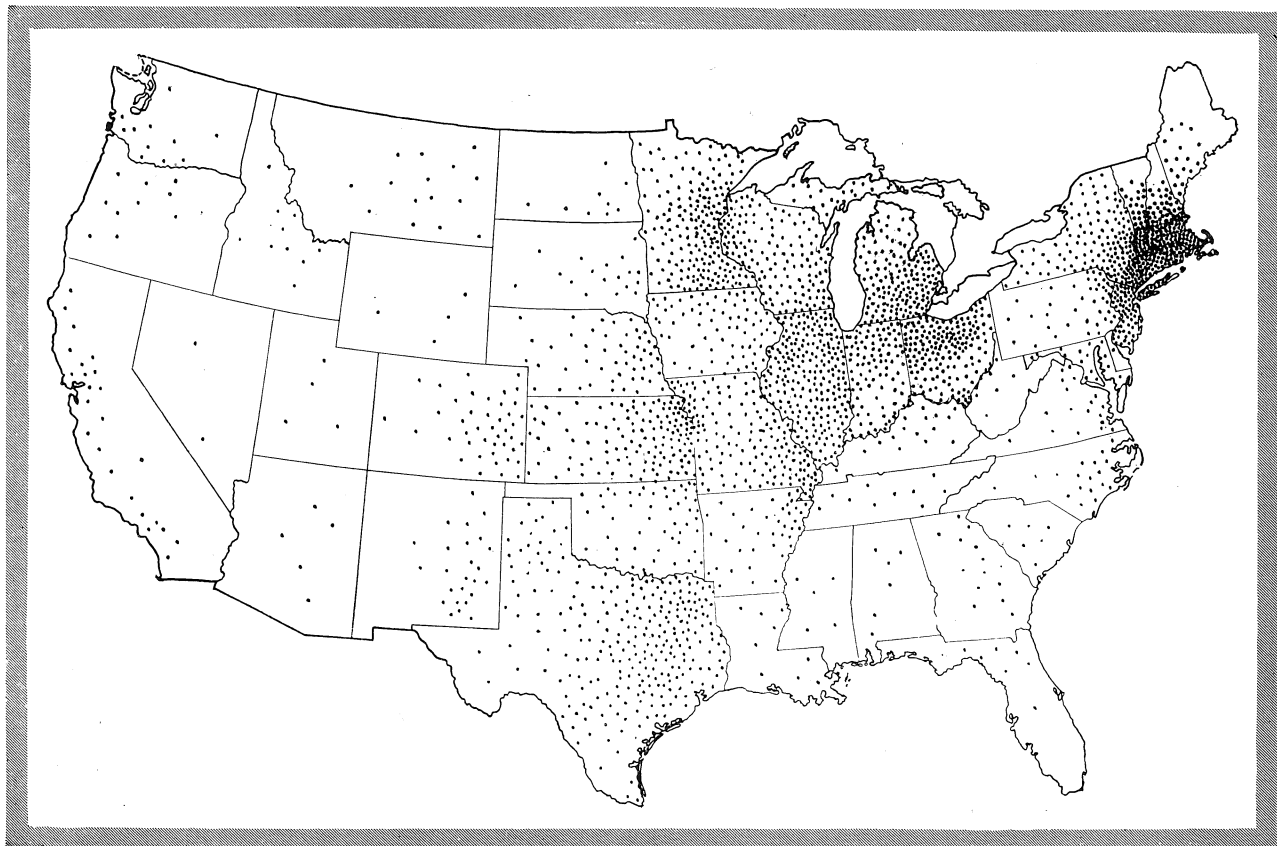
The value of America's elms for ornament, however, and as shade trees, eclipses that of all the forest elms. Home owners and civic-minded citizens have planted millions of elms. Communities in every state refer with pride to their elm trees. Each dot on the map below represents 10,000 elm trees growing on streets, roadsides, and homesites. More than 25,000,000 shade and ornamental elm trees adorn the landscape of the United States.

How much are they worth? Many are priceless. The Department of Agriculture recently secured answers to questionnaires from various official and unofficial sources that serve as a census and partial appraisal of elm values. The answers indicate an average value of \$26 for each tree. On this basis \$662,000,000 would be a nominal estimate of what their owners think the trees are worth.

Officially reported elms within the metropolitan area of a few representative cities follow:

	<i>Elms reported</i>	<i>Valuation</i>
Minneapolis, Minnesota	600,000	\$15,000,000
Detroit, Michigan	400,000	15,000,000
Cincinnati, Ohio	400,000	10,000,000
Dallas, Texas	300,000	5,000,000
Chicago, Illinois	200,000	2,000,000
Oklahoma City, Oklahoma	150,000	7,500,000
Denver, Colorado	105,000	
White Plains, New York	60,963	1,200,000
St. Louis, Missouri	28,000	310,000
Springfield, Massachusetts	27,500	6,000,000
Richmond, Virginia	13,900	1,040,000
Sacramento, California	12,500	2,860,000
Salt Lake City, Utah	9,000	180,000
Newark, New Jersey	7,105	710,500

Elm trees shade the nation. Each dot represents 10,000 ornamental elms



AMERICAN ELM

Ulmus americana, Linnaeus

THE dignified and courtly American elm is characteristic of the northeastern landscape and has been planted over most of the United States. Typically vase-shaped, it sometimes develops heavy far-reaching limbs after the manner of the oaks.

Elm belongs to the family "*Urticaceae*"—the family of the nettle. The genus *Ulmus*, which is the ancient Latin name for elm, has sixteen species distributed in the north temperate countries of the world. Six elms are native to eastern North America, with American elm the largest and most important. None are native west of the Rocky Mountains, but they grow successfully in all western states.

American elm is known as white elm, and sometimes as water or soft elm. It grows naturally in river bottoms and on low fertile hills, from southern Newfoundland to central

actually,
Ulmaceae,
the elm family



Field Museum

In summer the Elm combines grace and dignity with courtliness, while in winter it reveals the strength of its limbs and branches above a sturdy trunk

Florida, and west beyond the northern shores of Lake Superior to the Turtle Mountains of North Dakota, thence up the water courses to the base of the northern Rockies. Its western limits are confined to stream banks in western Nebraska, central Kansas and Oklahoma, through central Texas to the Gulf of Mexico.

The main trunk of open grown trees divides at ten or twenty feet to form a broad crown, while in the forest trunk lengths of thirty to sixty feet are attained. Trees two to four feet in diameter and eighty to one hundred feet high are common, but elms eight to eleven feet in diameter and 120 to 140 feet high have been known.

The lopsided, double-toothed, alternately placed, sharp pointed leaves are two to five inches long and one to three inches wide. Evenly spaced, parallel veins extend from the midrib to the sawtooth edges. The upper surface is slightly rough while the under surface is softly hairy. In early autumn the leaves turn golden yellow, then sere and brown and quickly leave the tree bare.

At the base of each short petiole or leaf stem is a blunt pointed, smooth, slightly flattened bud, which appears to be at one side of a semi-circular leaf scar after the leaves drop. Before the leaves are fully open, in May or June, the seeds ripen. They are flat, entirely surrounded by a broad, slightly hairy, papery wing, which rarely exceeds three-quarters of an inch in diameter. If planted immediately, most of the seed will germinate in a few days, but some may lay dormant until spring. Each seed develops from an inconspicuous light green perfect blossom with red stamens. They hang in clusters and are produced before the leaves, when the tree appears as if covered with a purple glow.

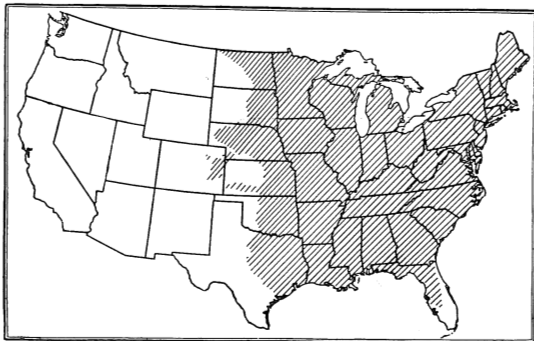
The wood is light brown, heavy, hard, tough, so cross-grained as to be difficult to split, and weighs thirty-three to thirty-five pounds to the cubic foot when air dry. It has a broad area of lighter colored sapwood. Because of its toughness it is used for the hubs of wheels and for hoops and staves in slack cooperage, for shipbuilding, furniture, flooring, sporting goods, boxes and crates. Relatively easy to season, it works fairly well, and while it can be scoured to a clean whiteness, does not polish easily. The Iroquois Indians of western New York used the bark for canoes and twisted it into ropes.

In 1935 the total cut of all elm lumber in the United States was 66,719,000 board feet as compared with 175,833,000 board feet in 1929. Nearly one-half of the 1935 cut was produced in Wisconsin and Michigan.

American elm grows from seed, sprouts readily from the stump and from root ends. Horticultural types may be reproduced by cuttings, buds and grafts. Preferring rich, deep, well drained loam, it will grow in almost any soil. The vigorous, shallow, fibrous root system permits comparatively easy transplanting until the trees reach a large size. The roots reach out long distances for water, occasionally entering and clogging drain pipes whose joints are not thoroughly closed.

Of its leaf pests, the elm leaf beetle is chief. By eating the leaves this beetle and its larvae occasionally kill trees, but like other insect pests it can be controlled.

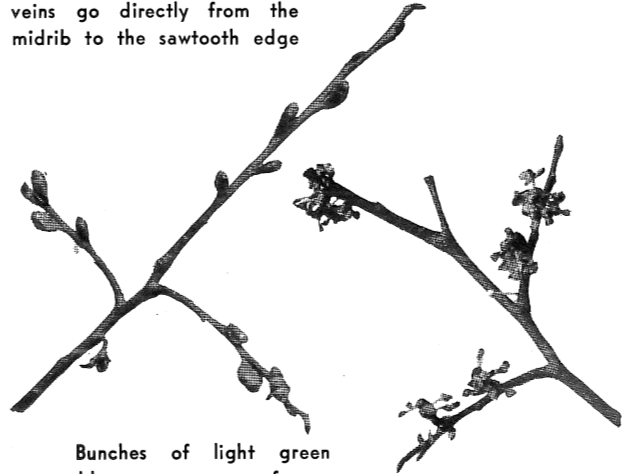
Much more to be feared is the Dutch Elm Disease,



Natural range of American Elm in the United States



One side of each leaf is larger than the other, and parallel veins go directly from the midrib to the sawtooth edge



Bunches of light green blossoms appear from last year's buds ahead of the new leaves



Field Museum

The dark, ashy gray bark of the main trunk is one to one and a half inches thick, with interlacing flaky ridges

for which no cure has been discovered. In spite of enemies, however, American elm is a popular shade tree and its ability to reproduce under forest conditions encourages its use in hardwood forest management.

A VICTIM OF THE DISEASE



Elm trees with wilting, discolored foliage on one or more branches, may have Dutch Elm Disease. If your elms show these signs of infection, they should be immediately reported, with samples, to the Dutch Elm Disease Laboratory, United States Department of Agriculture, Morristown, New Jersey

THE DUTCH ELM DISEASE

The Dutch Elm Disease is caused by a fungus that interferes with the normal sap flow of the tree. The reproductive parts of the fungus are confined to the interior of the tree, and are therefore seldom wind disseminated. The only known carriers are bark-boring beetles which burrow into the infected tissue. Thus far, transmission of the disease from one tree to another is believed to be limited to the activities of two small bark beetles, one of which was introduced from Europe a number of years ago. At present the range of the introduced beetle in this country is limited, but native bark-boring insects, such as are found wherever elms grow, undoubtedly may carry the disease if they get into infected trees.

Once introduced into the tree the fungus spreads rapidly to the surrounding tissues and kills the tree in three or four years. There is no known cure for infected trees. Accordingly, they must be cut down and destroyed to save the neighboring healthy trees.

The beetles which carry the disease are attracted to the limbs and branches of weak, decadent elms. This has led authorities to regard as necessary the practice of cutting down or poisoning all weak or sickly elms of no esthetic or economic importance in the vicinity of infected trees.

Wilting leaves on one or more elm branches, followed by discoloration, shriveling, and general falling of all but a few of the end leaves is usually good evidence of Dutch Elm Disease in a tree. The ends of the infected twigs may also curl in a characteristic manner, like a shepherd's crook. During the fall and winter, after the leaves have dropped, the curled twig-ends and numerous trunk-suckers at the base of the larger limbs are the chief means of identifying the presence of the disease.

Trees may be infected and killed during a single season, but usually the disease persists for several years, resulting in sickly, declining trees with small, sparse foliage.

When infected twigs or branches are cut crosswise, the wood near the bark shows brownish, discolored spots or flecks.

- Neither the wilting foliage nor the brown discoloration of the wood is conclusive evidence of Dutch Elm Disease infection. At least four other less destructive elm diseases cause similar symptoms. *This makes necessary a laboratory diagnosis as the only reliable means of identification.* Accordingly, elm trees displaying wilted foliage should be reported to the Dutch Elm Disease Laboratory of the United States Department of Agriculture at Morristown, New Jersey. The report should be accompanied by several twig samples from the portion of the tree showing wilted foliage. These need be no larger than a lead pencil.

If the sample, upon laboratory culturing, shows the Dutch Elm Disease fungus, the plant pest control laws of the State may be invoked to cause the tree to be destroyed. Not only must the tree be cut down, but the wood and brush must be burned, and the stump treated with copper sulphate to prevent sprouting.



ORIGIN OF THE DISEASE

Because the disease was first identified in Holland in 1919, it received the misleading name "Dutch Elm Disease." More or less simultaneously, diseased trees were found in France and Belgium. Where it came from has never been clearly determined but it is believed to be native to Asia. It has been suggested that war conditions in this general region explain the failure to identify the disease from 1914 to 1918.

By 1921 it had spread into Germany. Since then it has swept into northern Italy, Switzerland, Norway, Sweden, Poland, Austria, and across the channel into England. When first discovered in England, the British authorities hoped for its eradication, but careful surveys have revealed that it is so widespread that all hope of eradication has been abandoned. Any effective quarantine as between one country and another is so difficult that no European country has organized to eradicate the disease. The latest statement regarding the European situation, from the representative of the United States Department of Agriculture at Oxford, England, is: "After eighteen years of unsuccessful efforts to fight the disease which threatened her elms, Europe has decided to give it up as an aggressive campaign as far as eradication is concerned. Europe has found it began its work too late. It intends to continue only the normal processes for forestry practice, and let the beetle reap its inevitable harvest. It can be only a few years until all the elms of England and the Continent are gone."

During the years 1926 to 1933 the Dutch Elm Disease was brought to the United States on burl elm veneer logs imported from infected areas in Europe. Not until 1933, however, did scientists discover how it was being transported. Since then all elm logs and other materials under suspicion have been effectively withheld from our ports of entry.

Conclusive evidence has been assembled to prove that important elm burl logs not only carried the Dutch Elm Disease fungus, but also bark beetles which are known to be its carriers. Although importation of these logs is now prohibited, the beetles and fungus have established themselves in an unknown number of American elms.

Elm burls occur in various parts of Europe and formerly were shipped to the United States from England, France, Czechoslovakia, and Germany. No one knows what causes an elm to produce burls. Burls are not confined to one species of elm and they are found mainly on field and roadside elms rather than on forest trees.

American furniture manufacturers discovered that burlled elm trees in France and Germany have value for the manufacture of furniture veneer. Such heavily burlled elm trees as the one shown below (right), produce veneer which displays an effect like "bird's-eye maple."

Below—The approach to Windsor Castle in England, whose four parallel rows of elms are being rapidly reduced by inroads of the disease



Burlled elm on estate near Worcester, England, where 600 trees have been killed

INSECT CARRIERS

In Europe, two elm bark beetles have been found to be the carriers of the Dutch elm disease. The larger of these beetles, *Scolytus scolytus*, is not known to be established in the United States. The smaller beetle, however, *Scolytus multistriatus*, was found in this country some years ago, and is the principal recognized carrier of the Dutch Elm Disease fungus in North America. Although specimens of this beetle were discovered on elm logs imported from Europe in 1933, it was noted around New York City and Boston prior to 1910 and has since spread throughout New England, southeastern New York, New Jersey and eastern Pennsylvania. The earlier beetles were not associated with diseased trees or logs but their relationship was definitely established with the importation in 1933 of burl logs containing the Dutch Elm Disease.

The extent to which various native insects of the elm may be carriers of the disease has not been definitely established. The American bark-boring beetle, *Hylurgopinus rufipes*, is biologically similar to the larger European beetle and has been found to be a carrier. It has a range approximately the same as the American elm, and when it feeds upon diseased trees, its menace as a carrier should be equally if not more dangerous than that of the small European bark beetle.

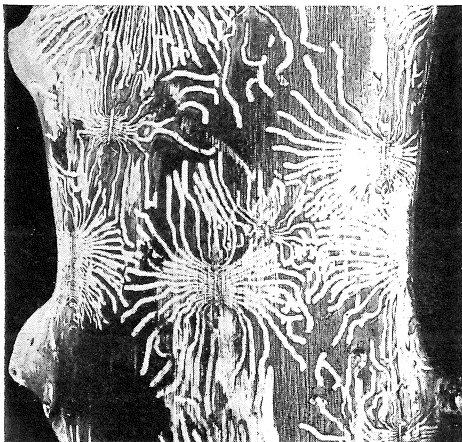
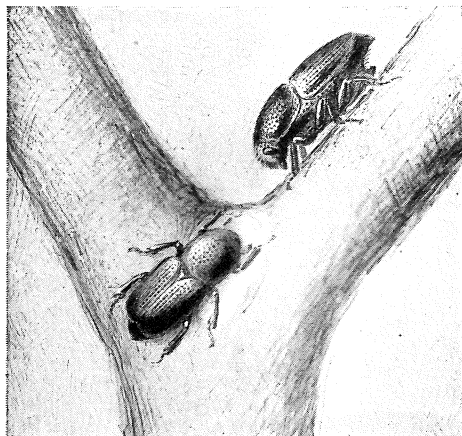
Each of these bark beetles, native as well as imported, is attracted to dead, or more or less devitalized elm trees and depends upon such trees for places in which to multiply.

In the region around metropolitan New York, the broods of adult beetles are actively in flight from May to September, during which period they feed in the crotches of small elm twigs. Seeking elms in which to lay her eggs, the female beetle bores directly through the bark to the tender cambium tissue and sapwood beneath the inner bark. Thereafter, she tunnels under the bark a one or two-inch vertical channel along which eighty to 140 eggs are laid. As the tiny white larvae hatch from these eggs, they channel immediately under the bark, feeding on the surrounding tissue and producing side galleries. The central brood gallery with its outward reaching burrows forms a characteristic pattern on the sapwood (see lower left photograph on opposite page) and a colony of grubs working together so girdle the trunk as to separate the bark from the trunk. Within a few weeks the larvae or grubs transform into beetles and leave the tree through small shot-like holes in the bark. Reddish sawdust which is forced out of these holes may be seen on the bark. The second brood lays its eggs in August and early September, and the grubs of this generation pass the winter under the bark, to emerge as beetles in the early spring.

When a beetle emerges from the galleries of a diseased tree, its body may be smeared with spores which can infect other trees when the beetle feeds on the tender tissues in the axils of the leaves and in the crotches of small twigs. When the spores germinate at the point of feeding, the new infection starts the sacrifice of other elms.

Thus, the contamination of bark beetles developing in Dutch Elm diseased trees, and their carrying the fungus to other trees spreads the disease. This alliance bestows benefits on both pests: the fungus is carried to new hosts by the insect; the insect is rewarded by the production of devitalized wood caused by fungus activity. The elm is compelled to play the sacrificial role.

America's magnificent heritage of elms is threatened by the attack of tiny, bark-boring beetles (shown below greatly magnified), which carry the Dutch Elm Disease from tree to tree. The lower inset shows the intricate and fantastic channels mined by these borers



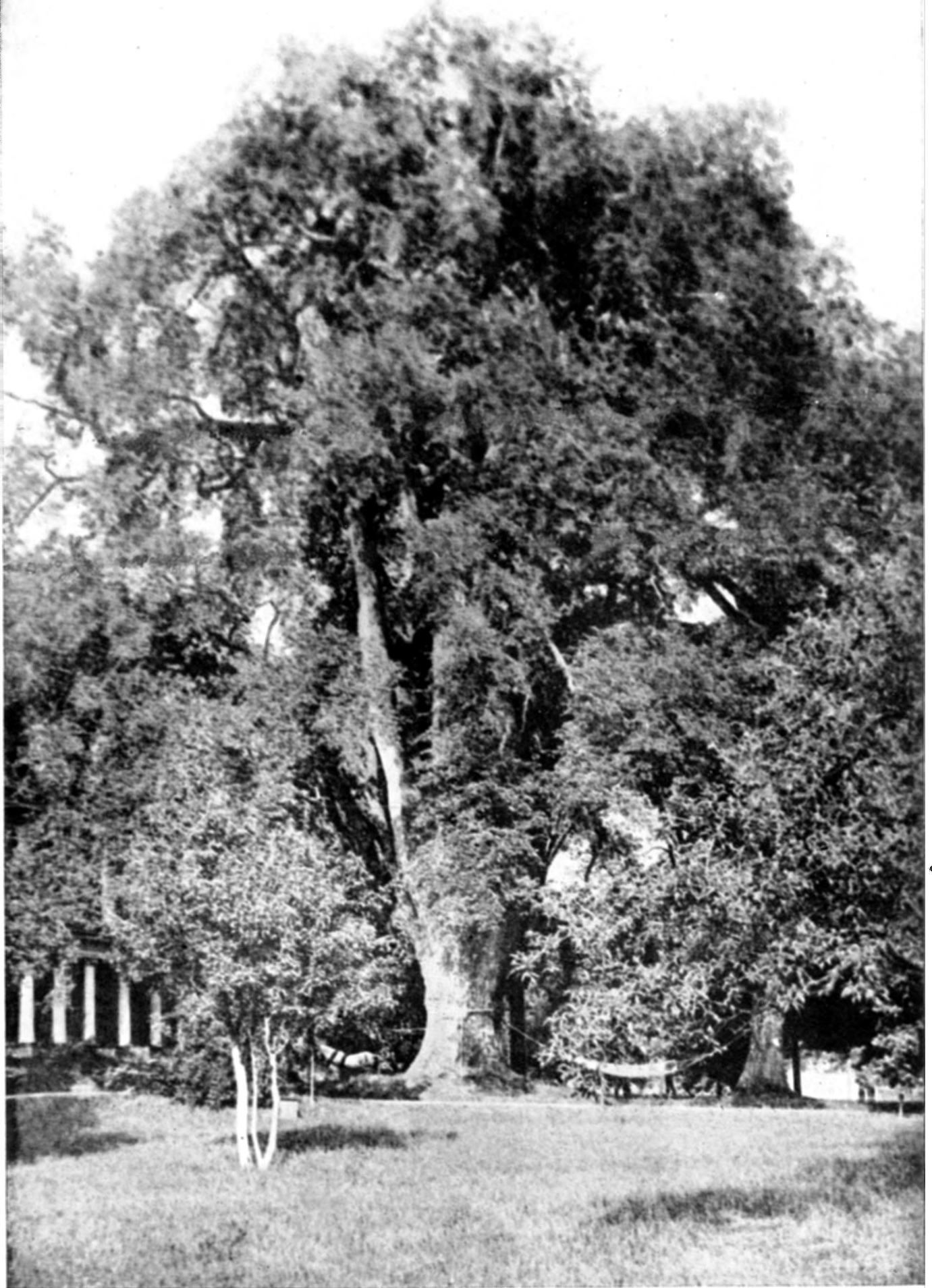


Plate by Henry Brooks

As Washington towered above his fellows, so does this great elm at Malden, Massachusetts, the Dexter Elm, rise in majesty—one of the most beautiful of all trees that ever sprang from American soil. Such an elm might well have inspired the poetical words of Walt Whitman: "Why are there trees I never walk under but large and melodious thoughts descend upon me?"



Once an elm becomes infected with the Dutch Elm Disease there is no cure for it. The tree must be cut and its wood burned to prevent the spread of the disease. In the case of ornamental and shade trees, this is an expensive task since such trees usually have to be cut section by section as shown in this photograph of a diseased tree in New Jersey

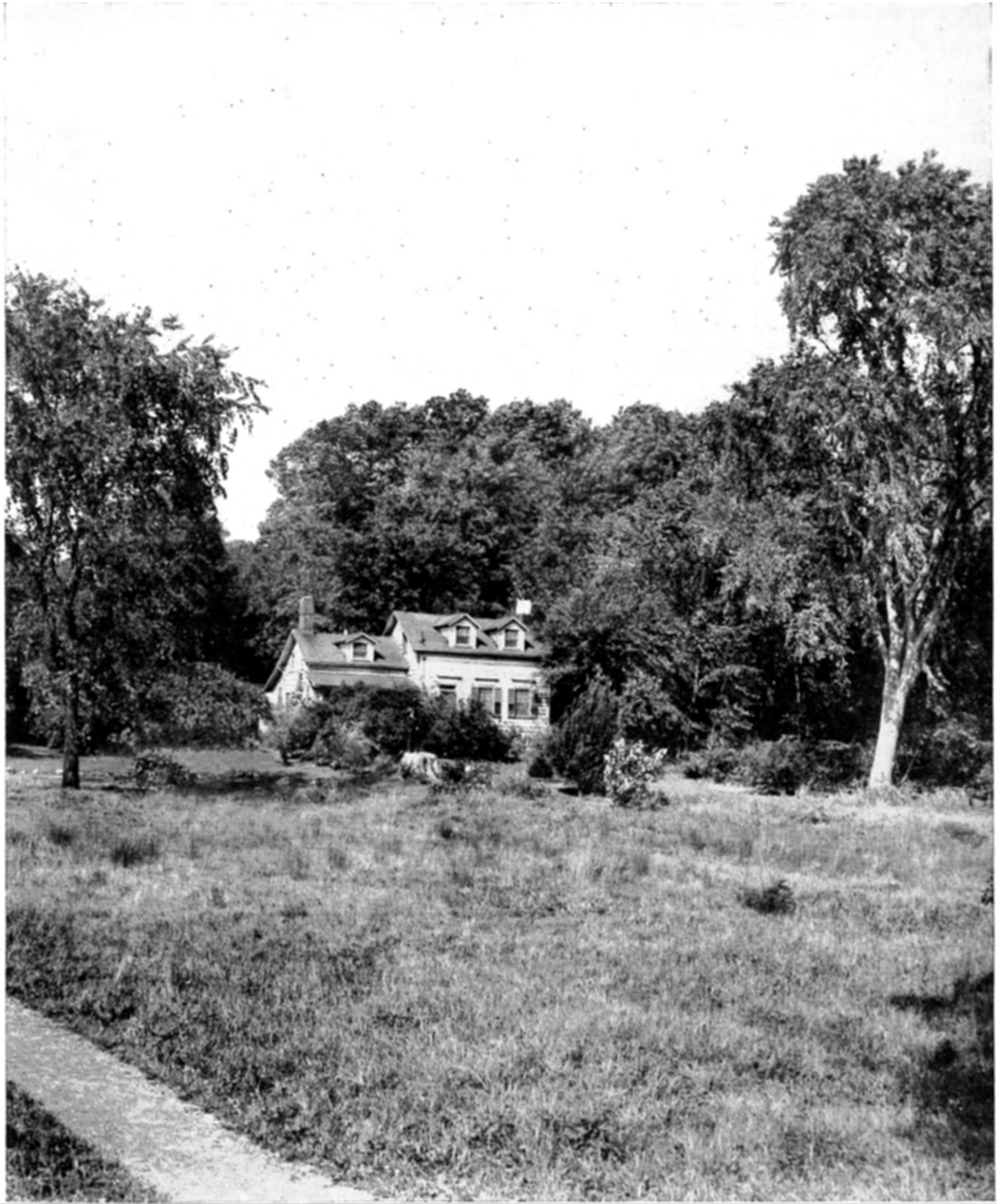


A HOME LOSES



For eighty years this American elm sheltered a home in Nutley, New Jersey. Unexpectedly and without warning the leaves turned yellow, wilted, and dropped leaving a few stragglers on curled branch ends. The Dutch Elm Disease had struck!

ITS HERITAGE!



The elm had to be cut and destroyed to protect its brothers in the neighborhood. To save others, the owner sacrificed almost three generations of care and veneration. This home now stands destitute of its greatest ornament

AREAS OF INFECTION

The first report of the occurrence of the Dutch Elm Disease in the United States came in 1930, when Christine Buisman, a Dutch plant pathologist then traveling in this country, identified the fungus, *Graphium ulmi Schwarz*, in three trees in Cleveland and one in Cincinnati, Ohio.

In June, 1933, the finding of a tree, so diseased, in Maplewood, New Jersey, set in motion the program of control and eradication which is being pursued today. The map below shows areas of general and localized infection where the disease has been found to date. The localized infection areas are (1) Old Lyme, Connecticut, (2) Cleveland, Ohio, (3) Cincinnati, Ohio, (4) Indianapolis, Indiana, (5) Cumberland, Maryland, (6) Brunswick, Maryland, (7) Baltimore, Maryland, (8) Portsmouth and Norfolk, Virginia, (9) Wileys Ford, West Virginia, and (10) Athens, Ohio.

The only known area of general or extended infection embraces New York City and the surrounding country within a radius of about forty miles. The infection here is believed to have spread from figured or burl elm logs received at Hoboken, New Jersey. Other logs were brought in to Baltimore, and to Norfolk, where the disease spread across the river—perhaps on drift logs—to Portsmouth. From these locations and from yards at Hoboken, the burl logs were carried to veneer and furniture factories in the interior of the country.

Each of the more recently discovered infections is directly associated with veneer or furniture manufactories as at Indianapolis, or with the transportation of the beetle-infested logs over the railroads—as in western Maryland at Cumberland and Brunswick, and more recently across the Potomac river at Wiley Ford. The only case of a diseased tree which does not lend itself to this kind of explanation is an isolated infection near Old Lyme, Connecticut.



Heavy tri-state infection area around New York City, and scattered infection areas in other states

AGENCIES OF ERADICATION

With the discovery of the disease around New York in 1933, the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture, the federal agency charged with investigation of plant diseases and pests of national menace, moved to organize a campaign of control and eradication. It was at once confronted by lack of funds in its effort to deal with a disease as insidious and little known as the Dutch Elm Disease.

Aroused by the sudden threat to American elms, a number of national and state conservation organizations joined in a plea to the President, members of his cabinet, directors of federal relief agencies and members of Congress, for special funds with which to fight the disease. Fortunately relief funds were made available after several months and since 1934 have formed more than ninety per cent of the money for federal activities in control and eradication.

Cooperation by the state departments of agriculture of New York, New Jersey and Connecticut has been provided both through special state appropriations and special invocation or enactment of state plant pest control laws. The funds which have supported the control and eradication program to January 1, 1938, are shown below:

FEDERAL AND STATE APPROPRIATIONS FOR DUTCH ELM DISEASE ERADICATION

Fiscal year	FEDERAL		STATE		
	Emergency funds	Budgetary	New Jersey	New York	Connecticut
1934	\$ 351,020	\$ _____	\$ 5,000	\$ _____	\$ _____
1935	563,190	152,996	55,000	172,500	2,500
1936	2,730,000	261,156	50,000	150,000	12,500
1937	4,315,882	261,156	39,100	100,000	12,500
1938	1,724,040	460,860	41,580	100,000	11,200
	<u>\$9,684,132</u>	<u>\$1,136,168</u>	<u>\$190,680</u>	<u>\$422,500</u>	<u>\$38,700</u>

While the allocation of emergency funds which have constituted the bulk of federal resources undoubtedly has made possible the checking of the disease thus far, the use of these funds has not been without handicaps and hazards. There have been delays between allotments which have disrupted the eradication work and the use of the funds has been subject to provisions prescribed by the Works Progress Administration, one of which is that ninety per cent of those employed be taken from relief enrollees.

The eradication agency has therefore been confronted with the adaptation of an unskilled and untrained class of employees to a type of specialized work that for the most part demands some training and experience. Despite these difficulties, it has developed a well organized program of eradication which needs only to be adequately supported by continuing funds until the disease can be eliminated from known infected areas and any further outbreaks promptly and completely dealt with.

CENTER OF ATTACK

The key infection area at the present time is that surrounding New York City. Federal and state officials believe that if \$15,000,000 is forthcoming during the next five year period this infection can be cleared up. The estimate is based on progress in the present work area and that made during the past several years.

In the light of present knowledge, saving the American elm from the Dutch elm disease clearly depends upon carrying to completion the present eradication program. The greatest danger to the completion of the work is the possible failure of federal funds called for during the next five years. While emergency funds have been provided for the fiscal year ending June 30, 1938, there is no assurance that they will be available thereafter. The present trend is towards a curtailment of emergency or relief funds and the prospect is that after July 1 next, the eradication work will be dependent upon direct appropriations by Congress. These, it seems clear from the past attitude of the Congress in respect to the disease, will be difficult to secure without vigorous and widespread public demand.

To cope with the disease, federal and state agencies must be financed to provide (1) for the employment of competent, trained, and unskilled personnel as needed; (2) for the establishment of aggressive research units; and (3) for the laying out and maintenance of eradication units. They must be prepared to deal with outlying infestations and new outbreaks by the prompt application of every known measure for the elimination of the disease.

In respect to the tri-state area in New Jersey, New York, and Connecticut, they must engage in (1) the timely and methodical scouting for the prompt detection of diseased and devitalized trees; (2) the prompt removal and destruction of Dutch Elm Diseased trees; (3) the rendering innocuous, trees classified as devitalized; and (4) the continued creation of elm-free areas so that the total work area (7,455 square miles) can be progressively contracted from without and reduced from within.

The present program of eradication is organized and operating on the above basis, with the restrictions as to employment and uncertainty of funds already mentioned.

The area involved, number of men employed, and distribution of funds are shown below:

	New Jersey	New York	Connecticut
Area in square miles in which eradication work is being conducted.....	3,838	2,510	1,107
Each state's work area in relation to the entire work area.....	55%	34%	10%
Average distribution of federal expenditures in terms of percentage*.....	56%	28%	11%
Federal men employed, October 23, 1937.....	2,331	721	271

*About five per cent of the federal funds have been spent on localized infections outside of these three states.

DESTROYING BEETLE BREEDING TREES



Girdling the tree



Stripped for silvicing

Not only are the actually diseased trees sources of infection, but sickly elms whose weakened branches attract bark-boring insects are helpers in distributing the Dutch Elm Disease fungus. Such trees may harbor the bark beetles and provide breeding places where they may multiply. Therefore, eradication of the disease from the generalized area around New York has demanded destruction of every tree in any way attractive to the beetles in the eradication units. As already stated, three and a half million such trees have been removed.

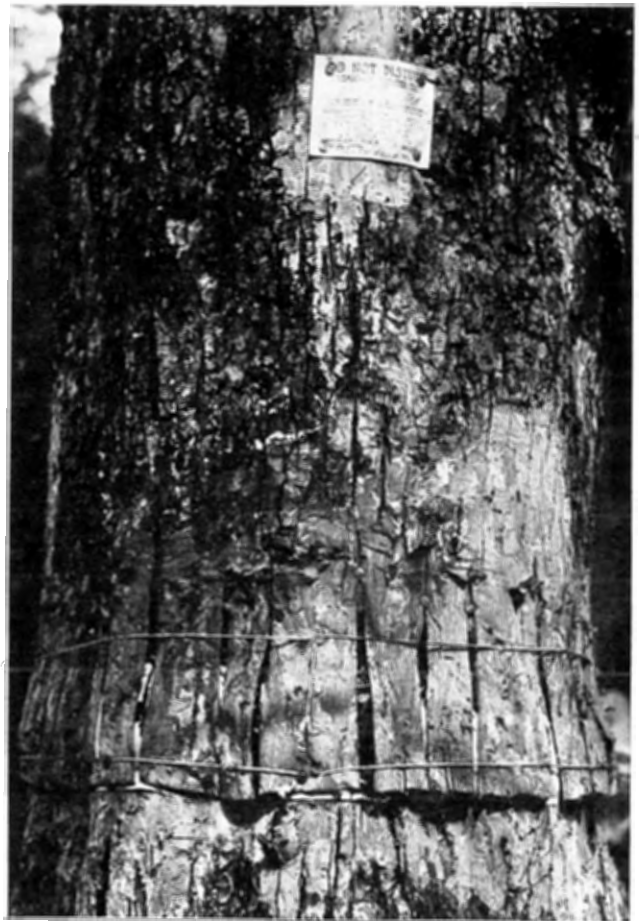
Before October, 1936, decadent elms, as well as those actually diseased, were felled and burned. This proved to be slow and costly; so "silvicing" methods were developed for killing the condemned elms to make bark and wood so distasteful as to repel the bark beetles, thus stopping the spread of infection and permitting the tree to stand until it could later be cut down and burned.

Owners of desirable, vigorous ornamental or shade trees in the tri-state eradication area are urged to prune out dead wood and use means to encourage their vitality. At the same time every "stag-headed," sickly elm of no particular shade or ornamental value will be tagged by the scouts and condemned for destruction.

TO STOP THE SPREAD OF INFECTION



Binding on copper sulphate



Tacked up and tagged for death

In carrying out the process of silvicide, each tree is girdled with an ax and the bark is stripped back for a distance of a foot or eighteen inches. Against the freshly exposed sapwood a pack of powdered copper sulphate is bound under a bandage of heavy cloth. When this is done the loose strips of bark are tacked back over the poison pack as protection against the weather. Other poisons will kill the tree, but copper sulphate is more generally used because it is less dangerous to animal life.

Almost immediately after the poison is applied, the sap begins dissolving the crystalline powder to carry it into the crown and down to the roots to permeate the entire woody structure. Not only does the tree die, but sprouting is prevented, and within a few weeks the mineral in the twigs and outer sapwood may actually repel the beetles.

Thus at less than ten per cent of the cost of felling and burning, the beetle breeding trees are eliminated. The trees are left standing and the owner may fell them at his convenience to use the wood as fuel, or for any other purpose. During the past year the authorities have killed by this method 626,137 trees. Most of these were in New Jersey. This is probably ten times as many as the same crews could have cut down and burned.

OUR ELMS CAN BE SAVED

The results of eradication work to date give reasonable assurance that the fight will be won if the program can be carried consistently forward without interruption. This depends upon continuing appropriations by the federal government and states concerned.

The appearance of newly diseased trees throughout the tri-state area around New York City and in the mid-west cities has continued as expected, for the fungus may remain hidden in the living tissues for four or five years. The encouraging features are that during 1937 there has been no extension of the disease beyond the infected zones, and in most areas the number of diseased trees reported and destroyed has actually decreased.

The following figures from various parts of the country, taken from the records of the Bureau of Entomology and Plant Quarantine, show conclusively a reduction in the spread of the disease:

DUTCH ELM DISEASED TREES REPORTED AND DESTROYED (BY YEARS)

	1933	1934	1935	1936	1937
Connecticut					
Stamford		9	27	9	25
New York					
New York City (5 Boroughs).....	22	1,239	692	266	118
Mt. Vernon	4	74	32	15	8
Mamaroneck	2	108	54	25	18
Staten Island	18	653	326	70	27
Queens County		54	16	7	6
New Jersey					
Fairlawn	1	36	16	9	1
Irvington	24	33	14	3	0
Leonia Boro	1	29	0	0	1
Westwood		13	11	7	21
Hillside	1	32	16	4	3
Bellville	26	71	30	11	4
Montclair	68	144	43	43	20
Orange	55	43	13	4	12
Roselle Park		14	5	1	6
Kearney	7	18	15	2	1
Ohio					
Cleveland	1	2	23	0	0
Indiana					
Indianapolis		4	10	19	31



Photograph by Katharine Matthies

The disease threatens all elms—large and small. The "Wethersfield Elm" at Wethersfield, Connecticut, is the largest in the United States

ELMS INFECTED WITH DUTCH ELM DISEASE FOUND AND DESTROYED

Location	Years								Total
	1930	1931	1932	1933	1934	1935	1936	1937	
	Number of Trees								
State of New Jersey				740	4,377	4,113	5,793	4,682	19,715
State of New York				77	2,427	2,258	1,740	1,254	7,756
State of Connecticut				1	56	76	102	121	356
Indianapolis, Indiana					4	10	19	32	65
Cleveland, Ohio	3	4	0	1	2	23	0	0	33
Cincinnati, Ohio	1	0	0	0	0	0	0	0	1
Athens, Ohio								1	1
Baltimore, Maryland				1	0	0	1	0	2
Brunswick, Maryland						3	0	0	3
Cumberland, Maryland							1	0	1
Norfolk, Virginia					1	3	1	0	5
Wiley Ford, West Virginia								5	5
	4	4	0	820	6,867	6,486	7,657	6,095	27,943

This record summarizes eradication of diseased trees up to November 23, 1937, when the scouting season had closed. The large number of diseased elm trees reported during recent years is due in part to the development of more effective scouting and in part to the extension of the area scouted.

DIFFICULTIES OF ERADICATION



The problem of the wild elm

Within northern New Jersey, eastern New York and southern Connecticut, where the greatest infection is found, all elms can be divided into two classes: those gracing homes, parks, and roadsides which are ornamental elms whose esthetic value far exceeds any income which might be secured from their wood, and those which have sprung up, wild and unattended, in meadows and woods. Often the latter are of rare beauty, but compared with ornamental trees their value is limited to commercial uses. The shade and ornamental trees, located as they are along streets and highways, are easily seen and examined, but the wild trees are largely located in swamps, meadows, and on low mountain ranges.



Cutting under handicaps

Because they are so numerous and so difficult to examine, the **wild elms present a special problem.** Between five and ten million of them are in the swamps and on the mountainsides of the infected area of New Jersey, New York, and Connecticut. To assure eradication of the Dutch Elm Disease from America, the control agencies are working towards the elimination of all beetle breeding trees as soon as possible.

The swamp elms can be reached only during seasons when the water is low, while those on the mountain ranges are widely scattered and often difficult to reach. They present a serious problem in the efforts to free infected areas from undesirable elms. That they may be destroyed as quickly and efficiently as possible, forms of poisoning by chemical treatment have been developed.

Efforts to treat urban elms were essentially undone by the fact that millions of wild elms were spread all over the eastern US.

THE CAMPAIGN PROGRESSES

By the end of November, 1937, the country had been scoured for suspected elms and almost 200,000 sets of samples sent to the laboratory in Morristown, New Jersey, for examination. These showed that 27,943 elm trees were actually diseased. Every one was cut and destroyed as quickly as possible. All but 116 were found in the tri-state infected area around New York City, and approximately one-fifth were elm trees of special ornamental or shade tree value.

The total number of trees removed through November in the campaign of clean cutting, eradication and sanitation was 3,652,977. Over one million of them were cut or poisoned in pursuance of the policy of creating elm free areas in the tri-state region.

Such areas are no longer a menace, and no further money need be spent in searching for new evidences of the disease. The task of removing all diseased and susceptible elms from an area of 7,500 square miles is one of great magnitude. During the past three years more than 5,000 men have been employed, and by the end of November, over 340,000 tagged trees remained to be treated—a task that will furnish continuing work for hundreds of men through the present winter.



Photograph by James A. G. Davey

Old elms at Deerfield, Massachusetts. Of all our trees worth fighting for, the American elm comes first. It is the pride of whole communities and being a "home tree" has been planted at countless doorways throughout the land, where its friendly and sheltering branches spread above little children who ever since the Pilgrims landed have played about its feet

SUMMARY OF THE SITUATION

No less than a "national catastrophe."

The elm is a domestic tree. Here it stands—a guardian of beauty—dappling an old home with its kindly shade. Think what a national catastrophe the loss of our elms would be, and support the campaign against the destroying Dutch Elm Disease



Photograph by James A. G. Dares

At the close of November, 1937, the Dutch Elm Disease situation in this country can be summarized as follows:

1. Although brought into the country five years or more ago, the disease may still be considered in an incipient stage, a fact strongly supporting the possibility of successful control and eradication at reasonable cost.

2. While there have been scattering occurrences of the disease at a dozen different points in the United States, the source of these infections in every case except one has been traced to elm logs shipped to the United States from foreign countries for veneer manufacture. Importation of all elm logs has been stopped and localized infections promptly dealt with.

3. The only extensive infection now known to exist is in the region surrounding New York City. This infection is being aggressively combated by federal and state agencies. Spread of the disease is believed to have been checked and the disease is now on the decline in the region concerned.

4. Unlike England and the European countries, the United States through the allocation of federal emergency funds has been able to attack the disease promptly upon its discovery and to develop early in the disease's occurrence in this country organized combat units.

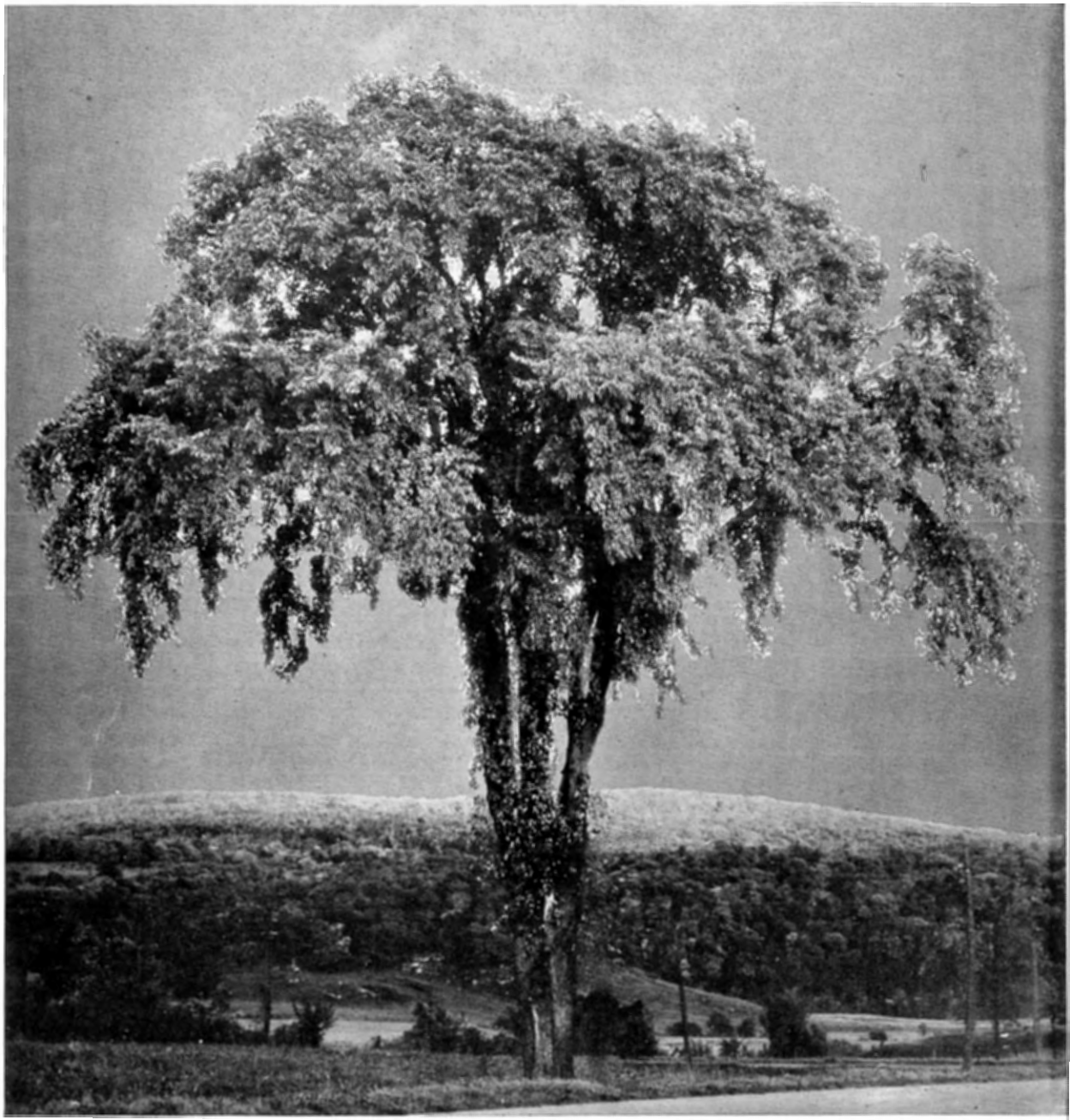
5. Through study of the disease abroad, through accelerated research in this country, and through first hand experience in dealing with the disease locally, methods of scouting and eradication have been and are continuing to be progressively improved, thus placing this country in a stronger position to defeat the disease.

Against the foregoing favorable factors are the following unfavorable ones:

1. Uncertainty as to the continuity of federal and state funds with which to complete the task of eradication. As previously pointed out, emergency funds for the work will be exhausted by summer of 1938—a critical period in the campaign. The declared intention of the administration to curtail emergency allotments leaves the future of eradication work in a highly uncertain status.

2. The fact that the Dutch Elm Disease is in this country; that American elms are highly susceptible to the disease; that the native elm bark beetle is a carrier with a wide range and that there may be infections and carriers not yet found constitute threats to the nation's elms that cannot be minimized.

3. Public complacency in respect to the disease. The American people have not yet become sufficiently aroused to assure adequate support of a continuing campaign of eradication during the next three years which from the present outlook may be the most critical period in determining whether American elms shall be saved or lost.



"A tree that like a fountain rises"

WHAT THE INDIVIDUAL TREE OWNER CAN DO

The foregoing pages have presented a factual picture of the Dutch Elm Disease fungus—a new plant-pest in this country.

Thousands of elm trees in yards and along streets and highways throughout America are threatened by this insidious disease. What can owners and lovers of the elm do to help save them?

First and foremost they can develop public opinion in support of the continuance of the organized campaign of eradication now under way. Failure of the public to support this campaign will mean not only the loss of the elms, but the loss of \$11,000,000 already spent in conducting the fight and additional millions that will be required to remove disease-killed elms from yards, streets and cities throughout the country.

Individual owners of elms can also contribute an important part in the war on Dutch Elm Disease by destroying all dead and dying wood and by keeping their trees in vigorous growth. The dead and dying wood in elm trees serves as breeding places for the bark beetles on whose bodies the spores of the Dutch Elm Disease are transmitted from one tree to another.

Every elm tree owner can cooperate in the following sanitation campaign:

Prune out all dead and weak branches. This work can be done in the fall, winter, and early spring. The wounds should be covered with paint or other dressing to prevent decay.

Spray for leaf-eating insects and defoliating fungus diseases.

Feed the trees at least once a year with a good nitrogeous fertilizer applied at the rate of half a pound of fertilizer for each inch of trunk diameter at about four and a half feet from the ground. Satisfactory results can be secured by making small holes under the entire area shaded by the crown, and filling each hole with a handful of fertilizer.

Pruning, spraying, fertilizing, and general diagnosis of tree conditions require training and equipment seldom possessed by the individual property owner. Best results will therefore be achieved if the tree owner will secure the advice and services of a competent arborist or tree specialist, or by consulting with his State Forester or Extension Forester.

All dead elm trees as well as the sickly ones which are not worth restoring to vigor by pruning, spraying, or feeding should be cut and destroyed.

There is no hope of saving a tree after it is infected with the Dutch Elm Disease. Accordingly the best protection is to take all possible measures to prevent infection. A living tree, like a living animal, can best protect itself if it is maintained in healthy, vigorous growth.