Prairie Openings in the Forest

B. Shimek
PRAIRIE OPENINGS IN THE FOREST.

BY B. SHIMEK.

Treeless openings in otherwise forested areas have long been known to field-workers in this part of the Mississippi valley. These openings are striking because of the absence of trees, but their flora differs also from the minor flora of the forest, being in fact the typical flora of the drier prairies. It matters not how remote the greater prairie areas may be, or how completely these openings may be surrounded by forest, their flora is invariably of the same general prairie type.

They are exceedingly variable in extent. Sometimes they have an area of only a few square rods, as is (or was) the case in the more heavily timbered parts of the state; again they are mere tongues of the general prairie and naturally blend with it, as in the rougher western parts of the state.

They differ in the nature of their soil. In the northeastern part of the state they occur on the driftless surfaces whether covered with loess or geest; they are equally present on all the types of drift sub-soils from the Kansas to the Wisconsin; they are well-developed on all kinds of loess surfaces; and they are common on sandy and alluvial areas.

But whatever may be the differences between them they agree in occurring uniformly on the rougher surfaces of the state, and they have the same flora.

The naturally timbered areas of the state are rough, and the prairie openings are more or less distinctly contrasted with the forest. Sometimes, especially where there are abrupt changes in topography, the line between the prairie openings and the forest is sharp; again the two types blend and a scant sprinkling of trees, usually stunted hard-wood species such as oaks, etc., encroaches upon the prairie border producing the typical “oak-openings” or “oak-barrens.” Their distribution suggests that this rough topography accounts for their existence, for they occur uniformly on surfaces which are exposed to the two great factors which determine evaporation—namely, the sun and wind. They are therefore usually located on the very tops of the ridges, or on the south-
westerly slopes where they receive the full effects of the "two-o'clock sun" and our prevailing southwesterly summer winds. Sometimes where a ridge slopes gradually to the north these openings will follow it on that side for some distance, such slopes being but little sheltered from both wind and sun. Sometimes other slopes than those on the south and west are treeless, but in such cases local topography produces a persistent change in the direction of the air-currents, or the slopes are merely a part of a greater dessicated area.

These limited openings therefore owe their existence to the same causes which have produced our broader prairies, and must be regarded as prairie types.

So great is the difference between the flora of these openings and the smaller flora of the surrounding forest, that frequently in the more heavily forested sections of the eastern part of the state not a single species of either flora is mingled with the other. The difference is evidently due to the fact that the minor flora of the forest is mesophytic, while the prairie flora is essentially xerophytic and can persist in exposed situations where the former would fail. The writer has made extensive detailed comparisons of the flora of various prairie areas,* including the prairie openings, and has found the flora practically the same. There are variations in the lists of species which may be found in the prairie openings of even the same forested regions, but these differences are not greater than those which will be observed in different parts of the same larger prairie area of the ordinary type, and they take place within the same limits.

In order that this fact may be brought out more prominently a list of the plants which the writer has collected in typical prairie openings in the eastern part of the state, chiefly in Johnson county, is here included.

It will be observed that the plants belong without exception to the flora of the broader prairies. The relative abundance and distribution of the species is also the same. It should be noted that the list includes only those species which are now found in the herbarium of the State University. For convenience in reference the list is arranged alphabetically. The 7th edition of Gray's Manual is followed.

*For some of the results of these observations see the Bulletin from the Lab. of Nat. History, State Univ. of Iowa, Vol. VI, No. 1, and the Report of the Iowa Geological Survey, Vol. xx., both published in 1910 (in print at the time of the presentation of this paper).
LISTS OF PLANTS COLLECTED IN PRAIRIE OPENINGS.

Achillea millefolium L.
Agastache serophulariaefolia
(Willd) Ktze, (chiefly along the borders.)
Agropyron Smithii Ryd.
Allium canadense L.
Ambrosia artemisiifolia L.
Ambrosia philostachya DC.
Amorpha canescens Pursh.
Andropogon furcatus Muhl.
Andropogon scoparius Michx.
Anemone cylindrica A. Gray.
Anemone patens var. Wolfgangi-ana (Bess.) Koch. (In Winne-
shiek county.)
Antennaria neodoica Greene.
Antennaria plantaginifolia (L.) Rich.
Agrostis hyemalis (Walt.) B. S. P.
Artemisia caudata Michx.
Artemisia dracunculoides Pursh.
Artemisia ludoviciana Nutt.
Asclepias purpuraseens L.
Asclepias syriaca L.
Asclepias tuberosa L.
Asclepias verticillata L.
Aster azureus Lindl.
Aster laevis L.
Aster multiflorus var. exiguus Fer-
nald.
Aster novae-angliae L.
Aster oblongifolius Nutt.
Aster sericeus Vent.

Bouteloua curtipendula (Michx.)
Torr.
Brauneria pallida (Nutt.) Britt.

Caesalia atriplicifolia L.
Carex festuacea Sech.
Carex pennsylvanica Lam.
Carex tetanica var. Meadii (Dew-
ey) Bailey.
Cassia chamæcrista L.
Castilleja coccinea (L.) Spreng.
Ceanothus americanus L.
Clematis virginiana L. (Borders
chiefly.)

Comandra umbellata (L.) Nutt.
Convulvulus sepium L.
Coreopsis palmata Nutt.
Coreopsis tripteris L.
Crotalaria sagittalis L.
Daectylis glomerata L.
Dodecatheon meadia L.
Dysodia papposa (Vent.) Hitch.

Ellisia nyctelea L. (In somewhat
sheltered places.)
Elymus canadensis L.
Equisetum arvense L. (Intro-
duced.)
Erigeron canadense L.
Erigeron pulchellus Michx.
Erigeron ramosus (Walt.) B. S. P.
Eryngium yuccifolium Michx.
Eupatorium altissimum L.
Euphorbia corollata L.
Euphorbia maculata L.
Euphorbia Preslii Guss.

Fragaria virginiana Duches.

Gentiana puberula Michx.
Geranium caroliniana L.
Gnaphalium polycarphalum Michx.

Hedeoma hispida Pursh.
Hedeoma pulegoidea (L.) Pers.
Helianthemum canadense (L.)
Michx.
Helenium occidentalis Rid.
Helenium seberrimus L.
Heliopsis scabra Dunal.
Heuchera hispida Pursh.
Hordeum jubatum L.
Hypoxis hirsuta (L.) Coville.

Isanthus brachiatus (L.) B. S. P.

Juneus tenuis Willd.

Krigia amplexicaulis Nutt.

Kuurnia eupatorioides var. corymbu-
losa T. & G.
Lappula Redowskii var. occidentalis (Wats.) Ryd.
Lepachys piuñata (Vent.) T. & G.
Lepidium apetalum Willd.
Lespedeza capitata Michx.
Littré pyenostachya Michx.
Linum sulcatum Rid.
Lithospernum angustifolium Michx. (Winnebago county)
Lithospernum canescens (Michx.) Lehmann.
Lobelia spicata Lam.
Monarda mollis L.
Monarda punctata L.

Nepeta cataria L. (Introduced.)

Oenothera biennis L.
Oenothera serrulata Nutt.
Oxalis stricta L.
Oxalis violacea L.
Oxybaphus nyctaginens (Michx.) Sweet.

Panicum capillare L. (Introduced.)
Panicum Scribnerianum Nash.
Panicum virgatum L.
Parietaria pennsylvanica Muhl.
Pedicularis canadensis L.
Petasitenum lavigatus var. digitalis (Sweet) Gray.

Petalostemon candidum Michx.
Petalostemon purpureum (Vent.) Ryd.
Phlox pilosa L.
Physalis pubescens L.
Poa pratensis L.
Polygonala senega L.
Polygonal verticillata L.
Polygonum convolvulus L. (Introduced.)

Potentilla arguta Pursh.
Potentilla canadensis L.

Potentilla monspeliensis L.
Pyrenanthemum pilosum Nutt.

Rhamnus fasicularis Muhl.

Rhus glabra L.
Rhus toxicodendron L.
Rosa humilis Marsh.
Rubus occidentalis L.
Rudbeckia hirta L.
Ruehia eliosa Pursh.
Runxia crispa L. (Introduced.)

Salix humilis Marsh.
Scrophularia leporella Bieb.
Scutellaria parvula Muhl.
Senicio plattensis Nutt.
Setaria viridis (L.) Beauv. (Introduced.)
Sileene antirrhina L.
Sileene stallata (L.) Ait.
Silphium laciniatum L.
Sisymbrium canescens var. brachycarpum (Rich.) Wats.

Sisyrinchium campestre Bieb.
Similacina stellata (L.) Desf.
Solidago missouriensis Nutt.
Solidago nemoralis Ait.
Sorghastrum nutans (L.) Nash.
Sphenopholis obtusata var. lobata (Trin.) Scrib.

Taraxacum officinale Weber. (Introduced.)

Tecnerium canadense L.

Thuieinum purpurascens L.

Tradescantia reflexa Raf.
Trifolium stoloniferum Muhl.

Verbascum thapsus L. (Introduced.)

Verbena augustifolia Michx.
Verbena braeieosa Michx.
Verbena hastata L.
Verbena stricta Vent.
Verbena urticifolia L.

Viola americana Muhl.
Viola fimbriatula Sm.
Vitis vulpina L.

Xanthium commune Britt.

Zizia aurea (L.) Koch.