

# THE RAVINE FLORA OF WINNEBAGO COUNTY, ILLINOIS

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The flora of southern Illinois ravines has attracted attention since the days of Engelmann, Forbes, Vasey, and Wolf and Hall (cited in Winterringer and Vestal, 1956). More recently, ravines and outcrops in other parts of Illinois have been written of by Pepon (1909, 1917), Thorne (1924), Henderson (1929), and Stover (1930). The most recent, but confined entirely to the cliff-top habitats and plants of southern Illinois is the excellent, detailed report of Winterringer and Vestal (*op. cit.*). None of these studies applies to the plants of the dolomite ravines in the glaciated prairie area of northern Illinois. These are of sufficient interest to justify the following brief report.

In previous publications we have described the physiographic and climatic environment of Winnebago County, Illinois, in some detail (Fell, 1955; Fell and Fell, 1956). The plant names used in this article follow Jones (1950) with a few exceptions. The species mentioned are all represented by specimens in the Illinois State Museum Herbarium and for the most part also in the University of Illinois Herbarium and in the Evelyn I. Fernald Memorial Herbarium of Rockford College.

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Voegeli of the Botany Department of Rockford College.

Considering the moderate topography of our prairie county we are well supplied with ravines that were made by streams eroding the glacial till and the underlying bed rock, which over most of the county is Galena or Platteville dolomite lying very near the surface. This dolomite is an inferior grade of limestone which occurs in thin or thick horizontal layers often with sand, chert or clay in the bedding seams. The ravines are of two types, the small ravines found on creeks over the county and the large river gorges. These two differ materially in the type of plants, though both provide various habitats for intraneous plants and furnish refuges for extraneous species.

Because the rock breaks easily with an irregular fracture the walls of the ravines are rough and broken, with numerous crevices, or step-like with minor shelves and recesses, often with an overhang, affording numerous lodging places for plants. Since the ravines are mostly on streams running east or west, a south-facing wall is exposed to direct sun and a north-facing wall is not exposed to direct sun. Either wall may be shaded by trees growing at the base of or on the face of the cliff. Other habitats in the ravines are the covering of the cliff

which slopes down to the edge of the dolomite forming the upper slope, the crest of the cliff, and the talus slope. The floor of the ravine is dolomite with a thin layer of bottom loam. Differences in exposure, soil, and moisture in various parts of the ravine determine the kind of plants which grow there and form a community that varies somewhat in its constituents on different outcrops but which follows a definite pattern. Much the same plants are found in all the small ravines in the county, but the species differ rather materially from those in the river gorges.

#### A TYPICAL SMALL CREEK RAVINE

The outcrop on South Kinnicknick Creek east of Roscoe, known as "South Ledges" furnishes a good example of the small creek ravine. A north cliff is in full sun most of the day and a south cliff is without direct sun and is partly shaded by trees that grow on the talus, at the base of the cliff, and on the much broken face which is cut by two small ravines. There is a definite overhang where the stream strikes the base of the cliff. The covering of the cliff, a thin layer of very sandy soil which is wind-borne, overlies glacial till of varying thickness so there is more or less of a slope from the general ground level to the edge of the dolomite without a bare ledge at the crest.

*Plants of the upper slope of the south, unexposed wall.*—The upper slope is densely wooded, a mixture of *Quercus alba* and *Q. velutina*, *Tilia americana*, *Juglans cinerea*, and *Ulmus americana* and *U. rubra* forming the canopy with an under-

story of *Carpinus caroliniana*, *Ostrya virginiana*, *Amelanchier* spp., and *Crataegus* spp. A tall shrub layer is well developed and includes *Cornus alternifolia*, several species of *Viburnum* (*V. lentago*, *V. rafinesquianum* and *V. acerifolium*), *Sambucus pubens*, and, farther back, *Prunus virginiana*, *Xanthoxylum americanum*, *Corylus americana*, *Rubus allegheniensis*, *R. strigosus*, and *Cornus racemosa*. Small shrubs are *Rubus hispidus*, *Ribes cynosbati*, and *Ceanothus americanus*. Vines are not abundant but one finds an occasional *Vitis vulpina* or *V. aestivalis*, *Parthenocissus* spp., and *Rhus radicans*. The forest floor is thickly covered with common spring-flowering plants and with many uncommon ones like *Chimaphilla corymbosa*, *Pyrola elliptica*, a small patch of *Pyrola secunda*, *Goodyera pubescens*, *Cypripedium parviflorum*, *Botrychium virginianum*, *B. multifidum* and *B. obliquum*, and *Dryopteris intermedia*. In shaded damp spots are *Trientalis borealis* and occasional patches of *Lycopodium lucidulum* and of *Carex deweyana*, while in more exposed places are *Pteridium latiusculum*, *Carex projecta*, and *Epilobium angustifolium*.

*Plants of the south crest.*—Here the sandy soil is a suitable place for *Juniperus virginiana* which grows 10 to 15 feet tall. Clothing the base of the junipers and draping over the edge of the cliff is an abundant growth of *Taxus canadensis*, in the shaded openings of which, on the crest, are such unusual plants as *Carex pedunculata*, *Corallorhiza maculata*, and *Mitchella repens*.

*Plants of the south wall.*—The face of the cliff, in its own shade.

is moist and, being rough, broken and fissured, offers many recesses for plants. These are either adventive like *Poa compressa* and common rock plants such as *Fragaria americana*, *Mitella diphylla*, and *Cystopteris fragilis* or such uncommon ones as *Actaea rubra*, *Aralia racemosa*, *Cryptogramma stelleri*, *Oryzopsis racemosa*, *Maianthemum canadense*, and *Polygonatum pubescens*. *Pellaea glabella* is not common on shaded cliffs, but when it does grow in damp shade it is much more robust.

The woody plants that grow on the lower part and foot of the cliff are, besides *Populus tremuloides*, such small trees as *Dirca palustris* and *Staphylea trifolia*, shrubs such as *Viburnum trilobum* and *Cornus rugosa*, and vines like *Lonicera dioica* and an occasional *Celastrus* or *Parthenocissus*. Other plants, each quite noticeable in its flowering season, are species of *Arabis* (*A. canadensis*, *A. laevigata* and *A. glabra*), *Anemone quinquefolia*, *Dentaria laciniata*, *Dicentra cucullaria*, and *Campanula intercedens*.

*Plants of the south talus slope.*—The sloping base of the cliff and the talus, with more moisture, are thickly covered in places with *Marchantia*, *Lunularia*, *Polytrichum*, and unidentified mosses. *Cystopteris bulbifera* grows in long rows in the wet cracks between the rock layers and festoons the damp walls of the overhang above the creek. Flat places are well occupied by *Camptosorus rhizophyllus* which is most common on large detached blocks of stone in the talus. The woodferns, *Dryopteris spinulosa* and *D. cristata*, are seen here more often than in

the drier upland that *D. intermedia* prefers. Many of the plants of low woods are found here, *Hepatica acutiloba*, *Polemonium reptans*, *Arisaema dracontium*, and *Asarum acuminatum*.

*Plants of the ravine floor.*—The floor of the ravine is about 100 yards wide and contains, on a dolomite bottom, the small, clear, cold, rapid South Kinnikinnick Creek. *Cornus obliqua* borders the creek and gives it its name. The few trees, shrubs, and herbs include *Populus*, *Salix*, *Equisetum hyemale*, *Acorus calamus*, *Symplocarpus foetidus*, and *Iris shrevei*.

*Plants of the exposed north wall.*—The north wall of the ravine is a vertical cliff the height of its opposite, about 50 feet. The upper slope differs in being sparsely timbered with *Quercus alba*, *Q. velutina*, *Q. macrocarpa*, a few *Q. ellipsoidalis*, and some *Juglans nigra*, and *Carya ovata* and *C. cordiformis*. It has an oak-opening ground layer composed of such herbs as low panicums, *Danthonia spicata*, *Carex brevior*, *Hypoxis hirsuta*, *Arenaria lateriflora*, *Ranunculus fascicularis*, *Helianthemum* spp., *Lechea stricta*, *Scutellaria parvula*, and *Synthyris bullii*.

The crest has *Juniperus virginiana* and *Crataegus pruinosa*, but it lacks *Taxus canadensis* and other shade species. There is a sparse growth of *Carex pennsylvanica* along the edge, but the only conspicuous spring flower is *Penstemon pallidus*.

The face is largely bare. There are a few adventive grasses, *Cerastium vulgatum*, and an occasional *Asclepias verticillata*, but the important plant is *Pellaea glabella* which

grows preferably on the outer edge of an overhang, usually well up on the face, and is inclined to follow the soft bedding layers of the dolomite. The persistent fronds with their accumulation of dead leaves and cobwebs catch dust and falling particles, making suitable places for the growth of *Heuchera richardsonii*, *Arabis lyrata*, *A. pycnocarpa*, and *Arenaria stricta*. Nearer the base are *Epilobium adenocaulon*, *Aquilegia canadensis*, *Smilacina* spp., and others that need a little more moisture. The liverworts of the south wall are replaced here by lichens and fungi. The talus offers nothing distinctive.

#### OTHER SMALL RAVINES

A.—“North Ledges” on North Kinnikinnick Creek has many of the same plants but lacks some of the northern species. *Pellaea glabella* and other ferns are particularly noticeable. The wide floor provides more space for wet-ground plants like *Spartina pectinata*, *Scirpus* spp., *Juncus* spp., *Mimulus ringens*, and *Aster puniceus*.

B.—Hall Creek “Dells” has a few residual white pine trees on the crest of the cliff. Yew grows here as does also *Ribes hirtellum*, *Aralia racemosa*, *Gentiana quinquefolia*, *Myosotis scorpioides*, and *Aster furcatus*. Here are *Cryptogramma stelleri*, a minute fern that is hard to find because of its size and because it fruits early and disappears, and *Carex pedunculata* which is equally difficult because all sign of fruit is gone by the middle of May. *Mertensia virginica* thickly covers a large area of the floor.

C.—Seward Bluffs on Grove Creek also has an exposed and an unexposed cliff. On the crest of the latter are *Botrychium obliquum*, *Carex pedunculata*, and *Cornus rugosa*. In the stream are *Callitriche heterophylla* and species of *Potamogeton*. On the creek bank we re-discovered *Geranium sibericum* whose presence was commented upon by M. S. Bebb three quarters of a century ago.

D.—The Rock Cut outcrop in the Forest Preserve on Willow Creek is unusual in the tall spur of dolomite which, on its exposed face, is clothed with *Pellaea glabella* which gives way to *Camptosorus rhizophyllus* on its shaded base. Here is an unusual number of ferns and such uncommon plants as *Vicia caroliniana* and *Viola affinis*.

Besides these there are some minor ravines and shaded dolomite outcrops having similar plants—in Tullock woods northwest of Rockford, in Kishwaukee River Forest Preserve, and on Kent Creek at the Illinois Central Railroad station in Rockford.

In the high central part of the county in Burrirt and Owen townships are a few dry ravines made by streams which have long since disappeared. The walls of some of these are sloping enough to assume the character of hill-side “limestone prairies” with *Andropogon scoparius*, *Bouteloua curtipendula*, and *Sporobolus* spp. A good example of this is on Owen Center Road near Roscoe Road. Another stranded ravine on Illinois Route 70 not far from Meridian Road has been so persistently pastured that none of the original flora is left.

## THE RIVER GORGES

When the glacier or its deposits blocked the large rivers in the south part of the county, the rivers were forced to seek new channels. Rock River moved to the west and cut a new bed in the dolomite. Evidence of this is seen at Blackhawk Park in Rockford and at the McCormick cliffs in Ogle County. Suggestions of a ravine flora are seen in *Dirca palustris* in Blackhawk Park and the ferns on the rocky opposite bank, but the gorge of Rock River is not well enough marked to make a floristic study feasible.

*Kishwaukee River Gorge.*—In pre-glacial times Kishwaukee River continued south from the forest preserve. When its channel was blocked by the glacier, the river turned sharply west and cut a new channel 3 miles long and 150 feet deep through the level till and the underlying dolomite to make a new outlet into Rock River below New Milford. The river is at the 700-foot level at the middle of the gorge where it is 100 feet wide. From crest to crest at this point the gorge is one-half mile wide. At only a few places does the depth of the river exceed three feet, the bed being dolomite or gravel on dolomite. The floor of the gorge, the flood plain of the river, is for the most part less than 100 yards wide. The slope of the walls of the gorge is abrupt from the floor for about 100 feet. These steep walls are much broken, there being numerous small ravines, some of them mere crevices a few feet wide, in which ice and packed snow stay until long after the flowering of hepatica. The rounded crowns

of the walls are till-covered and slope back gradually north and south to flat ground at the 850-foot elevation. The forest strip was formerly one-half mile wide on each side of the river but is now confined to the gorge where it is comparatively undisturbed. North and south of the forest strip is level prairie.

The trees of the gorge are more mesophytic than over the county as a whole. *Quercus velutina* and *Carya ovata* do not dominate, there being a larger proportion of *Quercus alba*, *Q. ellipsoidalis*, *Q. muhlenbergii*, and *Q. rubra* than is usual in this area. *Platanus occidentalis* and *Gymnocladus dioica* are more frequent here than elsewhere in the county. On the flood-plain are the common bottom-land trees, *Acer saccharinum*, (but no *A. rubrum*), *Tilia americana*, *Ulmus*, some *Acer saccharum*, and *Fraxinus quadrangulata* which is uncommon with us. The under-story is more distinct on the shaded south wall than elsewhere, the species being *Carpinus caroliniana*, *Ostrya virginiana*, *Euonymus atropurpureus*, *Staphylea trifolia*, *Ptelea trifoliata*, *Crataegus succulenta*, and *C. pedicellata* near the river and *C. pruinosa* and *C. punctata* on the crown. Juniper is less common than on Rock River and in the little ravines. Other secondary trees are *Populus grandidentata*, *Gleditsia triacanthos*, and *Amelanchier canadensis* and *A. laevis*.

The forest that covers the crown is more open. *Quercus* spp., *Carya* spp., *Juglans nigra*, *Fraxinus* spp., and *Celtis occidentalis* are the more common trees.

The shrubs of the river bank and

talus are: *Cornus alternifolia*, often of a definitely pagoda form; *Cornus rugosa* which, though a northern shrub, often suffers from late frosts; *Cornus obliqua* on the river bank where *Rosa palustris* is also found; *Sambucus canadensis*; and *Viburnum lentago*. In a minor ravine is the only *Hamamelis virginiana* that we have seen in the county. On both crowns is *Rhus arenaria* which seems to be only on Kishwaukee River in this county. The predominating gooseberry is *Ribes missouriensis*, and the common tall blackberry is *Rubus alligheniensis*. *Rhus glabra* and *Cornus racemosa* occur in patches, and *Ceanothus americanus* and *Amelanchier spicata* are occasional. The vines are *Vitis riparia*, often of large size, *Celastrus scandens*, and *Parthenocissus*, often in thick tangles.

The herbs of the flood-plain are those of the mesophytic woods of this area, there being no prairie species. Unusual plants of the river bank are *Carex davisii*, *Napaea dioica*, *Cassia hebecarpa*, *Amorpha fruticosa*, *Stellaria aquatica*, and *Dasistoma macrophylla*. The talus and lower part of the shaded wall harbor such unusual species as *Jeffersonia diphylla*, *Habenaria bracteata*, *Orchis spectabilis*, and *Cypripedium parviflorum*. Below the crown and in some of the little ravines are *Hepatica americana*, *H. acutiloba*, and plants which appear to be hybrids of these. On the crown are *Euphorbia commutata*, *Polygala verticillata*, *Gentiana quinquefolia*, *Pyrola elliptica*, and *Goodyera pubescens*. *Amphicarpa* forms a thick carpet in the upper part of some ravines.

The exposed north wall is thickly wooded with the same trees that cover the crown and thus, being in rather dense shade, there is not the marked difference in herbs that is found in the small creek ravines. On this wall liverworts and mosses which are abundant on the south wall are replaced by lichens. An unusual finding on this crest is *Orobanche uniflora*.

Because of the rugged terrain and the variety of habitats, especially cool, damp, shady places, the gorge has an unusually large fern flora. On the crown and above it is *Pteridium latiusculum* in large patches and, usually at the upper end of a small ravine, *Dryopteris intermedia* and *Adiantum pedatum*. Below the crown in exposed places is *Pellaea glabella*, though not as abundant as on many small outcrops. Farther down on sheltered shelves is the uncommon *Woodsia obtusa* and the more uncommon *Polypodium virginianum*. Toward the upper end of many ravines and in shady nooks on the face of the cliff is a luxuriant growth of *Cystopteris fragilis*, and in damper places on rock and on soil in the bottom of little ravines is the most vigorous growth of *Cystopteris bulbifera* that we have seen. *Camptosorus rhizophyllus* is rather common and in a small ravine near Camp Rotary is a large colony that has tail-less fronds. We did not find any that lacked basal lobes. On the talus is *Osmunda claytoniana*, *Dryopteris spinulosa*, and very infrequently *Dryopteris cristata* and *Athyrium thelypteroides*. *Athyrium angustum* and *Onoclea sensibilis* are in the bottom woods as is *Botrychium virginianum*. The evergreen

grape-ferns are on higher ground.

We have not tried to name all the plants that grow in the ravines, our purpose being mainly to show that the outcrops furnish living quarters for many species that would otherwise be absent from the county. Particularly in the small creek ravines, many of the plants are northern species which are uncommon this far south: *Pinus strobus*, *Taxus canadensis*, *Cryptogramma stelleri*, *Carex pedunculata*, *C. deweyana*, *Pyrola secunda*, *Epilobium angustifolium*, *Viburnum trilobum*, and many others. Whether their being here now is due to their being remnants of a more widespread distribution following the retreat of the glacier, or to their chance finding of a suitable environment is not apparent. Nor is it clear why the small creek ravines have such a large number and a greater proportion of northern species than the large Kishwaukee River Gorge has. Equally unexplained is the presence of some southern species — *Carex davisii*, *Gymnocladus dioica*, *Amorpha fru-*

*ticosa*, *Fraxinus quadrangulata*, and *Dasistoma macrophylla* — in Kishwaukee River Gorge and their absence from the small creek ravines.

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