

# <sup>1</sup>A FLORISTIC STUDY OF BIG TREES OF THE MIDWEST

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The list of big trees near the end of this article, List 1, shows in the order of their size the diameter, circumference and location of the largest individual of each species or hybrid of forest trees that I have found in the area enclosed within the following line:

Beginning at Benton Harbor, Mich., thence thru Niles, Mich., South Bend, Plymouth, Kokomo and Indianapolis to Jeffersonville, Ind., thence down the Ohio and Mississippi Rivers to the southeast corner of Arkansas, thence west along the southern border of Arkansas to eastern Oklahoma and north thru eastern Oklahoma and Kansas to northwestern Missouri, thence east to Fort Madison, Iowa, thence up the Mississippi River to the northwest corner of Illinois, thence east to Beloit, Wis., thence ENE via the C.M.St.P.& P. Railroad to Racine, Wis.

Where both the diameter and the circumference are shown in List 1, these measurements were taken at 54 inches above the ground, but where only the diameter is shown it was measured at about 62 inches above the ground or beneath the lowest limb, whichever was less.

The data in List 1 up to the double vertical rule relate to the individual trees listed in the first column. The data in the last column, headed "RANGE," relate to the species shown opposite in the first column.

List 2 shows the rates of growth of large individual forest trees, arranged in plant order. The average annual increment of circumference was arrived at by dividing the difference between the last measurement and the first measurement by the growing years elapsing between the two measurements. A growing year is the period between the last killing frost of spring and the first killing frost of fall, according to the Weather Bureau's records, and the nearest tenth of a growing season was used in the computations where measurements were made during the growing season.

A study of List 1 shows that 86% of the trees occur in colonies and only 14% occur singly; i.e., one in a woodland.

Perhaps the most important result flowing from this study is the rating of the woodlands. By adding together the diameters of the trees shown in List 1 in each continuous woodland (portions of which are often subdivided by name for convenience of reference), such total is treated in this paper as a measure of the magnitude of the timber in each of such tracts. The results for the fifteen highest ranking tracts are shown in the following Woodland Table:

RANK	TRACT	TOTAL OF DIAMETERS	TOTAL NUMBER OF SPECIES AND HYBRIDS	RATIO
				<u>Genera</u> Species
1	Big Oak Tree State Park, Mo.	588½	34	68%
2	Turkey Run.....	413½	60	60%
3	Dardanelle, Ark.....	273	10	80%
4	Glenwood, Ark.....	208	62	66%
5	Mountain Fork, Okla.....	185½	34	79%
6	Cox Woods.....	176	37	73%
7	Hot Springs, Ark.....	160	56	64%
8	Indiana Dunes.....	136	71	49%
9	Forest Park.....	128½	30	53%
10	Chechupinqua.....	105½	61	43%
11	Morton Grove, Ill.....	95	45	40%
12	Grandview, Ill.....	94	29	69%
13	Apple River.....	92	44	55%
14	Camp Ground Road Woods.....	82	40	50%
15	Funk's Grove, Ill.....	78	30	73%

The data shown in the last two columns above have no bearing on the method used in rating the various tracts but they are included because of their interest to botanists.

It is obvious that the number of species in a woodland has no bearing on its rank, reflecting the magnitude of the timber. Woodlands having a large number of species and woodlands having a small number are scattered thruout the list.

In the Woodland Table, the average number of species and hybrids is 43 and the average ratio genera/species is 61%. In eleven cases out of the fifteen (73%) either a below average number of species is accompanied by an above average percentage or an above average number of species is accompanied by a below average percentage. Therefore it usually appears that where the number of species is small the number of genera is relatively large, and where the number of species is large the number of genera is relatively small.

The combination of a small number of species and a relatively large number of genera occurs in Woodlands 1, 3, 5, 6, 12 and 15. Big Oak Tree State Park of Missouri and Funk's Grove are the nearest approaches to climax forests in the list. It is evident that a concomitant condition of climax forests is the occurrence of a relatively large number of genera. The probable explanation is that in the long course of evolution the process of natural selection has had more of an effect in reducing the number of species in the existing genera than in reducing the number of genera.

In Woodlands 2, 8, 10, 11 and 13 the number of species is large and the number of genera is relatively small. 8, 10 and 11 are in the Chicago region, whose flora is characterized by an excessive development of species of Rosaceae and Salix, resulting in relatively few genera for the many species.

#### DESCRIPTIONS OF THE FIFTEEN WOODLANDS

##### BIG OAK TREE STATE PARK, MO.

Foremost and tallest of the woodlands of the Midwest is the Big Oak Tree State Park of Missouri, located 22 miles south of Charleston and 1½ miles northeast of the Mississippi River. Its geographical position is unique in that it is within fifty miles of

four other states. It is 37 miles southwest of Cairo, Ill., 8 miles northwest of Hickman, Ky., 10 miles north of the northern border of Tennessee, and 47 miles northeast of the northeast corner of Arkansas.

Nineteen of the 34 species in this park exceed 3 feet in diameter. Baldcypresses, Bur Oaks, American Elms and Swamp Chestnut Oaks exceed 6 feet; Silver Maples and Eastern Cottonwoods exceed 5 feet; Rock Elms, Pecans, Shellbark Hickories, Pin Oaks and Cherrybark Oaks exceed 4 feet; and Shumard Oaks, Green Ashes, Overcup Oaks, Swamp Red Oaks, Thornless Honeylocusts, Quercus mutabilis, Sweetgums, Black Willows and Sycamores exceed 3 feet.

Following are the measured heights of a few of the park champions: Bur Oak, 143 ft.; Quercus mutabilis, 143 ft. (carrying a greater height in proportion to its girth than any other American Oak); Shellbark Hickory, 128 ft.; Cherrybark Oak, 122 ft.; Swamp Red Oak, 104 ft.; Swamp Cottonwood, 63 ft.; Swamp-Privet, 32 ft.; Planertree, 31 ft.; Possumhaw, 20 ft. These trees are things to marvel at. Nowhere else east of the Pacific Coast states do trees grow to such lofty heights.

An excess of precipitation in this locality favors tree growth. At New Madrid, Mo., 13 miles west, the average annual precipitation is 51 inches, while at Cairo it is 41 inches and at Memphis it is 48 inches.

The nucleus of the park was 80 acres in the northeast corner, which was purchased by the state from the Southern Hardware Co. for \$8,000 for the purpose of saving the big Bur Oak, third in List 1. H. S. Roberts donated 120 acres; Mrs. W. C. Bryant, Sr., 40 acres; and Mrs. Carl Mitchell, 40 acres. The remainder of the thousand acre tract was purchased from the owners. The park was presented to the State Park Board in March 1938. Credit must be given to Gov. Lloyd C. Stark (who insisted upon a thousand acre park), Mr. Elgin Davis of East Prairie and other citizens of Mississippi County for their timely efforts in devising ways and means for the state to acquire the original tract. The state now owns 1007 acres, of which 440 acres are in Section 14, 40 acres are in Section 11, 480 acres are in Section 10 and 40 acres are in Section 3.

Missourians may well be proud of this magnificent remnant of Mississippi River bottomland timber. The park is bordered by closely cultivated fields, sharply contrasting with the primeval forest a step beyond. But a botanist cannot help wishing that the area to the north to Black Bayou and east to the county highway had also been preserved, for the entire area was covered with superlative timber and there must have been tree monarchs of a size unknown today outside this area.

#### TURKEY RUN

Turkey Run State Park of Indiana, comprising 1520 acres, is located on Sugar Creek in northeastern Parke County 4 miles north of Marshall. In a channel carved in postglacial time, Sugar Creek passes here thru a resistant formation of red sandstone, the erosion of which has produced rugged scenery.

The big trees are scattered thru the creek gorge, the slopes of side canyons and the uplands. The largest tree is an American Elm 15'7" in circumference.

This tract was homesteaded by Salmon Lusk in 1826, whose

holdings later aggregated nearly 1400 acres. Salmon Lusk operated a grist mill on the creek until it was washed out in 1847. His son, John, a bachelor, jealously guarded his trees from the rapacity of lumbermen. After John Lusk's death in 1915 at the age of 75 it was necessary to divide the property among numerous heirs. In 1916 288 acres of big timber of the Lusk tract was sold at an auction to the Hoosier Veneer Co. for \$30,200.

Thru prodigious efforts and publicity Richard Lieber, pioneer conservationist, aided by Mrs. Juliet V. Strauss, procured sufficient state funds to buy the tract for the state. And so, thru the devotion of John Lusk to his trees and the dogged persistence of Mr. Lieber and Mrs. Strauss this prime timberland, the first in Indiana's state park system, was preserved from destruction.

#### DARDANELLE, ARK.

Dardanelle, the city of big trees, is located on the south bank of the Arkansas River about halfway between Little Rock and Fort Smith. The Oaks are apparently remnants of big Oak timber in the high Arkansas Valley.

The Cottonwood, 101 feet high, the fourth tree in List 1, is on the west side of Arkansas Highway 27 south of town. It is an extraordinary tree because the species is rare to the southward.

The Southern Red Oak (Quercus falcata Michaux) is one of several large specimens of the species on the grounds of the grammar school.

The White Oak, located about 100 feet east of Front Street, is known as "The Arkansas Council Oak" and is honored by a bronze marker erected by the Daughters of the American Revolution of Arkansas with the following inscription:

"Upon this spot, under the Council Oak, acting Governor Robert Crittenden and Chief Black Fox, tribe spokesman, met in council April 1820 and made the treaty which gave to Arkansas all of the Cherokee land south of the Arkansas River."

The Black Oak is growing in the yard of a residence on Front Street.

#### GLENWOOD, ARK.

The town of Glenwood, Ark. is located on the Caddo River just above the point where it emerges from the Cossatot Mountains onto the Athens Plateau. Most of the big trees are located in the river valley, which was traversed by Hernando De Soto in 1541, above and below U.S. Highway 70 and on Burnham Mountain.

Forty-one genera of trees are represented, which is a much greater number than in any other woodland.

The growth factor here is evidently the average annual precipitation of 57 inches, which is the greatest in the entire area covered by this survey.

The big trees of Glenwood are owned by Robert Newcomb of Conway, Ark., Patrick T. Hayes of Crestwood, Ill., and others.

#### MOUNTAIN FORK, OKLA.

Located half a mile west of Mountain Fork River, half a mile north of U.S. Highway 70 and 2 miles west of Eagletown, McCurtain County, Oklahoma, this tract is noted for the presence of a gigantic Baldcypress, the largest and oldest tree in the entire area covered by this survey. It is advertised to be two thousand years old, which may be an underestimate. The existence of this

remarkable tree, growing on relatively dry ground at the northwestern limit of the range of the species, verifies the dendrologists' contention that the Baldcypress makes its best growth on dry land; it grows in water only to escape the competition of other species.

This tract was formerly the seat of government of the Choctaw Nation. The owner, Robert Stiles, lives in the former mansion of the Choctaw Nation's native governor.

#### COX WOODS

Cox Woods, comprising 200 acres, is located 2 miles southeast of Paoli, Ind. between U.S. Highway 150 and Indiana Highway 37. The northern part is bottomland bordering on Lick Creek and contains fine specimens of Black Maple. The southern part is hilly with the exception of a portion in a small tributary valley. The hill soil is a red clay, which is deeply eroded in the absence of trees. In the southern part there are comparatively large specimens of Northern Red Oak, Chinkapin Oak, Tuliptree, Black Walnut, White Ash, Beech, Blackgum and Flowering Dogwood. The largest tree is a White Oak with a diameter of 4'10" and a circumference of 14'7". Photographs show the most intense competition, with closely spaced spindling saplings shooting upward to the light.

There seems to be nothing particularly favorable about the soil or the climate to produce such a dense growth of large trees, so that credit must be given to the Cox family and, latterly, the U.S. Forest Service for the excellent state of preservation of this tract.

The south 150 acres was purchased in 1942 from the Wood-Mosaic Co. for \$24,150, which was raised by public subscription thru the efforts of the Paoli Meridian Club and the Pioneer Mothers of Indiana Society, aided by the American Forestry Association's publicity. The north 50 acres, known as the Jeff Cox tract, bordering on Lick Creek, was purchased in about 1945 for \$1800, half of which was raised by public subscription thru the efforts of the Paoli Meridian Club and the other half appropriated by the U.S. Forest Service.

Cox Woods is now embodied in the Hoosier National Forest.

#### HOT SPRINGS, ARK.

Here are the town of Hot Springs and the Hot Springs National Park, established in 1832. The diverse topography and the protection afforded in this oldest of our national parks have produced many unusual trees of valley and mountain types.

Outstanding is the magnificent Tilia nuda in Whittington Park, 114 feet high, the tallest Basswood in the United States.

#### INDIANA DUNES

The Indiana Dunes State Park, comprising 2182 acres, is located at Tremont, Porter County, Indiana, between Lake Michigan and the Chicago South Shore & South Bend Railroad. It is exactly three miles wide from east to west and has a frontage of 3.3 miles on the lake. High moving sand dunes border the lake and reach a maximum height of 193 feet above the lake. Where vegetation has been able to get a foothold, the sand hills (particularly their south slope) support a growth of Black Oak, Witch-Hazel, Sassafras and Chokecherry, with Smooth Basswood on the summits of the dunes. The steep north slope of the dunes, facing the lake, provides a haven for the survival of the boreal conifers, while at the same time the

dunes encourage the growth of southern species on the lowlands by cutting off the cold north winds. The area south of the dunes, comprising more than half the total area of the park, is nearly level. A considerable area in the eastern half is a swamp, much of which is treeless. The humus that has accumulated on the sand left by the ice sheet and the persistently high humidity have encouraged the growth of a diversity of flora unequalled elsewhere in the Midwest. It is interesting to note, in this vast ligneous display, the boreal relicts, viz: White and Jack Pines, Common Juniper, Paper and Gray Birches and Speckled Alder; and the southern invaders, viz: Pin Oak, Sycamore and Pawpaw.

The trees are not conspicuously large, but it is an outstanding fact that all the small species of endemic trees attain phenomenal size in this particular tract. The largest tree is an American Elm 3'2" in diameter. A Smooth Basswood is 3 feet in diameter. Eastern Cottonwoods, White Oaks, Northern Red Oaks, Black Ashes, White Ashes, White Pines, Black Oaks, Tuliptrees, Blackgums, Red Maples, Swamp White Oaks, Pin Oaks, Beeches and Bitternut Hickories exceed 2 feet in diameter.

The total number of species, 71, shown in the Woodland Table on page 154, is greater than in any other woodland of similar size in the Midwest. This number includes the species in Dune Acres, adjoining the state park on the west. Sixty-nine of these species are in the state park. The two additional species in Dune Acres are Betula lutea and Quercus ellipsoidalis.

The acquisition of the state park in 1925 was financed by legislative appropriations and contributions by private individuals and interests. Being located near a thickly populated area and offering diversified recreational attractions, it is the most heavily patronized of the Indiana state parks.

#### FOREST PARK

Forest Park, comprising 1375 acres, is located on the western border of St. Louis, Mo. The River Des Peres, now largely enclosed in a sewer, flows thru the northern and eastern parts.

The Swamp White Oaks in the river valley in the northeastern part of the park are notably large. The White Oak is conspicuous in the uplands of the eastern part, but in the western part the Black Oak and the Shingle Oak are very common. In the vicinity of the Art Museum there are an extraordinary number of specimens of Quercus bushii (marilandica × velutina) and one large specimen of Quercus runcinata (borealis × imbricaria). Aside from the establishment of the many hybrid Oaks, the upland forest appears to be of youthful age.

An act was passed by the Missouri Legislature in 1872 authorizing the purchase by the City of St. Louis of a thousand or more acres of land for a public park. As the result of the opposition of property owners, the Missouri Supreme Court declared the act unconstitutional. In 1874 another bill meeting the objections was approved by the Legislature. This law gave the County Court of St. Louis discretionary power in the purchase of grounds. In pursuance of this authority appraisers were appointed to fix the value of the lands, which were then owned mainly by C. P. Chouteau, John Cabanne, William Forsyth and Thomas Skinker. The Forest Park tract, comprising 1371 acres, was purchased by the city under condemnation

proceedings for \$799,995, the value fixed by the appraisers.

The outdoor Municipal Theater, Jewel Box, Art Museum, Jefferson Memorial and Zoo are in this park, which was also the site of the Louisiana Purchase Exposition of 1904.

#### CHECHUPINQUA

The Chechupinqua tract extends along the Des Plaines River from Belmont Avenue to Devon Avenue and includes interesting types of woods spreading over the level drift plain for nearly a mile east of the river. It includes the Chechupinqua Woods, Schiller Woods and Robinsons Woods of the Cook County Forest Preserves.

With a representation of 61 species, Chechupinqua presents an excellent cross section of the flora of the Chicago region and a superb test for the taxonomist. There are six species of Willows and five species of Oaks. The Rosaceae are found in great variety and numbers. The Hawthorn forests, composed of the arborescent species crus-galli, arduennae, punctata, disperma, macrosperma pentandra, tortilis, pedicellata, mollis, gemmosa and calpodendron, reach their most expansive development here. The shrubby Hawthorns grow in dense thickets, the medium trees form dark canopies with interwoven branches, and the large species grow in open fashion. The variable Quercus ellipsoidalis, appearing in five forms, is very common. The largest specimen, which has a circumference of 7'4", has acorns identical with Q. coccinea tuberculata except for their darker color and should be regarded as a hybrid if the Scarlet Oak were in the region. The European species Salix fragilis, Salix alba vitellina, Rhamnus cathartica and Rhamnus frangula are thoroly naturalized; Populus alba and Morus alba are also adventive. The Ashes are very numerous and the Green, Red and White Ashes reach a large size. The largest tree is the A.F.A. champion Green Ash, on the north bank of the Des Plaines River in Robinsons Woods, which has a diameter of 3'6", a circumference of 12'3", a spread of 75' and a height of 62'. Part of the Chechupinqua Woods is of the nature of a park forest, composed of Oaks, Elms, Ashes and some Red and Silver Maples.

Chechupinqua includes half a section given to Claude La Framboise and two sections of land given to Chief Chechupinqua of the Potawatomi, Ottawa and Chippewa Nations in a treaty made by the Federal Government with those nations in 1833. This gift to Chief Chechupinqua, whose English name was Alexander Robinson, was a reward for the aid he gave to survivors of the Fort Dearborn Massacre. Chief Chechupinqua died in 1872 at the age of 110 years and is buried in the Robinson family cemetery in Robinsons Woods. His descendants still live in Robinsons Woods.

#### MORTON GROVE, ILL.

This tract consists of a strip of timber bordering the North Branch of the Chicago River and extending from Oakton Street to Lake Avenue. It comprises the Miami Woods, St. Paul Woods, Linne Woods, Northwestern Golf Course, Harms Woods and Glenview Memorial Woods of the Cook County Forest Preserves.

This timber is rather impressive. American and Slippery Elms, Silver Maples, Crack Willows, Eastern Cottonwoods, Swamp White and Northern Pin Oaks, White Ashes and Smooth Basswoods reach a diameter of 3 feet or more. The largest tree is an American Elm with a circumference of 18'10" in the St. Paul Woods.

In aboriginal days this tract supported a population of five thousand Potawatomi Indians.

#### GRANDVIEW, ILL.

The rank of this tract is the result of the presence of a huge American Elm, the second largest tree in the entire area covered by this survey and the largest tree in Illinois, which has an average diameter of 7'10", a circumference of 24'8", a spread of 92' and a height of 82'. It is on the south side of the Paris-Vandalia Road half a mile southwest of Grandview, Edgar County, Illinois, in a pasture owned by Minnie S. Snyder. The locality is a terminal moraine of the Early Wisconsin ice sheet.

In stagecoach days the driver had standing instructions to blow his horn when he passed this "big Elm tree" as a signal to the hostler in the tavern at Grandview to have a change of horses ready. This tavern was a favorite resort of Abraham Lincoln's when he was practising as a circuit lawyer, traveling on horseback; and the cabin where his father, Tom, spent his late years was only 22 miles distant on the Vandalia Road.

In the preparation of the data in the last two columns of the Woodland Table on page 154 and the range column of List 1, the species in Foley Woods, 3 miles east of Grandview, were included along with those at Grandview.

#### APPLE RIVER

Apple River Canyon State Park, comprising 157 acres, is located at the confluence of Apple River and its South Fork in Jo Daviess County in the northwest corner of Illinois. Below the confluence the river flows thru a canyon about 150 feet wide lined with vertical or steep walls 100 feet or more high. The state acquired the park in 1932.

In the operation of the two sawmills in the early day settlement of Millville, which was located at the confluence, all merchantable timber was stripped from the area of the park. The trees in List 1 are a Boxelder (beside the old stagecoach barn--evidently passed up by the early timber cutters as valueless), a Bigtooth Aspen, a Quaking Aspen and a Bebb Willow, all in the park; and a Butternut, on the east side of the river about 300 feet south of the park on Charles Foster's property. It is very unfortunate that all the virgin timber of value was destroyed because this insular area was not touched by the ice sheets of the Pleistocene period and served as a center of dispersion of plant life after the glacial retreat; there were probably Oaks, Hickories and Rock Elms of formidable size.

Apple River was named for the many Crab Apples on its banks, conspicuous in bloom in the early spring; but today scarcely a single Crab Apple can be found in the park.

#### CAMP GROUND ROAD WOODS, ILL.

The Camp Ground Road Woods of the Cook County Preserves lies east of the Des Plaines River between Oakton Street and Algonquin Road (Illinois Highway 62). The area east of the river is a level drift plain.

The species are those commonly found in woods along the Des Plaines River. The largest tree is a Crack Willow with a circumference of 13', a spread of 81' and a height of 47'. The other trees in List 1 are a Glossy Buckthorn, another European invader;

and a Downy Hawthorn, which has a circumference of 7'7", a spread of 49' and a height of 29' and is probably the largest Hawthorn in the world. All three are A.F.A. champions.

#### FUNK'S GROVE, ILL.

Funk's Grove, which was settled by Isaac Funk<sup>2</sup> in 1823, is located 9 miles southwest of Bloomington, Ill. on the G.M.& O. Railroad and U.S. Highway 66. An unbelievable gem of magnificent virgin timber, Funk's Grove, like other Illinois prairie groves, has developed its own specialties. Here Blue Ashes, Slippery Elms and Bur Oaks attain an extraordinary size.

The Blue Ashes of Funk's Grove surpass any of their kind found elsewhere in the United States. The A.F.A. champion Blue Ash, owned by S. D. Funk, has a diameter of 3'3", a circumference of 10'3" and a height of 116'. It is the tallest known Ash of any species.

The largest tree is a Bur Oak with a diameter of 4'8" and a circumference of 14'6".

In addition to the three species mentioned above, American Elms, White Oaks, Northern Red Oaks, Eastern Cottonwoods and White Ashes attain a diameter of 3 feet or more.

It is hoped that the Funk Household Trust, representing numerous members of the Funk family that own subdivided proportions of the timber, and Thad Stubblefield will continue to protect this tract from cutting as successfully as they have done in the past; for commercial exploitation of this superb timber would be a disaster of the first magnitude.

#### COMMENTS ON THE RANGES

A hyphen in the "RANGE" column of List 1 means that the intervening numbers are included as well as the end numbers.

Ulmus americana is the most widely distributed species, being found in all fifteen woodlands. Quercus alba and Prunus serotina are found everywhere except in the Big Oak Tree State Park. Fraxinus americana, Quercus borealis, Acer negundo, Morus rubra and Carya cordiformis are found in twelve of the fifteen woodlands. It is curious to observe that Fraxinus americana and Quercus borealis have exactly the same distribution, but the champion trees are located three states apart.

The general range of Quercus velutina extends thruout this region, but this species avoids certain areas. It is found thruout Indiana. Its absence from Woodlands 10, 11, 13, 14 and 15 indicates that it is absent from most of the northern half of Illinois. Its absence from No. 1 indicates that it is absent from the Mississippi River bottoms.

Nine taxa, indicated by blanks, do not show up in any of the fifteen woodlands. They are taxa of more or less limited distribution. Quercus coccinea is found in the Ozark hills of southern Illinois, the uplands of southeastern Missouri and Crowley's Ridge of Arkansas. Tilia palmeri is the common Basswood of western Missouri and Kansas. Magnolia acuminata is said to be found in Crowley's Ridge in Missouri. The other six taxa are almost or entirely confined to the localities where their champions are shown.

COMMENTS ON LIST 2

Stems of trees shrink in drouth. Measurements taken during the dry summer and fall of 1952 were less in some cases than previous measurements.

The table shows wide differences in some cases in the growth rates of different trees of the same taxon. In the case of Prunus pensylvanica, the difference in the growth rates of Nos. 71 and 72 is the result of open growth versus forest growth. Nos. 58, 63, 65 and 69 are growing within fifty feet of each other in the Chechupinqua Woods; the locality is a crowded, overmature Rose forest in a state of stagnation, and consequently the growth rates are negligible or nearly so.

The average growth rate of the Salicaceae, Nos. 4 to 9, is .85"/yr.

It is well known that there are great differences in the growth rates of the white Oaks and the bristle-tipped Oaks. The average growth rate of the Lepidobalanus Oaks, Nos. 19 to 30, is .42"/yr.; that of the Erythrobalanus Oaks, Nos. 31 to 45, is 1.17"/yr. These figures are equivalent to a ratio of 279 to 100.

The slow growth rate of Quercus macrocarpa, which is the largest species of Oak in Illinois and Missouri, is noteworthy. The ages of many of the trees must be measured in hundreds of years. My estimate of the age of the A.F.A. champion in List 1, based on a growth rate of .4"/yr., is 643 years.

Following the general principle that species attaining a large size at maturity grow faster than small species, Crataegus mollis is the largest and fastest growing of the Hawthorns. Next in the order of their growth rates come the Punctatae, Coccineae, Macracanthae and Crus-galli groups of Crataegus.

Of the species that attain a diameter of 3 feet or more, Tilia americana is the slowest grower. The measured growth of No. 82, in the Black Partridge Woods of Cook County, Illinois, indicates that it is 800 years old.

SUMMARY

1. In a dendrological survey listing the largest individual of each species of forest tree found in an area of the Midwest equivalent to about five states, the big trees are found to be widely scattered but they have a strong tendency to be concentrated in groups scattered thruout the region. 86% are found in colonies and 14% occur singly.

2. The total of the diameters of the listed big trees in each woodland is regarded as a measure of the magnitude of the timber. When the woodlands are rated according to the total of such diameters in each woodland, it is found that of the fifteen highest rated ones three are in Indiana, six are in Illinois, two are in Missouri, three are in Arkansas and one is in Oklahoma.

3. Nineteen percent of the listed big trees are in the Big Oak Tree State Park of Missouri and the Indiana Dunes, woodlands of widely different characteristics.

4. It is usually the case that where the number of species in a woodland is small the number of genera is relatively large, and where the number of species is large the number of genera is relatively small.

5. Ulmus americana, Quercus alba and Prunus serotina are the most generally distributed species.

6. The fastest growing taxon is Quercus shumardii Buckley.

7. Individual specimens of Pinus banksiana, Crataegus disperma, Crataegus pedicellata and Tilia americana showed no measurable growth for a period of five years or more.

8. The Erythrobalanus Oaks grow nearly three times as fast as the Lepidobalanus Oaks and faster than the Salicaceae.

9. Species attaining a small size at maturity grow more slowly than large species.

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<sup>1</sup>The author's previous article in this field was published in the May 1947 issue of "The American Midland Naturalist."

<sup>2</sup>"Funk of Funk's Grove," by Helen M. Cavanagh: Pantagraph Printing Co., Bloomington, Ill.

LIST 1  
LIST OF BIG TREES

SPECIES	DIAMETER		CIRCUMFERENCE		LOCATION	NO. (1)	RANGE (2)
	Ft.	In.	Ft.	In.			
<i>Taxodium distichum</i> .....	9	5	29	7	Mountain Fork, Oklahoma.....	...	1, 5
<i>Ulmus americana</i> .....	7	10	24	8	Southwest of Grandview, Illinois.....	...	1-15
* <i>Quercus macrocarpa</i> .....	6	9	21	4	Big Oak Tree State Park, Missouri.....	...	1, 2, 9-15
<i>Populus deltoides</i> .....	6	9	21	2	Dardanelle, Arkansas.....	...	1-3, 8-11, 13-15
<i>Quercus falcata</i> .....	6	4	20	0	Grammar school, Dardanelle, Arkansas..	...	1, 3-5, 7
<i>Quercus prinus</i> .....	6	1	19	1	Big Oak Tree State Park, Missouri.....	28	1
<i>Quercus alba</i> .....	5	8	17	9	Dardanelle, Arkansas.....	21	2-15
<i>Acer saccharinum</i> .....	5	7	17	6	Big Oak Tree State Park, Missouri.....	79	1, 2, 5, 8-11, 14, 15
<i>Platanus occidentalis</i> ...	4	9½	..	..	Turkey Run State Park, Indiana.....	...	1-9, 12, 15
<i>Salix alba</i> .....	4	9	14	10	Thatcher Woods, Cook Co., Illinois.....	...	10, 11, 14
<i>Juglans nigra</i> .....	4	8	14	0	Turkey Run State Park, Indiana.....	...	2, 4, 6, 7, 9-15
<i>Pinus taeda</i> .....	4	5	14	0	Wilcoxon Forest, Ashley Co., Arkansas..	...	4
<i>Quercus shumardii</i> .....	4	5	14	0	Glenwood, Arkansas.....	33	1, 4, 5, 7
<i>Gleditsia triacanthos</i> ...	4	5	13	10	Loose Park, Kansas City, Missouri.....	73	1, 2, 4-6, 9, 12, 15
<i>Ulmus thomasi</i> .....	4	4	13	7	Big Oak Tree State Park, Missouri.....	...	1, 13
<i>Carya illinoensis</i> .....	4	4	13	2	Big Oak Tree State Park, Missouri.....	...	1
* <i>Salix fragilis</i> .....	4	2	13	0	Camp Ground Road Woods, Cook Co., Ill..	...	10, 11, 13, 14
<i>Quercus palustris</i> .....	4	2	12	9	Big Oak Tree State Park, Missouri.....	31	1, 8, 12
<i>Liriodendron tulipifera</i> .	4	1	13	6	Turkey Run State Park, Indiana.....	...	2, 6, 8
* <i>Carya laciniosa</i> .....	4	1	12	9	Big Oak Tree State Park, Missouri.....	13	1, 2, 11, 12
<i>Quercus velutina</i> .....	4	0	13	7	Dardanelle, Arkansas.....	...	2-4, 6-9, 12
<i>Fraxinus americana</i> .....	4	0	..	..	Cox Woods, Paoli, Indiana.....	...	2, 4, 6-15
<i>Quercus nigra</i> .....	3	11	12	4	Mountain Fork, Oklahoma.....	...	5
<i>Quercus borealis</i> .....	3	11	11	3	Westheight Manor Park, Kansas City, Kan.	...	2, 4, 6-15
<i>Celtis occidentalis</i> .....	3	10	13	5	Shawnee Mission State Park, Kansas....	...	2, 6, 9-15
<i>Quercus muehlenbergii</i> ...	3	10	12	2	Brownfield Woods, Urbana, Illinois.....	29	2, 4-7, 9, 12, 13
<i>Quercus lyrata</i> .....	3	8	11	4	Big Oak Tree State Park, Missouri.....	24	1
<i>Tilia americana</i> .....	3	8	10	3	Black Partridge Woods, Cook Co., Ill..	82	2, 6, 8-15
<i>Fagus grandifolia</i> .....	3	7	11	0	Cox Woods, Paoli, Indiana.....	...	2, 6, 8, 12
* <i>Fraxinus pennsylvanica lanceolata</i>	3	6	12	3	Robinsons Woods, Cook Co., Illinois....	92	1, 2, 4-6, 8, 10, 11, 14, 15

<i>Pinus strobus</i> .....	3	11	0	White Pines State Park, Illinois.....	8,13
<i>Liquidambar styraciflua</i> .	3	6	6	Glenwood, Arkansas.....	1,3-5,7
* <i>Quercus mutabilis</i> .....	3	10	6	Big Oak Tree State Park, Missouri.....	1
<i>Acer saccharum</i> .....	3	5	5	Cox Woods, Paoli, Indiana.....	2,6,8,10-15
<i>Quercus bicolor</i> .....	3	4 $\frac{1}{2}$	11	Forest Park, St. Louis, Missouri.....	8-11
<i>Salix nigra</i> .....	3	4	8	Big Oak Tree State Park, Missouri.....	1-5,8-11,13,14
<i>Ulmus fulva</i> .....	3	3	7	Funk's Grove, Illinois.....	2,4,6-11,13-15
* <i>Fraxinus quadrangulata</i> ..	3	3	3	Funk's Grove, Illinois.....	2,15
* <i>Tilia nuda</i> .....	3	9	9	Whittington Park, Hot Springs, Arkansas	7
* <i>Acer rubrum tridens</i> .....	3	2	6	Warren Woods, Three Oaks, Michigan....	4,5,7
<i>Celtis laevigata</i> .....	3	2	4	Army & Navy General Hospital, Hot Springs, Arkansas	1,3-5,7
* <i>Quercus runcinata</i> .....	3	1	2	Heathwood Park, Kansas City, Kansas...	9
<i>Prunus serotina</i> .....	3	1	2	Turkey Run State Park, Indiana.....	2-15
* <i>Quercus ellipsoidalis</i> ...	3	0	7	Linne Woods, Cook Co., Illinois.....	8,10,11,13,14
<i>Quercus phellos</i> .....	2	11 $\frac{1}{2}$	6	Glenwood, Arkansas.....	4,7
* <i>Acer nigrum</i> .....	2	11	2	Turkey Run State Park, Indiana.....	2,6,13
<i>Quercus stellata</i> .....	2	11	2	Cox Woods, Paoli, Indiana.....	4,7,9
<i>Quercus imbricaria</i> .....	2	11	9	Carondelet Park, St. Louis, Missouri..	9
<i>Carya glabra</i> .....	2	10	9	6603 E. 17th St., Kansas City, Missouri	2,12
<i>Acer negundo</i> .....	2	9	8	Turkey Run State Park, Indiana.....	1,2,4-7,9-11,13-15
<i>Betula nigra</i> .....	2	9	8	Apple River Canyon State Park, Illinois	4,5
<i>Nyssa sylvatica</i> .....	2	8	5	Glenwood, Arkansas.....	2,4-8
* <i>Quercus bushii</i> .....	2	8	5	Warren Woods, Three Oaks, Michigan....	9
<i>Carya ovata</i> .....	2	8	4	Forest Park, St. Louis, Missouri.....	2,6,8-15
<i>Sassafras albidum</i> .....	2	7	4	Turkey Run State Park, Indiana.....	2,4,6-8,12
* <i>Fraxinus nigra</i> .....	2	7	1	Turkey Run State Park, Indiana.....	2,8,10,11,13,14
<i>Pinus echinata</i> .....	2	6	3	Dunes State Park, Indiana.....	4,5,7
<i>Quercus marilandica</i> .....	2	5	8	North Mt., Hot Springs, Arkansas.....	7,9
<i>Morus rubra</i> .....	2	5	8	Mine Creek, Ouachita Nat. Forest, Ark..	1,2,4-10,12,13,15
* <i>Crataegus mollis</i> .....	2	5	7	Forest Park, St. Louis, Missouri.....	1,10,11,14,15
* <i>Tilia palmeri</i> .....	2	5	7	Mt. Washington Cemetery, Jackson Co., Mo.	.....
<i>Tsuga canadensis</i> .....	2	5	7	Camp Ground Road Woods, Cook Co., Ill..	2
<i>Carya ovalis</i> .....	2	4	7	Scarritt Point, Kansas City, Missouri..	2,12
<i>Quercus coccinea</i> .....	2	4	8	Turkey Run State Park, Indiana.....	.....
<i>Juglans cinerea</i> .....	2	3	7	Giant City State Park, Illinois.....	2,6,8,10,11,13
* <i>Quercus bebbiana</i> .....	2	3	1	Apple River Canyon, Jo Daviess Co., Ill..	.....
	2	3	0	Swope Park, Kansas City, Missouri.....	.....

\*1 2 For explanation, see page 168.

LIST 1--Continued  
LIST OF BIG TREES

SPECIES	DIAMETER		CIRCUMFERENCE	LOCATION		① NO.	② RANGE
	Ft.	In.		Ft.	In.		
<i>Carya tomentosa</i> .....	2	3	6	11	Forest Park, St. Louis, Missouri.....	14	4, 7, 9
<i>Betula lutea</i> .....	2	3	6	9	Dune Acres, Indiana.....	....	8
<i>Carya cordiformis</i> .....	2	2	6	9	Miami Woods East, Cook Co., Illinois..	....	2, 4-8, 10-15
* <i>Carya texana arkansana</i> ..	2	2	6	9	Rose Inn, Crossett, Arkansas.....	....	4, 7, 9
<i>Gymnocladus dioicus</i> .....	2	2	..	..	Mt. Washington Cemetery, Jackson Co., Mo.	....	2, 12, 15
<i>Diospyros virginiana</i> .....	2	2	..	..	Carondelet Park, St. Louis, Missouri..	....	1, 4, 5, 7
<i>Ulmus alata</i> .....	2	1½	..	..	Mountain Fork, Oklahoma.....	....	4, 5, 7
<i>Aesculus glabra</i> .....	2	0	6	5	Turkey Run State Park, Indiana.....	....	2, 6
<i>Castanea ozarkensis</i> .....	2	0	6	2	Roaring River State Park, Missouri....	....	4, 7
* <i>Ulmus serotina</i> .....	2	0	6	1	Glenwood, Arkansas.....	50	4, 7
<i>Robinia pseudoacacia</i> .....	2	0	..	..	Shades State Park, Indiana.....	....	4, 7
<i>Juniperus virginiana</i> .....	1	11	6	0	White Pines State Park, Illinois.....	....	2, 4-8, 13
* <i>Salix amygdaloides</i> .....	1	9	5	10	Black Partridge Woods, Cook Co., Ill..	....	8, 10
<i>Populus tacamahaca</i> .....	1	7	5	1	Dunes Park, Illinois.....	9	8, 10, 13
* <i>Crataegus punctata aurea</i>	1	6	5	0	Billy Caldwell's Reserve, Chicago, Ill.	61	10
<i>Ostrya virginiana</i> .....	1	5	4	6	Miami Woods East, Cook Co., Illinois..	....	2, 4-8, 10, 11, 13-15
<i>Populus grandidentata</i> ..	1	4	4	7	Apple River Canyon State Park, Illinois	....	8, 10, 13
<i>Maclura pomifera</i> .....	1	4	..	..	Swope Park, Kansas City, Missouri....	....	4, 5, 9
* <i>Populus heterophylla</i> ....	1	3½	4	2	Big Oak Tree State Park, Missouri....	....	1
<i>Magnolia acuminata</i> .....	1	3	..	..	Buffalo River State Park, Arkansas....	....	.....
* <i>Malus ioensis</i> .....	1	3	4	1	Morton Arboretum, Lisle, Illinois.....	....	8, 10, 11, 14
<i>Cercis canadensis</i> .....	1	3	3	9	Hot Springs National Park, Arkansas...	74	1, 2, 4-7, 12, 15
<i>Ilex opaca</i> .....	1	3	..	..	MacArthur Park, Little Rock, Arkansas.	....	4
<i>Carpinus caroliniana</i> ....	1	2	3	11	Big Spring State Park, Missouri.....	....	1, 2, 4-8, 10, 12, 13
<i>Pinus banksiana</i> .....	1	1	3	6	Dunes State Park, Indiana.....	1	8
<i>Populus tremuloides</i> .....	1	0	..	..	Apple River Canyon State Park, Illinois	....	8, 10, 13
<i>Morus alba</i> .....	1	0	..	..	Chechupinqua Woods, Cook Co., Illinois	....	10, 14
* <i>Salix longipes wardi</i> ....	..	11	2	11	Caddo River, Glenwood, Arkansas.....	....	4, 7
* <i>Salix discolor</i>	..	..	2	10	Chechupinqua Woods, Cook Co., Illinois	7	10
<i>Bumelia lanuginosa</i> .....	..	10	2	8	Meramec State Park, Missouri.....	....	4, 7

Prunus pensylvanica.....	10	7	Chechupinqua Woods, Cook Co., Illinois	8,10
Betula papyrifera.....	10	5	Dunes State Park, Indiana.....	8
Thuja occidentalis.....	9	..	Starved Rock State Park, Illinois.....	.....
Magnolia tripetala.....	9	4	Eastern border of Hot Springs National Park, Arkansas	.....
Amelanchier arborea.....	9	..	Dunes State Park, Indiana.....	7
Cornus florida.....	9	..	Cox Woods, Paoli, Indiana.....	2,4,6-8,10
Crataegus viridis.....	8	..	West Mt., Hot Springs, Arkansas.....	2,4,6-8
*Crataegus crus-galli.....	8	6	Big Oak Tree State Park, Missouri.....	1
Crataegus pruinosa.....	8	..	Turnbull Woods West, Glencoe, Illinois	8,10,11
*Planera aquatica.....	8	..	Turnbull Woods East, Glencoe, Illinois	8,11
Asimina triloba.....	8	1	Big Oak Tree State Park, Missouri.....	1,5
Rhamnus cathartica.....	7	1	Hot Springs National Park, Arkansas.....	1,2,4,6-8,12,15
*Prunus lanata.....	7	0	Robinsons Woods, Cook Co., Illinois.....	10,11,14
*Crataegus pedicellata.....	7	11	Bard Spring, Polk Co., Arkansas.....	2,4,10,11,13,14
Ptelea trifoliata.....	7	6	Glennview Memorial Woods, Cook Co., Ill.	8,10,11,14
*Rhus vernix.....	7	..	Starved Rock, Illinois.....	2,4,8,10,14,15
*Crataegus disperma.....	6	9	Dune Acres, Indiana.....	8
*Crataegus calpodendron.....	6	5	Schiller Woods, Cook Co., Illinois.....	10
*Crataegus macrosperma pentandra	6	0	Morton Arboretum, Lisle, Illinois.....	8,10,11,14
Crataegus arduennae.....	6	11	Schiller Woods, Cook Co., Illinois.....	10
Viburnum lentago.....	6	10	Swope Park, Kansas City, Missouri.....	10
*Forestiera acuminata.....	6	9	Dunes State Park, Indiana.....	2,6,8,10,11,14
*Cephalanthus occidentalis	6	8	Big Oak Tree State Park, Missouri.....	1
*Alnus rugosa americana.....	6	8	South of Lisle, Illinois.....	1,4,5,7,8,11
*Malus lancifolia.....	6	7	Dunes State Park, Indiana.....	8
*Prunus virginiana.....	6	7	Mt. Washington Cemetery Woods, Jackson Co., Missouri	.....
*Acer leucoderme.....	6	7	White Pines State Park, Illinois.....	8,10,11,13,14
*Viburnum rufidulum.....	6	7	Sixmile Creek, Polk Co., Ouachita National Forest, Arkansas	.....
Rhus typhina.....	5	4	Bennett Spring State Park, Arkansas	.....
*Vaccinium arboreum.....	5	4	Dunes State Park, Indiana.....	4,7
Hamamelis virginiana.....	5	4	Burnham Mt., Glenwood, Arkansas.....	4,7
*Crataegus tortilis.....	5	3	Dunes State Park, Indiana.....	2,4,7,8,10,13
		3	Glennview Memorial Woods, Cook Co., Ill.	10,11

\* (1) (2) For explanation, see page 168.

LIST 1--Concluded  
LIST OF BIG TREES

SPECIES	DIAMETER		CIRCUMFERENCE	LOCATION	NO.	RANGE
	Ft.	In.				
*Malus coronaria.....	..	..	1	Dunes State Park, Indiana.....	..	2,8
*Rhus copallina.....	..	..	1	Dunes State Park, Indiana.....	75	4,5,7,8
*Euonymus atropurpureus..	..	..	1	Turkey Run State Park, Indiana.....	76	2,10,12,13,15
*Crataegus leucantha.....	..	..	1	Glenview Memorial Woods, Cook Co., Ill.	..	11
*Crataegus gemmosa.....	..	..	1	Chechupinqua Woods, Cook Co., Illinois	68	10,11,14
Betula populifolia.....	..	..	1	Dunes State Park, Indiana.....	..	8
*Alnus serrulata.....	..	..	1	Hot Springs National Park, Arkansas...	..	4,5,7
*Ilex decidua.....	..	..	1	Big Oak Tree State Park, Missouri.....	..	1,4,5,7
*Cornus drummondii.....	..	..	1	Mt. Washington Cemetery, Jackson Co., Mo.	..	1,2,15
Cornus alternifolia.....	..	..	1	Black Partridge Woods, Cook Co., Ill.	..	2,8,13
*Salix interior.....	..	..	1	Schiller Woods, Cook Co., Illinois.....	..	2,8,10,11,13,14
Salix bebbiana.....	..	..	..	Apple River Canyon State Park, Illinois	..	8,13
Quercus prinoides.....	..	..	0	Swope Park, Kansas City, Missouri.....	30	.....
Prunus americana.....	..	..	..	West Mt., Hot Springs, Arkansas.....	..	4,7
Viburnum prunifolium.....	..	..	11	Black Partridge Woods, Cook Co., Ill.	..	8,10,13
*Juniperus communis.....	..	..	10	Dunes State Park, Indiana.....	2	2,8
Celtis pumila georgiana..	..	..	..	North Mt., Hot Springs, Arkansas.....	..	7
Crataegus chrysoarpa....	..	..	..	Riverside Woods, Cook Co., Illinois...	..	.....
Prunus umbellata.....	..	..	..	Hot Springs Mt., Arkansas.....	..	7
Zanthoxylum americanum..	..	..	..	White Pines State Park, Illinois.....	..	6,8,10,13-15
Rhus glabra.....	..	..	9	Chechupinqua Woods, Cook Co., Illinois	..	4,6,10,11,13,14
Catalpa bignonioides.....	..	..	..	Glenwood, Arkansas.....	..	4
*Sambucus canadensis.....	..	..	9	Dunes State Park, Indiana.....	96	2,8-10,13
Rhamnus caroliniana.....	..	..	..	Roaring River State Park, Missouri....	..	4
*Rhamnus frangula.....	..	..	8	Camp Ground Road Woods, Cook Co., Ill.	..	10,11,14
Crataegus marshallii....	2½	..	..	Glenwood, Arkansas.....	..	4,7

\*Recognized by the American Forestry Association as the largest of its kind in the United States.  
 ① The number in this column is the number assigned to the same tree in List 2.  
 ② The numbers refer to the woodlands numbered according to their rank in the Table on page 154.

LIST 2  
RATES OF GROWTH OF LARGE FOREST TREES

No.	TAXON	CIR- CUM- FER- ENCE		AVER- AGE ANNU- AL IN- CRE- MENT OF CIR- CUM- FER- ENCE  In- ches	LENGTH OF RECORD  Grow- ing Years	LOCATION	
		Ft.	In.			County	State
1	<u>Pinus banksiana</u> .....	3	6	0	6	Porter.....	Ind.
2	* <u>Juniperus communis</u> .....	0	10	.125	8	Porter.....	Ind.
3	<u>Juniperus virginiana</u> ...	5	10	.5	10	Pike.....	Ark.
4	<u>Salix nigra</u> .....	8	8	1.7	3	Pike.....	Ark.
5	<u>Salix amygdaloides</u> .....	4	6	0	2	Porter.....	Ind.
6	<u>Salix fragilis</u> .....	11	11	1.0	5	Cook.....	Ill.
7	* <u>Salix discolor</u> <u>eriocephala</u>	2	10	1.0	4	Cook.....	Ill.
8	# <u>Populus deltoides</u> .....	13	0	1.0	2	Cook.....	Ill.
9	<u>Populus tacamahaca</u> .....	5	1	.4	5.7	Lake.....	Ill.
10	<u>Juglans cinerea</u> .....	6	0	.4	11	Cook.....	Ill.
11	<u>Carya cordiformis</u> .....	6	8	.7	9.1	Jackson.....	Mo.
12	<u>Carya laciniosa</u> .....	6	11	.3	10.2	Jackson.....	Mo.
13	* <u>Carya laciniosa</u> .....	12	9	.3	7.7	Mississippi..	Mo.
14	<u>Carya tomentosa</u> .....	6	11	1.0	2	St. Louis City	Mo.
15	<u>Carya texana arkansana</u> .	5	3	.2	10	Garland.....	Ark.
16	<u>Ostrya virginiana</u> .....	4	0	.19	10.7	Cook.....	Ill.
17	<u>Ostrya virginiana</u> .....	4	4	.4	5.7	Cook.....	Ill.
18	* <u>Alnus rugosa americana</u> .	1	7	.2	4.3	Porter.....	Ind.
19	<u>Quercus alba</u> .....	10	1	.4	8.5	Cook.....	Ill.
20	<u>Quercus alba</u> .....	10	10	.5	7.3	Cook.....	Ill.
21	<u>Quercus alba</u> .....	17	9	.6	5	Yell.....	Ark.
22	* <u>Quercus bebbiana</u> .....	7	0	.6	7	Jackson.....	Mo.
23	<u>Quercus stellata</u> .....	8	2	.2	10	Garland.....	Ark.
24	<u>Quercus lyrata</u> .....	11	4	.5	2	Mississippi..	Mo.
25	<u>Quercus macrocarpa</u> .....	11	11	.4	10.2	Jackson.....	Mo.
26	<u>Quercus macrocarpa</u> .....	13	1	.19	5.2	Champaign....	Ill.
27	<u>Quercus bicolor</u> .....	9	9	.5	4.1	Cook.....	Ill.
28	<u>Quercus prinus</u> .....	19	1	.5	2	Mississippi..	Mo.
29	<u>Quercus muehlenbergii</u> ..	12	2	.4	5.2	Champaign....	Ill.
30	<u>Quercus prinoides</u> .....	1	0	.2	10	Jackson.....	Mo.
31	<u>Quercus palustris</u> .....	12	9	1.32	7.7	Mississippi..	Mo.
32	* <u>Quercus mutabilis</u> .....	10	6	1.5	2	Mississippi..	Mo.
33	<u>Quercus shumardii</u> Buckley	14	0	1.9	10	Pike.....	Ark.
34	<u>Quercus shumardii</u> schneckii	9	10	1.5	2	Wyandotte....	Kan.

\*#For explanation, see page 171.

LIST 2--Continued  
RATES OF GROWTH OF LARGE FOREST TREES

No.	TAXON	CIR- CUM- FER- ENCE		AVER- AGE ANNU- AL IN- CRE- MENT OF CIR- CUM- FER- ENCE	LENGTH OF RECORD	LOCATION	
		Ft.	In.			Grow- ing Years	County
				In- ches			
35	<u>Quercus ellipsoidalis</u> ..	10	5	1.0	11		Cook..... Ill.
36	<u>Quercus ellipsoidalis</u> ..	10	5	.8	8.6		Lake..... Ill.
37	* <u>Quercus velutina</u> <u>missouriensis</u>	6	1	1.0	8		Jackson..... Mo.
38	* <u>Quercus falcata</u> <u>pagodaefolia</u>	11	3	1.6	5		Mississippi.. Mo.
39	<u>Quercus marilandica</u> ....	6	3	1.0	2		St.Louis City Mo.
40	<u>Quercus bushii</u> .....	5	5	.6	7		Jackson..... Mo.
41	<u>Quercus bushii</u> .....	5	7	.75	4		Jackson..... Mo.
42	<u>Quercus bushii</u> .....	7	5	1.0	2		St.Louis City Mo.
43	<u>Quercus imbricaria</u> ....	7	3	1.2	10.2		Jackson..... Mo.
44	* <u>Quercus runcinata</u> .....	9	2	1.4	7.4		Wyandotte.... Kan.
45	# <u>Quercus leana</u> .....	4	3	1.0	2		Jackson..... Mo.
46	<u>Ulmus fulva</u> .....	9	9	.6	4.2		Cook..... Ill.
47	<u>Ulmus americana</u> .....	12	7	.10	10		Jackson..... Mo.
48	<u>Ulmus americana</u> .....	12	5	1.5	2		Cook..... Ill.
49	<u>Ulmus thomasi</u> .....	10	8	.4	10.2		Jackson..... Mo.
50	* <u>Ulmus serotina</u> .....	6	1	.2	10		Pike..... Ark.
51	<u>Ulmus serotina</u> .....	5	7	.4	10		Garland..... Ark.
52	# <u>Celtis occidentalis</u> ....	11	10	1.0	4		Jackson..... Mo.
53	<u>Celtis laevigata</u> .....	9	4	1.5	10		Garland..... Ark.
54	<u>Morus rubra</u> .....	6	8	1.0	6.1		Jackson..... Mo.
55	<u>Magnolia tripetala</u> ....	2	0	0	4		Garland..... Ark.
56	<u>Asimina triloba</u> .....	2	1	.2	10		Garland..... Ark.
57	<u>Hamamelis virginiana</u> ...	1	3	.2	4.3		Porter..... Ind.
58	<u>Malus ioensis</u> .....	1	10	.14	11		Cook..... Ill.
59	<u>Malus ioensis</u> .....	2	6	.2	9		Jackson..... Mo.
60	<u>Crataegus arduennae</u> ....	1	10	.11	9.3		Jackson..... Mo.
61	* <u>Crataegus punctata</u> <u>aurea</u>	5	0	.3	11		Cook..... Ill.
62	* <u>Crataegus disperma</u> ....	2	5	.13	7.7		Cook..... Ill.
63	<u>Crataegus disperma</u> ....	2	0	0	10.8		Cook..... Ill.
64	* <u>Crataegus pedicellata</u> ..	2	6	.3	6.2		Cook..... Ill.
65	<u>Crataegus pedicellata</u> ..	2	0	0	10		Cook..... Ill.
66	<u>Crataegus mollis</u> .....	6	6	.7	8.6		Du Page..... Ill.
67	<u>Crataegus mollis</u> .....	4	7	.5	8.1		Jackson..... Mo.
68	* <u>Crataegus gemmosa</u> .....	1	1	.03	2		Cook..... Ill.
69	<u>Crataegus calpodendron</u> ..	1	2	.09	10.8		Cook..... Ill.

\*#For explanation, see page 171.

LIST 2--Concluded  
RATES OF GROWTH OF LARGE FOREST TREES

No.	TAXON	CIR- CUM- FER- ENCE		AVER- AGE ANNU- AL IN- CRE- MENT OF CIR- CUM- FER- ENCE	LENGTH OF RECORD	LOCATION		
		Ft.	In.			Grow- ing Years	County	State
				In- ches				
70	* <u>Crataegus calpodendron.</u>	2	0	.15	6.5	Du Page.....	Ill.	
71	<u>Prunus pensylvanica....</u>	2	3	.8	11	Cook.....	Ill.	
72	# <u>Prunus pensylvanica....</u>	2	8	.3	3	Porter.....	Ind.	
73	<u>Gleditsia triacanthos..</u>	13	10	1.6	3.2	Jackson.....	Mo.	
74	<u>Cercis canadensis.....</u>	3	9	.7	3	Garland.....	Ark.	
75	* <u>Rhus copallina.....</u>	1	2	.5	2	Porter.....	Ind.	
76	* <u>Euonymus atropurpureus.</u>	1	2	.3	6	Parke.....	Ind.	
77	* <u>Acer nigrum.....</u>	9	2	.14	7	Parke.....	Ind.	
78	<u>Acer nigrum.....</u>	9	2	.2	5	Orange.....	Ind.	
79	<u>Acer saccharinum.....</u>	17	6	.5	2	Mississippi..	Mo.	
80	<u>Acer negundo.....</u>	7	2	.8	10.6	Cook.....	Ill.	
81	<u>Rhamnus frangula.....</u>	0	7	0	2.7	Cook.....	Ill.	
82	<u>Tilia americana.....</u>	10	3	.15	6.5	Cook.....	Ill.	
83	<u>Tilia americana.....</u>	9	4	0	10.5	Cook.....	Ill.	
84	* <u>Tilia nuda.....</u>	9	9	.3	3	Garland.....	Ark.	
85	* <u>Tilia palmeri.....</u>	7	7	.4	10	Jackson.....	Mo.	
86	# <u>Tilia caroliniana.....</u> <u>rhoophila</u>	7	5	.6	7	Pike.....	Ark.	
87	<u>Nyssa sylvatica.....</u>	7	4	0	3	Garland.....	Ark.	
88	<u>Bumelia lanuginosa.....</u>	2	4	.5	4	Garland.....	Ark.	
89	} <u>Fraxinus pensylvanica</u>	8	0	.7	9.6	Cook.....	Ill.	
*90			Marshall	11	.6	8.8	Cook.....	Ill.
91				5	.4	6.8	Cook.....	Ill.
92	* <u>Fraxinus pensylvanica</u> <u>lanceolata</u>	12	3	.6	7.2	Cook.....	Ill.	
93	* <u>Cephalanthus</u> <u>occidentalis</u>	1	8	.4	4.9	Du Page.....	Ill.	
94	<u>Viburnum lentago.....</u>	1	9	.2	10	Porter.....	Ind.	
95	<u>Viburnum prunifolium...</u>	0	10	.10	10	Jackson.....	Mo.	
96	* <u>Sambucus canadensis....</u>	0	9	0	2	Porter.....	Ind.	

\*Recognized by the American Forestry Association as the largest of its kind in the United States.

#This tree is now dead.



Laughlin, Kendall. 1953. "A floristic study of big trees of the midwest."  
*Phytologia* 4, 153–171.

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