GEOLOGICAL SURVEY OF KENTUCKY.

N. S. SHALER, DIRECTOR.

REPORT ON THE TIMBERS

OF

GRAYSON, BRECKINRIDGE, OHIO, AND HANCOCK COUNTIES,

BY L. H. DEFRIESE.

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INTRODUCTORY LETTER.

Professor N. S. SHALER, *Director Kentucky Geological Survey*:

DEAR SIR: In 1874 the Geological Survey commenced a study of Kentucky timbers with special reference to the economic features of the State. In pursuance of the plan inaugurated then, and followed out by Messrs. Crandall and Hussey in their outcoming reports on the timbers of Greenup, Carter, Boyd, Lawrence, Barren, and Edmonson counties, I now submit a report on the timbers of Grayson, Breckinridge, Ohio, and Hancock counties.

The report is based upon a careful study made in those counties during May and June, 1876, and will be found, I think, tolerably thorough and accurate.

Very respectfully,

L. H. DEFRIESE.

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REPORT ON THE TIMBERS OF GRAYSON, BRECKINRIDGE, OHIO, AND HANCOCK COUNTIES.

In the following report it will be noticed that I have confined my attention mostly to the trees, descending occasionally to the shrubs. The reason is obvious. In a report, whose object is mainly to give what is of economic value to the State, the timbers must occupy the chief place. While it would have been a pleasure to me to embrace in my study endogenous botany, especially the cryptogamia, every moment devoted to them would have been that much taken from the too short time that I had to devote to the timbers themselves.

The method of study pursued has been as follows: starting out from Leitchfield I followed the Leitchfield and Cloverport road northwest to the Ohio river, at Cloverport; thence down the Ohio to Hawesville; then southwest, across Hancock county, and back southeast, across Ohio county, to the Paducah Railroad, at Rosine Station. In this way I obtained two sections of timber, from Leitchfield north to the Ohio river, far enough apart to give any marked changes in the timber. Along the road, in both cases, I selected stations varying from four to eight miles apart, according to the local changes in timbers, and took a plot of representative ground, usually 50 or 100 yards square, on which I took the number of trees of different kinds. I carefully separated the old timber from the younger growth in all cases, in order to see how the future forest of Kentucky would compare with the present one in the relative per cents. of different kinds of timber. I also noted the position of the plot chosen for such enumeration — whether level, hillside, or hilltop; whether the exposure, if on a hillside, was north or south; the geological formation, the relative size, height, etc., of the

different kinds of trees. Mr. Crandall originated the idea, in 1874, of studying hill timber with reference to the points of the compass, in order to see the difference in timber produced by a northern, southern, eastern, or western exposure. In order to do that a rounded hill is selected, and at its base four plots of ground are chosen, on the north, south, east, and west sides respectively, and the per centage of different timbers carefully noted; then four other plots, half way up the hill, are chosen and counted in the same way; and finally the timber of the hilltop is carefully noted. Observations of this kind, extending over a considerable area, give sufficient data to show the effects upon the timber, both of the height above drainage and of direction of exposure. On page 16 of this report is a diagram giving the result of such observations made by me in Western Kentucky. I have also tried to connect any marked changes in the timber with the geological changes that caused them. Of course this is not always possible, for the conditions of timber growth are confined largely to the surface of the ground. It is, therefore, possible that a local change of the surface stratum will produce a change in the per centage of different timbers without the geological change being sufficient to notice. It is a question whether, if the flora of a country were closely studied with reference to its condition of growth, it would not form a nicer index to the surface changes of soils than the geologist now possesses. Up to this time, however, botany and geology have not been sufficiently connected to render them mutual aids in difficult cases.

While speaking of the connection between geology and botany, I wish to call attention to a rather marked example of it in Grayson county. The coal-measure series crosses the Leitchfield and Hartford road, in a very irregular northwest and southeast direction, about 12 miles from Leitchfield. The line of juncture between it and the Sub-carboniferous can be easily traced towards the Paducah Railroad. After crossing this juncture, on through the coal measures north to the Ohio, the liriodendron tulipfera (tulip tree, erroneously called yellow

poplar all through the country), forms a conspicuous part of the forest. Its massive, cylindrical trunk, from two to five feet in diameter, is seen everywhere, on lowland and highland alike. But after crossing over into the Chester shale, near Leitchfield, scarcely a liriodendron is to be seen. So marked and conspicuous is its absence that the eye can trace the giving out of the Chester shale toward the coal measures by that alone. A very few scrubby liriodendrons are found in choice locations (heads of branches, streams, etc.) near the juncture on the Chester shale side; but these soon give out, and within three or four miles of the juncture not one is to be seen. This marked disappearance in that region is doubtless due to surface changes caused by the change of formation, the coal measures supplying more of that loose, sandy, moist surface so suitable to the liriodendron. This absence of the liriodendron is confined to the Chester shale, however, and does not extend through the whole of the Sub-carboniferous; for further on, in the "sinking region," the surface exposure is the St. Louis limestone, on which the tulip tree grows in great numbers, and to great size.

Another instance of change in timber, due to a modification of the surface soil, is found in a remarkable belt of woods crossing the Hartford and Cloverport road about twelve miles from Cloverport. The belt is about five miles wide, on a soil of thin, shaly sandstone, which forms a nearly level tract of land. Although the ground is at least one hundred and fifty feet above the drainage of the country, the loose sandy soil is always moist. The consequence is a forest of liriodendron, chestnut, white oak, and three varieties of hickory, whose noble size and height I have not seen surpassed in Kentucky. In addition to these, but in less numbers, are also found laurel oak, black sugar maple, water beech, white elm, etc. The change is very marked on passing from this wood-belt into the ordinary timbers that bound it on each side.

In addition to the methods of choosing plots and numbering trees, mentioned before, between these plots I walked along, noting down every variety of tree that occurred, so as to

correct any error that might be made in choosing a piece of ground which did not fully represent the timber of the immediate locality. I then walked off the road on each side, making my observations extend over a belt about five miles wide, so as to still farther insure a correct representation of the timber.

The chief timbers of value in that part of Western Kentucky studied by me are: black walnut (*Juglans nigra*), white walnut (*J. cinerea*), white hickory (*Carya microcarpa*), shagbark hickory (*C. alta*), white oak (*Quercus alba*), swamp white oak (*Q. bicolor*), post oak (*Q. obtusiloba*), chestnut oak (*Q. castanea*), mountain chestnut oak (*Q. montica*), swamp chestnut oak (*Q. prinus*), tulip tree (*Liriodendron tulipfera*), hop hornbeam (ironwood [*Ostrya virginica*]), white ash (*Fraxinus americana*), blue ash (*F. quadrangulata*), black ash (*F. sambucifolia*), black cherry (*Cerasus serotina*), sugar maple (*Acer saccharinum*), black sugar maple (*Acer nigrum*), black birch (*Betula lenta*), beech (both *B. sylvatica* and *B. ferruginea*), and chestnut (*Castanea vesca*). Of these the black walnut is of course the most valuable. It is found scattered all through Western Kentucky, in open places and about fields, where other timbers have been cut away or deadened. It is nearly all second growth, however, the old forest growth having been ruthlessly destroyed. The largest amount of primal walnut timber I found was on Beech Fork of Clover Creek, up near the head waters. Occasionally a forest tree of it is left standing in other localities, but it is very rare. Even the second growth, which would be very valuable in time, is meeting with the same fate as the first; and reckless hands are cutting it away for such rude purposes as rail-making as fast as it springs up. From the study I made of the walnut, I find the second growth comes up only in open spots of ground, where it is not overshadowed and choked out by other more rapidly growing and less valuable timbers. That causes it to spring up mostly about dwelling-houses and cleared pieces of ground—the very localities where it soonest meets with destruction. If farmers could only consider that a single tree of good walnut timber is worth more

than their best acre of land, they would take more pains to encourage the growth of a timber which is becoming so scarce in our country, and for which there is such great demand. I believe, with a little extra care, such as trimming out and killing other fast-growing timbers of little or no value, taking moderate pains to secure, in such localities as best suited the walnut, a good undergrowth of it, etc., that a considerable forest of this valuable timber might be secured and kept in Kentucky.

Next to the walnut in value, and fully as scarce, is the black cherry. The wood is so valuable in cabinet work, for the reason that it is very compact, close-grained, and receives a high polish. In a few years, at the present rate of destruction, it will have disappeared from our Kentucky forests.

The great forest timber of Western Kentucky is the white oak, which probably forms forty or fifty per cent. of the entire forest trees, or nearly as much as all other species together. Its timber is so valuable in the making of wagons, agricultural implements, and all other articles where a tough, durable, nicely-grained wood is required, and one which warps but little in seasoning, that no special mention of its claims is necessary. But the very abundance of white oak in the Kentucky forests to-day obscures the extermination to which it is liable, and which is fast approaching. I took particular pains to notice the conditions of growth of the white oak, and I find that, while at present it forms the large per cent. of the forest timbers given above, in the undergrowth, which is to be the future forest of Kentucky, it falls from 40 or 50 per cent. to about 8 per cent., while its place is taken by such valueless timbers as the pin oak, black oak, Spanish oak, and black hickory. This proves that the latter timbers are of more rapid and hardy growth than the white oak, and that, in a contest for supremacy, the white oak will finally be exterminated. The extinction of our white oak would be nothing less than a calamity—one which should be avoided if possible. The white walnut is found in considerable quantities, as second growth, all through Western Kentucky near the Ohio

river. Its reddish-colored, light wood is very valuable in paneling and all ornamental works. Its bark is cathartic. The white hickory is likewise a valuable timber, found in considerable quantities, scattered all through these counties, and very extensively used in making ax-handles, hammer-handles, axletrees, and other such work. The wood is much smoother and finer-grained than that of the shagbark hickory, though the timber of the latter is likewise valuable. The larger part of the chestnut oak in Western Kentucky is of the swamp variety, though the monticola, a mountain variety of the same, is met with on the mountain tops. The former is valuable for its timber, and has a straight, unbranching trunk 40 to 60 feet high. The latter (monticola) is valuable only for its bark, which contains a large amount of tannic acid that renders it useful to the tanner. Along the line of the Paducah Railroad, where transportation facilities can be had, quite an important traffic is going on in this bark, car-loads of which are constantly shipped.

Every lumberman knows the value of the liriodendron or tulip tree. It is one of the noblest forest trees of Kentucky, with its massive, cylindrical trunk, two to five feet in diameter and forty to sixty feet long. It is found everywhere between Leitchfield and the Ohio river, after crossing the Chester shale near Leitchfield. While not quite so large a per cent. of it is found in the undergrowth as in the old forest timber, still its growth is rapid, and I see no reason to apprehend its early extinction.

The white and blue ash are also common timbers in Western Kentucky, which are exceedingly valuable. They grow best in moist, loose, sandy forests and along streams, and their wood is tough, elastic, light, and strong. They are the woods used in the best buggies and carriages, where lightness and durability are both required. The black ash is found mostly near water, in swamps and moist woods, and is largely used by the cooper in barrel-making and other such work.

The hop hornbeam (iron wood) is a very hard, tough, strong wood, and is mostly used in making levers. The sugar maples

are too well known to need mention. There are fine forests of them along the streams and in the damp woods toward the Ohio river, but little use is made of them except for local purposes. They are very rich in sap, however, and with the same industry the region might be made as historic as the sugar forests of New England.

There is a very small amount of black birch in Western Kentucky, so far as I could discover. In my entire study I only saw one or two trees, on Panther Creek. It may be common in secluded and limited localities. Its timber is very valuable and is used in the manufacture of mahogany furniture. The beeches, which exist in almost endless quantities on all the streams of Western Kentucky, are coming largely into favor in the manufacture of benches, desks, etc. The wood is the hardest found in our forests. Beside the timbers mentioned here, which are the most valuable ones, many others, varying in usefulness, were noted, a complete list of which will be found at the end of the report.

I give below, in table form, the observations made upon a belt of timber about five miles wide, stretching across all four of the counties—Grayson, Breckinridge, Hancock, and Ohio. The belt is as nearly representative as I could get it, so that the table of locations, given in the order of observation, with the per cents. of different timbers, etc., will well represent the timbers of all the counties. In location No. I, at both stations, the timber was mostly second growth, the *old* forest timber having been cut away. The small proportion of white oak among the second growth is conspicuous.

LOCATION I—STATION (A).		REMARKS.
White oak	(o. f.) 4	O. f., old forest. Y. f., young forest. 1 to 1½ miles from Leitchfield. Hill slope 7° W. Plot of ground, 2,500 square yards. Formation, Sub-carboniferous Limestone —Chester.
White oak	(y. f.) 0	
Black oak	(o. f.) 1	
Black oak	(y. f.) 41	
Pin oak	(o. f.) 0	
Pin oak	(y. f.) 57	
Post oak	(y. f.) 1	
Chestnut	(o. f.) 1	
Black gum	(y. f.) 6	

Small undergrowth of flowering dogwood, hickory, several varieties, sourwood, etc.

STATION (B).		REMARKS.
White oak (o. f.)	2	Location, 1½ miles from Leitchfield. Chester formation. Hill slope 8° E. The two stations face each other like the two faces of a synclinal. Average diameter (o. f.), 1¾ feet. Average diameter (y. f.), 10 inches. Some sycamore in the region, though not found in the plot of ground chosen.
White oak (y. f.)	0	
Black oak (y. f.)	22	
Pin oak (y. f.)	4	
Laurel oak (y. f.)	3	
Hickory (pig and shag.)	6	
Mulberry (y. f.)	2	
Ironwood	3	
Black haw	2	
Willow	3	
Dogwood (flowering)	2	

LOCATION II—STATION (A).				REMARKS.
White oak (o. f.)	13	av. diam.	23 in.	Location, 8 miles from Leitchfield, on nearing the edge of the Chester shale. Note the introduction of Liriodendron, which takes place on nearing coal measures and leaving Chester. Area of plot observed, 2,500 square yards.
Black gum	5	"	7½ "	
Dogwood	4	"	6 "	
Liriodendron	3	"	24 "	
Hickory (pig)	2	"	10 "	

Small undergrowth of pin oak, black oak, Spanish oak, mulberry, dogwood, hickory, chestnut, and some maple.

STATION (B.)				REMARKS.
White oak	8	av. diam.	20 in.	Area 2,500 square yards. Tulip tree and pin oak occur, though not in plot of ground chosen. Location, hill-top, 145 feet above drainage.
Black oak	2	"	28 "	
Spanish oak	1	"	26 "	
Pig hickory	2	"	23 "	
Sassafras	2	"	7 "	
Black gum	1			
Persimmon	1			

Undergrowth: pin oak, sweet gum, sassafras, dogwood (flowering), sumach (black), hickory, persimmon, and small per cent. of white oak.

Between Location II and Location III is introduced the "sinking region," a cavernous St. Louis limestone, in which all the streams run below ground. The timber here is lirio-

dendron, redbud, mulberry, black walnut, beech, black hickory, etc.

LOCATION III—STATION (A).	REMARKS.
Post oak . . . . . 8 Black oak. . . . . 6 Spanish oak. . . . . 2 Pin oak. . . . . 1 White ash. 1	Area, 2,500 square yards. Location, 11 miles from Leitchfield, on Falls of Rough road. Formation Chester. Note the absence of liriodendron on the Chester again. Average diameter of trees, 19 inches. Some dogwood and hickory not shown in the plot. Situation, hill-top, with a long western slope.

STATION (B).			REMARKS.
White oak (o. f.) . 14	av. diam. . 21	in.	Station B is a bench of the hill slope, 2,500 square yards in area. It shows well the decrease of white oak in the young timber, as well as the timber taking its place.
White oak (y. f.) .			
Pin oak (y. f.) . . 15	" . 11½	"	
Pin oak (o. f.) . .			
Black oak (o. f.) .			
Black oak (y. f.) . 13	" . 8	"	
Post oak (y. f.) . . 5	" . 8	"	
Post oak (o. f.) . .			
Pig hickory (o. f.), 2	" . 16½	"	
Pig hickory (y. f.), 8	" . 7½	"	
Ironwood 1			
The small bushes are about the same.			

LOCATION IV—STATION (A).			REMARKS.
Black sugar maple . 8 White sugar maple. 7	} av. diam. . . 22	in.	Location, lowlands on Pleasant Run, one mile from Falls of Rough. Area, 2,500 square yards. The timber here is distinctly swamp.
Black walnut (y. f.) . 4			
Sycamore (y. f.) . 2	" . . 13	"	
Shag. hickory . . 1	diam. . . . 24	"	
Chinquapin oak . . 2			
Red elm (small) . . 2			
Hawthorn 3			
Buckeye 1			
Willow 2			

In the Rough Creek region hackberry and box elder, prickly ash, liriodendron, white and red elm, spicewood, hickory, three varieties, white oak, beech, and the other common forest timber, is noted. Owing to the making of two long sections off the regular belt of timber, during which I made only running notes, the next plot of ground on which I numbered and averaged the timber was about ten miles from Cloverport.

LOCATION V—STATION (A).			REMARKS.
White oak 6	av. diam. . .	19 in.	Location, hill top 10 miles from Cloverport. Area, 2,500 square yards. Pin oak, etc., are also found in the locality, though not in the plot. Undergrowth largely pin oak.
Black oak. 3	" .	24 "	
Chestnut 3	" .	18 "	
Liriodendron . . . 2	" .	18 "	
Pig hickory 1	diam.	13 "	

STATION (B).			REMARKS.
White oak 21	av. diam. .	19 in.	Station (B) is a water shed nearly level. Area, 2,500 square yards. Pin oak, Spanish oak, and black oak are represented in the timber there, though not in the plot.
Pig hickory . . . 5	" .	18½ "	
Black gum. . . . 12	" .	10 "	
Liriodendron. . . 2	" .	17 "	
Sugar maple . . 1	diam. . . .	18 "	

LOCATION VI—STATION (A).		REMARKS.
Dogwood (flowering) . 26 White oak . . . . . 12 Liriodendron . . . . 13 Pig hickory. . . . . 2 Black oak . . . . . 2 Red oak . . . . . 1 Sassafras . . . . . 1 Black sugar maple. 1	av. diam. of old timber, 25 in.	Location, near Hawesville. Area, 2,500 square yards. Formation, coal measures. Situation, level.

A little generalization from the tables, which were carefully prepared with that object in view, will give an instructive idea of the present and future conditions of the timber in Western Kentucky. For instance, restricting ourselves to the old forest growth, a little calculation shows that it is composed as follows:

White oak	40	per cent.
Post oak	7	"
Red oak	½	"
Black oak	7	"
Hickory	8½	"
Chestnut	2	"
Spanish oak	2½	"
Liriodendron	10	"
Black gum	9	"
Pin oak	½	"
Dogwood	2	"
Sugar tree	8½	"
Sycamore	1	"
White ash	1	"
Maple	½	"

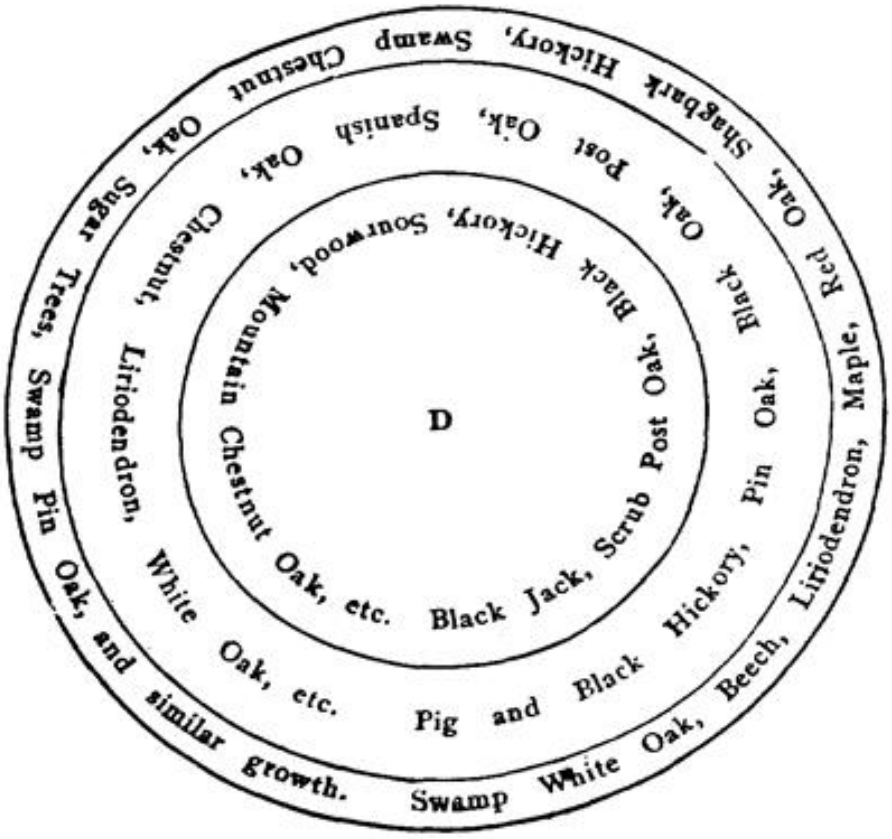
This table is not absolutely perfect, for no such tables could be. For instance, black walnut should appear in it, as a small amount of old forest walnut is found on the waters of Beech Fork of Clover Creek. But if I had introduced a section from that locality, walnut would have had a prominence which it cannot claim in Western Kentucky. For the same reason I did not introduce a section from any prominent creek bottom, where there would probably be 100 beech trees per acre, and no other timber at all. However, the table is as accurate as it is possible to get it, and fairly represents the timber of all the counties under consideration.

Now let us go over the tables and take the young forest timber only. In the same way we shall find its composition to be:

White oak	9.4	per cent.	
Post oak	3	"	nearly.
Black oak	36	"	"
Hickory	6.6	"	"
Liriodendron	2.36	"	"
Black gum	5.2	"	"
Pin oak	36	"	"
Sycamore	1	"	"
Black walnut	19	"	"

The difference between the two tables, showing the difference between the present and the coming forests, is remarkable. White oak has fallen from 40 per cent. of the old growth to a little over 9 per cent. of the young; while black oak and pin oak have risen from almost nothing in the old to 36 per cent. in the new forest. In other words, these worthless timbers are fast supplanting the white oak in Kentucky.

To these tables I shall now add a diagram showing the result of my observations in regard to the effect that height above drainage has upon the growth of timbers. While there are, of course, exceptions to this arrangement, still it is the most general expression of the distribution of timber, with reference to drainage, that can be given. The hills are so low in Western Kentucky that the points of the compass produce no appreciable effect on the timber:



If the hill, D, be divided into three belts, as in the diagram, each belt will be seen to have a growth somewhat peculiar to itself, wholly dependent upon its height above drainage. The timbers peculiar to each are indicated in the diagram. It will be noticed that the belt at the base of the hill is the narrowest, showing that, as a rule, swamp timbers do not extend very high above drainage. The middle belt of timber is the widest. The reason is, that timbers on a hillside change but little after leaving local drainage, until the rocky outcrops or the poor, thin shales near the top of the hill are reached. These shales or rocky cliffs, again, have their own timbers, the whole making three tolerably distinct belts, which can be easily traced on any considerable hill.

I also give below, condensed into table form, a complete list of the trees met with in my study:

ORDER CUPULIFERAE—MASTWORTS.

1. *Genus Quercus.*

White oak, Quercus alba (L.)
Red oak, Q. rubra (L.)
Pin oak, Q. palustris (Mx.)
Spanish oak, Q. fulcata (L.)
Black oak, Q. tinctoria (Bart.)
Post oak, Q. obtusiloba (Mx.)
Black jack, Q. nigra (L.)
Swamp laurel oak, Q. laurifolia (Mx.)
Swamp white oak, Q. bicolor (Willd.)
Chestnut oak, Q. castanea (Muhl.)
Swamp chestnut oak, Q. prinus (Willd.)
Var. monticola (Michx.)
Dwarf chestnut oak, Q. prinoides (Willd.)

2. *Genus Castanea.*

Chestnut, Castanea vesca (L.)

3. *Genus Fagus.*

Common beech, Fagus sylvatica (L.)
Red beech, F. ferruginea (Ait.)

4. *Genus Ostrya.*

Hop hornbeam or ironwood, Ostrya virginica (Willd.)

ORDER SALICACEÆ—WILLOWWORTS.

1. *Genus Salix.*

Basket osier, Salix riminalis (L.)
Green osier, S. petiolaris (Smith.)
Purple willow, S. purpurea (L.)

2. *Genus Populus.*

Western cotton tree, Populus angulata (Ait.)
American aspen, P. Tremuloides (Mx.)
Balm of gilead, P. candicans (Ait.)
Silver leaf poplar, P. alba (L.)

ORDER BETULACEÆ—BIRCHWORTS.

1. *Genus Betula.*

Black birch, Betula lenta (L.)
Red birch, B. nigra (Ait.)

2. *Genus Alnus.*

Smooth alder, Alnus serrulata (Willd.)

ORDER JUGLANDACEÆ—WALNUT.

1. *Genus Juglans.*

White walnut, Juglans cinerea (L.)
Black walnut, J. nigra (L.)

2. *Genus Carya.*

Shagbark hickory, Carya alba (Nutt.)
Shellbark hickory, C. sulcata (Nutt.)
Mockernut, C. tomentosa (Nutt.)
Pignut hickory, C. glabra (Sorr.)
White hickory, C. microcarpa (Nutt.)

ORDER PLATANACEÆ—SYCAMORE.

1. *Genus Platanus.*

Sycamore, plane tree, Platanus occidentalis (L.)

ORDER OLEACEÆ—OLIVES.

1. *Genus Fraxinus.*

White ash, Fraxinus americana (L.)
Blue ash, F. quadrangulata (Mx.)
Black ash, F. sambucifolia (Lam.)

ORDER ULMACEÆ—ELMWORTS.

1. *Genus Ulmus.*

Slippery elm (Red elm), Ulmus fulva (L).
White elm, U. americana (L).
Cork elm, U. racemosa (L.)
Winged elm (Whahoo), U. alata (Mx.)

2. *Genus Celtis.*

Hackberry, Celtis occidentalis (L.)

ORDER CORNACEÆ—CORNELS.

1. *Genus Cornus.*

Flowering dogwood, Cornus florida (L.)
Low cornel, C. canadensis (L.)

2. *Genus Nyssa.*

Black gum, Nyssa multiflora (Wang.)
Swamp black gum, N. uniflora (Walt.)

ORDER LAURACEÆ—LAURELS.

1. *Genus Sassafras.*
   Common sassafras, Sassafras officinale (Nees.)
2. *Genus Benzoin.*
   Spicewood, Benzoin odoriferum (Nees.)

ORDER ROSACEÆ—ROSEWORTS.

1. *Genus Cerasus.*
   Black cherry, Cerasus serotina (D. C.)
2. *Genus Prunus.*
   Red and yellow plum, Prunus americana (Misch.)
3. *Genus Cratagus.*
   Hawthorn (not a native) Cratagus oxycantha (L.)

ORDER ARTOCARPACEÆ—ARTOCARPS.

1. *Genus Morus.*
   Red Mulberry, Morus rubra (L.)

ORDER LEGUMINOSÆ.

1. *Genus Gleditschia.*
   Honey locust, Gleditschia triacanthus (L.)
2. *Genus Robinia.*
   Black locust, Robinia pseudacacia (L.)
3. *Genus Cercis.*
   Redbud (Judas tree), Cercis canadensis (L).

ORDER ACERACEÆ—MAPLES.

1. *Genus Acer.*
   Red maple (trident), Acer rubrum tridens (L).
   White maple, A. dasycarpum (Ehrh.)
   Sugar maple, A. saccharinum (L).
   Black sugar maple, A. nigrum (Mx.)
2. *Genus Negundo.*
   Box elder, Negundo aceroides (Moench).

ORDER SAPINDACEÆ—SOAPWORTS.

1. *Genus Æsculus.*
   Ohio buckeye, Æsculus glabra (Willd.)

ORDER ANACARDIACEÆ—SUMACHS.

1. *Genus Rhus.*
   Smooth sumach, Rhus glabra (L.)
   Large sumach, R. typhina (L.)

ORDER RUTACEÆ—RUEWORTS.

1. *Genus Xanthoxylum.*

Prickley ash, Xanthoxylum americanum (L.)

ORDER BIGNONACEÆ—TRUMPET FLOWERS.

1. *Genus Catalpa.*

Catalpa, Catalpa bignonioides (Walt.)

ORDER MAGNOLIACEÆ.

1. *Genus Liriodendron.*

Tulip tree (erroneously called yellow poplar), Liriodendron tulipfera (L.)

ORDER BERBERIDACEÆ.

1. *Genus Berberis.*

Berberry, Berberis vulgaris (L).

ORDER ANONACEÆ.

1. *Genus Asimina.*

Common papau, Asimina triloba (Dunal).

ORDER HAMAMELACEÆ—WITCH HAZELWORTS.

1. *Genus Liquidambar.*

Sweet gum, Liquidambar styraciflua (L.)

ORDER EBENACEÆ.

1. *Genus Dyospyros.*

Persimmon, Dyospyros virginiana (L.)

ORDER ERICACEÆ.

1. *Genus Oxydendrum.*

Sorrel tree, Oxydendrum arboreum (D. C.)

ORDER CAPRIFOLIACEÆ.

1. *Genus Sambucus.*

Pith elder, Sambucus canadensis (L.)

2. *Genus Viburnum.*

Black haw, Viburnum prunifolium (L.)

ORDER CALYCANTHACEÆ.

1. *Genus Calycanthus.*

Sweet shrub, Calycanthus floridus (L.)