THE LIGNEOUS FLORA OF RICHLAND COUNTY, ILLINOIS.

BY ROBERT RIDGWAY, OLNEY, ILLINOIS.

[The following is an abstract of a paper based on material collected during the years of 1914 to 1927, inclusive, and identified by the leading botanical authorities.]

Why investigation of the flora in certain parts of the United States has been so long neglected by botanists is little short of a psychological puzzle. The geographic distribution of plants is certainly an important part of botanical science; yet it is a common experience of local botanists to find that knowledge of this subject is very far from being exact. Two instances among the many that have been encountered by the writer will be sufficient to prove this assertion: Gray's "Manual" (seventh edition), Britton and Brown's "Illustrated Flora," and all other authoritative text-books on the botany of the Eastern United States that have been consulted, ascribe to *Viburnum dentatum* an extreme northeastern range, Michigan being given as its southwestern limit; yet that species has an extensive range over the central Mississippi Valley, occurring as far southward as the extreme southern portions of Illinois and Missouri; while *Malus platycarpa hoopesi,* which was known only from cultivated trees as recently as the date of publication of the second edition of Sargent's "Manual of the Trees of North America" (1922) occurs, rather plentifully, as an indigenous tree in Richland County, Illinois, as does also *M. angustifolia,* a southern species, not previously recorded (authentically) from farther northward than Pope and Johnson counties.

Few botanists seem to realize that natural conditions are changing so rapidly, not only in the more densely populated agricultural sections but also in parts less thickly settled, that it will soon be too late to ascertain the composition of the indigenous flora, indeed is already too late in many parts, where a greater or less number of the native plants are gone forever; others are so completely established by naturalization that it is now sometimes impossible to know

whether a species is really indigenous or not. The transformation of the country through deforestation, drainage, cultivation, pasturage, burning, and other agencies, the greater part of which has occurred within the memory of persons now living, is in some instances so profound that an individual born seventy-five years ago who left his home in childhood or early manhood would now scarcely recognize the country of his nativity.

The following remarks by Mr. Chas. C. Deam, State Forester of Indiana, will apply equally well to this portion, at least, of Illinois:

"The acquisition of additional data is rendered difficult or impossible, because 90 per cent of our area has been cleared. The original distribution of any species in Indiana can now be approximated only. The composition of our flora a few centuries hence can only be conjectured. No doubt several of our native species have already disappeared, and many more are doomed to extinction, because destructive agencies such as the cow and hog, axe and plow, and the steam dredge are ever busy. . . . Already the opportunity for obtaining data on the plant life of our prairie has gone. The opportunity for making a record of the original plant life of the barrens of Indiana has forever passed. The opportunity for acquiring a complete knowledge of the dune and lake flora is rapidly disappearing. When we motor over our improved highways among the fields of our alluvial bottoms, if we pause long enough to think, we will realize that the once virgin forest with its numerous native plants has disappeared forever." (Proc. Indiana Acad. Sci., Vol. 34, 1924 P. 39.) And this extract from a letter, dated April 22, 1918, from the late Dr. C. F. Millspaugh, Botanist of the Field Museum of Natural History, will show the need of botanical exploration in this portion of Illinois.

"I hope that you will be able to continue your very interesting and effective collecting and that this Museum may further benefit thereby. The more we work on the Illinois Flora the more we appreciate not only that there is deep need of the result that we hope to attain, but that the state has been all too meagerly worked in its most promising regions."

When Richland County was first settled the forests covered certainly much more than half, possibly as much as two-thirds, of the total area; but they are now reduced to about one-tenth, and of this remnant only 160 acres remain in a condition approaching that of the virgin forest. Such extensive deforestation within so short a time necessarily means the total extirpation of some of the more local trees, shrubs, and other plants; while drainage of swamps or marshy areas, grazing, and forest fires, have also contributed to this loss. The original prairie flora is practically gone, only small remnants remaining here and there, mostly along roadsides and fence-rows, where annual mowing and burning is steadily reducing not only the area and number of such remnants but the number of species composing them. Such places are, in fact, the last refuge of many native plants, both ligneous and herbaceous, chiefly species of the open country and margins or outskirts of the woodlands. One of these, the Chicasaw plum *(Prunus angustifolia)*, plentiful up to ten years ago, is now difficult to find; two of the wild crab-apples *(Malus lancifolia* and *M. platycarpa hoopesi)* have become relatively scarce, and the hawthorns *(Crataegus)*, while still fairly numerous, are widely scattered and far less abundant than they were a decade ago. Even from the woods themselves several species have practically disappeared. The writer has been able to locate, after ten years' search and inquiry, only three linden trees *(Tilia)* one beech tree, and two Kentucky coffee-trees *(Gymnocladus)* in the county.

Fifty years ago the cane *(Arundinaria macrosperma)* formed extensive and in places nearly impenetrable thickets in the bottoms of the Little Wabash and Fox rivers, and before the settlement of the country probably occupied the bottomlands of most of the streams. At the present time, however, every vestige of the cane has disappeared except in two areas of very limited extent. The mistletoe *(Phoradendron flavescens)*, once abundant, is now exceedingly rare, its scarcity being partly due to the disappearance of most of the mature trees of its principal host the common elm *(Ulmus americana)*. The white pond-lily *(Castalia odorata)* was once plentiful in Mutrie Slough and other

similar places, but these have been drained and the aquatic plants have, of course, disappeared.

Recognizing the urgency of prompt action, the writer has, during the past twelve years, devoted as much time as could be spared from other duties to the collecting of specimens of the now existing flora. Unfortunately his opportunities have been relatively few and available at irregular intervals, so that nothing like a systematic exploration has been possible; and consequently it is practically certain, when it is considered that so many species are more or less local, and that not more than 50 of the 670 (approximately) separate areas of woodland in the county have even been set foot in, that a considerable number could be added to this list.

The author's chief interest being in the woody plants, these have naturally received the most attention. Of herbaceous plants, only the grasses and sedges have received anything like special attention; as to the others, the genera *Aster* and *Solidago* are fairly well represented in the author's collection; the aquatic flora has been completely neglected, and it may be said that as to non-ligneous plants in general he has barely "skimmed the surface."

So far as the writer is aware, the only catalogue of the plants of southeastern Illinois north of the Ozark Uplift is Dr. Jacob Schneck's "Catalogue of the Flora of the Wabash Valley below the Mouth of White River", published in 1876 (Cox's Geological Survey of Indiana, volume for 1875, pp. 504-579), in which are listed 867 species of plants. Unfortunately, Dr. Schneck did not, in most cases, specify whether a given species was collected on the Illinois or the Indiana side of the Wabash River; neither did he distinguish between indigenous and naturalized species. From the writer's intimate acquaintance with Dr. Schneck, whom he often accompanied on his collecting trips, he is prepared to state that by far the greater part of the material on which the catalogue was based was collected in Wabash County, Illinois.[1] While very incomplete, from lack of time for thorough investigation of the local flora, Dr. Schneck's catalogue is nevertheless a most interesting and valuable

[1]Dr. Schneck was a physician with a large country practice, and most of his botanizing was done during visits to his patients in the country districts about Mt. Carmel.

contribution, especially from the standpoint of geographic distribution. His list includes twenty-two plants that were, at that time, far out of their known range, most of them being of southern distribution. A posthumous addition to Dr. Schneck's catalogue was published in 1911 (Proceedings of the Indiana Academy Science, 1911, pp. 365-369) by Mr. Chas. C. Deam, State Forester of Indiana, compiled from annotations in Dr. Schneck's handwriting in a copy of the original catalogue. In this paper 150 species are added to the list, making a total of 1017 species; but in this case also there is no indication, except in a few instances, of whether a particular species was found in Illinois or in Indiana.

In 1882 the present writer's "Notes on the Native Trees of the Lower Wabash and White River Valleys, in Illinois and Indiana" was published (Proc. U. S. National Museum, V. pp. 49-88). In this were enumerated, with annotations, 92 species of trees. The following year "Additions and Corrections to the List of Native Trees of the Lower Wabash" appeared (Botanical Gazette, VIII, Dec., 1883, pp. 345-352), and eleven years later, "Additional Notes on the Native Trees of the Lower Wabash Valley" (Proc. U. S. National Museum, XVII, 1894, pp. 409-421, pls. 10-14), both by the same author. All these were based, like Dr. Schneck's catalogue, on observations made on both sides of the Wabash, but chiefly in Wabash County, Illinois, and, like Dr. Schneck's catalogue, these papers were not sufficiently explicit concerning localities where the species mentioned were observed.

No mention seems to have been made of any plants of Richland County until 1921, when a most interesting and instructive paper by Mr. Ernest J. Palmer, entitled "Botanical Reconnaissance of Southern Illinois" appeared (Journ. Arnold Arboretum, 11, Jan., 1921, pp. 129-153). Although Mr. Palmer's paper was based essentially on investigations in the extreme southern counties (Union and Alexander to Gallatin), reference is made, among the 204 species of ligneous plants included in the paper, to 10 species observed in Richland County.[1] The following year

[1]The species mentioned by Mr. Palmer as having been seen by him in Richland County are: *Arundinaria macrosperma, Salix humilis rigidiuscula, Quercus lyrata, XQ. tridentata, Rosa palustris, Acer rubrum drummondi, Cornus stricta, Fraxinus profunda, Catalpa speciosa,* and *Viburnum dentatum.*

11 additional trees were accredited to Richland County in the second edition of Professor Sargent's "Manual of the Trees of North America", these being *Quercus borealis maxima, Q. runcinata, x. Q. exacta, x. Q. saulei,*[2] *Ulmus alta, U. serotina, Malus lancifolia, Crataegus phaenopyrum, Prunus lanata, P. munsoniana,* and *Fraxinus biltmoreana,* these records being based on material sent to Professor Sargent by the writer.

The collections and observations made by the author in various parts of Richland County, mostly since 1914, have, as previously stated, been made at irregular intervals, opportunities for the work being relatively few and brief. Nevertheless the best possible use has been made of the little time that was available, and nearly 2900 numbers, mostly of ligneous plants, have been collected. While extreme points in the county, except the northwest corner, have been visited, it has not been possible to make anything approaching an exploration of the entire area; indeed only about 5½ per cent of the separate wooded areas in the county have been explored. It is, therefore, evident that very much remains to be done before our knowledge of even the ligneous plants of Richland County can be anywhere near complete.

Except in the case of plants that are common and well known, or so distinct as not to require the dictum of experts, all the identifications are by leading botanical authorities. Most of the ligneous plants were determined by Professor C. S. Sargent or, during his illness, by Mr. E. J. Palmer (at the Arnold Arboretum), both of whom have been most kind and obliging. A series of the *Crataegi* (124 numbers) has been examined and, in part named, by Mr. W. W. Eggleston, assistant botanist in the Forest Service and Bureau of Plant Industry, U. S. Department of Agriculture. The grasses were identified by Professor A. S. Hitchcock and Mrs. Agnes Chase; other herbaceous plants mostly by Dr. B. L. Robinson, Dr. Wm. Trelease, Dr. J. N. Greenman, and the late Dr. C. F. Millspaugh; while a considerable collection, made several years prior to 1914 and deposited in the National Herbarium, was

[2]This, however, is an error, since *Q. montana*, one of the parent species, *XQ. saulei* being a hybrid of that species and *Q. alba*, does not occur in Richland County, the nearest point where it is known to grow indigenously being in Martin County, Indiana, about 60 miles farther east.

named by Mr. Paul C. Standley and Mr. E. S. Steele. Mr. B. F. Bush, of Courtney, Missouri, has rendered valuable help in determining certain forms of *Celtis, Fraxinus, Hypericum, Rosa, Tilia, Ulmus* and *Viburnum.*

A considerable part of the material sent, several years ago, to specialists for identification has not yet been reported on; consequently many species of herbaceous plants that might have been included in a catalogue of the Richland County flora must be omitted. This difficulty in obtaining authoritative identification of specimens has been a serious obstacle, wholly unforeseen and unexpected, and is much to be regretted.

The greater part of the material collected by the author in Richland County is deposited in the National Herbarium, the Gray Herbarium, and the herbaria of the Arnold Arboretum, the University of Illinois, the Field Museum of Natural History, and the Missouri Botanical Garden. The author has retained a set of the ligneous plants (except of the earlier collections) for reference.

As a result of the author's studies of the trees and shrubs of Richland County one fact stands out with great clearness; namely, that certain genera are, so far as their component forms are concerned, so little understood as to be in a condition little short of chaos, attempts to identify the species by any of the standard text-books being useless, because their satisfactory determination thereby is in many cases simply impossible. Such genera as *Cornus, Crataegus, Malus, Rosa, Rubus, Salix, Smilax,* and *Vitis* have certainly not been satisfactorily worked out; and the same, although perhaps to a less degree, may be said of *Carya, Amelanchier, Acer, Fraxinus, Tilia, Ulmus,* and *Viburnum.* Of these genera certain species, of course, are so well characterized that no difficulty is found in their identification; but others do not (at least so far as this region is concerned) conform to any of the species as described by standard authorities, or else agree equally well with more than one. The difficulty encountered by the writer in such cases he might himself attribute to his own inexperience or incompetence were it not for the fact that in forms of nearly all the genera named above he has received from leading botanists (sometimes from the same one), on different

occasions, two or even three, determinations for the same thing, based sometimes on specimens from the same individual tree or shrub.[1]

Only a brief statement can be given here as to the composition of the Richland County flora, as far as it is known. Of the total of 907 species and varieties that have been thus far identified, 216 are woody plants, the families most numerously represented being as follows:

Malaceae	42
Fagaceae	18
Salicaceae	16
Juglandaceae	15
Rosaceae	14
Aceraceae	12
Caprifoliaceae	10

The genera with the greatest number of species and varieties are:

Crataegus	31[2]
Quercus	17
Salix	14
Carya	13
Acer	11
Malus	8

In order to determine the life-zone relationships, or position, of Richland County, and especially to ascertain the extent to which its vegetation may be affected by the "climatic handicap" (as compared with an area of cor-

---

[1]Since the above was written the author has read an excellent paper by a well-known botanist from which the following is quoted. "Every complex genus in our Flora needs further elaboration. Among such may be mentioned Aster, Carex, Cyperus, Meibomia, Panicum, Quercus, Rosa, Rubus, and Viola. In fact there is scarcely a genus but which on critical examination presents surprises. Species have been misunderstood; strange species from the outside are found in our midst; even distinct undescribed species are not rarely brought to view." (Taxonomic Botany and the Washington Botanist. By A. S. Hitchcock, Bureau of Plant Industry; Journal of the National Academy of Sciences, Vol. VII, No. 9, pp. 251-263.)

[2]Many of the Crataegi are species previously known only from Southern Missouri. Two are new species, thus far known only from Richland County, having been described in 1925 (Journ. Arnold Aborstrun, Vol. VI, pp. 2, 3) by Professor Sargent. Some of the species included in the above enumeration have, however, been identified doubtfully or tentatively; but there are a considerable number of others, not included in the count, which have not yet been determined.

The forms of *Malus* include only one of doubtful identification. Among the others there are two of special interest, namely, *M. augustifolia*, a southern species heretofore recognized only in two of the extreme southern counties of Illinois (Pope and Johnson), and *M. platycarpa hoopesi*, a very distinct species, previously known only from cultivated trees. Both are not uncommon in Richland County.

The wild crab-apples and hawthorns are not only exceedingly difficult trees to understand, botanically, but, as "weed trees," are becoming scarcer each year. Therefore, in order to preserve as many of the forms of these two genera as practicable of the species indigenous to the county, and segregate them where they can be conveniently studied and compared, the author has been collecting them from "the wild" and transplanting them to Bird Haven, where there are now growing 119 specimens of *Crataegus* and 66 of *Malus*, besides 21 of the former and 8 of the latter that were already growing there when the land was purchased.

responding latitude near the Atlantic Coast), which is said to characterize the Middle West in general, it has, of course, been necessary to compare meteorological records for the two sections. This has been done by selecting nine Weather Bureau Stations in the Lower Wabash Basin and an equal number in the Middle Potomac Basin. The records for the former cover periods averaging 21.8 (19 to 38) years for temperature, and 28.1 (19 to 38) years for precipitation, those for the latter averaging 24.9 (13 to 46) years for temperature and 27.7 (13 to 48) years for precipitation,[1] the average elevation above sea-level of the former being 460.1 (384 to 500) feet, of the latter 237 (50 to 500) feet; all but three stations (one Wabash and two Potomac) being between the parallels of 38° and 39°, and these exceptions barely outside those limits.

Careful comparison of these records shows that the climatic difference between these two regions is in reality not greater than that between almost any two stations in either region, and that, so far as the Lower Wabash Valley is concerned, the alleged "climatic handicap" is rather insignificant and practically negligible as a factor affecting plant life.

The comparison shows that the Lower Wabash Basin has an excess of heat for the six warmer months amounting to 12° (by monthly averages) and for the six colder months a deficiency of 4.8°; that the mean maximum temperature averages higher for every month but three (December, January, and February), the deficiency for these amounting to 3.5°; that the mean minimum temperature also averages higher for every month but two (January and February), the deficiency for which is only 1.5°; and that while the highest recorded temperature is 4° higher (113° against 109°) the lowest recorded temperature is actually 1° *less* (—25° against —26°). As to seasonal averages, the Lower Wabash Basin shows an excess of heat amounting to 1.8° for Spring, 1.7° for Summer, and 1.4° for Autumn; and a deficiency of only 0.8° for Winter. The average date of the first Killing frost (or temperature of 32°) is exactly the same for the two regions (October 20); while that of

[1]For precipitation the average of 12 stations in the Lower Wabash Basin has been computed but only 9 for the Middle Potomac Basin, the records for one of the latter covering too short a period (6 years only).

the last Killing frost in Spring is three days earlier in the Lower Wabash Basin (April 15 against April 18).

As to precipitation, the Lower Wabash region shows an excess for each month except July and August, the total excess (by monthly averages being 3.34 inches, the deficiency for July being 0.30 and that for August 0.21 of an inch; the total amount for the year averaging 41.89 inches against 38.85 inches for the Middle Potomac region.

While collections of the local flora are far from being complete they have covered the ground sufficiently to indicate pretty clearly the position of Richland County in relation to life-zone areas. The following enumeration does not include several forms which at present are of doubtful status on account of insufficient material; should these prove to have been correctly identified (for example *Ulmus serotina*) they would increase considerably the number of species of southern range.

By species of northern, southern, or eastern range is meant those whose mass distribution is distinctly in the direction of those points of the compass. Those considered of central range are mainly if not strictly limited, as indigenous plants, to the Mississippi Valley, as a whole or in part, though a considerable number of these extend so far southward as to reach the Gulf States or, in some instances, even Florida, and therefore might almost as well be included with those of southern range; indeed, in some instances it is hard to decide as to the category in which a species should be placed.

Ligneous Plants of Richland County.

Species of northern range	13
Species of southern range	38
Species of central range	56
Species of eastern range	1
Species of general range	108
Total number	216

The herbaceous flora of Richland County is, as already stated, very imperfectly known, nevertheless, so far as the

species have been determined they show approximately the same relative proportions as the ligneous plants.

Herbaceous Plants of Richland County.

Species of northern range	59
Species of southern range	73
Species of central range	66
Species of eastern range	7
Species of general range	(486)[1]
Total number	691

[1]This number, however, includes many naturalized species, the elimination of which is prevented by lack of time.

A statement of the number of identified herbaceous species and varieties in each family that have been collected to date in Richland County may be of interest. They are here given in numerical order:

Compositae	100	Cichoriaceae	16
Poaceae	83	Violaceae	13
Cyperaceae	60	Asclepiadaceae	13
Fabaceae	30	Ammiaceae	12
Labiatae	22	Polypodiaceae	11
Scrophulariaceae	22	Cruciferae	11
Polygonaceae	21	Solanaceae	11
Ranunculaceae	17		

(All the other families are represented by less than 10 each. This enumeration also includes naturalized as well as indigenous species.)

The genera represented by 10 or more species are the following:

Carex	46	Viola	13
Aster	18	Panicum	12
Solidago	14	Asclepias	10