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THE NATIVE
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The Native Forests
of
Cuyahoga County, Ohio

By

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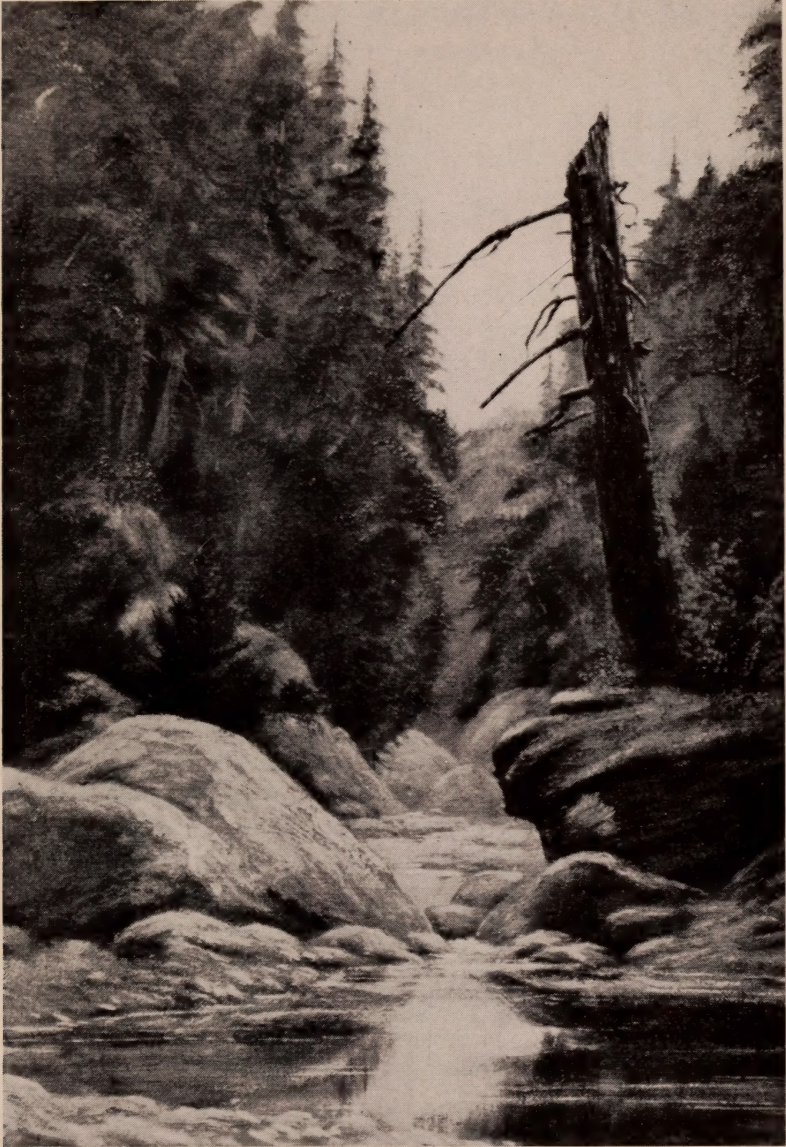
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Frontispiece — Chippewa Creek Gorge in 1860, showing dense hemlock forest. Now in Brecksville Metropolitan Park. From painting by F. H. Dart of Oberlin made in 1900. *Courtesy of Mrs. Walter Lister.*

The Native Forests of Cuyahoga County

I.

INTRODUCTION

This study was undertaken in order to determine, as accurately and in as much detail as possible, the character and composition of the forest cover of Cuyahoga County, Ohio, as it existed at the time when the first white man entered it.

While there are a few records of white men on the banks of the Cuyahoga River previous to the arrival of Moses Cleaveland and his band of surveyors in 1796, we may take this date as representing a time when the native forest then occupying the land might be considered to have been modified little, if any, by human agency. This was true of Cuyahoga County even with reference to Indian influences, since for many years this part of Ohio had been a sort of "no-man's-land" from the standpoint of the Indian tribes, which regarded the area mainly as a hunting territory so dubious that at any time it might turn out to be a battleground. (Whittlesey, 1867; Wilcox, 1933).

The date 1796 carries us back from the time of the present writing only 152 years. Since many forest trees in this region are known to have attained ages in excess of 300 years, it is evident that some remnants of the forests of Moses Cleaveland's day may still be in existence, as in fact they are. The time has come, however, when many old trees that have long stood as landmarks have disappeared, and the number of survivors of the forests of 1796 is becoming rapidly less. As time passes, the task of reconstructing the picture of the "original forests" becomes increasingly difficult.

Studies of this sort have already been made in Ohio for the counties of Athens (Boetischer 1929), Pickaway (Shupe 1930), Allen (Murray 1930), Logan (Diller 1932), Ashtabula (Hicks 1933), Meigs (Jones 1936), Ross (Crowl 1937), Wood and Henry (Shanks 1939), Geauga (Crittenden 1940), Trumbull (Shanks 1942). These are in the form of theses for advanced degrees in the Department of Botany, Ohio State University.

The natural vegetation of the entire state has been studied and outlined in a general way by Sears (1925, 1926), and Sampson (1927). In other states, the study of the natural vegetation of Cattaraugus County, New York, by Gordon (1940) is an outstanding example.

The value of such studies lies in the fact that they contribute to our understanding of the environment in which the civilization of the present day had its origins, and in which, though now greatly modified, we, in these latter days, live. Anything that helps mankind to a better adjustment to his environment is a contribution to human welfare and happiness. Such

studies, taken together, add to our knowledge of the forces that determine the character and distribution of plants throughout the land. They are of immediate interest to ecologists, botanists, foresters, conservationists and historians. For the student of natural history an understanding of the natural vegetation of any region is a prerequisite to the understanding of its present day fauna and flora, and often furnishes the basis for the explanation of facts which may otherwise seem completely baffling.

One of the real pleasures incident to the making of this study has been that of forming the acquaintance of a large number of people who really love trees. This was particularly true during the search for isolated large old trees within the built-up portions of the cities of the county. Many of these oldsters were trees loved for their association with family history or tradition and carefully cherished by present-day owners.

Acknowledgments are due especially to the following, who have aided by their advice and information relative to past conditions as they recalled them or as family tradition pictured them: Charles K. Arter, B. P. Bole, Jr., Nelson J. Cotabish*, Dr. T. D. Gould, C. H. Excell, Clarence Hutchinson*, Charles W. Irish, Frank D. Johnson, Don Knowlton, Mrs. Walter Lister, George Mastick*, Mrs. G. H. Michel, John Ord*, J. W. Saffold, Albert Smith, Oliver Upson*, Charles Willard, H. E. Willard*.

My thanks are also due to a long list of accommodating people who aided by reporting the locations of over 280 individual large trees in response to newspaper and radio publicity.

An annotated list of trees native to Cuyahoga County will be found in the section at the back of the book. This list is intended as an aid to students of our local trees who may want to become familiar with them as species, and to know something of their relationships and place in the picture of Cuyahoga County's native forests. Included under each species is a reference to a locality where it may be found within easy reach of Cleveland. For the sake of completeness, and because so many of them occur along our city streets or in parks, a list of the more common introduced tree species has also been included. Photographs, unless otherwise specified, have been taken by the writer.

*Since deceased.

II.

LOCATION, TOPOGRAPHY, SOILS, DRAINAGE

Since the character of the forest cover of any given area is largely determined by such things as topography, soil, drainage and climate, and since these factors in Cuyahoga County are exceedingly varied, it will be useful in this study, first of all, to examine these conditions as they occur in the county at the present time.

Cuyahoga County, Ohio, lies on the northern margin of the state, having a frontage of approximately 28 miles along the southern shore of Lake Erie. From east to west its greatest width is about 31 miles; from north to south through its central portion, about 16 miles. Its total area is in the neighborhood of 453 square miles, or 289,920 acres. Parallel 41°25' of north latitude passes through its central portion. Lake Erie, upon which it borders, stands at 573 feet above sea level; and the county's highest point, near its central southern limits, is 1280 feet above sea level, thus making a rise of 707 feet from lake level to heights.

Cuyahoga County is so situated that it includes within its boundaries portions of two of the great physiographic provinces of North America. Approximately two-thirds of its area is included within the western limits of the Appalachian Plateaus Province, while the other third lies within the Central Lowlands Province. The Portage Escarpment, which separates the two provinces in this region, passes through the county in a northeasterly southwesterly direction. The base of the Portage Escarpment within the county in its northeastern section is indicated in a general way by the line of Euclid Avenue from the eastern county line to University Circle, City of Cleveland. As the escarpment here turns southerly into the Cuyahoga Valley, its base may be located along the lines of Woodhill Road, East 93rd Street, Warner Road, and the eastern boundaries of Valley View Village, which roughly follow the crest of the first steep rise from the valley floor. As the escarpment emerges on the west side of the valley it may be picked up along Rockside Road, from the western end of which it curves west and southwest to meet the line of Pearl Road. From this point, following the line of Pearl Road, it passes out of the county in its southwestern corner. Thus the lowland portion of the county occupies its northern and western sections; the plateaus portion, the eastern and southern parts. The entire land surface of the county has been subjected to glaciation several times, the last, or "Wisconsin" stage of glaciation coming to a close in Ohio some 20,000 to 25,000 years ago. (Cushing, Leverett and Van Horn, 1931).

Because, within the county, the plateaus section is bisected by the broad valley of the Cuyahoga River, which here flows northwesterly into Lake Erie, this part of the county is separated into two relatively high land masses, one making up its eastern, the other its southern portion. The eastern highlands is also cut by a river valley, the Chagrin, along the eastern edge of the county. Likewise the southern highlands is cut in the southwestern corner of the county by the valley of the East Branch of Rocky River.

Most of that part of the county included within the central lowlands portion is known locally as the Erie Plain. This plain is limited to the

areas formerly occupied by the bottoms of glacial lakes during the withdrawal of the Wisconsin ice sheet. It is also often referred to as the Lake Plain. This relatively level land stretches in a narrow strip from 2 to 3 miles wide between Lake Erie and the foot of the Portage Escarpment from the northeast corner of the county to the Cuyahoga Valley. From this point, as the escarpment bends toward the southwest, the Erie Plain widens to include practically all of the western portion of the county.

In the southwestern part of the county there is a small area of till plain that represents the extreme northeastern tip of the great till plain that covers most of southwestern Ohio.

Cuyahoga County's varied topography may then be summed up by saying that it is characterized by eastern highlands, southern highlands, western lake plain and till plain, and a further narrow strip of lake plain fronting on Lake Erie in the county's northeastern portion. The land is further sculptured by the drainage patterns of the three rivers mentioned, and by their numerous tributary streams, as well as by many shorter streams that reach the lake directly. Reference to Figure 1 will make clear these major topographic divisions of the county.

These features will now be considered more in detail with reference to their soils, drainage, and influence on the character of vegetation present upon them now and in the past.

1. *The Eastern Highlands* — This portion of the county (see Fig. 1) presents the features of a broad dome, with its two highest portions at about 1250 feet above sea level (677 feet above Lake Erie). These points are easily located as the site of the Tuberculosis Sanatorium at Warrensville, and the corner of North Miles and Harper Roads. Just south of this latter point a fine view of the Cuyahoga Valley to the southwest may be gained.

These high spots mark the former surface of the old Allegheny Plateau. From their flat tops the land slopes in all directions — more steeply toward the Chagrin Valley to the east — more gradually toward the Cuyahoga Valley to west and southwest, and toward Lake Erie to the north. Streams having their origins here flow in many directions as determined by the character of the immediate land surface, often reaching the lake by tortuous courses. Those flowing northerly for the most part find their way more directly into the lake. The waters of the others eventually reach the same destination either by way of the Chagrin or the Cuyahoga Rivers.

The valley of the Chagrin, with its often precipitous sides, exhibits numerous steep-walled, narrow, tributary gorges. The smaller streams, as they near the steeper grades of the escarpment edge, and as the underlying shales and sandstones are uncovered, also develop ravines and gorges

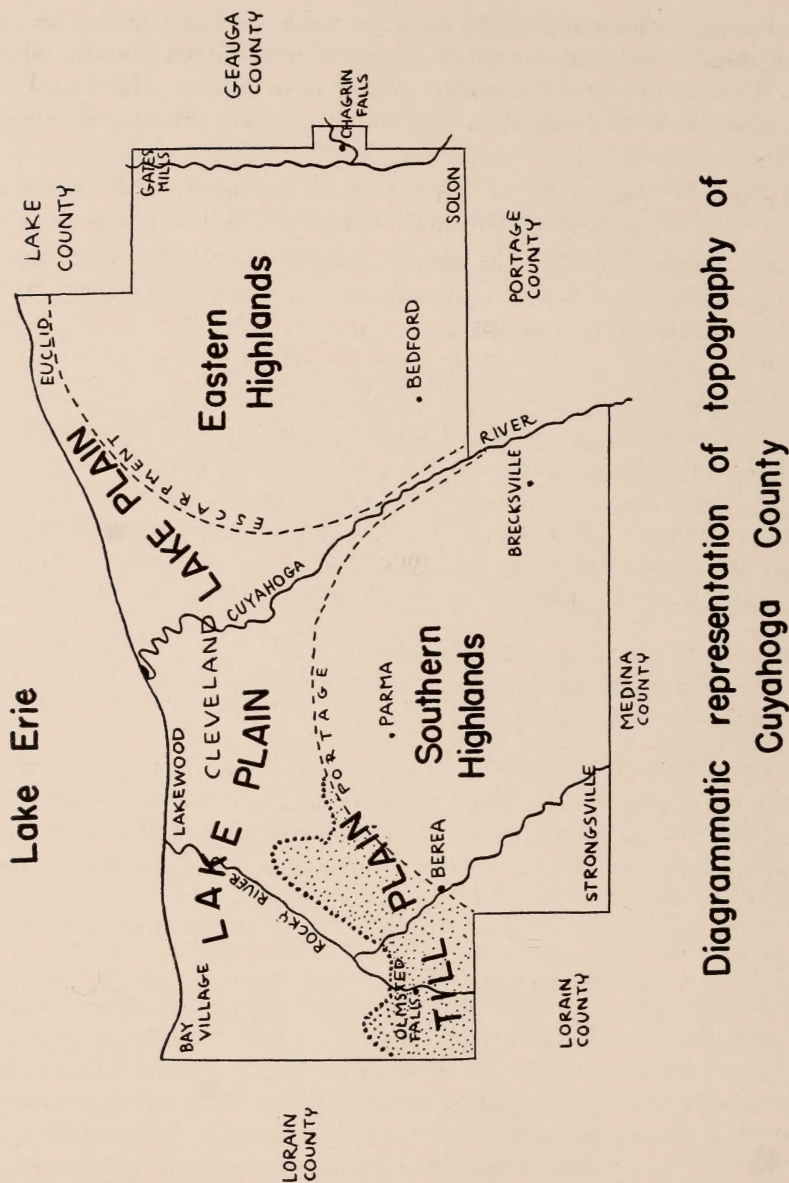


FIG. 1. Cuyahoga County. Diagram showing major topographic divisions.

that give a characteristically picturesque aspect to the region. The principal of these smaller streams are Euclid Creek (Green Road), Ninemile Creek (Belvoir Boulevard), Doan Brook (North Park Boulevard), Mill Creek (south of Broadway), and Tinker's Creek (Bedford Metropolitan Park).

Certain parts of these eastern highlands present surfaces of very low relative relief with poorly developed drainage. This is especially true of the southeastern corner of the county (Aurora Road), but holds good for many a smaller area as well. In such places, due to the dense character of the underlying clay, swampy ground is often developed, and it is certain that such places were much more common and more swampy in character 150 years ago than they are today.

The soils of the eastern highlands are of glacial origin, either of shale and sandstone materials such as cover most of northeastern Ohio, making a heavy clay loam, or in a few places a more sandy and gravelly soil, due to the presence of glacial moraines. The clay soils are poorly drained, not classed as among the more productive soils of the state, and usually characterized by the presence of beech trees. (Coffey and Rice, 1912).

2. *The Southern Highlands* — This portion of the county (see Fig. 1) again exhibits the dome-like character of topography previously noted for the eastern highland portion, except that it largely lacks the relatively flat, poorly drained areas such as characterize portions of the eastern highlands. Much of the land is more fully dissected by the streams, thus presenting a general ridge and valley topography. Its two highest points are near the corner of Ridge and Wallings Roads (1265 feet), and on the Brecksville-Rocky River Parkway connection just west of Broadview Road (1280 feet).

From these high points the slope of the land is much more gradual toward the north (Parma) than toward the east or west. On the east the approach to the Cuyahoga is much like that of the approach to the same valley westerly from the eastern highlands. On the west the approach to the broad valley of the East Branch of Rocky River is almost precipitous in the vicinity of York Road. Toward the north, however, the escarpment face extends a broad lobe out toward the lowlands, descending by easy slopes to the Lake Plain. Here the Portage Escarpment is difficult of recognition, except along the southerly edge of Rockside Road where it becomes a prominent feature of the landscape.

In this southern highlands portion of the county the headwaters of Big Creek begin their flow directly northward, but later become tributary to the Cuyahoga to the east. On the east slope the headwaters of Chippewa Creek, another tributary of the Cuyahoga, have their rise. On the south the head streams of the East Branch of Rocky River rise, to flow south,

until, circling Whipp's Ledges in Medina County, the stream turns northwest to enter Cuyahoga County again, cutting across the southwesterly edge of the southern highlands. To the west, the headwaters of Baldwin Creek flow westerly to join the East Branch at Berea.

The valley of the East Branch of Rocky River as a whole in this part of the county is broad, with gradual slopes, as compared with the often steep-walled valley of the Chagrin in the eastern highlands.

On the whole, the southern highlands are better and more completely drained than are the eastern highlands, which would indicate a lower water table. Both the Cuyahoga and the East Branch of Rocky River in this region are working in the soft glacial fillings of their ancient valleys, and have here developed wide valleys quite unlike those of the Chagrin or of Rocky River farther on toward Lake Erie. There are comparatively few places where swampy areas of any great extent could or have developed, although some smaller ones are known to have been present in earlier times. This region is therefore more xeric in character than the corresponding uplands of the eastern highland section.

In general, the larger land masses of the southern highlands present the features of long ridges extending in a northerly-southerly direction (Broadview, State, Ridge, and Abbey Roads), and the base of the plateau to the north is composed of the ends of these ridges spread out like the stubby fingers of a giant hand. Due to the broader character of the East Branch Valley, and the more gradual slope of the escarpment base toward the north, there is not the same spectacular development of short ravines and gorges in this section as in the eastern highlands. Toward the Cuyahoga, however, the gorge of Chippewa Creek, and of other smaller tributaries to this stream, have dissected the land quite fully.

The soils of the southern highlands are much like those already described for the eastern highlands.

3. *Escarpment Edge*—Inasmuch as the base of the Portage Escarpment within the county frequently appears as a steep and often precipitous slope, two special conditions are thus created that deserve attention. The first of these is the deep gorge, of which the principal are those formed by Euclid Creek, Doan Brook, Tinker's Creek and Chippewa Creek. In each of these the head of the gorge appears where the stream bed passes from a resistant sandstone (Berea Sandstone) to the softer shales (Bedford, Cleveland, and Chagrin Shales) below. From this point the gorge usually deepens rapidly, developing with steep sides until the foot of the escarpment is reached and the stream either enters the Lake Plain (Euclid Creek and Doan Brook) or the Flood Plain of the Cuyahoga (Tinker's Creek

and Chippewa Creek). The gorge itself is cool and moist due to the abundance of shade and the presence of the stream at its bottom.

The other type of environment created by the escarpment edge is that of the steep slope itself and especially of its higher parts, including the edge of the gorge. This is a rather unstable condition due to constant erosion, and, as there is little water-holding capacity in the underlying soil, it is quite xeric in character. Soils here are for the most part those derived directly from the underlying shales in which the forest cover must actually find its footing.

4. *The Lake Plain* — To the northeast the Lake Plain consists of a narrow strip of land, about 2 miles in width, lying between the escarpment base (Euclid Avenue) and the Lake Erie shore (see Fig. 2). This land is largely old lake bottom mantled with deposits of silts, sands and gravels. Its mid-portion is traversed nearly throughout its length by a sandy ridge representing an old lake beach (St. Clair Avenue beyond Collinwood). It is cut across by the shallow valleys of Euclid Creek, Ninemile Creek, and other smaller streams, most of which head back into the edge of the plateau. Along the lake shore the bluff is often nearly vertical, and consists largely of unconsolidated materials which form the filling of preglacial stream valleys. Through this material the smaller streams have developed short ravines just as they enter the lake.

This portion of the Lake Plain is relatively flat, with poor drainage, and formerly included many wet and swampy areas which have since been drained by human agency, and are no longer apparent.

Proceeding westward, the valley of the Cuyahoga River is reached, and the escarpment bends to the southwest. The Lake Plain here widens to include the filled-in delta of the preglacial Cuyahoga River. This constitutes the flat platform upon which the larger part of the City of Cleveland has been built (see Fig. 2). It consists of glacial, lake and river deposits of sands, gravels, clays, and silt. The underlying clays are very dense in character, while the overlying deposits are more porous. This allows water, percolating through the upper layers, to become impounded in pockets of the impervious clays below, thus creating wet and swampy areas, such as for instance formerly existed between Euclid Avenue and Kinsman Road in the vicinity of East 55th Street and in many another place now fully occupied by streets and buildings. On the other hand, this portion of the Lake Plain is also marked by numerous dry sandy ridges representing portions of old lake beaches (Euclid Avenue, Woodland Avenue, Detroit Avenue, Denison Avenue, Triskett Road, Hilliard Road, Schaaf Road), and is bordered on the south by a terminal moraine (Behrwald Avenue, Schaaf Road, south end of East 71st Street). (Cushing, Leverett and Van Horn, 1931).

Cuyahoga County -

Showing drainage, glacial lake beaches, pre-glacial river valleys now filled with till, moraines, and line of Portage Escarpment which limits Lake Plain and Plateau.

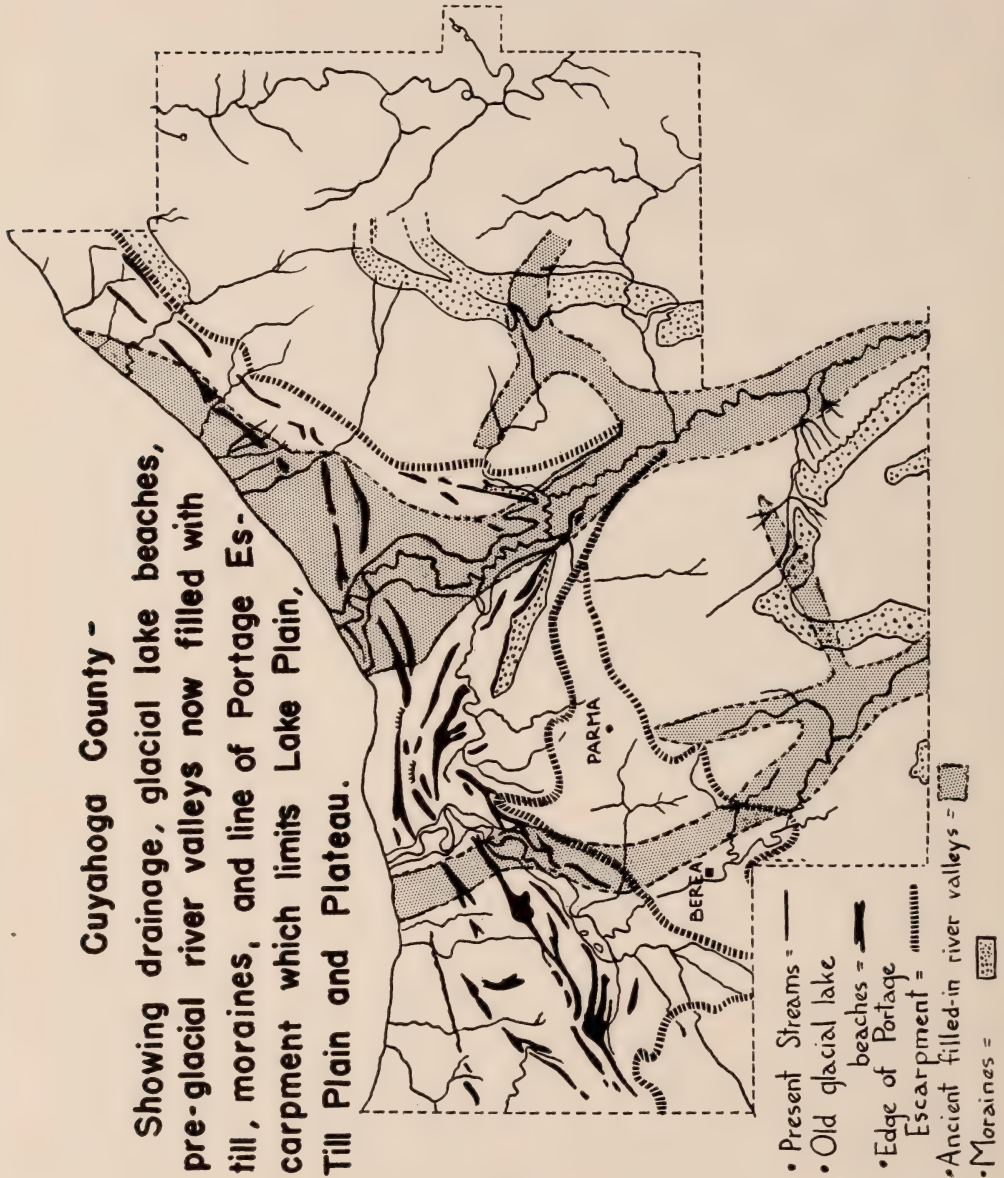


FIG. 2. Cuyahoga County. Map showing drainage, glacial lake beaches, preglacial filled-in river valleys, moraines, and line of Portage Escarpment.

This part of the Lake Plain is bisected by the present Cuyahoga River, which since glacial times has cut a new and smaller channel through the river and lake deposits now filling its broad ancient valley. Many a smaller stream, of which Doan Brook is the chief, also crosses this plain in a shallow valley, and many have developed small ravines as they enter the lake. Streams tributary to the Cuyahoga (Kingsbury Run, Morgan Run, Burk Branch, Mill Creek, Big Creek) have deeply dissected the plain to the south. (see Fig. 3).

West of the City of Cleveland the Lake Plain widens along the western line of the county to a distance of about 9 miles. This portion of the plain is also a region of low relief, but is traversed by several great old lake beaches throughout its length. These beach lines now carry important highways: North Ridge (Detroit Avenue), Middle Ridge (Center Ridge Road), Butternut Ridge (Lorain Avenue). Associated with the main beach lines are also numerous smaller sandy ridges and some peat and muck deposits. Swampy areas were formerly numerous here.

Within the county this portion of the Lake Plain is cut by the valley of Rocky River, including small portions of its East and West Branches, and also by numerous smaller streams emptying directly into the lake. Of the latter Cahoon Creek is the largest. Abram's Creek, a small tributary of Rocky River, has cut a narrow, steep-walled gorge through the underlying shales as it approaches its juncture with the river.

The valley of Rocky River here is steep-walled, narrow and flat-bottomed, being cut through the soft underlying shales since the last glacial period. Its old filled-in valley, about a mile in width, crosses this part of the plain, adding a further character to the soils of the region (see Fig. 2).

5. *The Till Plain* — The till plain portion of the county is that relatively small area lying in its southwesterly corner, which, during the last glacial period, escaped being covered by the waters of the glacial lakes (see Fig. 1). As a consequence, its soils have none of the sands and silts such as were deposited by the old lakes whose beaches in this region reached only as far south as North Olmsted. The land of the Till Plain is quite flat, poorly drained, and the soil is largely or entirely of glacial till. Like the land of the adjoining Lake Plain, it contained many wet and swampy spots, a famous one being the so-called Abram's Lake. Abram's Lake itself has now almost entirely disappeared, but its outlines can be traced within the boundaries of a considerable area of peat and muck deposits. Its location is at the base of the escarpment, extending in a north-south direction within the old filled-in valley of Rocky River. It is somewhat less than a mile wide, and including the old "Podunk Swamp" to the north, about

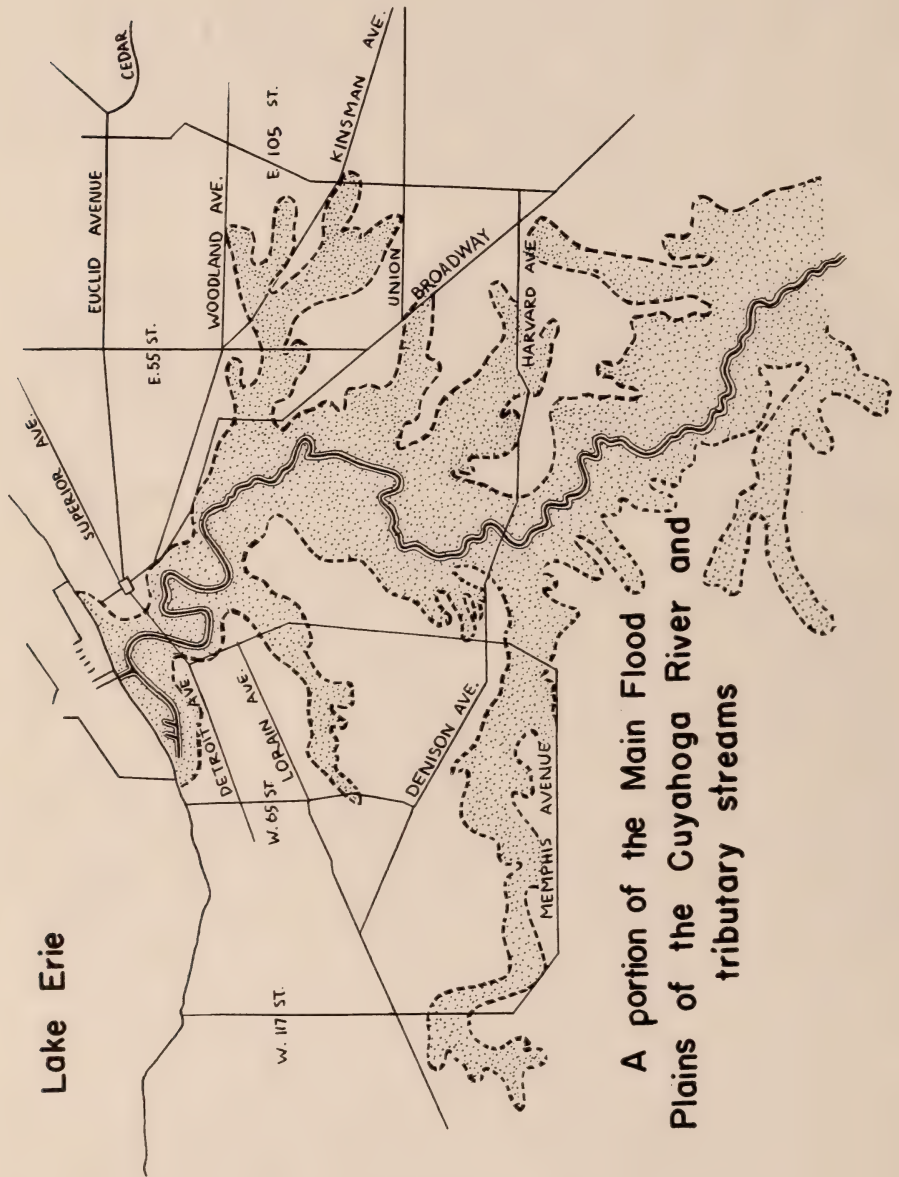


FIG. 3. Flood Plains of the Cuyahoga River and tributaries.

3 miles long. It is now largely enclosed within the area bounded by Bagley, Engle, Five Points, and Eastland Roads. The open water of years ago lay between Bagley and Sheldon Roads, the swampy lands reaching northerly to include the eastern edge of the present Cleveland Airport. This was the place to which Oliver Hazard Perry drove for his deer hunts in 1840 (Hunting Expeditions of Oliver Hazard Perry, of Cleveland, 1899), and was formerly a favorite Indian hunting ground. It is now traversed by the various small streams that finally come together to form Abram's Creek.



FIG. 4. Flood Plain of the Cuyahoga near Fitzwater Road.

6. *Flood Plains* — The main streams of the county have already been noted, and something of their character as they affect topography and drainage pointed out. It remains only to indicate that in connection with some of them, flood plains of considerable acreage were developed. Chief among these are the flood plains of Rocky River and the Cuyahoga, and some of their tributaries (see Figs. 3 and 4). These flat, river-bottom lands, built up gradually by stream action, consist of fine deep soils composed of deposits of transported clays, sands, loams, and finely divided shale particles, enriched by the nutrients leached out of the soils of the surrounding

countryside. Measurements made by the writer in the Rocky River Valley midway between the confluence of the two branches and the lake shore, show this soil to be fully 10 feet deep at this point. In the valley of the Cuyahoga particularly, broad flood plains have developed which have furnished some of the most fertile farming lands of the county. (see Fig. 4).



FIG. 5. Mouth of the Cuyahoga River; adapted from maps published in the First Geological Survey of Ohio (1858) and Early History of Ohio (Whittlesey 1867).

7. *Ponds, Lakes, Marshes*—With the exception of "Abram's Lake" (see p. 13) there are no ponds or lakes of any consequence within the limits of the county. In a few places evidences of former beaver dams still persist. One of the best of these at the present writing is in Lake View Cemetery near the Wade Memorial Chapel. Marshes of any great extent are also absent. Most of those which existed formerly were associated with the meanders of the lower portion of the Cuyahoga River. There was also a considerable area of marsh on the west side of the mouth of the Cuyahoga (see Fig. 5).

8. *Lake Erie Beaches*—Probably no part of the Lake Erie shore line of 1796 within the county now remains (see Fig. 5). In the early days of Cleveland's history, erosion of the shore line was rapid and continuous, and was a cause of concern to the early settlers (Mather, 1838). From 1796 to 1842 it was reported that 218 feet along the city front had been lost by erosion (Howe, 1890). At the mouths of some of the streams a limited sand dune area was probably present in 1796. This probably would have been true of Euclid Creek, Ninemile Creek, Doan Brook, Cuyahoga River, Rocky River, and Cahoon Creek. These then, as now, were no doubt subject to frequent shifting by lake currents and wave action. Aside from these few areas, the waves of the lake washed the base of the cliff, or came so close to it that little foothold was offered for vegetation (Mather, 1838).

III.

CLIMATE

Just as physiographically the State of Ohio presents a transition from plateaus to plains, so its climate is transitional between that of the Atlantic seaboard and that of the interior lowlands (Peattie, 1923). Cuyahoga County, lying astride the Portage Escarpment and bordering on Lake Erie, reflects this transition character of climate sometimes in spectacular ways.

The average annual mean temperature, as reported by the U. S. Weather Bureau at Cleveland for the 75 years of its operation, is 48.5 degrees F. Extremes rarely have fallen below a few degrees below zero F., or have risen higher than 100 degrees F. Annual precipitation has averaged 33.8 inches of water, and this is usually well distributed throughout the year.

These figures, however, do not accurately reflect the climatic conditions throughout the entire county, nor would it be possible for records obtained at any one station to do this. (Wolfe, 1945).

Along the Lake Erie shore the climate is greatly modified by the presence of the lake. As has often been pointed out, temperatures near the lake do not rise so high nor fall so low as they do farther inland. This makes possible a growing season (time between last killing frost of spring and first killing frost of autumn) on the lake plain of 200 days. On both eastern and southern highlands extremes of temperature show a wider range.

The presence of Lake Erie is also responsible for a condition of cloudiness that cuts down very appreciably the amount of possible sunshine (Moseley, 1897). During the year this may amount to a reduction of as much as 52 per cent of the possible hours of sunshine.

Records of precipitation taken at the United States Weather Bureau station in downtown Cleveland where it was located prior to 1941, were often astonishingly different from those obtained on the plateau to the east. This condition first came forcibly to the writer's attention when he was studying intensively a portion of the forest in the North Chagrin Reservation of the Cleveland Metropolitan Park System, located on the eastern highlands near the eastern boundary of the county.

For the four years 1932 to 1935 inclusive, weekly records of rainfall as well as other climatic records were secured at North Chagrin. It was soon noted that these were often quite different from those reported by the U. S. Weather Bureau at Cleveland. This was remarkably so in 1934 — the year of extreme drought in the western United States. For that year the Cleve-

land Weather Bureau records showed a total precipitation of only 22.8 inches. At North Chagrin, approximately only 15 miles to the east, the instruments recorded a total of 39.2 inches for the same period — an excess of 16.4 inches over the Cleveland records. (Williams, 1936).

At the Holden Arboretum, located on the plateau six miles to the north-east of North Chagrin, for the month of June, 1940, the rain gauges showed a good 8 inches of water, as compared with 3.5 inches recorded by the Cleveland Weather Bureau for the same period.

The explanation of these differences is no doubt that the prevailing westerly winds, blowing across Lake Erie, tend to accumulate moisture which is not precipitated until the plateau is reached. Here the moisture-laden air is deflected upwards, becomes suddenly cooled, and precipitation follows.

The fact that the shore line of the lake changes at the mouth of the Cuyahoga River from an east and west, to a northeasterly-southwesterly direction, makes the region northeast and east of Cleveland (eastern highlands) particularly subject to rains which often completely miss the lake plain and southern highlands. While no definite figures are available for the eastern and southern highlands as such, anyone who is accustomed to observe local weather conditions will probably sense the fact that rainfall definitely increases easterly, so that it is quite probable that precipitation is less on the southern highlands than on the eastern highlands.

IV.

METHODS EMPLOYED IN THIS STUDY

1. THE PROBLEM

In our day it is almost impossible for the average city dweller to visualize the density and character of the forest that once covered the land within the boundaries of Cuyahoga County. This is so not only because very few remnants of original vegetation now remain here, but also because very few such remnants are to be found anywhere else in the eastern part of the United States. It has frequently been emphasized that no other part of North America has been so profoundly altered by the works of man as has this section of the continent, and Cuyahoga County, in the State of Ohio, is no exception to this fact.

Mr. Charles K. Arter, in a letter to the writer, says, "My father was born in Tuscarawas County in 1841. I have heard him tell that when he was a small boy and had to drive from his home to certain other farms, how he was terrified at times by the thickness and darkness of the woods and forest that stood like a wall right up to each edge of the road."



FIG. 6. Measuring the largest cottonwood with steel diameter tape. The tree stands on the west bank of Rocky River just south of the Puritas Springs Road Bridge. It measures 5 feet 3 inches dbh. *Photo by Clayton Knipper, Cleveland Press.*

Cuyahoga County's nearby forests, no doubt, presented a similar picture when the first roads were being surveyed. We must not, however, think of this forest as being composed entirely of giant trees. Although there were many big ones, there was much younger growth as well, and frequently places where secondary succession due to windfalls was in progress. Twenty to thirty huge specimens per acre is the estimate of the Ohio Agricultural Experiment Station. (Forestry Publication, No. 76, 1944).

At the present time the City of Cleveland, built solidly in the northern-central part of the county, occupies about one sixth of the 453 square miles of the county's area. Metropolitan Cleveland, with its widespread and varied industries; its massive business section; its outlying community centers; has completely wiped out, within its limits, except for a few parks and outlying private estates, all evidence of the forest that formerly occupied its site. Even in the residential sections, both of the city and its suburbs, the land was once completely cleared for farms and practically no traces of original vegetation remain.

Cuyahoga County is now so completely occupied by cities and villages that out of its 59 political subdivisions, only 3 retain their township status. In other words, the problem with which we have to deal in this study is almost entirely one of changes brought about by man, rather than those due to natural causes.

In a situation such as the foregoing, the difficulty of reconstructing the picture of the forest of the past is not to be minimized, but it is not insuperable.

2. METHODS

In this study the following methods were employed:

(1) Systematic coverage of the county by automobile and on foot to locate and study all possible remnants of the original forest, including single large isolated trees. On these trips a map of the county was always carried, and notes made thereon showing:

a. Areas where portions of apparently original forest still remain, and the probable character of the forest of which they were once a part.

b. The location and species of individual isolated trees, large enough to be over 150 years of age. The largest of these were measured with steel diameter tape for dbh*. (see Fig. 6).

c. The location and character of more recent forest stands, where these seem to have value as indicating the character of former vegetation on these areas.

*Diameter breast high.

d. The character of topography and drainage, where these conditions seem to be important to an understanding of former forest conditions in such locations.

This work was facilitated greatly by the fact that for the last 18 years the writer, in his capacity of naturalist and ecologist for the Cleveland Metropolitan Park Board, and Curator of Education for the Cleveland Museum of Natural History, has had occasion to visit constantly, in the course of his work, all parts of the Cleveland Metropolitan Park System. These park lands lie in a great semicircle of reservations surrounding the City of Cleveland in the outlying parts of the county. Fortunately, within these reservations are to be found some of the best remnants of original forests, and it has been the writer's privilege to study these in detail and unhurriedly.

A mass of notes relative to forest conditions both within and without the park system has thus been accumulated. With a little extra effort every nook and corner of the county that might produce evidence germane to this study has now been personally explored by the writer.

The writer's service as chairman of the Advisory Committee for the Survey of Cleveland City Street Trees, completed by the WPA in 1939, and as chairman of the Cleveland Sesquicentennial Commission's Committee on Moses Cleaveland Trees in 1946 gave him some familiarity with the occurrence of the few large native trees still standing on Cleveland's city streets, as well as elsewhere throughout the county.

In addition, through radio broadcasts and newspaper publicity, reports of the location of some 280 large isolated trees were secured, and most of these which seemed important were investigated.

(2) Visitation and study of forested areas outside of, but contiguous to the eastern, western and southern limits of the county, as well as other areas nearby, which contain remnants of original vegetation such as probably formerly existed within Cuyahoga County.

(3) Use of intensive ecological studies, made by the writer, of areas within the Cleveland Metropolitan Park System, and at the Holden Arboretum in Lake County, which is contiguous to Cuyahoga County on the east. The composition and dynamics of local beech-maple, flood-plain, and oak-hickory communities, and the course of secondary succession within and adjacent to a beech-maple-hemlock community, have thus been studied in detail.

(4) Examination of early accounts of the settlement of Cleveland and the Western Reserve, early newspapers, original road surveys, old photographs, maps, and other early documents that might contain references to

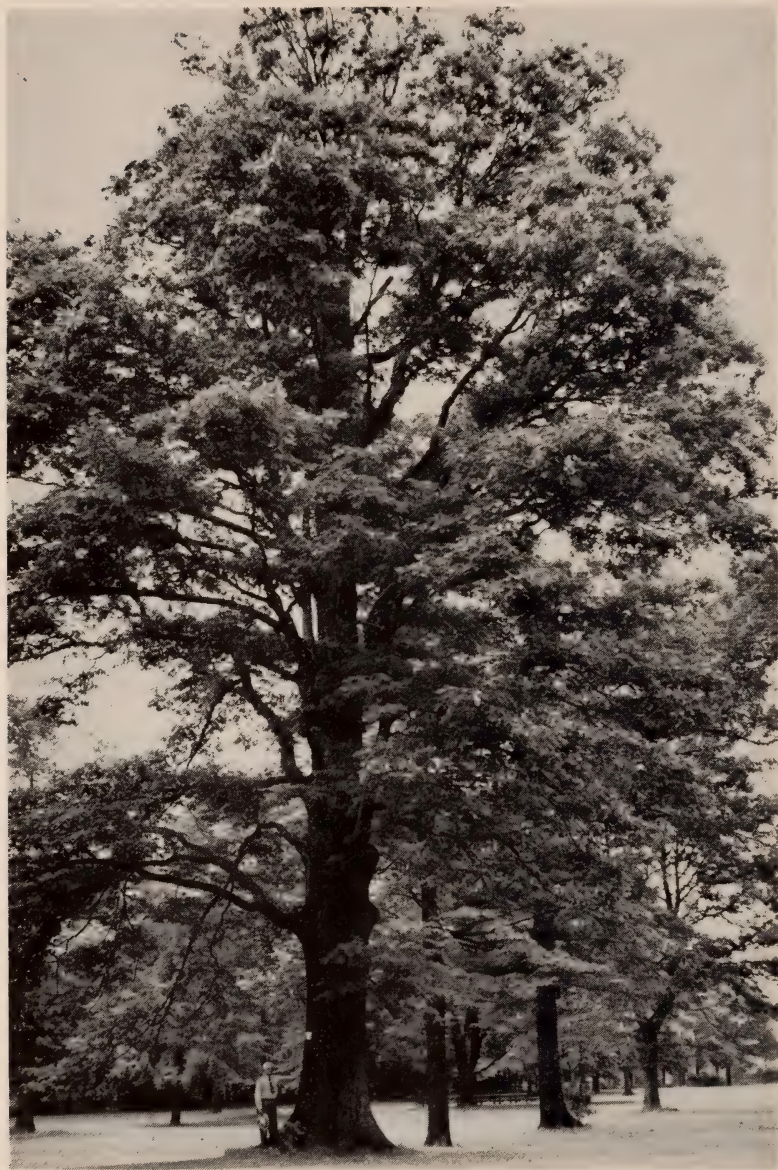


FIG. 7. The largest white oak. It stands in Forest Hill Park, the former estate of John D. Rockefeller. It measures 4 feet 8 inches dbh. *Photo by Dudley Brumbaugh, Cleveland Plain Dealer.*

the character of the original forest. The Cleveland Public Library, the libraries of Western Reserve University, of the Western Reserve Historical Society, and of the Cleveland Museum of Natural History, as well as the records of the Cuyahoga County Engineer's Office, have all yielded material.

(5) Interviews with persons who either have lived many years in the county, and whose memories may be relied upon to give an accurate picture of former conditions, or whose family tradition contains such information. Especially important are the statements of old lumbermen who recall vividly the character of the local forests in which they worked 40 or 50 years ago.

(6) A theoretical reconstruction of the original forest on the basis of topography, drainage, climate and soils, in the light of the writer's familiarity with the distribution and composition of the present forest communities of the region.

(7) A final combination of all of the information obtained through the methods above outlined into a single map, showing with as much detail as possible the probable composition and distribution of the forest communities present in the county in 1796.

In making a final interpretation of the facts found, certain ecological assumptions were adopted as guiding principles. The chief of these were the following:

1. Forest remnants that have evidently been subjected to little disturbance, containing trees of size sufficient to indicate an age of 150 years or more, are assumed to be representative of the character of the original forest on these, and similar nearby locations. These are the "climatic relicts" of Clements, who uses the term "with equal warrant" as applied either to a community, a species, or an individual tree. In either case "it is practically a universal rule that a community of some degree is concerned". (Clements, 1934).

In other words, even individual isolated trees of apparent age sufficient to identify them as a part of the forest of 150 years ago have an indicator value as components of a former forest community, the character of which may be closely inferred from the known ecological relationships of such species.

2. Most present native forest growth, even though comparatively recent, also has an indicator value with reference to the type of vegetation formerly occupying the same site. Of course, following the clearing of the

original forest, a forest of secondary succession character developed. Many remnants of such forests are to be found in the region, and may, with due care, be interpreted in terms of the original forests which they have replaced.

3. Topography, drainage, and the character of the soil all furnish a good criterion for the theoretical allocation of certain forest communities known to be dependent for their occurrence in this climate more or less on such edaphic factors. Physiographic distribution of forest types as they occur at the present time, within the limitations noted below, is a reliable guide to the probable distribution of such types in the past. "The basic relation is that of the species to its habitat" (Clements, 1934).

4. In allocating such probable situations for forest communities of the past, account must be taken of the changes which in the last 150 years have altered both the character of the land and the climate of the region. Thus, the filling in of marshy places, the draining of swamps, the diversion of woodland brooks to storm sewers, and the loss of forest humus which acted like a sponge to conserve moisture, have all combined to produce a much more xeric situation now than was the case before the white man arrived with his axe and plow.

Likewise, the removal of the forest itself has produced profound changes in the local climate. Underneath the dense canopy of foliage forming the practically continuous forest roof of 1796, temperature was lowered, the evaporation rate was cut down through the elimination of direct sunshine and the nullification of the drying-out effects of wind, relative humidity was raised, and the water from rains and snows was trapped and held in the tangle of rootlets of trees and lesser plants of the forest floor. With the removal of this forest cover the local climate has become much drier.

Account must also be taken of the progress of biotic succession in such situations as have retained their forest character to any degree. Thus, species of more northern affiliations, like white pine, hemlock, yellow birch, and black ash, which have long been in progress of displacement here by the climatic climax forest, must be assigned a larger place in the forest of the past than is evidenced by their present relative position.

5. The present-day list of native species, with few exceptions, will furnish quite accurately the list of species-components of the forests of 150 years ago.



FIG. 8 The largest sugar maple. It stands on Butternut Ridge Road beside a little cemetery in North Olmsted. It measures 4 feet 3 inches dbh. *Photo by A. C. Poore.*

V.

THE NATIVE FORESTS OF CUYAHOGA COUNTY

1. THE FORESTS OF THE COLDER CLIMATES

Studies of the stratified deposits contained within a filled-in post-glacial bog near Bucyrus, Ohio, just north of the Ohio-Erie watershed, have revealed in some detail the character of the forests which occupied parts of northern Ohio after the retreat of the glacial ice some 25,000 years ago. (Sears, 1930).

According to the analysis of the stratified pollen deposits obtained from this bog, the progress of forest succession in this region following the withdrawal of the ice sheet, according to Dr. Sears, seems to have been somewhat as follows:

- (1) A period during which firs and spruces were the dominant species. This boreal type of evergreen forest is typified by the present-day forests of northern Labrador.
- (2) A period characterized by the presence of spruces and pines, a forest type such as is now found in southern Manitoba.
- (3) A period when a forest dominated by pines and oaks appeared, a forest type such as may be found in northern Michigan at the present time.
- (4) A period during which oaks and a mixed deciduous forest, the forerunner of our present-day northern Ohio forests, appeared.

During each of these periods, the type of forest present probably reflected conditions of climate, such as are suggested by the present-day locations of such forest types, as noted above.

Although no human eye beheld them, forests such as these occurred in Cuyahoga County, and the evidence and the order of their appearance has been accurately preserved in such bog deposits as those cited above.

Another interesting witness as to the presence of such forests is contained in the great mastodon skeleton which stands in the main exhibition building of the Cleveland Museum of Natural History. This itself is a post-glacial bog relic, having been recovered from such a bog near Johnstown, Ohio, where the animal probably became mired some 30,000 years ago. Like all of the elephant group, the mastodon was a feeder upon plants. In the chinks between some of the great molar teeth of this particular animal, wads of spruce gum have been found.



FIG. 9. A picturesque sycamore in Rocky River Metropolitan Park near the Lagoon Picnic Grounds. *Photo by Clayton Knipper, Cleveland Press.*

Of these ancient evergreen forests the few native white pines and hemlocks now found within the county are the only living remnants. As the climate gradually grew warmer following the melting back of the glacial ice front, the boreal type of forest found itself unable to compete with the more efficient broad-leaved trees, and shortly the day of the deciduous forest had arrived. This displacement of the evergreens by the deciduous trees is still in process, though now almost complete.

2. THE FORESTS OF MOSES CLEVELAND'S DAY

Early accounts of the settlement of Cleveland are disappointingly meager in details regarding the character of the forest encountered by the early settlers. Those hardy pioneers seem to have been little interested in the forest as such, no doubt thinking of it largely as just so much encumbrance to be cleared away before they could begin to realize their dreams of comfortable living.

When Moses Cleaveland and his party arrived at the mouth of the Cuyahoga River, we are told that because of the densely wooded and swampy character of the shores, they were forced to go some distance up-

stream before they could find a landing place. Here, after climbing a "clay bank" some "30 to 40 feet high", the party must have found themselves in a dense forest pressing down on every side to the river margin. Later, Moses Cleaveland described this forest, as it appeared after they had ascended the bank, as "the land level, covered with Chestnut, Oak, Walnut, Ash, and some sugar Maple. There are but few Hemlocks, and those only on a margin of Swamp, pond or Lake." (Cleaveland, 1796). These are all trees common to the Cleveland region today, and they suggest something of the character of the forest on the east bank of the Cuyahoga near its mouth in 1796. As the first survey included only about one square mile of this forest, it is apparent that the above report is a very limited one.

Today there are probably no places in Cuyahoga County that look as they did in 1796, though only 152 years have intervened. Some trees of that original forest are indeed standing in the same places where they then grew (see Figs. 7,8,9), but the great forests of which they were a part, and the big trees that gave the forests character, have passed away forever.

Yet occasionally one may find small remnants of woodland where the suggestion of the aspect of the original forest still lingers. One may sense something of the look and feeling of it in the beech and sugar maple woods in the North Chagrin Metropolitan Park, or in certain small stands of similar forest overlooking the Chagrin Valley where conspicuous evidences of human occupation have not as yet developed. Here is the high, closed, humid forest of beech and maple, with its small array of regularly associated species, which still is, as it was in 1796, the climax forest of the region. Here one may stand and conjure up in imagination the immense stretches of the "dark beech woods of the Connecticut Western Reserve" (Kirtland, 1838) that formerly shut out the sunlight from the land; that sheltered deer and wild turkeys in abundance in its dark, cool depths; that was famous for its wildcats and wolves; that was rarely disturbed by the presence of a human form. (see Fig. 10).

Or, in the lower part of the gorge of Abram's Creek — a place which at the time of this writing is still largely unspoiled by paths, bridges, roads or other artificial scars — one may find a lingering suggestion of the cold northern type of vegetation in which hemlock and yellow birch play such a conspicuous part, and which sounded the dominant note in the aspect of the gorges and ravines of the region when the first settlers looked upon them. (see Fig. 21).

The Cuyahoga River at Willow, before the beginning of the extensive highway improvements in 1938, presented a picture in which an Indian canoe might be imagined as being entirely in keeping with the surroundings. Here the river was almost entirely closed in from overhead by huge leaning cottonwoods, sycamores, and silver maples, from which dense curtains of



FIG. 10. Beech-maple climax forest, North Chagrin Metropolitan Park.

the river grape hung in sweeping festoons. Farther back from the river's edge were large elms, black walnuts and Ohio buckeyes. (See Fig. 11).

Of the oak and chestnut forests which claimed so large a place in what is now downtown Cleveland, little remains to suggest their former grandeur. Practically nowhere within the limits of the county does there now exist more than a few oaks of forest form and proportions to suggest the former lordly trees of these forests. In Clague Park, Village of Westlake, the remnants of such an oak forest may be seen. A few years ago one might have seen in Lake County on the east (Madison), or in Lorain County on the southwest (New London), examples of the giants of the oak forests of former days. In these places prior to 1941 a few oaks remained towering above the newer forest trees, exhibiting the stately proportions to which the oaks of Cuyahoga County must once also have attained. Some of the largest of these trees must have been growing where they then stood when Columbus first reached the Atlantic seaboard.

A major change which has taken place in our day is the complete disappearance of the chestnut from the native forest scene. The "chestnut blight" (*Endothia parasitica*) appeared first in Cuyahoga County about 1920, and within 10 years most of the big chestnuts were dead. At the time of this writing there are still a few living sprouts about old chestnut stumps, and occasionally one finds a small seedling tree, but the blight is still active and these soon succumb. (see Fig. 12).

Although the forests of former days are gone, it is possible to attempt a reconstruction in some detail of the picture of the forest cover of Cuyahoga County as it appeared in 1796. In doing this it will be both convenient and useful to follow the various topographic features of the land as outlined under Section II (pp. 7-16).

Scientific and common names of trees used herein are, with a few exceptions, in accordance with those in *Trees of the Eastern United States and Canada*, by William M. Harlow (1943). For complete species list with both common and scientific names see pages 68-88.

1. *The Eastern Highlands* — In this section of the county (see Fig. 1) during the time of this study there existed more fragments of native forest character than in any other part of the region. Among the best of these are four Metropolitan Park Reservations — Euclid Creek (338 acres), North Chagrin (1497 acres), South Chagrin (509 acres), Bedford (1203 acres). (Board of Park Commissioners, 1947). In these reservations are some of the finest relics of original natural vegetation to be found in the entire county. All have been studied in detail by the writer, one such study having been published under the title "The Composition and Dynamics of a Beech-Maple Climax Community". (Ecological Monographs, 6:317-408; and Scientific Series, Vol. VI, Cleveland Museum of Natural History).



FIG. 11. Cuyahoga River near Tinker's Creek Road. An Indian canoe would not seem out of place here. Silver maples and elms along river edge.

Other smaller fragments of original forest character are scattered over the entire area, but are more numerous easterly. These are made up almost exclusively of beech and sugar maple with associated species characteristic of the beech-maple climax forest of the region. A few consist of remnants of elm-ash-red maple communities so characteristic of the more wet and poorly drained areas of the locality. In the southwestern part of the eastern highlands, remnants suggesting former oak-hickory and oak-chestnut communities become quite pronounced.

The distribution and character of all these remnants are such as to indicate clearly that the eastern highlands was a region formerly almost entirely occupied by a climax forest of beech and sugar maple, with certain variations in the form of inclusions due to topography and drainage.

A. The beech-maple climax — A typical piece (65 acres) of beech-maple climax forest of the approximate age of 250 years is described in detail in the writer's study previously alluded to (Williams, 1936). In this area it was found that in numbers of trees of $3\frac{1}{2}$ inches in diameter or over, beech made up 52.6 per cent, sugar maple 32.7 per cent. It is quite probable that 150 years ago beech held an even more commanding place in the climax forest of the region. The frequency with which beech is noted in the county by early writers, to the exclusion of other species, points to this conclusion,

as well as the fact that in the forest remnants above referred to, large old beech trees are more common than large old sugar maple trees. It also appears that in the process of displacement of hemlock by the deciduous forest due to biotic succession, which has been going on for a very long time, the order of succession seems to have been beech before sugar maple. (Williams, 1936). (see Figs. 13, 14).

In close association with beech and sugar maple in the climax forest, red maple, tulip, white ash, cucumber and tupelo occur; and there are enough old trees of these species still extant to assign them a definite place as secondary dominants in the original forest of the region. The present common understory trees — hophornbeam, flowering dogwood and shad-bush — no doubt occupied much the same position then as now. This would be true also of the characteristic shrubs of the present forest, namely: witchhazel (*Hamamelis virginiana*), spicebush (*Benzoin aestivale*), maple-leaved viburnum (*Viburnum acerifolium*), red-berried elder (*Sambucus racemosa*), and purple-flowering raspberry (*Rubus odoratus*). There is a rich herbaceous growth of early spring "wildflowers", of which the most characteristic are hepatica (*Hepatica acutiloba*), spring beauty (*Claytonia virginica*), and great white trillium (*Trillium grandiflorum*).

B. Where swampy and poorly drained areas occurred, there would be found within the beech-maple climax smaller areas of the characteristic upland swamp forest in which American elm, black ash, and red maple were the dominants, and swamp white oak, basswood, and bitternut hickory commonly also occurred. Where streams developed enough width to let in the sunlight, black willow, heart-leaved willow and pussy willow would be found. In many such a place, now entirely cleared of forest, large isolated American elms often appear to mark the spot where in former years some small area of swamp forest once held sway. American hornbeam, spicebush and poison ivy (*Rhus radicans*) are now, and undoubtedly were formerly the common understory plants of this hydrarch association. (see Fig. 15).

C. The slopes of the Chagrin Valley walls, when not too steep, were occupied by hemlocks, and here we must assign to the hemlocks much more territory than they now occupy. Their dead remains, reaching back into the present deciduous forest, and the progress of climatic succession set forth previously (p. 24) warrant the assumption that hemlock 152 years ago was a much larger component of the forest than is now the case. In this tension zone between beech-maple and hemlock, frequently extensive beech-hemlock associations were present. This was also the place where oaks (red oak, white oak, scarlet oak) and chestnut occurred. Here also were the hickories, especially pignut and shagbark. It is also the place where occasional white pines still persist. American yew (*Taxus canadensis*), leatherwood (*Dirca palustris*), fly honeysuckle (*Lonicera canadensis*), and bush honeysuckle (*Diervilla lonicera*) are the characteristic shrubs, and



FIG. 12. Chestnut formerly standing near escarpment edge overlooking Chagrin Valley.

Canada mayflower (*Maianthemum canadense*) the characteristic herbaceous plant. (see Fig. 19).

D. In the southwestern portion of these eastern highlands, as the Cuyahoga Valley is approached, oaks and remains of chestnut become more numerous. Fine examples of large white oak, black oak, scarlet oak, and red oak are to be found on the ridges and at the tops of the slopes. Here also tulip and remains of chestnut appear frequently. As one descends the terraced valley slope these species become more common. These species are also characteristic of the opposite slope of the valley wall to the west, as was noted by Wolcott in 1811 (see p. 35), and we assume that here on the ridges extending down into the Cuyahoga Valley, a forest dominated by oak and chestnut, with white ash and shagbark hickory, occurred. Beech, sugar maple, tulip, white ash and basswood claimed the slopes between the ridges. In Garfield Park at the present time are a few remnants, indicating a beech-maple forest mixed with white oak as having once been present here.

2. *The Southern Highlands* — In this part of the county is situated the Brecksville Reservation of the Metropolitan Park System (1784 acres), and the narrow strip of parkway connecting the Brecksville and the Rocky River Reservation (265 acres). Within this section also occur portions of the Rocky River Reservation lying along the East Branch of the River (2381 acres). The Hinckley Reservation (1154 acres) lies immediately south of the Cuyahoga County line in Medina County, and its type of vegetation should reflect accurately that of the former forests of the contiguous areas of Cuyahoga County. The forests of these reservations have been studied in detail by the writer.

Most fortunately, a written account of the character of the native forests of the Township of Brecksville (25 square miles), which includes the entire slope from the highest portion of the southern highlands to the flood plain of the Cuyahoga, has been preserved in the "Field Book" of Alfred Wolcott, who surveyed the Township in 1811 for the purpose of dividing it into lots for partition among the owners.

The surveyor made 101 lots, of which about 60 per cent averaged approximately 200 acres each, and about 40 per cent approximately 100 acres each. The four corners of each of these lots are indicated in the surveyor's notes either by trees which he found growing there at the time, or by posts located with reference to living trees. In every case the species of tree or post-wood is noted. In addition to this, the surveyor indicates the prevailing type of timber on each lot. In all, 27 species of trees are thus named, and from this record it becomes possible to reconstruct quite accurately a picture of the original native forest of Brecksville Township before it had been in the least altered by the presence of white men.

The following 20 species are mentioned by Wolcott either as living trees at lot corners, posts, or trees from which posts were located. The list is here arranged in order of frequency in which the species is mentioned, the figure preceding the species name being the number of times mentioned. The names are as given in the surveyor's notes, the writer's interpretation of some of these following in parenthesis:

33 White Oak	6 Buck Eye (Ohio Buckeye)
30 Beach (Beech)	5 Black Oak (Black Oak and Red Oak)
29 Sugartree (Sugar Maple)	5 Chestnut
18 Ironwood (Hophornbeam)	3 Willow (Black Willow)
16 Dogwood (Flowering Dogwood)	2 Maple (Red Maple)
14 White Ash	2 Blew Beach (American Hornbeam)
12 Buttonball (Sycamore)	1 Butternut
9 Elm (American Elm)	1 Sassafras
7 Hk. (Shagbark Hickory)	1 Black Ash
6 Poplar (Cottonwood)	1 Box Elder (Ash-leaved Maple)

The following 7 species (thus making 27 in all) are named as additional "timber" trees found on the lots: White Pine, Hemlock, Cucumber, Black Walnut, Plumb (Wild Plum), Crabb Tree (Wild Crab), Bass. (Basswood).

By marking on the map the species of tree indicated for the corner of each lot, and noting thereon the predominant timber trees for each lot as indicated by the surveyor, a rather complete picture of the original forest of Brecksville Township is constructed. The species most frequently mentioned is "White Oak"; and "Oak, Hk, Ash" is the most frequent designation for timber trees on lots. The next most frequently mentioned species is "Beach", with "Sugartree" a close third. Using the frequencies noted in the list above, it appears that a little less than 50 per cent of the forest surveyed may have consisted of white oak, beech and sugar maple in nearly equal proportions.

From these records it is also apparent that beech and sugar maple were best represented in the southwestern part of the Township, which lay on the higher, more level, lands; and that oak, hickory, and chestnut dominated the ridges of the rest of the western section of the Township, with some admixture of beech and sugar maple. From the middle of the Township eastward, except on the bottomlands of the Cuyahoga, oak and hickory predominated almost to the exclusion of beech and sugar maple.

In connection with lot 23 the surveyor says, "near Chipua Creek is a considerable grove of White Pine Timber." In connection with lot 32, which adjoins lot 23 on the south, he says, "on the north side of Chipua Creek is some very good White Pine Timber." This is along the present Royalton-Northfield Road and not far from the Metropolitan Park entrance near the head of Chippewa Creek gorge.



FIG. 13. Beech
among hemlocks.
North Chagrin in
summer.



FIG. 14. Sugar maple. North Chagrin in winter.

In connection with lot 64 (near the present northeastern corner of Boston and Broadview Roads), the surveyor notes "at the N. E. corner is a Black Ash Swamp", and significantly, this corner is marked with a black ash post, located with reference to a nearby black ash tree. Apparently there was a considerable area of poorly drained flat upland country in this region. It is near here that Mr. Don Knowlton recalls an extensive "hickory swamp".

It is of special interest to note that into this picture from Alfred Wolcott's surveyor's notes the present vegetation of the Brecksville Reservation of the Cleveland Metropolitan Park System fits perfectly, except that the chestnuts are gone and no traces of the white pines remain.

On the Lister place, on Snowville Road, grow several large white pines, apparently at least 100 years old, said to have been transplanted as seedlings from the surrounding neighborhood, that could well have come from the stand described by the surveyor.

Wolcott also mentions hemlock a number of times. There are still hemlocks in Chippewa Creek gorge. Mr. Don Knowlton recalls the lower gorge of Chippewa Creek when it was "solid hemlock arching over the stream so that the tops of the trees interlocked." (see frontispiece).

Aside from the very considerable forest remnant on the steep slope between Ridge Road and York Road (which is largely beech and maple, with the usual associated species), and that included in the Brecksville Reservation noted above, the remaining evidences of native forests in the southern highlands are not nearly so numerous as in the eastern highlands section. Enough remains, however, to indicate that in this more xeric location (pp. 9,18) the oaks and chestnuts held a more commanding place than did beech and sugar maple, though the latter were present in some abundance. It should be noted that a remarkably fine example of beech-maple climax forest included within the limits of the Akron Metropolitan Park System (Summit County) still stands on the Brecksville Road just south of the Cuyahoga County line. Charles Willard says that on land adjoining Cuyahoga County to the south in Medina County the forest was of beech and maple. There was once a large "sugar bush" here where the trees were so big "you could hang three buckets on one tree". There was not much chestnut or oak but plenty of "whitewood" (tulip).

The 7 miles of parkway connecting the Brecksville Reservation with the parkway along the east branch of Rocky River traverses a woodland, the species composition of which points strongly to the probability that all of this high land was formerly occupied by a beech-maple climax forest.

The northern front of the southern highlands, however, supported a forest of oak, chestnut, hickory, ash and tulip. In an interview which the

writer had with Mr. John Ord in 1941, this veteran lumberman, who had worked in the forests of this part of the county since boyhood, indicated that throughout the Parma and Brecksville region there was formerly much chestnut, oak (white, red and black), and tulip, and that white oak especially from this locality was much in demand for ship's timbers. There were places here which he remembers as "solid white oak". (see Fig. 20).

Mr. Don Knowlton recalls "chestnut all over the hillsides" along the creek on the south side of Schaaf Road. Between State and Broadview Roads there was "much chestnut, with hemlock overhanging the gorge".

The Wolcott survey notes, the present forest remnants in the park reservations, and the testimony of those whose memory of other days serves to reconstruct the picture of the old forests, all agree in effect that there once existed here on the northerly slope of the escarpment some remarkably fine pure stands of white oak; and that, farther to the south, white oak, black oak, red oak, scarlet oak and chestnut occupied the ridges; while the climax forest of beech and sugar maple, with their characteristic associated species, among which white ash, cucumber and tulip were common, occupied the highlands and the slopes between the ridges. In the ravines and gorges, hemlock, white pine and yellow birch were characteristic species. (see Fig. 21).

In this oak-hickory-chestnut forest the characteristic shrubs of the beech-maple association were largely absent and herbaceous growth was sparse. Partridgeberry (*Mitchella repens*) sometimes produced a considerable ground cover. Trailing arbutus (*Epigaea repens*) and wintergreen (*Gaultheria procumbens*) were not uncommon. The moss *Leucobrym glaucum* was characteristic.

It is worthy of note that the hepatica of the southern highlands is *Hepatica triloba*, as contrasted with *H. acutiloba* of the eastern highlands.

3. *The Escarpment Edge, Ravines and Gorges* — As one approaches the escarpment edge from the eastern highlands it is evident that a pronounced change in the character of the forest occurred at this point. With increased dryness, due to the decreased water-holding capacity of the soil, the beech-maple forest here gave place to oaks and chestnuts. Near the top of the slope, white oak was apparently the most abundant species. Associated with white oak were red oak, scarlet oak, and chestnut oak. Chestnut was an abundant species. Shagbark hickory, pignut hickory and sassafras were also components of this oak-chestnut association. Farther down the slope, as moisture again began to accumulate in the soil, beech and maple once more appeared, and with them, white ash, tulip, cucumber and tupelo.

Some fragments of this oak-chestnut forest are still to be seen on either side of Richmond Road as it descends the slope to Euclid Avenue in the City of Euclid; along the top of the steep slope from Brush Road to Euclid Creek Metropolitan Park; and in Forest Hill Park, East Cleveland.



FIG. 15. American elm, Lander and Wilson's Mill Roads, Mayfield Village. A good example of the "farmhouse elm". It measures 5 feet dbh.

The occurrence of chestnut oak within the county at the present time is restricted to the edge of the escarpment in this northeastern section. At the head of Euclid Creek gorge and in Forest Hill Park it is well represented. It persists as far west as the gorge of Doan Brook, but beyond this point the writer has been able to find it represented by only a single young tree of 6-inch diameter size. This is on the grounds of the Children's Fresh Air Camp overlooking the southerly side of Kingsbury Run, and it may indicate the former presence of the species here in larger size. West of the Cuyahoga River there seem to be no traces of chestnut oak at the present time.

The deep, cool ravines which characterize the escarpment base are even now occasionally dark with hemlocks, which are usually associated with yellow birch, black birch, tulip, basswood, and an occasional beech or red maple. One hundred and fifty years ago these ravines and gorges must have been more fully occupied by vegetation of northern character than is now the case. Here it was, also, that white pine occurred in small stands, and mountain maple, now rare in Cuyahoga County, could be found. (see Fig. 21).

4. *Lake Plain*—For purposes of study it will be convenient to divide the Lake Plain portion of the county into three sections.

A. *Eastern Section* — That portion of the Lake Plain east of Doan Brook presents such a relatively flat surface that in many locations here in times past there must have been large areas of wet, swampy, marshy or poorly drained lands. In this section today, although largely occupied by homes and factories, one encounters individual large trees of pin oak, red oak, swamp white oak, bur oak, American elm, white ash, tulip, and silver maple; with occasional red maple, tupelo, white oak and shagbark hickory. Beech occurs occasionally as a large tree, but more often as a smaller tree, apparently arriving because recent drainage has made the area more mesic in character. Sugar maple is also present in large size where the water table is not too high.

Wherever natural reforestation is in progress the common trees are cottonwood and pin oak. There are numerous stands of relatively young pin oak. There are some remains of chestnut.

It is apparent that pin oak once dominated large areas of this wet, flat country. Associated with it in lesser numbers were swamp white oak, bur oak, silver maple, red maple, tupelo, and occasionally cottonwood. Where the land was slightly higher, and the water table consequently lower, sugar maple replaced silver maple; and beech, tulip, shagbark hickory, and white ash appeared. In very wet places the northern Ohio lowland swamp forest,

dominated by American elm, black ash, and silver maple, held sway. This was particularly true of areas along the line of the Lake Erie shore where the so-called "black forest" of pioneer days was located. There are still some very large American elms and silver maples in this region, though the land is now largely occupied by homes.

On the sandy ridges representing old beach lines, white oak, red oak, black oak, sassafras and chestnut were common species.

The Village of Bratenahl, lying along the Lake Erie shore from the mouth of Doan Brook eastward for over two and a half miles, contains some fine old trees of forest type, and in several places some real, though small, forest remnants. The soil here is largely sandy old lake beach, and upon it still grow some fine large old examples of black oak, scarlet oak, white oak, red oak, white ash and American elm. Chestnut was formerly present in very large size. Mr. B. P. Bole, Jr., remembers a 36-inch pignut and a 60-inch tupelo between the boulevard and the lake shore just east of Gordon Park, which have disappeared only in the last few years.

This part of the lake plain is crossed by numerous short streams, in addition to the larger ones already mentioned. Where these cut through the lake cliff overlooking Lake Erie, short ravines or gullies are formed which may be from 30 to 50 feet deep. In such places today are commonly found American elm, cottonwood, basswood, white ash, beech, sugar maple; and occasionally red maple, tupelo, tulip, cucumber and silver maple.

Apparently, as better drainage is established in these short gullies, the beech-maple climax forest tends to reassert itself. It seems safe to assume that this is no new condition, but that it reflects the type of vegetation common to these gullies in the past.

B. Central Section — The portion of the lake plain from Doan Brook west to Edgewater Park, and south to Willow, in the throat of the ancient Cuyahoga delta, is that which is now almost completely occupied by the City of Cleveland. Across it the present Cuyahoga River flows. In this section very few evidences of original forest remain, and it is here that we have our greatest difficulty in attempting an accurate reconstruction of the picture of the forest of 1796.

The valley of Doan Brook, which crosses the lake plain just west of Bratenahl, and which now includes Gordon, Rockefeller, and Wade Parks, still contains a few remnants of original forest. On the slopes are beech, sugar maple, tulip, cucumber, white ash and tupelo. At the top of the bank and on the sandy beach lines are black oak, white oak, red oak, scarlet oak, tulip, and remains of chestnut. The old tulips just north of the Cleveland Museum of Art are real landmarks.



FIG. 16. Swamp forest at northern end of Aurora Pond. Black ash and yellow birch.

Along the line of the old beach of glacial Lake Warren (Cedar, Carnegie and Euclid Avenues; and cross-streets east of East 55th Street), there were at the time of this study a few large old isolated trees of tulip, white oak, black oak and white ash, but these are disappearing rapidly. (see Fig. 18).

In the southern part of this central section of the lake plain, near the sewage disposal plant at Willow, is a considerable remnant of a former beech-maple forest, with a few white oaks and remains of chestnut at the top of the slope. In Washington Park there still remain a few old stag-headed tulips to indicate something of the character of the original forest there.

References in the early surveyors' notes and recollections of people whose memories of early Cleveland go back 60 to 70 years with whom the writer has talked all agree as to the presence, in what is now downtown Cleveland, of numerous wet and swampy places which have since disappeared. One such area was in the vicinity of Euclid Avenue and East 55th Street. Another was at University Circle. Others were along Cedar and Kinsman Roads. The corner of Euclid Avenue and Erie (East Ninth) Street was referred to in 1852 as the "Euclid Frog Pond" (Orth, 1910). Dr. J. P. Kirtland, writing in the *Family Visitor* of July 2, 1851, mentions "an extensive marsh running between Euclid and Kinsman streets" which was later drained and became fine farm land.

Mrs. G. H. Michel remembers a "large frog-pond" between Prospect and Carnegie Avenues from about East 36th Street to East 46th Street. She also remembers going chestnutting in "Wilson's Woods", which reached from East 40th Street to East 55th Street (formerly Wilson Avenue). Here the trees were "oaks, chestnuts and beech".

Mr. H. E. Willard, whose boyhood was spent on a farm near the corner of Euclid Avenue and East 55th Street, recalls the presence of swampy places in the neighborhood and says that toward the north the largest trees were chestnut, red oak and pin oak — also many pepperidge (tupelo) and "scrawny maples" (silver maple). To the south were large butternut and black walnut trees, ironwood and hickories. Also some white oak and cucumber. He says that west of "the heights" there was plenty of beech but very little sugar maple.

Mr. C. H. Excell recalls many large chestnut trees, beech and black walnut between Euclid and Superior Avenues in the neighborhood of East 105th Street.

Mr. Don Knowlton speaks of numerous large tulips scattered about the region of West 14th Street and Clark Avenue, as far as Riverside Cemetery overlooking the Cuyahoga Valley.

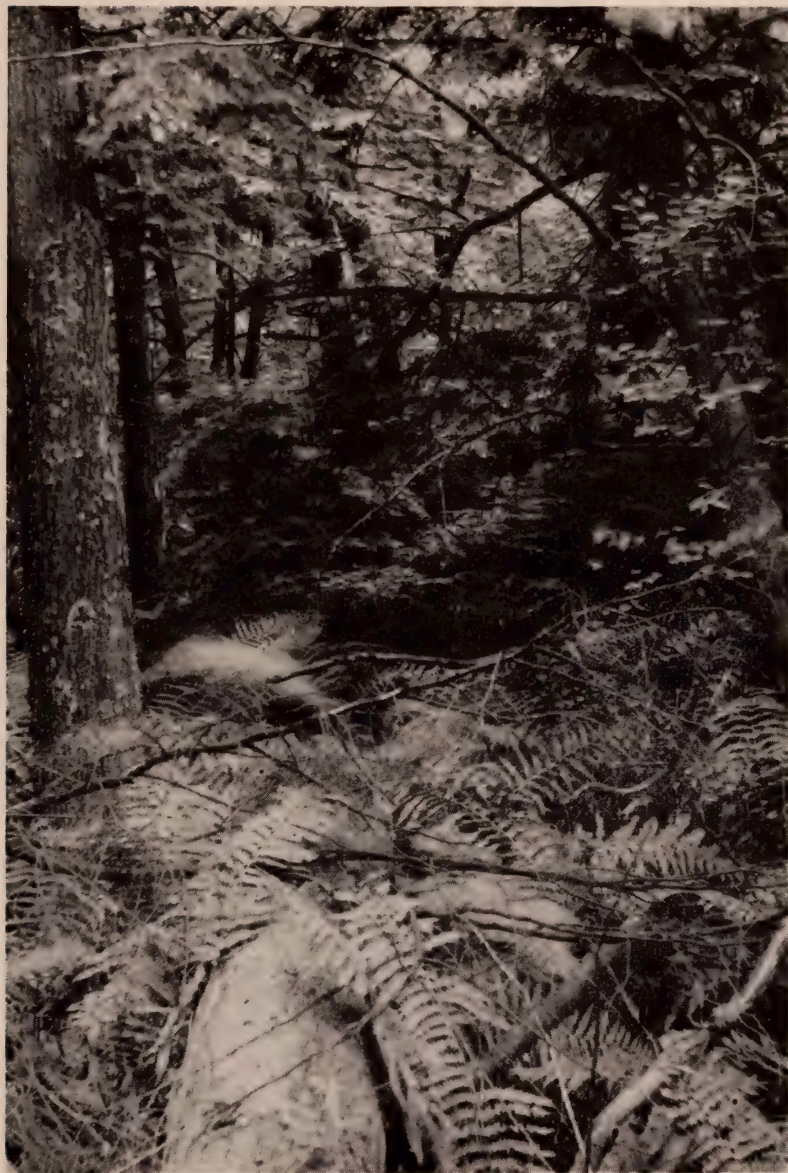


FIG. 17. Swamp forest at northern end of Aurora Pond. Red maple and hemlock.



FIG. 18. Black oak at Emmanuel Episcopal Church, 8614 Euclid Avenue Cleveland. The sole survivor (1946) of a famous grove of black oaks and tulips in this locality. It measures 33.5 inches dbh.

The early accounts of the settlement of Cleveland contain scanty references to the character of the original forest. We have already noted Moses Cleaveland's brief description (p. 28). John Heckewelder, the Moravian missionary, antedates Moses Cleaveland on the banks of the Cuyahoga by several years. He has left this description of the country "next to the lake". "Well timbered either with Oaks and Hickory or with lofty Chestnuts" (Heckewelder, 1796). On May 10, 1813, Captain Sholes came to Cleveland with a company of soldiers. He mentions "a forest of large timber (mostly chestnut) between the lake and the lake road." (Whittlesey, 1867).

Clearing of the land proceeded slowly at first. By 1817 the population of Cleveland was only 250 persons. Even as late as 1835 there were still "groves of fine black oaks and chestnuts on Erie (East 9th) Street between Superior and Prospect Streets, and a good many on the northeast part of the Public Square between St. Clair and the lake" (Cleveland, 1896). Nevertheless, the first concern of those who settled upon the land was to clear away the forest as completely and as rapidly as possible, and it is astonishing with what thoroughness it was done. None of the old photographs of Cleveland which the writer has inspected shows any large trees.

A brief glance into these forest clearings in what is now downtown Cleveland is given by Gilman Bryant, who wrote in 1797, "There was no cleared land only where the logs were cut to erect the cabin, and for firewood. I saw the stakes at the corners of the lots among the logs and large oak and chestnut trees." (Whittlesey, 1867).

Samuel Huntington, telling of a visit to Cleveland in 1800, wrote, "Explored the city and town; land high and flat, covered with white oak." (Whittlesey, 1867).

Said Robert Engle in 1816, "I wouldn't then have taken a farm in Cleveland as a gift; it was nothing but a sandbank surrounded by scrub oaks." (World's History of Ohio, 1896).

The foregoing seems to indicate that this central section of the lake plain, where the City of Cleveland now stands, was formerly occupied by a mixed forest, the character of which varied with topography, drainage and character of soil.

In this forest, chestnut, black oak, white oak, white ash, beech and tulip played a prominent part, especially on the better drained land and sandy ridges, while sugar maple, so prominent in the forests of the uplands, was here in a minor position.

The wetter places were occupied by the lowland swamp forest of American elm, black ash and silver maple, or by the characteristic stands of pin oak, in which tupelo regularly appears as a lesser element. Apparently black walnut and butternut were not uncommon, and doubtless sycamore, which is usually a stream edge tree, may have been a more or less frequent associate of the American elm. Hemlock was present in swamps and gullies, but was not common.



FIG. 19. A stand of hemlock near the escarpment edge overlooking the Chagrin Valley.

On the slopes of the shallow stream valleys and in the short gullies through the lake cliff, the characteristic species of the beech-maple association would appear.

C. *Western Section* — In this section of the lake plain at the present time there are few old forest remnants except in the valley of Rocky River within the Cleveland Metropolitan Park System (1906 acres). Here, on the sides of the valley walls, when not too steep, and on lands above flood plain level, the beech-maple forest, with its characteristic associated species, occurs. At the top of the slope the common trees are black oak, red oak and white oak.

That part of the valley of Big Creek which lies within the Cleveland Metropolitan Park System, particularly between Snow Road and Stumpf Road, contains some large beech, sugar maple, tulip, white ash, tupelo, basswood and white oak.

The flat top of "Mount Pleasant", in the Rocky River Valley south of the Brookpark Bridge, has apparently never been more than partially cleared. Its eastern two-thirds still retains a goodly number of trees well over 150 years of age. They are such as to indicate clearly a beech-maple association. There are a few white oaks, and about the edges of the mesa are black oak, red oak and chinquapin oak. As this "hilltop" is an isolated and relatively undisturbed piece of land, formerly a part of the neighboring flat lake plain until cut off by the action of the river, its vegetation can be assumed to represent the character of the forest that formerly occupied the cleared farming country on both sides of the valley.

Near the western line of the county, on the south side of West Lake Road, there existed in 1939 a small piece of relatively undisturbed woodland. This flat wet area supported a dense stand of pin oaks, among which were several large old trees. Where the land was a bit higher, a few red oaks and white oaks appeared. There were also a few tupelo trees of smaller size.

Frequent isolated examples of pin oak in large sizes occur throughout the section. Other large old trees are white oak, red oak, black oak, swamp white oak, bur oak, scarlet oak, chinquapin oak, American elm, silver maple, tupelo, cucumber, white ash, and remains of chestnut. In the swampy areas behind the sandy ridges occur a few old trees of cottonwood, American elm, silver maple and red maple. (see Figs. 23, 24).

Although at the present time remains of beech are rare west of Rocky River, they do occasionally occur. On the other hand, beech holds a dominant position in this region in the records of certain early road surveys preserved in the Cuyahoga County Engineer's office. In making these

surveys it was the custom, when running the line through the forest, to mark a tree at intervals of one mile, or even at times whenever the direction of the line changed.

In 1810 the road known as the "Rocky River-Hogsback-Mastick-Columbia Road" was laid out by surveyor Ira P. Morgan. This road ran from the mouth of Rocky River, on its east side, to the "hogsback", at an angle in Riverside Road near the southerly line of the City of Lakewood. From that point it descended into the valley, crossed the river, and ascended the cliff on the opposite side. From this point it proceeded south and southwest near the lines of the present Wooster Road and Mastick Road to Columbia Road, which passes south through Olmsted Falls. Of the 11 "mile trees" noted on this survey, 10 were beech, and 1 maple.

In 1811 the road known as "Center Ridge Road" was surveyed by Ira P. Morgan. This road, running westerly from Rocky River along the old beach of glacial Lake Whittlesey, is essentially the Center Ridge Road of today. Fifteen "mile trees" are noted, of which 10 are beech, 2 oak, 1 white ash, 1 maple, 1 whitewood (tulip).

In 1816 the road known as the "Fisher-Triskett-Lorain-Columbia Road" was surveyed by Samuel S. Baldwin. This road ran substantially along the lines of the present Berea, Triskett and Lorain Roads and Riverside Drive, crossing the east branch of Rocky River at Berea to meet Columbia Road west of the river. Thirteen "mile trees" are noted, of which 8 are beech, 1 white oak, 1 elm, 1 hemlock (near the river crossing), 2 no record.

In 1817 the road known as the "Columbia-Mastick-Wooster Road" was surveyed by Alfred Wolcott. This road, starting in Columbia Township, Lorain County, followed essentially the course of Columbia, Mastick and Wooster Roads of today, to the present City of Rocky River. In the 14½ miles of its course in Cuyahoga County there are 92 changes in direction recorded in the surveyors' notes. At each of these points the species of tree encountered is recorded. Of these, 47 are beech, 11 "Sugartree" (sugar maple), 9 white oak, 5 chestnut, 5 ironwood, 2 "Gunnwood" (black walnut), and 1 each of hemlock, hickory, poplar, and maple. The remaining nine points are represented by stakes or obscure records.

In 1819 an "alteration" of the "Wooster Pike" was surveyed by Zara D. Howe. This was substantially the present Wooster Road. Of 8 "mile trees" recorded, 5 are beech, 1 hickory, 1 maple, 1 white oak.

Taken together, these surveyors' records figure 60 per cent beech, 10 per cent oak, and 8 per cent sugar maple. It should be noted that these roads followed the higher and better drained portions of the land, some of them being located on the sandy ridges of the old glacial lake beaches.

There are some fine old sugar maples along the roadside on these beaches today, but Mr. H. E. Willard is of the opinion that these trees were planted by human hands. Their more or less even spacing would also suggest this.

Apparently this western and southwestern section of the lake plain was formerly occupied by a number of forest types which varied with the topography and drainage of the land. In the wetter locations along the Lake Erie shore, and often in poorly drained locations elsewhere throughout the area, dense stands of pin oak were common. Associated with these were swamp white oak, bur oak and tupelo. Characteristic of some of these communities was sphagnum moss and buttonbush (*Cephalanthus occidentalis*). On areas where the water table was lower, white oak, red oak, black oak and chestnut occurred. There are also enough evidences of scarlet oak to include this species as at least an occasional constituent of this mixed oak forest. For the first time, chinquapin oak and boxelder appear as characteristic trees. Bur oak is much more common here than on the lake plain farther east. The presence of hackberry and honey locust for the first time should be noted. These appear in the Rocky River Valley. Shagbark hickory and pignut also appear to have been more common here than on other parts of the lake plain.



FIG. 20. Second growth white oak, Brecksville Metropolitan Park.

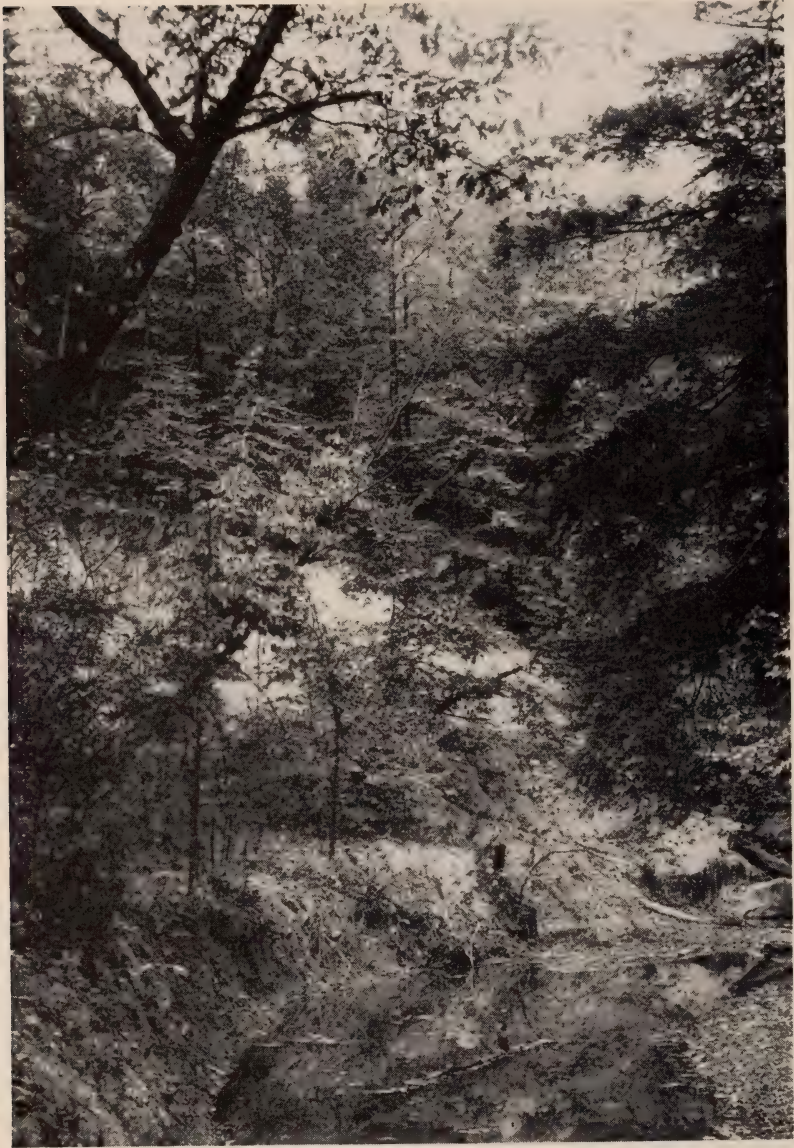


FIG. 21. Characteristic ravine cutting through the escarpment, tributary to Euclid Creek. Hemlock and beech-maple.

Wherever the water table was low enough, and the land was not too dry, beech, tulip, cucumber, white ash and occasional sugar maple — in other words, the typical beech-maple association of the region, would have been found. This was true particularly of the slopes of the larger valleys, the stream beds of the smaller streams, and the gullies of the lake cliff.

On the dry ridges, represented by the old beaches of glacial lakes, beech, white oak, black oak, chestnut, tulip and white ash made up the bulk of the forest. In the swampy areas behind the beaches grew forests of American elm, silver maple, boxelder and black ash.

In this western section of the lake plain in Cuyahoga County we approach more closely to the conditions of the old "Black Swamp" of pioneer days, which occupied a large part of the lake plain farther west in Lorain and other northwestern counties. The black swamp is all drained now, and little remains of the original forest. The Toledo Metropolitan Park (on the lake plain about 80 miles west of Cuyahoga County) includes a remnant of this forest. Its main constituents are American elm, black ash, red ash, white ash and silver maple. Large elms and maples predominate. There are also some sycamore, cottonwood, basswood, bur oak, swamp white oak, chinquapin oak, red oak, and shagbark hickory in large size. Among the smaller sized trees are some tulip, boxelder, American hornbeam, bitternut and papaw, with an occasional beech. Poison ivy is abundant.

One must not lose sight of the fact that the situation here is now much drier than formerly, and the probability is that such species as beech and tulip may be relatively recent arrivals. It was, however, to a forest of this type that the forest of the western section of the lake plain in Cuyahoga County was approximating.

5. *Till Plain* — The till plain within the county (see Fig. 1) is a relatively small, flat area, now practically devoid of trees. It is quite evident that it once contained many more wet and swampy places than now appear. A famous swamp was the so-called "Podunk Swamp", which lay somewhat to the southeast of the present Cleveland Airport. Here also is Abram's Lake, which now occupies but a small portion of its original site (see p. 13).

Mr. Albert Smith, over 80 years of age, told the writer that he has lived beside Abram's Lake ever since he was a small boy, and that behind the willows that once fringed the lake's edge there stretched a forest of elm, black ash and "soft maple" (identified later as silver maple). There was no beech, sugar maple or hemlock in the neighborhood.

Dr. T. D. Gould, of Lodi, Ohio, remembers Abram's Lake as it appeared about 1858. "The forest growth about there, as it was over most of that region," he writes, "was soft maple and elm predominating, drainage being difficult there. In fact, the Cleveland Airport, was at that time a part of

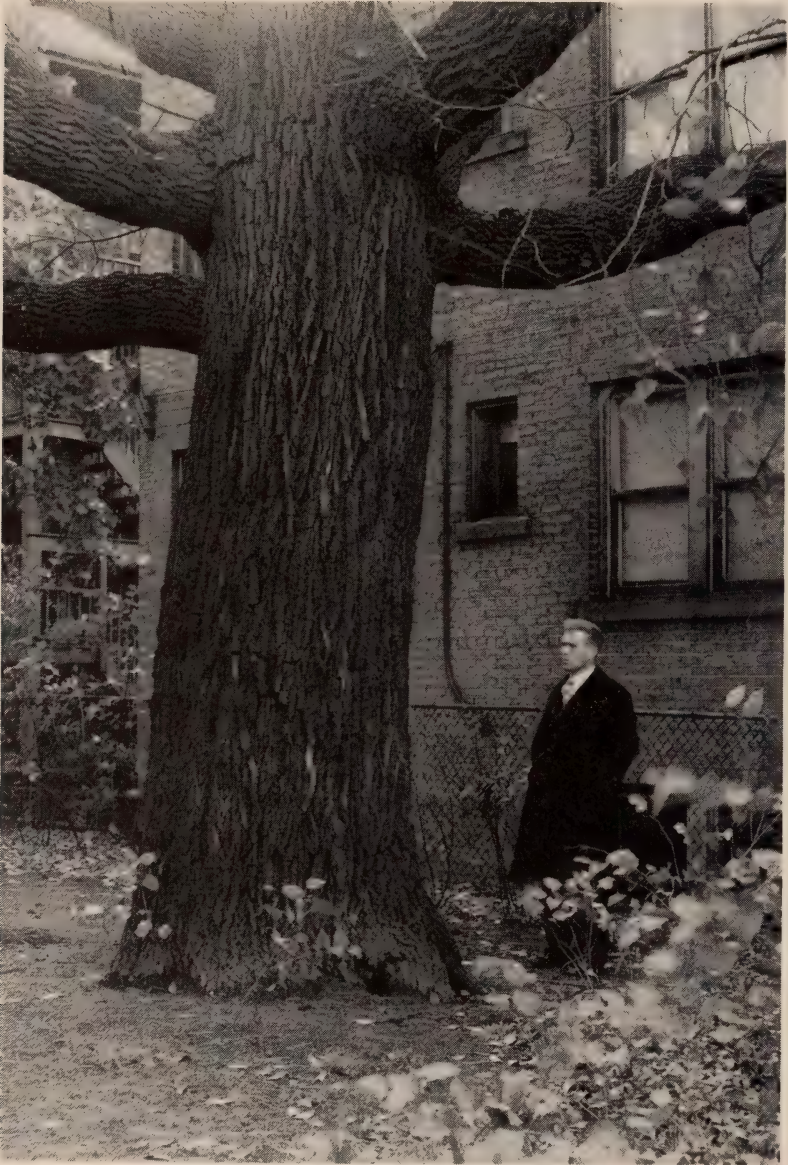


FIG. 22. White ash at 10010 Detroit Avenue, Cleveland. It measures 4 feet 1 inch dbh.

this same type of land. My recollection goes back to the time when the road along the east side of the Airport was corduroy, with water in the ditch's side until mid-summer." And again, "Several lesser swamps in the immediate neighborhood of Lake Abram were caused by beaver dams that blocked their outlets."

Cuyahoga County's southern boundary just misses the line of post-glacial bogs that are located on or near the summit of the watershed which passes through contiguous Summit and Geauga Counties. Abram's Lake, however, was such a bog, and probably once supported about its edges a growth of tamarack and white pine, such as now may be seen in the bog to the south of Fern Lake in Geauga County, or such as formerly existed about Solon bog, almost on the Cuyahoga County line. (Aldrich, 1943).

Besides the extensive swamp forests of elm, ash, and maple, certain large pin oaks, white oaks, and swamp white oaks on the till plain indicate the presence formerly of the "wet oak" type of forest, of which the "pin oak flat" is the extreme example. In May, 1941, the writer inspected the remnants of such a forest in New London, Huron County, Ohio, about 30 miles to the southwest of the locality under discussion. This was a poorly drained area, containing much standing water at the time. Above the more recent forest growth towered a few giant oaks and hickories, the species being pin oak, swamp white oak, bur oak, white oak, red oak, and shagbark hickory. Many of these trees were from 4 to 6 feet in diameter, and 125 feet in height. Probably some were from 300 to 400 years old. They were magnificent specimens which made it possible to reproduce in imagination something of the character of the forest of the same till plain in Cuyahoga County not so far away, in the days before the axe of the white man began its demolition.

In addition to these swampy areas there were numerous locations on the till plain within Cuyahoga County where the water table was low enough to encourage the development of another type of forest. A few large trees of beech, white ash, and white oak, associated with more recent growth of beech, sugar maple, cucumber, basswood, tulip and tupelo, suggest that the beech-maple association was probably in possession of the less wet portions of this small area of till plain.

In summary, we may conclude that the oaks probably occupied much of the level lands of the till plain. Pin oak, swamp white oak, and bur oak, with shagbark hickory probably were the dominant species; while white oak and red oak appeared on the drier lands. In certain favorable locations, beech, tulip, white ash, basswood, cucumber and tupelo would have been present. But over much of the area the lowland swamp forest of American elm, black ash, and silver maple held sway.

6. *Flood Plains and Stream Valleys* — John Heckewelder, previously quoted (p. 46), writes that the Cuyahoga bottomlands were timbered with “either Black Walnut or White Thorn Trees, intermixed with various other Trees as Cherry, Mulberry, etc. The ground entirely covered with high nettles.” “In such bottoms somewhat inferior to the above, the Timber is principally lofty Oaks, Poplar or Tulip Tree, Elm, Hickory, Sugar Maple, yet intermixed with black Walnut, Cherry, Mulberry, Grape Vines, White Thorn, Haw bush, etc., etc., Ash, etc.” At the old Moravian Town (near mouth of Tinker’s Creek) he mentions “very lofty Sycamore Trees.” (Heckewelder, 1796). J. D. Cleveland, previously quoted (p. 47), says that in 1835 “the Scranton flats were covered with Great Meadows, and the Stone flats by the primeval forest of black walnut, hickory and chestnuts.” (Cleveland, 1896).

Alfred Wolcott in 1811 wrote in his surveyor’s record book, “As the Cuyahoga bottoms generally are — with Black Walnut, Ash, some Elm, Bass, Buck Eye, Plumb and Crabtree.” We thus have several eye-witness characterizations of the original forest of the flood plains of the Cuyahoga.

Fortunately, we are able to amplify these brief descriptions by means of detailed studies of many remnants of original flood plain forests in the valleys of the Chagrin, Cuyahoga and Rocky Rivers, as well as of smaller streams, such as Euclid Creek and Doan Brook; and also through the personal recollections of a few men who recall the character of forests long since removed.

Mr. Don Knowlton speaks of the Cuyahoga bottomlands in the neighborhood of Clark Avenue (see Fig. 3) in 1900 as then wooded with “extremely large” and numerous buckeyes, cottonwoods, and boxelders; and on the second level, or terrace, butternuts, American elms and silver maples. He particularly recalls a large Ohio buckeye, perhaps 80 feet high, in the valley near the Clark Avenue Bridge.

Black walnut particularly stands out as a tree of these bottomlands. Mr. Oliver Upson told the writer that the building of the Upson-Walton Company, located at the Cuyahoga River edge at West 11th Street, Cleveland, was originally built in 1865. Extensive repairs were made in 1925 or 1926. At this time, he says, excavations made at the four corners of the building disclosed that it rested upon a “mattress of black walnut logs”. This would seem to indicate that black walnut was not a difficult timber to procure in the neighborhood of West 11th Street near the river a little less than 100 years ago.

Mr. George Mastick, whose family tradition in the neighborhood of Mastick Road in the Rocky River Valley goes back for well over a century, mentioned to the writer the prevalence of black walnut as a tree of the

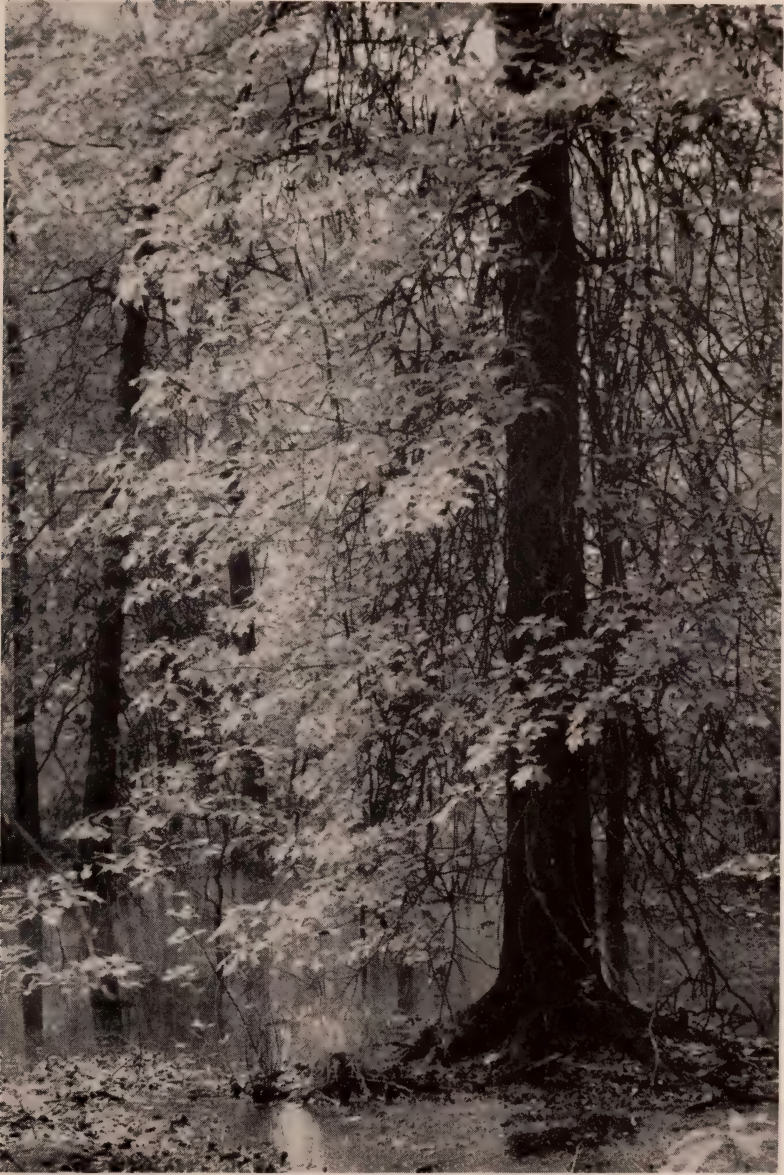


FIG. 23. Pin oak in small swamp, Brecksville Metropolitan Park.

valley where he lived for over 80 years. According to Mr. Mastick, this was the tree that furnished the material for the log cabins and fence rails of the early days in the vicinity of his home.

Mr. Frank D. Johnson recalls the "whaling big black walnuts" that were cut in the Rocky River Valley during his boyhood days (1885), which dotted the valley almost to Lake Erie.

During the extensive highway improvement operations at Willow, in the Cuyahoga bottomlands a few years ago, black walnut logs, buried under river deposits, were unearthed by the steam shovels. Some large silver maples and cottonwoods were removed from the river bottom land nearby at this time.

The writer has investigated in detail many localities where large trees of the river bottom or flood plain forest still survive within Cuyahoga County. It is very apparent that this was formerly a forest of giants, only a few of which still remain. (see Figs. 6, 25, 26).

Along the river edge, sandbar willow, black willow and heart-leaved willow are now common species. In the wetter locations, sycamore, cottonwood, American elm, slippery elm, and boxelder predominate. As the water table becomes lower, the two elms become more common; while black walnut, butternut, Ohio buckeye, black maple and big shellbark hickory appear in numbers. Less common trees are black ash, red ash, basswood, red mulberry, wahoo, bitternut hickory, red maple and silver maple. In certain wet locations swamp white oak and bur oak occur. Groves of papaw are not infrequent, and occasionally a few wild plum trees are encountered. Thorns (*Crataegus*) commonly occur along the river edge and are usually mentioned by the early surveyors. (see Fig. 28).

The writer feels that the foregoing was essentially the composition of the flood plain forests of 150 years ago, as it is today, in the Cuyahoga and Rocky River Valleys. The Chagrin Valley lacked the abundance of Ohio buckeyes, boxelders and black maples of the valleys of the lake plain section of the county.

Not only was this forest rich in species of trees, but it was also rich in species of lesser plants, including many climbers and twiners. Its under-story was dense and rank with tall, weedy perennials, such as cow parsnip (*Heracleum lanatum*), (see Fig. 27), and in places well-nigh impenetrable. Its level lands, when cleared, became the most fertile and easily worked of farm lands throughout the county. (see Fig. 4).

Extensions of these flood plain forests occurred also on the small flood plains of tributary streams, and often extended far up into the gullies and ravines of the uplands. As the land became higher, however, the slopes and



FIG. 24. Swamp white oak in small swamp. Brecksville Metropolitan Park.

bottoms tended more and more to be taken over by the beech-maple association, often including hemlock.

7. *Lake Erie Beach Line and Contiguous Marshes* — The trees of the lake beaches were largely cottonwoods and willows, and due to the unstable character of the habitat, they probably did not formerly, as they do not now, succeed in attaining to large size.



FIG. 25. The largest sycamore. It stands on the Flood Plain of the East Branch of Rocky River north of Berea. The trunk is completely hollow and large enough to accommodate a card table with four people sitting about it in chairs. It measures 9 feet 5 inches dbh.

In a few places where limited areas of sand dunes afforded a better foothold, a thin forest of cottonwood, black oak, red oak, bur oak, pin oak, white ash and basswood, in varying combinations, would have developed. In this association wafer-ash (*Ptelea trifoliata*) was a common shrub. An illustration of such a community exists at the present time just beyond the eastern limits of the county at Richmond Beach, just west of the mouth of the Grand River. Probably this type of forest also once bordered the marsh on the west side of the Cuyahoga River near its mouth before the true flood plain forest was reached. (see Fig. 5). Wherever the lake cliffs bordered the water there was no transition from interior forest to shore line conditions.

SUMMARY

The following paragraphs summarize briefly the detailed account of the forests of Cuyahoga County as they existed 152 years ago, as has been indicated in the foregoing pages. A simple statement is well-nigh impossible, since the picture is rendered too complex by the factors of topography, soils, drainage, micro-climates and general location at a sort of ecological crossroads in North America.

1. Throughout the region the beech-maple climax forest occupied all available locations in almost unbroken form. This was a forest dominated by beech and sugar maple, usually including as associated species in lesser numbers red maple, white ash, tulip, cucumber and tupelo. Normally it was a high, closed, dark forest with little undergrowth except the seedling trees of the dominants.

Within the county this beech-maple association was practically continuous throughout the eastern highlands; occupied much of the ground in the southern highlands; occupied the slopes of the valley walls, the ravines between the ridges, and the short gullies through the lake cliff; and appeared in modified or fragmented form throughout the lake plain and till plain wherever the soil was not too wet or too dry. Although beech was well represented on the lake plain, apparently sugar maple was not so common here as upon the uplands.

2. Included within the limits of the beech-maple association on the uplands were numerous locations where, because of the swampy character of the land, beech and sugar maple gave way to a typical upland swamp forest of limited and local extent, in which American elm, red maple and black ash were the dominant species. In this upland swamp forest basswood often appeared, and American hornbeam was a rather common understory tree.

3. Where the beech-maple association approached the edge of the escarpment, and the soil became less capable of holding moisture, an oak-chestnut association of limited extent appeared. The oaks were white oak, red oak, black oak, scarlet oak — and along the escarpment edge of the eastern highlands — chestnut oak. Chestnut in this location was an abundant species. Shagbark hickory, pignut, hophornbeam, flowering dogwood and shadbush reached a better degree of development here than elsewhere.

4. On the spurs overlooking the valleys, along the edges of the gorges, and within the cool, damp ravines, hemlock and white pine were commonly found. Of these, hemlock often formed extensive, practically pure stands. Where hemlock came into contact with the beech-maple forest, a tension zone existed, which often resulted in a mixture of beech and hemlock which might properly be called a beech-hemlock association. In the ravines, on



FIG. 26. The largest big shellbark hickory. It stands on the west bank of Rocky River just south of the Puritas Springs Road Bridge. It measures 34.5 inches dbh.

the other hand, hemlock was frequently associated with yellow birch, black birch and American yew. On the lake plain hemlock appeared as a tree of the swampy areas, where it was associated with red maple, silver maple and black ash.

White pine was not an abundant tree in Cuyahoga County even 150 years ago. On the slopes of the valley walls occasional large individual trees might have been found, and in a few places small groves of white pines associated with hemlocks were known to have occurred.

5. On the southern highlands a forest of oak, hickory, and chestnut was particularly well developed on the ridges. The species were white oak, red oak, black oak, scarlet oak, chestnut, shagbark hickory, pignut and white ash. Some exceptionally fine, almost pure stands of white oak were known to have occupied the north-facing slope of the escarpment here.

6. The drier portions of the lake plain and till plain supported a mixed forest in which black oak, white oak, red oak, tulip and white ash were the common species. On the sandy old lake beaches black oak particularly was an abundant tree. To a lesser degree scarlet oak, and (particularly westerly) chinquapin oak appeared. Beech was a not infrequent member of this mixed forest.

7. The very considerable swampy areas on the lake plain and till plain were mostly occupied by lowland swamp forests in which American elm, silver maple and black ash dominated. Frequently associated with these species were slippery elm, bur oak, swamp white oak and bitternut hickory.

8. Other wet lands on the lake plain and till plain frequently supported dense, almost pure stands of pin oak. Sometimes associated with the pin oaks were tupelo, swamp white oak and silver maple. It is probable also that these "pin oak flats" might have been present to a limited extent in suitable wet locations on the eastern and southern highlands.

9. Although unsupported by existing evidence, it seems reasonable to infer from the vegetation of similar sites contiguous to Cuyahoga County that tamarack and white pine might well have been present about Abram's Lake.

10. The bottomlands of the Rocky River, Cuyahoga and Chagrin Valleys were occupied by typical northern Ohio flood plain forests, which usually extended into the smaller valleys of tributary streams, even sometimes appearing in fragmentary form in the bottoms of ravines and gullies leading into the uplands.

At the stream edges, sandbar, heart-leaved, and black willow were common species. In the wetter locations, cottonwood and sycamore flourished and grew to large size. As the water table lowered slightly, American

elm, slippery elm, black walnut, and butternut became common. In lesser numbers, red ash and black ash were found along the streams, and occasional groves of papaw, wild plum, American crab and thorns were developed. In the Rocky River Valley at least, wahoo and red mulberry were occasional understory species. In the Cuyahoga and Rocky River Valleys Ohio buckeye, boxelder, big shellbark hickory, and black maple were abundant species, but these were apparently rare or not present in the Chagrin Valley.



FIG. 27. Flood Plain vegetation, Rocky River Valley. Sycamore, box elder, cow parsnip and stinging nettle.

11. On the exposed faces of the shale cliffs of the valley walls, and particularly where glacial till was eroding, red cedar and common juniper grew.

12. Wherever sand beaches were established along the Lake Erie shore, sandbar willow, black willow, cottonwood, and occasionally basswood, bur oak and red oak were characteristic species.

13. In areas where secondary succession was in progress it seems reasonable to infer that the order of succession would have been largely that of the present time, which includes thorns, crabs, sumacs (both staghorn and smooth), aspens (both large-toothed and quaking), wild black cherry, sassafras, red oak, shagbark hickory, white ash, red maple, American elm, tulip and tupelo as usual early arrivals, depending on character of soil and proximity of various types of forest units.

VI.

GENERAL ECOLOGICAL RELATIONSHIPS

From the foregoing, it would appear that the native forests of Cuyahoga County are a part of the great Deciduous Forest Formation of northeastern North America. In fact, the county lies well within the limits of this formation as described by Weaver and Clements (1929).

Northern and eastern vegetational affiliations are suggested by the presence here of hemlock, white pine, yellow birch, black ash and mountain maple. These northern and eastern species occur here close to their western and southern limits of distribution. According to Nichols (1935), Cuyahoga County appears at the southwestern edge of the irregularly outlined region which he designates as the "Hemlock-White Pine-Northern Hardwood Region" of eastern North America.

Also evident within the species composition of Cuyahoga County's forests are distinctly western and southern elements, as indicated by the presence of such species as honey locust, hackberry, chinquapin oak, big shellbark hickory, Ohio buckeye, cucumber tree and tulip — all of which are here close to their northern or eastern limits of distribution.

Still another western influence is reflected in the probability that Cuyahoga County once contained small areas of prairie character. Although Transeau's map of the Prairie Peninsula (1935) does not show any outliers of the western prairies within its limits, we find Samuel Huntington, writing of a visit to Cleveland in 1800, reporting that "on the west side (of the Cuyahoga River) is a prairie where one hundred tons of hay might be cut each year." (Whittlesey, 1867). Assuming a yield of one ton of hay per acre, we may take this reference as indicating an area of about 100 acres. At the present time this location is so fully occupied by streets and buildings that all traces of its original vegetational character have long ago disappeared. (see Fig. 5).

It thus appears that Cuyahoga County, ecologically speaking, is on the tension line between eastern and western, northern and southern plant associations. This spectacular meeting and overlapping of forest communities within the limits of a single small county in northern Ohio is due in great measure to its unique position with reference to great continental physiographic boundaries, which has already been noted (see p. 6), coupled with the fact that its climate is also transitional between that of the east coast and the continental interior (p. 17).

Although Lake Erie seems to form a natural barrier to the extension of southern species northward, northern species reach the region by way of the lake shore, which from Cleveland extends toward the northeast.

It might be added that this overlapping of plant communities in the county is somewhat paralleled by a similar overlapping of animal forms. (Bole and Moulthrop, 1942).

The fact that Cuyahoga County is thus situated at a veritable ecological crossroads is indicated in many ways, but perhaps not more dramatically than in the distribution of its trilliums. To the east, on the plateau, *Trillium grandiflorum* is the abundant trillium; *Trillium sessile* is conspicuously absent. To the west, on the lake plain, *Trillium sessile* is abundant; *Trillium grandiflorum* is rare or absent.



FIG. 28. Rocky River, showing flood plain forest.

VI.

THE "MOSES CLEAVELAND TREES"

Before bringing this account of the native forests of Cuyahoga County to a close, it may be of more than passing interest to record the labeling of the "Moses Cleaveland Trees". This was a project undertaken in connection with Cleveland's Sesquicentennial celebration in 1946. It involved the selection and labeling of 150 old trees (one for each year of the city's life), distributed throughout Cuyahoga County in places where they might easily be seen and appreciated by the public.

In each case the tree was judged to be more than 150 years old, so that it represented the "original" forest of Moses Cleaveland's day. The writer was chairman of the committee which undertook this work.

The labels were of aluminum, 10 by 5 inches in size, with etched lettering filled in with red enamel. One reads as follows:

BLACK OAK

Quercus velutina

This is a Moses Cleaveland Tree. It was standing here as a part of the original forest when Moses Cleaveland landed at the mouth of the Cuyahoga River July 22, 1796. Let us preserve it as a living memorial to the first settlers of the Western Reserve.

The Sesquicentennial Commission

When the trees were all chosen, it appeared that 23 different species were represented. These were:

White Oak	35	Black Walnut	3
Sugar Maple	19	Cucumber	2
American Elm	13	Bur Oak	2
Beech	12	Cottonwood	2
Black Oak	9	Silver Maple	2
Pin Oak	9	Sassafras	2
Red Oak	8	Swamp White Oak	2
Tulip	7	Scarlet Oak	2
Red Maple	6	Chestnut Oak	2
White Ash	4	Big Shellbark Hickory	1
Tupelo	4	Hemlock	1
Sycamore	3		

Some of these trees are shown in the preceding pages (see Figs. 6, 7, 8, 9, 15, 18, 22, 25, 26).

It will be noted that white oak stands at the head of the list in numbers. This appeared to be the species best equipped to survive to old age in fairly good condition, and to maintain itself successfully against wind damage and fungus attack.

CHECK LIST OF TREES
CUYAHOGA COUNTY, OHIO

I.

NATIVE TREES

The order of arrangement in the following list, and the scientific names used, are, with a few exceptions, as found in *Trees of the Eastern United States and Canada*, by William M. Harlow, 1942. It is to be understood that the remarks below, unless otherwise indicated, refer only to the species as it occurs in Cuyahoga County, Ohio, and in its native state. Measurements given are taken breast high with steel diameter tape. While many good examples of native trees may be found growing along city streets, the locations given herein usually refer to the tree in its natural environment.

Eastern White Pine — *Pinus strobus* L.

Formerly present in small isolated stands or as individual trees, usually associated with hemlock, on the spurs, ridges and steep slopes of the valley walls of the Chagrin and Cuyahoga Rivers and their tributary gorges and the gorges of the escarpment edge. Now found in its native state only as a few scattered individual trees. A tree of more northerly relationships, it occurs here at about its southern limits except as it may grow at higher elevations in the Appalachians. Good examples of small stands of old trees close to the Cuyahoga County line in Lake County may be seen in the North Chagrin Reservation of the Cleveland Metropolitan Parks, and on Little Mountain. Occasional isolated trees occur on the east slope of the Cuyahoga Valley.

Tamarack — *Larix laricina* (DuRoi) K. Koch.

Never abundant in Cuyahoga County, its distribution here was limited to the margins of postglacial bogs, such as Abram's Lake. A tree of the north, growing almost to the Arctic Circle. Here near the southern limits of its range. Good examples may be seen in Geauga County at Fern Lake and swampy ground to the south.

Eastern Hemlock — *Tsuga canadensis* (L.) Carr.

Our most common native evergreen tree. Formerly abundant in gorges and ravines, and on spurs overlooking the valleys. Has long been in process of displacement by the deciduous forest, and within the county limits is gradually diminishing in numbers. Often with beech it forms a beech-hemlock association. A tree of more northerly relationships, it represents, with white pine and yellow birch, a more boreal type of forest than that now occupying the land. Good examples of native hemlock are still to be seen on the spurs overlooking the Chagrin Valley in the North Chagrin Metropolitan Park, and in many small ravines. (see Fig. 19, 21).

Eastern Redcedar — *Juniperus virginiana* L.

Occasional only. While elsewhere it is often associated with swampy locations, here it occurs in much the same situations as does common juniper (below). A rather common tree of practically all of the United States east of the prairies. Good examples may be seen near the Trailside Museum in the Brecksville Metropolitan Park.

Common Juniper — *Juniperus communis* L.

Occasional only. Most frequently found as a small stunted tree on dry cliffs of glacial drift, or dry exposed banks of soft shale. Otherwise on poor or rocky soil. The variety *depressa* occurs also in much the same locations. A tree or shrub of northern affiliations and circumpolar in distribution. Examples may be seen on some of the steep exposed walls of Rocky River Valley and (*depressa*) near the Trailside Museum in the Brecksville Metropolitan Park.

Black Willow — *Salix nigra* Marsh.

Our most tree-like native willow, common along streams and edges of ponds. A tree of the eastern U. S. and southern Canada. Common as a riveredge species in Rocky River Valley. A specimen of rather poor form may be seen on the westerly side of the small pond at the Forest Lane entrance to the North Chagrin Metropolitan Park.

Peach-leaf Willow — *Salix amygdaloides* Anders.

A rather uncommon small tree or shrub of the Lake Erie shore. A common tree of the northwest and central U. S., here near the eastern limits of its range.

Pussy Willow — *Salix discolor* Muhl.

A common small tree or shrub of stream sides and wet places. A tree of the northeastern U. S. and southern Canada, here near the southern limits of its range. Good examples can be found in almost any wet location where vegetation exists.

Bebb Willow — *Salix bebbiana* Sarg.

A rather rare small tree of wet places such as pond margins and stream sides. A tree of Canada and the northern states, reaching the southern limit of its range here. A small tree of this species may be seen on the easterly side of the pond at the Forest Lane entrance to the North Chagrin Metropolitan Park.

Shining Willow — *Salix lucida* Muhl.

Not uncommon along streams and pond edges. A small tree of eastern

Canada and the northeastern U. S., at about the southern limits of its range here. A good specimen may be seen at the edge of the brook on the south side of Fairmount Road just west of Coventry Road, Cleveland Heights.

Sandbar Willow — *Salix longifolia* Muhl.

This is the abundant willow of sandbars and stream sides, often being the first plant to occupy a newly deposited bar of sand or shale fragments. A small tree or shrub of southern Canada and the northeastern U. S. Can be found on almost any stream, but particularly abundant in Rocky River Valley.

Heart-leaved Willow — *Salix cordata* Muhl.

Frequent along streams, widely distributed through northeastern U. S. Common in Rocky River Valley.

Quaking Aspen — *Populus tremuloides* Mx.

Not so common as largetooth aspen (below) but found in much the same situations. A tree of the far northwest and southern Canada, reaching its southern limits (except as it may grow at higher altitudes in the mountains) in central Ohio. A small thicket stands on the east side of the Park Boulevard south of Brookpark Bridge in the Rocky River Metropolitan Park.

Largetooth Aspen — *Populus grandidentata* Mx.

A common tree of thin woods and woods edges. One of the earliest of the secondary succession species to appear on abandoned lands. A tree of the northeastern U. S. and southern Canada. Examples may be seen about the Trailside Museum, in the Rocky River Metropolitan Park. Probably Forest Lane Picnic Grounds in the North Chagrin Metropolitan Park.

Eastern Cottonwood — *Populus deltoides* Marsh.

Common in all river and stream valleys and along the Lake Erie shore. Occurs also in many wet, open locations. A regular component of the flood plain forest. A tree of wide distribution in the U. S. and southern Canada, including the Mississippi basin and extending into Saskatchewan and Manitoba. Occurring here toward the eastern limits of its range. Many fine examples may be seen along the Nature Trail, and generally in the vicinity of the Trailside Museum in the Rocky River Metropolitan Park. Probably the largest cottonwood in the county is that standing beside the bridle path near the river edge just south of the Puritas Springs Road Bridge near the Mastick Road entrance to the Rocky River Metropolitan Park. This tree measures 63 inches dbh. (see Fig. 6).

Black walnut — *Juglans nigra* L.

A common tree of river and stream valleys. A regular component of the flood plain forest. A tree of the eastern U. S. and southern Ontario, occurring here near the northern limits of its range. Fine examples may be seen along the Nature Trail, and generally in the vicinity of the Trailside Museum, in the Rocky River Metropolitan Park.

Butternut — *Juglans cinerea* L.

A common tree of river and stream valleys, often associated with black walnut (above). A tree of the northeastern and central U. S. and southern Ontario. Good examples may be seen along the Nature Trail, and generally in the vicinity of the Trailside Museum, in the Rocky River Metropolitan Park.

Shagbark Hickory — *Carya ovata* (Mill.) K. Koch.

The common hickory of the upland woods of the region. A component of the oak-hickory forest and occurring in most mixed woods. A tree of the eastern U. S. and southern Canada, occurring here near the northern limits of its range. A good example stands close to the Trailside Museum in the Brecksville Metropolitan Park.

Big Shellbark Hickory — *Carya laciniosa* (Mx. f.) Loud.

Common in the valley of Rocky River as a tree of the bottomlands. A tree of the eastern central U. S., reaching its northern limit here. A fine example stands on the bridle path along the river edge just south of Puritas Springs Road Bridge near the Mastick Road entrance to the park. (Fig. 26).

Pignut Hickory — *Carya glabra* (Mill.) Sweet.

A rather uncommon tree of the upland woods, occurring either as a component of the oak-hickory forest or as an occasional tree in the beech-maple climax. A tree of the northeastern U. S. and southern Ontario, occurring here near the northern limits of its range. A good example stands on the Nature Trail in the North Chagrin Metropolitan Park.

Bitternut Hickory — *Carya cordiformis* (Wang.) K. Koch.

Common in river and creek bottoms and in other moist situations. A tree of the eastern U. S. and southern Canada. A good example may be seen close to the Wildflower Trail in the North Chagrin Metropolitan Park. A fine tree, 3 feet dbh., stands in the Snow Road Picnic Ground in the Big Creek Metropolitan Park.

Yellow Birch — *Betula lutea* Mx. f.

Common in cool moist ravines and on slopes of valley walls, often associated with hemlock as a remnant of a forest of a colder climate than that of the present time. A tree of the northeastern U. S. and southern Canada, occurring here at the southern limits of its range, except as it may grow at higher altitudes in the Appalachians. Good examples may be seen in Doan Brook ravine near Delaware Road; in the ravine of Dugway Brook, Forest Hill Park; in the ravine of Abram's Creek, tributary to Rocky River Valley.

Black Birch — *Betula lenta* L.

Not uncommon in ravines tributary to the Chagrin Valley and ravines along the edge of the escarpment. A tree of the northeastern U. S., occurring here near the western edge of its range. Two good-sized trees may be seen on the ravine slope near the Trailside Museum in the North Chagrin Metropolitan Park. Smaller trees stand along the Nature Trail in the South Chagrin Metropolitan Park.

Speckled Alder — *Alnus incana* (L.) Moench.

Common in wet places along streams or banks of ponds or lakes, or in swamps. A small tree of northern relationships occurring here at the southern limits of its range. May be seen along the Park Boulevard near the Brookpark Bridge in Rocky River Metropolitan Park, or on the low wet lands at the foot of the bluff east of the Trailside Museum in the North Chagrin Metropolitan Park.

Hophornbeam — *Ostrya virginiana* (Mill.) K. Koch.

A common understory tree of the beech-maple climax and of most mixed woods. A tree of the eastern U. S. and southern Canada. Examples may be seen on the Nature Trails in the Brecksville and North Chagrin Metropolitan Parks.

American Hornbeam — *Carpinus caroliniana* Walt.

A common understory tree of moist woods in many locations. A tree of the eastern U. S. and southern Canada. Examples may be seen on the Nature Trails in the Brecksville and North Chagrin Metropolitan Parks.

American Beech — *Fagus grandifolia* Ehrh.

Formerly one of the most common trees of the region, forming, with sugar maple, the climatic climax forest which covered large portions of the uplands. A tree of moist locations, not too dry nor too wet. A tree of the eastern U. S. and southeastern Canada. A good example of the beech-maple climax forest may be seen about the Trailside Museum in the North Chagrin

Metropolitan Park. A striking example of the differences in growth-form between forest-grown and open-grown trees may be noted by comparing with these an open-grown beech standing on the north side of the Park Boulevard near the SOM Center Road entrance to the South Chagrin Metropolitan Park. (see Fig. 13).

Chestnut — *Castanea dentata* (Marsh.) Borkh.

Formerly a common tree of dry ridges and on the spurs overlooking the valleys. A component of the oak-hickory and oak-chestnut forests. Common in mixed woods and transition stages of succession. Due to the ravages of the "chestnut blight" it has now entirely disappeared as a tree of any size. Many large stumps remain, and in many places suckers from these, or small seedling trees still persist. A tree of the central and northeastern U. S. and southern Ontario, it occurs here near the northern limits of its range. (see Fig. 12).

White Oak — *Quercus alba* L.

Next to the red oak, the most common of the oaks in the region. A tree of dry uplands and ridges, but tolerant of many soils. Almost pure stands formerly occupied many locations on the southern highlands. Common along the escarpment edge. A tree of the eastern U. S. and southern Canada. Some fine examples of old trees still remain in Forest Hill Park. (Figs. 7, 20).

Bur Oak — *Quercus macrocarpa* Mx.

Not uncommon in the Rocky River and Cuyahoga Valleys and along the Lake Erie shore. A tree of moist locations. A tree of the central U. S. and southern Canada, more common westerly. Two fine examples may be seen near the juncture of Parkview Road and River Road in the southeast corner of the Brecksville Metropolitan Park. A few small trees stand in the parkway just west of Coventry Road and north of South Park Boulevard, Shaker Heights.

Chestnut Oak — *Quercus montana* Willd.

Not uncommon along the edge of the escarpment, east of the Cuyahoga River. A tree of the northeastern U. S., it occurs here at the northwestern edge of its range. A component of the oak-chestnut forest and characteristic of the Appalachian Mountains. Good examples may be seen on both sides of Euclid Creek gorge, and some fine old trees still stand in Forest Hill Park, East Cleveland.

Swamp White Oak — *Quercus bicolor* Willd.

Not uncommon in wet and swampy locations on both the plateau and plain portions of the region. Often appears as a component of either upland or lowland swamp forests. A tree of the northeastern U. S. and southern

Canada. Two fine old examples stand on either side of Tinker's Creek Road not far from Canal Road. An interesting smaller tree may be seen in the small bog along the Park Boulevard where it passes the upper Shelter House in the Brecksville Metropolitan Park. (see Fig. 24).

Chinquapin Oak — *Quercus muhlenbergii* Engelm.

An occasional tree of the lake and till plains west of the Cuyahoga, in poorly drained soils. A tree of the northern central U. S. and southern Ontario, occurring here toward the eastern limits of its range. A good example may be seen on the northeastern slope of Mount Pleasant (a dissected portion of the Lake Plain) in Rocky River Valley south of Brookpark Bridge.

Common Red Oak — *Quercus maxima* (Marsh.) Ashe.

The most abundant of the oaks of the region. Widely distributed and found in many situations. A tree of mixed woods and many transition stages. A tree of the eastern U. S. and southern Canada. Good examples are numerous. Several fine trees stand along the Nature Trail in the North Chagrin Metropolitan Park. Other good examples may be seen about the lower Shaker Lake.

Black Oak — *Quercus velutina* Lam.

Common on sandy ridges and dry slopes of valley walls. A tree of the eastern U. S. and southern Canada. Good examples may be seen along most of the foot trails in the Brecksville Metropolitan Park. A medium-sized tree stands near the Trailside Museum in this park. Some fine trees stand in Forest Hill Park. Probably the largest black oak in the county stands near the Band Shell in Gordon Park, measuring 54 inches dbh.

Scarlet Oak — *Quercus coccinea* Muench.

Not uncommon on dry ridges and ravine edges and on spurs overlooking the valleys. A tree of the eastern U. S. and southern Canada. Good examples may be seen in Forest Hill Park, about the lower Shaker Lake, along the ridge trails in the Brecksville Metropolitan Park, and along the edge of the cliff on the north side of Tinker's Creek gorge in the Bedford Metropolitan Park.

Pin Oak — *Quercus palustris* Muench.

An abundant tree of the lake plain in wet situations, as well as of river bottoms and poorly drained sites on the uplands. A tree of the northern central U. S. and southern Ontario. Good examples are numerous. Two large trees stand on either side of the road leading from the main Park Boulevard in Rocky River Valley between Fort Hill and Mount Pleasant. A tree 48 inches dbh., stands just west of 13105 Detroit Avenue, Cleveland. (see Fig. 23).

Shingle Oak — *Quercus imbricaria* Mx.

Rare here. Probably occurred formerly as scattered individual trees in the oak-hickory forest. A tree of the northern central U. S., occurring here near the northern limit of its range. A good example stands on the northern edge of Chippewa Creek gorge just outside the limits of the Brecksville Metropolitan Park. Two planted specimens may be seen on the south side of North Park Boulevard, just west of Coventry Road, Cleveland Heights. Several others stand near the lagoon in Rockefeller Park, Cleveland.

American Elm — *Ulmus americana* L.

Abundant in wet bottomlands, sometimes forming pure stands in flood plain or wet upland woods. Component of both upland and lowland swamp forests. On many farms now under cultivation, elms of large size often dot the landscape or give shade and protection to the farmhouse. Usually these trees mark the places where moisture either is, or formerly was, abundant. Often planted as a roadside tree, occasionally a large specimen, out of line with the others, betrays the fact that it was already there as a native before the others arrived. A tree of the eastern U. S. and southern Canada. Large elms are so much a feature of the landscape in the open country that fine examples are easy to find. A good example of the "farmhouse elm" stands beside the white house on Wilson's Mill Road where Lander Road joins Wilson's Mill. This tree measures 60 inches dbh. (see Fig. 15).

Slippery Elm — *Ulmus fulva* Mx.

Common in bottomlands of river and stream valleys, and sometimes found on the uplands as well. A tree of the eastern U. S. and southern Canada. Good examples may be seen along the Nature Trail in the Rocky River Metropolitan Park near the Trailside Museum. A fine tree stands in the ravine near the Trailside Museum in North Chagrin Metropolitan Park.

Cork Elm — *Ulmus thomasi* Sarg.

Rare here. Occasional on the East Branch of Rocky River. A tree of the central U. S. and southern Ontario and southern Quebec, occurring here near the northeast corner of its range. Best examples of a good-sized tree just over the Cuyahoga County line in Medina County may be seen on bottomland near foot trail along east side of river on East Branch of Rocky River just above Hinckley Lake in Hinckley Metropolitan Park. A small tree grows on the Nature Trail in Brecksville Metropolitan Park.

Hackberry — *Celtis occidentalis* L.

Rare here, occurring sparingly in Rocky River Valley and perhaps elsewhere. A tree of wide distribution, its best development is in the west and south. Here it appears near the northeastern limits of its main range.

Several trees may be seen at the foot of the west wall of Rocky River Valley along the Park Boulevard south of the Brookpark Bridge.

Red Mulberry — *Morus rubra* L.

Occasional only, as a small understory tree in the flood plain forest. A tree of the eastern and southern U. S. and southern Ontario, occurring here near the northern limits of its range. Several trees may be seen along the bridle path near the Trailside Museum in Rocky River Metropolitan Park. Another small specimen stands near the Trailside Museum in the Brecksville Metropolitan Park.

Cucumbertree — *Magnolia acuminata* L.

Although not present in large numbers, this tree is a regular component of the beech-maple climax forest here, either on the relatively flat uplands of the plateau, or in the ravines and gorges east, south or west of Cleveland. A tree of southern and southwestern relationships, it is here near the northern limits of its range. Fine examples may be seen in the North Chagrin, South Chagrin, and Brecksville Metropolitan Parks. The largest tree known to the writer, 46 inches dbh., is located on Center Ridge Road (north side) near the western limits of the City of Rocky River where the road crosses a small gully. This tree should be preserved as a landmark.

Tuliptree — *Liriodendron tulipifera* L.

Like the cucumbertree, this tree is a regular constituent of the beech-maple climax forest, but more common than the cucumber. Formerly it was relatively more numerous than at present, often occurring in groves. It grew to giant size. Tulip was present also along the old beach lines where it was associated with beech and ash. A tree of southerly and easterly associations, it occurs here near its northern limits. A giant tuliptree formerly growing near the present small lake in Wade Park is mentioned by Charles A. Post as a tree which "took five or six boys with outstretched arms and clasped hands to encircle it". Large old tulips still stand in Wade Park just north of the Museum of Art, as in many another location within the limits of the city. Several good examples of such old trees may be seen on East 89th Street north of Euclid Avenue. Perhaps the tuliptree may be seen in its best development as a forest tree now in the North Chagrin Metropolitan Park not far from the Trailside Museum there.

Pawpaw — *Asimina triloba* (L.) Duval.

A small tree formerly common in groves or thickets in rich bottomlands and ravines. Now limited to a few localities in river and stream valleys. A tree of southern relationships existing here near the northern limits of its range. Small thickets may still be seen along the East Branch of Rocky

River; along the Nature Trail in the Brecksville Metropolitan Park; beside the boulevard in Euclid Creek Metropolitan Park, or along the bridle path in the North Chagrin Metropolitan Park at the foot of the bluffs not far from the Trailside Museum.

Sassafras — *Sassafras variifolium* (Salisb.) Ktze.

A common tree in mixed woods or open places, sometimes growing to large size, sometimes forming thickets about old trees by the process of suckering from the roots. A tree of southern and southwestern relationships occurring here near the northern limits of its range. Good examples of large forest form may be seen in the North Chagrin Metropolitan Park along or near the Nature Trail. A tree 36 inches dbh., stands in Forest Hill Park (East Cleveland) near the foot trail on the east side of Dugway Brook ravine.

Witchhazel — *Hamamelis virginiana* L.

Sometimes occurs in small tree form, but usually as a shrub. It is common in open woods or along ravine edges in the beech-maple climax forest. A tree of the eastern U. S. and southern Canada. Good examples may be found in all Metropolitan Parks.

Sycamore — *Platanus occidentalis* L.

A common tree of the flood plain forest and of ravine bottoms, widely distributed over the area. Old trees may reach huge proportions. A tree of the eastern U. S. and southern Canada. Good examples may be seen in almost any stream bottom. For many years a large tree (over 6 feet dbh.), reputed to mark the meeting place of the Moravian missionaries with the Indians, stood by the roadside west of the Cuyahoga River near the junction of Tinker's Creek Road and Canal Road. In 1940 the top of this tree was blasted off as a safety measure. But the great bole continues to live and produce an abundance of leafy sprouts. (see Figs. 9, 25).

Wild Black Cherry — *Prunus serotina* Ehrh.

Nowhere abundant as a large tree, but regularly found as an individual tree in most mixed woods. An early secondary succession species. A tree of the eastern U. S. and Canada. Good examples are found in all Metropolitan Parks. A tree 34 inches dbh. stands in Big Creek Parkway in ravine just north of Stumpf Road. Another, 36 inches dbh., stands near the foot of one of the spurs which touches the main Park Boulevard near lower Chippewa Creek in the Brecksville Metropolitan Park.

Choke Cherry — *Prunus virginiana* L.

A rather common shrub or small tree at the edges of woods or fields, or along roadsides, or as an understory shrub in open places in the forest, or on hillsides. In late May it is conspicuous by reason of its racemes of white

bloom. A tree of the eastern U. S. and Canada. Examples may be seen along most country roadsides or at the edges of woods.

Fire Cherry — *Prunus pennsylvanica* L.

A small tree occurring along roadsides, woods edges, or on the Lake Erie shore. A tree of northern affiliations occurring here near the southern limits of its range, except as it may appear at higher elevations in the Appalachians. A small thicket may be seen along the bridle path just west of Coventry Road and north of South Park Boulevard, Shaker Heights.

Wild Plum — *Prunus americana* Marsh.

Usually found forming thickets in bottomlands. Mentioned by Alfred Wolcott in 1811 as characteristic of the "Cuyahoga bottoms". An extensive thicket was known to have occurred in the valley of Baldwin Creek a generation ago. At the present time a rare tree here. A tree of the eastern U. S. reaching its northerly limits about the more southerly of the Great Lakes. A good example of a wild plum thicket may be seen just over the Cuyahoga County line in Medina County at the southern end of Hinckley Lake.

Hawthorn — *Crataegus* L. ssp.

The hawthorns are a group of exceptionally difficult trees from the standpoint of taxonomy. Even the specialists reach widely different conclusions. In Cuyahoga County there may be from 15 to 20 species. In view of the confusion now existing with regard to their classification it seems best to include them in this list under one general head. As a group, the thorns constitute a strong element in early secondary succession stages. With the crabs and sumacs they quickly occupy abandoned fields. They also appear in dry open woods, along woods edges, and river banks. They are among the very common small trees of the region.

Some idea of the possible species occurring in Cuyahoga County may be gained from the following list of specimens collected by Mr. F. J. Tyler in adjoining Lake, Portage, and Geauga Counties (most of them in the neighborhood of Painesville, Lake County). These have all been determined by Dr. Ernest J. Palmer of the Arnold Arboretum.

Found in Lake County

- Crataegus pruinosa* K. Koch
- Crataegus calpodendron* (Ehrle) Medic.
- Crataegus assurgens* Sarg.
- Crataegus ovatafolia* Sarg.
- Crataegus punctata* Jacq.
- Crataegus sera* Sarg.
- Crataegus Pringlei* Sarg.
- Crataegus crus-galli* L.

- Crataegus leptophylla* Sarg.
- Crataegus Kellermanii* Sarg.
- Crataegus latisepala* Ashe.
- Crataegus tenella* Ashe.
- Crataegus cuneiformis pausiaca* Ashe.
- Crataegus gaudens* Sarg.
- Crataegus dissona* Sarg.
- Crataegus compacta*
- Crataegus pedicellata albicans* Ashe.
- Crataegus pedicellata Robesoniana* Sarg.
- Crataegus structilis* Ashe.
- Crataegus macrosperma* Ashe.

Found in Portage County

- Crataegus disperma* Ashe.
- Crataegus succulenta* Schrad.
- Crataegus Porteri* Britton.
- Crataegus calpodendron* (Ehrle) Medic.

Found in Geauga County

- Crataegus brumalis* Ashe.
- Crataegus punctata* Jacq.

American Crab — *Malus coronaria* (L.) Mill.

A tree of abandoned fields and woods edges. Its area of distribution is centered about the Great Lakes. A common secondary succession species.

Shadbush — *Amelanchier canadensis* (L.) Med.

Occurs on hillsides and woods edges in dry locations, often in beech-maple or oak-hickory forest along ravine edges or on spurs. A tree of the eastern U. S., reaching nearly to its northern limits here. Not uncommon. Particularly conspicuous when in bloom in early May before the appearance of the leaves on the forest trees. Good examples of relatively large trees may be seen in Rocky River Valley at foot of slope on westerly side of Fort Hill, in the Brecksville Metropolitan Park near end of spur which touches the main boulevard near the lower portion of Chippewa Creek, in open field near the intersection of Cedar and Lander Roads, Mayfield Heights.

Honeylocust — *Gleditsia triacanthos* L.

Rare here. Like the coffeetree (below), it is a tree of river bottoms and lake shores, occupying much the same range, and with much the same growth habits. Several medium-sized trees may be seen at the western end of Puritas Springs Road Bridge on the river bank just within the Metropolitan Park entrance in Rocky River Valley. These are the natural progeny

of a very large old tree that until 1937 stood nearby.

Kentucky Coffeetree — *Gymnocladus dioica* (L.) K. Koch.

Rare here. A tree of river bottoms usually growing as a solitary tree or in small groups. A tree of western and southwestern relationships, it occurs here near the northeastern corner of its range. Examples may be seen near the northwestern corner of the intersection of Mastick and Puritas Springs Roads, Rocky River Valley. These, however, are planted trees.

Northern Pricklyash — *Zanthoxylum americanum* Mill.

Uncommon here. A small tree or shrub formerly probably only of occasional occurrence as an understory tree of open forests or along stream banks. A tree of more westerly relationships, occurring here near the eastern limits of its range. Good examples are rare. One location is on the upper edge of Doan Brook ravine near Chestnut Hills Drive.

Hoptree — *Ptelea trifoliata* L.

A small tree or shrub found most frequently here growing on the sand dunes of the Lake Erie shore. A tree of southern and southwestern relationships, occurring here near the northern limits of its range. Occasional examples may be found along the lake shore east of Gordon Park, and on the Nature Trail in that park.

Staghorn Sumac — *Rhus typhina* L.

A small tree of waste places and abandoned fields. Common along roadsides. One of the earliest arrivals in the process of secondary succession. A tree of the northeastern U. S. and southern Canada. Common along country roadsides.

Smooth Sumac — *Rhus glabra* L.

A small tree of much the same habit and affiliations as staghorn sumac, but not so common. Good examples of this and the above species may be seen near the Trailside Museum in the Rocky River Metropolitan Park.

Poison Sumac — *Rhus vernix* L.

A small tree of bogs and swamps or wet grounds. Rather common in such locations. A tree of the eastern U. S. and southern Canada. Keep away from it!

Wahoo — *Euonymus atropurpureus* Jacq.

A small tree of the river bottoms occurring as an understory tree of the flood plain forest. Not uncommon in Rocky River Valley. A tree of the west and southwest, it occurs here near the northeastern corner of its range.

A few examples may be seen at the south side of the ford which crosses the Rocky River near the Detroit Avenue entrance to the Metropolitan Park.

Sugar Maple — *Acer saccharum* Marsh.

Most abundant of the maples here, forming, with beech, the climatic climax forest of the region. Even on completely cleared and open land, the presence of large sugar maples as roadside trees of the neighborhood is a reminder of its former abundance, not only on the plateau but also on many parts of both the lake and the till plains. A tree of the U. S. and southern Canada east of the prairies. Many fine examples may be seen along country roadsides and in the Metropolitan Parks. A large tree (37 inches dbh.) may be seen in a small area of woodland on the north side of Mayfield Road just east of SOM Center Road. Perhaps the largest sugar maple in the county stands by the roadside in front of the small cemetery on Butternut Ridge Road just east of the Village of North Olmsted. In 1948 this tree measured 53 inches dbh. Another large tree of this species may be seen in Forest Hill Park at the head of Dugway Brook ravine near the corner of Lee and Monticello Boulevards. (see Fig. 8).

Black Maple — *Acer nigrum* Mx. f.

Comparable to the sugar maple in size and appearance, this tree is found in moist situations in river and stream bottoms. It is fairly common here in such locations. Abundant in Rocky River Valley, appearing also in lesser degree in the Cuyahoga and Chagrin Valleys. A tree of the eastern U. S. and southern Canada, it occupies much the same range as the sugar maple, but does not go so far south, north, east, or west. Good examples may be seen along the Nature Trail, or generally in the neighborhood of the Trailside Museum in the Rocky River Metropolitan Park.

Silver Maple — *Acer saccharinum* L.

One of the dominants of the lowland swamp forest, occurring in low swampy places along the lake plain, in river valleys, and along stream edges. Formerly more abundant as a native tree than now. A tree of the eastern and southern U. S. and southern Canada. A good example of a large old tree may be seen on the south side of the ford crossing the Rocky River near the Detroit Avenue entrance to the park. Perhaps the largest silver maple in the county stands at the rear of the house at 33 East 194th Street, City of Euclid. This measures 54 inches dbh. (see Fig. 11).

Red Maple — *Acer rubrum* L.

Next to the sugar maple the most abundant of the maples here. Grows in many situations but prefers moist locations. With the American elm and black ash it is one of the dominants of the upland swamp forest. Frequently identified with the beech-maple climax, it is often found in association with

those trees. It often appears in large size as a tree of country roadsides. A tree of the eastern U. S. and southern Canada. A fine example of an open-grown tree stands opposite the Harriet Keeler Memorial Garden on the northerly side of the Park Boulevard in the Brecksville Metropolitan Park. Fine trees of forest form may be seen along the Nature Trail in the North Chagrin Metropolitan Park, as well as along most country roadsides. (see Fig. 17).

Boxelder — *Acer negundo* L.

This maple is abundant as a component of the flood plain forest in Rocky River Valley. Also a tree of the lowland swamp forest on the Lake Plain west of the Cuyahoga. A tree of the eastern U. S. and southern Canada growing along the borders of streams and lakes, appearing here near the northeastern limits of its range. Good examples may be seen along the Nature Trail, or generally in the vicinity of the Trailside Museum in the Rocky River Metropolitan Park.

Mountain Maple — *Acer spicatum* Lam.

A small tree of cool rocky gorges, especially along the face of the Portage Escarpment. Rare now, probably much more common formerly. A tree of northern affiliations occurring here at the southern limits of its range, except as it may grow at higher altitudes in the Appalachians. Examples may be seen in Doan Brook gorge near the head of Delaware Road, Cleveland Heights, or in Tinker's Creek gorge (north side and eastern end) along the foot trail near the base of the cliffs.

Ohio Buckeye — *Aesculus glabra* Willd.

A common tree in Rocky River Valley as a component of the flood plain forest. Occasional elsewhere. A tree of the eastern central U. S. reaching its northern limit here. Frequent examples may be seen along the bridle path in the Rocky River Metropolitan Park south of Mastick Road.

Basswood — *Tilia americana* L.

Common but not abundant in moist locations in mixed woods, often growing in clumps of several trunks together. Often found in ravine bottoms. A tree of the northern and middle U. S. and southern Canada east of the prairies. Good examples may be found in all Metropolitan Park Reservations. A fine large tree stands on the Nature Trail in the Bedford Reservation.

Herculesclub — *Aralia spinosa* L.

A small tree apparently occurring only occasionally here in moist ravines. Native to the southeastern U. S., at its extreme northern limits here. The only two specimens known to the writer, which were trees of considerable size, apparently indigenous, were both found in ravines in the Chagrin Valley. Largely planted as an ornamental, good specimens may be seen in Forest Hill Park, East Cleveland.

Tupelo — *Nyssa sylvatica* Marsh.

A rather common tree in association with the beech-maple climax, especially on the spurs overlooking the Chagrin Valley; also associated with pin oak and lowland swamp forests in wet locations. A tree of the eastern U. S. Some fine specimens can be seen in the North Chagrin Metropolitan Park near the Trailside Museum.

Flowering Dogwood — *Cornus florida* L.

A common small tree occurring most frequently in association with oak-hickory woodlands, but common also along woods edges everywhere; often appearing in open abandoned fields. A tree of the eastern U. S. and southern Ontario. May be seen to good advantage when it is in bloom in early May in the Brecksville Metropolitan Park.

Alternate-leaved Dogwood — *Cornus alternifolia* L.

Usually a smaller tree than the foregoing, it is also less common and apt to be overlooked in the forest, where it grows in open places or along woods edges. A tree of the northeastern U. S. and southeastern Canada. A good-sized specimen can be seen on the east side of Rocky River about opposite the Mastick Road picnic grounds.

White Ash — *Fraxinus americana* L.

In the beech-maple climax forest this tree occurs regularly as a tree of secondary succession origin. It is a member of most transition stages and of mixed forests. It occurred formerly with oak along the old beach lines. A tree of the eastern half of the U. S. and southern Canada. Excellent examples may be seen in all of the Metropolitan Parks. A very old tree stands near the house at 10013 Detroit Avenue (49 inches dbh.). Another (29 inches dbh.) stands in Forest Hill Park in Dugway Brook ravine about opposite Glenmont Road. (see Fig. 22).

Red Ash — *Fraxinus pennsylvanica* Marsh.

A tree of moist situations, like river banks or pond or swamp edges. Sometimes a component of the swamp forest in its later transition stages. Not readily recognized without close scrutiny, it is probably more common than it appears to be. Found in Rocky River, Cuyahoga and Chagrin Valleys. A tree of the eastern and middle U. S. and southern Canada east of the prairies. A fine large tree may be seen near the Chagrin River edge at Gates Mills near the Town Hall. Rather common in Rocky River Valley.

Black Ash — *Fraxinus nigra* Marsh.

Usually found in swamp forests with American elm and red maple or silver maple. Also occurs in wet situations in river and stream valleys.

Normally a tree of deep, cold northern swamps and low banks of streams and lakes. An excellent example may be seen at the edge of the bridge path near the Forest Lane entrance to the North Chagrin Metropolitan Park. In the same general location are a few smaller trees. Another good example stands on the east side of the Park Boulevard in Rocky River Valley just north of the Hilliard Bridge. In the Brecksville Metropolitan Park two good-sized trees may be seen in the bottom of the small ravine near the Trailside Museum. (see Fig. 16).

Nannyberry — *Viburnum lentago* L.

A small tree or shrub, not very abundant here, occurring in open, rather moist situations. A tree of southern Canada and northeastern U. S. A good example may be seen in the North Chagrin Metropolitan Park on the west side of the River Road and east of the River Road entrance to the park.

Black Haw — *Viburnum prunifolium* L.

This small tree is rare here, but may occasionally be found as a tree of woods edges or open places in woodlands. A tree of the northeastern U. S.

INTRODUCED TREES

II.

Because of their frequent occurrence as street trees or ornamentals on lawns, the following list of the more common or more fully established exotic species in the Greater Cleveland region is given.

(1) TREES NATIVE TO NORTH AMERICA

Red Pine — *Pinus resinosa* Ait.

Native of southern Canada and the northeast. Extensively planted as an ornamental, and in so-called "reforestation" projects. Good examples of young trees may be seen near the Trailside Museum in the Brecksville Metropolitan Park, and in Forest Hill Park.

Jack Pine — *Pinus banksiana* Lamb.

Native of the more northerly Lake states, the northeast and Canada, growing almost to the Arctic Circle. Used for forest plantings as a pioneer on sandy or poor soils. Good examples may be seen near the Trailside Museum in the Brecksville Metropolitan Park.

Baldcypress — *Taxodium distichum* (L.) Rich.

Native of the lowlands of the southern Atlantic and Gulf coasts and lower Mississippi Valley. Although normally a tree of swamps and low bottomlands, it also grows well on drier soils. Planted here as an ornamental. Examples may be seen at 14013 and 12629 Detroit Avenue, also in the small park at Landon Road and Detroit Avenue.

Arborvitae — *Thuja occidentalis* L.

Native to southeastern Canada, the more northerly Lake states, New England and the Appalachian Mountains. Usually a tree of moist situations. Planted largely as an ornamental. A good example may be seen in Forest Hill Park, Cleveland Heights.

Gray Birch — *Betula populifolia* Marsh.

Native to New England, Nova Scotia and the St. Lawrence Valley, New York, New Jersey, eastern Pennsylvania and Delaware. A tree of waste places, and throughout its range an early arrival in the progress of secondary succession. Planted here largely as an ornamental. Two small trees may be seen near the artificial lake in Forest Hill Park.

Red Birch — *Betula nigra* L.

Native to the eastern U. S., except in the mountains, largely south of the Great Lakes, common in central and southern Ohio as a tree of stream edges and river banks. Planted here as an ornamental, some good examples may be seen in the parkway south of North Park Boulevard just west of Coventry Road, Cleveland Heights.

Osageorange — *Maclura pomifera* (Raf.) Schw.

Native to the bottomlands of southeastern Oklahoma and Texas, and southwestern Arkansas. Extensively planted here as a hedge plant in the days before wire fences. It served this purpose well because of its thorny and tough branches. To the east of Cleveland old hedges of osageorange are not uncommon. Large individual trees are rare however. Several may be seen in the Monroe Avenue Cemetery on the west side, and a single isolated tree stands at the corner of Fairmount Boulevard and Lander Road, Shaker Heights.

Sweetgum — *Liquidambar styraciflua* L.

Native to the southeastern U. S., reaching its best development along stream bottoms. Planted here sometimes as a street tree, sometimes as an ornamental. A row of well developed street trees may be seen on either side of Euclid Heights Boulevard east of Kenilworth Road, Cleveland Heights. Some large thrifty specimens occupy a conspicuous place along the main driveway in the Cleveland Zoo, Brookside Park.

Redbud — *Cercis canadensis* L.

Native to the eastern and southern U. S. to the level of the Great Lakes. Not uncommon in the region of Sandusky, but apparently not native to the Cleveland region. Extensively planted as an ornamental, it may be seen in most city parks.

Black Locust — *Robinia pseudoacacia* L.

Native to the Appalachian Mountains and parts of Arkansas and eastern Oklahoma. Was early introduced to Cleveland, as an ornamental tree, being offered as a "premium" with the purchase of nursery stock. Many of these old trees still stand before farm houses. A visitor to Cleveland in 1850 noted "some fine rows of locust trees" on what is now Detroit Avenue.

Hardy Catalpa — *Catalpa speciosa* Ward.

Native to the region surrounding the juncture of the Ohio and the Mississippi Rivers. Planted extensively in the eastern U. S. as a street tree and as an ornamental. Also grown early in the history of Cleveland in groves for use as fence posts. Can be still seen on many streets, although it is gradually being replaced by more desirable species. Most heavily planted as a street tree in the region between Lorain Avenue and West 25th Street, Cleveland.

(2) TREES NATIVE TO EUROPE

Austrian Pine — *Pinus nigra* Arn.

The dominant species in the "Black Forest" of Germany. Planted extensively as an ornamental and in so-called "reforestation" projects. Good examples may be seen in Forest Hill Park; at the Forest Lane entrance to the North Chagrin Metropolitan Park; and near the Trailside Museum in the Brecksville Metropolitan Park.

Scotch Pine — *Pinus sylvestris* L.

An abundant tree of the native forests of northern Germany and Russia. Planted extensively throughout the eastern U. S. and Canada for forestry purposes. Good examples may be seen in Forest Hill Park; about the Forest Lane entrance to the North Chagrin Metropolitan Park; and near the Trailside Museum in the Brecksville Metropolitan Park.

Norway Spruce — *Picea abies* (L.) Karst.

Native to northern and central Europe. Planted extensively throughout the U. S. as a windbreak and for ornamental purposes. In the early days in Cleveland trees of this species were often offered as a premium

with orders of nursery stock and frequently old trees still occupy a place before the farm house. Good examples may be seen in Forest Hill Park.

Crack Willow — *Salix fragilis* L.

Native to Europe and Asia. Early introduced into the U. S. and Canada, and now so thoroughly established in the eastern part of the country as to appear like a native tree. This is the common large willow found along all streams in the Cleveland region. Good examples may be seen in the vicinity of the Trailside Museum in the Rocky River Metropolitan Park.

Silver Poplar — *Populus alba* L.

Native to Europe and Asia. Planted largely as an ornamental. Good examples may be seen on East Park Boulevard near the Cleveland Museum of Art, and just south of the Mastick Road picnic ground, Rocky River Metropolitan Park.

Lombardy Poplar — *Populus italica* Moench.

Native to Europe. Planted largely as an ornamental. A common tree of private estates where it is often used as a screen.

European White Birch — *Betula pendula* Roth.

Native to Europe. Planted largely as an ornamental, but disappearing because of the ravages of a boring insect.

London Planetree — *Platanus acerifolia* Willd.

A hybrid, supposedly, between the native sycamore and the oriental species. Planted extensively as a street tree because of its ability to tolerate a smoke-laden atmosphere. The second most common street tree in Cleveland. Some recent plantings can be seen on the Mall just west of the Board of Education building.

European Mountainash — *Sorbus aucuparia* L.

Native to Europe. Planted extensively as an ornamental, and now found in certain places growing wild. Good examples may be seen along the Park Boulevard in Rocky River Valley between the Hilliard and Lorain Bridges.

Norway Maple — *Acer platanoides* L.

Native to Europe. Planted extensively as a city shade tree. An unusually large isolated tree can be seen in the eastern edge of Gordon Park near St. Clair Avenue.

(3) TREES NATIVE TO ASIA

Ginkgo — *Ginkgo biloba* L.

Native to China and Japan. Planted as an ornamental. Some good-sized trees may be seen on the lawns of the old residences on the north side of Euclid Avenue between East 22nd and East 40th Streets. A fine old specimen, probably planted a century ago, stands on the grounds of Dr. Kirtland's old home at 14013 Detroit Avenue.

White Mulberry — *Morus alba* L.

Native to China. Many trees were imported to Cleveland about 1829 to serve as a food plant for silkworms. Very few large trees remain, but small trees are not uncommon along woods edges where seeds have been dropped by birds. A large specimen stands on the south side of Center Ridge Road near the western line of Cuyahoga County.

Ailanthus — *Ailanthus altissima* (Mill.) Swing.

Native to China. Introduced into the U. S. as early as 1784. Has been a Cleveland tree for well over 100 years and is now thoroughly established all over the built-up portions of the city. Originally planted as an ornamental and a street tree, it now commonly grows at the base of foundations of buildings, along fences or walls, and in abandoned lots, propagating itself by its wind-borne seeds. Some of the largest ailanthus trees in Cleveland grow in the Monroe Avenue Cemetery.

Horsechestnut — *Aesculus hippocastanum* L.

Native to southern Asia. Extensively planted as an ornamental. Good examples are numerous.

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