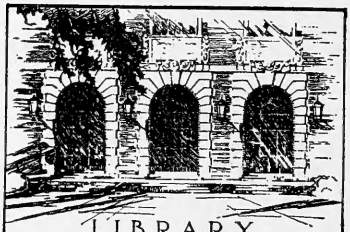

STATE OF ILLINOIS
DEPARTMENT OF REGISTRATION AND EDUCATION
DIVISION OF THE
NATURAL HISTORY SURVEY

FORESTRY CIRCULAR NO. 3

Brownfield Woods:
A Remnant of the Original Illinois Forest

BY

C. J. TELFORD, *Forester*
Illinois State Natural History Survey

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BROWNFIELD WOODS: A REMNANT OF THE ORIGINAL ILLINOIS FOREST

By Clarence J. Telford, Forester
Illinois State Natural History Survey

"Brownfield Woods" approximates 56 acres of woodland in a nearly virgin condition, situated three miles northeast of Urbana, Champaign county, Illinois. Through the generosity of the owners the public has enjoyed unregulated access to this beautiful woodland, and it is visited by thousands each year. The writer was interested to find a knowledge and appreciation of this woodland to be almost state-wide. Together with the thousands of well-intentioned and appreciative visitors, there is the inevitable minority of vandals whose depredations are changing the condition of this unique woodland.

Added to this deterioration incident to use, is the possibility that the woodland will be logged off. The survey upon which this article is based was made at the request of the owners to determine the quantity of timber on the area. A survey of the timbered areas of fully 66 per cent of Illinois, covering in detail all but the prairie counties, has disclosed but one other piece of upland timber at all comparable to Brownfield Woods in the number of splendid old forest giants; hence it may safely be described as one of the best upland stands now growing in the state. Splendid as is this remnant, the few persons who retain accurate impressions of the original body declare that this remaining wood-lot is scarcely a fair sample of the splendid forest called by settlers, "The Big Woods." Very few measurements from the original forests of Illinois have been preserved, and with the disappearance of these forests and of the generation which knew them, too frequently there passes all knowledge of the monarchs which once grew where, in this later day, grow lesser trees of monotonous uniformity.

The upland forests of the state, both second growth and virgin, show a decided variation in composition for different regions. As a broad generalization it may be stated that the forests of the southern part of the state and of the Wabash region show the greatest variety and best development of species, and that the tendency toward fewer species is evident in progressing northward. Throughout the southern section the original forests were continuous, but in the central part of the state, and to a less extent in the northern, the prairies dominated the uplands, and the forests were belts along the streams.

Champaign county is a fairly representative prairie county and the total of these original forests comprised 7 per cent of its area, or 47,659 acres. These forest belts occupied the flood-plains of the streams, and the slopes—often very gentle—between the flood-plains and the prairies. They were rarely more than two miles wide, nor did they usually continue up the stream quite to its source. During the past seventy-five years the forested areas have been progressively cleared. By 1870 the original forest of 47,659 acres had been reduced to 16,780 acres. There

is a wide variation in estimates of the total area of present woodland: according to the U. S. census, there are 9,731 acres; the State Crop Survey gives 2,173 acres; and the Natural History Survey reports 6,400 acres. Probably not over one per cent of the county now bears any kind of forest. This shrinkage in area of the woodlands of the county has been accompanied by very great changes in their character. The present forests are largely composed of trees which have come up since the settlement of the country and, under conditions quite different from those which influenced the character and composition of the virgin stands, they are even-aged and dominantly oak.

"The Big Woods" was a much more extensive forest than was usually found near the headwaters of streams in this region. It was situated within ten miles of the source of the Salt Fork of the Vermilion River, at the bend of this stream where in its southern course it is turned eastward by the Champaign morainic system, and occupied, in the general form of a triangle, an area of about ten square miles. The southern side of this wooded area was at about the present Main Street, Urbana, the apex was some five miles up Salt Fork at a point opposite Leverett, and the main upland forest extended down-stream another five miles to a point north of Mayview. These woods were in places three miles across. The eastern boundary of the original forest was about half a mile east of the present woods. The existing remnant of the "Big Woods" occupies the S. E. ¼ of Section 34, R. 9 E. Tp. 20 N. The general topography of this 60 acres is that of a moderately rolling upland. The most pronounced topographic feature is a small valley or swale extending diagonally from the northwest to the southeast corner, through which drains an intermittent stream. The total relief between the highest and lowest part is about thirty feet, and the area is thus assured good drainage. If cleared, probably three quarters of it could be cultivated without serious erosion resulting. The soil along the swale, approximating a fifth of the total area of the woodland, has been classified by experts from the University of Illinois Agricultural Experiment Station as a brown silt loam of the prairie; that of the adjoining rolling uplands, as a yellow gray silt loam of the upland timber series. Both the swale and the adjoining uplands were timbered when the settlers first visited the region. The largest tree on the tract, a bur oak having a diameter of sixty-five inches at a distance of 4½ feet from the ground, is growing in this swale. Such a tree requires approximately 250 years to attain this size, and it was probably 150 years old when the first settlers arrived. In view of the discussion among ecologists as to the factors controlling progression of forest in encroaching upon the prairie,* it would appear that an examination and study of the tree and soil relationships in this particular area might be instructive.

The Brownfield Woods are of interest as a sample of the type of forest which existed on the uplands of the upper Wabash drainage basin. They are situated in the extreme northwestern margin of this area, yet show the great variety of species which characterize the forests of the Wabash region. The tree associations or types vary somewhat in response to varying moisture conditions of the soil. The uplands and moderate slopes adjoining bear a rich variety in which hard maple is the commonest tree. Along the miniature bottoms elm predominates, but the type lines are not sharply drawn and elm may be commonly found on drier sites. A complete record of the number of tree species in this woodland has never been made. The University Woods, another fragment of the

* See (1) in foot-note on following page.

"Big Woods", located about a mile and a half southeast of the Brownfield Woods, has been found to contain 31 tree species in the 54 acres of semi-virgin forest. (McDougall (2)*.) In our survey of the Brownfield Woods all trees having a diameter of three inches or more were tabulated, but the specific headings were based upon commercial divisions rather than true botanical differences. Thus all ashes were listed under ash, all white oaks under the single heading of white oak, the black oak group under red oak, etc. Listed in this manner, there were seventeen different groups of species, but a complete botanical survey would doubtless reveal nearly double this number of tree species.

A unique feature of Brownfield Woods is the splendid dimensions of occasional trees. The Lower Wabash in former years held huge trees, the largest broad-leaves on the continent. A few huge sycamores yet stand, stag-headed and isolated, too enormous for our energetic axemen to fell; but of those giants which stood as neighbors—magnificent tulips, pecans, sweet gums, and oaks—we have only records. Yet in this extremely outlying fragment of 56 acres of the Upper Wabash forest there are 36 trees attaining a diameter from three to five feet at a point 4½ feet from the ground. There probably does not exist in Illinois, or on our continent even, another upland area with such a variety of great hardwood trees. Included among these thirty-six monarchs are ashes, elms, and oaks. One of the largest trees in the woods is the bur oak already mentioned, with a diameter of 65 inches and a height of 104 feet; and another, with a diameter of 45 inches, has a height of 112 feet. These are not large trees as contrasted with those which have disappeared, yet we have record of but one larger living oak in the state, and no record whatever of so many large oak, elm, and ash in a single wood-lot.

The actual number of trees present per acre (115) is low as compared with the average of the all-virgin upland stands studied in the state (146); but the average diameter for the Brownfield trees is 12.7 inches as against 10.9 inches in the virgin upland stands in general. The loss is in the low diameter classes. An examination of the last column on page 9, which shows the total of all species for each diameter, brings out the fact that there are fewer 3- and 4-inch trees than in either 5, 6, 7, 8, 9, or 10-inch classes. In a normal virgin forest by far the greater number of trees are always in the smaller-diameter classes. Brownfield Woods, in its larger-diameter class of trees, conforms to this rule, their number increasing with reasonable regularity as the diameters diminish, but from the 6-inch class down to the 3-inch the number of trees rapidly diminishes. There are two possible explanations: either (1) for the past forty years the use of the woods by man and cattle has destroyed the reproduction, and if continued will ultimately result in the complete destruction of the woods; or (2) it is possible that the forest was more open than now some forty or fifty years ago, offering light conditions which favored the establishment of seedlings, and that fires or grazing prevented the establishment of seedlings for a time, after which the somewhat open forest was not burned or grazed. Thus there would become established a great number of trees which have now grown to sapling and pole-wood size and have so thoroughly occupied the space

*McDougall, W. B.
(1) Forests and Soils of Vermilion County, Illinois, with special Reference to the Striplands. Ecology, Vol. VI, No. 4, p. 376. Oct. 1925.
(2) Symbiosis in a Deciduous Forest. Botanical Gazette, Vol. 73, No. 3. March, 1922.

The monarch of the "Woods". Bur Oak, 65 inches in diameter and 105 feet in height.

that younger trees have not been able since then to persist in numbers. If this is the case, when the stand opens up again the normal number of smaller trees will become established and the forest is in no danger of destruction through lack of regeneration. In support of this latter assumption is the fact that the stand as a whole seems vigorous and the crown canopy dense, and here the condition of relatively few small trees prevails; but along a strip through the center of the stand where there was formerly a highway, seedlings and small trees have come in until the old road is now choked with them.

Perhaps the most interesting fact brought out in the tabulation is the relative abundance of the species which make up the stand. There are actually almost as many hard maple trees present—49%—as all other species combined, but this preponderance of maple is only found in the smaller-diameter classes. If we use 13 inches, the diameter of the average tree of the stand, as an arbitrary dividing line, maple composes 62% of the total number of trees from 3″ to 13″ inclusive while it makes up but 17% of the total number of trees of 14 inches and up. Thus maple is assured a heavy representation in this forest a hundred years hence merely by the great numbers of young trees now present, but its dominant place in this future stand is doubly assured because maple is the most tolerant tree growing in this region. It can grow where shade is too dense for any of its neighbors, and when a forest becomes dominantly of hard maple and is undisturbed by cyclone, grazing, fire, or heavy cutting —all accidental forces which suddenly destroy the adjustment of a forest to its environment—it remains hard maple. This woods is on the point of reaching the final state of its evolution or climax type for the region. As a forest it has been on the road to this maple type for hundreds and probably thousands of years, during which the prairie has given place to elm, hackberry, soft maple, then oaks and hickories, and now hard maple.

This is but a tiny division in the great sequence of changes of the plants of this region. Ages ago palms and figs flourished in these latitudes; waves of magnolias, sequoia, sassafras, and gums were succeeded by spruce and balsam as the temperatures dropped preceding the ice age. When the ice sheets finally receded, these gently undulating prairies were almost immediately clothed by grasses, but the forests gained the slopes and stream bottoms, and from this vantage they were gradually extending their areas. Thus the "Big Woods" might in time have covered a great area. Our civilization has not been here a century when there remains of the "Big Woods" nothing suggestive of their sturdy trees but this 56 acres. There are oaks and maples here which in the first of their three centuries of existence have doubtless sheltered elk and bison, have stood while the bison, the elk, the Indian, and the turkey vanished before our race, and today are as unusual in Illinois as would be these vanished forms if they were to return. Brownfield Woods can be destroyed in about three months as a sawmill operation, but there would not be seen another such forest in Champaign county in 300 years if we started to build it today.

STAND TABLE OF BROWNFIELD WOODS. TREES

D.B.H.* In.	Ash	Basswood	Elm	Hard maple	Red oaks	White oaks	Hackberry
3	.09	.02	.38	3.50	.....	.02	.16
4	.39	.17	.61	4.30	.....	.05	.04
5	.36	.31	1.21	6.70	.07	.04	.02
6	.55	.70	1.57	8.60	.20	.07	.11
7	.81	.39	1.41	6.40	.16	.11	.05
8	.70	.39	1.30	4.80	.16	.16	.16
9	.96	.68	1.80	5.30	.20	.18	.14
10	.84	.57	1.16	4.20	.23	.39	.04
11	.57	.41	1.23	2.80	.29	.16	.05
12	.64	.51	1.04	2.40	.31	.14	.12
13	.54	.31	1.11	1.80	.31	.11	.12
14	.51	.50	1.09	1.88	.64	.14	.04
15	.32	.54	.89	1.09	.73	.07	.09
16	.39	.34	.81	.73	.46	.11	.05
17	.21	.39	.70	.32	.51	.20	.05
18	.45	.46	.82	.31	.61	.04	.04
19	.23	.27	.45	.21	.50	.12	.11
20	.39	.39	.50	.16	.46	.02	.09
21	.23	.27	.39	.18	.34	.16	.14
22	.31	.31	.32	.05	.38	.12	.12
23	.31	.20	.34	.14	.29	.21	.14
24	.21	.12	.18	.05	.34	.16	.09
25	.09	.09	.29	.05	.23	.07	.07
26	.16	.04	.23	.11	.11	.11	.09
27	.11	.....	.14	.09	.12	.04	.02
28	.05	.04	.07	.07	.07	.11	.02
29	.05	.04	.09	.....	.05	.09	.02
30	.07	.02	.07	.04	.05	.07	.02
31	.02	.....	.04	.05	.04	.07	.02
32	.02	.....	.05	.05	.02	.07	.02
33	.02	.....	.04	.....	.....	.04	.....
34	.....	.....	.07	.....	.02	.....	.....
35	.02	.....	.02	.....	.....	.02	.....
36	.....	.....	.....	.....	.....	.09	.....
37	.....	.....	.05	.....	.....	.....	.....
38	.02	.....	.02	.....	.02	.04	.....
39	.....	.....	.02	.....	.....	.02	.....
40	.....	.....	.....	.....	.....	.04	.....
41	.....	.....	.02	.....	.....	.07	.....
42	.....	.....	.04	.....	.....	.02	.....
43	.....	.....	.....	.....	.....	.05	.....
44	.....	.....	.02	.....	.....	.05	.....
45	.....	.....	.....	.....	.....	.02	.....
46	.....	.....	.....	.....	.....	.....	.....
47	.....	.....	.02	.....	.....	.....	.....
48	.....	.....	.....	.....	.....	.02	.....
50	.....	.....	.....	.....	.02	.....	.....
54	.....	.....	.....	.....	.....	.04	.....
65	.....	.....	.....	.....	.....	.02	.....
Total	10.64	8.48	20.61	56.38	7.94	3.95	2.25
Per cent	9.3	7.4	17.9	49.0	6.9	3.4	1.9

*D.B.H.—Diameter Breast High (4½').

PER ACRE. BASED ON 56 ACRES. OCTOBER 1925

Honey locust	Black walnut	Coffee-tree	Hickory	Buckeye	Butternut	Judas-tree	Mulberry	Total
.....	.02	.02	.05	.09	.....	.....	.02	4.37
.02	.02	.02	.04	.04	.....	.....	.02	5.72
.....	.04	.04	.07	.05	.....	.....	.05	8.96
.....	.05	.07	.09	.07	.....	.....	.02	12.10
.04	.....	.07	0.9	.05	.....	.....	.02	9.60
.02	.04	.11	.05	.11	.....	.02	.02	8.04
.02	.07	.05	.14	.09	.....	.....	.02	9.65
.09	.12	.....	.29	.07	.....	.....	.02	8.02
.....	.07	.04	.04	.05	.....	.....	.....	5.71
.02	.02	.02	.05	.04	.....	.....	.02	5.33
.05	.16	.02	.07	.....	.....	.....	.....	4.60
.05	.12	.....	.05	.04	.....	.....	.....	5.06
.....	.09	.02	.02	.02	.....	.....	.....	3.88
.....	.07	.....	.05	.05	.....	.....	.....	3.06
.02	.11	.02	.02	.04	.....	.....	.....	2.59
.....	.09	.....	.05	.05	.....	.....	.....	2.92
.02	.07	.....	.09	.....	.02	.....	.....	2.09
.04	.....	.....	.02	.....	.....	.....	.....	2.07
.05	.04	.....	.....	.....	.....	.....	.....	1.80
.....	.04	.....	.....	.....	.....	.....	.....	1.65
.....	.....	.....	.....	.....	.....	.....	.....	1.63
.02	.02	.....	.02	.....	.....	.....	.....	1.21
.02	.02	.....	.....	.....	.....	.....	.....	.93
.....	.....	.....	.....	.....	.....	.....	.....	.85
.02	.....	.....	.....	.....	.....	.....	.....	.54
.....	.....	.....	.....	.....	.....	.....	.....	.43
.....	.....	.....	.....	.....	.....	.....	.....	.34
.....	.....	.....	.....	.....	.....	.....	.....	.34
.....	.....	.....	.....	.....	.....	.....	.....	.24
.....	.....	.....	.....	.....	.....	.....	.....	.23
.....	.....	.....	.....	.....	.....	.....	.....	.10
.....	.....	.....	.....	.....	.....	.....	.....	.09
.....	.....	.....	.....	.....	.....	.....	.....	.06
.....	.....	.....	.....	.....	.....	.....	.....	.09
.....	.....	.....	.....	.....	.....	.....	.....	.05
.....	.....	.....	.....	.....	.....	.....	.....	.10
.....	.....	.....	.....	.....	.....	.....	.....	.04
.....	.....	.....	.....	.....	.....	.....	.....	.04
.....	.....	.....	.....	.....	.....	.....	.....	.09
.....	.....	.....	.....	.....	.....	.....	.....	.06
.....	.....	.....	.....	.....	.....	.....	.....	.05
.....	.....	.....	.....	.....	.....	.....	.....	.07
.....	.....	.....	.....	.....	.....	.....	.....	.02
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.02
.....	.....	.....	.....	.....	.....	.....	.....	.02
.....	.....	.....	.....	.....	.....	.....	.....	.02
.....	.....	.....	.....	.....	.....	.....	.....	.04
.....	.....	.....	.....	.....	.....	.....	.....	.02
.50	1.28	.50	1.30	.86	.02	.02	.21	114.97
.4	1.1	.4	1.1	.7	.02	.02	.19	100%

TABULATION OF ALL TREES 3 INCHES AND UP IN

D.B.H.* In.	Ash	Bass-wood	Elm	Hard maple	Red oaks	White oaks	Hack-berry	Honey locust	Black walnut
3	5	1	21	198	.....	1	9	.....	1
4	22	7	34	238	.....	3	2	1	1
5	20	17	68	373	4	2	1	.....	2
6	31	39	88	480	11	4	6	.....	3
7	45	22	79	358	9	6	3	2	.....
8	39	22	73	267	9	9	9	1	2
9	54	38	101	294	11	10	8	1	4
10	47	32	65	233	13	22	2	5	7
11	32	23	69	156	16	9	3	.....	4
12	36	29	58	133	18	8	7	1	1
13	30	17	62	103	17	6	7	3	9
14	29	28	61	105	36	8	2	3	7
15	18	30	50	61	41	4	5	.....	5
16	22	19	45	41	26	6	3	.....	4
17	12	22	39	18	29	11	3	1	6
18	25	26	46	17	34	2	2	.....	5
19	13	15	25	12	28	7	6	1	4
20	22	22	28	9	26	1	5	2	.....
21	13	15	22	10	19	9	8	3	2
22	17	17	18	3	21	7	7	.....	2
23	17	11	19	8	16	12	8	.....	.....
24	12	7	10	3	19	9	5	1	1
25	5	5	16	3	13	4	4	1	1
26	9	2	13	6	6	6	5	.....	.....
27	6	.....	8	5	7	2	1	1	.....
28	3	2	4	4	4	6	1	.....	.....
29	3	2	5	.....	3	5	1	.....	.....
30	4	1	4	2	3	4	1	.....	.....
31	1	.....	2	3	2	4	1	.....	.....
32	1	.....	3	3	1	4	1	.....	.....
33	1	.....	2	.....	.....	2	.....	.....	.....
34	.....	.....	4	.....	1	.....	.....	.....	.....
35	1	.....	1	.....	.....	1	.....	.....	.....
36	.....	.....	.....	.....	.....	5	.....	.....	.....
37	.....	.....	3	.....	.....	.....	.....	.....	.....
38	1	.....	1	.....	1	2	.....	.....	.....
39	.....	.....	1	.....	.....	1	.....	.....	.....
40	.....	.....	.....	.....	.....	2	.....	.....	.....
41	.....	.....	1	.....	.....	4	.....	.....	.....
42	.....	.....	2	.....	.....	1	.....	.....	.....
43	.....	.....	.....	.....	.....	3	.....	.....	.....
44	.....	.....	1	.....	.....	3	.....	.....	.....
45	.....	.....	.....	.....	.....	1	.....	.....	.....
46	.....	.....	.....	.....	.....	.....	.....	.....	.....
47	.....	.....	1	.....	.....	.....	.....	.....	.....
48	.....	.....	.....	.....	.....	1	.....	.....	.....
50	.....	.....	.....	.....	1	.....	.....	.....	.....
54	.....	.....	.....	.....	.....	2	.....	.....	.....
65	.....	.....	.....	.....	.....	1	.....	.....	.....
Total	596	471	1153	3146	445	220	126	27	71

*D.B.H.=Diameter Breast High (4½').

DIAMETER ON THE 56 ACRES OF BROWNFIELD WOODS

Coffee-tree	Hickory	Buckeye	Butter-nut	Judas-tree	Mul-berry	Cherry	Syca-more	Total
1	3	5	.....	.....	1	.....	.....	246
1	2	2	.....	.....	1	.....	.....	314
2	4	3	.....	.....	3	.....	.....	499
4	5	4	.....	.....	1	2	.....	678
4	5	3	.....	.....	1	.....	.....	537
6	3	6	.....	1	1	.....	1	449
3	8	5	3	.....	1	.....	.....	541
.....	16	4	2	.....	1	.....	.....	449
2	2	3	.....	.....	.....	.....	.....	319
1	3	2	1	.....	1	.....	.....	299
1	4	.....	.....	.....	.....	.....	.....	259
.....	3	2	1	.....	.....	1	.....	286
1	1	1	.....	.....	.....	1	2	220
.....	3	3	.....	.....	.....	.....	.....	172
1	1	2	.....	.....	.....	.....	.....	145
.....	3	3	.....	.....	.....	.....	.....	163
.....	5	.....	1	.....	.....	.....	.....	117
.....	1	.....	.....	.....	.....	.....	.....	116
.....	.....	.....	.....	.....	.....	.....	.....	101
.....	.....	.....	.....	.....	.....	.....	.....	92
.....	.....	.....	.....	.....	.....	.....	.....	91
.....	1	.....	.....	.....	.....	.....	.....	68
.....	.....	.....	.....	.....	.....	.....	.....	52
.....	.....	.....	.....	.....	.....	.....	.....	47
.....	.....	.....	.....	.....	.....	.....	.....	30
.....	.....	.....	.....	.....	.....	.....	.....	24
.....	.....	.....	.....	.....	.....	.....	.....	19
.....	.....	.....	.....	.....	.....	.....	.....	19
.....	.....	.....	.....	.....	.....	.....	.....	13
.....	.....	.....	.....	.....	.....	.....	.....	13
.....	.....	.....	.....	.....	.....	.....	.....	5
.....	.....	.....	.....	.....	.....	.....	.....	5
.....	.....	.....	.....	.....	.....	.....	.....	3
.....	.....	.....	.....	.....	.....	.....	.....	5
.....	.....	.....	.....	.....	.....	.....	.....	3
.....	.....	.....	.....	.....	.....	.....	.....	5
.....	.....	.....	.....	.....	.....	.....	.....	2
.....	.....	.....	.....	.....	.....	.....	.....	2
.....	.....	.....	.....	.....	.....	.....	.....	5
.....	.....	.....	.....	.....	.....	.....	.....	3
.....	.....	.....	.....	.....	.....	.....	.....	3
.....	.....	.....	.....	.....	.....	.....	.....	4
.....	.....	.....	.....	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	.....	.....	.....	2
.....	.....	.....	.....	.....	.....	.....	.....	1
27	73	48	8	1	11	4	3	6,430

One of the elder brothers. Another of the "Big 36". Bur Oak.

The product of three centuries. Large Oak.

A century old youngster cut by vandals for thirty cents worth of honey.

Forests such as our forefathers saw.

Close-up of another large Oak, showing the splendid proportions of these veterans.