The Flora of Northern Indiana
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other, *P. major*, bitter and unpalatable. They distinguish *P. Rugelii* by a character I have not seen mentioned, viz: the petioles being purplish toward the base, a character that holds good so far as I have observed and one easily distinguished. That eminently practical botanist, the old cow, accepts *P. Rugelii* readily but rejects *P. major* after an olfactory test. It would seem that the reputed medicinal properties must reside in *P. major*, although both have been used indiscriminately, of course."

THE FLORA OF NORTHERN INDIANA.—Having been occupied mostly with the flora of that part of Indiana bordering upon the Ohio river, I had often looked longingly upon the map of the state at the northern tier of counties, bordering upon Michigan lake and state, and well filled with small lakes and tamarack swamps. It seemed as if some of our best plants must be found there, and in my preparation for publishing a catalogue of the flora of the state, I could find no report or no working botanist from that region. Last summer an opportunity presented itself of making a hasty survey for myself and the result was most encouraging. Although many very excellent species were obtained, the richest result to my mind was the fine prospect of good things that might reward a diligent search, rather than those that were actually obtained. Accompanied by my enthusiastic pupil and assistant, Mr. Chas. R. Barnes, I spent some three or four weeks along the line of the Lake Shore and Michigan Southern Railroad, which crosses the state exactly in the region I wished to traverse. The Kankakee river forms a natural boundary on the south side of the northwestern corner of this region, a slow, sluggish stream as it crosses Indiana, but rapid enough in Illinois. The consequence is that it has spread out on either side into a succession of extensive marshes, which render approach to the river well nigh impossible in many places. To the east lie the headwaters of the St. Joseph and Tippecanoe rivers, both of which are lost in an intricate system of small lakes, reminders of the time when one enormous lake covered it all. This is the lake region of the state, in no case extending farther south than the second tier of counties, and containing thousands of depressions, filled either with clear bodies of water or swamps. The time of our visit was rather unfortunate for the best results, too early for the best fall flowers and too late for the spring ones, and we had to note the former in bud and the latter in fruit, but we saw enough to know that the region was well worthy a thorough exploration at different seasons. The wildest, most unfre-

quented parts of it we did not even reach, as they were too inaccessible for our limited time, but what we heard of them made us expect great things.

We noticed five well defined classes into which it would be possible and convenient to divide the flora of this region.

I. First there is the flora of the sand hills and plains bordering upon Lake Michigan. The whole neighborhood of this lake appears strange to one who is not accustomed to the enormous deposits of sand resulting from the melting of the great glacier. This sand occurs in some places hundreds of feet thick, piled up into huge hills, swept out into steep valleys, so white that the reflection of the bright sunlight from it soon becomes painful, and so fine that it is the most fatiguing labor to walk in it. Clinging to this uncertain, shifting soil some plants find a precarious living. The sand hills seem perfectly bare except as they are covered here and there by clumps of shrubs and stunted growths of *Pinus Strobus*. The shrubs are *Ceanothus Americanus, Hamamelis Virginica, Rhus copallina, R. Toxicodendron, Quercus nigra* and a *Juniperus*. The first herb noticed and collected was *Campanula rotundifolia*, L., var. *linifolia*, Gr., with very rigid leaves and rooting deep into the sand. Then there were *Arabis lyrata, Tephrosia Virginiana, Krigia Virginica, Monarda punctata, Lithospermum hirtum*, and more abundant, *Saponaria officinalis, Lespedeza hirta, Œnothera biennis, Asclepias tuberosa, Euphorbia corollata*, etc. Among the sedges and grasses we found *Cyperus Schweinitzii, C. filiculmis, Carex Muhlenbergii, Poa compressa*, and *Kœleria cristata*. The only fern noted was *Pteris aquilina*. The flora of these sands is meager but well defined, for we found very few of the species mentioned in other localities. Of course it is not meant that they are all only found upon sand hills, for some of them we have collected in Southern Indiana, but such seemed to be their habit in this region.

II. The second division is the flora of the wet grassy meadows and choked up swamps. Such regions we always found a short distance from the lakes, evidently former prolongations of their beds. We studied them principally a few miles south of Otis, and south of Laporte, which lies upon a cluster of beautiful lakes. The only shrubs we noticed in the conditions just described were *Rhus glabra, Spiræa salicifolia, Rosa blanda, Ribes rubrum, Cephalanthus occidentalis, Viburnum prunifolium*, and *Salix humilis*. Among the herbaceous phænogams were *Elodes Virginica, Epilobium coloratum, E. palustre*, var. *lineare, Lythrum alatum, Cicuta bulbifera, Sium lineare, Coreopsis trichosperma*, with leaves so slender that they resemble those of *C. verti-*

cillata, Cacalia tuberosa, Campanula aparinoides, Scutellaria galericulata, Typha latifolia, Sparganium eurycarpum, Alisma Plantago, Asclepias incarnata, Saururus cernuus, etc. Of other families we found *Eleocharis palustris, Eriophorum Virginicum, Rhynchospora alba, R. glomerata, Carex scoparia, Zizania aquatica, Spartina cynosuroides, Bromus ciliatus, Osmunda regalis* and *Woodwardia Virginica.* Of *Epilobium palustre* we noticed two forms that seemed constant and easily distinguished. In the first the flowers were smaller, always white; the leaves very much crowded, narrowly linear, 1½–2 inches long, 1 line wide; the whole upper part of the plant whitened. In the second the flowers were larger, pink or rose-color; leaves 1–1¼ inches long, 2–3 lines wide. Of course the differences are only such as may occur in all species, but both forms are certainly necessary to make a complete specimen. The differences seem to become less when we come to analyze them and subject them to measurement, but there is an indescribable something that always enables us to distinguish them at a glance.

III. The flora of the lakes proper. To one who has never botanized upon small lakes there is something very fascinating in his first ride in a "dug-out," coasting along reedy banks and among floating leaves, crowding through choked channels where every dip of the oar brings up dense masses of underwater vegetation. Such trips can be best taken at Laporte, where boats can be had at any time and where the lakes are full of plants. Probably the most noticeable growth there is *Pontederia cordata* with its tall spikes of violet-blue flowers rising in endless succession along all the shores. Then there is an abundance of *Nuphar advena* and *Nymphæa odorata,* though we searched our Nymphæas in vain for any fragrance. They were as scentless as could be. We peered anxiously for tubers, but no tubers could we find, and it had to stand as *N. odorata.* Then there was *Brasenia peltata, Sagittaria graminea* with leaves varying from ovate-lanceolate to filiform, *Ranunculus aquatilis,* var. *stagnatilis, Schollera graminea, Potamogeton compressus, Anacharis Canadensis, Myriophyllum spicatum, Utricularia vulgaris,* etc. Along the low sandy shores we picked up *Hypericum Canadense,* var. *major, Hydrocotyle umbellata, Stachys hyssopifolia, Juncus pelocarpus, J. acuminatus, Dulichium spathaceum, Scirpus Smithii, Eleocharis acicularis,* etc. Up to these lakes formerly extended the growth of the prairies that lie farther south and it is still found in old neglected fields and along the lines of railroads, but the rest has so long been under cultivation that the indigenous flora has disappeared. Hence any mention of the numerous prairie forms

we found in the conditions just indicated will be made under the head of prairie flora.

IV. The flora of the tamarack and sphagnous swamps These swamps are found along the Kankakee, but chiefly in north-eastern Indiana. The one we examined was near Kendallville, on the L. S. & M. S. R. R. If one is delighted with his first botanical trip upon a lake, he can scarcely be less so with his first experience in a tamarack swamp, with the dark branches of *Larix* above his head and a soft cushion of *Sphagnum* under his feet. It is in such places that I think we will find our rarest forms and I regretted exceedingly that our visit lasted but one day. We noticed that three species of moss chiefly formed the covering of the ground, viz: *Sphagnum squarrosum, S. cuspidatum* and *Leucobryum glaucum.* Growing abundantly upon these moss banks was *Drosera rotundifolia*, and each gland upon the delicate leaves had exuded a clear drop of fluid that glittered like a dew-drop, showing how beautifully appropriate is the name 'sundew." Then there was *Sarracenia purpurea, Elodes Virginica, Campanula aparinoides, Calopogon pulchellus, Cypripedium pubescens, C. acaule, Smilacina bifolia, Osmunda regalis,* etc. We found several bushes of *Betula pumila* which seem to be intermediate between *B. pumila* and *B. glandulosa.* The leaves are glandular dotted and there are many resinous, wart like glands upon the glabrous branchlets; but the bushes were 6 or 8 feet high and the leaves pale beneath with finely reticulated veinlets. Around the edges of the swamp, in wet ground, but before the tamarack begins, we noted *Clematis Virginiana, Potentilla fruticosa, Cornus stolonifera, Aster longifolius, Cnicus muticus, C. discolor, Lobelia Kalmii, Salix candida, Scirpus validus, Carex comosa, C. flava,* etc.

V. The prairie flora. The prairie of Indiana is found in a tier of counties farther south and the flora is as well defined as that of the lakes. Here thrive principally the large and coarse *Compositæ* and some peculiar *Leguminosæ.* To tell of all the plants we found either upon the prairies or that had extended from them along the railroads, would take up too much space and I can mention only the best marked. There were *Linum sulcatum, Petalostemon violaceus, P. candidus, Amorpha canescens, Gaura biennis, Eryngium yuccæfolium, Liatris scariosa, L. spicata, L. cylindracea, L. pycnostachya, Solidago stricta, S. rigida, S. Missouriensis, S. gigantea, Silphium laciniatum, S. terebinthinaceum, S. integrifolium, Parthenium integrifolium, Rudbeckia subtomentosa, Lepachys pinnata, Helianthus lætiflorus, H. occidentalis, H. mollis, H. giganteus, H. grosse-serratus, H. divaricatus, H. hirsutus, Co-*

reopsis palmata, Cacalia tuberosa, Verbena stricta, Asclepias verticillata, Acerates longifolia, A. viridiflora, Juncus nodosus, var. *megacephalus,* etc.

Some good species have been omitted as belonging strictly to none of the divisions made but rather a mixture of all and brought together by artificial conditions, as along the railroads. For instance, between Laporte and South Bend we found, in addition to very many of the species just mentioned as belonging to the prairie region, *Anemone cylindrica, Helianthemum Canadense, Lechea major, Polygala polygama, Lupinus perennis, Astragalus Canadensis, Potentilla argentea, Vaccinium Pennsylvanicum, Seymeria macrophylla, Gerardia flava* (with leaves in every case decidedly acute), *G. pedicularia, Ruellia ciliosa, Apocynum androsæmifolium, Habenaria virescens, H. ciliaris, Tofieldia glutinosa, Allium cernuum,* etc. In a ditch were collected *Lemna polyrrhiza* and both species of *Wolffia.*

In the streets of Goshen we found *Borrago officinalis,* L., looking as though it had taken up its abode permanently, though of course we could not tell. There was an old garden near by from which it had undoubtedly escaped but probably was not established sufficiently to entitle it to a place in our flora.

In conclusion, I would request that all botanists of Indiana, or those who have worked in Indiana, communicate with me in regard to the catalogue of the state flora, that it may be made as full and complete as possible upon the first issue.—J. M. C.

Potato Pierced by Grass.—A case of this is given in the Gazette for December. The past season I found two tubers in one hill pierced by stems of *Poa pratensis.* I mention this because some people still doubt that such a thing can take place. I have no doubt quick-grass is often carried from one farm to another where it has grown into potatoes. The growing point of the stems of quick-grass and June-grass are quite sharp and stout.—W. J. Beal, *Lansing, Mich.*

The Botrychia not Ferns.—In nearly all the botanies now in use, the species of *Botrychium* and *Ophioglossum* will be found included among the Ferns, arranged either at the commencement or close of that family under the head, Sub-order *Ophioglossaceæ.* Hooker, in his "Synopsis Filicum," makes the same arrangement although in "Species Filicum," published previously, he omits them altogether, as not coming within the province of that work. Until very recently, but little was to be found written upon these interesting plants on this side of the water, and even the descriptions in the American