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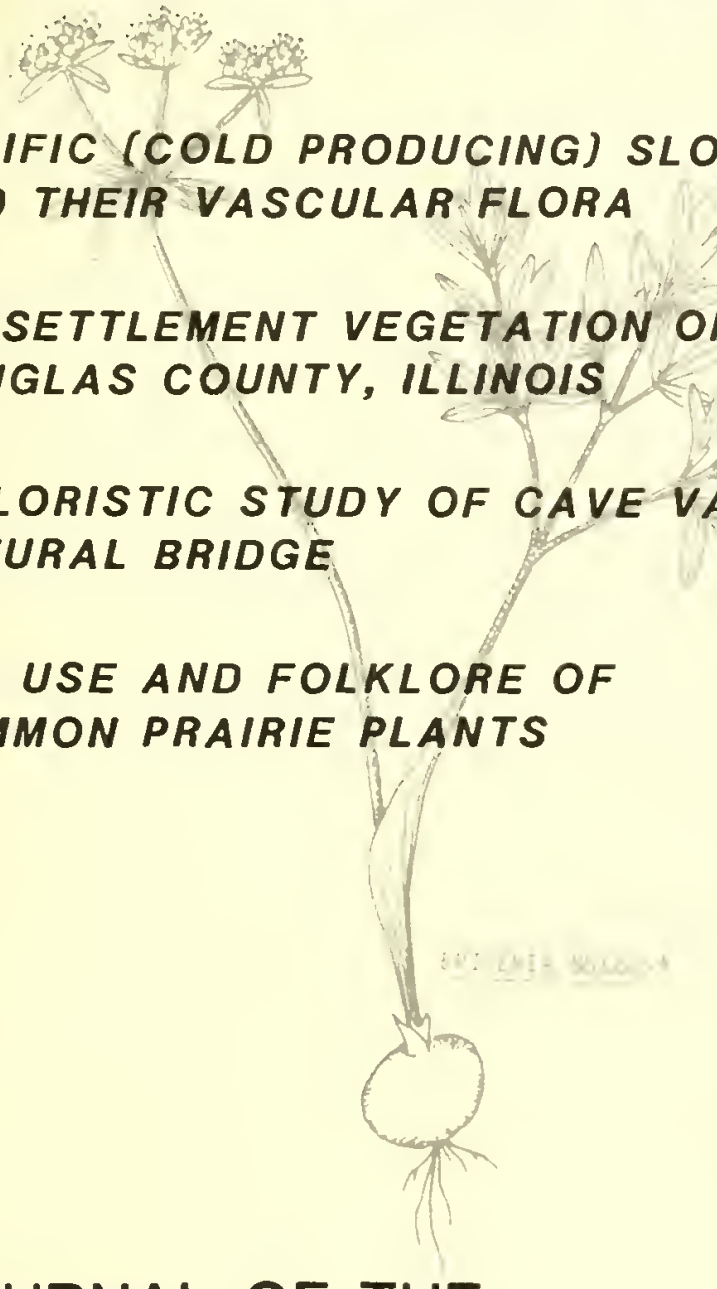

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ALGIFIC (COLD PRODUCING) SLOPES IN ILLINOIS AND THEIR VASCULAR FLORA

by

John E. Schwegman[1]

Algific slopes are cold producing talus slopes that retain subsurface ice through most of the summer. Refrigerated air draining from ice retaining crevices in the talus, and sometimes from "ice caves" in an adjoining buff, create a cold microclimate on the surface of the slope. Such slopes in the upper midwest frequently support relict northern and Pleistocene biota.

The term algific was coined by Frest (1981) and is adopted here. Thorne (1964) referred to these habitats as shaded north-facing talus slopes and Lammers (1983) as boreal slopes. A famous occurrence of this habitat in West Virginia is referred to as Ice Mountain by Hayden (1843). Mark Twain (1872) in "Roughing It" describes "natural icehouses" in talus along his stage route west through Utah.

Much attention has been focused on the midwest algific slopes in recent years with the development of natural area preservation programs and the realization that many endangered species inhabit them. Perhaps the most notable endangered species restricted to them is the Iowa Pleistocene Snail *(Discus maclintockii)*. Field work associated with determining the status of this animal, as summarized by Frest (1984), greatly expanded the knowledge of algific slopes in Iowa including the development of theories on their origin and development. One of the most notable plants on them is the Northern monkshood *(Aconitum noveboracense)*. The snail and monkshood are listed under federal law as endangered and threatened species respectively.

Algific slopes in the upper midwest are associated with the so called "Wisconsin Driftless Area" of Wisconsin, Iowa, Minnesota and Illinois which has escaped recent glaciation. They occur only in areas of well dissected topography with significant rock exposure and recent proximity to a continental ice sheet (Frest, 1984).

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Such proximity produces periglacial conditions in an otherwise temperate locale. Periglacial effects include creation of a fractured mechanical karst in the outcrop and an abundance of talus, both resulting from ice wedging and ice breakdown of rock. Thus the slopes owe their physical structure to recent Pleistocene glaciation even though they were not directly covered by the ice sheet.

Most midwestern algific slopes are developed in large porous carbonate rock units that cap eroded slopes and are underlain by a unit relatively impervious to ground water flow (Frest, 1984). These are Ordovican and Silurian limestones and dolomites. While sandstone units are present in the "Driftless Area" they have not developed algific slopes. However, the Ice Mountain of West Virginia is developed in sandstone (Hayden, 1843). All known algific slopes have a northerly exposure.

The role of groundwater in ice and climate modification on the slopes is uncertain. Hayden (1843) noted that the summer temperature of spring water emanating from the Ice Mountain talus was the same (52° F) as other springs in the county. This is considerably warmer than the air temperature on the slope of less than 40° F. Thorne (1964) attributes a cooling effect to seepage water flowing from crevices in the limestone at White Pine Hollow, Iowa. If so it is probably melt water from ice in the relatively shallowly fractured bedrock and not ground water at the mean temperature of the area. He gives no temperature for the water. Ground water probably contributes to ice build up in some slopes along with winter and spring precipitation. I have never seen water flowing from any of the algific slopes I have visited.

Soil on midwest algific slopes is apparently derived from loess and residuum and because of greater loess depth, probably averages deeper on Illinois slopes than on those west of the Mississippi River. Some Illinois slopes have very thin soil and are rocky while others have soil at least 15 cm deep on parts of the talus. This soil is very dark and organic rich as compared to forest soils on adjacent slopes. The extreme cold of some slopes appears to retard organic decomposition creating a unique upland high-organic soil.

I discovered the first algific slope in Illinois (Asgard) north of Blanding Landing in JoDaviess County in the spring of 1981

(Schwegman 1982). In the late autumn of 1982, Mr. Randy Nyboer and I flew an aerial survey of the Illinois part of the Driftless Area searching for talus deposits. Field visits were made during the following summer to determine which talus areas were algific. A total of 8 new slopes were discovered, but only one was as strongly developed as Asgard and it had been greatly disturbed by grazing cattle. All were within two miles of Asgard except 2 small areas on bluffs of the Galena River north of Galena and one on the Sinsinawa River.

After determining that the Asgard site was almost certainly the largest, coldest and least disturbed algific slope in Illinois, it seemed appropriate to describe its environment, vegetation and vascular plant species. To this end, I visited the slope April 25, June 5, July 30 and September 25, 1985. Plant species were listed on all trips and temperature slope and aspect observations were made July 30. Voucher specimens were collected for some of the more notable and confusing species. These are housed in the Botany Program herbarium of the Department of Conservation.

The Asgard slope is 200 feet above and 500 feet east of the Mississippi River in the SE$\frac{1}{4}$ of Sect 28, T27N, R1E, JoDaviess County, Illinois. It faces west-northwest with a 35° slope. The talus is below a 30 foot high cliff of limestone between elevations 800 and 870 feet. The talus rests on a strata of limestone that forms a "bench" extending some 30 feet west of its base in most places. At one point a small algific slope extends below the "bench". The slope is 300 feet long at its base but narrows toward the top. Talus rocks in the middle and upper slope average under 3 feet in diameter, but some large boulders occur along the base of the slope. The species list is for the talus slope including the large basal boulders and the adjoining "bench".

Temperature measurements were taken on July 30, 1985 at Asgard and two other nearby slopes. At Asgard the surface temperature at lower slope sites supporting relict northern plants was 42° F at 2 PM while the air temperature away from the slope was 65° F. At 25 cm down in the talus the temperature was 33° F indicating ice nearby. One of the other sites had temperatures as cold as Asgard but had been disturbed by grazing. The other slope had a cool 50° F, but not cold, surface reading. The cold air flows down the slope in a layer no more than 6 to 8 inches deep.

In addition to its impact on organic soil formation, the cold temperature probably alters the structure of the vegetation and the form of some plants. It definitely alters the flowering phenology of plants.

At Asgard the main slope is essentially devoid of trees apparently due to persistent cold at the rooting depths required for tree growth. The occasional paper birch *(Betula papyrifera)* and black Ash *(Fraxinus nigra)* on the slope probably occur on warm spots or areas of deeper surface soil. The slope is mostly dominated by herbs and mosses rooted in the soil on the surface of the talus.

An unusual form of *Lysimachia ciliata* with dwarf leaves grows at Asgard. This form may be due to cold-related growth retardation.

The cold affects flowering phenology by extending the flowering season for some plants. This effect apparently stems from slowed metabolism and is most pronounced in low herbs that scarcely rise above the 6 to 8 inch deep cold air layer. Spring flowering herbs such as *Arabis Lyrata, Campanula rotundifolia* and *Viola canadensis* bloomed all summer and were still in flower on the September 25 visit. *Aquilegia canadensis* and *Heuchera richardsonii* were still blooming on July 30.

The effect of the cold on vegetative recovery from soil disturbance is unknown. At the cold slope which appears to have been disturbed by cattle, patches 3 to 4 feet across are dominated by liverworts of the genus *Marchantia*. These are extremely cold spots that may be too cold for the typical *Cystopteris bulbifera* cover to survive. However, since cold patches at Asgard do not support similar liverwort communities, I interpret them as successional stages of recovery from past soil disturbance. Recovery appears to be very slow.

Vegetation on the Asgard slope is remarkable for its openness with no complete tree canopy or shrub cover. The slope is dominated by *Cystopteris bulbifera, Polymnia canadensis & Impatiens biflora* with scattered *Betula papyrifera* and *Fraxinus nigra* trees and clumps of *Cornus rugosa*. Most of the relict northern plants grow near the base o the slope, especially at its north end. Large boulders along the base of the slope support *Physocarpus opulifolius, Ribes cynosbati, Aralia nudicaulis* and other mesophytic species. The "bench" at the base of th

slope, which is influenced by cold air drainage from the slope, supports a forest of oaks and sugar maple *Acer saccharum* with an understory including *Cornus rugosa* and a diverse herb layer containing an abundance of *Viola canadensis*.

The following list includes 116 species of vascular plants which I have recorded for the Asgard slope. The taxonomy and sequence of families follows Mohlenbrock (1975). The species are listed alphabetically within families. Abundance is indicated as rare (less than 10 plants observed), local (abundant in part of suitable habitat) and common (abundant throughout its habitat).

Equisitaceae

Equisetum arvense. Local in lower talus slope, a forking branched variety.

Ophioglossaceae

Botrychium virginianum. Local at base of slope

Polypodiaceae

Asplenium rhizophyllum. Local on boulders at base of slope.
Cryptogramma stelleri. Local on cold rocks at base of slope.
Cystopteris bulbifera. Common and dominant on open slope.
Cystopteris fragilis. Local in rock crevices.
Pellaea glabella. Local on cliffs at top of slope.

Cupressaceae

Juniperus virginiana. Local on lower algific slope and on cliffs above main slope.

Poaceae

Andropogon gerardii. Rare at base of slope.
Festuca obtusa. Local on slope and at base of slope.
Oryzopsis racemosa. Local on slope.
Poa compressa. Local on boulders and slope.
Poa palustris. Local on slope.
Poa pratensis. Local on slope
Sphenopholis obtusata. Common at base of slope.

Cyperaceae

Carex artitecta. Local on boulders at base of slope.
Carex eburnea. Local on rocks and slopes.
Carex rosea. Rare at the base of the slope.
Carex sprengelii. Local at base of slope.

Liliaceae

Maianthemum canadense. Rare in cold spot at base of slope.
Polygonatum commutatum. Local at base of slope.
Smilacina raceomosa. Local at base of slope.
Uvularia grandiflora. Local at base of slope.

Smilacaceae	
Similax ecirrata.	Rare at base of slope.
Dioscoreaceae	
Dioscorea villosa.	Rare at base of slope.
Orchidaceae	
Orchis spectabilis.	Rare at base of slope.
Juglandaceae	
Juglans cinerea.	A large specimen at base of slope.
Betulaceae	
Betula papyrifera.	Common on slope and in adjacent woods.
Corylus cornuta.	Rare on the lower part of slope & north end.
Ostrya virginiana.	Local on lower part of slope.
Fagaceae	
Quercus muhlenbergii.	Local at base of slope.
Quercus rubra.	Local at base of slope.
Ulmaceae	
Ulmus rubra.	Local at base of slope.
Urticaceae	
Parietaria pensylvanica.	Local on tops of boulders
Pilea Pumila.	Local on talus on the slope.
Polygonaceae	
Polygonum scandens.	Local on the slope and in adjacent woods.
Chenopodiaceae	
Chenopodium gigantospermum.	Rare in and along the upper north edge of slope.
Chenopodium standleyanum.	Rare on the slope.
Ranunculaceae	
Actaea rubra.	Rare on lower slope.
Anemone virginiana.	Local on boulders at base of slope.
Aquilegia canadensis.	Common on boulders and along lower edge of slope.
Clematis verticillaris.	Local along lower edge and base of slope.
Hepatica nobilis var acuta.	Local at base of slope.

Menispermaceae	
Menispermum canadense.	Local at base of slope.
Papaveraceae	
Dicentra cucullaria.	Local at base of slope.
Sanguinaria canadensis.	Local at base of slope.
Cruiferae	
Arabis lyrata.	Common on lower part of slope.
Erysimum cheiranthoides L.	Local at lower north end of slope.
Saxifragaceae	
Heuchera richardsonii.	Local on the slope.
Ribes cynosbati.	Common at base of slope.
Rosaceae	
Amelanchier interior.	Local on lower slope at north end.
Fragaria americana.	Local on lower part of slope.
Physocarpus opulifolius.	Local on boulders at base of slope.
Prunus virginiana.	Common at base of slope.
Rosa acicularis.	Local on lower part of slope and in cold pockets at base of slope.
Rubus occidentalis.	Local on slope and at its base.
Leguminosae	
Amphicarpa bracteata.	Local at edge of slope.
Desmodium glutinosum.	Common at base of slope.
Oxalidaceae	
Oxalis stricta.	Rare in a boulder crevice at edge of slope.
Rutaceae	
Xanthoxylum americanum.	Local at base of slope.
Anacardiaceae	
Rhus glabra.	Rare on the lower part of the slope.
Toxicodendron radicans.	Common at the base of the slope.
Celastraceae	
Celastrus scandens.	Rare at base of slope.
Euonymus atropurpureus.	Rare on a boulder at base of slope.

Staphyleaceae	
Staphylea trifolia.	Local at base of slope.
Aceraceae	
Acer saccharum.	Local along edge of slope.
Balsaminaceae	
Impatiens biflora.	Common on the slope.
Vitaceae	
Parthenocissus vitacea.	Local on the north end of the slope
Parthenocissus quinquefolia.	Local at base of slope.
Vitis riparia.	Rare on a boulder at base of slope.
Tiliaceae	
Tilia americana	Local on the slope.
Violaceae	
Viola canadensis.	Common on the lower slope and at the base of the slope.
Viola pratincola.	A single sterile specimen on the slope.
Viola sororia.	Local at base of the slope.
Onagraceae	
Circaea quadrisulcata.	Local at base of slope.
Araliaceae	
Aralia nudicaulis.	Local on the lower slope.
Aralia racemosa.	Rare on lower slope.
Unbelliferae	
Osmorhiza claytoni.	Local at base of slope.
Cornaceae	
Cornus alternifolia.	Local at base of slope.
Cornus racemosa	Rare at base of slope
Cornus rugosa.	Common on slope and local at its base.
Primulaceae	
Lysimachia ciliata.	Rare dwarf-leaved specimen on the slope.
Oleaceae	
Fraxinus americana.	Local at base of slope.
Fraxinus nigra.	Local on the slope.

Apocynaceae	
Apocynum cannabinum.	Local at base of slope.
Convolvulaceae	
Calystegia sepium.	Local on the slope.
Hydrophyllaceae	
Hydrophyllum virginianum.	Local at base of slope.
Phrymaceae	
Phryma leptostachya.	Local at base of slope.
Labiatae	
Monarda fistulosa.	Rare on a boulder at base of slope.
Stachys tenuifolia.	Rare at base of slope.
Solanaceae	
Solanum americanum.	Rare in a crevice of boulder at south edge of slope.
Scrophulariaceae	
Veronicastrum virginicum.	Rare on lower slope.
Orobanchaceae	
Orobanche uniflora.	Rare on a large talus stone on lower part of slope.
Rubiaceae	
Galium boreale.	Local on lower half of slope.
Galium concinnum.	Local at base of slope.
Caprifoliaceae	
Lonicera prolifera.	Rare on boulder at base of slope.
Viburnum lentago.	Local on slope.
Viburnum rafinesquianum	Local along lower slope at north end.
Viburnum trilobum.	Rare on lower slope at north end.
Campanulaceae	
Campanula americana	Local at base of slope.
Campanula rotundifolia.	Local on lower slopes and on rock ledges at its base.

Compositae

Aster sagittifolius.	Local on talus on lower slope.
Aster shortii.	Common at base of slope.
Cacalia atriplicifolia.	Rare at base of slope.
Erigeron philadelphicus.	Rare on lower slope.
Eupatorium rugosum.	Local around edges of slope.
Helianthus divaricatus.	Rare at base of slope.
Helianthus strumosus.	Rare at base of slope.
Heliopsis helianthoides.	Rare at base of slope.
Polymnia canadensis.	Common on talus slope.
Prenanthes alba.	Rare on talus at north end.
Rudbeckia hirta.	Local in cold area at base of slope.
Solidago canadensis.	Local along base of slope.
Solidago felxicaulis	Common along base of slope.
Solidago sciaphila.	Local in cold area at base of slope.
Solidago ulmifolia.	Local on boulders and at base of slope.
Taraxicum officinale.	Local on boulders at base of slope.

The following plants were observed on other algific slopes in Illinois but were not present at Asgard.

Equisetum pratense	Rare on one slope near Asgard.
Taxus canadensis.	Local on slopes along Galena & Sinsinawa Rivs.
Arabis hirsuta.	Rare on the disturbed slope near Asgard.
Rubus strigosus.	Rare on the Sinsinawa River slope.
Circaea alpina.	Local on slopes along the Galena River.

Another species reported from a small perched algific slope along Carroll Creek in Carroll County is *Gymnocarpium robertianum*. I have not seen this population or a voucher specimen from it however.

Acknowledgements

I wish to thank Mr. Randy Nyboer for assistance in searching for algific slopes and gathering temperature data.

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PRESETTLEMENT VEGETATION OF DOUGLAS COUNTY, ILLINOIS

John E. Ebinger

The original land survey notes have occasionally been used to reconstruct presettlement vegetation, and according to Bourdo (1956) this information, when used in conjunction with non-survey sources of information, provides a good picture of the vegetation prior to settlement. In Illinois the extent of prairie has been determined using this material (Anderson, 1970), as well as the presettlement vegetation of both Lake County (Moran, 1976), and Kane County (Kilburn, 1959).

In the present study the presettlement vegetation of Douglas County, Illinois was reconstructed using the General Land Office Survey notes. Douglas County is located in east-central Illinois (88° 15′ W, 39° 50′ N) in the southern part of the Grand Prairie Section of the Grand Prairie Division of Illinois (Schwegman, 1973). The county has an area of 420 square miles, and the topography, for the most part, is flat to gently rolling due to ground moraine and low recessional moraine deposits resulting from Wisconsin glaciation. Two river systems traverse the county, the Embarras River in the eastern half, and the Kaskaskia River in the west. Both form relatively shallow valleys since down-cutting has only occurred since the last glaciation (16,000 years), and both rivers originated just to the north of Douglas County. The first settlement in Douglas County was established in 1829 (Hallbick and Fehrenbacher, 1971). Thus the vegetation present when the county was surveyed in 1821 and 1822 was not greatly changed by European man.

Microfilms of the General Land Office Survey notes were examined as were the original survey notes and plats at the Illinois State Archives, Springfield, Illinois. The job of the surveyor was to establish a grid system of township, range, and section lines by the placement of section and quarter section corner posts. In prairie and marsh areas only posts were used, while in timbered areas two witness trees were blazed and the distance and direction of these trees from the corner posts, the species, and dbh recorded. At the end of each mile the surveyor described the predominant vegetation encountered, and after surveying a township, a plat map was drawn from the field notes. These maps show the distribution of prairie, timber, lakes, streams, marshes, and other natural features.

From the surveyor's notes the number, size (dbh), species, and distance and direction from the corner posts were recorded for all witness trees. Also, the species and size (dbh) of all line trees as well as all notes concerning the vegetation were recorded. From these data the total individuals, total basal area (sq. ft.), average diameter, average distance to corner posts, relative density, relative dominance, and Importance Values (IV) were calculated. Frequency was computed by considering the witness trees at each corner post as comparable to a quadrat in which only two trees are present (Cottom and Curtis, 1949). The calculation of the IV follows the procedure outlined by McIntosh (1957) in which the IV is the sum of the relative density and the relative dominance.

The information from the surveyor's notes and plat maps, along with soil (Hallbick and Fehrenbacher, 1971) and topographic maps were then used to determine the extent of prairie and forest in the county (figure 1). As the surveyors accurately noted the point along the section lines where they entered another vegetation type the construction of the map was not difficult.

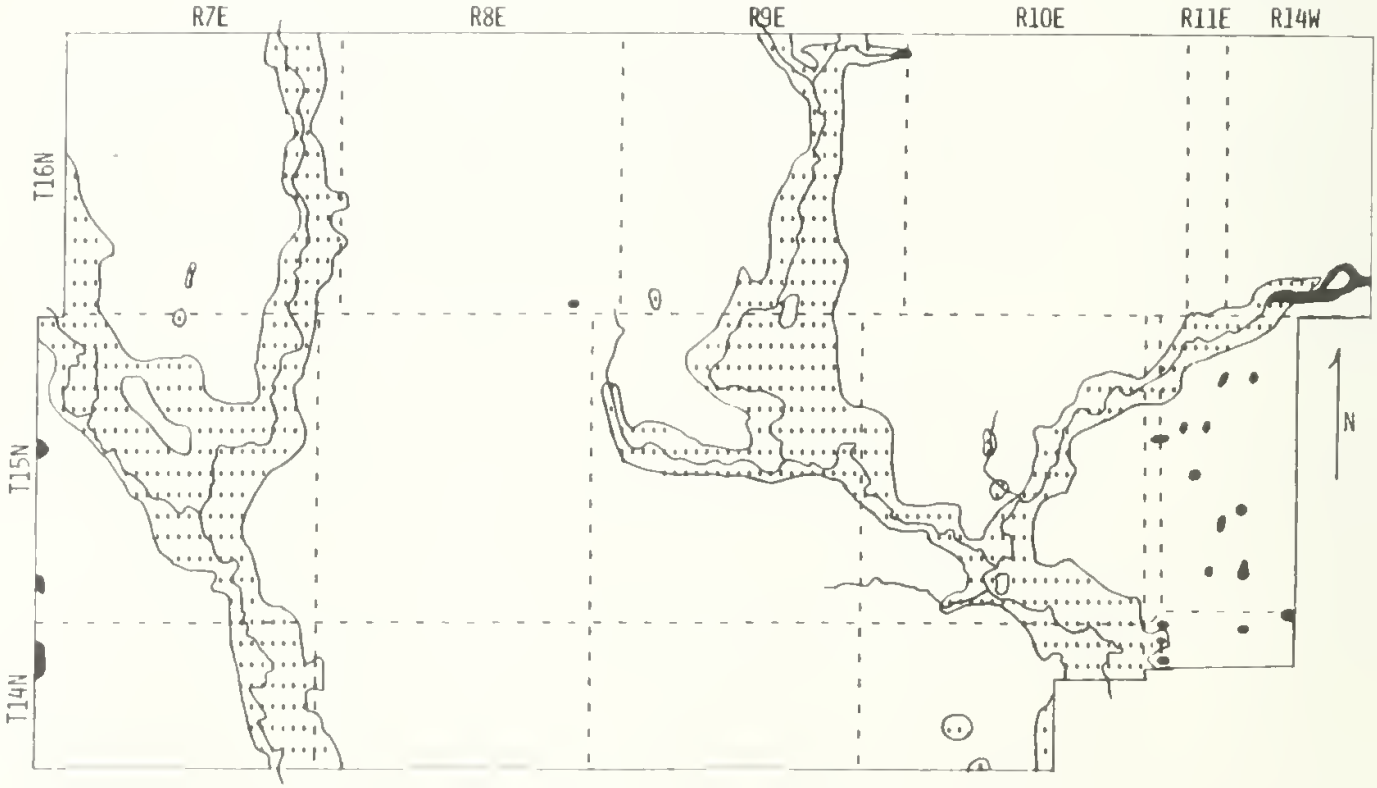

FIGURE 1. PRESETTLEMENT VEGETATION OF DOUGLAS COUNTY, ILLINOIS SHOWING THE DISTRIBUTION OF PRAIRIE AND FOREST . ALSO SHOWN ARE THE PONDS AND LAKES RECORDED IN THE ORIGINAL SURVEY.

Also, if the corner was in forest, witness trees were usually recorded, and if the corner was in prairie, it was so noted. However, since the interior of sections were not surveyed, small groves, small prairie inclusions in the forest, ponds, and other small natural features may not have been recorded.

A total of 13 species were listed as witness (tables 1 and 2) and line trees (table 3). The surveyor also used the collective names of hickory, elm, and ash. It is not possible to identify these to a particular taxa and all undoubtedly refer to two or more

Table 1. Total individuals, total basal areas, relative values, importance values, average diameters, average distance to corners, and frequencies for witness trees listed in the original land survey records for Douglas County, Illinois.

Common Name and Symbol	Total Ind.	Total Basal Area (sq. ft.)	Relative Density	Relative Dominance	Importance Value	Average Diameter (inches)	Average Distance to Corner (ft)	Frequency(%)
White Oak/WO	128	322.828	34.0	44.7	78.7	20.2	41.21	39
Hickory/Hi	77	88.329	20.4	12.2	32.6	14.1	36.95	28
Black Oak/BO	44	90.802	11.7	12.6	24.3	16.9	37.77	16
Elm/El	42	52.545	11.1	7.3	18.4	13.7	42.19	15
Black Walnut/BW	16	28.556	4.2	4.0	8.2	16.9	45.58	7
Silver Maple/SiM	10	25.096	2.7	3.5	6.2	15.5	28.31	4
Bur Oak/BuO	10	24.195	2.7	3.3	6.0	18.6	45.76	4
Red Oak/RO	12	16.080	3.1	2.2	5.3	15.1	182.88	5
Ash/As	12	13.118	3.1	1.8	4.9	13.7	25.74	5
Pin Oak/PiO	8	18.006	2.1	2.5	4.6	18.9	54.78	2
Sugar Maple/SuM	7	12.871	1.9	1.8	3.7	17.7	28.66	2
Sycamore/Sy	3	14.100	.8	2.0	2.8	29.3	46.86	1
Honey Locust/HL	3	10.233	.8	1.4	2.2	24.7	69.74	1
Red Mulberry/RM	3	2.841	.8	.4	1.2	13.0	32.34	1
Basswood/Ba	1	1.396	.3	.2	.5	16.0	51.48	1
Post Oak/PoO	1	.785	.3	.1	.4	12.0	67.98	1
Totals	377	721.781	100.0	100.0	200.0			

species. Also, since the surveyors listed only common names, some care was taken in assigning scientific names. For the most part little difficulty was encountered since the most abundant species are still common in woodlots throughout the county. Also, the probably scientific names correspond well with those of other authors, particularly Kilburn (1959) and Moran (1976). The only name which presented a problem was a few entries of Spanish oak. These were interpreted as pin oak (Quercus palustris Muenchh.). A few species that were not used as witness or line trees, were also recorded by the surveyors. These include hazel (Corylus americana), buckeye (Aesculus glabra), hackberry (Celtis occidentalis), sassafras (Sassafras albidum), redbud (Cercis canadensis), plum (Prunus sp.), spice (probably sassafras), briers (?), and vines(?).

Table 2. Witness tree diameter classes listed from the original land survey records for Douglas County, Illinois.

	Diameter Classes (in inches)																
Symbol	6-7	8-9	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	36-37	38+
WO	-	2	10	12	9	6	24	19	3	18	4	2	9	3	2	3	2
Hi	2	4	10	19	17	6	11	5	3	-	-	-	-	-	-	-	-
BO	-	6	8	5	7	2	3	3	-	5	-	1	1	-	-	-	3
El	2	4	7	10	5	3	7	2	-	-	-	-	1	-	-	1	-
BW	-	2	2	3	-	-	2	3	-	3	-	-	1	-	-	-	-
SiM	1	-	1	1	2	-	1	1	-	1	-	-	-	-	-	2	-
BuO	-	-	-	1	1	-	4	3	-	-	-	-	-	-	-	-	1
RO	-	1	2	1	3	-	1	4	-	-	-	-	-	-	-	-	-
As	-	-	4	3	2	-	1	2	-	-	-	-	-	-	-	-	-
PiO	-	-	1	2	-	2	-	-	-	1	-	-	2	-	-	-	-
SuM	-	-	-	2	1	-	1	1	-	2	-	-	-	-	-	-	-
Sy	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-
HL	-	-	-	-	-	-	-	1	-	1	-	-	1	-	-	-	-
RM	-	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-
Ba	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
PoO	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	5	19	46	61	47	21	55	44	6	31	4	4	17	3	2	6	6

A total of 1386 corners were surveyed in the county. Of this total 1175 were in prairie, while 211 were in forest. Of the corners in forest 171 had two witness trees listed, 35 had only one tree listed, while 5 had no trees listed. Prairie was the most widespread plant community, covering approximately 85% of the county, while forest communities, which were generally restricted to the major river systems, account for the remaining 15%. These are the only two plant communities listed by the surveyor.

Though prairie was the most common vegetation type in the county, little information concerning prairie vegetation is available in the surveyor's notes. No prairie species are listed, and the most common comments are "gently rolling prairie, good soil"; "rolling prairie"; or "level wet prairie". This latter comment is used to describe the prairie areas in the extreme western part and the extreme southeastern part of the county where numerous shallow ponds and lakes were reported by the surveyors (figure 1). In general, prairie appears to be more extensive on the west side of both river systems. This pattern suggest that periodic fires restricted forest development to the protected eastern side of the rivers (Gleason, 1913).

A total of 377 witness trees (table 1) and 51 line trees (table 3) were recorded in the surveyor's records for Douglas County. White oak is by far the most important species listed. Overall this species has an importance value of 78.7, an average diameter of 20.2 inches, and a frequency of 39% (table 1). The hickories as a species group are second in importance (IV of 32.6), followed by black oak (IV of 24.3), and elms (IV of 18.4). The remaining species all have importance values of less than 10, indicating their minor contribution in the presettlement forest. The most common surveyor's comment of the forested areas near the rivers is "timberland poor, hilly, unfit for agriculture", while near the prairie-forest border the most common comments are "timber level, wet soil", or "mostly thinly timbered, land level to somewhat broken". The surveyors also list hazel as the common understory species, though sassafras, spice, brush, briers, and vines are common entries. Of the few prairie groves reported, the only surveyor's comment was that the large grove in T14N R10E was a grove of hickories.

Table 3. Total individuals, total basal area, relative values, and average diameters for the line trees listed in the original land survey records for Douglas County, Illinois.

Symbol	Total Ind.	Total Basal Area (sq. ft.)	Relative Density	Relative Dominance	Importance Value	Average Diameter (inches)
WO	17	43.132	33.3	31.0	64.3	20.5
BO	11	46.444	21.5	33.4	54.9	26.1
El	8	16.976	15.6	12.2	27.8	19.0
Hi	8	8.780	15.6	6.3	21.9	14.0
BuO	1	11.540	2.0	8.3	10.3	46.0
BW	2	5.323	4.0	3.8	7.8	22.0
PiO	2	2.552	4.0	1.8	5.8	15.0
RO	1	2.181	2.0	1.6	3.6	20.0
As	1	2.181	2.0	1.6	3.6	20.0
TOTAL	51	139.109	100.0	100.0	200.0	

More than 70% of the witness trees recorded by the surveyors were between 10 and 21 inches dbh. Of the species recorded white oak is well represented in nearly all diameter classes (table 2), indicating its continued and high importance in the presettlement forest. Hickories, black oak, and elm are also well represented in the smaller and medium diameter classes, indicating their continued importance. This data must be used with caution, however, since witness tree selection was more or less arbitrary (Lutz, 1930). The surveyors commonly selected species that were durable and relatively easy to inscribe, also smaller trees were commonly not selected since the surface area needed to inscribe the blaze was too small, nor were large veteran trees due to their high mortality.

Due to the small number of witness trees, it was not possible to distinguish different forest types. However, the distribution of certain species indicate that different forest types did occur in the county. The presence of silver maple, sycamore, and honey locust indicate that floodplain and terrace forests occurred along the major river systems. Also bur oak, post oak, red oak, and pin oak were mostly reported at section corners near the prairie-forest border. In these areas the witness trees tended to average a greater distance from the corner posts than in most other forested areas, probably indicating a trend toward a more open, savannah type vegetation.

The composition of the presettlement forest is very similar to that of a forest surveyed by Ebinger, Phillippe, and Phillippe (1977) at Walnut Point State Park, Douglas County, Illinois. Though this forest has been subjected to past grazing and cutting, it represents the best remaining example of an upland, streamside forest in the upper part of the Embarras River watershed. In this forest white oak is the dominant species with an importance value of 65.65 (out of a possible 300), followed by black oak, pignut hickory, mockernut hickory, shagbark hickory, white ash, and red elm. Most of the remaining species listed were also found in the presettlement forests.

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A FLORISTIC STUDY OF CAVE VALLEY/POMONA NATURAL BRIDGE

Thomas Sadowski[1]

The Cave Valley/Pomona Natural Bridge area is located within the Cedar Creek/Cave Valley watershed of the Shawnee National Forest, Jackson County, Illinois. This diverse area is located approximately ten miles southwest of Carbondale, Illinois, and is included in sections 16, 17, 20, and 21, T10S, R2W. (Fig. 1). This heterogeneous area of both lowlands and uplands is 1.3 miles in a north-south direction and 1.5 miles in an east-west direction.

The Cave Valley/Pomona Natural Bridge area is included in the Shawnee Hills section of the Interior Low Plateau physiographic province of North America (Leighton et al., 1948). The Shawnee Hills section is characterized by a high east-west cuesta composed of resistant sandstone of the Pennsylvanian period (Harris et al., 1977). Schwegman (1973) segregated this section into the Greater and Lesser Shawnee Hills. The study area is included in the latter and is distinguished from the Greater Shawnee Hills in having hills of lower elevation and bedrock comprised of sandstone and limestone.

The action of streams, wind, and glaciation on the Pennsylvania strata formed the present topography. Of these, glacial outwash probably was the most influential weathering process (Desborough, 1960). The greatest elevation is 680 feet above mean sea level just south of the Natural Bridge in the SW1/4, sec. 17. (Fig. 1). The lowest elevation is 340 feet and is located in the Cedar Creek floodplain in the NW1/4, sec. 17. (Fig. 1). Differential erosion of a scarp trending northeast to southwest is responsible for this overall relief of 340 feet.

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The closely placed streams of the dendritic drainage pattern predominant in southern Illinois is characteristic of the area. Cave Creek, a tributary of Cedar Creek, forms the eastern boudary. The northwest boundary is formed by Cedar Creek, a tributary of the Big Muddy River. Additionally, three intermittent streams drain into these creeks.

Erosion of the uplifted substrate by Cedar Creek and Cave Creek formed the major valleys characterized by wide, flat floodplains with low gradients and meandering stream channels. The lowest elevations are found in these valleys.

Valleys formed by intermittent streams are of a different nature. The resistance of the sandstone has given rise to v-shaped valleys with gentle sloping sides. The most significant feature found in these lesser valleys is the Pomona Natural Bridge in the SW1/4, sec. 17 (Fig. 1). This monolithic bridge was formed by stream erosion hundreds of years ago when the stream was more active. The bridge spans 90 feet across a ravine 20 feet below (Mohlenbrock, 1973).

The Pomona Natural Bridge was cited for its well developed sandstone escarpments and bluffs, upland forest, and ravine communities (Voigt and Mohlenbrock, 1964). A description of each of these communities with emphasis on the corresponding plant assemblages was included. Two sites were designated as containing rare, endangered, or threatened biota in the Illinois Natural Areas Inventory (INAI), conducted for the Department of Conservation (K. Andrew West, District Biologist, Natural Heritage Program, Illinois Department of Conservation, pers. comm.). Areas containing rare, endangered, or threatened biota are classified by the INAI as Category II. One site designated as Category II is located in Cave Valley and supports a population of Hottonia inflata on the muddy edge of a pond. The second area cited as Category II wasn't visited by the INAI. This classification was based on a citing of the occurrence of the rare and endangered mint, Synandra hispidula near the Pomona Natural Bridge (Mohlenbrock, unpublished). Previous studies of the flora were of limited perspective. As a result, a complete and comprehensive plant list has never been compiled, nor have all the natural communities occurring in the area been described.

The following taxa have been collected from the Cave

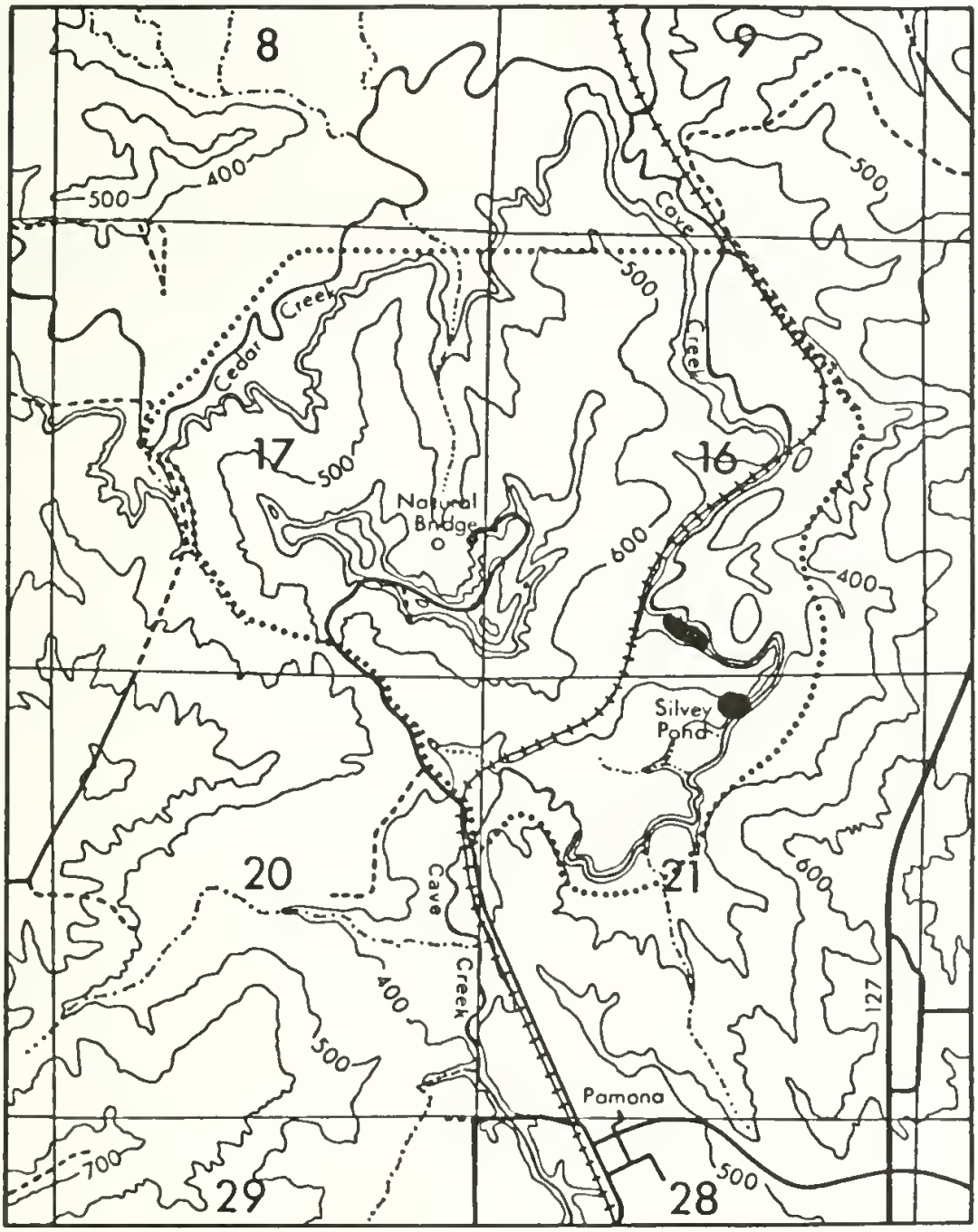

Figure 1. Topographic map of study area.
Boundaries outlined by dotted line.

taxon. A list of all collection numbers is available by writing the Department of Botany, Southern Illinois University, Carbondale, Illinois 62901. A single asterisk (*) before the species indicates the taxon has been previously unreported from Jackson County, Illinois (Mohlenbrock and Ladd, 1978).

Nomenclature follows that of Mohlenbrock (1975) for taxa previously recorded in Illinois. Lactuca hirsuta and Lathyrus hirsuta were not known to occur in Illinois prior to the publication of Guide to the Vascular Flora of Illinois (Mohlenbrock, 1975). For these taxa, nomenclature follows that of Steyermark (1963).

ACANTHACEAE

Ruellia humilis Nutt. var. longiflora (Gray) Fern.; upland forest.
Ruellia pedunculata Torr.; mesic forest.
Ruellia strepens L.; floodplain forest.

ACERACEAE

Acer barbatum Michx.; mesic forest.
Acer negundo L.; wet floodplain forest.
Acer rubrum L.; upland forest.
Acer saccharinum L.; wet floodplain forest.
Acer saccharum Marsh.; mesic forest.

AIZOACEAE

Mollugo verticillatus L.; cultural, old field.

ALISMACEAE

Alisma subcordatum Raf.; cultural, game opening.

AMARANTHACEAE

Froelichia gracilis (Hook.) Moq.; cultural, railroad bed.

ANACARDIACEAE

Rhus aromatica Ait.; sandstone glade.
Rhus copallina L.; cultural, railroad bed.
Rhus glabra L.; cultural, game opening.
Toxicodendron radicans (L.) Kuntze.; cultural, trail.

ANNONACEAE

Asimina triloba (L.) Dunal.; mesic forest.

APOCYNACEAE

Apocynum cannabinum L.; cultural, game opening.
*Vinca major L.; cultural, pine plantation.

ARACEAE

Arisaema dracontium (L.) Schott.; mesic forest.
Arisaema triphyllum (L.) Schott.; mesic forest.

ARISTOLOCHIACEAE

Asarum canadense L.; mesic forest.

ARALIACEAE

Aralia spinosa L.; mesic forest.
Mertensia virginica (L.) Pers.; mesic forest (L.)
Myosotis virginica (L.) BSP.; cultural, trail.

CACTACEAE

Opuntia compressa (Salisb.) Macbr.; sandstone glade.

CAMPANULACEAE

Campanula americana L.; floodplain forest.
Lobelia inflata L.; cultural, roadside ditch.
Lobelia siphilitica L.; mesic forest.
Specularia biflora (R. & P.) Fisch. & May.; upland forest.
Specularia perfoliata (L.) A. DC.; cultural.

CAPPARIDACEAE

Polanisia dodecandra (L.) DC.: cultural.

CAPRIFOLIACEAE

Lonicera japonica Thunb.; cultural, game opening.
Sambucus canadensis L.; cultural, roadside.

CARYOPHYLLACEAE

Arenaria serpyllifolia L.; cultural, railroad bed.
Cerastium nutans Raf.; cultural, roadside.
Cerastium viscosum L.; cultural, roadside.
Cerastium vulgatum L.; cultural, railroad bed.

Dianthus armeria L.; cultural, trail.
Silene stellata (L.) Ait.; cultural, trail.
Stellaria media (L.) Cyrillo; cultural, roadside.

CELASTRACEAE

Euonymus atropurpureus Jacq.; cultural, roadside.

CHENOPODIACEAE

Chenopodium missouriense Aellen; cultural, railroad bed.

CISTACEAE

Lechea tenuifolia Michx.; sandstone glade.

COMMELINACEAE

Commelina communis L.; cultural, game opening.
Tradescantia ohiensis Raf.; cultural, railroad bed.
Tradescantia subaspera Ker; mesic forest.

COMPOSITAE

Achillea millefolium L.; cultural, roadside.
Ambrosia artemisiifolia L.; cultural, roadside.
Ambrosia bidentata Michx.; cultural, roadside.
Ambrosia trifida L.; cultural, roadside.
Antennaria plantaginifolia (L.) Richards; upland forest.
Aster anomalus Engelm.; sandstone glade.
Aster cordifolius L.; sandstone glade.
Aster lateriflorus (L.) Britt.; upland forest.
Aster ontarionis Wieg.; cultural, trail.
Aster patens Ait.; upland forest.
Aster pilosus Willd.; cultural, game opening.
Aster sagittifolius Wedem. ex Willd.; upland forest.
Aster simplex Willd.; cultural, roadside ditch.
Aster turbinellus Lindl.; sandstone glade.
Bidens aristosa L.; cultural, game opening.
Bidens comosa (Gray) Wieg.; cultural, roadside ditch.
Boltonia asteroides (L.) L'Her.; cultural, game opening.
Cacalia atriplicifolia L.; mesic forest.
Cirsium discolor (Muhl.) Spreng.; cultural, game opening.
Eclipta alba (L.) Hassk.; cultural, roadside ditch.
Elephantopus carolinianus Willd.; mesic forest.
Erigeron annuus (L.) Pers.; floodplain forest.
Erigeron canadensis L.; cultural, roadside.
Erigeron philadelphicus L.; cultural, railroad bed.
Erigeron strigosus Muhl.; mesic forest.
Eupatorium coelestinum L.; cultural, game opening.
Eupatorium fistulosum Barratt; cultural, game opening.
Eupatorium perfoliatum L.; cultural, roadside ditch.
Eupatorium purpureum L.; mesic forest.
Eupatorium rugosum Houtt.; mesic forest.
Eupatorium serotinum Michx.; mesic forest.
Helenium flexuosum Raf.; cultural, railroad bed.
Helianthus annuus L.; cultural, railroad bed.
Helianthus decapetalus L.; upland forest.
Helianthus divaricatus L.; upland forest.
Helianthus hirsutus Raf.; upland forest.
Helianthus microcephalus Torr. & Gray; mesic forest.
Helianthus petiolaris Nutt.; cultural, game opening.
Helianthus strumosus L.; cultural, trail.
Helianthus tuberosus L. var. subcanescens Gray; mesic forest.
Heliopsis helianthoides (L.) Sweet; mesic forest.
Hieracium gronovii L.; upland forest.
Krigia biflora (Walt.) Blake.; sandstone glade.
Krigia dandelion (L.) Nutt.; upland forest.

Krigia oppositifolia Raf.; upland forest.
Lactuca canadensis L.; cultural, railroad bed.
Lactuca floridana (L.) Gaertn.; cultural, roadside.
*Lactuca hirsuta Muhl.; cultural, railroad bed.
Lactuca serriola L.; cultural, roadside.
Matricaria matricarioides (Less.) Porter; cultural, roadside.
Rudbeckia hirta L.; cultural, roadside.
Senecio aureus L.; cultural, roadside ditch.
Senecio glabellus Poir.; floodplain forest.
Silphium perfoliatum L.; cultural, game opening.
Solidago caesia L.; mesic forest.
Solidago canadensis L.; cultural, game opening.
Solidago juncea Ait.; sandstone glade.
Solidago nemoralis Ait.; upland forest.
Solidago patula Muhl.; cultural, roadside ditch.
Solidago rugosa Mill.; cultural, roadside ditch.
Solidago speciosa Nutt.; upland forest.
Solidago ulmifolia Muhl.; mesic forest.
Taraxacum officinale Weber.; cultural, roadside.
Tragopogon dubius Scop.; cultural, railroad bed.
Verbesina alternifolia (L.) Britt.; occasional, roadside.
Verbesina helianthoides Michx.; upland forest.
Veronia gigantea (Walt.) Trel.; cultural, game opening.
Veronia missurica Raf.; cultural, game opening; common.

CONVOLVULACEAE

Calystegia sepium (L.) R. Br. var. americana (Sims.) Mohlenbr.; cultural, railroad bed.
Convolvulus arvensis L.; cultural, railroad bed.
Cuscuta campestris Yuncker.; cultural, trail.
Cuscuta gronovii Willd.; cultural, railroad bed.
Ipomoea hederacea (L.) Jacq.; cultural, railroad bed.
Ipomoea pandurata (L.) G. F. W. May.; cultural, railroad bed.

CORNACEAE

Cornus florida L.; mesic forest.

CRUCIFERAE

Arabidopsis thaliana (L.) Heynh.; cultural, game opening.
Arabis laevigata (Muhl.) Poir.; mesic forest.
Barbarea vulgaris R. Br. var. arcuata (Opiz) Fries; cultural, railroad bed.
Capsella bursa-pastoris (L.) Medic.; cultural, roadside.
Cardamine bulbosa (Schreb.) BSP.; mesic forest.
Cardamine hirsuta L.; mesic forest.
Cardamine pensylvanica Muhl.; mesic forest.
Draba brachycarpa Nutt.; cultural, old field.
Dentaria laciniata Muhl.; mesic forest.
Lepidium campestre (L.) R. Br.; cultural, railroad bed.
Lepidium virginicum L.; cultural, railroad bed.
Thlaspi arvense L.; cultural, railroad bed.

CUCURBITACEAE

Melothria pendula L.; cultural, railroad bed.

CUPRESSACEAE

Juniperus virginiana L.; sandstone glade.

CYPERACEAE

Carex abdita Bickn., upland forest.
Carex annectens Bickn.; floodplain forest.
Carex artitecta Mackenz.; upland forest.
Carex blanda Dewey; mesic forest.
Carex caroliniana Schwein.; mesic forest.
Carex cephalophora Muhl.; upland forest.
Carex crinita Lam.; pond.

Carex crus-corvi Shuttlew.; floodplain forest.
Carex digitalis Willd.; upland forest.
Carex flaccosperma Dewey; mesic forest.
Carex frankii Kunth.; mesic forest.
Carex glaucodea Tuckerm.; mesic forest.
Carex grayii Carey; floodplain forest.
Carex hirsutella Mackenz.; upland forest.
Carex jamesii Schwein.; mesic forest.
Carex leavenworthii Dewey; mesic forest.
Carex lupuliformis Sartwell; shrub swamp.
Carex lupulina Muhl.; shrub swamp.
Carex muhlenbergii Schkuhr; upland forest.
Carex muhlenbergii Schk. var. enervis Boott; upland forest.
Carex normalis Mackenz.; mesic forest.
Carex projecta Mackenz.; cultural, trail.
Carex retroflexa Muhl.; upland forest.
Carex rosea Schkuhr; mesic forest.
Carex scoparia Schkuhr; shrub swamp.
Carex shortiana Dewey; cultural, trail.
Carex squarrosa L.; cultural, trail.
CArex stipata Muhl.; mesic forest.
Carex torta Boott; mesic forest.
Carex tribuloides Wahlenb.; cultural, game opening.
Carex umbellata Schkuhr; sandstone glade.
Carex vulpinoidea Michx.; cultural, trail.
Cyperus esculentus L.; cultural, roadside.
Cyperus esculentus L. var. leptostachyus Boeckl.; cultural, roadside ditch.
Cyperus ovularis (Michx.) Torr.; cultural, game opening.
Cyperus strigosus L.; cultural, trail.
Eleocharis obtusa (Willd.) Schult.; cultural, game opening.
Scirpus atrovirens Willd.; cultural, roadside ditch.

DIOSCOREACEAE

Dioscorea quaternata (Walt.) J. F. Gmel.; mesic forest.
Dioscorea villosa L.; mesic forest.

EBENACEAE

Diospyros virginiana L.; cultural, game opening.

ELAEAGNACEAE

Elaeagnus angustifolia L.; cultural, game opening.

ERICACEAE

Vaccinium arboreum Marsh.; sandstone glade.

EUPHORBIACEAE

Acalypha gracilens Gray; upland forest.
Acalypha rhomboidea Raf.; cultural, roadside.
Acalypha virginica L.; cultural, game opening.
Chamaesyce maculata (L.) Small; cultural, railroad bed.
Chamaesyce supina (Raf.) Moldenke; cultural, railroad bed.
Croton monanthogynus Michx.; sandstone glade.
Crotonopsis elliptica Willd.; sandstone glade.
Euphorbia corollata L.; upland forest.
Poinsettia dentata (Michx.) Kl. & Garcke; cultural, railroad bed.

EQUISETACEAE

Equisetum arvense L.; floodplain forest.

FAGACEAE

Fagus grandifolia Ehrh.; mesic forest.
Quercus alba L.; mesic forest.
Quercus coccinea Muenchh.; sandstone glade.
Quercus imbricaria Michx.; sandstone glade.
Quercus marilandica Muenchh.; sandstone glade.
Quercus michauxii Nutt.; mesic forest.

Quercus muhlenbergii Engelm.; mesic forest.
Quercus palustris Muenchh.; mesic forest.
Quercus rubra L.; mesic forest; common.
Quercus stellata Wangh.; upland forest.
Quercus velutina Lam.; upland forest.

GENTIANACEAE

Obolaria virginica L.; mesic forest.
Swertia caroliniensis (Walt.) Kuntze; mesic forest.

GERANIACEAE

Geranium carolinianum L.; cultural, railroad bed.
Geranium maculatum L.; mesic forest.

HAMAMELIDACEAE

Liquidambar styraciflua L.; floodplain forest.

HYDROPHYLLACEAE

Hydrophyllum appendiculatum Michx.; mesic forest.
Hydrophyllum canadense L.; mesic forest; common
Hydrophyllum virginianum L.; mesic forest.

HYPERICACEAE

Ascyrum hypericoides L. var. multicaule (Michx.) Fern.; sandstone glade.
Hypericum drummondii (Grev. & Hook.) Torr. & Gray; upland forest.
Hypericum gentianoides (L.) BSP.; sandstone glade.
Hypericum punctatum Lam.; cultural, roadside.

IRIDACEAE

Belamcanda chinensis (L.) DC.; mesic forest.
Iris pseudacorus L.; cultural, game opening.
Iris shrevei Small; cultural, railroad bed.
Sisyrinchium angustifolium Mill.; cultural, roadside.

JUGLANDACEAE

Carya glabra (Mill.) Sweet; upland forest.
Carya laciniosa (Michx.) Loud.; mesic forest.
Carya ovalis (Wang.) Sarg.; upland forest.
Carya ovata (Mill.) K. Koch; mesic forest.
Carya tomentosa (Poir.) Nutt.; upland forest.
Junglans cinerea L.; floodplain forest.

JUNCACEAE

Juncus dudleyi Wieg.; cultural, roadside.
Juncus effusus L. var. solutus Fern. & Wieg.; shrub swamp.
Juncus interior Wieg.; cultural, roadside.
Juncus marginatus Rostk.; cultural, game opening.
Juncus secundus Beauv.; sandstone glade.
Juncus tenuis Willd.; cultural, trail.
Juncus torreyi Coville; cultural, game opening.
Luzula multiflora (Retz.) Lejeune; upland forest.

LABIATAE

Agastache nepetoides (L.) Ktze.; mesic forest.
Blephilia ciliata (L.) Benth.; cultural, railroad bed.
Blephelia hirsuta (Pursh) Benth.; shrub swamp.
Collinsonia verna Nutt.; mesic forest.
Cunila origanoides (L.) Britt.; upland forest.
Glechoma hederacea L. var. micrantha Moricand; floodplain forest.
Lamium purpurem L.; cultural, roadside.
Lycopus americanus Muhl.; cultural, game opening.
Lycopus rubellus Moench.; floodplain forest.
Monarda bradburiana Beck; cultural, roadside.

Monarda fistulosa L.; cultural, game opening.
Perilla frutescens L.; cultural, trail.
Prunella vulgaris L. var. lanceolata (Bart.) Fern.; cultural, game opening.
Pycnanthemum incanum (L.) Michx.; cultural, game opening.
Pycnanthemum tenuifolium Schrad.; mesic forest.
Scutellaria incana Biehler; cultural, game opening.
Scutellaria lateriflora L.; shrub swamp.
Scutellaria ovata Hill var. versicolor (Nutt.) Fern.; mesic forest.
Scutellaria parvula Michx. var. leonardii (Epling) Fern.; upland forest.
Stachys palustris L. var. phaneropoda Weath.; cultural, roadside.
Stachys tenuifolia Willd.; cultural, trail.
Stachys tenuifolia Willd. var. hispida (Pursh) Fern.; floodplain forest.
Synandra hispidula (Michx.) Baill.; mesic forest.
Teucrium canadense L. var. virginicum (L.) Eat.; cultural, railroad bed.

LAURACEAE

Lindera benzoin (L.) Blume; floodplain forest.
Sassafras albidum (Nutt.) Nees; cultural, roadside.

LEGUMINOSAE

Amphicarpa bracteata (L.) Fern.; cultural, pine plantation.
Amphicarpa bracteata (L.) Fern. var. comosa (L.) Fern.; cultural, railroad bed.
Apios americana Medic.; cultural, railroad bed.
Cassia fasciculata Michx.; cultural, railroad bed.
Cassia nictitans L.; cultural, railroad bed.
Cercis canadensis L.; mesic forest.
Clitoria mariana L.; cultural, game opening.
Desmanthus illinoensis (Michx.) MacM.; cultural, railroad bed.
Desmodium canescens (L.) DC.; cultural, railroad bed.
Desmodium dillenii Darl.; upland forest.
Desmodium glutinosum (Muhl.) Wood; upland forest.
Desmodium nudiflorum (L.) DC.; mesic forest.
Desmodium paniculatum (L.) DC.; cultural, game opening.
Desmodium pauciflorum (Nutt.) DC.; mesic forest.
Gleditsia triacanthos L.; floodplain forest.
*Lathyrus hirsutus L.; cultural, railroad bed.
Lespedeza cuneata (Dum-Cours.) G. Don; cultural, railroad bed.
Lespedeza hirta (L.) Hornem.; upland forest.
Lespedeza striata (Thunb.) Hook. & Arn.; cultural, game opening.
Medicago lupulina L.; cultural, railroad bed.
Melilotus alba Desr.; cultural, roadside.
Melilotus officinalis (L.) Lam.; cultural, railroad bed.
Psoralea psoralioides (Nutt.) var. eglandulosa (Ell.) Freeman; upland forest.
Robinia pseudoacacia L.; cultural, roadside.
Strophostyles helvola (L.) Ell.; cultural, railroad bed.
Strophostyles umbellata (Muhl.) Britt.; upland forest.
Stylosanthes biflora (L.) BSP.; upland forest.
Trifolium campestre Schreb.; cultural, game opening.
Trifolium dubium Sibth.; cultural, game opening.
Trifolium hybridum L.; cultural, trail.
Trifolium pratense L.; cultural, roadside.
Trifolium repens L.; cultural, roadside.
*Trifolium resupinatum L.; cultural, trail.
Vicia dasycarpa Ten.; cultural, railroad bed.

LEMNACEAE

Lemna obscura (Austin) Daub.; pond.
Spirodela polyrhiza (L.) Schleiden; pond.

LENTIBULARIACEAE

Utricularia vulgaris L.; pond.

LILIACEAE

Allium canadense L.; cultural, railroad bed.
Asparagus officinalis L.; cultural, roadside.
Erythronium americanum Ker; mesic forest.
Hemerocallis fulva L.; cultural, game opening.
Lilium michiganense Farw.; mesic forest.
Narcissus poeticus L.; cultural, game opening.
Narcissus pseudo-narcissus L.; cultural, game opening.
Nothoscordum bivalve (L.) Britt.; sandstone glade.
Ornithogalum umbellatum L.; cultural, game opening.
Polianthes virginica (L.) Shinners; sandstone glade.
Polygonatum commutatum (Schult.) A. Dietr.; mesic forest.
Smilacina racemosa (L.) Desf.; mesic forest.
Trillium recurvatum Beck; mesic forest.
Yucca filamentosa L. var. smalliana (Fern.) Ahles; cultural, game opening.

LINACEAE

Linum medium (Planch.) Britt. var. texanum (Planch.) Fern.; sandstone glade.

LYTHRACEAE

Ammannia coccinea Rottb.; cultural, railroad bed.
Cuphea petiolata (L.) Koehne; cultural, railroad bed.

MAGNOLIACEAE

Liriodendron tulipifera L.; mesic forest.

MALVACEAE

Abutilon theophrastii Medic.; cultural, railroad bed.

MENISPERMACEAE

Menispermum canadense L.; cultural, railroad bed.

MORACEAE

Morus rubra L.; mesic forest.

NYCTAGINACEAE

Mirabilis nyctaginea (Michx.) MacM.; cultural, railroad bed.

NYMPHAEACEAE

Nuphar luteum L. ssp. variegatum (Engelm.) Beal; pond.

OLEACEAE

Fraxinus americana L.; upland forest.
Fraxinus pensylvanica Marsh.; mesic forest.
Fraxinus pensylvanica Marsh. var. subintegerrima (Vahl) Fern.; floodplain forest.

ONAGRACEAE

Circaea quadrisulcata (Maxim.) Franch. & Sav. var. canadensis (L.) Hara; floodplain forest.
Epilobium coloratum Muhl.; pond.
Jussiaea repens L. var. glabrescens Ktze.; pond.
Ludwigia alternifolia L.; mesic forest.
Oenothera biennis, L. var. canescens Torr. & Gray; cultural, game opening.

OPHIOGLOSSACEAE

Botrychium biternatum (Sav.) Underw.; upland forest.
Botrychium virginianum (L.) Sw.; mesic forest.

ORCHIDACEAE

Aplectrum hyemale (Muhl.) Torr.; mesic forest.

OROBANCHACEAE

Epifagus virginiana (L.) Bart.; mesic forest.

OXALIDACEAE

Oxalis dillenii Jacq.; cultural, roadside.
Oxalis stricta L.; cultural, old field.
Oxalis violacea L.; sandstone glade.

PAPAVERACEAE

Corydalis flavula (Raf.) DC.; floodplain forest.
Dicentra cucullaria (L.) Bernh.; mesic forest.
Sanquinaria canadensis L.; mesic forest.

PASSIFLORACEAE

Passiflora lutea L. var. glabriflora Fern.; cultural, roadside.

PHRYMACEAE

Phryma leptostachya L.; mesic forest.

PHYTOLACCACEAE

Phytolacca americana L.; cultural, roadside.

PINACEAE

Pinus echinata Mill.; cultural, pine plantation.

PLANTAGINACEAE

Plantago aristata Michx.; cultural, roadside.
Plantago lanceolata L.; cultural, roadside.
Plantago rugelii Dcne.; cultural, roadside.
Plantago virginica L.; cultural, game opening.

PLATANACEAE

Platanus occidentalis L.; floodplain forest.

POACEAE

Agropyron smithii Rydb.; cultural, railroad bed.
Agrostis alba L.; cultural, roadside.
Agrostis hyemalis (Walt.) BSP.; mesic forest.
Alopecurus carolinianus Walt.; cultural, game opening.
Andropogon virginicus L.; cultural, railroad bed.
Aristida purpurascens Poir.; sandstone glade.
Arundinaria gigantea (Walt.) Chapm.; floodplain forest.
Brachelytrum erectum (Schreb.) Beauv.; mesic forest.
Bromus commutatus Schrad.; cultural, railroad bed.
Bromus pubescens Muhl.; mesic forest.
Bromus racemosus L.; cultural, roadside.
Bromus secalinus L.; cultural, railroad bed.
Bromus tectorum L.; cultural, roadside.
Chasmanthium latifolium (Michx.) Yates; mesic forest.
Cinna arundinacea L.; mesic forest.
Dactylis glomerata L.; cultural, game opening.
Danthonia spicata (L.) Beauv.; sandstone glade.
Diarrhena americana Beauv. var. obovata Gleason; floodplain forest.
Digitaria sanguinalis (L.) Scop.; cultural, roadside.
Echinochloa pungens (Poir.) Rydb.; cultural, old field.
Echinochloa pungens (Poir.) Rydb. var. wiegandii Fassett; cultural, roadside.
Eleusine indica (L.) Gaertn.; cultural, railroad bed.
Elymus canadensis L.; upland forest.
Elymus hystrix L.; cultural, roadside.
Elymus virginicus L.; cultural, game opening.
Elymus virginicus L. var. glabriflorus (Vasey) Bush; floodplain forest.
Elymus villosus Muhl.; mesic forest.
Eragrostis cilianensis (All.) Mosher; cultural, railraod bed.
Eragrostis pectinacea (Michx.) Nees; cultural, railroad bed.
Eragrostis poaeoides Beauv.; cultural, roadside.

Festuca arundinacea Schreb.; mesic forest.
Festuca obtusa Bieler; mesic forest.
Festuca pratensis Huds.; cultural, old field.
*Glyceria arkansana Fern.; floodplain forest.
Glyceria striata (Lam.) Hitchcock; floodplain forest.
Holcus lanatus L.; cultural, game opening.
Hordeum pusillum Nutt.; cultural, roadside.
Leersia oryzoides (L.) Swartz; pond.
Leersia virginica Willd.; pond.
Lolium multiflorum Lam.; cultural, game opening.
Lolium perenne L.; cultural, game opening.
Muhlenbergia frondosa (Poir.) Fern.; mesic forest.
Muhlenbergia sobolifera (Muhl.) Trin.; upland forest.
Panicum anceps Michx.; cultural, roadside.
Panicum boscii Poir.; upland forest.
Panicum clandestinum L.; mesic forest.
Panicum commutatum Schult.; upland forest.
Panicum dichotomum L.; upland forest.
Panicum lanuginosum Ell. var. fasciculatum (Torr.) Fern.; cultural, roadside.
Panicum lanuginosum Ell. var. implicatum (Scribn.) Fern.; mesic forest.
Panicum lanuginosum Ell. var. lindheimeri (Nash) Fern.; upland forest.
Panicum laxiflorum Lam.; mesic forest.
Panicum microcarpon Muhl.; mesic forest.
Panicum oligosanthes Schult. var. scribnerianum (Nash) Fern.; sandstone glade.
Panicum polyanthes Schult.; floodplain forest.
Panicum rigidulum Bosc; pond.
Paspalum ciliatifolium Michx.; cultural, roadside.
Paspalum laeve Michx.; pond.
Paspalum pubiflorum Rupr. var. glabrum (Vasey) Vasey; cultural, roadside.
Poa annua L.; cultural, roadside ditch.
Poa compressa L.; cultural, roadside.
Poa pratensis L.; cultural, roadside.
Poa sylvestris Gray; mesic forest.
Phleum pratense L.; cultural, roadside.
Schizachyrium scoparium (Michx.) Nash; sandstone glade.
Setaria faberi Herrm.; cultural, railroad bed.
Setaria lutescens (Weigel) Hubb.; cultural, railroad bed.
Setaria viridis (L.) Beauv.; cultural, railroad bed.
Sorghum halepense (L.) Pers.; cultural, roadside.
Sphenopholis obtusata (Michx.) Scribn.; mesic forest.
Sphenopholis obtusata (Michx.) Scribn. var. major (Torr.) Erdman; cultural, roadside.
Spenopholis nitida (Biehler) Scribn.; upland forest.
Tridens flavus (L.) Hitchcock; cultural, old field.
Vulpia octoflora (Walt.) Rydb. var. glauca (Nutt.) Fern.; cultural, trail.

POLEMONIACEAE

Phlox divaricata L.: mesic forest.
Phlox paniculata L.; mesic forest.
Phlox pilosa L.; upland forest.
Polemonium reptans L.; mesic forest.

POLYGALACEAE

Polygala sanquinea L.; cultural, game opening.

POLYGONACEAE

Polygonum aviculare L.; cultural, railroad bed.
Polygonum cespitosum Blume var. longisetum (DeBruyn) Steward; cultural, trail.
Polygonum convolvulus L.; cultural, railroad bed.
Polygonum cristatum Engelm. & Gray; mesic forest.
Polygonum hydropiperoides Michx.; shrub swamp.
Polygonum pensylvanicum L.; cultural, old field.

Polygonum pensylvanicum L. var durum Stanford; cultural, old field.
Polygonum pensylvanicum L. var. laevigatum Fern.; cultural, roadside ditch.
Polygonum persicaria L.; cultural, game opening.
Polygonum punctatum Ell.; shrub swamp.
Polygonum sagittatum L.; floodplain forest.
Polygonum tenue Michx.; sandstone glade.
Polygonum virginianum L.; mesic forest.
Rumex acetosella L.; cultural, game opening.
Rumex crispus L.; cultural, game opening.
Rumex verticillatus L.; cultural, roadside ditch.

POLYPODIACEAE

Adiantum pedatum (Tourn.) L.; mesic forest.
Asplenium pinnatifidum Nutt.; mesic forest.
Asplenium platyneuron (L.) Oakes; mesic forest.
Asplenium rhizophyllum L.; mesic forest.
Asplenium trichomanes L.; mesic forest.
Athyrium pycnocarpon (Spreng.) Tidestrom; mesic forest.
Athyrium thelypterioides (Michx.) Desv.; mesic forest.
Cheilanthes feei Moore; sandstone glade.
Cheilanthes lanosa (Michx.) D. C. Eaton; sandstone glade.
Cystopteris fragilis (L.) Bernh.; mesic forest.
Cystopteris fragilis (L.) Bernh. var. protrusa Weatherby; mesic forest.
Dryopteris marginalis (L.) Gray; mesic forest.
Onoclea sensibilis L.; shrub swamp.
Polypodium polypodioides (L.) Walt var. michauxianum Weatherby; upland forest.
Polypodium vulgare L. var. virginianum (L.) Eaton; upland forest.
Polystichum acrostichoides (Michx.) Schott; mesic forest.
Thelypteris hexagonoptera (Michx.) Weatherby; mesic forest.
Woodsia obtusa (Spreng.) Torr.; upland forest.

PORTULACACEAE

Claytonia virginica L.; mesic forest.

PRIMULACEAE

Dodecatheon meadia L.; upland forest.
Hottonia inflata Ell.; pond.
Lysimachia ciliata L.; floodplain forest.
Lysimachia nummularia L.; pond.

RANUNCULACEAE

Actaea pachypoda Ell.; mesic forest.
Anemone virginiana L.; upland forest.
Anemonella thalictroides (L.) Spach; mesic forest.
Clematis virginiana L.; cultural, railroad bed.
Delphinium tricorne Michx.; mesic forest.
Hydrastis canadensis L.; mesic forest.
Myosurus minimus L.; cultural, old field.
Ranunculus abortivus L.; cultural, roadside.
Ranunculus abortivus L. var acrolasius Fern.; mesic forest.
Ranunculus hispidus Michx.; mesic forest.
Ranunculus micranthus Nutt.; mesic forest.
Ranunculus pusillus Poir.; shrub swamp.
Ranunculus recurvatus Poir.; mesic forest.
Ranunculus septentrionalis Poir.; floodplain forest.
Ranunculus sceleratus L.; pond.
Thalictrum dioicum L.; mesic forest.

RHAMNACEAE

Ceanothus americanus L.; mesic forest.

ROSACEAE

Agrimonia parviflora Ait.; mesic forest.
Agrimonia pubescens Wallr.; cultural, roadside.
Agrimonia rostellata Wallr.; mesic forest.
Aruncus dioicus (Walt.) Fern.; mesic forest.
Fragaria virginiana Duchesne; cultural, trail.
Geum canadense Jacq.; cultural, railroad bed.
Geum vernum (Raf.) Torr. & Gray; mesic forest.
Gillenia stipulata (Muhl.) Baill.; mesic forest.
Potentilla norvegica L.; cultural, game opening.
Potentilla recta L.; cultural, roadside.
Potentilla simplex Michx.; cultural, trail.
Prunus serotina Ehrh.; mesic forest.
*Pyrus pyrifolia (Burmf.) Nakai.; cultural, game opening.
Rosa carolina L.; upland forest.
Rosa multiflora Thunb.; cultural, roadside.
Rosa palustris Marsh.; shrub swamp.
Rosa setigera Michx.; cultural, old field.
Rubus flagellaris Willd.; cultural, railroad bed.
Rubus occidentalis L.; cultural, roadside.
Rubus pensylvanicus Poir.; cultural, roadside.

RUBIACEAE

Cephalanthus occidentalis L.; shrub swamp.
Galium aparine L.; mesic forest.
Galium circaezans Michx.; upland forest.
Galium obtusum Bigel.; mesic forest.
Galium pilosum Ait.; upland forest.
Galium tinctorium L.; floodplain forest.
Galium triflorum Michx.; mesic forest.
Houstonia longifolia Gaertn.; upland forest.
Houstonia longifolia Gaertn. var. tenuifolia (Nutt.) Wood; upland forest.

SALICACEAE

Populus deltoides Marsh.; shrub swamp.
Salix amygdaloides Anderss.; cultural, game opening.
Salix fragilis L.; shrub swamp.
Salix nigra Marsh.; floodplain forest.

SAURURACEAE

Saururus cernuus L.; shrub swamp.

SAXIFRAGACEAE

Heuchera hirsuticaulis (Wheelock) Rydb.; cultural, railroad bed.
Heuchera parviflora Bartl. var. rugelii (Shuttlw.) Rosend.; mesic forest.
Hydrangea arborescens L.; cultural, roadside.
Penthorum sedoides L.; cultural, roadside ditch.

SCROPHULARIACEAE

Chelone obliqua L. var. speciosa Pennell & Wherry; floodplain forest.
Collinsia verna Nutt.; floodplain forest.
Gerardia tenuifolia Vahl var. macrophylla Benth.; mesic forest.
Gerardia skinneriana Wood; sandstone glade.
Lindernia anagallidea (Michx.) Pennell; cultural, roadside.
Mimulus alatus Ait; cultural, roadside ditch.
Penstemon calycosus Small; mesic forest.
Penstemon digitalis Nutt.; cultural, railroad bed.
Penstemon pallidus Small; cultural, railroad bed.
Scrophularia marilandica L.; mesic forest.
Verbascum thapsus L.; cultural, game opening.
Veronica arvensis L.; cultural, roadside.
Veronica peregrina L.; cultural, roadside ditch.
Veronicastrum virginicum (L.) Farw.; mesic forest.

SMILACACEAE

Smilax glauca Walt.; mesic forest.
Smilax hispida Muhl.; floodplain forest.
Smilax rotundifolia L.; upland forest.

SOLANACEAE

Datura stramonium L.; cultural, railroad bed.
Physalis angulata L.; cultural, railroad bed.
Solanum americanum Mill.; cultural, railroad bed.
Solanum carolinense L.; cultural, railroad bed.

STAPHYLEACEAE

Staphylea trifolia L.; mesic forest.

TYPHACEAE

Typha angustifolia L.; pond.
Typha latifolia L.; pond.

ULMACEAE

Celtis occidentalis L.; floodplain forest.
Ulmus alata Michx.; sandstone glade.
Ulmus americana L.; cultural, railroad bed.
Ulmus rubra Muhl.; mesic forest.

UMBELLIFERAE

Chaerophyllum procumbens (L.) Crantz; floodplain forest.
Cicuta maculata L.; mesic forest.
Cryptotaenia canadensis (L.) DC.; cultural, roadside.
Daucus carota L.; cultural, roadside.
Erigenia bulbosa (Michx.) Nutt.; mesic forest.
Osmorhiza longistylis (Torr.) DC. var. villicaulis Fern.; mesic forest.
Sanicula canadensis L.; upland forest.
Sanicula gregaria Bickn.; floodplain forest.
Thaspium trifoliatum (L.) Gray var. flavum Blake; cultural, roadside.
Torilis japonica (Houtt.) DC.; cultural, roadside.

URTICACEAE

Boehmeria cylindrica (L.) Sw.; floodplain forest.
Laportea canadensis (L.) Wedd.; floodplain forest.
Parietaria pensylvanica Muhl.; upland forest.
Pilea pumila (P.) Gray; mesic forest.

VALERIANACEAE

Valeriana pauciflora Michx.; mesic forest.
Valerianella radiata (L.) Dufr.; cultural, old field.

VERBENACEAE

Lippia lanceolata Michx.; cultural, roadside ditch.
Verbena hastata L.; cultural, roalroad bed.
Verbena urticifolia L.; cultural, roadside.

VIOLACEAE

Hybanthus concolor (T. F. Forst.) Spreng.; mesic forest.
Viola pratincola Greene; mesic forest.
Viola pubescens Ait. var. eriocarpa (Schwein.) Russell; mesic forst.
Viola rafinesquii Greene; cultural, roadside.
Viola sororia Willd.; mesic forest.
Viola striata Ait.; floodplain forest.

VITACEAE

Parthenocissus quinquefolia (L.) Planch.; mesic forest.
Vitis aestivalis Michx.; upland forest.
Vitis cinerea Engelm.; floodplain forest.
Vitis vulpina L.; cultural, roadside ditch.

Six natural communities were found in the Cave Valley/Pomona Natural Bridge study area. A description of each natural community with emphasis on the corresponding flora follows.

Sandstone Glade

A glade is an opening in the forest, usually caused by bedrock at the surface. Soil accumulation is slight as a result of intense wind and water erosion. Soil moisture is low and plants occurring in this natural community are drought tolerant. Quercus marilandica, Q. stellata, and Q. coccinea, which dominate the woody layer, are scrubby in form. Vaccinium arboreum and Rhus aromatica are often of greater stature than these diminutive oaks. Juniperus virginiana is also well adapted to this harsh environment.

Drought resistant herbs grow in depressions where soil material accumulates. Oxalis violacea, Linum medium, Opuntia compressa, and Nothoscordum bivalve add color to the otherwise drab background. Cheilanthes lanosa, C. feei, Lechea tenuifolia, and Aristida purpurascens also occur on these ledges.

Soil accumulation is greater further from the bluff's edge, and less drought tolerant plants set root. These areas are characterized by Gerardia skinneriana, Polianthes virginica, Hypericum gentianoides, Carex umbellata, and Danthonia spicata.

The color pagentry of spring returns in autumn. Aster tubinellus, A. cordifolius, Solidago juncea, and S. speciosa grow well where soil accumulation occurs. Schizachyrium scoparium lends contrast to this scene.

Upland Forest

Forests are communities that are dominated by trees, with an average canopy cover of at least 80% (White and Madany, 1978). High topographic position and steepness in slope result in soils that are poorly developed and excessively drained. These forests are found intergrading with glades on bedrock escarpments or on the steep slopes of the minor stream valleys.

The thin layer of soil supports a drought tolerant flora. An oak-hickory forest dominated by Q. velutina, Q. stellata, and Carya tomentosa is found in the uplands. Quercus marilandica,

Q. glabra, and Fraxinus americana are inter-mixed among the dominants. Growth is slow, but the woody layer isn't stunted. A shrub layer was usually absent. The occurrence of Rosa carolina, Toxicodendron radicans, and Vitis aestivalis, however, was indicative of disturbance.

The vernal aspect of the herbaceous layer was represented by Antennaria plantaginifolia, Krigia dandelion, K. oppositifolia, and Dodecatheon media, Panicum boscii, P. lanuginosum, Carex artitecta, C. retroflexa, and Lazula multiflora are indicative of graminoids found as part of the vernal aspect of this habitat.

The change of season brought a different semblance to the upland forest. Stylosanthes biflora, Hypericum drummondii, Desmodium glutinosum, Asclepias quadrifolia, and A. variegata replaced the vernal aspect. In autumn, composites such as Aster patens, A. sagittifolius, Solidago nemoralis, and S. speciosa were the most abundant herbs.

The dry habitat wasn't conducive to the establishment of the more mesic pteridophytes. Woodsia obtusa, Polypodium polypodioides, and Polypodium vulgare var. virginianum, however, grew on the exposed bedrock.

Mesic Forest

These forests occur in areas that are of lesser slopes than areas supporting upland forest or on level soil. As a result, run off is moderate and the soil profile is wet for a significant period of time (White and Madany, 1978).

Mesic upland forests were found on the lesser slopes of the minor creek valleys. A particularly rich mesic woods is found on a terrace in the Cave Creek floodplain. In both cases, run off is slow, resulting in a wet soil profile, and a significant amount of soil accumulates. A diverse flora was found within these areas of high moisture conditions and stable habitat. A dense canopy of Acer saccharum, Fagus grandifolia, and Carya ovata is found in the ravines. The woody dominants of the terrace are Quercus alba, Q. rubra, and Carya ovata. Liriodendron tulipifera is found inter-mixed within both these mesic woods. Woody shade-tolerants, such as Morus rubra, Ostrya virginiana, Carpinus caroliniana, Cercis canadensis, Staphylea

trifolia, Asimina triloba, and Cornus florida form an understory beneath a dense canopy.

The ephemeral flora of this habitat is well know. Erigenia bulbosa was the first plant to emerge in the spring. Afterwards, the blossoms of Claytonia virginica, Sanquinaria canadensis, Erythronium americanum, Dicentra cucullaria, Dentaria laciniata, Trillium recurvatum, and Viola spp. become manifest.

This moist habitat was ideal for pteridophytes. Asplenium pinnatifidum, A. rhizophyllum, and A. trichomanes, were conspicuous on the rock outcrops frequently found in the mesic woods. Additionally, Thelypteris hexagonoptera, Athyrium pycnocarpon, A. thelypterioides, Adiantum pedatum, and Botrychium virginianum were found.

Carex rosea, C. blanda, C. torta, Brachyelytrum erectum, Sphenopholis obtusata and Cinna arundinacea represented the monocotyledonous plants. Other characteristic plants adding to the great diversity were Solidago caesia, Mertensia virginica, Podophyllum peltatum, Hydrophyllum appendiculatum, Phlox paniculata, Veronicastrum virginicum, and Geranium maculatum.

Floodplain Forest

These forests are found along the major creek valley floors. They are subjected to runoff from the uplands. The impermeable soils and lack of slope result in the pooling of the run off. The resulting inundated soils support a woody canopy dominated by Acer saccharinum, A. negundo, Liquidambar styraciflua, and Fraxinus pennsylvanica var. subintegerrima. An understory is nearly absent except in the disturbed areas, where Arundinaria gigantea and Lindera benzoin were found. Laportea canadensis is vividly remembered as occurring in the disturbed floodplains.

Two herbaceous monotypic colonies of Corydalis flavula and Viola striata accounted for the spring flora of this habitat. As the season progressed, Impatiens pallida, I. biflora, Polygonum sagittatum, and Lysimachia ciliata were found. Graminoids were represented by Diarrhena americana, Carex grayii, and C. crus-corvi.

Ponds

Ponds as distinguished from lakes are generally calm, shallow waters lacking a wave swept shore (White and Madany, 1978). This community occurs in the valley floor of Cave Creek. The water is typically still and shallow enough to permit the colonization of Nuphar luteum over most of its surface. In shallower water, the rooted aquatic Jussiaea repens var. glabrescens was found. Lemna obscura and Spirodela polyrhiza were found floating among these rooted aquatics.

In still shallower water, Typha latifolia, T. angustifolia, Ranunculus sceleratus, and Hottonia inflata emerged from the organic soil. On the banks, Lysimachia nummularia, Epilobium coloratum, Panicum rigidulum, Leersia oryzoides, and Paspalum laeve were encountered.

Shrub Swamp

A swamp is a wetland dominated by woody plants. A true swamp is forested, while the woody vegetation of this community is shrubby (White and Madany, 1978). The shrub swamp occurring in the Cave Creek floodplain was subjected to flooding throughout the entire growing season. Only in late fall did the water recede.

These hydric soils supported the shrubby Cephalanthus occidentalis, Rosa palustris, and Salix fragilis. Populus deltoides was conspicuous at the swamp margins. Sedges and rushes were represented by Carex crinita, C. lupulina, C. lupuliformis, C. scoparia, and Juncus effusus var. solutus. The absence of an overstory and the hydric condition facilitated the dominance of these graminoids, along with Saururus cernuus.

Asclepias incarnata, Blephilia hirsuta, Scutellaria lateriflora, and Onoclea sensibilis were found among the dominants.

Cultural Communities

Old fields, roadsides, railroad tracks, game openings, and tree plantations are all included under this heading. The unifying factor is human disturbance. With the exception of tree plantations, great species diversity is found in these habitats.

Woody plants such as Diospyros virginiana, Rhus copallina, R. glabra, Juniperus virginiana, Sassafras albidum, Sambucus canadensis and Elaeagnus angustifolia were found. Ascelepias syriaca, Achillea millefolium, Ambrosia trifida, A. artemesiifolia, and Daucus carota were characteristic. Rudbeckia hirta, Solidago spp., Taraxacum officinale, and Tragopogon dubius were representative of the composites. Iris shrevii and Narcissus pseudo-narcissus brought welcome color to the game openings. Leguminous plants such as Trifolium spp., Melilotus alba, Lespedeza cuneata, and Cassia fasciculata were common. Festuca pratensis, Dactylis glomerata, Andropogon virginicus, Hordeum pusillum, Elymus hystrix, Sorghum halepense, and Tridens flavus represented the grasses. Additionally, eleven members of the Polygonaceae and an equal number of taxa from the Rosaceae added to the great diversity of the artificial habitat.

A total of 552 vascular plants belonging to 100 families have been collected and identified from the Cave Valley/Pomona Natural Bridge area. Five of these species, notably, Lactuca hirsuta, Melothria pendula, Synandra hispidula, Botrychium biternatum, and Glyceria arkansana are endangered in Illinois (Sheviak, 1981). Vinca major, Lactuca hirsuta, Lathyrus hirsutus, Trifolium resupinatum, Pyrus pyrifolia, and Glyceria arkansana have been collected from the study area but are previously unreported from Jackson County, Illinois (Mohlenbrock and Ladd, 1978).

The most floristically diverse natural community of the study area is the mesic forest. A total of 125 taxa were collected from this community. Sixteen taxa were collected from the pond making this the least diverse natural community.

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The Use and Folklore of Common Prairie Plants

Russell R. Kirt

INTRODUCTION

The purpose of this presentation is to acquaint people with the use of prairie plants primarily from the open mesic prairie. Most of the information regards primitive man as his culture was intricately tied with plants and the environment. A glossary of medicinal terms is provided at the end of this text. Nomenclature is from Plants of the Chicago Region by Swink and Wilhelm, 1979. Hopefully this review of humanistic uses of prairie plants will help people remember them and assist in prairie preservation and restoration activities.

These plants are all rare when compared to their abundance in pre-settlement times, therefore I urge you not to remove any for experimentation. My knowledge comes from books only as I have not experimented with any plant materials except for Pycnanthemum virginianum (L.) Durand & Jackson, COMMON MOUNTAIN-MINT. Also, since there is a poisonous nature to parts of many plants, it is unwise for the amateur to experiment. An instance has been related about aged man, a member of the Mide, who came to a lodge one winter night tired and cold. He said, "Never mind, I have some medicine which will soon warm me." He then took a packet from the skull of his Mide bag, put a little of the contents in water and drank it. A few minutes later he said, "I have taken the wrong medicine; I shall die." And in a few hours he was dead (Densmore, 1928).

Allium spp., WILD ONIONS, Liliaceae (Lily)

Most Allium spp. are known to be edible and were used for food by Indian tribes (Kirk, 1975). In addition to seasoning, they are/were eaten fresh as a relish, cooked as a flavor for meat and soup, fried, steamed, and creamed. Wild onions were collected and stored for winter use. The Indians undoubtedly caused some local extinction of wild onions due to their extensive use. Ingestion of large amounts of onions, including cultivated ones, may cause poisoning due to their alkaloids. However, it is safe to eat normal amounts of wild onions in the same manner as cultivated onions.

In addition to the above, A. cernuum Roth, NODDING WILD ONION has been used as a stimulant in increasing perspiration and urine flow. It has also been used as a cough remedy and to cure intestinal worms. The whole plant was used as an insect repellent when rubbed on the body (Kavasch, 1977). Historians believe that "Chicago" comes from the Algonquian word meaning "wild onion".

Amorpha canescens Pursh, LEAD PLANT, Fabaceae (Legume)

Other common names for Amorpha canescens include: "buffalo bellow plant" as its time of blooming is synchronous with the rutting season of the buffalo (Gilmore, 1977) and "prairie shoestring" because when the virgin prairie was plowed, the breaking of the roots sounded like snapping shoestring. Another reason for the plant being called "prairie shoestring" is because of its deep roots which often penetrate to depths of fifteen feet or more (Voigt and Mohlenbrock, 1978).

Omaha Indians broke the stems of lead plant into small pieces, moistened, and attached them to the skin. After attachment, the stem was lit on fire and burned down to the skin. This was believed to ward off neuralgia and rheumatism (Gilmore, 1977). Dr. Paul Sorenson of Northern Illinois University (DeKalb, Illinois) has experimented with extracts of lead plant as a potential cure for some cancers (per. com.).

American Indians used the dried leaves for tea and pipe smoking, sometimes mixed with a little buffalo fat (Gilmore, 1977). Local superstitions have held that the lead plant was an indicator of lead ore (this is true around Galena, Illinois), but the common name refers to the lead-color of the leaves in dense lead plant colonies (Johnson and Nichols, 1970).

Andropogon gerardii Vitman, BIG BLUE STEM, Poaceae (Grass)

This plant was used to cure indigestion and fever. Big blue stem is among the best and most palatable of the prairie grasses for ungulates both in quality (over 6% protein) and quantity.

Antennaria spp., PUSSYTOES, Asteraceae (Composite)

The gum of pussytoe stalks can be chewed to make a pleasing gum claimed to be somewhat nourishing. The flowers are an attractive addition in dried arrangements. This small plant was enjoyed as a fine smoking plant and became known as Ladies' Tobacco by many northeastern tribes (Kavasch, 1977). The entire plant was made into a tea which was given to mothers after childbirth to purge the afterbirth and aid internal healing. Pussytoes was also useful as a douche for vaginitis (Moore, 1979).

Asclepias tuberosa L., BUTTERFLY MILKWEED, PLEURISY ROOT, Asclepiadaceae (Milkweed)

Common names for this plant come from its ability to attract butterfies and other insects and its medicinal uses for diseases of the respiratory system. Asclepias tuberosa is most unusual in two respects: it has no milky sap and usually has bright orange flowers but flower color can vary from yellow-orange.

In some parts of eastern New Mexico, this plant is called "Immortal". It is a stimulant to the vagus nerve, producing perspiration and brochial dilation. As its name implies, it is useful for pleurisy and mild pulmonary edema. However if more than a scant teaspoon of chopped root, boiled in water, is taken in dosages of more than one or two cups a day, nausea and vomiting will occur (Moore, 1982). This plant has also been used as an expectorant and emetic. Pleurisy root was also pulverized after drying and blown into wounds or was chewed into a paste which was placed on wounds. Ceremonials connected with the digging, preparation, consecration, and distribution of this plant by the Shell Society of the Omaha Indians occupied four days (Gilmore, 1977).

Asclepias spp., MILKWEEDS, Asclepiadaceae (Milkweed)

The flowers may be eaten raw or boiled; the buds, young shoots and young leaves are good as greens or boiled in soup with meat. The seeds and the inner wall of the pod may be eaten raw or cooked. The latex, even though it contains a bitter alkaloid, of some milkweed species was chewed by Plains Indians. If consumed by insect larva alkaloid residues are still present in

the adults and are distasteful to some predators. All of the milkweeds of this genus contain asclepain, a good meat tenderizer (Kirk, 1975). Dr. Paul Sorenson of Northern Illinois University (DeKalb, Illinois) has experimented with A. sullivantii as a potential cure for some cancers (per. com.).

The United States Department of Agriculture once considered the possibility of using the seed hairs of certain milkweed species in place of kapok in filling life rafts (Kirk, 1975). A "silky type" rope can be made from the hairs. The latex of many milkweed species may offer possibilities in rubber production (Voigt and Mohlenbrock, 1978).

Aster laevis L., SMOOTH BLUE ASTER, Asteraceae (Composite)

The smoke from the burning of this plant has been used to treat fainting and comas (Owensby, 1980).

Baptisia spp., WILD INDIGOS, Fabaceae (Legume)

The young growth of all species of wild indigo resemble asparagus but must not be eaten because during its first stages of development, the plant is poisonous (Owensby, 1980). Indian children used the mature inflorescence of seed pods as rattles.

Early settlers, and perhaps also the Indians, collected seeds in the fall from Baptisia leucantha T. & G., WILD INDIGO, and made soup which supposedly tasted like lentil soup (per. com., Deborah Drazdik). Dr. C. Wayne Ogzewalla of the University of Cincinnati is currently doing research with this plant species (per com.).

The roots of Baptisia leucophaea Nutt., CREAM WILD INDIGO, have been used as a laxative, astringent, and antiseptic, in addition to being useful to induce vomiting. When boiled, its roots can be used as an internal remedy for fever, sore throat, typhus, and scarlet fever. A poultice made from the roots of B. leucophaea also serves as a treatment for ulcers. The Indians made a decoction of the leaves of this plant and applied it to cuts and wounds, and also used this decoction as a stimulant (Owensby, 1980). A dark blue dye material has been extracted from the leaves and fruits but it is inferior to the real indigo dye (Voigt and Mohlenbrock, 1978).

Castilleja coccinea (L.) Spreng., INDIAN PAINT BRUSH, Scrophulariaceae (Figwort)

The Indians used this plant to help cure rheumatism, paralysis, colds, and disease of women (Densmore, 1928). The common name is appropriate as these plants appear as though they have been dipped in a bucket of paint.

Ceanothus americanus L., NEW JERSEY TEA, Rhamanaceae (Buckthorn)

During the American Revolution, the leaves of this plant were used as a substitute for tea. The fresh flowers make an excellent lather when crushed and rubbed in water, and are said to leave the skin soft and faintly fragrant. As an added note, the tea made by this plant was initially used as a hair tonic (Kirk, 1975). On the buffalo hunt, when timber was scarce, the great gnarled woody roots were used as fuel (Gilmore, 1977).

The Indians used a decoction of New Jersey Tea roots to treat cancer, syphilis, gonorrhea, and dysentery. The plant has also been used to treat eye disease in small children. New Jersey Tea was an excellent home remedy for menstrual hemorrhage, nosebleeds, ulcerated sore throats, bleeding piles, hemorrhoids, external skin disorders, and old ulcers, as well as a treatment for capillary ruptures from vomiting or coughing. It also aids in the shrinking of nonfibrous cysts, stimulation of lymph glands and inter-tissue fluid for circulation, and in the reduction of enlarged spleens (Moore, 1982).

Cirsium spp., THISTLES, Asteraceae (Composite)

Roots of Cirsium spp. have been eaten raw, boiled and roasted. They are nutritious though flat in taste. The peeled stems may be cooked or eaten raw (Kirk, 1975). Thistles were also used to cure diseases of women (Densmore, 1928). Cirsium discolor, C. hillii, and C. pitcheri are native to Illinois prairies.

Echinacea pallida Nutt., PURPLE CONEFLOWER, Asteraceae (Composite). Figure 1.

This plant was universally used as an antidote for snake bites, stings, burns, wounds, and other venomous/poisonous conditions. It was employed as a smoke treatment to relieve headaches.

Figure 1. Photo of Echinacea pallida, PURPLE CONEFLOWER. This plant is still sought after by "root-diggers". Photo by Russell R. Kirt.

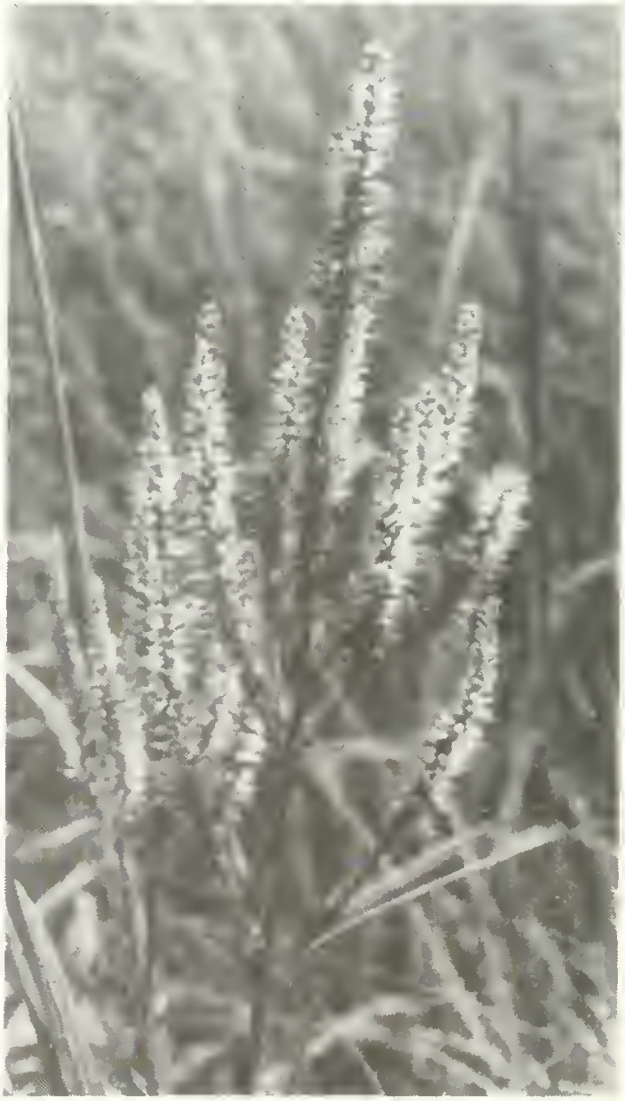

Figure 2. Photo of Veronicastrum virginicum, CULVER'S ROOT. Named after Dr. Culver, the root of this plant has many medicinal uses. Photo by Russell R. Kirt.

Indians chewed pieces of purple coneflower rootstalk as a remedy for toothaches and relief of mumps. They used the root extract as a remedy for blood poisoning and cancer (Owensby, 1980). Juices from the plant were also used to treat horse distemper (Johnson and Nichols, 1970). A Winnebago said he had often used the plant to make his mouth insensitive to heat, so that for show he could take a live coal into his mouth (Gilmore, 1977).

Today, the purple coneflower (or black sampson) is still used as medicine for healing wounds, curing sore throats, and reducing pain. Pharmaceutical companies purchase quantities of the root for medicines. This plant has been extirpated from many prairies in Missouri and Kansas by commercial collectors (Clubine, 1982).

Eryngium yuccifolium Michx., RATTLESNAKE MASTER, Apiaceae (Parsnip)

The common name originates from its use to treat rattlesnake bites. The roots of this plant have been used medicinally for liver ailments, to increase urine flow, to induce vomiting, and as an emetic, expectorant, and a diaphoretic (Owensby, 1980). A liquid made from roots smashed in cold water was drunk to relieve muscular pains and rheumatism. Inhalation of smoke from the plant was also used to cure headaches, nosebleeds, and tonsil inflammation. A decoction from the root of rattlesnake master has been found useful in dropsy; chronic laryngitis and bronchitis; irritation of the urethra, vaginal, uterine, and cystic mucous membranes; gonorrhea; and exhaustion from sexual depletion with loss of erectile power, seminal emissions, and orchitis (Millspaugh, 1974).

Fragaria virginiana Duchesne, WILD STRAWBERRY, Rosaceae (Rose)

The berries, though small, are sweet and delicious. Many people prefer them to domestic varieties of cultivated strawberries. Indians prepared tea from the green leaves. A gourmet commercial tea from wild strawberry is available. This slightly tart tea has a mild astringent effect which can be used for pregnancy, convalescence, and chronic stomach sensitivity. It has a mild but noticeable diuretic effect. If drunk frequently, it will help hematuria and diarrhea. If the rootstalks are included in the tea, it can be used as a douche for vaginitis and as an enema for diarrhea (Moore, 1982).

Figure 3. Photo of Lithospermum canescens, PRAIRIE PUCCOON. An excellent ornamental plant in addition to providing dyes. Photo by Russell R. Kirt.

The fruit is purported to tighten loose teeth, clean teeth, clear blurred vision, and remedy gout (Owensby, 1980). Other medicinal values of wild strawberry include its use as an astringent, diuretic, laxative and a tonic. Folklore remedies include use for bladder or kidney ailments, bowel troubles, dysentery, intestinal weakness, night sweats and as a stomach cleanser. It has also been used as a gargle for sore throats.

Gentiana andrewsii Griseb., BOTTLE GENTIAN, Gentianaceae (Gentian). Figure 4.

A decoction made from the roots of this plant was used as a tonic. The plant served as a treatment for bites and stings. Sometimes a piece of the rhizome was worn or carried in the belief that it will increase one's physical powers. Native Americans once made compresses from the roots and applied them to aching backs (Smith and Smith, 1980). Gentiopicrin (for malaria) and gentisic acid (for rheumatic inflammations) are still used in pharmacy. The rhizome has also been used to treat fever, gout, joint inflammation, and as an aid for nervous distress (Moore, 1982).

Geum triflorum Pursh, PRAIRIE SMOKE, Rosaceae (Rose)

The roots may be boiled to produce a beverage resembling weak sassafras tea (Johnson and Nichols, 1970). It undoubtedly had many medicinal uses. Because of its plumose fruits, it is also called "old man's whiskers" (Voight and Mohlenbrock, 1977).

Helianthus spp., SUNFLOWERS, Asteraceae (Composite)

Sunflower plants provide dark gray seeds that are excellent when eaten raw or roasted. Various Indian tribes parched the seeds, ground them into meal and made nutritious bread and cakes. Many Indian tribes cultivated sunflowers and extracted oil from their seeds. Purple and black dyes were made from the seeds, and a yellow dye was boiled from the ray flowers. The seeds can be used for human, poultry, and pet food. Oil used for cooking, margarine, and paints may be extracted by boiling the crushed seeds and then skimming the oil from the surface of the water. The roasted shells were once used as a coffee substitute. The leaves were dried and used as a tobacco substitute in cigars and pipes (Kavasch, 1977).

Figure 4. Photo of Gentiana andrewsii, BOTTLE GENTIAN. Gentiana spp. provides perhaps the best stomach tonics from the plant kingdom. Their extracts are still used in pharmacy. Photo by Russell R. Kirt.

Sunflower seeds were sacred food to the Plains Indians of the prairie regions of North America. They placed bowls of sunflower seeds on the graves of their dead. This was food to sustain them on their long and dangerous journey to their Happy Hunting Ground.

Heuchera richardsonii R. Br., PRAIRIE ALUM-ROOT, Saxifragaceae (Saxifrage)

The roots of Heuchera spp. are an effective cure when eaten raw for diarrhea (Kirk, 1975). In addition to healing sore mouths (Densmore, 1928), the geranium-like leaves were used to close wounds.

Liatris spp., BLAZING STARS, Asteraceae (Composite)

The Indians used the corm-like root of blazing stars both fresh and for stored food. They supposedly tasted like carrots. When the plant is dried just prior to the opening of the flowers, it makes an attractive addition to dried arrangements. The Indians boiled the leaves and corm together to produce a decoction which was given to children for diarrhea. In addition the corms, after being chewed, were blown into the nostrils of horses to enable them to run well without getting out of breath. It was also supposed to strenghen and help them stay in good condition (Gilmore, 1977).

Blazing stars were used as a diuretic, e.g., to increase the volume of water in the urine for mild bladder and urethra infections. One problem with using this plant as a diuretic is that it decreases the amount of phosphates in urine when used over an extended period of time (Moore, 1982).

Lilium spp., LILIES, Liliaceae (Lily)

A tincture of Lilium spp. has been used to relieve mental exhaustion, headaches, dullness of the eye, bitter tastes in the mouth, constipation, extremity weaknesses, and restlessness (Millspaugh, 1974). All of the true lilies have edible bulbs, but because of their relative rarity and beauty they should not be harvested except in great emergency. The bulbs may be eaten raw or cooked, and have an excellent flavor.

Lithospermum canescens (Michx.) Lehm., PRAIRIE PUCCOON, Boraginaceae (Borage). Figure 3.

Children used the roots of this plant to chew with their gum. The flowers were likewise used to color the gum yellow. A purple dye can be extracted from the root.

Monarda fistulosa L., WILD BERGAMONT, BEEBALM, Lamiaceae (Mint)

Bergamont oil (which contains thymol) extracted from the dried, boiled leaves, was used by numerous tribes to treat cold symptoms and bronchitis. This volatile oil served as a stimulant to relieve stomach gases (Kavasch, 1977). It was used to suppress menstruation. Also, an antiseptic and anesthetic gargle for sore throats was made from it. Indians used wild bergamont to treat intestinal ailments and dermal eruptions on the face. Modern medicine uses an antiseptic drug derived from this genus (Johnson and Nichols, 1970).

Wild bergamont makes an excellent flavoring when cooked with other food, and a good tea may be steeped from the leaves. Flowers and herbage have been used to scent clothes closets, bureau drawers, and pillows.

Panicum virgatum L., SWITCH GRASS, Poaceae (Grass)

The seeds are edible raw or ground, and may be used in mush or cakes (Kirk, 1975).

Petalostemum spp., PRAIRIE CLOVERS, Fabaceae (Legume)

The Pawnee Indians used Petalostemum candidum (Willd.) Michx., WHITE PRAIRIE CLOVER and P. purpureum (Vent.) Rydb., PURPLE PRAIRIE CLOVER as prophylactics (Gilmore, 1977). When the roots were pulverized and boiled the decoction was drunk in order to keep venereal disease away. Commanche Indians chewed the roots for their pleasant taste and made tea from its leaves. Other American Indians used bruised leaves of these plants steeped in water and applied it to fresh wounds (Owensby, 1980). Petalostemum spp. are considered one of the most important groups of legumes in native grasslands since they fix nitrogen, making it available for associated grasses (Johnson and

Nichols, 1970). Thus, prairie clovers are valuable additions to prairie hay. In addition, the Pawnees used the tough, elastic stems of prairie clovers to make brooms for sweeping their lodges (Gilmore, 1977).

Pycnanthemum virginianum (L.) Durand & Jackson, COMMON MOUNTAIN-MINT, Lamiaceae (Mint)

The leaves of the plant make an excellent tea when the flowers are in bloom (per. exp.). Also, the leaves can be used as seasoning in cooking (Voight and Mohlenbrock, 1977).

Ratibida pinnata (Vent.) Barnh., YELLOW CONEFLOWER, Asteraceae (Composite)

The leaves and flowers may be brewed into a pleasant tea.

Salix humilis Marsh, PRAIRIE WILLOW, Saliceae (Willow)

The bitter inner bark of many willows may be eaten raw as an emergency food. It is more palatable when dried and ground into flour. The Indians undoubtedly had many uses for the stems, such as basketry. The inner bark was used in Indian steam baths to relieve rheumatic discomforts. Also, the inner bark contains the glucoside salicin, a primitive form of aspirin (Kavasch, 1977). Thus, willow root and bark trees were brewed and drunk to relieve pain and reduce fevers.

Silphium laciniatum L., COMPASS PLANT, Asteraceae (Composite)

Indians made tea from the leaves of this plant and used it to hasten the milk flow of new mothers. The whole plant has been used to increase urine flow and to soothe sore and chapped skin. Early settlers used the juice from the plant as a sedative and nerve tonic. At one time, the milky sap was thought to be useful as a substitute for opium (another common name is WILD OPIUM), but this idea never gained ground.

Indian children gathered chewing gum from the upper parts of the stem, where the gum exudes and forms large lumps. Omahas say that wherever this plant is found lightning is prevalent and they would not set up camp in such places. However, they

burned the dried roots during electrical storms so that its smoke might act as a charm to avert lightning strike (Gilmore, 1977). Compass plant stems, by themselves or with a mixture of buffalo chips, were used as fuel for fires.

Livestock seek it out and hence it is not found where they have a chance to graze (Owensby, 1980). The leaves of this plant commonly align themselves in a north-south direction - thus its common name.

Silphium spp., Asteraceae (Composite)

The following information primarily refers to Silphium integrifolium Michx., ROSIN WEED, and S. perfoliation L., CUP PLANT. A decoction of both the flower and the leaves was used to treat lung diseases, pneumonia, small pox, and gonorrhea. A tea made from the flowers and leaves was administered to relieve stomach pains, treat urinary ailments, and cure skin rashes caused by toxic plants such as poison ivy. Rosin weed was also used as a mild sedative and cardiac relaxant, although not always reliable.

The root stocks of these plants were used in smoke treatment for head colds, neuralgia, and rheumatism. A Winnebago medicine-man said a decoction made from the root stock was used as an emetic in preparatory cleansing and lustration before going on a buffalo hunt. It was also used for cleansing ceremonial defilement incidents due to accidental proximity to a woman during her menstrual period (Gilmore, 1977).

Sorghastrum nutans (L.) Nash, INDIAN GRASS, Poaceae (Grass)

The seeds may be used whole or ground into flour.

Spartina pectinata Link, PRAIRIE CORD GRASS, Poaceae (Grass)

The seeds may be used whole or ground into flour. This plant was used as thatching to support the earth covering of the lodges and for mats (Gilmore, 1977). Indians may have made arrows from the stems.

Sporobolus heterolepis Gray, PRAIRIE DROPSEED, Poaceae (Grass)

The tiny seeds are fairly easy to harvest as they are relatively free of their husk. They may be eaten raw, but are best when parched and ground into flour (Kirk, 1975). The maturing seeds have a noticeable buttered popcorn smell.

Stipa spartea Trin., PORCUPINE GRASS, NEEDLE GRASS, Poaceae (Grass)

The Indians used the stiff awns of this plant as a brush for dressing the hair. This brush was used as part of the Indian ceremonies (Gilmore, 1977). Porcupine grass is very nutritious and relished by all livestock, but should not be grazed during June and July when the seeds are present as the awns can cause mechanical injury to an animal by sticking in its mouth (Johnson and Nichols, 1970).

Tradescantia ohiensis Raf., SPIDERWORT, Commelinaceae (Spiderwort)

Tradescantia ohiensis is being used as a biological indicator to check radiation emitted from nuclear power plants in the U.S., Japan, and Europe. Radiation turns the blue cells of the stamen hairs to pink. The increase in pink cells is proportional to the dose of radiation received, even if the doses are extremely low. A color change can be observed in the stamen hairs most efficiently 12 to 13 days after exposure to radiation. The plant may also be eaten as vegetable greens. Another colorful common name, "cow-sobbers," has been given this plant because of the strings of mucilaginous sap (Owensby, 1980).

Veronicastrum virginicum (L.) Farw., CULVER'S ROOT, Scrophulariaceae (Figwort). Figure 2.

The dried tubers of this plant were used as a mild laxative. Many native peoples used the fresh root for its cathartic qualities, to reduce fever, and as a stomach tonic and laxative (Kavasch, 1977). The common name of the plant is named after Dr. Culver, a physician who recorded uses of the plant.

CONCLUSION

This partial survey of the botanical lore for primitive man is meant to be an introduction to the many uses and popular knowledge of some of our indigenous prairie plants. WILD QUININE, Parthenium integrifolium L. and many other plants that suggest a use have not been discussed in this manuscript leaving this information for others to search out. This review of ethnic botany suggests that this system of science never came to maturity in the grassland areas of the United States as it was cut off in its infancy by a more advanced stage of culture. Many ethnobotany studies are now occuring in South America countries, however, one does not have to leave our grasslands to learn and be involved in the exciting science of "ethnobotany".

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GLOSSARY

ASTRINGENT: A substance that causes tissues to shrink, and is used to stop bleeding, secretions, and the like.

DECOCTION: A preparation made by boiling the hard materials, such as the roots, bark, or large seeds of herbs.

DIURETIC: An herb or medicine that causes an increase of urine flow.

EMETIC: A substance that promotes vomiting.

ENEMA: A liquid injected into the rectum as a medicine or purge.

EXPECTORANT: A substance that stimulates the outflow of mucus from the lungs and bronchials.

HEMATURIA: The presence of blood in the urine.

NEURALGIA: An acute pain manifested along the length of a nerve, often having no detectable effects other than the pain.

POULTICE: A preparation of fresh leaves that are crushed and steeped in boiling water for a short time. It is then applied to the skin, usually between two pieces of muslin, to remedy skin disorders such as pain, inflammation, and tissue damage.

PROPHYLACTIC: Anything that prevents disease.

PURGE: Something that will evacuate the intestine.

STIMULANT: An agent, such as beverage, that produces a temporary increase in vital activity.

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Manuscripts pertaining to the native flora of Illinois, natural areas, gardening with native plants and related topics are accepted for publication. The author shall be required to cover publication costs, if financially able, by remittin- $5.00 per page of manuscript (including illustration and map pages). Manuscripts should be typed single-spaced with 1 3/4 inch top and bottom margins and 1½ inch side margins. Title pages should have 2 1/4 inch top margins. Paragraphs should be double-spaced. Paragraphs are not to be indented. Pages are to be numbered, but in pencil only. Tables and figures should be numbered consecutively and an indication should be made as to where the author would like them placed. Either "Literature Cited" or "References" may be used. Use of the Harvard style for citing literature is recommended. If at all possible, please use an IBM Selectric typewriter and indicate which element was used as the editor can correct the copy much easier this way. Illustrations and maps are printed up to a maximum size of 5-by-7 inches. Four-by-five inch glossy black and white photos are also accepted. Cost of each photo to author is $7.50. The original manuscript and one copy must be included. Title and author's name should be typed on the first page of the manuscript in a manner found in ERIGENIA 2 or more recent issue. A one paragraph biobraphical sketch of the author must also accompany manuscripts submitted. Manuscripts are not returned to the author. If other materials such as photos or illustrations are requested to be returned, a self-addressed stamped envelope is required and should accompany the manuscript.

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Copy ready manuscripts and/or questions concerning publication should be sent to:

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