

# THE VASCULAR FLORA OF THE VINTON FURNACE EXPERIMENTAL FOREST<sup>1</sup>

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## INTRODUCTION

In 1952 the U. S. Forest Service leased an area of 1200 acres in Vinton County, Ohio, for long-range studies in forest management. The writer first visited the Vinton Furnace Experimental Forest in 1955 and was struck by the great variety of native vascular flora present. The role of the Forest as a laboratory-in-the-woods where careful ecological studies were being initiated made a floristic inventory of the tract seem desirable. In addition, almost half of the species occurring had yet to be reported for Vinton County. Twenty-eight additional collecting trips to the area followed, resulting in the present study.

## LOCATION AND TOPOGRAPHY

The Forest lies southeast of McArthur in sections 19, 25, and 31 of Madison Township and sections 30 and 36 of Vinton Township. Adjoining are the Raccoon State Forest and extensive tracts owned by the Baker Wood Preserving Company, which leased the study area to the Forest Service.

The area lies in the Unglaciated Allegheny Plateau and is much dissected into long ridges and steep-sided ravines, the higher ridges reaching 980 ft. Surface strata are Pennsylvanian in age, consisting almost entirely of the Allegheny series. Large sandstone outcrops on the ridge in the northeast corner of the forest are well known locally as the Watch Rocks.

Elk Fork and its tributary Pine Run drain the area and form the north and west boundaries. Elk Fork is heavily polluted with acid mine waters and is nearly devoid of aquatic life, though the small rocky streams of the ravines are clean. The elevation of the Elk Fork valley is 680 ft, giving an area relief of 300 ft.

## HISTORICAL BACKGROUND

In the early 1850's, many iron furnaces were erected in southeastern Ohio, including the Vinton Furnace just northwest of the present forest. The virgin stands of timber in the surrounding areas were destroyed for charcoal and soon after the Civil War, the furnaces were abandoned. Most of the timber presently on the Vinton Forest apparently dates from a clearcut made during this period.

With depletion of the better timber and coal and widespread erosion, Vinton County suffered economic decline and land abandonment. Apparently there were never homesteads on the forest area proper although county roads crossed it. Today no occupied houses exist for several miles.

Activities of the Forest Service on the area have included installation of deep wells, run-off troughs, and nine weather stations, and the construction of roads and a Headquarters building. Soils, water relations, methods of stand improvement and of logging are under study. Experimental plots have been subjected to a variety of treatments, including complete clearcut, commercial clearcut, diameter limit cut, selective cut with stand improvement, and conversion from hardwoods to pine. The outcome of this research is of course many years in the future.

<sup>1</sup>Extracted from a Master's thesis presented to Ohio University, February 2, 1957.

## VEGETATION PATTERNS

The present vegetation may be divided arbitrarily into five major groupings: ridge forest, upland clearings, ravines, open bottomlands, and forested bottomlands.

The ridges and upper slopes are dominated by oaks, chiefly *Quercus alba*, *Q. prinus*, *Q. velutina*, and *Q. coccinea*. Other common or characteristic species include *Pinus rigida*, *P. echinata*, *Carya ovata*, *Quercus stellata*, and *Cornus florida*. On the more acid slopes, ericads such as *Oxydendrum arboreum*, *Kalmia latifolia*, and *Vaccinium vacillans* are conspicuous. Characteristic herbs include *Danthonia spicata*, *Gillenia stipulata*, *Tephrosia virginiana*, *Desmodium nudiflorum*, *Oxalis violacea*, *Houstonia caerulea*, *Cunila organoides*, *Antennaria plantaginifolia*, and *Hieracium venosum*. *Cladonia* lichens and mosses such as *Dicranum scoparium*, *Leucobryum glaucum*, *Ditrichum pallidum*, and *Polytrichum ohioense* form extensive mats in the dry soil.

Upland clearings include disturbed roadsides, experimental plots, and two old fields. The flora of the roadsides and plots is a heterogeneous assemblage marked by such coarse species as *Pteridium aquilinum*, *Phytolacca americana*, *Sassafras albidum*, *Rubus* spp., *Lespedeza* spp., *Apocynum cannabinum*, *Helianthus* spp., *Solidago* spp., *Aster* spp., *Erigeron canadensis*, and *Erechtites hieracifolia*. Weeds of foreign origin are invading although many have not yet spread beyond the point of introduction, e.g., *Barbarea vulgaris*, *Agrostemma githago* and *Rumex mexicanus* which are confined to a spot where hay had once been spread; *Capsella bursa-pastoris*, *Plantago rugelii*, three species of *Veronica*, and *Taraxacum officinale* which were found only in the lawn at Headquarters. The "north old field" is a small opening dominated by *Andropogon scoparius*. Also prominent are *Hypericum spathulatum*, *Spiraea tomentosa*, and *Solidago juncea*. A larger grassy area, the "south old field," lies along the southern border of the tract. Only the portion immediately adjacent to the Forest entrance was included in this study.

The ravines and lower slopes support a rich mixed mesophytic forest. Among the many canopy species are *Juglans cinerea*, *Carya cordiformis*, *Fagus grandifolia*, *Quercus alba*, *Q. rubra*, *Liriodendron tulipifera*, *Acer saccharum*, *Aesculus octandra*, and *Tilia americana*. Dominating the forest floor are ferns and a wide variety of vernal herbs such as *Erythronium americanum*, *Trillium grandiflorum*, *Orchis spectabilis*, *Claytonia virginica*, *Sanguinaria canadensis*, *Dentaria heterophylla*, *Tiarella cordifolia*, *Viola canadensis*, and *Phlox divaricata*. Two rarer Appalachian species occurring here are *Phlox stolonifera* and *Meehania cordata*.

Open bottomland consists of intermittent openings on the Pine Run-Elk Fork floodplain. Favorable light and moisture conditions result in a rank herbaceous vegetation interspersed with alder thickets and young trees. Characteristic species include *Onoclea sensibilis*, *Panicum clandestinum*, *Carex* spp., *Polygonum* spp., *Agrimonia rostellata*, *Impatiens* spp., *Galium asprellum*, *Sambucus canadensis*, *Eupatorium* spp., *Aster puniceus*, and *Actinomeris alternifolia*.

Forested bottomland includes most of the Pine Run-Elk Fork floodplain with extensions into the larger ravines. *Salix nigra*, *Betula nigra*, *Ulmus americana*, *Platanus occidentalis*, *Acer saccharinum* and *Fraxinus americana* mark the canopy. Herbs include *Ranunculus septentrionalis*, *Cardamine bulbosa*, *Sedum ternatum*, *Geum canadense*, *Viola papilionacea*, *Cryptotaenia canadensis*, *Lysimachia ciliata*, *Mertensia virginica* and many coarser species shared with the preceding habitat grouping.

## LIST OF SPECIES

Records of 536 species representing 314 genera of 95 families are substantiated by specimens collected by the writer and deposited in the Herbarium of Ohio University. A few additional, incomplete records are also mentioned. Nomenclature and sequence follow Fernald (1950) with the nominate race of a polytypic

species indicated by "(typical)" after the name. Relative abundance is given although habitat information is included only for the less frequent species. Collection numbers of specimens are cited. With the exception of *Panicum*, *Carex*, *Rubus*, and *Crataegus* which are admittedly incomplete, the list below is believed to be a nearly exhaustive catalog of the vascular flora actually occurring on the forest at present.

*Lycopodiaceae*.—*Lycopodium lucidulum* (typical), one large colony in a moist rocky ravine; 1157. *L. complanatum* var. *flabelliforme*, scattered extensive colonies; 1007, 1337.

*Ophioglossaceae*.—*Xotrychium dissectum*, occasional, chiefly the "oblique-lobed" rather than the typical form; 1447, 2258. *B. virginianum*, common; 1142.

*Osmundaceae*.—*Osmunda claytoniana*, common; 1195. *O. cinnamomea*, fairly common; 1176.

*Polyodiaceae*.—*Woodsia obtusa*, a few individuals on a moist sandstone outcrop; 1302. *Cystopteris fragilis* var. *protrusa*, common; 1148. *Onoclea sensibilis*, common; 1293. *Dryopteris noveboracensis*, very common; 1284. *D. hexagonoptera*, fairly common; 1145. *D. spinulosa* var. *intermedia*, a few with the *Lycopodium lucidulum* colony; 2179. *D. goldiana*, several in a partly-open ravine-bottom; 1385. *D. marginalis*, fairly common; 1301. *Polystichum acrostichoides*, very common; 1381. *Dennstaedtia punctilobula*, several individuals in recent clearings on "Yellow-jacket Ridge" in the southwest corner of the Forest; 1899. *Athyrium pycnocarpon*, uncommon; 2048. *A. thelypteroides*, fairly common; 1985. *A. filix-femina* var. *michauxii*, fairly common; 1942, 1982. *Camptosorus rhizophyllus*, occasional; 1001. *Asplenium pinna-tifidum*, a few in niches of the Watch Rocks; 1297. *A. platyneuron*, fairly common; 1400, 2155. *Pellaea atropurpurea*, a few on a sandstone outcrop south of the Watch Rocks; 1660. *Adiantum pedatum*, common; 1837. *Pteridium aquilinum* var. *latiusculum*, common; 1137. *Polypodium virginianum*, common; 1004.

*Pinaceae*.—*Tsuga canadensis*, a young stand and scattered older trees along Elk Fork; 1360. *Pinus echinata*, fairly common; 1390. *P. rigida*, fairly common; 1115. Seedlings of *P. strobus* have been planted in some experimental plots.

*Typhaceae*.—*Typha latifolia*, a few in wet roadside depressions; 1639, 1900.

*Sparganiaceae*.—*Sparganium* sp., a large sterile colony along Elk Fork; 2086.

*Alismataceae*.—*Sagittaria australis*, a colony at the mouth of Pine Run and a second along Elk Fork; 1627, 2087.

*Gramineae*.—*Bromus purgans*, fairly common; 2254. *Festuca obtusa*, uncommon; 1133. *Vulpia octoflora*, scattered colonies; 1947. *Glyceria striata* (typical), fairly common; 1292. *Poa compressa*, common; 1889. *P. cuspidata*, fairly common; 1002, 1060. *Eragrostis capillaris*, occasional; 2038. *Triodia flava*, chiefly roadsides in the south old field; 2069. *Elymus riparius*, fairly common; 1977. *Hystrix patula* (typical), common; 1320. *Sphenopholis nitida*, a few scattered colonies; 1073. *Danthonia spicata* (typical), very common; 1163. *Calamagrostis insperata* Swallen, several small colonies in ridgetop clearings just north of Forest Headquarters; 1392A, 1945. Although apparently included in *C. porteri* Gray by Fernald (1950), this species is considered distinct by Hitchcock (1950) and other authorities. *C. insperata* has been reported previously only from the type locality of Ophir Hollow, Jackson County, Ohio, and from two stations in Missouri (Van Schaak, 1954). *Agrostis alba* (typical), chiefly roadsides in the south old field; 1894. *A. perennans*, very common; 2039, 2145. *Cinna arundinacea*, uncommon; 2206, 2253. *Phleum pratense*, uncommon; 1876. *Muhlenbergia tenuiflora*, common; 2034. *M. sylvatica*, fairly common; 2201. *Aristida oligantha*, restricted to the south old field; 2192. *A. longespica*, with the preceding; 2196. *Eleusine indica*, a stray individual in road in the south old field; 2191. *Leersia virginica* var. *ovata*, common; 2051. *Digitaria ischaemum*, common on disturbed roadsides; 2083. *D. sanguinalis*, with the preceding; 2084. *Paspalum ciliatifolium* var. *muhlenbergii*, a small colony on roadside in the south old field; 2190. *Panicum dichotomiflorum* var. *geniculatum*, occasional; 2199. *P. capillare* (typical), a few along road in the south old field; 2225. *P. stipitatum*, a stray individual along Elk Fork; 2082. *P. dichotomum* (typical), very common; 1166, 1374. *P. polyanthes*, uncommon; 2079. *P. commutatum* (typical), fairly common; 1132. *P. clandestinum*, very common; 2231. *Echinochloa pungens* (typical), occasional; 2188. *Setaria glauca*, roadsides in the south old field; 2187. *S. viridis* (typical), a few with the preceding; 2184. *Andropogon scoparius*, very common; 2053. *A.*

*gerardi*, one colony in a ridgetop clearing; 1560. *A. virginicus* (typical), common; 2197, 2227. *A. elliotii*, only in the south old field; 2228.

*Cyperaceae*.—*Cyperus flavescens* var. *poaeformis*, occasional along Pine Run; 2232A. *C. strigosus* (typical), occasional; 2232. *Eleocharis obtusa*, occasional; 2233. *Scirpus atrovirens* var. *georgianus*, occasional; 1274. *S. rubricosus*, a small colony in a wet roadside depression on Yellow-jacket Ridge; 2241. *Carex rosea*, fairly common; 1289. *C. crinita* (typical), occasional; 1848. *C. hirsutella*, common; 1161. *C. prasina*, fairly common; 1175. *C. plantaginea*, fairly common; 1709. *C. lurida*, occasional; 1328. *C. lupuliformis*, occasional; 2167.

*Araceae*.—*Arisaema atrorubens*, fairly common; 1080. *A. dracontium*, occasional, valley of Pine Run; 1177, 1986.

*Commelinaceae*.—*Tradescantia virginiana*, uncommon; 1153, 1801.

*Juncaceae*.—*Juncus tenuis*, very common; 1129, 1880. *J. effusus* var. *solutus*, fairly common; 1327. *J. biflorus*, one large colony in moist open soil on Yellow-jacket Ridge; 2080. *J. acuminatus*, one small colony; 1326. *Luzula echinata*, common; 1059.

*Liliaceae*.—*Chamaelirium luteum*, fairly common; 1144. *Uvularia perfoliata*, common; 1800. *U. grandiflora*, fairly common; 1051. *Allium canadense*, one colony on terrace along Elk Fork; 1853. *Lilium canadense* var. *editorum*, fairly common; 1453. *Erythronium americanum*, common; 1704. *E. albidum*, fairly common; 1705. *Smilacina racemosa* var. *cylindrata*, common; 1146, 1796. *Polygonatum biflorum*, fairly common; 1074. *P. canaliculatum*, occasional; 1881. *Medeola virginiana*, fairly common; 1159. *Trillium flexipes*, one colony; 1083, 1802. *T. grandiflorum*, very common; 1053. *Smilax herbacea*, occasional along Pine Run; 1178. *S. rotundifolia*, very common; 2198. *S. tamnoides* var. *hispida*, fairly common; 2250. *S. glauca* var. *leurophylla*, common; 2166.

*Dioscoreaceae*.—*Dioscorea villosa*, uncommon; 1335, 1844.

*Amaryllidaceae*.—*Hypoxis hirsuta*, one colony; 1077.

*Iridaceae*.—*Sisyrinchium angustifolium*, a few in the north old field; 1279. *Iris cristata*, scattered colonies along Elk Fork; 1804.

*Orchidaceae*.—*Cypripedium calceolus* var. *pubescens*, occasional; 1110. *Orchis spectabilis*, occasional; 1456, 1797. *Isotria verticillata*, fairly common, in association with *Kalmia*; 1294, 1805. *Spiranthes tuberosa*, occasional; 2065. *S. vernalis*, a few in the south old field; 2062. *Goodyera pubescens*, fairly common; 1458. *Corallorhiza odontorhiza*, occasional; in part the yellowish forma *flavida*; 1631. *Malaxis unifolia*, fairly common; 1361. *Liparis lilifolia*, occasional; 1138. *Aplectrum hyemale*, occasional; 1673. *Tipularia discolor*, one small colony; 1008.

*Salicaceae*.—*Salix nigra*, fairly common; 1846. *S. sericea*, collected once; 1819. *S. humilis*, uncommon; 1994. *S. tristis* Ait. [*S. humilis* var. *microphylla* in Fernald (1950)], a few along upper border of the north old field; 1706. *Populus grandidentata*, fairly common; 1884.

*Juglandaceae*.—*Juglans cinerea*, fairly common; 2175. *J. nigra*, uncommon; 2257. *Carya cordiformis*, uncommon; 2249. *C. ovata*, fairly common; 2229. *C. tomentosa*, fairly common; 2244. *C. glabra* (typical), common; 2224.

*Corylaceae*.—*Corylus americana*, common; 1465. *Ostrya virginiana*, collected only once but probably commoner; 2263. *Carpinus caroliniana* var. *virginiana*, common; 1149. *Betula nigra*, fairly common; 1849. *Alnus serrulata*, common; 1662.

*Fagaceae*.—*Fagus grandifolia*, uncommon; 1286. *Castanea dentata*, fairly common, short-lived sprouts only; 1140. *Quercus alba*, very common; 2211. *Q. stellata*, uncommon; 1372. *Q. prinus*, very common; 2212. *Q. muehlenbergii*, no specimens. *Q. rubra* (typical), common; 2217. *Q. coccinea*, common; 2215. *Q. velutina*, very common; 2216. *Q. imbricaria*, uncommon, chiefly along Pine Run; 1288.

*Ulmaceae*.—*Ulmus rubra*, fairly common; 2159. *U. americana*, fairly common; 2267.

*Moraceae*.—*Morus rubra*, occasional; 1123.

*Urticaceae*.—*Laportea canadensis*, fairly common; 1979. *Pilea pumila* (typical), common; 1553. *Boehmeria cylindrica* (typical), fairly common; 1624. *Parietaria pensylvanica*, one colony near the Watch Rocks; 1398.

*Aristolochiaceae*.—*Asarum canadense* (typical), common; 1052. *Aristolochia serpentaria*, fairly common; 1838.

*Polygonaceae*.—*Rumex mexicanus*, one small colony on Yellow-jacket Ridge; 1898. *R.*

*obtusifolius*, occasional; 1866, 1980. *R. acetosella* (typical), fairly common; 1116. *Tovara virginiana*, common; 1459, 1979. *Polygonum aviculare*, a few at Headquarters; 1875. *P. pensilvanicum* var. *laevigatum*, occasional; 2185. *P. persicaria* (typical), fairly common; 1350. *P. punctatum* var. *leptostachyum*, uncommon; 1992, 2230. *P. sagittatum*, fairly common; 1987. *P. arifolium* var. *pubescens*, occasional; 2172. *P. scandens*, common; 1618.

*Chenopodiaceae*.—*Chenopodium hybridum* var. *gigantospermum*, one colony; 1462. *C. album*, uncommon; 1461, 1868.

*Phytolaccaceae*.—*Phytolacca americana*, common; 1268.

*Portulacaceae*.—*Claytonia virginica*, common; 1006.

*Caryophyllaceae*.—*Paronychia canadensis*, common; 1167. *P. fastigiata*, one stray individual; 2055. *Stellaria pubera* var. *silvatica*, fairly common; 1084. *S. longifolia*, uncommon; 1113. *Cerastium nutans*, a single colony; 1820. *C. viscosum*, occasional; 1789. *Agrostemma githago*, a few individuals on Yellow-jacket Ridge; 1356. *Silene stellata*, fairly common; 1319. *S. virginica*, fairly common; 1109. *Dianthus armeria*, fairly common; 1343.

*Ranunculaceae*.—*Ranunculus recurvatus*, common; 1158. *R. hispidus*, one small colony; 1793. *R. septentrionalis* (typical), fairly common; 1750. *Thalictrum polygamum*, common; 1330. *Anemonella thalictroides*, common, sometimes flowering in the fall; 1046. *Anemone virginiana*, no specimens. *Hepatica americana*, fairly common; 1005. *Clematis virginiana*, common; 1441, 1616A. *C. viorna*, fairly common; 1334. *Cimicifuga racemosa*, common; 1336.

*Berberidaceae*.—*Podophyllum peltatum*, common; 1338, 1803. *Jeffersonia diphylla*, one colony; 1396. *Caulophyllum thalictroides*, occasional; 1395.

*Menispermaceae*.—*Menispermum canadense*, fairly common, 2164.

*Magnoliaceae*.—*Liriodendron tulipifera*, common; seedlings are often abundant in recent clearcuts; 2160.

*Annonaceae*.—*Asimina triloba*, fairly common; 1816.

*Lauraceae*.—*Sassafras albidum* var. *molle*, very common; 1941, 2045. *Lindera benzoin*, very common, the leaves varying from moderately pubescent to glabrous beneath; 1710, 1845.

*Papaveraceae*.—*Sanguinaria canadensis*, common; 1050, 1836. *Dicentra cucullaria*, fairly common; 1712.

*Cruciferae*.—*Lepidium campestre*, a few on roadside on Yellow-jacket Ridge in the southwest corner of the area; 1795. *Capsella bursapastoris*, a few at Headquarters; 1790. *Brassica kaber* var. *pinnatifida*, one colony on Yellow-jacket Ridge; 1351A. *Sisymbrium officinale* var. *leiocarpum*, a few at Headquarters; 1872. *Barbarea vulgaris* var. *arcuata*, a few on Yellow-jacket Ridge; 1792. *Dentaria laciniata*, very common; 1041. *D. heterophylla*, common; 1054. *Cardamina bulbosa*, common; 1112. *C. douglassii*, common; 1058, 1711. *C. pensylvanica* (typical), fairly common; 1798. *C. parviflora* var. *arenicola*, one large colony near Headquarters; 1791. *Arabis laevigata* (typical), fairly common; 1049. *A. canadensis*, fairly common; 1107, 1130.

*Crassulaceae*.—*Sedum ternatum*, very common; 1076.

*Saxifragaceae*.—*Saxifraga virginiana*, common; 1075. *Tiarella cordifolia*, very common; 1079. *Heuchera americana*, fairly common; 1072. *Hydrangea arborescens*, common; 1282.

*Hamamelidaceae*.—*Hamamelis virginiana*, common; some of the material approaches the variety *parvifolia*; 1661, 2209.

*Platanaceae*.—*Platanus occidentalis*, fairly common; 1847.

*Rosaceae*.—*Spiraea tomentosa*, only in the north old field; 1452, 2052. *Aruncus dioicus*, fairly common; 1156. *Gillenia stipulata*, very common; 1160. *Pyrus coronaria* var. *lancifolia*, fairly common; 2068. *Amelanchier arborea*, fairly common; 1703. *Crataegus* spp., fairly common but largely immature; 2137. *Fragaria virginiana* var. *illinoensis*, one small colony on the Forest; the species is common on roadsides nearby; 1882. *Potentilla norvegica*, uncommon; 1389. *P. simplex* (typical), common; 1085. *Geum canadense*, common; 1333, 1976. *G. virginianum*, occasional; 1903. *Rubus occidentalis*, uncommon; 2174. *Rubus* sp. (dewberry), in the north old field; 1821. *Rubus* sp. (blackberry), common; 1896. *Agrimonia parviflora*, fairly common; 2158, 2170. *A. rostellata*, occasional; 2032. *A. pubescens*, fairly common; 1448, 2035. *Rosa carolina*, very common; 1128. *Prunus serotina*, uncommon; 2156.

*Leguminosae*.—*Cassia nictitans*, common; 1450. *Cercis canadensis*, very common; 1936. *Trifolium pratense* var. *sativum*, uncommon; 1170. *T. repens*, chiefly around Headquarters;

1877. *T. reflexum* (typical), collected once near the Watch Rocks; 1299. *T. hybridum* var. *elegans*, occasional near Headquarters; 1887. *T. agrarium*, a few in the north old field; 1280. *Melilotus officinalis*, occasional near Headquarters; 1871. *M. alba*, fairly common; 1387. *Medicago lupulina* var. *glandulosa*, a few in the Headquarters lawn; 1870. *Tephrosia virginiana* (typical), fairly common; 1269. *Robinia pseudo-acacia*, occasional; 2142. *Desmodium nudiflorum*, very common; 1322. *D. glutinosum*, common; 1349. *D. rotundifolium*, uncommon; 2042. *D. ciliare*, fairly common; 2047, 2070. *D. marilandicum*, uncommon; 2144. *D. cuspidatum* (typical), fairly common; 1376, 2040. *D. glabellum*, uncommon; 2146. *D. paniculatum*, very common; 2044. *Lespedeza repens*, very common; 2064, 2076. *L. virginica*, restricted to the south old field; 2061. *L. intermedia*, common; 2063. *L. hirta*, common; 1556. *L. striata*, common around Headquarters and in the south old field; 2085. *L. stipulacea*, a few at Headquarters; 2238. *Stylosanthes biflora* (typical), uncommon; 1946. *Vicia* sp., a small colony of sterile plants in the north old field; 2265. *Apios americana*, fairly common; 1329. *Chitoria mariana*, fairly common; 1948, 2058. *Amphicarpa bracteata* (typical), fairly common; 1558.

*Linaceae*.—*Linum virginianum*, fairly common; 1263, 2043.

*Oxalidaceae*.—*Oxalis violacea*, fairly common; the specimen approaches var. *trichophora*; 1071. *O. corniculata*, apparently restricted to the south old field; 2182. *O. europaea*, uncommon; 1869. *O. grandis*, uncommon; 1151.

*Geraniaceae*.—*Geranium maculatum*, common; 1042.

*Polygalaceae*.—*Polygala incarnata*, occasional; 1276, 1562. *P. sanguinea*, a few in the north old field; 1341. *P. verticillata* var. *ambigua*, common; 1354, 1564, 2073.

*Euphorbiaceae*.—*Acalypha gracilens*, common; 1640. *Euphorbia corollata*, very common; variable in amount of pubescence; 1266, 1563, 1883. *E. supina*, only on roadsides in the south old field; 2186, 2226. *E. maculata*, occasional; 2181.

*Callitricheaceae*.—*Callitriche deflexa* var. *austini*, common around ruts and puddles and on other damp, bare soil; 1897.

*Anacardiaceae*.—*Rhus typhina*, a solitary tree on Yellow-jacket Ridge; 1902. *R. glabra* (typical), common; 1265. *R. copallina* var. *latifolia*, very common; 2067. *R. aromatica* (typical), a few at base of the Watch Rocks; 1298. *R. radicans*, very common; 2245.

*Aquifoliaceae*.—*Ilex verticillata* var. *padifolia*, occasional; 1290.

*Celastraceae*.—*Euonymus atropurpureus*, uncommon; 1152, 1663. *Celastrus scandens*, fairly common; 2157.

*Staphyleaceae*.—*Staphylea trifolia*, uncommon; 1120.

*Aceraceae*.—*Acer saccharum*, common; 2204. *A. nigrum*, occasional 2203. *A. rubrum* (typical), common; 1173. *A. saccharinum*, fairly common; 1812.

*Hippocastanaceae*.—*Aesculus octandra*, fairly common; 1813.

*Balsaminaceae*.—*Impatiens pallida*, very common; 1621. *I. capensis*, very common; 1622.

*Rhamnaceae*.—*Ceanothus americanus*, very common; 1135, 1346.

*Vitaceae*.—*Parthenocissus quinquefolia*, fairly common; 1850. *Vitis aestivalis* var. *argenti-folia*, common; 2200, 2220. *V. riparia* (typical), fairly common; 2235.

*Tiliaceae*.—*Tilia americana* (including *T. neglecta*), fairly common; 2161.

*Malvaceae*.—*Sida spinosa*, chiefly on roadsides in the south old field; 2071. *Abutilon theophrasti*, a few along road in the south old field; 2183.

*Guttiferae*.—*Hypericum perforatum*, recently collected on a roadside in the south old field; specimen not yet deposited. *H. punctatum*, common; 1270, 1344. *H. spathulatum*, chiefly in the north old field, occasional elsewhere; 1391. *H. mutilum*, fairly common; 1463. *H. gentianoides*, only in the south old field; 2195.

*Cistaceae*.—*Lechea racemulosa*, common; 2075.

*Violaceae*.—*Hybanthus concolor*, uncommon; 1121. *Viola cucullata*, uncommon; 1818. *V. papilionacea*, common; 1092. *V. triloba* (typical), fairly common; 1044. *V. blanda*, fairly common; 1082, 1809. *V. canadensis*, common; 1057, 1081. *V. striata*, fairly common; 1118.

*Passifloraceae*.—*Passiflora lutea*, collected recently in upland woods near Headquarters; specimen not yet deposited.

*Nyssaceae*.—*Nyssa sylvatica* var. *caroliniana*, common; 1193.

*Onagraceae*.—*Ludwigia alternifolia*, fairly common; 1353, 2077. *L. palustris* var. *americana*,

occasional; 1628. *Epilobium coloratum*, occasional; 2057, 2240. *Oenothera biennis*, uncommon; 1983. *O. pilosella*, a few in the north old field; 1278. *Circaea quadrisulcata* var. *canadensis*, fairly common; 1323.

*Araliaceae*.—*Aralia racemosa*, a few on a steep slope along Elk Fork; 1393. *A. nudicaulis*, several individuals at head of a moist ravine; 1155. *Panax quinquefolius*, occasional; 1399.

*Umbelliferae*.—*Sanicula canadensis*, common; 1272, 1935. *Osmorhiza claytoni*, uncommon; 1394. *O. longistylis* (typical), fairly common; 1119. *Erigenia bulbosa*, occasional; 1707. *Zizia aptera*, common; 1070, 1169. *Cicuta maculata* (typical), uncommon; 1841. *Cryptotaenia canadensis*, common; 1840. *Taenidia integerrima*, occasional; 1162. *Thaspium barbinode*, one colony on a terrace along Elk Fork; 1295. *Angelica venenosa*, uncommon; 1437, 1990. *Daucus carota*, fairly common; 1386.

*Cornaceae*.—*Cornus florida*, very common; 1045. *C. obliqua*, fairly common; 1287. *C. alternifolia*, occasional; 1382.

*Pyrolaceae*.—*Chimaphila maculata*, fairly common; 1359. *Pyrola rotundifolia* var. *americana*, uncommon; 1851. *Monotropa uniflora*, fairly common; 1379, 1457. *M. hypopithys*, fairly common; 1460.

*Ericaceae*.—*Rhododendron roseum*, one colony; 1106, 1814. *Kalmia latifolia*, very common; 1136. *Oxydendrum arboreum*, common; 1347. *Epigaea repens* (typical), common; 1047, 1702. *Gaultheria procumbens*, fairly common; 1464. *Gaylussacia baccata*, fairly common; 1191, 1815. *Vaccinium stamineum* (typical), common; 1068. *V. vacillans* (typical), very common; 1086.

*Primulaceae*.—*Lysimachia quadrifolia*, common; 1165. *L. ciliata*, common; 1331.

*Ebenaceae*.—*Diospyros virginiana*, uncommon; 2066.

*Oleaceae*.—*Fraxinus americana* (typical), fairly common; 2261. *F. pennsylvanica* (typical), a few saplings along Elk Fork; 2259. *Chionanthus virginicus*, a number of individuals on a moist ridgetop; 1104.

*Gentianaceae*.—*Sabatia angularis*, common; 1454. *Gentiana andrewsii*, a few along edge of the north old field; 1666. *Obolaria virginica*, a few on a rich north slope of Yellow-jacket Ridge; 1139.

*Apocynaceae*.—*Apocynum androsaemifolium*, uncommon; 1134. *A. cannabinum* var. *pubescens*, fairly common; 1131.

*Asclepiadaceae*.—*Asclepias tuberosa*, uncommon; 1348. *A. quadrifolia*, fairly common; 1108. *A. exaltata*, occasional; 1291. *A. variegata*, uncommon; 1179. *A. syriaca*, a single sterile individual at Headquarters; 2239. *A. hirtella*, a number in the south old field; 1401, 1890.

*Convolvulaceae*.—*Ipomoea purpurea*, a few on a roadside in the south old field; 2189. *I. pandurata*, uncommon; 1944. *Convolvulus spithameus*, collected once on a roadside bank near Headquarters; 1171. *Cuscuta gronovii*, common; 1623, 2050.

*Polemoniaceae*.—*Polemonium reptans*, common; 1055. *Phlox subulata*, common; our material variable in amount of glandularity; 1003, 1087, 1751. *P. divaricata*, common; 1056. *P. pilosa*, collected once in oak woods near Headquarters; 1103. *P. stolonifera*, a large colony in a hemlock stand along Elk Fork and small patches in a rich ravine; 1810. *P. maculata* var. *purpurea*, uncommon along Pine Run; 1975. *P. paniculata*, fairly common; 1443.

*Hydrophyllaceae*.—*Hydrophyllum macrophyllum*, uncommon; 1154. *H. canadense*, uncommon; 1852.

*Boraginaceae*.—*Cynoglossum virginianum*, fairly common; 1141. *Myosotis verna*, occasional; 1078. *Mertensia virginica*, uncommon; 1708, 1749.

*Verbenaceae*.—*Verbena urticifolia*, uncommon; 1351.

*Labiatae*.—*Trichostema dichotomum*, chiefly in the south old field; 2193. *Teucrium canadense* var. *virginicum*, no specimens. *Scutellaria serrata*, fairly common; 1143. *S. incana*, uncommon; 1455, 2246. *S. lateriflora*, fairly common; 1626, 1981. *S. nervosa* (typical), uncommon; 1150. *Meehania cordata*, scattered colonies on rich lower slopes along Elk Fork; 1296. *Glechoma hederacea* var. *micrantha*, fairly common; 1089. *Prunella vulgaris* var. *lanceolata*, fairly common; 1342. *Stachys riddellii*, uncommon; 1384, 1842. *Salvia lyrata*, occasional along Pine Run; 1843. *Monarda clinopodia*, fairly common; 1283. *M. fistulosa* (typical), occasional; 1378. *Blephilia hirsuta*, occasional; 1383. *Hedeoma pulegioides*, very common; 1451. *Pycnanthemum tenuifolium*, common; 1339. *P. incanum*, occasional; 1377. *Cunila origanoides*, very common;

1611. *Lycopus virginicus*, fairly common; 1988, 2173. *Collinsonia canadensis*, common; 1629, 2049.

*Solanaceae*.—*Solanum americanum*, uncommon; 1552, 2223. *S. carolinense*, occasional; 1352. *Physalis virginiana*, collected once on a hillside along Pine Run; 2247.

*Scrophulariaceae*.—*Verbascum thapsus*, fairly common; 1895. *Chelone glabra* var. *elatior*, fairly common; 1620. *Penstemon digitalis*, restricted to the south old field; 2060. *Mimulus ringens*, common; 1984. *M. alatus*, collected once on a mudflat along Elk Fork; 2081. *Gratiola neglecta*, scattered colonies about moist depressions in roads; 1274A; 2054. *Veronicastrum virginicum*, uncommon; 1446. *Veronica serpyllifolia*, a few at Headquarters; 1873. *V. peregrina* (typical), a few at Headquarters; 1817. *V. arvensis*, a few at Headquarters; 1788. *Gerardia tenuifolia* (typical), common; 1609, 2138. *G. laevigata*, common; 1438. *G. flava* var. *macrantha*, fairly common; 1555. *Pedicularis canadensis* (typical), fairly common; 1125, 1806.

*Orobanchaceae*.—*Epifagus virginiana*, occasional; 2088. *Conopholis americana*, occasional; 1122. *Orobanche uniflora*, collected once; 1807.

*Acanthaceae*.—*Justicia americana*, occasional along Elk Fork; 1362.

*Phrymaceae*.—*Phryma leptostachya*, one colony; 1371.

*Plantaginaceae*.—*Plantago rugelii*, chiefly at Headquarters; 1874. *P. lanceolata* (typical), occasional; 1794.

*Rubiaceae*.—*Galium aparine*, uncommon; 1090. *G. triflorum*, occasional; 2234. *G. pilosum*, occasional; 1373. *G. circaeazans*, common; 1267. *G. lanceolatum*, uncommon; 1172. *G. tinctorium*, occasional along Pine Run; 1325. *G. concinnum*, common; 2251. *G. asprellum*, common along Pine Run; 1625. *Mitella repens*, uncommon; 1638. *Cephalanthus occidentalis* (typical), fairly common; 2171. *Houstonia caerulea*, very common; 1048, 1088. *H. longifolia*, very common; 1168, 1275.

*Caprifoliaceae*.—*Triosteum perfoliatum*, one small colony; 1635. *T. aurantiacum*, uncommon; 1811. *Viburnum cassinoides*, uncommon; 2180. *V. prunifolium*, common; 1114. *V. dentatum* (typical), fairly common; 1281. *V. acerifolium*, common; 1102. *Sambucus canadensis*, common; 1285.

*Valerianaceae*.—*Valeriana pauciflora*, fairly common; 1117. *Valerianella chenopodifolia*, uncommon; 1091, 1808.

*Campanulaceae*.—*Specularia perfoliata*, fairly common; 1105, 1397. *Campanula americana* var. *illinoensis*, uncommon; 1380. *Lobelia cardinalis*, fairly common; 1442. *L. siphilitica*, fairly common; 1619. *L. puberula* var. *simulans*, fairly common; 1608. *L. spicata* (typical), uncommon; 1358. *L. inflata*, very common; 1355, 1937.

*Compositae*.—*Vernonia altissima*, fairly common; 1614. *Eupatorium fistulosum*, common; 1616. *E. purpureum*, uncommon; 1554. *E. sessilifolium* (typical), common; 1440, 1993. *E. perfoliatum*, uncommon; 2168. *E. rugosum*, common; 1634. *E. coelestinum*, one small colony on a moist roadside; 2031. *Liatris scariosa*, fairly common; 1559. *Chrysopsis mariana*, uncommon; 1612. *Solidago caesia*, common; 1605, 2150. *S. flexicaulis*, common; 1665, 2178. *S. squarrosa*, a few on a rich slope along Elk Fork; 2163. *S. bicolor*, common; 1606. *S. erecta*, fairly common; 1439, 2046. *S. juncea*, very common; 1392. *S. patula* (typical), uncommon; 1613. *S. nemoralis*, common; 1565. *S. ulmifolia*, fairly common; 2218. *S. rugosa*, fairly common; 1617. *S. altissima*, uncommon; 2194, 2242. *S. graminifolia*, occasional, chiefly south old field; 2243. *Aster divaricatus*, common; 1630, 1659. *A. macrophyllus*, common; 1449, 2090. *A. shortii*, uncommon; 1664. *A. cordifolius* (typical), fairly common; 2162. *A. undulatus*, common; 1658, 2213, 2260. *A. patens* var. *phlogifolius*, fairly common; 2140, 2147. *A. prenanthoides*, fairly common; 2176, 2236. *A. puniceus* (typical), uncommon; 2169. *A. laevis*, uncommon; 2136. *A. pilosus* (typical), fairly common; 2214. *A. vimineus* (typical), uncommon; 2148. *A. lateriflorus*, fairly common; 1657, 2205. *A. infirmus*, occasional; 1991. *A. linariifolius*, one large colony; 1656. *Erigeron pulchellus*, occasional; 1126. *E. philadelphicus*, occasional around Headquarters; 1787. *E. annuus*, common; 1164. *E. canadensis*, common; 2033. *Sericocarpus asteroides*, very common; 1318, 1388. *Antennaria plantaginifolia*, very common; 1043. *Gnaphalium obtusifolium* (typical), fairly common; 1561. *G. purpureum*, uncommon; 1358A. *Ambrosia artemisiifolia* var. *elatior*, common; 1550, 2056. *Polymnia uvedalia*, one small colony; 1943. *Silphium perfoliatum*, fairly common; 1445. *S. trifoliatum* (typical), fairly common;



1345. *Heliopsis helianthoides*, a colony on Yellow-jacket Ridge; 1357. *Rudbeckia laciniata*, common; 1444. *R. hirta*, fairly common; 1194, 1264. *Helianthus divaricatus*, common; 1321, 1879. *H. hirsutus* (typical), fairly common; 2151. *H. microcephalus*, uncommon; 1938. *H. strumosus*, occasional; 2036. *Actinomeris alternifolia*, very common; 1615. *Coreopsis tripteris* (typical), fairly common; 1557. *Bidens frondosa*, fairly common; 2078. *Achillea millefolium*, fairly common; 1192. *Anthemis cotula*, a few at Headquarters; 1867. *Chrysanthemum leucanthemum* var. *pinnatifidum*, fairly common; 1340. *Erechtites hieracifolia*, common; 1607, 2152. *Cacalia suaveolens*, a colony along Elk Fork; 2089. *C. atriplicifolia*, fairly common; 1633. *Senecio aureus* var. *intercurus*, fairly common; 1111. *Cirsium altissimum*, fairly common; 1632. *Krigia biflora*, uncommon; 1124. *Taraxacum officinale*, only at Headquarters; 1865. *Lactuca canadensis*, common; our material very variable and assignable to several of the varieties recognized by Fernald; 1891, 1892, 2153. *Prenanthes serpentaria*, common; 1637. *P. altissima*, fairly common; 2177, 2221. *Hieracium vemosum* var. *nudicaule*, common; 1069. *H. paniculatum*, uncommon; 1610. *H. scabrum*, common; 1989. *H. gronovii*, only in the south old field; 2059.

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## REFERENCES

- Deam, C. C. 1940. Flora of Indiana. Dept. Conservation, Div. of Forestry, Indianapolis. 1236 pp.
- Fassett, N. C. 1951. *Callitriche* in the New World. *Rhodora* 53: 137-155.
- Fernald, M. L. 1950. Gray's Manual of Botany. 8th ed. American Book Company, New York. 1632 pp.
- Gleason, H. A. 1952. The new Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada. 3 vols. New York Botanical Garden, New York. 1726 pp.
- Hitchcock, A. S. 1950. Manual of the Grasses of the United States. 2nd ed., rev. by Agnes Chase. U. S. Dept. of Agric., Misc. Publ. No. 200, Government Printing Office, Washington. 1051 pp.
- Jones, G. N. 1950. Flora of Illinois. 2nd ed. Amer. Midl. Nat. Monograph No. 5. 368 pp.
- Lawrence, G. H. M. 1951. Taxonomy of Vascular Plants. The Macmillan Company, New York. 823 pp.
- Louis-Marie, Father. 1944. The ancylatheran *Calamagrostis* of eastern North America. *Rhodora* 46: 285-305.
- Marple, Mildred F. 1954. The Geology of Lake Hope State Park. Div. Geol. Surv. Information Circular No. 13, Columbus, Ohio. 30 pp.
- Schaffner, J. H. 1928. Field Manual of the Flora of Ohio and Adjacent Territory. R. G. Adams and Company, Columbus, Ohio. 638 pp.
- . 1932. Revised catalog of Ohio vascular plants. *Ohio Biol. Surv. Bull.* 5: 89-215.
- Stout, W. 1927. Geology of Vinton County. *Geol. Surv. of Ohio, 4th series, Bulletin No. 31*, Columbus, Ohio. 402 pp.
- United States Dept. of Agric. Forest Service, Cent. States For. Exp. Sta. 1955. Vinton Furnace Experimental Forest. 44 pp.
- Van Schaack, G. B. 1954. *Calamagrostis insperata* in Missouri. *Rhodora* 56: 43.
- Weishaupt, Clara. 1954. List of plants in the Ohio State Herbarium from Vinton County. (Mimeographed.) 5 pp. Distributed by the author.