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[*Paper C.*]

NOTES ON THE ALPINE CHARACTERISTICS OF THE
MINNESOTA CREST FLORA OF THE COTEAU
DES PRAIRIES.

E. P. Sheldon.

In Minnesota the rolling series of prairie hills known as the Coteau des Prairies, reaches its greatest heights in Lyon, Lincoln and Pipestone counties.

It is to be noted that nowhere in the state, except in the iron ranges on the north, do we attain so high an altitude as when we travel over the exposed treeless bluffs which constitute the crest of the Coteau.

Lake Benton which is the highest above the level of the sea of any of the Minnesota lakes, occupies a long narrow depression in the Coteau, presumably a part of the bed of an ancient watercourse. Arriving at the town of Lake Benton during the month of August, 1891, I was particularly struck by the characteristics of the flora.

In general we find many of the typical prairie plants of the southern part of the state. But there are also species from the Saskatchewan district and the Rocky mountains, which find on these high and dry bluffs something remarkably approaching their natural habitat.

It is to the prevalence of these, and to the peculiarly dwarfed habits of growth of the general flora that I wish to direct particular attention.

The phrase "Alpine characteristics," as applied to a part of this flora, should not be misunderstood. It is not that we have here a large number of peculiarly mountain plants, but rather that in their dwarfed habits of growth, nearly every species observed resembles the stunted and stubby growth so familiar to everyone who has traveled over bare mountain heights. I have noted that these hills are well nigh treeless, but in the gulches and waterways down their sides, stunted growths of *Quercus tinctoria* Bartr. are frequently found. *Quercus macrocarpa* Mich. is more rare, and I have frequently gone miles without seeing a single specimen.

Amelanchier canadensis Torr. and Gray is occasionally met with, as also *Salix longifolia* Muhl. and *Populus tremuloides* Michx.

The above which we know ordinarily attain to a considerable height, here present a bushy, shrubby appearance, and are commonly to be found flowering and fruiting at from one-fourth to one-third their normal height.

Many of the prairie pulses were noted: *Psoralea esculenta* Pursh., a characteristic plant of the Coteau, was, at the time of my visit, just breaking loose from its summer moorings and preparing to scatter its seeds according to the custom of tumbleweeds. Its near relation, *Psoralea argophylla* Pursh., was frequently found at from five to eight inches in height. The *Astragali* come in for their due share of consideration.

Astragalus crassicaarpus Nutt. was of course plentiful, but with peculiarly dwarfed and densely hirsute leaves.

Astragalus laxmanni Jacq. is quite common at from 3 to 4 inches high.

Astragalus hypoglottis L. and *Astragalus lotitlorus* Hook. are more rare plants of these prairie slopes.

Nearly related to the above is *Spissia lamberti* (Pursh.) O. K., which is often abundant and covered with a plentiful growth of *Erysiphe*.

Very peculiar are the forms of *Petalostemon violaceus* Michx. and *Petalostemon candidus* Michx. Low, dwarfed, and often bushy, their crowded, subglobose heads have more the appearance of a pink or a bachelor's button escaped from our gardens.

Many other pulses were found, and as respecting their habits of growth, I must particularly mention two more. *Glycyrrhiza lepidota* Nutt. is found growing abundantly on the crest in low depressions and scatters its cockle-like burs through the agency of every passerby. *Parosela daleai* (L.) Britt. crowds out almost every other plant in many places on the sandy shores of lake Benton, where it is found fruiting at from two to twelve inches high.

Traveling up the "Hole in the Mountain" one early morning I met my first specimens of *Pentstemon acuminatus* Dougl. This plant prefers lower and somewhat moister

ground than the other prairie species of *Pentstemon*. Besides this, *Pentstemon albidus* Nutt. and *Pentstemon hirsutus* (L.) Willd. were noticeable for their stunted preference of high morainish ground.

Many composites are, of course, to be included in this category. The peculiar forms of the different species of *Laciniaria* have been mentioned in a preceding paper.* *Solidago nemoralis* Ait. and *S. mollis* Bartl. were found flowering at from three to ten inches. The latter with its upright, rigid *hoary-pubescent* leaves, and its strict, dense thyrse is especially noteworthy. *Kuhnia cupatorioides* L. growing in bunches, stout and somewhat approaching the var. *corymbulosa* Torr. and Gray is very abundant; as also the purple cone flower *Brauneria pallida* (Nutt.) Britt. with its club-shaped stems. The latter was found completely matured and only six or eight inches high.

Gaura coccinea Nutt. was rarely found with branching, somewhat *cæspitose* habit. Two mustards attracted my attention. *Erysimum asperum* DC., which often flowers at from five to six inches on the high shores of Lake Benton; and *Sisymbrium incisum* Englm., found in the shade of dwarfed oaks.

The appearance of the latter is quite remarkable in Minnesota, although there is no reason why we should not expect to find other Rocky-mountain mustards on these prairie heights.

Plantago purshii R. & S. has frequently been observed flowering at from three-fourths to one inch high, both on the crest and at Pipestone quarries twelve miles away.

Many grasses came to my notice. *Boutelona racemosa* Lag. and *Boutelona hirsuta* Lag. were found to range from three to seven inches in height at the time of flowering.

Aristida purpurea Nutt., with its long triple awned seeds, looking more like a bunch of miniature pitch-forks than anything I can conceive, was abundant, as also *Stipa spartea* Trin., with its droll habit of having its seeds bore their way down into the soil.

Sporobolus depauperatus Vasey and *Andropogon sco-*

*See these Bulletins, vol. III, No. 3.

parius Michx. are two other grasses which show very depauperate forms.

Among the many other plants which may be mentioned as showing Alpine characteristics on this crest of the prairie hills are the following:

Festuca ovina L.; *Festuca nutans* Willd; *Amorpha canescens* Nutt.; *Amorpha microphylla* Pursh.; *Prunus pumila* L.; *Teucrium canadense* L.; *Lithospermum angustifolium* Michx.; *Senecio lugens* Richard; *Crepis runcinata* Torr. & Gray; *Zygadenus elegans* Pursh.; *Hedeoma hispida* Pursh.; *Lepachys columnaris* Torr. & Gray; *Cyperus aristatus* Rottb.; *Chrysopsis villosa* Nutt.; *Linum rigidum* Pursh.; *Castilleja sessiliflora* Pursh.; *Solidago lanceolata* L.; *Solidago rigida* L.; *Aster ptarmicoides* Torr. & Gray; *Aster sericeus* Vent.; *Aster oblongifolius* Nutt.; *Allium stellatum* Nutt.; *Acerates viridiflora* Ell.; *Helianthus lætiflorus* Pers.; *Helianthus hirsutus* Raf.; *Artemisia frigida* Willd; *Geum triflorum* Pursh.; *Delphinium azureum* Michx.; *Physostegia virginiana* Benth.; *Rudbeckia hirta* L.; *Oxybaphus hirsutus* Sweet; *Scutellaria parvula* Michx.; *Polygala verticillata* L.; *Prenanthes racemosa* Michx.; *Gerardia aspera* Dougl.; *Vernonia fasciculata* Michx.; *Potentilla arguta* Pursh.; *Galium boreale* L.

These characteristics might well be pointed out on many of the Dakota hills, and they may possibly be shown to be peculiar to high-growing vegetation; yet neither in Minnesota nor in Dakota have I ever seen so many plants varying so widely as on the crest of the Coteau des Prairies in Minnesota.

April, 1892.