XXII. A contribution to the knowledge of the flora of southeastern Minnesota

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The work of the Minnesota Botanical Survey in southeastern Minnesota during the summer of 1899 was carried on with two main purposes in view: first, to collect and preserve plants in formalin for museum and class use, and second, to collect herbarium specimens of the higher seed plants. The work of collection was begun June 1st, and closed August 31st. The catalogue of species is, therefore, very incomplete in its enumeration of the early spring and autumn plants.

District of collection.—The territory in which the collections were made is in the extreme southeastern part of Minnesota, comprising the valleys of Winnebago and Crooked creeks, and the adjoining region near the Mississippi river. Nearly all of this territory is included in an area about twelve miles square, formed by the townships of Mayville and Crooked Creek, on the north, and Winnebago and Jefferson on the south.

Physiography.—The topography of this part of Houston county is not essentially different from that of most of the region south from Red Wing along the Mississippi river to the southern boundary of Minnesota and into Iowa. There is no part of it level or nearly so. It is almost entirely broken by the valleys of the two creeks and their smaller tributaries. The height above the sea level varies from 620 feet at the level of the Mississippi river in the southeastern corner of Jefferson, to 1200 feet in the northwestern corner of Mayville. Crooked creek, from the source of the north fork to its discharge into Bluff slough, is about eleven miles in length. It drains about 65 square miles of territory. The south fork, a branch about three miles long, lies entirely in Mayville. Winnebago creek from the Big spring near its source, to its discharge into Min-
minnesota slough, is about twelve miles in length. There are three small branches, one of which has, within the last decade, become considerably smaller than it formerly was, on account of the drying up of several springs near its source. The amount of water discharged from each of the two main creeks during the summer months is probably not less than 1,500,000 cubic feet per day. Neither creek is very susceptible to changes of season, but either one will rise very rapidly after a sudden heavy rain-fall and return to its usual level in a few hours.

The bluffs are high and steep, and not adapted to cultivation. (Plates XXII. and XXVI.) However, many of the ridges are cultivated and form some of the best farms in this part of the state. The valleys being subject to overflow and the bluffs very steep, by no means the entire area is adapted to cultivation. This condition is very favorable for the collection of native plants.

The valleys are narrow, in no place exceeding a mile in width from the brow of one bluff to the brow of the one opposite.

In taking a view of the ecological groups of the plants inhabiting this region, the territory may, for convenience, be divided into river valley, creek valleys and bluffs.

The river valley is so distinct from the creek valleys that it is almost imperative that it be considered separately. The bluffs along the river vary somewhat from the other bluffs, but not sufficiently to warrant a division into river bluff and creek bluff.

River valley.—In the river valley I include the area from the foot of the bluffs on one side of the river, to the foot of the bluffs on the opposite side, not including any tributaries. Along this stretch of the river, from New Albin, Iowa, to Brownsville, Minnesota, the valley varies from three to five miles in width. The main channel of the river is from one-half a mile to a mile wide. The remainder of the area between the bluffs is formed of islands, sloughs and lakes during most of the year. (Plate XXV., B.) During the spring and early summer the whole area is generally flooded so that collection can be carried on only during the late summer and autumn. The river channel proper is not a fruitful field for the collection of higher plants. The sluggish sloughs, lakes and ponds, however, offer excellent conditions for such collection.
For consideration, the water plants of the river valley may be classified into four main groups: plankton, attached submerged aquatic, attached aquatic plants with natant leaves, and adaptive shore plants.

**Plankton.**

The plants forming this group are those which are not attached to any soil substratum, and so are rarely found in any of the swift-flowing currents, but rather on the surface of protected lakes and ponds and near the high banks of sloughs, where they are protected from rapid currents of wind and water. The plants comprising this group are:

*Azolla caroliniana*, *Spirodea polyrhiza*,

*Ceratophyllum demersum*, *Utricularia vulgaris*,

*Lemna minor*.

With them are often found plants of *Sagittaria* and *Potamogeton* which have been dislocated from their original position on the soil. They seem to grow nearly as well and bloom nearly as profusely as when attached. In this condition they form part of the plankton, but as they are originally attached and ordinarily remain so, I have not included them in the list of plankton types.

One of the most beautiful and interesting plants of this group is the small heterosporous fern, *Azolla caroliniana*. In the early part of the summer it is green or but slightly red in color and only scattered plants or very small patches can be found. In the later summer and autumn it covers large areas of water with a deep red pure growth or mixed with the duckweeds. In restricted areas it often grows so rapidly late in the summer that it is pushed up from the surface of the water and forms ridges and bunches above the water-level.

**Attached submerged aquatic plants.**

The floor of some of the very shallow ponds and sloughs is covered with a growth of bassweeds and pondweeds that are entirely immersed. This group contains but few species of the higher plants. The species collected are:

*Najas flexilis*, *Potamogeton pusillus*,

*Najas guadalupensis*, *Potamogeton zosteraefolius*. 
Attached aquatic plants with natant leaves.

_Castalia tuberosa_,  _Potamogeton lonchites_,
_Nelumbo lutea_,  _Potamogeton natans_,
_Nymphaea advena_,  _Sagittaria cuneata_.

 Nearly every one who has ever visited any of the lakes or rivers of Minnesota is acquainted with at least one representative of this group, the white water-lily, _Castalia tuberosa_. This with the Indian lotus, _Nelumbo lutea_, and the yellow pond-lily, _Nymphaea advena_, all of which are members of the water-lily family, are the most conspicuous and beautiful of our river plants. They cover large areas of shallow water for sometimes a mile or more in extent. It may be of interest to call attention to the methods of adaptation of these plants to their aquatic habitat. The white water-lily and the yellow pond-lily carry their natant leaves on long flexible petioles which allow the leaves to remain upon the surface for variations of several feet in the height of the water. The Indian lotus, however, carries the leaf-blades upon stiff strong petioles some of which are carried up to the water surface and others are raised from one to three feet above the water. (Plate XXV., A.) In case the water rises the natant leaves are destroyed but those that are raised above the surface remain useful to the plant and may in this way be caused to float. The projecting leaves are not conspicuously modified in any way from those that were originally natant.

Both the Indian lotus and the white water-lily are abundant in the sloughs of the Mississippi river at Jefferson. The yellow pond-lily is not so abundant as either of the other two. The _Potamogetons_ with floating leaves may be found growing with the water-lilies or in small patches scattered throughout the sloughs. They never cover very large areas to the exclusion of other plants.

Adaptive shore plants.

_Alisma plantago-aquatica_,  _Sagittaria latifolia_,
_Eleocharis acicularis_,  _Sagittaria rigida_,
_Nelumbo lutea_,  _Scirpus lacustris_,
_Polygonum emersum_,

The plants living on the shores of the lakes and sloughs must adapt themselves to life under the varying conditions in which they may be placed by the rise and fall of the water. During
low stages they may be left out of the water entirely and when the water is at its height most of them are nearly or quite submerged. The plants adapting themselves to these conditions might be considered as the Sagittaria group, for the two Sagittarias—latifolia and rigida—are the most abundant shore plants with the possible exception of Eleocharis acicularis. Nelumbo lutea may often be seen in times of very low water, growing on the muddy banks entirely emersed holding its leaves erect two or three feet above the mud, while the Castalia when placed under these conditions lodges its leaves on the mud where they soon die. Polygonum emersum covers many banks to the exclusion of other vegetation. It is adapted to living on the exposed mud or in the water but under the latter conditions it always projects its leaf-bearing stems out of the water and keeps the foliage leaves emersed.

Wet meadows of the river valley.

During a large part of the growing season the wet meadows of the river bottoms are submerged. When they are exposed for a sufficient length of time to become somewhat dry the grasses are generally cut for hay. The plants living under these conditions are mostly coarse grasses and sedges. No trees but willows seem to be able to live upon these meadows and they do not then attain tree size. Some of the plants forming the vegetation of the wet meadows are:

Asclepias incarnata, Scirpus atrovirens, 
Cyperus esculentus, Scirpus cyperinus, 
Eleocharis acicularis, Sium ciculaefolium, 
Elymus virginicus, Sparganium eurycarpum, 
Eragrostis hypnoides, Spartina cynosuroides, 
Eupatorium purpureum, Vernonia fasciculata, 
Homalocenchrus virginicus, Zizania aquatica, 
Penthorum sedoides, 

Mud-flat vegetation.

The mud-flat comprises the highest land of the islands. It is flooded only during the early summer but on account of its growth of timber and shrubs the soil remains wet during the entire year. The largest trees growing anywhere in this region are found on the mud-flats of the Mississippi river.
The plants which form large trees on the islands are:

- Acer saccharinum,
- Betula nigra,
- Fraxinus lanceolata,
- Fraxinus nigra,
- Gleditsia triacanthos,
- Populus deltoides,
- Quercus platanoides,
- Salix amygdaloides,
- Ulmus americana.

The following species do not attain large size, but are either scattered throughout as shrubs or small trees, or form a dense low growth on some of the lower grounds of the mud flat. (Plate XXV., A.)

- Cephalanthus occidentalis,
- Cornus amomum,
- Salix florviatilis,
- Salix nigra.

Three species of woody vines are common throughout the islands. The Virginia creeper, Parthenocissus quinquefolia, and wild grape, Vitis vulpina, are abundant, covering and in many cases killing large trees. The climbing poison ivy, Rhus radicans, is common throughout the most densely wooded parts. It sometimes climbs to a height of twenty-five or thirty feet, and develops a stem from two to three inches in diameter.

During the late summer and autumn the mud-flat throughout is covered with a dense growth of coarse herbs most of which are perennials.

The following herbaceous plants grow on the mud-flat:

- Acnida tamariscina,
- Apocynum cannabinum,
- Arisema dracontium,
- Bidens comosa,
- Bidens frondosa,
- Bidens laevis,
- Cicuta bulbifera,
- Helinium autumnale,
- Ilysanthes gratioloideis,
- Lippia lanceolata,
- Lobelia cardinalis,
- Lycopus americanus,
- Lycopus lucidus,
- Lycopus rubellus,
- Lycopus virginicus,
- Lythrum alatum,
- Mentha canadensis,
- Minnllus ringens,
- Onoclea sensibilis,
- Polygonum hartzwrightii,
- Polygonum hydrophyloides,
- Polygonum incarnatum,
- Polygonum punctatum,
- Polygonum virginianum,
- Physalis philadelphica,
- Physostegia virginiana,
- Ranunculus pennsylvanicus,
- Scutellaria laterijlora,
- Stachys palustris,
- Steironema ciliata,
- Teucrium canadense,
- Urtica gracilis,
- Urticastrum divaricatum.
Creek valleys.—The valleys of the creeks present an entirely different aspect from the river valley. The creeks have their own well-defined channels to which they hold almost the year round. High waters never last for any great period of time. Those which are caused by the melting of the snows in the spring generally last from about noon to sun-down while those which are supplied by the heavy June showers generally rise and fall during the night or very early morning. The damage done to vegetation is almost restricted to the floods of the summer months. They come in the season of most rapid growth and destroy a large part of the season’s growth with which they come in contact. The areas inundated by these floods are never very extensive compared to those along the river. At most points along the valleys the gradual rise of the land from the creeks to the bluffs is sufficient to prevent the formation of ponds and lakes by the rise of the water. The alluvial soils deposited on the flats do not dry up until late in the summer and so have very little growth besides coarse weeds. They are often cultivated but there is always the danger of the crops being destroyed by high water. Most of the best cultivated fields in the valleys are on the table lands adjacent to the foot of the bluffs. They are generally fertile, are protected from high water and hard winds and are not in a position to wash to any great extent. The steep banks on the north edges of the table lands are generally wooded and bear the richest and greatest variety of plants that can be found anywhere in this region. The table lands are often very sharply marked off from the creek bottoms and steep bluffs. Towards the heads of the creeks the table lands disappear and there is a gradual rise from the creeks to the bluffs.

The water vegetation of the creek valleys is almost entirely limited to the cold water plants of the springs and small streams. There are very few ponds or marshes to contain still water orms.

The vegetation of the land may be divided into that of the wet meadow, moist woods and mesophytic field. The wet meadow is about on a level with the banks of the creeks. It never becomes very dry and on the lower places shows some of the characters of a marsh. The vegetation of the moist woods is well shown on the wooded banks bordering the table lands. Moist woods often cover some of the protected table lands and
extend for some distance up the narrow dark ravines. In places where timber covers the flooded areas the vegetation is similar to that of the mud flat on the islands near the river. The vegetation of the open table lands I have called mesophytic field.

**Cold spring vegetation.**

The valleys of Winnebago and Crooked creeks have a great many springs arising from the bases of the bluffs throughout their whole length but perhaps more numerous at the heads of the creeks than elsewhere. Some of the springs that outlet in low level land occasionally form small cold bogs in which the ordinary cold water plants find very favorable conditions for growth. A large spring near the head of Clear creek, a short branch of Crooked creek contains the greatest abundance of typical cold water plants of any spring visited. The large creeks do not contain much vegetation. The smaller creeks often contain plants similar to those of the cold springs.

The plants characteristic of cold running water are:

- *Batrachium divaricatum*, *Minulus jamesii*,
- *Batrachium trichophyllum*, *Philotria canadensis*,
- *Berula erecta*, *Roripa nasturtium*,
- *Cardamine bulbosa*, *Veronica americana*.

*Epilobiums*—*coloratum* and *adenocaulon*—are often found growing in cold spring water but are not peculiar to this locality as they are also found growing in moist soil. None of the spring plants can be called common to large areas, for the conditions necessary for their growth are limited in extent.

**Pond vegetation.**

There are but very few natural ponds along the creeks. The ponds are generally artificial and as such present a variety of conditions and a corresponding variety of plants. A small natural pond in a bog near Crooked creek contains all it can hold of the yellow pond-lily. (Plate XXVII., B.) This is the only place in which any of the water-lily family were found outside of the sloughs and lakes of the Mississippi river.

**Wet meadow vegetation of the creek valleys.**

The wet meadows naturally cover a very large part of the creek valleys but under present conditions most of them are
used for pasture, or where they can be easily drained for cultivation, though they are of course in constant danger of being flooded. Under these conditions there are but few wet meadows which have retained their original vegetation. Many of them under continual pasturing have grown up to coarse weeds and grasses. The greatest variety of plants is found where the wet meadow has been used as a hay meadow. This offers more nearly the natural conditions for such plants as Lilium canadense (Plate XXVII., A). Habenaria leucophaea, Pedicularis lanceolata, Saxifraga pennsylvanica, Chelone glabra, Parnassia caroliniana, Onoclea sensibilis and many others in the list.

The plants which grow in the wet meadows are:


**Moist woods vegetation.**

As previously stated the most typical moist woods vegetation is to be found on the north banks of the table lands. The timber on the banks has much of it been left uncut and offers the very best conditions for the survival of moist woods vegetation. In the list of moist woods plants here given are included only those collected or noted from a single location in Winnebago valley. It is a bank about one-half a mile long bordering on the table land for the greater part of its length. Some of the
plants listed do not seem to be typical moist woods plants and in such cases they have probably been driven to the margin of the thicket by the cultivation of the table land on one side and by the high water of the creek bottom on the other. The plants of the moist woods on this bank are:

Acer negundo,
Acer nigrum,
Actea alba,
Actea rubra,
Adiantum pedatum,
Adopogon virginicum,
Adoxa moschatellina,
Agastache scrophulariifolia,
Agrimonia hirsuta,
Amelanchier canadensis,
Anemone quinquefolia,
Anemone virginica,
Apoios apioides,
Apoios androsaemifolium,
Aralia nudicaulis,
Aralia racemosa,
Arisaema triphyllum,
Asarum canadense,
Asclepias exaltata,
Asclepias incarnata,
Asclepias syriaca,
Asplenium acrostichoides,
Asplenium flexifolium,
Bacopa cucullaria,
Bidens frondosa,
Bidens comosa,
Botrychium virginianum,
Campanula americana,
Carex rosea,
Carpinus caroliniana,
Caulophyllum thalictroides,
Cerastium longipedunculatum,
Circaea lutetiana,
Clematis virginiana,
Cornus candidissima,
Cornus rotundifolia,
Cornus stolonifera,
Corylus americana,
Crataegus punctata,
Crataegus tomentosa,
Cypripedium hirsutum,
Cystopteris bulbifera,
Dieringa canadensis,
Dierickia dierickii,
Epilobium adenocaulon,
Epilobium coloratum,
Equisetum arvense,
Erigeron pulchellus,
Erythronium albidum,
Enonynus atropurpureus,
Eupatorium agaratoides,
Falcata comosa,
Fragaria americana,
Galium aparine,
Galium boreale,
Galium trifidum,
Galium triflorum,
Geranium maculatum,
Geum strictum,
Habenaria bracteata,
Hepatica acuta,
Heracleum lanatum,
Humulus lupulus,
Hydrophyllum virginicum,
Impatiens aurea,
Impatiens bi flora,
Juglans cinerea,
Juglans nigra,
Lactuca floridana,
Lathyrus ochroleucus,
Lathyrus venosus,
Leptorchis liliifolia,
Lobelia syphilitica,
Lonicera dioica,
Lonicera sullivantii,
Malus ioensis,
Menispernum canadensis,
Mentha canadensis,
Micranthelis lobata,
Mitella diphylla,
Nabalus albus,
Nepeta cataria,
Onoclea struthiopteris,
Osmunda claytoniana,
Ostrya virginiana,
Oxalis stricta,
Parthenocissus quinquefolia,
Pedicularis canadensis,
Peranema pubescens,
Phlox divaricata,
Phryma leptostachya,
Podophyllum peltatum,
Polononium reptans,
Polygonatum commutatum,
Polygonum incarnatum,
Polygonum hydropiperoides,
Populus grandidentata,
Populus tremuloides,
Potentilla canadensis,
Prunus americana,
Prunus nigra,
Prunus serotina,
Prunella vulgaris,
Prunus virginiana,
Pteris aquilina,
Pyrola elliptica,
Quercus coccinea,
Quercus macrocarpa,
Quercus rubra,
Quercus velutina,
Ranunculus abortivus,
Ranunculus septentrionalis,
Rhus glabra,
Ribes cynosbati,
Ribes floridum,
Ribes uva-crispa,
Rubus occidentalis,
Rubus villosus,
Rudbeckia laciniata,
Rudbeckia triloba,
Salix amygdaloides,
Salix fluviatilis,
Sambucus canadensis,
Sanicula gregaria,
Sanicula marylandica,
Silene alba,
Smilax herbacea,
Solidago canadensis,
Staphylea trifolia,
Syndesmon thalicroides,
Thalictrum dioicum,
Thalictrum purpurescens,
Tilia americana,
Trillium cernuum,
Trillium erectum,
Triostegum perfoliatum,
Ulmus americana,
Ulmus fulva,
Urtica gracilis,
Urticastrum divaricatum,
Uvularia grandiflora,
Vagnera racemosa,
Viburnum lantanum,
Viola pubescens,
Viola obliqua,
Vitis vulpina,
Washingtonia claytonii,
Xanthoxylum americana.
Mesophytic field vegetation.

The mesophytic field vegetation as it exists in the creek valleys to-day is almost entirely a result of cultivation. The table lands which bear the plants of the mesophytic field were formerly almost entirely wooded. To-day they are cleared of timber and used for cultivation. They furnish the best fields for cultivation in the whole district. They are not subject to the overflow of the bottom lands, nor to the drought of the ridges, nor to the washouts of the side-hills. Being so extensively cultivated the plants growing upon them, which are not themselves cultivated, are almost confined to the edges of fields and thickets. Under such conditions a list of plants of this area would have no bearing upon the natural ecological groups.

Bluffs.—The bluffs bordering the river differ from those bordering creek valleys in being steeper and in having many more precipitous cliffs. The brow of the bluff along the river for almost the entire distance bordering the territory covered except where interrupted by branch valleys or ravines is one almost perpendicular limestone cliff, varying from a few feet to a hundred feet in height. Cliffs of this sort are not so common back from the river. The vegetation of the river bluffs differs to some extent from the creek bluffs in its character. Some of the common forest trees of the lowland of the creek valleys, instead of growing on the lowland of the river valley inhabit the foot of the river bluff. The proximity of the river bluff to larger areas of water seems to raise the moisture content of the soil of the river bluff above that of the creek bluff at the same height above water level. The growth then of such a tree as the black walnut at the foot of the river bluff does not show that it grows here under more arid conditions than in the creek valley, but that the same conditions of moisture in the soil are found at a higher level on the river bluff than on the creek bluff.

On all bluffs the vegetation shows the greatest variation with the direction of the slope. Those facing from south to west and receiving the direct rays of the sun from noon to 4 P. M. are generally bare of trees (Plate XXII., B) and shrubs while those facing from north to east are generally thickly wooded (Plate XXVI., B). Ravines with their greater amount of moisture in the soil and greater protection from winds are
generally wooded to some extent whatever the direction of the slope (Plate XXII., A and B).

Near the heads of the creeks at the bases of the northern slopes are many moist limestone cliffs with their characteristic abundance of liverworts, mosses and ferns, sometimes almost to the exclusion of the higher seed plants. The moist cliffs bear more of the northern types of plants rare to this region than any one other special area.

The zones of forest vegetation on the bluffs are often very distinctly marked out by a few species. The oaks, *Q. rubra*, *Q. macrocarpa* and *Q. coccinea* extend from the valley to the ridge of the bluff in varying degrees of abundance and thus do not determine the zone. With these, however, are a few species which are limited either to the base or ridge. The aspen and a large-tooth poplar as primary and the ironwood, juneberry and wild crab as secondary species mark out the basal zone of forest and the white oak, white birch and shagbark hickory in varying proportions mark out the ridge forest. Between the zone containing white birch on the ridge and that containing the aspen at the base is a zone which is almost entirely covered with dark-barked trees. Thus the zones are clearly shown by the white bark of the white birch on the ridge and that of the aspen below with the dark-barked trees between.

The vegetation areas of the bluffs may be considered as moist cliffs, wooded slopes and ravines, ridge forests, bare slopes and open ridges, and dry rocks. The plants of the moist cliffs are hydrophytic; those of the wooded slopes and ravines which include a large part of the bluff area are mesophytic; the ridge forests are xerophytic and the bare slope, open ridge and dry rock plants which grow on the most exposed and dry areas in this region are distinctly xerophytic.

**Moist cliff vegetation.**

This group of plants is one of the most interesting of this region. One is always on the lookout for rare plants to this part of the state from the secluded and often almost inaccessible moist cliff. The short list of plants given here might be said to be almost peculiar to moist cliffs as they are rarely found elsewhere. Others might be named that grow upon moist cliffs, but which are more characteristic of moist woods.

Some of the plants characteristic of moist cliffs are:
Acer spicatum,  
Adoxa moschatellina,  
Betula lutea,  
Circcea alpina,  

**Vegetation of wooded slopes and ravines.**

This group of plants borders and perhaps encroaches upon the moist woods of the valley upon the one hand and the ridge forest upon the other. It covers a large area but does not represent the variety of species that are found in the moist woods of the valley.

Some of the plants of the wooded slopes and ravines are

- Asplenium acrostichoides
- Asplenium filix-femina
- Castilleja coccinea
- Cypripedium hirsutum
- Cypripedium spectabilis
- Cystopteris fragilis
- Epilobium coloratum
- Erechtites hieracifolia
- Eupatorium ageratoides
- Falcata comosa
- Hieracium umbellatum
- Hieracium scabrum
- Hypericum maculata
- Hypericum majus

- Lilium umbellatum
- Lobelia cordifolia
- Lobelia inflata
- Osmunda claytoniana
- Panax quinquefolia
- Pedicularis canadensis
- Polygonatum commutatum
- Pteris aquilina
- Rubus occidentalis
- Rubus villosus
- Silene stellata
- Smilax herbacea
- Smilax hispida

**Ridge forest vegetation.**

Most of the woods upon the ridges are rather open and therefore present somewhat xerophytic conditions. The principal forest trees of the ridges are those which have been previously mentioned, i.e., Betula papyrifera, Hicoria ovata, Quercus alba and Quercus macrocarpa. Scattered trees of other kinds are found on special areas. On the point of a bluff near the village of Freeburg, several trees of Gymnocladus dioicus were found in one of the most exposed locations that it could obtain. This is a very unusual location for this tree. Prunus virginiana, Juniperus virginiana, Tilia americana and Celtis occidentalis quite frequently grow near or on the rocky summits of the bluffs but do not cover large areas.
Bare slope and open ridge vegetation.

The soil of the southern slope and open ridge is generally largely formed of sand and broken limestone. It becomes very dry early in the summer, and then appears almost bare of vegetation except where it is broken by scattered junipers (Plate XXI., A) or patches of Rhus glabra.

Some of the plants characteristic of the bare slope and open ridge are:

- Acerates viridiflora,
- Asclepias verticillata,
- Aster sericeus,
- Bouteloua curtipendula,
- Bouteloua hirsuta,
- Coreopsis palmata,
- Cyperus fliculmis,
- Cyperus houghtoni,
- Cyperus schweinitzii,
- Draba caroliniana,
- Elymus canadensis,
- Helianthus occidentalis,
- Euphorbia heterophylla,
- Hieracium canadense,
- Juniperus communis,
- Juniperus sabina,
- Kaeleria cristata,
- Kuhnistera purpurea,
- Lacinaria cylindracea,
- Lacinaria scariosa,
- Lappula lappula,
- Linum sulcatum,
- Lobelia spicata,
- Oxalis violacea,
- Polygala verticillata,
- Polygonum tenue,
- Pulsatilla hirsutissima,
- Ratibida columnaris,
- Rhus glabra,
- Rhus radicans,
- Silene antirrhina,
- Valeriana edulis,
- Viola pedata,
- Viola pedatifida.

Dry rock vegetation (Plate XXI., B).

The rock plants and sand plants do not in many places form distinct groups. The sand of the bluffs nearly always contains considerable broken limestone and thus furnishes conditions favorable to the growth of limestone plants. Pellaea atropurpurea and Camptosorus rhizophyllus seem to be the only ones that are restricted to the bare limestone. The former prefers dryer and more exposed locations than the latter.

The characteristic plants of dry rocks are:

- Betula papyrifera,
- Campanula rotundifolia,
- Camptosorus rhizophyllus,
- Cystopteris bulbifera,
- Juniperus communis,
- Pellaea atropurpurea,
- Valeriana edulis,
- Zygadenus elegans.
Results of the survey.—The botanical survey of this part of the state was undertaken with a great deal of interest by the collectors. Never before has this region been explored for the purpose of botanical collection. Great opportunities were therefore offered in the search for species, which may have made this corner of the state the northern limit of their range and for those which may have strayed down the Mississippi river from their native home at its headwaters. With such possibilities in view the collectors were not disappointed with the results.

As a result of the survey 578 species of plants were collected, 26 of which are Pteridophyta, 5 Archispermæ, 87 Monocotyledons and 460 Dicotyledons.

In the catalogue of species are reported the following plants which either have not been previously reported from Minnesota or have been reported without any known authentic collection. The specimens have been placed in the Herbarium of the University.

*Allionia linearis,† Asplenium angustifolium, Bidens comosa,* Carex torta, Cratagus macracantha, Falcata pitcheri,* Gleditsia triacanthos, Helianthus atrorubens,*

Hieracium umbellatum,† Meibomia illinoensis, Naias guadalupensis, Prunus nigra, Quercus prinoides, Rudbeckia triloba, Sanicula trifoliata, Senecio plattensis.*

The following plants collected are of great interest as rare plants in the state or in this part of the state.

Aretostaphylos uva-ursi, Asclepias obtusifolia, Azolla caroliniana, Betula lenta, Carex lurida, Cheilanthes gracilis, Cratagus punctata, Cyperus houghtoni, Dasystoma grandiflora, Dryopteris goldieana,

Gaura biennis, Hamamelis virginiana, Hydrocotyle americana, Juniperus sabina, Lactuca ludoviciana, Lactuca sagittifolia, Meibomia dillenii, Polygonum tenue, Polygonum virginianum, Quercus platanoides,*

* Previously collected but not reported from Minnesota.
† Previously reported from incorrect determinations or from general distribution ranges given in large manuals without authentic collection.
Sanicula gregaria, Thalesia uniflora,  
Sagittaria cuneata, Woodsia oregana.  
Solidago erecta,

**Catalog of species collected.**

The following catalog of plants contains only those collected by  
Mr. H. L. Lyon and the writer in the southeastern part of  
Houston county. With the exception of about ten species  
which were collected in Brownsville, they were all gathered in  
the townships of Mayville, Crooked Creek, Winnebago and  
Jefferson.

The determinations were almost entirely made by the col- 
lectors, each determining the plants of his own collection. The  
determinations of the species of Physalis were kindly made by  
Mr. P. A. Rydberg, of Columbia University, and those of  
Quercus prinoides, velutina, coccinea and rubra, and Betula  
lemba by Professor C. S. Sargent.

The nomenclature is that of Britton and Brown's Illustrated  
Flora of the Northern United States and Canada.

**PTERIDOPHYTA.**

**OPHIOGLOSSACEÆ.**

Coll.: Lyon 38, Winnebago; 207, Mayville. June, July.  
Infrequent, rich woods and shady banks.

**OSMUNDACEÆ.**

*Osmunda claytoniana* L. Sp. Pl. 1066. 1753.  
Common, shady hillsides and ravines.

**POLYPODIACEÆ.**

Common, wet meadows and river bottoms.

Coll.: Lyon 79, Winnebago; 208, Mayville. June, July.  
Common, moist thickets and river bottoms.
Rare and local, on brow of river bluff. The only previous collection reported from Minnesota is that from Stillwater by Miss Field. There are no previously collected specimens from Minnesota in the Herbarium of the University.

Common on shaded rocks and limestone ledges.

  Coll.: Lyon 221, Mayville. July.
Frequent in deep woods.

Dryopteris thelypterus (L.) A. Gray, Man. 630. 1848.
Common in swamps and wet meadows along Wild Cat creek.

Dryopteris goldieana (Hook.) A. Gray, Man. 631. 1848.
Rare and local, deep rich woods. The only previous authentic collection in Minnesota is that of Leiberg at Minneopa falls, Blue Earth County.

Dryopteris spinulosa (Retz.) Kuntze, Rev. Gen. Pl. 813. 1891.
Rare and local, deep rich woods.

Camptosorus rhizophyllus (L.) Link, Hort. Berol. 2: 69. 1833.
Infrequent or rare, limestone ledges and boulders.

  Coll.: Lyon 204, 224, Mayville. July.
Rare, deep rich woods. Not previously reported from Minnesota.

  Coll.: Lyon 206, 223, Mayville; 318, Jefferson. July
  Aug.
Frequent, rich woods and moist thickets.
Common woods and thickets.

Adiantum pedatum L. Sp. Pl. 1095. 1753.
Common, woods and shady banks.

Common, hillsides and cut-over timber lands.

Infrequent, moist limestone ledges.

Frequent, dry limestone cliffs and boulders.

Rare and local, dry limestone cliff. There is no previous authentic collection of this from Minnesota in the University Herbarium. Sandberg’s collection from Vermillion lake made in 1885 and reported as this species should be Cheilanthes lanosa (Michx.) Watt. which has not previously been reported from Minnesota.

Local on limestone ledge.

SALVINIACEÆ.

Abundant on sloughs and lakes of the Mississippi.

EQUISETACEÆ.

Equisetum arvense L. Sp. Pl. 1061. 1753.
Coll.: Lyon 102, Winnebago. June.
Frequent, meadows and pastures.
Frequent in light shaded soil.

Common.

Local, moist meadows.

SELAGINELLACEÆ.

Selaginella rupestris (L.) Spring. in Mart. Fl. Bras. 1: Part 2, 118. 1840.
Infrequent, dry rocks.

SPERMATOPHYTA.

ARCHISPERMAE.

PINACEÆ.

Local on bluffs along Winnebago and Crooked Creeks.

Common on dry bluffs. (Plates XXI., A and B, XXIV., B.)

Frequent on dry bluffs.

Rare and local on dry bluffs. No previous collection reported from this part of the state. This is about the most southern point of collection for this species in the United States according to Britton and Brown.
TAXACEÆ.

Infrequent, generally on dry limestone ridges, occasionally in woods. Not previously reported from the southern part of the state.

METASPERMAE.

TYPHACEÆ.

Typha latifolia L. Sp. Pl. 971. 1753.

SPARGANIACEÆ.

Sparganium eurycarpum Engelm. in A. Gray, Man. Ed. 2, 430. 1856.

NAIADACEÆ.

Naias flexilis (Willd.) Rost. & Schmidht, Fl. Sed. 384. 1824.
Not previously reported from Minnesota. Sloughs and lakes of the Mississippi river.

ALISMACEÆ.

Coll.: Wheeler 123, Winnebago; 304.
Crooked Creek; 492, Jefferson. June–Aug.

Not previously reported from this part of the state or the Mississippi river. Frequent in sloughs.


VALLISNERIACEÆ.

Philotria canadensis (Michx.) Britton, Science (II.) 2: 5. 1895.

GRAMINEÆ.


Panicum crus-galli L. Sp. Pl. 56. 1753.


Panicum capillare L. Sp. Pl. 58. 1753.
Cenchrus tribuloides L. Sp. Pl. 1050. 1753.


Spartina cynosuroides (L.) Willd. Enum. 80. 1809.


Eragrostis hypnoides (Lam.) B.S.P. Prel. Cat. N. Y. 69. 1888.


Panicularia americana (Torr.) MacM. Met. Minn. 81. 1892.

Bromus ciliatus L. Sp. Pl. 76. 1753.

Bromus kalmii A. Gray, Man. 600. 1848.

Bromus secalinus L. Sp. Pl. 76. 1753.

Elymus virginicus L. Sp. Pl. 84. 1753.

Elymus canadensis L. Sp. Pl. 83. 1753.

Cyperaceæ.


Cyperus esculentus L. Sp. Pl. 45. 1753.
Cyperus filiculmis Vah!. Enum. 2: 328. 1806.

The only previous collection known from Minnesota is that of Holzinger, St. Croix River, Minn. Britton reports this collection in the Bull. Torr. Club, 18: 368. 1891.
The collection from Crooked Creek was made from the summit of a very dry sandy hill. Both C. houghtoni and C. schweinitzii grow in sand but the former probably grows in the drier locality of the two.


Scirpus atrovirens Muhl. Gram. 43. 1817.

Scirpus cyperinus (L.) Kunth, Enum. 2: 170. 1837.


No Minnesota specimens in the Herbarium of the University. Previously collected at Lake Itasca, Sandberg No. 1180.


Carex torta Boot!.; Tuckerm. Enum. Meth. 11. 1843.
Coll.: Lyon 60, Winnebago. June.
Not previously reported from Minnesota. The nearest point of previous collection, as shown by the Herbarium of the University, is Winnebago county, Wisconsin.

Wheeler: Flora of Southeastern Minnesota


ARACEÆ.


Arisäma dracontium (L.) Schott, Melet. 1: 17. 1832.
The only previous collections reported from Minnesota are Manning, Lake Pepin and Holzinger, Winona. Frequent in moist woods along the Mississippi River.

LEMNACEÆ.


COMMELINACEÆ.


Not previously reported from Minnesota.

JUNCACEÆ.


Coll.: Lyon 73, Winnebago. June.

MELANTHACEÆ.


**LILIACEÆ.**


All previous collections of this species from Minnesota have been reported as *L. philadelphicum* L. The latter species so far as known has not been collected in Minnesota.

Coll.: Lyon 199, Crooked Creek. July.
Common, moist meadows. (Plate XXVII., A.)


**CONVALLARIACEÆ.**


Coll.: Wheeler 78, 184, Winnebago; 570, Jefferson; Lyon 166, Crooked Creek. June, Aug.


**SMILACEÆ.**

Smilax herbacea L. Sp. Pl. 1030. 1753.
Smilax hispida MuHL. : TorR. Fl. N. Y. 2: 302. 1843.

**AMARYLLIDACEÆ.**

Hypoxis hirsuta (L.) Coville, Mem. TorR. Club, 5: 118. 1894.

**DIOSCOREACEÆ.**

Coll.: Wheeler 322, Mayville; 364, Crooked Creek. July.

**IRIDACEÆ.**


**ORCHIDACEÆ.**

Cypripedium reginae Walt. Fl. Car. 222. 1788.


Peramium pubescens (Willd.) MacM. Met. Minn. 172. 1892.
Coll.: Lyon 100, Winnebago. June.

**JUGLANDACEÆ.**

Coll.: Lyon 243, Crooked Creek. July.


Coll.: Lyon 149, Winnebago; 238, 239, Mayville; 475, Jefferson. June, Aug.


**SALICACEÆ.**


Populus balsamifera candicans (Ait.) A. Gray, Man. Ed. 2, 419. 1856.

Coll.: Lyon 64, Winnebago. June.


Coll.: Lyon 125, Winnebago. June.

Salix nigra Marsh, Arb. Am. 139. 1785.


Coll.: Wheeler 138½, Winnebago; 232, Crooked Creek. June, July.
Salix fluviatilis Nutt. Sylva, 1: 73. 1842.

Salix bebbiana Sarg. Gard. & For. 8: 463. 1895.


**BETULACEÆ.**

Carpinus caroliniana Walt. Fl. Car. 236. 1788.


Corylus americana Walt. Fl. Car. 236. 1788.

Coll.: Wheeler 223, Winnebago; 275, Crooked Creek. June.

Not previously collected from southern part of state. Local on bluffs.


Common, dry ridges. (Plates XXIII., A and XXIV., B.)


Common in the lowlands of the Mississippi River.

Not previously collected in the southern part of the state. Rare.

Coll.: Wheeler 199, Winnebago; 271, Crooked Creek; 325, Mayville. June, July.

Frequent in moist locations along Winnebago and Crooked creeks.
Betula pumila L. Mant. 124. 1767.
Coll.: Wheeler 272, Crooked Creek. June.
Local along Crooked creek, forming large thickets in wet meadows.

Local at mouth of Wild Cat creek.

FAGACEÆ.

Quercus rubra L. Sp. Pl. 996. 1753.
Common throughout.

Quercus coccinea Wang. Amer. 44. pl. 4. f. 9. 1787.
Common throughout.

Quercus velutina Lam. Encycl. 1: 721. 1783.
Prof. Sargent writes about 643: "Collection 643, which I call Q. velutina, differs from that species as it usually occurs by the much smaller less tomentose buds; the acorns, however, are clearly from Q. velutina. I frequently have seen specimens of this same form from the region immediately west of the Great Lakes. It appears sometimes as if it might be a hybrid between Q. velutina and Q. coccinea but its occurrence is too frequent and its distribution too wide to admit of this supposition. With the present state of our knowledge I can but refer it to Q. velutina."

Q. velutina does not seem to be nearly so common in this region as Q. coccinea.

Quercus alba L. Sp. Pl. 996. 1753.
Common on ridges of bluffs throughout.

Common throughout.

No previous collection reported from Minnesota. Reported by Garrison as frequent at several points near the headwaters of the Mississippi. Frequent on the lowlands of the Mississippi in Jefferson and Crooked Creek townships and in Allamakee Co., Iowa.

Not previously reported from Minnesota. Whether this is the species reported by Lapham as Q. castanea Willd. cannot be ascertained as there are no specimens from Lapham's collection in the Herbarium of the University.

The specimens were collected from two trees on the side of a bluff in section 19, township 102 N., range 4 W.

ULMACEÆ.


Infrequent on lowland near Crooked creek.


MORACEÆ.

Infrequent along Mississippi river.

Humulus lupulus L. Sp. Pl. 1028. 1753.


URTICACEÆ.


SANTALACEÆ.


ARISTOLOCHIACEÆ.


POLYGONACEÆ.


Rumex crispus L. Sp. Pl. 335. 1753.


Polygonum emersum (Michx.) Britton, Trans. N. Y. Acad. Sci. 8: 73. 1879.


Crooked Creek. Aug.
The only previous collections from Minnesota are Sheldon, Madison lake and Sheldon, Zumbrota. Infrequent in moist woods along Mississippi river.


The only previous authentic collection from Minnesota is Moyer, Montevideo. Infrequent on dry sandy ridges.


CHENOPODIACEÆ.


AMARANTHACEÆ.


Acnida tamariscina (Nutt.) Wood, Bot. & Fl. 289. 1873.


NYCTAGINACEÆ.

Allionia nyctaginea Michx. Fl. Bor. Am. 1: 100. 1803.
Not previously collected in Minnesota. Collections Oest-lund 155 and Herrick 256, Minneapolis, in the Herbarium of the University and reported in Metaspermae of Minnesota Valley as A. linearis Pursh? should be A. hirsuta Pursh.

**AIZOACEÆ.**

Mollugo verticillata L. Sp. Pl. 89. 1753.

**CARYOPHYLLACEÆ.**

Silene alba MUHL. Cat. 45. 1813.
The only previous collections from Minnesota are from Goodhue and Winona counties. Frequent along Winnebago and Crooked creeks.
Silene antirrhina L. Sp. Pl. 419. 1753.

**NYMPHÆACEÆ.**

Nelumbo lutea (WILLD.) PERS. Syn. 1: 92. 1805.
Abundant in the sloughs of the Mississippi river at Jefferson. (Plate XXV., A.)

**CERATOPHYLLACEÆ.**

Common in the sloughs of the Mississippi river at Jefferson and Crooked Creek.
RANUNCULACEÆ.

Coll.: Lyon 244, Crooked Creek. July.

Actæa rubra (Ait.) Willd. Enum. 561. 1809.


Aquilegia canadensis L. Sp. Pl. 533. 1753.

Coll.: Lyon 9, Winnebago; 245, Crooked Creek. June, July.


Anemone quinquefolia L. Sp. Pl. 541. 1753.


 Syndesmon thalicroides (L.) Hoffmg. Flora, 15: Part 2,
Intell. Bl. 4, 34. 1832.

Pulsatilla hirsutissima (Pursh) Britton, Am. N. Y. Acad.
Sci. 6: 217. 1891.

Clematis virginiana L. Amoen. Acad. 4: 275. 1759.
Coll.: Wheeler 194, Winnebago; 355, Crooked Creek.
June, July.

Atragene americana Sims, Bot. Mag. pl. 887. 1806.

1818.
Coll.: Lyon 201, Crooked Creek. July.


Ranunculus pennsylvanicus L. f. Suppl. 272. 1781.
Ranunculus septentrionalis Poir. in Lam. Encycl. 6: 125. 1804.

Batrachium trichophyllum (Chaix) Bossch, Prodr. Fl. Bot. 5. 1850.


Thalictrum dioicum L. Sp. Pl. 545. 1753.


**BERBERIDACEÆ.**


**MENISPERMACEÆ.**


**PAPAVERACEÆ.**

Sanguinaria canadensis L. Sp. Pl. 505. 1753.
Coll.: Lyon 169, Crooked Creek. June.


**CRUCIFERÆ.**


Brassica nigra (L.) Koch, in Roehl, Deutsche Fl. Ed. 3, 4: 713. 1833.
Coll.: Lyon 233, Crooked Creek. July.
Brassica arvensis (L.) B.S.P. Prel. Cat. N. Y. 1888.

Roripa palustris (L.) Bess. Enum. 27. 1821.
Coll.: Lyon 200, Crooked Creek. July.


Cardamine bulbosa (Schreb.) B.S.P. Prel. Cat. N. Y. 4. 1888.

Coll.: Lyon 120, Winnebago. June.


Draba caroliniana WALT. Fl. Car. 174. 1788.

Arabis laevigata (Muhl.) Poir. in Lam. Encycl. Suppl. 1: 411. 1810.

Coll.: Lyon 111, Winnebago; 212, Crooked Creek. June, July.

Coll.: Lyon 122, Winnebago; 227, Mayville. June, July.

Coll.: Lyon 187, Crooked Creek; 226, Mayville. July.

**CAPPARIDACEÆ.**


**CRASSULACEÆ.**


**SAXIFRAGACEÆ.**


Heuchera hispida Pursh, Fl. Am. Sept. 188. 1814.

Coll.: Wheeler 587, Crooked Creek; 629, Brownsville. August.

**GROSSULARIACEÆ.**


Frequently adventive in open woods throughout.

Coll.: Lyon 82, Winnebago. June.

**HAMAMELIDACEÆ.**

Reported from southeastern Winona County. No Minnesota specimens in the Herbarium of the University. Local on north side of bluff in section 22 of Winnebago.

**ROSACEÆ.**

Coll.: Lyon 33, 103, Winnebago. June.

Spiræa salicifolia L. Sp. Pl. 489. 1753.  


Rubus canadensis L. Sp. Pl. 494. 1753.  


Coll.: Lyon 439, Jefferson. August.

Coll.: Lyon 209, Crooked Creek. July.


Coll.: Lyon 196, 228, Crooked Creek. July.


**POMACEÆ.**


Amelanchier botryapium (L. f.) DC. Prodr. 2: 632. 1825.

As synonym. 1840.


Coll.: Lyon 101, Winnebago, June.

Not previously reported from Minnesota.

Crataegus tomentosa L. Sp. Pl. 476. 1753.
DRUPACEÆ.


Not previously reported from Minnesota. This species has been recognized by horticulturists in several parts of the state but no previous authentic collections are known to have been made. It is common on the lowlands of the North and South forks of Crooked creek. Also collected on the banks of Winnebago creek and in East Burns valley, Winona county.


CÆSALPINACEÆ.


Not previously reported from Minnesota. This tree has been frequently cultivated for ornament throughout the southern part of the state but no native trees have previously been reported. It is frequent on the islands of the Mississippi river in northeastern Iowa and extends north along the river into Houston county, Minnesota, where it probably reaches its northern limit. The tree from which the collection was made is 59 feet high and has a trunk-circumference of 6 feet, 3 feet from the ground.

Gymnocladus dioica Koch, Dendrol. 1: 5. 1869.
Coll.: Lyon 193, 230, Crooked Creek; 271, Jefferson. July. (Plate XXIV., A.)

PAPILIONACEÆ.

  Coll.: Lyon 194, Crooked Creek. July.
Trifolium hybridum L. Sp. Pl. 766. 1753.
Trifolium repens L. Sp. Pl. 767. 1753.
Amorpha fruticosa L. Sp. PI. 713. 1753.
Kuhnistera purpurea (Vent.) MacM. Met. Minn. 329. 1892.
Meibomia grandiflora (Walt.) Kuntze, Rev. Gen. Pl. 196. 1891.
  Coll.: Lyon 198, 246, Crooked Creek. July.
Meibomia dillenii (Darl.) Kuntze, Rev. Gen. Pl. 195. 1891.
  No previously collected Minnesota specimens in the Herbarium of the University.
  Not previously reported from Minnesota. Frequent and in some places common in dry fields and hillsides.
  Coll.: Wheeler 331, Crooked Creek. July.

Not previously reported from Minnesota. Several specimens of this species, previously reported as F. comosa, have been collected in southern Minnesota. Probably common throughout the southern part of the state.


GERANIACEÆ.


OXALIDACEÆ.


LINACEÆ.

Linum sulcatum Riddel, Suppl. Cat. Ohio Pl. 10. 1836.

RUTACEÆ.

Xanthoxylum americanum Mill. Gard. Dict. Ed. 8, No. 2. 1768.

POLYGALACEÆ.


**EUPHORBIACEÆ.**

Acalypha virginica L. Sp. Pl. 1003. 1753.


Euphorbia maculata L. Sp. Pl. 455. 1753.

Euphorbia nutans Lag. Gen. & St. 17. 1816.


**ANACARDIACEÆ.**


Rhus glabra L. Sp. Pl. 265. 1753.

Rhus radicans L. Sp. Pl. 266. 1753.

**CELASTRACEÆ.**

Euonymus atropurpureus Jacq. Hort. Vind. 2: 5. pl. 120. 1772.


**STAPHYLEACEÆ.**

Staphylea trifolia L. Sp. Pl. 270. 1753.
ACERACEÆ.

Coll.: Lyon 149, Winnebago; 274, Jefferson. June, July.


Acer spicatum Lam. Encycl. 2: 381. 1786.
Frequent on moist shaded cliffs throughout.


BALSAMINACEÆ.

Impatiens aurea Muhl. Cat. 26. 1813.

RHAMNACEÆ.


Coll.: Wheeler 92, Lyon 66\(\frac{1}{2}\), Winnebago. June.

VITACEÆ.

Coll.: Wheeler 139, Winnebago; 344, Crooked Creek. June, July.

Parthenocissus quinquefolia (L.) Planch. in DC. Mon. Phan. 5: Part 2, 448. 1887.

TILIACEÆ.

Coll.: Lyon 211, Mayville. July.

MALVACEÆ.

Wheeler: FLORA OF SOUTHEASTERN MINNESOTA.  397

Previously collected at Vasa and Lanesboro. Rare on lowland near Winnebago creek.


HYPERICACEÆ.


Hypericum maculatum Walt. Fl. Car. 189.  1788.


CISTACEÆ.


VIOLACEÆ.


**THYMELEACEÆ.**

Rare in moist thickets near Winnebago creek.

**LYTHRACEÆ.**


**ONAGRACEÆ.**

No previous authentic collection from Minnesota. There are no Minnesota specimens in the Herbarium of the University. Miss Manning’s collection of 1883 from Pepin, Wis., is probably the one upon which is based the report of this species by Upham and others.
Circaea lutetiana L. Sp. Pl. 9. 1753.
Circaea alpina L. Sp. Pl. 9. 1753.

**ARALIACEÆ.**

Aralia nudicaulis L. Sp. Pl. 274. 1753.


**UMBELLIFERÆ.**

Angelica atropurpurea L. Sp. Pl. 251. 1753.

Coll.: Lyon 93, Winnebago. June.


The only precious collection from Minnesota is that of Sheldon, Milaca, 1892.


Not previously reported from Minnesota.


Washingtonia claytoni (Michx.) Britton in Brit. & Brown, Ill. Fl. 2: 530. f. 2680. 1897.

Sium cicutaefolium Gmel. Syst. 2: 482. 1791.


Zizia cordata DC. Prodr. 4: 100. 1830.

Cicuta maculata L. Sp. Pl. 256. 1753.
Cicuta bulbifera L. Sp. Pl. 255. 1753.

Deringa canadensis (L.) Kuntze, Rev. Gen. Pl. 266. 1891.

   In cold springs at the head of Clear creek.

   The only previously reported locality of collection is St. Croix Falls. Rare in moist woods near Crooked creek.

CORNACEÆ.

Cornus circinata L’Her. Cornus, 7. pl. 3. 1788.

Cornus amonum Mill. Gard. Dict. Ed. 8, No. 5. 1768.


PYROLACEÆ.

   Coll.: Wheeler 191, Winnebago; 276, Crooked Creek. June, July.

ERICACEÆ.

Arctostaphylos uva-ursi (L.) Spreng. Syst. 2: 287. 1825.
   On a sandy point of a bluff in section 19 of Jefferson.

PRIMULACEÆ.

Lysimachia terrestris (L.) B.S.P. Prel. Cat. N. Y. 34. 1888.
   Coll.: Lyon 249, Crooked Creek. July.

   Coll.: Lyon 251, Crooked Creek. July.

Previously collected only in Winona and Wabasha counties. Rare in moist woods.

**OLEACEÆ.**


Coll.: Lyon 173, Crooked Creek. June. (Plate XXIII., B.)

**GENTIANACEÆ.**

Gentiana crinita Froel. Gen. 112. 1796.


**APOCYNACEÆ.**

Apocynum androsæmifolium L. Sp. Pl. 213. 1753.
Coll.: Lyon 188, Crooked Creek. July.

Apocynum cannabinum L. Sp. Pl. 213. 1753.

Apocynum cannabinum glaberrimum DC. Prodr. 8: 439. 1844.

**ASCLEPIADACEÆ.**

Asclepias tuberosa L. Sp. Pl. 217. 1753.


Previously reported only by Lapham. Infrequent on dry hillsides.

Asclepias exaltata (L.) Muhl. Cat. 28. 1813.

Acerates viridiflora (Raf.) Eaton, Man. Ed. 5, 90. 1829.

CONVOLVULACEÆ.

Convolvulus spithamaeus L. Sp. Pl. 158. 1753.

CUSCUTACEÆ.

Cuscuta indecora Choisy, Mem. Soc. Gen. 9: 278. pl. 3. f. 5. 1841.

POLEMONIACEÆ.

Phlox pilosa L. Sp. Pl. 152. 1753.
Phlox divaricata L. Sp. Pl. 152. 1753.
Polemonium reptans L. Syst. Ed. 10, No. 1. 1759.

HYDROPHYLLACEÆ.

Hydrophyllum virginicum L. Sp. Pl. 146. 1753.

**BORAGINACEÆ.**

Coll.: Lyon 186, Crooked Creek. July.

Lappula virginianum (L.) Greene, Pittonia, 2: 182. 1891.

Lithospermum gmelini (Michx.) A. S. Hitchcock, Spring Fl. Manh. 30. 1894.

Lithospermum canescens (Michx.) Lehmi. Asperif. 305. 1818.


Onosmodium caroliniana (Lam.) DC. Prodr. 10: 70. 1846.

Lycopsis arvensis L. Sp. Pl. 139. 1753.
Not previously reported from Minnesota.

**VERBENACEÆ.**


Verbena hastata L. Sp. Pl. 20. 1753.


Lippia lanceolata Michx. Fl. Bor. Am. 2: 15. 1803.
Coll.: Lyon 279, Jefferson; Wheeler 622, Brownsville.
July, Aug.
Common on the very low lands of the Mississippi river.

**LABIATÆ.**

Scutellaria lateriflora L. Sp. Pl. 598. 1753.

Scutellaria cordifolia MUHL. Cat. 56. 1813.

Scutellaria parvula MICHX. Fl. Bor. Am. 2: 11. 1803.


  Coll.: Lyon 229, Crooked Creek. July.

Prunella vulgaris L. Sp. Pl. 600. 1753.

Physostegia virginiana (L.) BENTH. Lab. Gen. and Sp. 504. 1834.

Leonurus cardiaca L. Sp. Pl. 584. 1753.

  Coll.: Wheeler 300, Crooked Creek. July.

Monarda fistulosa L. Sp. Pl. 22. 1753.
  Coll.: Lyon 185, Crooked Creek. July.

Blephila hirsuta (PURSH) TORR. Fl. U. S. 27. 1824.

Hedeoma pulegioides (L.) PERS. Syn. 2: 131. 1807.

Previously reported from the Mississippi river by Garrison and Miss Manning, but there are no Minnesota specimens in the Herbarium of the University.


Kœllia virginiana (L.) MacM. Met. Minn. 452. 1892.


Lycopus rubellus Moench, Meth. Suppl. 146. 1802.

Lycopus americanus Muhl.; Bart. Fl. Phil. Prodr. 15. 1815.

Lycopus lucidus Turcz.; Benth. in DC. Prodr. 12: 178. 1848.

Mentha canadensis L. Sp. Pl. 577. 1753.
Coll.: Lyon 199, Crooked Creek. July.


Mr. Rydberg says: "This is a very peculiar form that I have never seen before. It may be a new species but in order to make a good description fruit is required. At present it should be referred to P. philadelphica with which it agrees except in the very large and broad leaves. In that respect it resembles P. macrophyta Rydb. but the latter is a perennial not an annual as this plant."

Physalis virginiana Mill. Gard. Dict. Ed. 8, No. 4. 1768.

Physalis heterophylla Nees, Linnaea, 6: 463. 1831.

Coll.: Lyon 192, Crooked Creek. July.


Scrophulariaeæ.

Verbascum thapsus L. Sp. Pl. 177. 1753.


Chelone glabra L. Sp. Pl. 611. 1753.

Mimulus jamesii T. & G.; Benth. in DC. Prodr. 10: 371. 1846.
Coll.: Lyon 68, Winnebago; Wheeler 589, Crooked Creek. June, Aug.

Ilysanthes gratioloides (L.) Benth. in DC. Prodr. 10: 419. 1846.

Veronica americana Schwein.; Benth. in DC. Prodr. 10: 468. 1846.


Coll.: Lyon 234, 250, Crooked Creek. July.

Dasystoma grandiflora (Benth.) Wood. Bot. & Flor. 231. 1873.
This is the first authentic specimen of this seen from Minnesota.

Gerardia aspera Dougl.: Benth. in DC. Prodr. 10: 517. 1846.


Castilleja coccinea (L.) Spreng. Syst. 2: 775. 1825.

Coll.: Lyon 69, Winnebago. June.

Coll.: Wheeler 515, Winnebago; 600, Crooked Creek. Aug.

Pedicularis canadensis L. Mant. 86. 1767.

LEN TIBULARIAE.

Utricularia vulgaris L. Sp. Pl. 18. 1753.
OROBANCHACEÆ.


PHRYMACEÆ.


PLANTAGINACEÆ.

Plantago major L. Sp. Pl. 112. 1753.

RUBIACEÆ.

Cephalanthus occidentalis L. Sp. Pl. 95. 1753.
Common on the lowlands of the Mississippi river.


Coll.: Lyon 53, Winnebago; 199½, Crooked Creek. June, July.


CAPRIFOLIACEÆ.

Sambucus canadensis L. Sp. Pl. 269. 1753.


Viburnum dentatum L. Sp. Pl. 268. 1753.


Lonicera dioica L. Syst. Ed. 12, 165. 1767.


ADOXACEÆ.

Frequent in moist woods.

VALERIANACEÆ.


CAMPANULACEÆ.

Campanula rotundifolia L. Sp. Pl. 163. 1753.

Campanula aparinoides Pursh, Fl. Am. Sept. 159. 1814.
Coll.: Lyon 194½, Crooked Creek. July.


Lobelia spicata Lam. Encycl. 3: 587. 1789.

CICHORIACEÆ.


Sonchus asper (L.) All. Fl. Ped. 1: 222. 1785.


Lactuca ludoviciana (Nutt.) DC. Prodr. 7: 141. 1838.
Previously reported only by Sheldon from Sleepy Eye.

Previously reported only by Sheldon from Lake Benton.


No authentic specimens previously reported from Minnesota.


Hieracium scabrum Michx. Fl. Bor. Am. 2: 86. 1803.


AMBROSIACEÆ.


COMPOSITÆ.


Eupatorium ageratoides L. f. Suppl. 355. 1781.


Lacinaria cylindracea (Michx.) Kuntze, Rev. Gen. Pl. 349. 1891.
  Coll.: Lyon 181, Crooked Creek; 290, Jefferson. July.

Lacinaria pycnostachya (Michx.) Kuntze, Rev. Gen. Pl. 349 1891.

Lacinaria scariosa (L.) Hill, Veg. Syst. 4: 49. 1762.

Solidago flexicaulis L. Sp. Pl. 879. 1753.
  Coll.: Lyon 371 1/2, 484, Jefferson; Wheeler 590, Crooked Creek. Aug.


Reported from Stearns County but no Minnesota specimens previously seen.


Solidago canadensis L. Sp. Pl. 878. 1753.


Solidago rigida L. Sp. Pl. 880. 1753.


Boltonia asteroides (L.) L'Her. Sert. Angl. 27. 1788.


Coll.: Wheeler 584, Crooked Creek. Aug.


Aster puniceus L. Sp. Pl. 875. 1753.


Aster salicifolius Lam. Encycl. 1: 306. 1783.
Aster paniculatus Lam. Encycl. 1: 306. 1783.


Erigeron ramosus (WALT.) B.S.P. Prel. Cat. N. Y. 27. 1888.


Polymnia canadensis L. Sp. Pl. 926. 1753.


Not previously reported from Minnesota. Infrequent, edges of thickets.


Ratibida columnaris (Sims) D. Don; Sweet, Brit. Fl. Gard. 2: 361. 1838.
Not previously reported from eastern Minnesota. Rare, dry banks.

Helianthus atrorubens L. Sp. Pl. 906. 1753.
Not previously reported from Minnesota. The only previous collection known is that of Sandberg, Hennepin Co., Aug., 1889.


Helianthus occidentalis Riddell, Suppl. Cat. Ohio Pl. 13. 1836.


Helianthus strumosus L. Sp. Pl. 905. 1753.


Coll.: Lyon 160, Winnebago; 182, Crooked Creek. June, July.
Bidens laevis (L.) B.S.P. Prel. Cat. N. Y. 29. 1888.

Not previously reported from Minnesota. The only previously collected authentic specimen seen from Minnesota is that of Aiton, Minneapolis, Sept., 1890.
Common on the low wet ground throughout.


Achillea millefolium L. Sp. Pl. 899. 1753.


Chrysanthemum leucanthemum L. Sp. Pl. 888. 1753.
Coll.: Lyon 231, Crooked Creek. July.


Artemisia dracunculoides Pursh, Fl. Am. Sept. 742. 1814.


Erechtites hieracifolia (L.) Raf. DC. Prodr. 6: 294. 1837.

Mesadenia reniformis (Muhl.) Raf. New Fl. 4: 79. 1836.

Not previously reported from Minnesota. The only previous known collection in this state is that of Prof. Conway MacMillan from Hennepin county.


Coll.: Lyon 242, Crooked Creek. July.

Carduus discolor (MuHl.) Nutt. Gen. 2: 130. 1818.


Description of Plate XXI.

A. Juniper point, Crooked creek valley. Southwest side of bluff dotted with junipers and white birch.
B. Base of bluff, upper Winnebago valley. White pine, juniper and white birch along the upper edge of cliff.

Plate XXII.

A. Western slope of bluff. The woods follow the areas of greatest moisture i.e., the ravines and foot of bluff and the water course in the valley. The shrubs in the valley mark the course of a small creek and are principally willows and dogwoods.
B. Southern slope of bluff showing the steep bare slopes and the thickly wooded ravine. The extreme base of the bluff to the left has been cleared of timber for cultivation.

Plate XXIII.

A. Grove of white birch.
B. Swamp vegetation. Spathyema growing in the shade of black ash and yellow birch.

Plate XXIV.

A. Group of coffee trees (Gymnocladus).
B. White birch and juniper on side of bluff.

Plate XXV.

A. Slough and island vegetation. Sagittarias and Nelumbo are the most prominent water plants, and willows and cottonwood on the island in the background.
B. General view of river valley from bluffs on Minnesota side of river. The river channel is on the farther side at the base of the Wisconsin bluffs.
Plate XXVI.

A. General view of Winnebago valley showing general distribution of forest vegetation. The valley is almost entirely cleared for cultivation.

B. South branch of Winnebago valley. The northern slope of bluff is densely wooded.

Plate XXVII.

A. *Lilium canadense* growing in moist meadow of creek valley.

B. Pond vegetation. Yellow pond-lily with water grasses and sedges.
PLATE XXI.
PLATE XXII.
PLATE XXIII.

THE HELIOTYPE PRINTING CO., BOSTON
PLATE XXIV.
PLATE XXV

THE HELIOTYPE PRINTING CO., BOSTON.