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-hyta of Ames
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ny of Iowa.
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With Compliments of the Author

(No. 1)

CONTRIBUTIONS

TO THE

Flora of Iowa;

A CATALOGUE OF THE

PHÆNOGAMOUS PLANTS.

QK169

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A CATALOGUE OF THE

PHÆNOGAMOUS PLANTS.

PREPARED BY

J. C. ARTHUR.

CHARLES CITY:
"INTELLIGENCER" BOOK PRINT.
1876.

PUBLISHED FOR THE
INTERNATIONAL EXHIBITION,
BY THE
IOWA CENTENNIAL COMMISSION.

PREFACE.

IN offering this Catalogue to the public, it is proper to state that it has been prepared very hurriedly; the collection upon which it is based, with the exception of the part taken from the fine herbarium of the State Agricultural College, and from a few comparatively small collections made in previous years, having been made during the summer of 1875. Although Botany is taught quite generally in the various schools of the State, yet, with few exceptions, little or no attention is given to the systematic preparation and preservation of native plants, even in the higher Institutions; hence the difficulty of making a complete showing of the Iowa flora.

In preparing the work, accuracy has been thought more desirable than a larger list of names. It is to be hoped that as soon as data can be secured, a more complete Catalogue, with the Cryptogams added, may be published before many of the rarer kinds of plants are exterminated by fires, cattle, cultivation, and other causes.

The information is yet too meagre for a paper on the very interesting subject of geographical distribution. Though lying west of the Mississippi river, which would seem to indicate a western flora, the State in this respect is characteristically eastern. Yet the greater or less variation in the manner of growth, development of parts, and habitat, often show the effect upon the species of the western climatic and other influences.

Collections have been received from various places in the eastern half of the State, and the middle through to the Mis-

souri river, but the large tracts of country lying in the northwest and southwest parts, with their rich and varied flora, could not be reached.

I am under many obligations for valuable contributions and assistance to PROF. C. E. BESSEY, of the Iowa Agricultural College, who published, in the "Fourth Biennial Report of the Agricultural College, 1871," the first and only "Contribution to the Flora of Iowa" thus far made, and who has since been indefatigable in his labors in the Botanical field. I am also greatly indebted to J. W. CONGDON, of East Greenwich, R. I., and to DR. GEO. ENGELMANN, of St. Louis, Mo., for the examination and determination of many specimens. Also to the following gentlemen of the State for contributions of specimens and lists of plants of their respective localities: J. G. HAUPT, Davenport, list of plants from the advance sheets of the "Report of the Academy of Sciences" of that place; E. W. HOLWAY, Decorah; DR. T. D. KELLOGG, Doud's Station, list of plants from Lee County; PROF. CALVIN, of the State University, Iowa City; DR. ASA HERR, Dubuque; DR. GEO. M. KELLOGG, Carthage, Ill., list of Lee County plants; M. E. JONES, Grinnell; REV. R. BURGESS, late of Woodbine; DR. WM. YOUNG, Greene; I. R. S. BIRCH, Birmingham; also, to L. L. CADWELL, conductor on the Milwaukee & St. Paul Railroad, Iowa Division, for assistance in making collections.

Gray's Manual, 5th edition, has furnished the basis of the present work. Introduced plants are printed in *italics*. Varieties are numbered the same as species for facility of reference and exchange. When plants have been reported but from one locality and without specimens, the locality has been generally placed at the foot of the page. The common names have been added for the use of those who prefer them. It has been thought advisable to append descriptions of species and revisions not included in Gray's Manual.

Charles City, March 1, 1876.

J. C. ARTHUR.

Catalogue.

RANUNCULACEÆ.

Clematis

1. Viorna, L.
2. Pitcheri, T. & Gr.
3. Virginiana, L.

Anemone

4. patens, L., var. Nuttalliana, Gray.
5. Caroliniana, Walt.
6. cylindrica, Gray.
7. Virginiana, L.
8. Pennsylvanica, L.
9. nemorosa, L.

Hepatica

10. triloba, Chaix.
11. acutiloba, DC.

Thalictrum

12. anemonoides, Michx.
13. dioicum, L.
14. purpurascens, L.
15. Cornuti, L.

Ranunculus

16. aquatilis, L., var. trichophyllus, Chaix.
17. var. stagnatilis, DC. (*See App.*)
18. multifidus, Pursh.
19. Cymbalaria, Pursh.
20. rhomboideus, Goldie.
21. abortivus, L.
22. sceleratus, L.
23. recurvatus, Poir.*
24. Pennsylvanicus, L.
25. fascicularis, Muhl.
26. repens, L.
27. bulbosus, L.
28. acris, L.

Myosurus

29. minimus, L.*

Isopyrum

30. bitermum, T. & Gr.

CROWFOOT FAMILY.

Virgin's-Bower.

1. Leather-flower.
2. ———
3. Common Virgin's-Bower.

Anemone.

4. Pasque-flower.
5. Carolina Anemone.
6. Long-fruited A.
7. Virginian A.
8. Pennsylvanian A.
9. Wood A. Wind-flower.

Liver-leaf. Hepatica.

10. Round-lobed Hepatica.
11. Sharp-lobed H.

Meadow-Rue.

12. Rue-Anemone.
13. Early Meadow-Rue.
14. Purplish M.
15. Tall M.

Crowfoot. Buttercup.

16. Common White Water-Crowfoot.
17. Stiff Water-C.
18. Yellow Water-C.
19. Sea-side C.
20. ———
21. Small-flowered C.
22. Cursed C.
23. Hooked C.
24. Bristly C.
25. Early C.
26. Creeping C.
27. Buttercups.
28. " "

Mouse-tail. "

29. Mouse-tail.

Isopyrum.

30. Isopyrum.

*Davenport.

Caltha

31. palustris, L.

Aquilegia

32. Canadensis, L.

Delphinium

33. exaltatum, Ait.*

34. tricornis, Michx.

35. azureum, Michx.

Hydrastis

36. Canadensis, L.†

Actea

37. spicata, L., var. rubra,
-
- Michx.

38. alba, Bigel.

ANONACEÆ.**Asimina**

39. triloba, Dunal.

MENISPERMACEÆ.**Menispermum**

40. Canadense, L.

BERBERIDACEÆ.**Caulophyllum**

41. thalictroides, Michx.

Podophyllum

42. peltatum, L.

NYMPHÆACEÆ.**Nelumbium**

43. luteum, Willd.

Nymphaea

44. tuberosa, Paine.

Nuphar

45. advena, Ait.

SARRACENIACEÆ.**Sarracenia**

46. purpurea, L.*

PAPAVERACEÆ.**Chelidonium**

47. majus, L.†

Sanguinaria

48. Canadensis, L.

FUMARIACEÆ.**Dicentra**

49. Cucullaria, DC.

Corydalis

50. aurea, Willd.

51. var. occidentalis, Engel.

Marsh Marigold.

31. Marsh Marigold.

Columbine.

32. Wild Columbine.

Larkspur.

33. Tall Larkspur.

34. Dwarf L.

35. Azure L.

Orange-root. Yellow Puccoon.

36. Orange-root.

Baneberry.

37. Red Baneberry.

38. White B.

CUSTARD-APPLE FAMILY.**North American Papaw.**

39. Common Papaw.

MOONSEED FAMILY.**Moonseed.**

40. Canadian Moonseed.

BARBERRY FAMILY.**Blue Cohosh.**

41. Blue Cohosh.

May-Apple. Mandrake.

42. May-Apple.

WATER-LILY FAMILY.**Nelumbo. Sacred Bean.**

43. Yellow Nelumbo.

Water-Lily. Water-Nymph.

44. Tuber-bearing W.

Yellow Pond-Lily. Spatter-Dock.

45. Common Yellow P.

PITCHER-PLANT FAMILY.**Side-saddle Flower.**

46. Pitcher-Plant.

POPPY FAMILY.**Celandine.**

47. Celandine.

Blood-root.

48. Blood-root.

FUMITORY FAMILY.**Dutchman's Breeches.**

49. Dutchman's Breeches.

Corydalis.

50. Golden Corydalis.

51. Western Golden C.

*Davenport.

†Lee County.

CRUCIFERÆ.

Nasturtium

52. sinuatum, Nutt.
 53. obtusum, Nutt.*
 54. palustre, DC.
 55. var. hispidum, Gray.*

Dentaria

56. diphylla, L.
 57. laciniata, Muhl.

Cardamine

58. rhomboidea, DC.
 59. var. purpurea, Torr.
 60. hirsuta, L.

Arabis

61. lyrata, L.
 62. dentata, T. & Gr.
 63. lævigata, DC.
 64. Canadensis, L.
 65. hesperidoides, Gray.
 66. Drummondii, Gray.

Erysimum

67. cheiranthoides, L.
 68. asperum, DC., var. pumilum (?), Watson.

Sisymbrium

69. officinale, Scop.
 70. canescens, Nutt.

Brassica

71. *Sinapistrum*, Boissier.
 72. alba, Boissier.
 73. nigra, Boissier.

Draba

74. cuneifolia, Nutt.
 75. Caroliniana, Walt.
 76. var. micrantha, Gray.

Alyssum

77. calycinum, L.

Camelina

78. sativa, Crantz.

Capsella

79. *Bursa-pastoris*, Mœench.

Lepidium

80. Virginicum, L.
 81. intermedium, Gray.

CAPPARIDACEÆ,

Polanisia

82. graveolens, Raf.

Cleome

83. integrifolia, T & Gr.

MUSTARD FAMILY.

Water-Cress.

52. Water-Cress.
 53. "
 54. Marsh-Cress.
 55. "

Toothwort. Pepper-root.

56. Pepper-root.
 57. "

Bitter Cress.

58. Spring Cress.
 59. Purple Spring C.
 60. Small Bitter C.

Rock Cress.

61. Rock Cress.
 62. "
 63. "
 64. Sickie-pod.
 65. Rock Cress.
 66. Tower Mustard.

Treacle Mustard.

67. Worm-seed Mustard.
 68. Western Wall-flower.

Hedge Mustard.

69. Hedge Mustard.
 70. Tansy M.

Mustard.

71. Charlock.
 72. White Mustard.
 73. Black M.

Whitlow Grass.

74. Whitlow-Grass.
 75. "
 76. "

Alyssum.

77. Alyssum.

False Flax.

78. False Flax.

Shepherd's Purse.

79. Shepherd's Purse.

Pepperwort. Peppergrass.

80. Wild Peppergrass.
 81. " "

CAPER FAMILY.

Polanisia.

82. Polanisia.

Cleome.

83. Cleome.

*Davenport.

RESEDACEÆ.**Reseda†**

- 84.
- Luteola*
- , L.

VIOLACEÆ.**Viola**

85. *blanda*, Willd.*
 86. *cucullata*, Ait.
 87. var. *palmata*, Gray.
 88. *sagittata*, Ait.
 89. *delphinifolia*, Nutt.
 90. *pedata*, L.
 91. *Canadensis*, L. (*See App.*)
 92. *pubescens*, Ait.
 93. var. *eriocarpa*, Nutt.*
 94. *tricolor*, L., var. *arvensis*, DC.

CISTACEÆ.**Helianthemum**

- 95.
- Canadense*
- , Michx.

Lechea

- 96.
- minor*
- , Lam.

HYPERICACEÆ.**Hypericum**

97. *pyramidatum*, Ait.
 98. *perforatum*, L.
 99. *corymbosum*, Muhl.
 100. *mutilum*, L.*
 101. *Canadense*, L.
 102. *Drummondii*, T. & Gr.

Elodes

- 103.
- Virginica*
- , Nutt.

CARYOPHYLLACEÆ.**Saponaria**

- 104.
- officinalis*
- , L.

Vaccaria

- 105.
- vulgaris*
- , Host.

Silene

106. *stellata*, Ait.
 107. *nivea*, DC.
 108. *inflata*, Smith.
 109. *antirrhina*, L.
 110. *noctiflora*, L.

Lychnis

- 111.
- Githago*
- , Lam.

Arenaria

112. *serpyllifolia*, L.
 113. *lateriflora*, L.

Stellaria

114. *media*, Smith.
 115. *longifolia*, Muhl.

MIGNONETTE FAMILY.**Dyer's Rocket.**

84. Dyer's Weed or Weld.

VIOLET FAMILY.**Violet, Heart's-ease.**

85. Sweet White Violet.
 86. Common Blue V.
 87. Hand-leaf V.
 88. Arrow-leaved V.
 89. Larkspur V.
 90. Bird-foot V.
 91. Canada V.
 92. Downy Yellow V.
 93. " "
 94. Heart's-ease.

ROCK-ROSE FAMILY.**Rock-rose.**

95. Frost-weed.

Pinweed.

96. Pinweed.

ST. JOHN'S-WORT FAMILY.**St. John's-wort.**

97. Great St. J.
 98. Common St. J.
 99. St. John's-wort.
 100. "
 101. "
 102. "

Marsh St. John's-wort.

103. Marsh St. J.

PINK FAMILY.**Soapwort.**

104. Bouncing Bet. Common S.

Cow-Herb.

105. Cow-Herb.

Catchfly. Campion.

106. Starry Campion.
 107. Campion.
 108. Bladder Campion.
 109. Sleepy Catchfly.
 110. Night-flowering Catchfly.

Lychnis. Cockle.

111. Corn Cockle.

Sandwort.

112. Thyme-leaved S.
 113. Sandwort.

Chickweed. Starwort.

114. Common Chickweed.
 115. Long-leaved Stitchwort.

*Davenport.

†Lee County.

Cerastium

116. *viscosum*, L.
 117. *nutans*, Raf.
 118. *oblongifolium*, Torr.

Spergula

119. *arvensis*, L.

Anychia

120. *dichotoma*, Michx. var. *capillacea*.
 121. var. *dichotoma*.

Mollugo

122. *verticillata*, L.

PORTULACACEÆ.**Portulaca**

123. *oleracea*, L.
 124. *retusa*, Engel.* (*See App.*)

Claytonia

125. *Virginica*, L.
 126. *Caroliniana*, Michx.

MALVACEÆ.**Malva**

127. *rotundifolia*, L.
 128. *sylvestris*, L.
 129. *crispa*, L.

Callirrhoe

130. *triangulata*, Gr.
 131. *involucrata*, Gr. (*See App.*)

Napæa

132. *dioica*, L.

Malvastrum

133. *angustum*, Gray.

Sida

134. *spinosa*, L.

Abutilon

135. *Avicenna*, Gærtn.

Hibiscus

136. *militaris*, Cav.
 137. *Trionum*, L.

TILIACEÆ.**Tilia**

138. *Americana*, L.

LINACEÆ.**Linum**

139. *Virginianum*, L.
 140. *sulcatum*, Riddell.

GERANIACEÆ.**Geranium**

141. *maculatum*, L.
 142. *Carolinianum*, L.

Mouse-ear Chickweed.

116. Mouse-ear Chickweed.
 117. " "
 118. " "

Spurrey.

119. Corn Spurrey.

Forked Chickweed.

120. Forked C.
 121. "

Indian-Chickweed.

122. Carpet-weed.

PURSLANE FAMILY.**Purslane.**

123. Common Purslane.
 124. Western P.

Spring-Beauty.

125. Narrow-leaved S.
 126. Wide-leaved S.

MALLOW FAMILY.**Mallow.**

127. Common M.
 128. High M.
 129. Curled M.

Callirrhoe.

130. Callirrhoe.
 131. "

Glade Mallow.

132. Glade M.

False Mallow.

133. False M.

Sida.

134. Sida.

Indian Mallow.

135. Velvet-Leaf. Indian M.

Rose-Mallow.

136. Halberd-leaved R.
 137. Bladder Ketmia.

LINDEN FAMILY.**Basswood. Linden.**

138. Basswood. Whitewood.

FLAX FAMILY.**Flax.**

139. Wild Flax.
 140. " "

GERANIUM FAMILY.**Cranesbill.**

141. Wild C.
 142. Carolina C.

*Fide Prof. Seldon, Davenport.

Florkea

- 143.
- proserpinacoides*
- , Willd.*

Impatiens

- 144.
- pallida*
- , Nutt.
-
- 145.
- fulva*
- , Nutt.

Oxalis

- 146.
- violacea*
- , L.
-
- 147.
- stricta*
- , L.

RUTACEÆ.**Zanthoxylum**

- 148.
- Americanum*
- , Mill.

Ptelea

- 149.
- trifoliata*
- , L.

ANACARDIACEÆ.**Rhus**

- 150.
- typhina*
- , L.†
-
- 151.
- glabra*
- , L.
-
- 152.
- Toxicodendron*
- , L.
-
153. var.
- radicans*
- , Torr.
-
- 154.
- aromatica*
- , Ait.

VITACEÆ.**Vitis**

- 155.
- cordifolia*
- , Michx. (
- See App*
-)
-
- 156.
- riparia*
- , Michx. (
- See App*
-)

Ampelopsis

- 157.
- quinquefolia*
- , Michx.

RHAMNACEÆ.**Rhamnus**

- 158.
- lanceolatus*
- , Pursh.

Ceanothus

- 159.
- Americanus*
- , L.
-
- 160.
- ovalis*
- , Bigel.

CELASTRACEÆ.**Celastrus**

- 161.
- scandens*
- , L.

Euonymus

- 162.
- atropurpureus*
- , Jacq.

SAPINDACEÆ.**Staphylea**

- 163.
- trifolia*
- , L.

Fesculus

- 164.
- glabra*
- , Willd.
-
- 165.
- flava*
- , Ait.

Acer

- 166.
- saccharinum*
- , Wang.
-
167. var.
- nigrum*
- , Gr.
-
- 168.
- dasycarpum*
- , Ehrh.
-
- 169.
- rubrum*
- , L.

False Mermaid.

143. False M.

Balsam. Jewel-weed.

144. Pale Touch-me-not.
-
145. Spotted T.

Wood-Sorrel.

146. Violet W.
-
147. Yellow W.

RUE FAMILY.**Prickly-Ash. Toothache-tree.**

148. Northern P.

Shrubby Trefoil. Hop-tree.

149. Hop-tree.

CASHEW FAMILY.**Sumach.**

150. Staghorn Sumach.
-
151. Smooth S.
-
152. Poison Ivy. Poison Oak.
-
153. Climbing Ivy. Poison Ivy.
-
154. Fragrant Sumach.

VINE FAMILY.**Grape.**

155. Winter or Frost Grape.
-
156. " " "

Virginian Creeper.

157. American Ivy. Virginian C.

BUCKTHORN FAMILY.**Buckthorn.**

158. Western B.

New Jersey Tea. Red-root.

159. New Jersey Tea.
-
160. Red-root.

STAFF-TREE FAMILY.**Staff-tree. Bitter-sweet.**

161. Climbing B.

Spindle-tree.

162. Burning-Bush. Waahoo.

SOAPBERRY FAMILY.**Bladder-nut.**

163. American B.

Horse-chestnut. Buckeye.

164. Fetid or Ohio Buckeye.
-
165. Sweet B.

Maple.

166. Sugar or Rock-Maple.
-
167. Black Sugar-M.
-
168. Silver M.
-
169. Red or Swamp M.

*Lee County.

†Davenport.

Negundo

- 170.
- aceroides*
- , Moench.

POLYGALACEÆ.**Polygala**

171. *incarnata*, L.
 172. *sanguinea*, L.
 173. *verticillata*, L.
 174. *Senega*, L.

LEGUMINOSÆ.**Crotalaria**

- 175.
- sagittalis*
- , L.

Trifolium

176. *arvense*, L.
 177. *pratense*, L.
 178. *stoloniferum*, Muhl.
 179. *repens*, L.
 180. *procumbens*, L.

Melilotus

181. *officinalis*, Willd.
 182. *alba*, Lam.

Medicago

183. *sativa*, L.
 184. *lupulina*, L.

Psoralea

185. *floribunda*, Nutt.
 186. *argophylla*, Pursh.
 187. *esculenta*, Pursh.

Dalea

188. *alopecurioides*, Willd.
 189. *laxiflora*, Pursh. (*See App.*)

Petalostemon

190. *violaceus*, Michx.
 191. *candidus*, Michx.

Amorpha

192. *fruticosa*, L.
 193. *canescens*, Nutt.

Robinia

- 194.
- Pseudacacia*
- , L.

Tephrosia

- 195.
- Virginiana*
- , Pers.

Astragalus

196. *caryocarpus*, Ker.
 197. *Canadensis*, L.
 198. *Cooperi*, Gray.*
 199. *distortus*, T. & Gr.

Oxytropis

- 200.
- Lamberti*
- , Pursh.

Glycyrrhiza

- 201.
- lepidota*
- , Nutt.

*Lee County.

Ash-leaved Maple. Box-Elder.

170. Box-Elder.

MILKWORT FAMILY.**Milkwort.**

171. Milkwort.
 172. "
 173. "
 174. Seneca Snakeroot.

PULSE FAMILY.**Rattle-box.**

175. Rattle-box.

Clover. Trefoil.

176. Rabbit-foot or Stone C.
 177. Red C.
 178. Running Buffalo-C.
 179. White C.
 180. Low Hop-C.

Sweet-Clover. Melilot.

181. Yellow S.
 182. White S.

Medick.

183. Lucerne.
 184. Black Medick. Nonesuch.

Psoralea

185. Psoralea.
 186. "
 187. Pomme de Prairie.

Dalea

188. Dalea.
 189. "

Prairie-Clover.

190. Purple P.
 191. White P.

False Indigo.

192. False I.
 193. Lead-Plant.

Locust-tree.

194. False Acacia. Common L.

Hoary Pea.

195. Goat's Rue.

Milk-Vetch.

196. Ground Plum.
 197. Milk-Vetch.
 198. "
 199. "

Oxytropis.

200. Oxytropis.

Liquorice.

201. Wild L.

Desmodium

202. *acuminatum*, DC.
 203. *canescens*, DC.*
 204. *cuspidatum*, T. & Gr.
 205. *paniculatum*, DC.
 206. *Canadense*, DC.†
 207. *sessilifolium*, T. & Gr.

Lespedeza

208. *capitata*, Michx.
 209. *var. angustifolia*, Gray.

Vicia

210. *Cracca*, L.
 211. *Caroliniana*, Walt.
 212. *Americana*, Muhl.

Lathyrus

213. *venosus*, Muhl.
 214. *ochroleucus*, Hook.
 215. *palustris*, L.

Apios

216. *tuberosa*, Mœnch.

Phaseolus

217. *perennis*, Walt.
 218. *diversifolius*, Pers.
 219. *pauciflorus*, Benth.

Amphicarpæa

220. *monoica*, Nutt.

Baptisia

221. *leucantha*, T. & Gr.
 222. *leucophæa*, Nutt.

Cereis

223. *Canadensis*, L.

Cassia

224. *Marilandica*, L.‡
 225. *Chamæcrista*, L.

Gymnocladus

226. *Canadensis*, Lam.

Gleditschia

227. *triacanthos*, L.

Desmanthus

228. *brachylobus*, Benth.

ROSACEÆ.**Prunus**

229. *Americana*, Marshall.
 230. *Pennsylvanica*, L.
 231. *Virginiana*, L.
 232. *serotina*, Ehrh.

Tick-Trefoil.

202. Tick-Trefoil.
 203. "
 204. "
 205. "
 206. "
 207. "

Bush-Clover.

208. Bush-Clover.
 209. "

Vetch. Tare.

210. Vetch.
 211. "
 212. "

Vetchling. Everlasting Pea.

213. Vetchling.
 214. "
 215. Marsh V.

Ground-nut. Wild Bean.

216. Ground-nut.

Kidney Bean.

217. Wild Bean.
 218. " "
 219. " "

Hog Pea-nut.

220. Hog P.

False-Indigo.

221. White F.
 222. Yellow F.

Red-bud. Judas-tree.

223. Red-bud.

Senna.

224. Wild Senna.
 225. Partridge Pea.

Kentucky Coffee-tree.

226. Kentucky C.

Honey-Locust.

227. Honey-L. Three-thorned
 Acacia.

Desmanthus

228. Desmanthus.

ROSE FAMILY.**Plum. Cherry.**

229. Wild Yellow or Red Plum.
 230. Wild Red Cherry.
 231. Choke-Cherry.
 232. Wild Black C.

*Lee County.

†Indianola.

‡Davenport.

Spiræa

233. *opulifolia*, L.
 234. *salicifolia*, L.
 235. *lobata*, Murr.

Agrimonia

236. *Eupatoria*, L.

Geum

237. *album*, Gmelin.
 238. *strictum*, Ait.
 239. *triflorum*, Pursh.

Potentilla

240. *Norvegica*, L.
 241. *rivalis*, Nutt., var. *pentandra*, Watson. (*See App.*)
 242. *paradoxa*, Nutt.
 243. *Canadensis*, L.
 244. *arguta*, Pursh.

Fragaria

245. *Virginiana*, Ehrh.
 246. var. *Illinoensis*, Gray.
 247. *vesca*, L.

Rubus

248. *strigosus*, Michx.
 249. *occidentalis*, L.
 250. *villosus*, Ait.

Rosa

251. *blanda*, Ait.

Crataegus

252. *coccinea*, L.
 253. *tomentosa*, L.
 254. var. *pyrifolia*, Gray.
 255. var. *punctata*, Gray.
 256. var. *mollis*, Gray.

Pyrus

257. *coronaria*, L.

Amelanchier

258. *Canadensis*, T. & Gr., var. *Botryapium*, T. & Gr.
 259. var. *oblongifolia*, T. & Gr.
 260. var. *alnifolia*, T. & Gr.

SAXIFRAGACEÆ.**Ribes**

261. *Cynosbati*, L.
 262. *rotundifolium*, Michx.
 263. *floridum*, L.

Hydrangea

264. *arborescens*, L.*

Parnassia

265. *Caroliniana*, Michx.

Meadow-Sweet.

233. Nine-Bark.
 234. Common M.
 235. Queen of the Prairie.

Agrimony.

236. Common A.

Avens.

237. Avens.
 238. "
 239. Three-flowered A.

Cinque-foil. Five-finger.

240. Five-finger.
 241. "
 242. "
 243. Common F.
 244. Five-finger.

Strawberry.

245. Wild S.
 246. "
 247. "

Bramble.

248. Wild Red Raspberry.
 249. Black Raspberry.
 250. Com. or High Blackberry.

Rose.

251. Early Wild R.

Hawthorn. White Thorn.

252. Scarlet-fruited Thorn.
 253. Black or Pear T.
 254. "
 255. "
 256. "

Pear. Apple.

257. American Crab-Apple.

June-berry.

258. Service-berry. Shad-bush.
 259. "
 260. "

SAXIFRAGE FAMILY.**Gooseberry. Currant.**

261. Prickly Gooseberry.
 262. Smooth G.
 263. Wild Black Currant.

Hydrangea.

264. Wild H.

Grass of Parnassus.

265. Grass of P.

*Lee County.

Saxifraga266. *Pennsylvanica*, L.**Sullivantia**267. *Ohionis*, T. & Gr.***Heuchera**268. *hispida*, Pursh.**Mitella**269. *diphylla*, L.**CRASSULACEÆ.****Penthorum**270. *sedoides*, L.**HALORAGÆÆ.****Myriophyllum**271. *spicatum*, L.272. *verticillatum*, L.273. *heterophyllum*, Michx.**Proserpinaca**274. *palustris*, L.**ONAGRACEÆ.****Circœa**275. *Lutetiana*, L.**Gaura**276. *biennis*, L.277. *coccinea*, Nutt. (*See App.*)**Epilobium**278. *angustifolium*, L.279. *palustre*, L. var. *lineare*, Gr.280. *coloratum*, Muhl.**Enothera**281. *biennis*, L.282. *rhombipetala*, Nutt.283. *fruticosa*, L.284. *serrulata*, Nutt.**Ludwigia**285. *polycarpa*, Short & Peter.**LYTHRACEÆ.****Lythrum**286. *alatum*, Pursh.**Cuphea**287. *viscosissima*, Jacq.**CACTACEÆ.****Opuntia**288. *Rafinesquii*, Engel.**CUCURBITACEÆ.****Sicyos**289. *angulatus*, L.**Saxifrage.**

266. Swamp S.

Sullivantia.267. *Sullivantia*.**Alum-root.**

268. Alum-root.

Mitre-wort. Bishop's-Cap.

269. Mitre-wort.

ORPINE FAMILY.**Ditch Stone-crop.**

270. Ditch S.

WATER-MILFOIL FAMILY.**Water-Milfoil.**

271. Water-Milfoil.

272. " "

273. " "

Mermaid-weed.

274. Mermaid-weed.

EVENING-PRIMROSE FAMILY**Enchanter's-Nightshade.**

275. Common E.

Gaura.276. *Gaura*.

277. "

Willow-herb.

278. Great W.

279. Willow-herb.

280. " "

Evening-Primrose.

281. Common E.

282. Evening-Primrose.

283. Sundrops.

284. Evening-primrose.

False Loosestrife.

285. False L.

LOOSESTRIFE FAMILY.**Loosestrife.**

286. Loosestrife.

Cuphea.

287. Clammy C.

CACTUS FAMILY.**Prickly Pear. Indian Fig.**

288. Prickly P.

GOURD FAMILY.**Star-Cucumber.**

289. One-seeded S.

*Fide Prof. C. E. Bessey, Ames.

Echinocystis

290. lobata, T. & Gr.

UMBELLIFERÆ.**Sanicula**

291. Canadensis, L.
-
292. Marilandica, L.

Eryngium

293. yuccæfolium, Michx.

Daucus

- 294.
- Carota*
- , L.

Polytaenia

295. Nuttallii, DC.

Heracleum

296. lanatum, Michx.

Peucedanum (?)

297. nudicaule, Nutt. (
- See App.*
-)

Pastinaca

- 298.
- sativa*
- , L.

Archemora

299. rigida, DC.

Conioselinum

300. Canadense, T. & Gr.*

Thaspium

301. barbinode, Nutt.
-
302. aureum, Nutt.
-
303. trifoliatum, Gray.

Zizia

304. integerrima, DC.

Cicuta

305. maculata, L.

Sium

306. lineare, Michx.

Cryptotaenia

307. Canadensis, DC.

Chærophyllum

308. procumbens, Lam.

Osmorrhiza

309. longistylis, DC.
-
310. brevistylis, DC.

Conium

- 311.
- maculatum*
- , L.*

ARALIACEÆ.**Aralia**

312. racemosa, L.
-
313. nudicaulis, L.
-
314. quinquefolia, Gray.

Balsam-apple.

290. Wild B.

PARSLEY FAMILY.**Sanicle. Black Snakeroot.**

291. Black Snakeroot.
-
292. " "

Eryngo.

293. Button Snakeroot.

Carrot.

294. Common Carrot.

Polytaenia.

295. Polytaenia.

Cow-Parsnip.

296. Common C.

Peucedanum.

297. Peucedanum.

Parsnip.

298. Common P.

Cowbane.

299. Cowbane.

Hemlock-Parsley.

300. Hemlock-P

Meadow-Parsnip.

301. Meadow-Parsnip.
-
302. " "
-
303. " "

Zizia.

304. Zizia.

Water-Hemlock.

305. Spotted Cowbane. Beaver-Poison.

Water-Parsnip.

306. Water-Parsnip.

Honewort.

307. Honewort.

Chervil.

308. Wild C.

Sweet Cicely.

309. Smoother Sweet C.
-
310. Hairy Sweet C.

Poison Hemlock.

311. Poison H.

GINSENG FAMILY.**Ginseng. Sarsaparilla.**

312. Spikenard.
-
313. Wild Sarsaparilla.
-
314. Ginseng.

*Davenport.

CORNACEÆ.**Cornus**

- 315. sericea, L.
- 316. asperifolia, Michx.
- 317. paniculata, L'Her.
- 318. alternifolia, L.

CAPRIFOLIACEÆ.**Symphoricarpus**

- 319. occidentalis, R. Br.
- 320. vulgaris, Michx.

Lonicera

- 321. flava, Sims.
- 322. parviflora, Lam.
- 323. var. Douglasii, Gray.

Diervilla

- 324. trifida, Mœench.

Triosteum

- 325. perfoliatum, L.

Adoxa

- 326. Moschatellina L. (*See App.*)

Sambucus

- 327. Canadensis, L.
- 328. pubens, Michx.

Viburnum

- 329. Lentago, L.
- 330. pubescens, Pursh.
- 331. Opulus, L.

RUBIACEÆ.**Galium**

- 332. Aparine, L.
- 333. asprellum, Michx.
- 334. concinnum, T. & Gr.
- 335. trifidum, L.
- 336. var. tinctorium, Gray.
- 337. var. latifolium, Gray.
- 338. triflorum, Michx.
- 339. boreale, L.

Cephalanthus

- 340. occidentalis, L.

Houstonia

- 341. angustifolia, Michx.
- 342. minima, Beck.

VALERIANACEÆ.**Valeriana**

- 343. edulis, Nutt.

Fedia

- 344. Fagopyrum, T. & Gr.*

DOGWOOD FAMILY.**Cornel. Dogwood.**

- 315. Silky Cornel. Kinnikinnik.
- 316. Rough-leaved Dogwood.
- 317. White-fruited D.
- 318. Alternate-leaved D.

HONEYSUCKLE FAMILY.**Snowberry.**

- 319. Wolf-berry.
- 320. Coral-berry.

Honeysuckle. Woodbine.

- 321. Yellow H.
- 322. Small H.
- 323. Crimson H.

Bush-Honeysuckle.

- 324. Bush-H.

Fever-wort. Horse-Gentian.

- 325. Fever-wort.

Adoxa.

- 326. Adoxa.

Elder.

- 327. Common E.
- 328. Red-berried E.

Arrow-wood. Laurestinus.

- 329. Sheep-berry.
- 330. Downy Arrow-wood.
- 331. Cranberry-tree.

MADDER FAMILY.**Bedstraw. Cleavers.**

- 332. Cleavers. Goose-Grass.
- 333. Rough Bedstraw.
- 334. Small B.
- 335. "
- 336. "
- 337. "
- 338. Sweet-scented B.
- 339. Northern B.

Button-bush.

- 340. Button-bush.

Houstonia.

- 341. Houstonia.
- 342. "

VALERIAN FAMILY.**Valerian.**

- 343. Valerian.

Corn Salad. Lamb-Lettuce.

- 344. Corn Salad.

*Lee County.

COMPOSITÆ.

Vernonia

345. *Noveboracensis*, Willd.
346. *fasciculata*, Michx.

Liatris

347. *squarrosa*, Willd.
348. *cylindracea*, Michx.
349. *punctata*, Hook. (*See App.*)
350. *scariosa*, Willd.
351. *pycnostachya*, Michx.

Kuhnia

352. *eupatorioides*, L.

Eupatorium

353. *purpureum*, L.
354. *perfoliatum*, L.
355. *serotinum*, Michx.
356. *ageratoides*, L.

Conoclinium

357. *coelestinum*, DC.*

Aster

358. *sericeus*, Vent.
359. *patens*, Ait.
360. *laevis*, L., var. *laevigatus*, Gr.
361. var. *cyaneus*, Gray.
362. *azureus*, Lindl.
363. *undulatus*, L.
364. *cordifolius*, L.
365. *sagittifolius*, Willd., var.
 Drummondii, Gray.
366. *multiflorus*, Ait.
367. *Tradescanti*, L.
368. *miser*, L., Ait.†
369. *simplex*, Willd.
370. *carneus*, Nees.
371. *Novi-Belgii*, L.
372. *puniceus*, L.
373. *prenanthoides*, Muhl.
374. *oblongifolius*, Nutt.
375. *Novæ-Angliæ*, L.
376. var. *roseus*, Gray.
377. *ptarmicoides*, T. & Gr.

Erigeron

378. *Canadense*, L.
379. *divaricatum*, Michx.
380. *bellidifolium*, Muhl.
381. *Philadelphicum*, L.
382. *annuum*, Pers.
383. *strigosum*, Muhl.

Diplopappus

384. *umbellatus*, T. & Gr.

Boltonia

385. *glastifolia*, L'Her.

COMPOSITE FAMILY.

Iron-weed.

345. Iron-weed.
346. "

Blazing-Star. Button Snakeroot.

347. Blazing-Star.
348. "
349. "
350. "
351. "

Kuhnia.

352. Kuhnia.

Thoroughwort.

353. Joe-Pye Weed.
354. Boneset. Thoroughwort.
355. Thoroughwort.
356. White Snakeroot.

Mist-flower.

357. Mist-flower.

Aster.

358. Aster.
359. "
360. "
361. "
362. "
363. "
364. "
365. "
366. "
367. "
368. "
369. "
370. "
371. "
372. "
373. "
374. "
375. "
376. "
377. "

Fleabane.

378. Horse-weed. Butter-weed.
379. Dwarf Fleabane.
380. Robin's Plantain.
381. Common Fleabane.
382. Daisy F. Sweet Scabious.
383. Daisy F.

Double-bristled Aster.

384. Double-bristled A.

Boltonia.

385. Boltonia.

*Lee County.

†Dubuque.

Solidago

386. bicolor, L., var. concolor,
Gray.
387. latifolia, L.
388. speciosa, Nutt.
389. var. angustata, Gray.
390. rigida, L.
391. Riddellii, Frank.
392. altissima, L.
393. ulmifolia, Muhl.
394. nemoralis, Ait.
395. Missouriensis, Nutt.
396. Canadensis, L.
397. serotina, Ait.
398. gigantea, Ait.
399. lanceolata, L.

Aplopappus

400. spinulosus, DC. (*See App*)

Grindelia

401. squarrosa, Dunal. (*See App*)

Polymnia

402. Canadensis, L.

Silphium

403. laciniatum, L.
404. terebinthinaceum, L.
405. integrifolium, Michx.
406. perfoliatum, L.

Parthenium

407. integrifolium, L.

Cyclachæna

408. xanthiifolia, Fres. (*See App*)

Iva

409. xanthiifolia, Nutt.

Ambrosia

410. trifida, L.
411. var. integrifolia, Gray.
412. artemisiæfolia, L.
413. psilostachya, DC.

Xanthium

414. strumarium, L.
415. var. echinatum, Gray.

Eclipta

416. procumbens, Michx.*

Heliopsis

417. lævis, Pers., var. scabra, Gr.

Echinacea

418. purpurea, Mœench.
419. angustifolia, DC.

Golden-rod.

386. Golden-rod.
387. "
388. "
389. "
390. "
391. "
392. "
393. "
394. "
395. "
396. "
397. "
398. "
399. "

Aplopappus.

400. Aplopappus.

Grindelia.

401. Grindelia.

Leaf-Cup.

402. Leaf-Cup.

Rosin-Plant.

403. Compass-Plant.
404. Prairie Dock.
405. Rosin-Plant.
406. Cup-Plant.

Parthenium.

407. Parthenium.

Cyclachæna.

408. Cyclachæna.

Marsh Elder.

409. ———

Ragweed.

410. Great R.
411. Smaller R.
412. Roman Wormwood.
413. Western Ragweed.

Clotbur. Cocklebur.

414. Common Cocklebur.
415. " "

Eclipta.

416. Eclipta.

Ox-eye.

417. Ox-eye.

Purple Cone-flower.

418. Purple C.
419. "

*Lee County.

Rudbeckia

420. *laciniata*, L.
 421. *subtomentosa*, Pursh.
 422. *triloba*, L.
 423. *hirta*, L.

Lepachys

424. *pinnata*, T. & Gr.

Helianthus

425. *annuus*, L.
 426. *lenticularis*, Dougl. (*See App.*)
 427. *rigidus*, Desf.
 428. *laetiflorus*, Pers.
 429. *mollis*, Lam.
 430. *grosse-serratus*, Mart.
 431. *strumosus*, L.
 432. *hirsutus*, Raf.
 433. *tracheliifolius*, Willd.
 434. *doronicoides*, Lam.

Actinomeris

435. *squarrosa*, Nutt.

Coreopsis

436. *palmata*, Nutt.
 437. *tripteris*, L.
 438. *aristosa*, Michx.

Bidens

439. *frondosa*, L.
 440. *connata*, Muhl.
 441. var. *petiolata*.
 442. var. *comosa*, Gray.
 443. *cernua*, L.
 444. *chrysanthemoides*, Michx.
 445. *Beckii*, Torr.

Dysodia

446. *chrysanthemoides*, Lag.

Helenium

447. *autumnale*, L.

Leptopoda

448. *brachypoda*, T. & Gr.*

Maruta

449. *Cotula*, DC.

Anthemis

450. *arvensis*, L.

Achillea

451. *Millefolium*, L.

Leucanthemum

452. *vulgare*, Lam.

Tanacetum

453. *vulgare*, L.

Cone-flower.

420. Cone-flower.
 421. "
 422. "
 423. "

Cone-flower.

424. Cone-flower.

Sunflower.

425. Common S.
 426. Wild S.
 427. Sunflower.
 428. "
 429. "
 430. "
 431. "
 432. "
 433. "
 434. "

Actinomeris.

435. Actinomeris.

Tickseed.

436. Tickseed.
 437. "
 438. "

Bur-Marigold.

439. Common Beggar-ticks.
 440. Swamp B.
 441. "
 442. "
 443. Smaller Bur-Marigold.
 444. Larger B.
 445. Water Marigold.

Fetid Marigold.

446. Fetid M.

Sneeze-weed.

447. Sneeze-weed.

Leptopoda.

448. Leptopoda.

May-weed.

449. Common M.

Chamomile.

450. Corn C.

Yarrow.

451. Milfoil. Common Y.

Ox-eye Daisy.

452. Ox-eye or White Daisy.

Tansy.

453. Common T.

*Indianola.

Artemisia

454. *dracunculoides*, Pursh.
 455. *caudata*, Michx.
 456. *Ludoviciana*, Nutt.
 457. var. *gnaphalodes*, Gray.
 458. *biennis*, Willd.
 459. *Absinthium*, L.

Gnaphalium

460. *polycepalum*, Michx.

Antennaria

461. *margaritacea*, R. Br.*
 462. *plantaginifolia*, Hook.

Erechtithites

463. *hieracifolia*, Raf.

Cacalia

464. *suaveolens*, L.*
 465. *reniformis*, Muhl.
 466. *atriplicifolia*, L.†
 467. *tuberosa*, Nutt.

Senecio

468. *aureus*, L.
 469. var. *Balsamitæ*, Gray.

Centaurea

470. *Cyanus*, L.
 471. *Americana*, Nutt. (*See App*)

Cnicus (*Cirsium*, *Gray's Man.* *See App*)

472. *discolor*, Muhl.
 473. *altissimus*, Willd.
 474. *muticus*, Pursh.
 475. *pumilus*, Torr.
 476. *arvensis*, Hoffm.

Lappa

477. *officinalis*, All., var. *major*, Gray.

Cichorium

478. *Intybus*, L.

Cynthia

479. *Virginica*, Don.

Troximon

480. *cuspidatum*, Pursh.

Hieracium

481. *Canadense*, Michx.
 482. *scabrum*, Michx.
 483. *longipilum*, Torr.
 484. *venosum*, L.

Nabalus

485. *albus*, Hook.
 486. *racemosus*, Hook.
 487. *asper*, Torr. & Gr.

Wormwood.

454. Wormwood.
 455. "
 456. Western Mugwort.
 457. "
 458. Biennial Wormwood.
 459. Common W.

Cudweed.

460. Common Everlasting.

Everlasting.

461. Pearly Everlasting.
 462. Plantain-leaved E.

Fireweed.

463. Fireweed.

Indian Plantain.

464. Indian Plantain.
 465. Great Indian P.
 466. Pale Indian P.
 467. Tuberous Indian P.

Groundsel.

468. Golden Ragwort.
 469. " "

Star-Thistle.

470. Bluebottle.
 471. Bachelor's-Button.

Thistle.

472. Common T.
 473. "
 474. Swamp T.
 475. Pasture T.
 476. Canada T.

Burdock.

477. Common B.

Succory or Cichory.

478. Common C.

Cynthia.

479. Cynthia.

Troximon.

480. Troximon.

Hawkweed.

481. Canada H.
 482. Rough H.
 483. Long-bearded H.
 484. Rattlesnake-weed.

Rattlesnake-root.

485. White Lettuce.
 486. Rattlesnake-root.
 487. "

*Davenport.

†Dubuque.

Lygodesmia488. *junceae*, Don.**Crepis**489. *runcinata*, T. & Gr. (*See App.*)**Taraxacum**490. *Dens-leonis*, Desf.**Lactuca**491. *Canadensis*, L.492. var. *sanguinea*, T. & Gr.493. *Ludoviciana*, DC. (*See App.*)**Mulgedium**494. *Floridanum*, DC.495. *leucophæum*, DC.**Sonchus**496. *asper*, Vill.**LOBELIACEÆ.****Lobelia**497. *cardinalis*, L.498. *syphilitica*, L.499. *puberula*, Michx.*500. *inflata*, L.501. *spicata*, Lam.**CAMPANULACEÆ.****Campanula**502. *rotundifolia*, L.503. var. *linifolia*, Gray.504. *aparinoides*, Pursh.505. *Americana*, L.**Specularia**506. *perfoliata*, A. DC.**ERICACEÆ.****Vaccinium**507. *vacillans*, Solander.**Pyrola**508. *elliptica*, Nutt.**Monotropa**509. *uniflora*, L.**EBENACEÆ.****Diospyros**510. *Virginiana*, L.†**PLANTAGINACEÆ.****Plantago**511. *major*, L.512. *lanceolata*, L.**Lygodesmia.**488. *Lygodesmia*.**Crepis.**489. *Crepis*.**Dandelion.**

490. Common D.

Lettuce.

491. Wild L.

492. “

493. “

False or Blue Lettuce.

494. Blue Lettuce.

495. “ “

Sow-Thistle.

496. Spiny-leaved S.

LOBELIA FAMILY.**Lobelia.**

497. Cardinal-flower.

498. Great Lobelia.

499. Lobelia.

500. Indian Tobacco.

501. Lobelia.

BELLFLOWER FAMILY.**Bellflower.**

502. Harebell.

503. “

504. Marsh Bellflower.

505. Tall B.

Venus's Looking-glass.

506. Venus's L.

HEATH FAMILY.**Cranberry. Blueberry.**

507. Low Blueberry.

Shin-leaf. Wintergreen.

508. Shin-leaf.

Indian Pipe.

509. Indian P.

EBONY FAMILY.**Date-Plum. Persimmon.**

510. Common Persimmon.

PLANTAIN FAMILY.**Plantain. Ribgrass.**

511. Common Plantain.

512. Ribgrass. English P.

*Davenport.

†Fide Prof. Bessey, Ames.

PRIMULACEÆ.**Androsace**

- 513.
- occidentalis*
- , Pursh.

Dodecatheon

- 514.
- Meadia*
- , L.

Lysimachia

515. *thyrsiflora*, L.
 516. *stricta*, Ait.
 517. *ciliata*, L.
 518. *lanceolata*, Walt.
 519. *longifolia*, Pursh.

LENTIBULACEÆ.**Utricularia**

520. *vulgaris*, L., var. *Americana*, Gray.
 521. *cornuta*, Michx.

BIGNONIACEÆ.**Martynia**

- 522.
- proboscidea*
- , Glox.

OROBANCHACEÆ.**Aphyllon**

- 523.
- fasciculatum*
- , T. & Gr.

SCROPHULARIACEÆ.**Verbascum**

524. *Thapsus*, L.
 525. *Blattaria*, L.

Linaria

- 526.
- vulgaris*
- , Miller.

Serophularia

- 527.
- nodosa*
- , L.

Chelone

- 528.
- glabra*
- , L.

Pentstemon

529. *pubescens*, Solander.
 530. *Digitalis*, Nutt.
 531. *grandiflorus*, Fraser.

Mimulus

532. *ringens*, L.
 533. *Jamesii*, Torr.

Herpestis

- 534.
- rotundifolia*
- , Pursh.*

Gratiola

- 535.
- Virginiana*
- , L.

Ilysanthes

- 536.
- gratioloides*
- , Benth.

Synthyris

- 537.
- Houghtoniana*
- , Benth.

PRIMROSE FAMILY.**Androsace.**

- 513.
- Androsace.*

American Cowslip.

- 514.
- Shooting-Star.*
- Am. C.

Loosestrife.

515. *Tufted L.*
 516. *Loosestrife.*
 517. "
 518. "
 519. "

BLADDERWORT FAMILY.**Bladderwort.**

- 520.
- Greater B.*

- 521.
- Bladderwort.*

BIGNONIA FAMILY.**Unicorn-plant.**

- 522.
- Common Martynia.*

BROOM-RAPE FAMILY.**Naked Broom-rape.**

- 523.
- Naked B.*

FIGWORT FAMILY.**Mullein.**

524. *Common M.*
 525. *Moth M.*

Toad-Flax.

- 526.
- Butter-and-eggs.*
- Toad-Flax

Figwort.

- 527.
- Figwort.*

Turtle-head. Snake-head.

- 528.
- Turtle-head.*
- Balmony.

Beard-tongue. Pentstemon.

529. *Pentstemon.*
 530. "
 531. "

Monkey-flower.

532. *Monkey-flower.*
 533. "

Herpestis.

- 534.
- Herpestis.*

Hedge-Hyssop.

- 535.
- Hedge-H.*

False Pimpernel.

- 536.
- False P.*

Synthyris.

- 537.
- Synthyris.*

*Davenport.

Veronica

538. *Virginica*, L.
 539. *Anagallis*, L.
 540. *peregrina*, L.

Seymeria

541. *macrophylla*, Nutt.

Gerardia

542. *purpurea*, L.
 543. *aspera*, Dougl.
 544. *tenuifolia*, Vahl.
 545. *setacea*, Walt.
 546. *grandiflora*, Benth.
 547. *auriculata*, Michx.

Castilleja

548. *coccinea*, Spreng.
 549. *sessiliflora*, Pursh.

Pedicularis

550. *Canadensis*, L.
 551. *lanceolata*, Michx.

Melampyrum

552. *Americanum*, Michx.*

ACANTHACEÆ.**Ruellia**

553. *ciliosa*, Pursh.
 554. *strepens*, L.

VERBENACEÆ.**Verbena**

555. *angustifolia*, Michx.
 556. *hastata*, L.
 557. *urticifolia*, L.
 558. *stricta*, Vent.
 559. *bracteosa*, Michx.

Lippia

560. *lanceolata*, Michx.

Phryma

561. *Leptostachya*, L.

LABIATÆ.**Teucrium**

562. *Canadense*, L.

Trichostema

563. *dichotomum*, L.

Isanthus

564. *cæruleus*, Michx.

Mentha

565. *viridis*, L.*
 766. *piperita*, L.*
 567. *Canadensis*, L.
 568. *var. glabrata*, Benth.

Speedwell.

538. *Culver's Physic*.
 539. *Water Speedwell*.
 540. *Neckweed*. *Purslane S*.

Seymeria.

541. *Mullein-Foxglove*.

Gerardia.

542. *Purple G*.
 543. "
 544. *Slender G*.
 545. "
 546. *Gerardia*.
 547. "

Painted-Cup.

548. *Scarlet P*.
 549. *Dwarf P*.

Lousewort.

550. *Common L*.
 551. *Lousewort*.

Cow-Wheat.

552. *Cow-W*.

ACANTHUS FAMILY.**Ruellia.**

553. *Ruellia*.
 554. "

VERVAIN FAMILY.**Vervain. Verbena.**

555. *Vervain*.
 556. *Blue V*.
 557. *Nettle-leaved or White V*.
 558. *Hoary V*.
 559. *Prostrate V*.

Lippia.

560. *Fog-fruit*.

Lopseed.

561. *Lopseed*.

MINT FAMILY.**Germander.**

562. *American G*. *Wood Sage*.

Blue Curls.

563. *Bastard Pennyroyal*.

False Pennyroyal.

564. *False P*.

Mint.

565. *Spearmint*.
 566. *Peppermint*.
 567. *Wild Mint*.
 568. " "

*Lee County.

Lycopus

569. *Virginicus*, L.
 570. *rubellus*, Moench. (*See App*)
 571. *lucidus*, Turcz., var. *Americanus*, Gray. (*See App*.)
 572. *sinuatus*, Ell. (*See App*.)

Pycnanthemum

573. *pilosum*, Nutt.
 574. *lanceolatum*, Pursh.
 575. *linifolium*, Pursh.

Hedeoma

576. *pulegioides*, Pers.
 577. *hispidula*, Pursh.

Salvia

578. *lanceolata*, Willd. (*See App*)

Monarda

579. *fistulosa*, L.

Blephilia

580. *hirsuta*, Benth.

Lophanthus

581. *nepetoides*, Benth.*
 582. *scrophulariæfolius*, Benth.
 583. *anisatus*, Benth.

Nepeta

584. *Cataria*, L.
 585. *Glechoma*, Benth.†

Dracocephalum

586. *parviflorum*, Nutt.

Physostegia

587. *Virginiana*, Benth.

Brunella

588. *vulgaris*, L.

Scutellaria

589. *versicolor*, Nutt.
 590. *parvula*, Michx.
 591. *galericulata*, L.
 592. *lateriflora*, L.

Galeopsis

593. *Tetralix*, L.

Stachys

594. *palustris*, L. var. *aspera*, Gr.
 595. var. *glabra*, Gray.
 596. var. *cordata*, Gray.

Leonurus

597. *Cardiaca*, L.

BORRAGINACEÆ.**Echium**

598. *vulgare*, L.

Water Horehound.

569. Bugle-weed.
 570. Water H.
 571. "
 572. "

Mountain Mint. Basil.

573. Mountain Mint.
 574. "
 575. "

Mock Pennyroyal.

576. American Pennyroyal.
 577. Mock P.

Sage.

578. Wild Sage.

Horse-Mint.

579. Wild Bergamot.

Blephilia.

580. Blephilia.

Giant Hyssop.

581. Giant H.
 582. "
 583. "

Cat-Mint.

584. Catnip.
 585. Gill. Ground Ivy.

Dragon-Head.

586. Dragon-H.

False Dragon-Head.

587. False D.

Self-heal.

588. Com. Self-heal or Heal-all.

Skullcap.

589. Skullcap.
 590. "
 591. "
 592. Mad-dog S.

Hemp-Nettle.

593. Common H.

Hedge-Nettle.

594. Hedge-N.
 595. "
 596. "

Motherwort.

597. Common M.

BORAGE FAMILY.**Viper's Bugloss.**

598. Blue-weed.

*Davenport.

†Indianola.

Onosmodium

599. *Carolinianum*, DC.
600. *molle*, Michx.

Lithospermum

601. *angustifolium*, Michx.
602. *latifolium*, Michx.
603. *hirtum*, Lehm.
604. *canescens*, Lehm.
605. *longiflorum*, Spreng.

Mertensia

606. *Virginica*, DC.

Echinosperrum

607. *Lappula*, Lehm.

Cynoglossum

608. *officinale*, L.
609. *Morisoni*, DC.

HYDROPHYLLACEÆ.**Hydrophyllum**

610. *Virginicum*, L.
611. *appendiculatum*, Michx.

Ellisia

612. *Nyctelea*, L. (*See App.*)

POLEMONIACEÆ.**Polemonium**

613. *reptans*, L.

Phlox

614. *maculata*, L.
615. *pilosa*, L.
616. *divaricata*, L., var. *Laphamii*, Wood.

CONVOLVULACEÆ.**Ipomœa**

617. *purpurea*, Lam.

Calystegia

618. *sepium*, R. Br.
619. *spithamœa*, Pursh.

Cuscuta

620. *Gronovii*, Willd.
621. *glomerata*, Choisy.

SOLANACEÆ.**Solanum**

622. *Dulcamara*, L.
623. *nigrum*, L.
624. *Carolinense*, L.

Physalis (*See App*)

625. *Philadelphica*, Lam.
626. *Virginica*, Mill. (*P. viscosa* Gray's Man., not of L.)
627. *lanceolata*, Michx. (*P. Pennsylvanica* Gray's Man. in part, not of L.)

False Gromwell.

599. *False G.*
600. "

Gromwell. Puccoon.

601. *Gromwell.*
602. "
603. *Hairy Puccoon.*
604. *Alkanet.* Hoary P.
605. *Puccoon.*

Smooth Lungwort.

606. *Virginian Cowslip* or L.

Stickseed.

607. *Common S.*

Hound's-Tongue.

608. *Common H.*
609. *Beggar's-Lice.*

WATERLEAF FAMILY.**Waterleaf.**

610. *Waterleaf.*
611. "

Ellisia.

612. *Ellisia.*

POLEMONIUM FAMILY.**Greek Valerian.**

613. *Polemonium.*

Phlox.

614. *Wild Sweet-William.*
615. *Wild Phlox.*
616. " "

CONVOLVULUS FAMILY.**Morning-Glory.**

617. *Common M.*

Bracted Bindweed.

618. *Hedge Bindweed.*
619. *Bracted B.*

Dodder.

620. *Dodder.*
621. "

NIGHTSHADE FAMILY.**Nightshade.**

622. *Bittersweet.*
623. *Common Nightshade.*
624. *Horse-Nettle.*

Ground Cherry.

625. *Ground C.*
626. "
627. "

Datura

628. *Stramonium*, L.

GENTIANACEÆ.**Gentiana**

629. *quinqueflora*, Lam., var.
 occidentalis, Gray.
630. *crinita*, Frœl.
631. *detonsa*, Fries.
632. *alba*, Muhl.
633. *Andrewsii*, Griseb.
634. *Saponaria*, L.
635. *puberula*, Michx.

Menyanthes

636. *trifoliata*, L.

APOCYNACEÆ.**Apocynum**

637. *androsæmifolium*, L.
638. *cannabinum*, L., var. *glaberrimum*, DC.
639. var. *hypericifolium*, Gr.

ASCLEPIADACEÆ.**Asclepias**

640. *Cornuti*, Decaisne.
641. *Sullivantii*, Engelm.
642. *phytolaccoides*, Pursh.
643. *purpurascens*, L.
644. *ovalifolia*, Decaisne.
645. *incarnata*, L.
646. *obtusifolia*, Michx.
647. *Meadii*, Torr.
648. *tuberosa*, L.
649. *verticillata*, L.

Acerates

650. *viridiflora*, Ell.
651. *longifolia*, Ell.

OLEACEÆ.**Fraxinus**

652. *Americana*, L.
653. *viridis*, Michx. f.
654. *sambucifolia*, Lam.
655. *quadrangulata*, Michx.

ARISTOLOCHIACEÆ.**Asarum**

656. *Canadense*, L.

NYCTAGINACEÆ.**Oxybaphus**

657. *nyctagineus*, Sweet.
658. *angustifolius*, Sweet. (*See App.*)
659. *albidus*, Sweet. (*See App.*)

Jamestown-Weed. Thorn-Apple.

628. Common Stramonium.

GENTIAN FAMILY.**Gentian.**

629. Five-flowered Gentian.
630. Fringed G.
631. Smaller Fringed G.
632. Whitish G.
633. Closed G.
634. Soapwort G.
635. Gentian.

Buckbean.

636. Buckbean.

DOGBANE FAMILY.**Dogbane. Indian Hemp.**

637. Spreading Dogbane.
638. Indian Hemp.
639. " "

MILKWEED FAMILY.**Milkweed. Silkweed.**

640. Common Milkweed.
641. Milkweed.
642. Poke-M.
643. Purple M.
644. Dwarf M.
645. Swamp M.
646. Milkweed.
647. "
648. Butterfly-weed.
649. Whorled Milkweed.

Green Milkweed.

650. Green M.
651. "

OLIVE FAMILY.**Ash.**

652. White Ash.
653. Green A.
654. Black or Water A.
655. Blue A.

BIRTHWORT FAMILY.**Wild Ginger. Asarabacca.**

656. Wild G.

FOUR-O'CLOCK FAMILY.**Oxybaphus.**

657. Oxybaphus.
658. "
659. "

PHYTOLACCACEÆ.

Phytolacca

- 660.
- decandra*
- , L.

CHENOPODIACEÆ.

Chenopodium

661. *album*, L.
 662. *Boschianum*, Moq. (*See App*)
 663. *hybridum*, L.
 664. *Botrys*, L.
 665. *ambrosioides*, L.

AMARANTACEÆ.

Amarantus

666. *retroflexus*, L.
 667. *albus*, L.
 668. *Blitum*, L. (*See App.*)

Montelia

669. *tamariscina*, Gray.
 670. var. *concatenata*, Gray.

POLYGONACEÆ.

Polygonum

671. *orientale*, L.
 672. *Pennsylvanicum*, L.
 673. *incarnatum*, Ell.
 674. *Persicaria*, L.
 675. *Hydropiper*, L.
 676. *acre*, H. B. K.
 677. *amphibium*, L., var. *aquaticum*, Willd.
 678. var. *terrestre*, Willd.
 679. *Hartwrightii*, Gr. (*See App*)
 680. *Virginianum*, L.
 681. *aviculare*, L.
 682. var. *erectum*, Roth.
 683. *ramosissimum*, Michx.
 684. *sagittatum*, L.
 685. *Convolvulus*, L.
 686. *dumetorum*, L.

Fagopyrum

- 687.
- esculentum*
- , Moench.

Rumex

688. *orbiculatus*, Gray.
 689. *Britannica*, L.
 690. *verticillatus*, L.
 691. *crispus*, L.
 692. *maritimus*, L.
 693. *Acetosella*, L.

LAURACEÆ.

Sassafras

- 694.
- officinale*
- , Nees.

THYMELEACEÆ.

Dirca

- 695.
- palustris*
- , L.

POKEWEED FAMILY.

Pokeweed.

660. Com. Poke. Scape. Garget.

GOOSEFOOT FAMILY.

Pigweed. Goosefoot.

661. Lamb's-Quarters. Pigweed.
 662. Slender Pigweed.
 663. Maple-leaved Goosefoot.
 664. Jerusalem Oak.
 665. Mexican Tea.

AMARANTH FAMILY.

Amaranth.

666. Pigweed. Green A.
 667. Tumble-weed.
 668. Amaranth.

Montelia.

669. Montelia.
 670. "

BUCKWHEAT FAMILY.

Knotweed.

671. Prince's Feather.
 672. Smartweed.
 673. "
 674. Lady's Thumb.
 675. Common Smartweed.
 676. Water Smartweed.
 677. Water Persicaria.
 678. "
 679. Persicaria.
 680. ————
 681. Knotgrass. Door-weed.
 682. "
 683. Knotweed.
 684. Arrow-leaved Tear-thumb.
 685. Black Bindweed.
 686. Climbing False Buckwheat.

Buckwheat.

687. Common B.

Dock. Sorrel.

688. Great Water-Dock.
 689. Pale Dock.
 690. Swamp D.
 691. Curled D.
 692. Golden D.
 693. Field or Sheep Sorrel.

LAUREL FAMILY.

Sassafras.

694. Sassafras.

MEZEREUM FAMILY.

Leatherwood. Moosewood.

695. Leatherwood.

SANTALACEÆ.**Comandra**

- 696.
- umbellata*
- , Nutt.

CALLITRICHACEÆ.**Callitriche**

- 697.
- verna*
- , L.

EUPHORBIACEÆ.**Euphorbia**

698. *petaloidea*, Engelm.
 699. *serpens*, H. B. K.
 700. *serpyllifolia*, Pers.
 701. *glyptosperma*, Engelm.
 702. *maculata*, L.
 703. *hexagona*, Nutt. (*See App.*)
 704. *hypericifolia*, L.
 705. *marginata*, Pursh.
 706. *corollata*, L.
 707. *dentata*, Michx.
 708. *heterophylla*, L.
 709. *dictyosperma*, F. & M.
 710. *Cyprisias*, L.

Acalypha

- 711.
- Virginica*
- , L.

Croton

712. *glandulosus*, L.
 713. *capitatus*, Michx.

URTICACEÆ.**Ulmus**

714. *fulva*, Mich.
 715. *Americana*, L., Willd.

Celtis

- 716.
- occidentalis*
- , L.

Morus

- 717.
- rubra*
- , L.

Urtica

- 718.
- gracilis*
- , Ait.

Laportea

- 719.
- Canadensis*
- , Gaudich.

Pilea

- 720.
- pumila*
- , Gray.

Parietaria

- 721.
- Pennsylvanica*
- , Muhl.

Cannabis

- 722.
- sativa*
- , L.

Humulus

- 723.
- Lupulus*
- , L.

PLATANACEÆ.**Platanus**

- 724.
- occidentalis*
- , L.

SANDALWOOD FAMILY.**Bastard Toad-flax.**

696. Bastard T.

WATER-STARWORT FAMILY.**Water-Starwort.**

697. Water-S.

SPURGE FAMILY.**Spurge.**

698. Spurge.
 699. "
 700. "
 701. "
 702. "
 703. "
 704. "
 705. "
 706. "
 707. "
 708. "
 709. "
 710. "

Three-seeded Mercury.

711. Three-seeded M.

Croton.

712. Croton.
 713. "

NETTLE FAMILY.**Elm.**

714. Slippery or Red Elm.
 715. American or White Elm.

Hackberry.

716. Sugarberry. Hackberry.

Mulberry.

717. Red M.

Nettle.

718. Nettle.

Wood-Nettle.

719. Wood-N.

Richweed. Clearweed.

720. Richweed.

Pellitory.

721. Pellitory.

Hemp.

722. Common H.

Hop.

723. Common H.

PLANE-TREE FAMILY.**Buttonwood. Plane-tree.**

724. American Plane. Sycamore.

JUGLANDACEÆ.**Juglans**

725. cinerea, L.
726. nigra, L.

Carya

727. olivæformis, Nutt.
728. alba, Nutt.
729. tomentosa, Nutt.
730. amara, Nutt.

CUPULIFERÆ.**Quercus**

731. alba, L.
732. obtusiloba, Michx.
733. macrocarpa, Michx.
734. bicolor, Willd.
735. Prinus, L., var. acuminata, Michx.
736. var. humilis, Marshall.*
737. imbricaria, Michx.
738. nigra, L.
739. coccinea, Wang.
740. var. tinctoria, Gray.
741. rubra, L.
742. palustris, Du Roi.

Corylus

743. Americana, Walt.

Ostrya

744. Virginica, Willd.

Carpinus

745. Americana, Michx.

BETULACEÆ.**Betula**

746. papyracea, Ait.
747. nigra, L.

Alnus

748. incana, Willd., var. glauca, Gray.

SALICACEÆ.**Salix**

749. tristis, Ait.
750. humilis, Marshall.
751. discolor, Muhl.
752. petiolaris, Smith.
753. cordata, Muhl.
754. livida, Wahl., var. occidentalis, Gray.
755. nigra, Marshall.
756. var. amygdaloides, And. (See App.)
757. longifolia, Muhl.

WALNUT FAMILY.**Walnut.**

725. Butternut.
726. Black Walnut.

Hickory.

727. Pecan-nut.
728. Shell-bark or Shag-bark H.
729. Mockernut.
730. Bitter-nut or Swamp H.

OAK FAMILY.**Oak.**

731. White Oak.
732. Post Oak.
733. Bur Oak.
734. Swamp White-Oak.
735. Yellow Chestnut-Oak.
736. Dwarf Chestnut-Oak.
737. Laurel or Shingle Oak.
738. Black-Jack or Barren Oak.
739. Scarlet Oak.
740. Yellow-barked Oak.
741. Red Oak.
742. Pin Oak.

Hazel-nut. Filbert.

743. Wild Hazel-nut.

Hop-Hornbeam. Iron-wood.

744. American H.

Hornbeam. Iron-wood.

745. Blue or Water Beech.

BIRCH FAMILY.**Birch.**

746. Paper or Canoe Birch.
747. River or Red B.

Alder.

748. Speckled Alder.

WILLOW FAMILY.**Willow. Osier.**

749. Dwarf Gray Willow.
750. Prairie W.
751. Glaucous W.
752. Petioled W.
753. Heart-leaved W.
754. Livid W.
755. Black W.
756. Almond-leaved W.
757. Long-leaved W.

*Fide Dr. Vasey, vol. ii, Am. Ent. & Bot.

Populus

758. tremuloides, Michx.
759. grandidentata, Michx.
760. monilifera, Ait.

CONIFERÆ.**Pinus**

761. Strobis, L.

Juniperus

762. communis, L.
763. Virginiana, L.

Taxus

764. baccata, L., var. Canadensis, Gray.

ARACEÆ.**Arisæma**

765. triphyllum, Torr.
766. Dracontium, Schott.

Symplocarpus

767. foetidus, Salisb.

Acorus

768. Calamus, L.

LEMNACEÆ.**Lemna**

769. trisulca, L.
770. minor, L.
771. polyrrhiza, L.

TYPHACEÆ.**Typha**

772. latifolia, L.

Sparganium

773. eurycarpum, Engelm.
774. simplex, Hudson, var. Nuttallii, Engelm.
775. androcladum, Engelm.*

NAIADACEÆ.**Najas**

776. flexilis, Rostk.

Zannichellia

777. palustris, L.

Potamogeton

778. lonchites, Tucker.
779. amplifolius, Tucker.
780. gramineus, L.†
781. prælongus, Wulfen.
782. perfoliatus, L.
783. pauciflorus, Pursh.
784. pectinatus, L.

Poplar. Aspen.

758. American Aspen.
759. Large-toothed A.
760. Cotton-wood.

PINE FAMILY.**Pin.**

761. White P.

Juniper.

762. Common J.
763. Red Cedar or Savin.

Yew

764. Ground Hemlock.

ARUM FAMILY.**Indian Turnip. Dragon-Arum.**

765. Indian Turnip.
766. Green Dragon.

Skunk Cabbage.

767. Skunk C.

Sweet Flag. Calamus.

768. Sweet F.

DUCKWEED FAMILY.**Duckweed. Duck's-meat.**

769. Duckweed.
770. "
771. "

CAT-TAIL FAMILY.**Cat-tail Flag.**

772. Common Cat-tail.

Bur-reed.

773. Bur-reed.
774. "

775. "

PONDWEED FAMILY.**Naiad.**

776. Naiad.

Horned Pondweed.

777. Horned P.

Pondweed.

778. Pondweed.
779. "
780. "
781. "
782. "
783. "
784. "

*Davenport.

†Lee County.

ALISMACEÆ.**Allisma**

785. *Plantago*, L., var. *Americanum*, Gray.

Echinodorus

786. *parvulus*, Engelm.

Sagittaria

787. *variabilis*, Engelm.
788. *graminea*, Michx.

HYDROCHARIDACEÆ.**Anacharis**

789. *Canadensis*, Planchon.

Vallisneria

790. *spiralis*, L.

ORCHIDACEÆ.**Orchis**

791. *spectabilis*, L.

Habenaria

792. *viridis*, R. Br., var. *bracteata*, Reich.
793. *leucophæa*, Gray.

Spiranthes

794. *cernua*, Richard.

Pogonia

795. *pendula*, Lindl.

Calopogon

796. *pulchellus*, R. Br.

Liparis

797. *liliifolia*, Richard.

Aplectrum

798. *hyemale*, Nutt.

Cypripedium

799. *candidum*, Muhl.
800. *pubescens*, Willd.
801. *spectabile*, Swartz.

AMARYLLIDACEÆ.**Hypoxys**

802. *erecta*, L.

IRIDACEÆ.**Iris**

803. *versicolor*, L.

Sisyrinchium

804. *Bermudiana*, L., var. *anceps*, Gray.
805. var. *mucronatum*, Gray.
806. var. *albidum*, Gray.

DIOSCOREACEÆ.**Dioscorea**

807. *villosa*, L.

WATER-PLANTAIN FAMILY.**Water-Plantain.**

785. *Water-P.*

Echinodorus.

786. ———

Arrow-head.

787. *Common A.*
788. *Arrow-head.*

FROG'S-BIT FAMILY.**Water-weed.**

789. *Water-weed.*

Tape-grass. Eel-grass.

790. *Eel-grass.*

ORCHIS FAMILY.**Orchis.**

791. *Showy O.*

Rein-Orchis.

792. *Rein-O.*

793. “

Ladies' Tresses.

794. *Ladies' T.*

Pogonia.

795. *Pogonia.*

Calopogon.

796. *Calopogon.*

Twayblade.

797. *Twayblade.*

Putty-root. Adam-and-Eve.

798. *Putty-root.*

Lady's-Slipper.

799. *Small White L.*
800. *Large Yellow L.*
801. *Showy L.*

AMARYLLIS FAMILY.**Star-grass.**

802. *Star-grass.*

IRIS FAMILY.**Flower-de-Luce.**

803. *Common Blue Flag.*

Blue-eyed Grass.

804. *Blue-eyed G.*

805. “

806. “

YAM FAMILY.**Yam.**

807. *Wild Yam-root.*

SMILACEÆ.**Smilax**

808. *hispida*, Muhl.
 809. *herbacea*, L., var. *pulverulenta*, Gray.

LILIACEÆ.**Trillium**

810. *sessile*, L.
 811. *recurvatum*, Beck.
 812. *erectum*, L., var. *album*, Pursh.
 813. var. *declinatum*, Gray.
 814. *cernuum*, L.
 815. *nivale*, Riddell.

Melanthium

816. *Virginicum*, L.

Zygadenus

817. *glaucus*, Nutt.

Uvularia

818. *grandiflora*, Smith.

Smilacina

819. *racemosa*, Desf.
 820. *stellata*, Desf.
 821. *bifolia*, Ker., var. *Canadensis*, Gray.

Polygonatum

822. *biflorum*, Ell.
 823. *giganteum*, Dietrich.

Lilium

824. *Philadelphicum*, L.
 825. *Canadense*, L.
 826. *superbum*, L.

Erythronium

827. *albidum*, Nutt.

Scilla

828. *Fraseri*, Gray.

Allium

829. *tricoccum*, Ait.
 830. *Canadense*, Kalm.
 831. *striatum*, Jacq.

Yucca

832. *angustifolia*, Pursh. (*See App.*)

JUNCACEÆ.**Luzula**

833. *campestris*, DC.*

Juncus

834. *effusus*, L.
 835. *tenuis*, Willd.

SMILAX FAMILY.**Greenbrier. Catbrier.**

808. Greenbrier.
 809. Carrion-Flower.

LILY FAMILY.**Three-leaved Nightshade.**

810. *Trillium*.
 811. "
 812. "

813. "

814. Wake-Robin.
 815. Dwarf White Trillium.

Melanthium.

816. Bunch-flower.

Zygadene.

817. *Zygadene*.

Bellwort.

818. Bellwort.

False Solomon's Seal.

819. False Spikenard.
 820. False Solomon's S.
 821. " "

Solomon's Seal.

822. Smaller Solomon's Seal.
 823. Great S.

Lily.

824. Wild Orange-red Lily.
 825. Wild Yellow L.
 826. Turk's-cap L.

Dog's-tooth Violet.

827. White Dog's-tooth V.

Squill.

828. Wild Hyacinth. Quamash.

Onion. Garlic.

829. Wild Leek.
 830. Wild Garlic.
 831. " "

Bear-Grass. Spanish Bayonet.

832. Spanish B

RUSH FAMILY.**Wood-Rush.**

833. Wood-Rush.

Rush. Bog-Rush.

834. Common or Soft R.
 835. Bog-Rush.

*Lee County.

836. acuminatus, Michx.
 837. nodosus, L.
 838. var. megacephalus, Torr.
 839. Canadensis, J. Gay.

PONTEDERIACEÆ.**Pontederia**

840. cordata, L.

Schollera

841. graminea, Willd.

COMMELYNACEÆ.**Tradescantia**

842. Virginica, L.

CYPERACEÆ.**Cyperus**

843. diandrus, Torr., var. castaneus, Torr.
 844. phymatodes, Muhl.
 845. strigosus, L.
 846. Michauxianus, Schultes.
 847. Engelmanni, Steud.
 848. Schweinitzii, Torr.
 849. filiculmis, Vahl.

Dulichium

850. spathaceum, Pers.

Eleocharis

851. palustris, R. Br.
 852. compressa, Sulliv.
 853. intermedia, Schultes.
 854. acicularis, R. Br.

Scirpus

855. validus, Vahl.
 856. atrovirens, Muhl.
 857. Eriophorum, Michx.

Eriophorum

858. polystachyon, L.

Scleria

859. triglomerata, Michx.

Carex

860. bromoides, Schk.
 861. disticha, Huds.
 862. vulpinoidea, Michx.
 863. stipata, Muhl.
 864. sparganioides, Muhl.
 865. cephaloidea, Boott.
 866. cephalophora, Muhl.
 867. rosea, Schk.
 868. sterilis, Willd.
 869. stellulata, L., var. scirpoides, Gray.
 870. arida, Schw. & Torr.*
 871. scoparia, Schk.
 872. var. minor, Boott.

836. Bog-Rush.

837. "

838. "

839. "

PICKEREL-WEED FAMILY.**Pickereel-weed.**

840. Pickerel-weed.

Water Star-grass.

841. Water S.

SPIDERWORT FAMILY.**Spiderwort.**

842. Common S.

SEDGE FAMILY.**Galingale.**

843. Galingale.

844. "

845. "

846. "

847. "

848. "

849. "

Dulichium.

850. Dulichium.

Spike-Rush.

851. Spike-R.

852. "

853. "

854. "

Bulrush or Club-Rush.

855. Great Bulrush.

856. Bulrush.

857. Wool-Grass.

Cotton-Grass.

858. Cotton-G.

Nut-Rush.

859. Nut-R.

Sedge.

860. Sedge.

861. "

862. "

863. "

864. "

865. "

866. "

867. "

868. "

869. "

870. "

871. "

872. "

*Dubuque.

873. lagopodioides, Schk.	873. Sedge.
874. cristata, Schw.	874. "
875. var. mirabilis, Boott.	875. "
876. adusta, Boott.	876. "
877. feneae, (?) Willd.	877. "
878. var. (?) ferruginea, Boott.	878. "
879. straminea, Schk., var. typica, Boott.	879. "
880. var. hyalina, Boott.	880. "
881. var. Meadii, Boott.	881. "
882. aperta, Boott.	882. "
883. stricta, Lam.	883. "
884. Buxbaumii, Wahl.	884. "
885. Meadii, Dew.	885. "
886. grisea, Wahl.	886. "
887. Davisii, Schw. & Torr.	887. "
888. plantaginea, Lam.*	888. "
889. laxiflora, Lam., var. blanda, Boott.	889. "
890. var. latifolia, Boott.	890. "
891. eburnea, Boott.	891. "
892. Pennsylvanica, Lam.	892. "
893. lanuginosa, Michx.	893. "
894. hystericina, Willd.	894. "
895. intumescens, Rudge.	895. "
896. lupulina, Muhl.	896. "
897. folliculata, L.	897. "
898. longirostris, Torr.	898. "

GRAMINEÆ.

Leersia

899. Virginica, Willd.
900. oryzoides, Swartz.

Zizania

901. aquatica, L.

Alopecurus

902. aristulatus, Michx.

Phleum

903. pratense, L.

Vilfa

904. vaginæflora, Torr.
905. cuspidata, Torr.

Sporobolus

906. heterolepis, Gray.
907. cryptandrus, Gray.

Agrostis

908. perennans, Tuckerm.
909. scabra, Willd.
910. vulgaris, With.
911. alba, L.

Cinna

912. arundinacea, L.

GRASS FAMILY.

White Grass.

899. White G.
900. Rice Cut-grass.

Water or Indian Rice.

901. Indian Rice. Water Oats.

Foxtail Grass.

902. Wild Foxtail.

Cat's-tail Grass.

903. Timothy. Herd's-Grass.

Rush-Grass.

904. Rush-G.
905. "

Drop-seed Grass.

906. Drop-seed G.
907. "

Bent-Grass.

908. Thin-Grass.
909. Hair-G.
910. Red-top.
911. Fiorin or White Bent-G.

Wood Reed-grass.

912. Wood R.

*Lee County.

Muhlenbergia

913. *sobolifera*, Trin.
 914. *glomerata*, Trin.
 915. *Mexicana*, Trin.
 916. *sylvatica*, Torr. & Gr.
 917. *Willdenovii*, Trin.
 918. *diffusa*, Schreber.

Brachelytrum

919. *aristatum*, Beauv.

Calamagrostis

920. *Canadensis*, Beauv.
 921. *longifolia*, Hook.

Oryzopsis

922. *melanocarpa*, Muhl.

Stipa

923. *spartea*, Trin.

Aristida

924. *gracilis*, Ell.

Spartina

925. *cynosuroides*, Willd.

Bouteloua

926. *hirsuta*, Lagasca.
 927. *curtipendula*, Gray.

Diarrhena

928. *Americana*, Beauv.

Dactylis

929. *glomerata*, L.

Koeleria

930. *cristata*, Pers.

Eatonia

931. *obtusata*, Gray.

Melica

932. *mutica*, Walt., var. *glabra*,
 Gray.
 933. var. *diffusa*, Gray.

Glyceria

934. *nervata*, Trin.

Poa

935. *compressa*, L.
 936. *serotina*, Ehrh.
 937. *pratensis*, L.

Eragrostis

938. *reptans*, Nees.
 939. *poaeoides*, Beauv.
 940. var. *megastachya*, Gray.
 941. *pilosa*, Beauv.
 942. *Frankii*, Meyer.

Festuca

943. *tenella*, Willd.
 944. *nutans*, Willd.

Drop-seed Grass.

913. Drop-seed G.
 914. "
 915. "
 916. "
 917. "
 918. "

Brachelytrum.

919. ———

Reed Bent-Grass.

920. Blue Joint-G.
 921. " "

Mountain Rice.

922. Mountain Rice.

Feather-Grass.

923. Porcupine Grass.

Triple-awned Grass.

924. Triple-awned Grass.

Cord or Marsh Grass.

925. Fresh-water Cord-G.

Muskit-Grass.

926. Muskit-G.
 927. "

Diarrhena.

928. Diarrhena.

Orchard Grass.

929. Orchard G.

Koeleria.

930. Koeleria.

Eatonia.

931. Eatonia.

Melic-Grass.

932. Melic-G.

933. "

Manna-Grass.

934. Fowl Meadow-G., in part.

Meadow-grass. Spear-Grass.

935. Wire-Grass.
 936. False Red-top.
 937. Kentucky Blue-Grass.

Eragrostis.

938. Eragrostis.
 939. "
 940. "
 941. "
 942. "

Fescue-Grass.

943. Fescue-G.
 944. "

Bromus

945. *secalinus*, L.
 946. *racemosus*, L.
 947. *Kalmii*, Gray.
 948. *ciliatus*, L.
 949. var. *purgans*, Gray.

Phragmites

950. *communis*, Trin.

Lolium

951. *temulentum*, L.

Triticum

952. *repens*, L.

Hordeum

953. *jubatum*, L.

Elymus

954. *Virginicus*, L.
 955. *Canadensis*, L.
 956. var. *glaucifolius*, Gray.
 957. *striatus*, Willd.

Gymnostichum

958. *Hystrix*, Schreber.

Hierochloa

959. *borealis*, Roem. & Schul.

Phalaris

960. *arundinacea*, L.

Paspalum

961. *laeve*, Michx.

Panicum

962. *glabrum*, Gaudin.
 963. *sanguinale*, L.
 964. *agrostoides*, Spreng.
 965. *proliferum*, Lam.
 966. *capillare*, L.
 967. *virgatum*, L.
 968. *latifolium*, L.
 969. *xanthophysum*, Gray.
 970. *pauciflorum*, Ell.
 971. *dichotomum*, L.
 972. var. *sphaerocarpon*, L.
 973. *Crus-galli*, L.

Setaria

974. *glauca*, Beauv.
 975. *viridis*, Beauv.

Cenchrus

976. *tribuloides*, L.

Andropogon

977. *furcatus*, Muhl.
 978. *scoparius*, Michx.

Sorghum

979. *nutans*, Gray.

Brome-Grass.

945. Cheat or Chess.
 946. Upright Chess.
 947. Wild C.
 948. Brome-Grass.
 949. "

Reed.

950. Common R.

Darnel.

951. Bearded D.

Wheat.

952. Couch-, or Quick-Grass.

Barley.

953. Squirrel-tail Grass.

Lyme-Grass. Wild Rye.

954. Wild Rye.
 955. " "
 956. " "
 957. " "

Bottle-brush Grass.

958. Bottle-brush G.

Holy Grass.

959. Vanilla or Seneca G.

Canary-Grass.

960. Reed Canary-G.

Paspalum.

961. Paspalum.

Panic-Grass.

962. Panic-G.
 963. Common Crab or Finger-G.
 964. Panic-G.
 965. "
 966. Old-witch Grass.
 967. Panic-G.
 968. "
 969. "
 970. "
 971. "
 972. "
 973. Barnyard-Grass.

Bristly Foxtail Grass.

974. Foxtail.
 975. Green Foxtail. Bottle-G.

Hedgehog- or Bur-Grass.

976. Bur-G.

Beard-Grass.

977. Beard-G.
 978. "

Broom Corn.

979. Indian Grass. Wood-Grass.

APPENDIX.

17. *RANUNCULUS AQUATILIS*, L., var. *STAGNATILIS*, DC. (*R. divaricatus*, of Gray's Manual.)

"Frequent forms occur connecting this with the variety *trichophyllus*. It can hardly be *R. divaricatus*, Schrank, as European and Asiatic specimens of that species show a well-defined lamina to the segments of the leaves, while in American specimens they are always filiform." *Watson's Rep. in King's Exp.*

CLEOME, L.

Sepals distinct or somewhat united. Stamens 6 or rarely 4. Torus minute. Pod linear or oblong, subsessile or stipitate.—Annual herbs or shrubs with digitate or simple leaves and racemed or solitary flowers. *Benth. & Hook.*

83. *C. INTEGRIFOLIA*, Torr. & Gr.—Annual, somewhat glaucous, 2⁰–3⁰ high, widely branching; leaves 3-foliolate; leaflets lanceolate, (the lower-most oblong) entire, submucronate; racemes sometimes nearly 1⁰ long; flowers large, showy, reddish purple, rarely white; sepals united to the middle, persistent, segments triangular-acuminate; petals with very short claws; stamens equal; pods oblong-linear, compressed, much longer than the stipe. *Flor. Col., Port. & Coul.*

91. *VIOLA CANADENSIS*, L.—As yet found only at Decorah. Our plant varies from the typical one in having much smaller pink flowers, whose lateral petals are not bearded; as well as in general aspect, which is decidedly like *V. pubescens*.

124. *PORTULACA RETUSA*, Engel.—Like *P. oleracea*, but greener, and the stem more ascending, sometimes covering a space several feet in diameter; leaves usually smaller than the common species; sepals obtuse, broadly carinate winged; petals yellow; stigmas 3 or 4; capsule 2½"–3" long, broader in proportion; seeds more strongly tuberculate than in *P. oleracea*. *Flor. Cal.*

131. *CALLIRHOE INVOLUCRATA*, Gray.—Hirsute; stem branching, procumbent; leaves deeply 3–5-parted, covered with stellate hairs, segments linear-lanceolate, laciniately 3–5-toothed; peduncles erect, 1-flowered, longer than the leaves; flowers few in a loose panicle, about 1½' in diameter, axillary, scarlet; bracteoles 3, linear-lanceolate, ¾ the length of the deeply-parted calyx; carpels numerous, hairy, not wrinkled. *Flor. Col., Port. & Coul.*

155. *VITIS CORDIFOLIA*, Michx.—Tall (or more rarely low) climbing high, trunks not rarely 6'-9' in diameter; leaves middle-sized or small ($2\frac{1}{2}$ '-3' or 4' in diameter), heart-shaped, mostly entire or very slightly tri-lobed on the edges, with broad, shallow teeth, usually smooth and shining, more on the upper than on the lower side, the young ones sometimes, and very rarely the old ones, with short hair on the ribs below; berries small, in large, mostly loose bunches, black, without a bloom, maturing late in the fall, usually only with a single short and thick seed, marked by a prominent raphe.—This grows more especially in fertile soil, and is common in river and creek bottoms. *Engelm. in 6th An. Rep. Insects Mo.*

156. *VITIS RIPARIA*, Michx., (*V. cordifolia*, Michx., var. *riparia*, Gray.)—Mostly a smaller plant than the last, but with larger (3' 5' in diameter) and more or less incisely 3-lobed, glabrous, shining (or rarely when young, slightly hairy) leaves, the lobes long and pointed, the teeth also more pointed than in *V. cordifolia*; berries usually larger than in the last, mostly with a bloom, in smaller and often more compact bunches, commonly 1-2-seeded; seeds with a less prominent raphe.—This species prefers thickets or rocky soil on river banks, the northern form has fewer and larger berries in a bunch, and is easily distinguished from *V. cordifolia*. The fruit ripens earlier than the former and is pleasanter. *Engelm. in Insects Mo.*

189. *DALEA LAXIFLORA*, Pursh.—Glabrous, 3^o-4^o high, erect, branched above; branches slender and spreading; leaflets 4-5 pairs, linear-oblong, 2''-3'' long, $\frac{1}{2}$ '' wide, strongly dotted; spikes panicle, few-flowered; flowers distant; bracts very broad, almost orbicular, glandular, coriaceous, glabrous, slightly cuspidate, embracing the flower; calyx deeply cleft, teeth long, setaceous, beautifully plumose; corolla white, keel twice as long as the wings, vexillum cordate, very small, sometimes with 4 approximated glands near the middle. *Flor. Col., Port. & Coul.*

241. *POTENTILLA RIVALIS*, Nutt.—More slender than *P. Norvegica*, branched, villous or nearly glabrous; stipules lanceolate to ovate, entire or toothed; leaves pinnate, with two pairs of closely approximate leaflets, or a single pair and the terminal leaflet three-parted, the upper leaves ternate; leaflets ovate or oblong-cuneate or lanceolate, 1'-2' long, more or less incised-serrate; cymes loose, less leafy, with slender pedicels; bractlets and sepals equal, $1\frac{1}{2}$ ''-3'' long; petals minute; stamens 10-20; achenia usually smooth; receptacle short.—From the Missouri river to New Mexico. Not yet found within our limits.

VAR. *PENTANDRA*, Watson.—Leaves ternate, the lateral leaflets of the lower leaves parted nearly to the base; stamens five, opposite to the sepals. (*P. pentandra*, Engelm.)—Found only at Humboldt, Humboldt County. *Watson's Rev. in Proc. Am. Acad. VIII.*

277. *GAURA COCCINEA*, Nutt.—Canescent, puberulent or glabrate; stems suffruticose and fastigiately branched from the base, 6'-12' high, very leafy, ascending; leaves lanceolate, linear-oblong or linear, repand-denticulate or entire, 6''-12'' long, closely sessile; flowers in simple spikes terminating the leafy branches, rose-color, turning to scarlet; bracts linear, rather persistent, longer than the ovaries; calyx-segments linear-oblong, shorter than the narrow infundibuliform tube, as long as the roundish, unguiculate petals; fruit elliptical, sessile, short, terete, 4-sided above. *Flor. Col., Port. & Coul.*

297. *PEUCE DANUM* (?) *NUDICAULE*, Nutt.—Caulescent or sometimes scarcely so, minutely pruinose-pubescent, 3'-15' high; leafy only at base; leaves bipinnate or ternate-bipinnate, the segments in-

cisely lobed with usually rather broad and subacute divisions; umbel somewhat capitate in flower, with 8-12 rays; involucre none; involucrels unilateral, of 6-10 membranously margined, more or less united bracts; petals white, with attenuated apex and quasi-obcordate; calyx-teeth short; fruit pubescent, broadly oval, 3"-4" long and 3" broad, the thickish wing more than half as wide as the seed; vittæ 3 in the intervals, 6 upon the commissure, conspicuous; seed flattened. March-June. *Watson's Rep. in King's Exp. of 40th Par.*

"As observed by Dr. Gray, the plant does not accord with Nuttall's description, nor in all respects with the characters of the genus."

ADOXA, L.

A genus belonging to the order Caprifoliaceæ, and composed of but a single species, widely distributed throughout the cooler parts of the globe. It is characterized as follows in Flor. N. A.:

Flowers perfect. Tube of the calyx coherent with the lower part of the ovary, the limb slightly 2-3 cleft. Petals 4-5, inserted on the limb of the calyx, united at the base, spreading. Stamens 4-5, each filament 2-parted; the divisions bearing each a single-celled petalate anther. Styles 4-5, subulate. Fruit an herbaceous and juicy berry, 4-5 celled; each cell with a single suspended seed. Seeds compressed, with a membranaceous margin.

326. *A. MOSCHATELLINA*, L.—A small perennial herb, with the odor of musk; root tuberous; radical leaves twice ternately compound, on long petioles, the cauline solitary, 1-2 ternate or incised; flowers 4-6 (greenish) in a terminal capitulum, the lateral ones mostly pentamerous, the terminal tetramerous.

349. *LIATRIS PUNCTATA*, Hook. — Stems 8'-3' high, from a thick, knotted fusiform root, glabrate, leafy to the top; leaves linear, rigid, strongly punctate on both sides, glabrous or their margins sometimes ciliate, lower ones 3'-5' long, slightly 3-nerved, 1"-3" wide, pungently acute; heads in a dense spike, 4'-10' long, 4-6 flowered; flowers reddish-purple; scales of the cylindraceous involucre oblong, strongly punctate, imbricated, appressed, with mucronate, acuminate, rather spreading tips, margins woolly-ciliate; bristles of the pappus about 30, purplish or white, very plumose; achenia hairy. *Flor. Col., Port. & Coul.*

APLOPAPPUS, Cass.

Heads few-many-flowered; ray-flowers 3-many, pistillate, fertile; those of the disk tubular, perfect, generally fertile. Involucre cylindrical, turbinate, campanulate, or hemispherical, the scales imbricated in few-several series, from linear-subulate varying to broadly oval. Receptacle flat, alveolate. Corolla of the disk funnel-shaped, or slightly dilated upward, 5-toothed. Style of the disk flowers with the branches flattened, the subulate hispid appendages much longer than the stigmatic portion. Achenia oblong or linear, mostly terete or turbinate. Pappus simple, white or brownish, of copious, mostly unequal bristles.—Perennial herbs or suffruticose plants, with entire or pinnately-toothed or serrate leaves; flowers always yellow. Natives of Western North America and parts of South America.

400. *A. SPINULOSUS*, DC.—Herbaceous, caescent with a soft, minute, woolly pubescence; stems many, 1'-2' high, corymbosely branched above; leaves small, 9"-12" long, rigid, pinnately or somewhat bi-pinnately parted, segments short, linear-subulate, mucronate with a short bristle; heads small, subglobose, terminating the numerous branchlets; involucre shorter than the disk, scales subulate-lanceolate, mucronulate, imbricated in 3-4 series, appressed, caescent; rays 20-30; corolla of the disk with very short teeth;

pappus pale or tawny, short, very unequal; achenia turbinate, villous. *Flor. Col., Port. & Coul.*

GRINDELIA, Willd.

Heads many-flowered; the ray flowers generally present, pistillate, the ligule elongated; disk-flowers perfect, the corolla tubular-funnel-shaped, 5-toothed. Involucre subglobose or hemispherical, the scales imbricated in many rows. Receptacle naked, flat, foveolate. Style with lanceolate, hispid appendages as long as the stigmatic portion. Achenium smooth, oblong, or ovate, somewhat angled. Pappus of 2-8 smooth, rigid, deciduous awns, shorter than the disk-corollas.—Biennial (?) perennial or suffruticose, often resiniferous, Mexican and North American plants.

401. *G. SQUARROSA*, Dunal.—Glabrous and viscidly resinous; stems herbaceous from a perennial caudex, 1⁰-2⁰ high, corymbosely branched above; leaves somewhat rigid, glaucous and punctate, radical ones spatulate-lanceolate, narrowed into a petiole, dentate or incised, cauline mostly oblong, sessile and partly clasping, rather obtuse, finely toothed or spinulose-serrate; heads numerous, subglobose, 6'' broad; the scales very rigid, close-appressed, but with very long reflexed, squarrose, subulate points, resinous; rays numerous, rather narrow; pappus of 2-4 very rigid, deciduous bristles or awns. *Flor. Col., Port. & Coul.*

CYCLACHÆNA, Fres.

Fertile and sterile flowers in the same head; the former 5, in the axils of the inner scales of the involucre, with no corolla or a mere rudiment; the latter 10-15, with an obconical 5-toothed corolla (nearly destitute of proper tube); the central ones abortive. Scales of the flattish hemispherical involucre usually 10, in 2 series; the exterior 5, ovate, somewhat acuminate, thickish, herbaceous; the interior dilated-obovate, truncate, membranaceous, at length loosely wrapped around the achenia. Receptacle small, flat; the chaff linear-spatulate, usually wanting toward the center. Anthers slightly united, tipped with an inflexed mucronate appendage. Style of the fertile flowers deeply 2-cleft, linear, acutish; in the sterile flowers undivided, radiate-penicillate at the apex. Achenia obovate, obcompressed, somewhat turgid, not margined, glabrous, entirely destitute of pappus; the staminate flowers with no rudiments of ovaries.

408. *C. XANTHIFOLIA*, Fres.—A tall and coarse annual; the stem simple, and more or less branched at the summit; leaves opposite, ovate or sub-cordate, acuminate, doubly or unequally serrate, 3-nerved, hirsute-canescens or pubescent beneath, somewhat scabrous, on long petioles; heads small greenish, ebracteate, sessile and often glomerate, disposed in compound terminal and axillary spikes, forming a pyramidal panicle. *Flor. N. A.*

426. *HELIANTHUS LENTICULARIS*, Dougl.—Annual, scabrous or hispid, branching, stout, 3⁰-8⁰ high; leaves ovate, alternate, acuminate, coarsely-serrate, 3'-6' long, 2'-4' broad, 3-nerved at the base and suddenly narrowed into a petiole nearly as long as the leaf, uppermost often lanceolate and entire; heads mostly paniced, peduncled, 2'-4' broad; scales of the involucre ovate, ciliate, abruptly and conspicuously acuminate, in about 3 rows, spreading; rays 20-40, large; chaff of the flat receptacle nearly as long as the purplish disk-flowers, concave, carinate, tricuspidate, the middle point much the strongest and dark-colored; achenia finely appressed-pubescent; pappus of two lanceolate, chaffy awns. *Flor. Col., Port. & Coul.*

471. *CENTAUREA AMERICANA*, Nutt.—Stem erect, striate-grooved, sparingly branched, thickened under the heads; leaves sessile, gla-

brous, often scabrous, the lower oblong-ovate, repand-toothed, the upper lanceolate, acute; heads not bracteate; scales of the involucre all with pectinate appendages; rays elongated, the segments very long and slender. *Flor. N. A.*

Common in cultivation, and native in Southern U. S. Plant 2⁰-3⁰ high, with very large, showy heads. Flowers pale purple.

CNICUS, L.

(*CIRSIUM*, Tourn., of Gray's Manual.) This change is the result of a more exhaustive study of the genus and leaves the synonymy as given in the body of the Catalogue. It does not otherwise effect the species enumerated. See *Gray's Rev. of Thistles in Proc. Am. Ac. IX. & X.*

CREPIS, L.

Heads several-many-flowered; flowers all ligulate. Involucre usually calyculate with a few small bracteoles, the proper scales nearly equal, in a single series. Receptacle naked or slightly hairy. Achenia terete or somewhat compressed, 8-30 striate, usually narrower above or even tapering into a short beak, the apex expanded into a minute disk. Pappus pure white, copious, of denticulate or scabrous delicate capillary bristles, or sometimes of more rigid bristles slightly dilated toward the base.

489. *C. RUNCINATA*, Torr. & Gr. — Perennial, slightly hirsute, becoming smoother; radical leaves obovate or oblong-lanceolate, runcinate-lobed or only slightly toothed, tapering to the base, 2'-7' long; scape 1⁰-2⁰ high, branching, bearing a few linear, bract-like leaves; branches and involucre more or less hirsute with blackish, often glandular, hairs; involucre many-flowered, calyculate; scales linear-lanceolate, with scarious margins; achenia striate, slightly tapering upwards. *Flor. Col., Port. & Coul.*

493. *LACTUCA LUDOVICIANA*, DC. — Very smooth (3⁰-5⁰ high); leaves all runcinate, retrorsely and sharply toothed, the cauline partly clasping; panicle divaricate, the peduncles and involucre naked; pappus conspicuously stipitate; flowers yellow. *Flor. N. A.*

It is doubtful if this be distinct from *Mulgedium pulchellum*, Nutt.

570. *LYCOPUS RUBELLUS*, Mönch. — Nearly glabrous; stem weak, sub-erect (1⁰-2⁰ high), obtusely angled; leaves petioled, ovate-oblong or oblong-lanceolate, much acuminate at both ends; calyx teeth triangular awl-shaped, not rigid. (*L. Europæus*, L., var. *integrifolius*, Gray.) *Gray's Rev. Lyc., Proc. Am. Ac., 1870.*

571. *LYCOPUS LUCIDUS*, Turcz. Stem stout (2⁰-3⁰ high), erect, acute-angled at top; leaves lanceolate or oblong-lanceolate (2'-4' long), acute or acuminate, with large and very sharp serrations, the base obtuse, or occasionally acute, sessile; calyx teeth alternate, subulate.

VAR. *AMERICANUS*, Gray. — Leaves barely shining on both sides, often hairy pubescent; stem generally hairy; calyx teeth small and rigid. *Ibid.*

572. *LYCOPUS SINUATUS*, Ell. — Stem acutely 4-angled; leaves lanceolate or oblong, acute, irregularly incised and lacinate-pinnatifid, sinuate, dentate at the point, attenuate at the base, on moderately long petioles; calyx teeth triangular, subulate, short cuspidate; rudimentary stamen filiform, capitate, or clavate at the summit. (*L. Europæus*, L., var. *sinuatus*, Gray.) *Ibid.*

578. *SALVIA LANCEOLATA*, Willd. — Stem herbaceous, ascending and with the branches, glabrous; leaves petioled, lance-linear, obtuse or acuminate, base narrow; bracts lance-subulate, shorter than

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(M. 2)
Compt. of C. Bessey

Bessey

DEPARTMENT OF BOTANY AND HORTICULTURE.

Extracts from Report of 1879.

Began work March 11th; made hot-bed, and started early plants.

Cleared the ground designed for Garden purposes of rubbish, corn stalks, cane roots, etc. Then manured somewhat over two acres and a-half, putting on the whole about two hundred and twenty-five loads.

As soon as the ground became dry enough it was plowed. This, however, was not well done, being plowed altogether too shallow to withstand the drouth which soon came on. After plowing, the whole was laid out into nine blocks, one hundred and sixty by two hundred and seventy-two and a-fourth feet, separated by drives fifteen feet in width. One acre of this, on the east side, was turned over to Professor Mathews, for small fruits; and it was decided not to break up the south-east half acre of sod, so that in the Garden proper there are seven acres and a-half, exclusive of the space taken up by the drives.

The ordinary Garden crops were planted in their time. All suffered more or less from the excessive drouth of the spring and summer. There were raised in all one hundred and eighty varieties of vegetables, comprising plants of twenty-three different species.

A bed was prepared, and set with the Linnæus variety of Rhubarb. A large percentage of the plants were killed by the drouth. Such as lived are doing well, and will be ready for use next season.

In the fall a bed was begun for Asparagus, by heavily manuring, and then thoroughly plowing and subsoiling. It will be re-manured during the winter, and then subsoiled again in the spring, when it it will be ready for plants.

During the fall two hundred and sixty rods of tile draining were put down under the supervision of the Farm Superintendent, Mr.

Roberts. These drains, though not yet sufficient, will do much to better the land.

At the close of the season the crops were removed, (excepting parsnips and salsify,) and the ground manured, and then carefully plowed and subsoiled, and left in the rough for winter.

REPORT FOR 1871.

To the Board of Trustees of the Iowa Agricultural College:

GENTLEMEN: I herewith submit my annual report of the Department of Botany and Horticulture for the year 1871 :

For both out door and class-room work the year just closed has been pleasant as well as profitable. In the class-room the students under my charge have manifested a gratifying degree of interest in the study of Botany; and for the out-door operations I can say that as a general thing those working with me have done so with cheerfulness, taking a good degree of interest in their work, and performing their tasks in a satisfactory manner. In the results obtained the year has also been eminently successful. Most of the crops have done well, though the short periods of drouth in the summer, and the dry weather of the fall, somewhat decreased certain crops. The whole work has moved on with a uniformity not known last year, and all of the improvements begun have been successfully carried out.

PERMANENT IMPROVEMENTS.

Finished the drives on the north side of the garden, and made considerable improvement upon those already in use. These drives are now in quite good condition, but on account of their not being graveled, it will take a good deal of work annually to keep them in good repair, and free from weeds. Some labor was put upon a portion of the ground in preparing it for better cultivation next year, by not planting it, keeping it free from weeds, and constantly stirring it with the plow and cultivator. This portion now promises to fully

repay all the labor expended upon it, in the looser condition of the soil, and its greater freedom from weeds. As a whole the ground is now in much better condition for garden purposes than a year ago. The effect of the somewhat extensive system of under-drains laid last season, is beginning to show itself in the greater friability of the soil, which before draining was so tenacious as to make it exceedingly difficult to plow.

CROPS RAISED.

Although the main object of the garden is to serve as a means of illustration, we have raised upon it more than enough to supply the wants of the boarding-hall, farm house, and Professors' families. The following list embraces the more important crops raised for this purpose :

Beans,	Lettuce,	Radishes,
Beets,	Melons,	Salsify,
Cabbages,	Onions,	Squashes,
Carrots,	Parsnips,	Turnips,
Corn,	Peas,	Tomatoes.
Cucumber,	Potatoes.	

In the spring I procured and set out in the bed prepared last year, one thousand roots of Purple Giant Asparagus, also planted one hundred roots of Conover's Colossal. Both varieties did so well that I expect to crop quite heavily next spring. The Rhubarb bed made last year yielded a full supply for the boarding hall. Such plants as died out from the drouth of last year were very generously replaced by the firm of Mathews & Son, of Knoxville. Also prepared and set out a bed of Horseradish, which did well.

EXPERIMENTS.

Seventy-nine varieties of potatoes were planted with a view to determining which were least liable to suffer from the attacks of the potato beetle. The following is the list of those tried :

Black Mercer.	EARLY ROSE.
Great Western.	Early White Sprout.
Early York.	Shaker's Fancy.

Early Pinkeye.	Climax.
Chenango.	Harrison.
Patterson's Blue.	Early Shaw.
Calico.	Early Mohawk.
White Mountain.	Excelsior.
Union.	King of the Earlies (No. 4).
White Rock.	Bresee's Prolific (No. 2).
Kearsearge.	Peerless (No. 6).
Extra Early White.	Garnet Chili.
Early Wendall,	Chili No. 2.
Rough & Ready.	White Chili.
<i>Early London.</i>	PEACHBLOW.
Irish Cup.	WHITE-EYED PEACHBLOW.
Gleason.	WHITE PEACHBLOW.
Scotch Blue.	White Apple.
Chenery.	Vanderveer's Seedling.
Colbrook Seedling.	Six Weeks.
Cuzco.	Jackson White.
Russet No. 1.	Merino.
Snowball.	Ohio Russet.
Late Pinkeye.	Prince Albert.
Shaker Russet.	<i>Black Kidney.</i>
Shaker Russet No. 2.	Pennsylvania Searchwarrant.
British Queen.	Andes.
Mountain Sprout.	Orono.
Lapstone Kidney.	Strawberry.
Early Don.	Sebec.
Mercer.	Scotch Russet.
Coppermine.	Early Buckeye.
Seedling Rock.	Callao.
Early Stevens.	Early Goodrich.
Early Sovereign.	Lady Finger.
Dover Seedling.	Western Red.
Prince of Wales.	Farfarshire Red.
Noblow.	Early Handsworth.
Napoleon.	Bulkley's Seedling.
Dykeman.	

Those in Italics were entirely destroyed by the beetle ; while the Peachblow and Chili varieties stood their attacks without suffering much. Climax also showed a good deal of freedom from injury in this respect. For an early potato, Early Rose suffered as little as any in the whole lot, while the much vaunted King of the Earlies was almost annihilated. We never need expect to find a beetle-proof variety of potato, but by planting those most nearly so, we shall at any rate prevent the beetles increasing as rapidly as they would otherwise have done. All things considered, the Early Rose is perhaps the best early potato for general culture ; while the Peachblows will generally prove the most satisfactory for late plantings.

White Apple is, to all appearance but a sub-variety of the Peachblows, so that I have classed it with them.

TOMATOES.

About thirty varieties of tomatoes were tried, the most important of which are the following:

Extra Early Red.—Early and very prolific, but badly curved, and wrinkled.

Trophy.—Large, heavy, smooth, and reasonably early. Worthy of general introduction.

General Grant.—Good.

Tilden's New.—Very good.

Fejee.—Large and heavy, but too late.

Yellow Fig, *Yellow Cherry*, and *Red Cherry*.—Small and smooth; valuable for preserving.

CABBAGE.

Planted about twenty varieties, native and foreign.

Early York and *Early Wakefield* for early varieties, *Winnigstadt* for second early, and *Marblehead Mammoth* and *Stone Mason* for late use, are worthy of general cultivation. Among the recently introduced foreign varieties, *McEwan's Early* seems worthy of further attention.

BEETS.

Of the fourteen varieties planted, none seemed better for table use

than the *Philadelphia Early Turnip Beet*, which is medium sized, round, smooth, and of a fine dark red color.

Bassano, and *Early Blood Turnip* are too well known to need recommendation here.

CORN.

Tried several varieties of sweet corn, which were sent out by the Department of Agriculture at Washington, D. C.

Asylum Sweet, resembles somewhat the old standard sort, *Stowell's Evergreen*, but its ears are larger and fewer rowed.

Narragansett Sweet is perhaps worthy of some attention. It is of a low and slender habit, producing its small but exceedingly sweet ears very early in the season. Where earliness is important this will probably be a very desirable variety.

INSECTS.

As Iowa has no State Entomologist, it may not be out of place to name a few of the worst insects found on the garden.

On Beans. Last season (1870) during the excessive drouth, beans were attacked by the red spider (*Trombidium telarium*, Herm,) which caused the crop to prove almost an entire failure. This pest is a little mite, not more than one fiftieth of an inch in length, living on the under surface of the leaves. Fortunately its habits prevent its becoming injurious in seasons when there is much rain, as it can not stand the wet. Remedy: copious watering with cold water.

On Cabbage. The little black flea-beetle (*Haltica striolata*, Illiger,) is often destructive to young cabbages, turnips and allied plants. Ashes sprinkled on the plants when moist, will help the matter.

Cut worms (*Agrotis*—perhaps several species,) did some damage the past season. In order to get rid of these, every particle of rubbish should be taken off of the ground in the fall, and the whole then plowed so as to expose it to all the freezing and thawing possible.

The Cabbage Moth (*Plutella cruciferarum*, Zeller,) was very destructive here in 1870, and did some damage this year. The larvæ of this moth is a little green worm about half an inch in length; it

lives on the under side of the leaves, and eats multitudes of holes into them. I know of no remedy.

The larger cabbage worm, which is the larvæ of the common white butterfly, (*Pieris Protodice*, Boisd.) is about one inch in length, greenish, marked with longitudinal yellow stripes. This season it was found in some abundance in the garden, boring into the heads of cabbage; and when it was allowed to have its own way it utterly destroyed the head. Hand picking the "worms" will do much to prevent their ravages. The butterflies can also be easily caught in hand-nets and killed, as they are not rapid in flight.

The cabbage plant louse (*Aphis brassicæ*, L.) was very abundant during the past season, and proved quite injurious to cabbage, cauliflower, kale &c. I know of no effectual remedy.

On Corn. This season a neighbor called my attention to a worm which was boring into his corn. Upon examination I found it to be the corn worm (*Heliothis armigera*, Hubner,) which seems to be advancing upon us from the south, where it feeds upon the cotton bolls, and is accordingly called the Boll Worm.

The perfect insect is a night flying moth, with a spread of wing of an inch and a half or more, while the worm or larva is in size and appearance very much like a fat cut-worm. Hand picking, though laborious, seems to be the most effectual remedy yet discovered.

On Cucumber, Squash, &c.—The two worst enemies of these plants, during the last two years, were the twelve spotted cucumber beetle, (*Diabrotica 12-punctata*, Fabr.) and the striped squash beetle, (*Diabrotica vittata*, Fabr.) both of which are yellow above, with black markings, the former with twelve black dots on the back, the latter with three longitudinal black lines. A mixture of one part of Paris green to ten or twelve of flour, proved a very efficient remedy this season.

On Potatoes.—The Colorado potato beetle (*Doryphora decemlineata*, Say.) seems to be slowly giving way before its numerous enemies. For a considerable time last spring the "Lady Bugs," (*Coccinella* and *Hippodamia*) ate up the eggs of the beetle as fast as laid, and I am certain that on the garden, at least, these friends of ours reduced the crop of beetles fully one-half. I was gratified at finding another active enemy of the beetle, the Soldier Bug, busily at work during the summer, killing the young larvæ.

Entomologists now count up about a dozen quite important insects engaged in this good work of exterminating the potato beetle, so that we may with considerable certainty predict that we have passed the worst, and that the future, with of course some fluctuations, will show an annual decrease in the amount of injury done the potato crop by this pest.

Aside from these natural checks, hand picking and the application of Paris green, are the most universally adopted means for their eradication. Of the two, the former is perhaps the best, all things considered.

A judicious selection of such varieties of potatoes as suffer least from their attacks, will also do much to shorten the stay of the beetle among us.

PREPARATIONS FOR NEXT YEAR.

At the close of the season the debris of crops was cleared off, such vegetables as were designed for use next spring were buried, and the ground plowed in part. The early setting in of cold weather prevented the completion of this work.

A quantity of peat was dug from the bed on the farm, and piled up for use in making compost during the winter and spring. By utilizing the material on hand, I do not see why we cannot manufacture from five hundred to a thousand loads of first-class fertilizer each year, which would be fully enough to meet all the demands of the garden.

NEEDS.

The most pressing want just now is for a Garden-house. This should contain an office, seed-room, tool-room, and vegetable-room, and under the whole there should be a good sized frost-proof cellar. As the fruit department also needs a cellar, and grafting room, a considerable expense might be saved by combining all into one larger building.

The supply of tools is not sufficient for all purposes. We should have a greater variety as well as a greater number, so that our students can become acquainted with the use of all kinds of garden implements.

I would also call your attention to the fact that we need a greenhouse and conservatory, for the propagation and preservation of flowering plants.

I have placed these needs in the order of their importance, and would respectfully urge that efforts be made for providing, at least the Garden-house before mentioned.

BOTANY.

The Sophomore and Junior classes pursued this subject as laid down in the course of study, both classes doing their work in a thorough and satisfactory manner. In the first mentioned class collections of plants were made amounting in the aggregate to upwards of two thousand specimens; these were neatly mounted in suitable books, correctly named, and preserved for further study next year.

During the past two years I have been endeavoring to make a full collection of the plants of this locality, but for want of time have not yet been able to do so. This season we added quite materially to the Herbarium both by exchange and purchase, and now have representatives of perhaps about twenty-five hundred species. There should be some provision made for an annual addition of at least a thousand species, which would in a few years give us a good sized and valuable collection.

I append below, a list of plants, as a contribution to the Flora of Iowa. The list is necessarily imperfect, in omitting many plants known to be native of Iowa, but which for lack of time to fully identify have been left out. In collecting the material for the list I have been greatly aided by Mr. J. C. Arthur, of the Junior class, and am under many obligations to Professor Carpenter, of Indianola, Professor McLain, of Fayette, and Professor Parker, late of Grinnell, (now of Amherst, Mass.,) for lists of plants found in their respective localities.

Rev. Isaiah Reid, of Nevada, also furnished me with a partial list of the plants collected by him several years ago in the vicinity of Burlington.

All of which is respectfully submitted.

CHAS. E. BESSEY.

CONTRIBUTIONS TO THE FLORA OF IOWA.

(Fourth Biennial Report of the Iowa Agricultural College, 1874.) C. G. Bessey

(Plants in *italic* are introduced, and in most cases are weeds.)

RANUNCULACEÆ.

Leather Flower.	<i>Clematis Viorna</i> , L.
Des Moines; Ames.
Virgin's Bower.	<i>Clematis Virginiana</i> , L.
Charles City; Ames; Fayette; Burlington.
Pasque Flower.	<i>Anemone patens</i> , L. var. <i>Nuttalliana</i> .
Charles City; Fayette.
Carolina Anemone.	<i>Anemone Caroliniana</i> , Walt.
Ames.
Many Cleft Anemone.	<i>Anemone multifida</i> , DC.
Burlington—rare.
Long Fruited Anemone.	<i>Anemone cylindrica</i> , Gray.
Charles City; Ames.
Pennsylvanian Anemone.	<i>Anemone Pennsylvanica</i> , L.
Grinnell; Ames; Fayette.
Wind Flower.	<i>Anemone nemorosa</i> , L.
Charles City; Ames; Fayette; Burlington.
Round Lobed Hepatica.	<i>Hepatica triloba</i> , Chaix.
Fayette; Burlington.
Sharp Lobed Hepatica.	<i>Hepatica acutiloba</i> , DC.
Charles City; Ames; Fayette.
Rue Anemone.	<i>Thalictrum anemonoides</i> , Michx.
Ames; Fayette.
Early Meadow Rue.	<i>Thalictrum dioicum</i> , L.
Ames; Fayette.
Purplish Meadow Rue.	<i>Thalictrum purpurascens</i> , L.
Ames.
Fall Meadow Rue.	<i>Thalictrum Cornuti</i> , L.
Ames; Grinnell; Charles City; Fayette.

- White Water Crowfoot. *Ranunculus aquatilis*, L. var. *trichophyllus*.
Hamilton county.
- Yellow Water Crowfoot. *Ranunculus multifidus*, Pursh.
Ames; Indianola.
- Sea-Side Crowfoot. *Ranunculus Cymbalaria*, Pursh.
Ames—rare.
- Ranunculus rhomboideus*, Goldie.
Charles City; Fayette.
- Small Flowered Crowfoot. *Ranunculus abortivus*, L.
Grinnell; Indianola; Fayette.
- Cursed Crowfoot. *Ranunculus sceleratus*, L.
Ames.
- Bristly Crowfoot. *Ranunculus Pennsylvanicus*, L.
Burlington.
- Early Crowfoot. *Ranunculus fascicularis*, Muhl.
Indianola; Fayette; Burlington.
- Creeping Crowfoot. *Ranunculus repens*, L.
Grinnell; Indianola; Ames.
- Buttercups. *Ranunculus bulbosus*, L.
Indianola.
- Isopyrum biternatum*, Torr. & Gray.
Ames—very common.
- Marsh Marigold. *Caltha palustris*, L.
Ames; Grinnell; Charles City; Fayette.
- Wild Columbine. *Aquilegia Canadensis*, L.
Ames; Grinnell; Charles City; Fayette; Burlington.
- Tall Larkspur. *Delphinium exaltatum*, Ait.
Grinnell
- Dwarf Larkspur. *Delphinium tricornes*, Michx.
Indianola.
- Azure Larkspur. *Delphinium azureum*, Michx.
Ames; Charles City.
- White Baneberry. *Actæa alba*, Bigel.
Ames; Charles City.

ANONACEÆ.

- Papaw. *Asimina triloba*, Dunal.
Marion County; Burlington.

MENISPERMACEÆ.

- Canadian Moonseed. *Menispermum Canadense*, L.
Ames; Fayette,

BERBERIDACEÆ.

- Blue Cohosh. *Caulophyllum thalictroides*, Michx.
Ames; Fayette; Burlington.
- May Apple. *Podophyllum peltatum*, L.
Ames; Grinnell; Indianola; Charles City; Fayette; Burlington.

NYMPHÆACEÆ.

- Yellow Nelumbo. *Nelumbium luteum*, Willd.
Burlington.
- White Water Lily. *Nymphæa odorata*, Ait.
Ames; Charles City; Fayette.
- Yellow Pond Lily. *Nuphar advena*, Ait.
Ames; Charles City.
- Small Yellow Pond Lily. *Nuphar luteum*, Smith. var. *pumilum*. (*N. Kalmiana*, Pursh.)
Fayette-

PAPAVERACEÆ.

- Common Poppy. *Papaver somniferum*, L.
Escaped as a weed at Charles City.
- Smooth Fruited
Corn Poppy. *Papaver dubium*, L.
Escaped as a weed at Charles City.
- Blood Root. *Sanguinaria Canadensis*, L.
Ames; Grinnell; Charles City; Fayette; Burlington

FUMARIACEÆ.

- Dutchman's
Breeches. *Dicentra Cucullaria*, DC.
Ames; Grinnell; Fayette; Burlington.

CRUCIFERÆ.

- Two-leaved Pepper
Root. *Dentaria diphylla*, L.
Burlington.
- Pepper-root. *Dentaria laciniata*, Muhl.
Ames; Grinnell; Burlington.

- Spring Cress. *Cardamine rhomboidea*, DC.
Ames ; Charles City ; Grinnell ; Fayette.
- Rock Cress. *Arabis dentata*, Torr. & Gray.
Fayette.
- Wood Cress. *Arabis hesperidoides*, Gray.
Ames.
- Worm-seed Mustard. *Erysimum cheiranthoides*, L.
Ames.
- Hedge Mustard. *Sisymbrium officinale*, Scop.
Ames ; Fayette.
- Charlock. *Brassica Sinapistrum*, Boissier. (*Sinapis arvensis*. L.)
Ames.
- Black Mustard. *Brassica nigra*, L.
Ames ; Charles City ; Fayette. A vile weed, coming into fields from the East.
- Draba Caroliniana*, Walt.
Ames.
- False Flax. *Camelina sativa*, Crantz.
Ames ; Grinnell.
- Shepherd's Purse. *Capsella Bursa-pastoris*, Moench.
Ames ; Indianola ; Charles City ; Fayette ; Burlington. A weed, common in fields and neglected grounds, as are also the two following.
- Wild Pepper-grass. *Lepidium Virginicum*, L.
Ames ; Grinnell ; Fayette ; Burlington.
- Pepper-grass. *Lepidium ruderale*, L.
Ames.
- Radish. *Raphanus sativus*, L.
cultivation in places.

CAPPARIDACEÆ.

- Polanisia graveolens*, Raf.
Ames.

VIOLACEÆ.

- Round-leaved Violet. *Viola rotundifolia*, Michx.
Fayette ; Grinnell.

- Common Blue
Violet. *Viola cucullata*, Ait.
Grinnell; Ames; Charles City; Indianola; Burlington.
Var *palmata*.
Found at Fayette and Burlington.
- Arrow-leaved
Violet. *Viola sagittata*, Ait.
Fayette.
- Larkspur Violet. *Viola delphinifolia*, Nutt.
Ames; Grinnell; Indianola; Fayette; Burlington.
- Bird-foot Violet. *Viola pedata*, L.
Ames; Grinnell; Charles City; Fayette; Burlington.
- Downy Yellow
Violet. *Viola pubescens*, Ait.
Ames; Grinnell; Charles City; Burlington.
Viola tricolor, L. var. *arvensis*.
Ames.

HYPERICACEÆ.

- Great Saint John's-
wort. *Hypericum pyramidatum*, Ait.
Ames, rare.
Hypericum Kalmianum, L.
Burlington, rare.
- Common Saint
John's-wort. *Hypericum perforatum*, L.
Burlington. *A pernicious weed.*

CARYOPHYLLACEÆ.

- Bouncing Bet. *Saponaria officinalis*, L.
Des Moines; Charles City.
- Cow Herb. *Vaccaria vulgaris*, Host.
Grinnell.
- Starry Campion. *Silene stellata*, Ait.
Ames; Grinnell; Burlington.
- Sleepy Catchfly. *Silene antirrhina*, L.
Ames.
- Corn-Cockle. *Lychnis Githago*, Lam.
Ames; Charles City; Fayette. Found too often in wheat fields.
- Sandwort. *Arenaria lateriflora*, L.
Grinnell; Fayette.

Mouse-ear Chick-weed. *Cerastium vulgatum*, L.
Fayette; Burlington.

Larger Mouse-ear Chickweed. *Cerastium viscosum*, L.
Ames; Burlington.

Cerastium nutans, Raf.
Indianola.

Corn Spurry. *Spergula arvensis*, L.
Ames.

Carpet-weed. *Mollugo verticillata*, L.
Cedar Rapids.

PORTULACACEÆ.

Purslane. *Portulaca oleracea*, L.
Common as a weed in gardens and fields.

Portulaca. *Portulaca grandiflora*, ———,
Escaping as a weed at Charles City.

Spring Beauty. *Claytonia Virginica*, L.
Ames; Charles City; Indianola; Grinnell; Fayette; Burlington.

Spring Beauty. *Claytonia Caroliniana*, Michx.
Grinnell.

MALVACEÆ.

Common Mallow. *Malva rotundifolia*, L.
Ames; Des Moines; Cedar Rapids.

High Mallow. *Malva sylvestris*, L.
Ames.

Indian Mallow. *Abutilon Avicennæ*, Gærtn.
Ames; Indianola; Fayette; Marshalltown; Burlington; &c.
An Indian plant coming to us as a troublesome weed.

Bladder Ketmia. *Hibiscus Trionum*, L.
Escaping as a weed at Indianola.

TILIACEÆ.

Basswood. *Tilia Americana*, L.
Ames; Charles City; Fayette; Burlington.

LINACEÆ.

Wild Flax. *Linum sulcatum*, Riddell. (L. *Boottii*, Planchon.)
Ames; Charles City; Burlington.

- Common Flax. *Linum usitatissimum*, L.
Escaping from cultivation at Ames.

GERANIACEÆ.

- Wild Cranesbill. *Geranium maculatum*, L.
Ames; Charles City; Grinnell; Fayette.
- Pale Touch-me-not. *Impatiens pallida*, Nutt.
Grinnell.
- Spotted Touch me-not. *Impatiens fulva*, Nutt.
Ames; Fayette; Burlington.
- Violet Wood-Sorrel. *Oxalis violacea*, L.
Ames; Charles City; Indianola; Grinnell; Fayette; Burlington.
- Yellow Wood-Sorrel. *Oxalis stricta*, L.
Ames; Charles City; Indianola; Grinnell; Fayette; Burlington.

RUTACEÆ.

- Prickly Ash. *Zanthoxylum Americanum*, Mill.
Ames; Charles City; Fayette.

ANACARDIACEÆ.

- Smooth Sumach. *Rhus glabra*, L.
Ames; Charles City; Fayette; Burlington.
- Poison Ivy. *Rhus Toxicodendron*, L.
Ames; Charles City; Fayette; Burlington.

VITACEÆ.

- Summer Grape. *Vitis æstivalis*, Michx.
Burlington.
- Frost Grape. *Vitis cordifolia*, Michx.
Ames; Fayette; Burlington.
- Virginia Creeper. *Ampelopsis quinquefolia*, Michx.
Ames; Charles City; Fayette; Burlington. This beautiful vine is often mistaken for its poisonous relative, the Poison Ivy. This creeper has *five* leaflets, while the Poison Ivy has but *three*.

RHAMNACEÆ.

- New Jersey Tea. *Ceanothus Americanus*, L.
Ames; Charles City; Grinnell; Burlington.
- Ceanothus ovalis*, Bigelow.
Ames; Fayette.

CELASTRACEÆ.

- Climbing Bitter-Sweet. *Celastrus scandens*, L.
Ames; Fayette; Burlington.
- Waahoo. *Euonymus atropurpureus*, Jacq.
Ames; Fayette; Burlington.

SAPINDACEÆ.

- Bladder Nut. *Staphylea trifolia*, L.
Ames; Charles City; Fayette; Burlington.
- Ohio Buckeye. *Æsculus glabra*, Willd.
Indianola.
- Sweet Buckeye. *Æsculus flava*, Ait.
Burlington.
- Sugar Maple. *Acer saccharinum*, Wang.
Ames; Charles City; Fayette; Burlington.
Var. *nigrum*.
Fayette.
- Silver Maple. *Acer dasycarpum*, Ehrhart.
Ames; Fayette; Burlington.
- Box Elder. *Negundo aceroides*, Moench.
Ames; Grinnell; Fayette; Burlington.

POLYGALACEÆ.

- Milkwort. *Polygala incarnata*, L.
Ames; Grinnell.
- Polygala sanguinea*, L.
Ames; Charles City.
- Polygala verticillata*, L.
Ames; Charles City.
- Seneca Snakeroot. *Polygala Senega*, L.
Burlington.

LEGUMINOSÆ.

- Stone Clover. *Trifolium arvense*, L.
Lately introduced at Ames.
- Red Clover. *Trifolium pratense*, L.
Cultivated largely.
- White Clover. *Trifolium repens*, L.
Introduced in cultivation.
- Low Hop-Clover. *Trifolium procumbens*, L.
Lately introduced at Ames.
- White Melilot. *Melilotus alba*, Lam.
Charles City ; Cedar Rapids.
- Black Medick. *Medicago lupulina*, L.
Lately introduced at Ames.
- Psoralea argophylla*, Pursh.
Grinnell.
- Violet Prairie Clover. *Petalostemon violaceus*, Michx.
Ames ; Charles City ; Grinnell.
- White Prairie Clover. *Petalostemon candidus*, Michx.
Ames ; Charles City ; Grinnell.
- False Indigo. *Amorpha fruticosa*, L.
Ames ; Indianola ; Grinnell ; Burlington.
- Lead Plant. *Amorpha canescens*, Nutt.
Ames ; Charles City ; Indianola ; Grinnell ; Burlington.
- Common Locust. *Robinia Pseudacacia*, L.
Largely planted, especially in the southern counties. Frequently called, also, Black Locust.
- Ground Plum. *Astragalus caryocarpus*, Ker.
Ames ; Charles City ; Grinnell ; Fayette.
- Astragalus Canadensis*, L.
Ames ; Charles City ; Burlington.
- Astragalus distortus*, Torr. & Gr.
Burlington.
- Tick Trefoil. *Desmodium acuminatum*, DC.
Ames ; Burlington.
- Desmodium cuspidatum*, Torr. & Gr.
Burlington.
- Desmodium paniculatum*, DC.
Grinnell.

Desmodium Canadense, DC.

Ames; Grinnell; Indianola.

Desmodium sessilifolium, Torr. & Gray.

Ames.

Bush Clover.

Lespedeza capitata, Michx.

Grinnell.

Vetch.

Vicia Americana, Muhl.

Ames; Charles City; Fayette.

Vetchling.

Lathyrus venosus, Muhl.

Fayette.

Marsh Vetchling.

Lathyrus palustris, L.

Ames.

Ground-nut.

Apios tuberosa, Moench.

Ames; Grinnell.

Wild Bean.

Phaseolus perennis, Walt.

Ames; Charles City; Burlington.

Phaseolus diversifolius, Pers.

Ames, along the Des Moines River.

False Indigo.

Baptisia leucantha, Torr. & Gr.

Ames; Charles City; Grinnell; Burlington.

Baptisia leucophæa, Nutt.

Ames; Charles City; Indianola; Grinnell; Fayette; Burlington.

Red Bud.

Cercis Canadensis, L.

Burlington.

Partridge Pea.

Cassia Chamæcrista, L.

Ames; Grinnell; Charles City; Burlington.

Kentucky Coffee-tree.

Gymnocladus Canadensis, Lam.

Ames; Burlington.

Honey Locust.

Gleditschia triacanthos, L.

Ames, common variety with thorns, and also a thornless variety; Burlington.

ROSACEÆ.

Wild Plum.

Prunus Americana, Marsh.

Ames; Indianola; Grinnell; Fayette; Charles City; Burlington.

Chickasaw Plum.

Prunus Chicasa, Michx.

Fayette.

Wild Red Cherry.

Prunus Pennsylvanica, L.

Ames; Charles City; Fayette.

- Choke Cherry. *Prunus Virginiana*, L.
Ames ; Charles City ; Fayette ; Burlington.
- Wild Black Cherry. *Prunus serotina*, Ehrhart.
Ames ; Grinnell ; Fayette ; Burlington.
- Nine-Bark. *Spiraea opulifolia*, L.
Charles City.
- Meadow-Sweet. *Spiraea salicifolia*, L.
Charles City.
- Agrimony. *Agrimonia Eupatoria*, L.
Ames ; Charles City.
- Avens. *Geum album*, Gmelin.
Ames.
- Geum triflorum*, Pursh.
Charles City ; Fayette.
- Norway Cinque-foil. *Potentilla Norvegica*, L.
Ames.
- Common Cinque-foil *Potentilla Canadensis*, L.
Ames ; Charles City ; Fayette ; Burlington.
- Potentilla arguta*, Pursh.
Ames ; Grinnell ; Charles City.
- Wild Strawberry. *Fragaria Virginiana*, Ehrhart. (var. *Illinoensis*.)
Ames.
- Wild Red Raspberry *Rubus strigosus*, Michx.
Ames ; Charles City ; Fayette.
- Wild Black Raspberry. *Rubus occidentalis*, L.
Ames ; Charles City ; Fayette ; Burlington.
- Wild Blackberry. *Rubus villosus*, Ait.
Ames ; Charles City ; Fayette ; Burlington.
- Wild Rose. *Rosa lucida*, Ehrhart.
Ames ; Burlington.
- Wild Rose. *Rosa blanda*, Ait.
Ames ; Fayette. These two species of *Rosa* seem to be too nearly alike.
- Black Thorn. *Crataegus tomentosa*, L.
Ames ; Indianola ; Fayette.
- Var. *punctata*, Gray.
Ames. Other forms are found in abundance, but they seem to be not sufficiently fixed, for classifying.

- Cockspur Thorn. *Crataegus Crus-Galli*, L. (?)
Burlington.
- American Crab-Apple. *Pyrus coronaria*, L.
Ames ; Grinnell ; Charles City ; Fayette ; Burlington.
- Service Berry. *Amelanchier Canadensis*, Torr. & Gr.
Ames ; Indianola ; Fayette ; Burlingto

SAXIFRAGACEÆ.

- Wild Gooseberry. *Ribes hirtellum*, Michx.
Burlington.
- Wild Gooseberry. *Ribes rotundifolium*, Michx.
Ames ; Fayette.
- Wild Black Currant. *Ribes floridum*, L.
Ames ; Fayette ; Burlington.
- Wild Hydrangea. *Hydrangea arborescens*, L.
Fayette.
- Grass of Parnassus. *Parnassia Caroliniana*, Michx.
Ames.
- Swamp Saxifrage. *Saxifraga Pennsylvanica*, L.
Grinnell ; Burlington.
- Alum Root. *Heuchera hispida*, Pursh.
Ames ; Grinnell ; Charles City ; Fayette

CRASSULACEÆ.

- Ditch Stonecrop. *Penthorum sedoides*, L.
Ames ; Charles City.

HALORAGÆÆ.

- Mermaid Weed. *Proserpinaca palustris*, L.
Ames.

ONAGRACEÆ.

- Enchanter's Night-shade. *Circæa Lutetiana*, L.
Ames ; Burlington.
- Gaura. *Gaura biennis*, L.
Des Moines ; Indianola.
- Willow Herb. *Epilobium coloratum*, Muhl.
Ames ; Charles City.

Evening Primrose. *Oenothera biennis*, L.

Ames ; Indianola ; Burlington.

Oenothera serrulata, Nutt.

Ames ; Charles City.

Ludwigia polycarpa, Short & Peter.

Ames.

LYTHRACEÆ.

Loosestrife. *Lythrum alatum*, Pursh.

Ames ; Grinnell ; Charles City.

CUCURBITACEÆ.

One-seeded Cucum-
ber. *Sicyos angulatus*, L.

Ames, on Des Moines river.

Wild Balsam Apple. *Echinocystis lobata*, Torr. & Gray.

Ames ; Charles City.

UMBELLIFERÆ.

Black Snakeroot. *Sanicula Marilandica*, L.

Ames.

Button Snakeroot. *Eryngium yuccæfolium*, Michx.

Ames ; Grinnell ; Charles City.

Cow Parsnip. *Heracleum lanatum*, Michx.

Ames ; Grinnell ; Fayette.

Common Parsnip. *Pastinaca sativa*, L.

Escaping from cultivation at Ames.

Cow bane. *Archemora rigida*, DC.

Ames ; Charles City. Plant poisonous.

Great Angelica. *Archangelica atropurpurea*, Hoffm.

Ames ; Charles City.

Meadow Parsnip. *Thaspium aureum*, Nutt.

Ames ; Grinnell ; Charles City.

Zizia integerrima, DC.

Ames ; Burlington.

Honewort. *Cryptotaenia Canadensis*, DC.

Ames.

Chervil. *Chærophyllum procumbens*, Lam.

Ames.

Smoother Sweet
Cicely. *Osmorrhiza longistylis*, DC.

Ames.

Hairy Sweet Cicely. *Osmorrhiza brevistylis*, DC.

Ames.

ARALIACEÆ.

Spikenard. *Aralia racemosa*, L.

Ames ; Fayette ; Burlington.

Wild Sarsaparilla. *Aralia nudicaulis*, L.

Ames ; Burlington.

Ginseng. *Aralia quinquefolia*, Gray.

Fayette ; Burlington.

CORNACEÆ.

Round Leaved Cor- *Cornus circinata*, L'Her.

nel.

Ames.

Kinnikinnik. *Cornus sericea*, L.

Ames.

Red-Osier Dogwood. *Cornus stolonifera*, Michx.

Burlington.

Rough Leaved Dog- *Cornus asperifolia*, Michx.

wood.

Fayette.

Panicled Cornel. *Cornus paniculata*, L'Her.

Ames ; Charles City ; Burlington.

Alternate Leaved *Cornus alternifolia*, L.

Cornel.

Fayette ; Burlington.

CAPRIFOLIACEÆ.

Wolfberry. *Symphoricarpus occidentalis*, R. Br.

Charles City.

Small Honey suckle. *Lonicera parviflora*, Lam. var. *Douglasii*.

Ames ; Charles City ; Fayette.

Horse Gentian. *Triosteum perfoliatum*, L.

Ames ; Grinnell ; Charles City ; Fayette ; Burlington.

Black Elder. *Sambucus Canadensis*, L.

Ames ; Charles City ; Burlington.

Red Elder. *Sambucus pubens*, Michx.

Ames.

Sheep-Berry. *Viburnum Lentago*, L.

Ames ; Grinnell ; Burlington.

- Withe-rod. *Viburnum nudum*, L.
 Fayette.
 Downy Arrow-wood *Viburnum pubescens*, Pursh.
 Ames.
 Cranberry Tree. *Viburnum Opulus*, L.
 This, or a nearly allied species, is found at Charles City.

RUBIACEÆ.

- Bedstraw. *Galium concinnum*, Torr. & Gr.
 Burlington.
 Small Bedstraw. *Galium trifidum*, L.
 Ames ; Grinnell ; Charles City.
 Button Bush. *Cephalanthus occidentalis*, L.
 Ames ; Burlington.

COMPOSITÆ.

- Iron-Weed. *Vernonia fasciculata*, Michx.
 Ames ; Grinnell ; Charles City ; Burlington. This, on low pas-
 ture lands, is a somewhat troublesome weed.
 Blazing Star. *Liatris cylindracea*, Michx.
 Ames ; Grinnell.
 Liatris scariosa, Willd.
 Ames ; Indianola ; Grinnell ; Charles City ; Burlington.
 Liatris pycnostachya, Michx.
 Ames ; Indianola ; Grinnell ; Charles City.
 Kuhnia eupatorioides, L.
 Ames ; Grinnell.
 Joe-Pye Weed. *Eupatorium purpureum*, L.
 Ames ; Grinnell ; Charles City.
 Boneset. *Eupatorium perfoliatum*, L.
 Ames ; Indianola ; Charles City ; Fayette ; Burlington.]
 White Snakeroot. *Eupatorium ageratoides*, L.
 Ames ; Grinnell.
 Aster. *Aster sericeus*, Vent.
 Ames ; Grinnell ; Charles City.
 Aster patens, Ait.
 Ames ; Grinnell.
 Aster lævis, L.
 Grinnell.

Aster azureus, Lindl.

Grinnell.

Aster undulatus, L.

Grinnell.

Aster cordifolius, L.

Ames.

Aster multiflorus, Ait.

Ames ; Grinnell.

Aster dumosus, L. (?)

Ames.

Aster Tradescanti, L.

Grinnell.

Aster miser, L. (?)

Ames.

Aster simplex, Willd. (?)

Ames ; Grinnell.

Aster tenuifolius, L. (?)

Grinnell.

Aster carneus, Nees.

Ames.

Aster puniceus, L.

Grinnell.

Aster prenanthoides, Muhl.

Ames.

Aster oblongifolius, Nutt.

Grinnell. Seems to vary from typical

Aster Novæ Angliæ, L.

Ames.

Horse Weed.

Erigeron Canadense, L.

Grinnell. A rapidly spreading weed.

Erigeron divaricatum, Michx.

Ames. A native weed, of a low and spreading habit, which is intruding on our pastured prairies.

Robin's Plantain.

Erigeron bellidifolium, Muhl.

Burlington.

Common Fleabane.

Erigeron Philadelphicum, L.

Ames ; Charles City ; Fayette.

- Daisy Fleabane. *Erigeron annuum*, Pers.
Ames ; Grinnell.
- Daisy Fleabane. *Erigeron strigosum*, Muhl.
Ames ; Charles City.
Boltonia glastifolia, L'Her.
Ames.
- Golden Rod. *Solidago latifolia*, L.
Ames.
Solidago rigida, L.
Ames ; Grinnell ; Charles City ; Burlington.
Solidago Riddellii, Frank.
Ames.
Solidago ulmifolia, Muhl.
Ames.
Solidago nemoralis, Ait.
Grinnell.
Solidago Missourienensis, Nutt. (?)
Ames.
Solidago Canadensis, L.
Ames ; Indianola ; Grinnell.
Solidago lanceolata, L.
Ames, Grinnell.
- Compass Plant. *Silphium laciniatum*, L.
Ames ; Charles City ; Fayette ; Burlington. This curious plant
is found abundantly on the moister parts of the prairies,
but cultivation soon drives it out.
- Prairie Dock. *Silphium terebenthinaceum*, L.
Burlington.
- Cup Plant. *Silphium perfoliatum*, L.
Ames ; Charles City ; Burlington. At Grinnell it seems to vary
from the typical form.
Parthenium integrifolium, L.
Charles City.
- Ragweed. *Ambrosia bidentata*, Michx.
Burlington.
- Great Rag-weed. *Ambrosia trifida*, L.
Ames ; Charles City.
—— var. *integrifolia*.
Ames.

- Bitter-weed. *Ambrosia artemisiaefolia*, L.
Ames ; Charles City.
- Ambrosia pilostachya*, DC.
Ames.
These species of *Ambrosia* are vile weeds, and should be eradicated as rapidly as possible.
- Cocklebur. *Xanthium strumarium*, L.
Ames ; Burlington. A bad weed on low grounds.
- Ox-Eye. *Heliopsis lævis*, Pers.
Ames ; Indianola.
——— var. *scabra*.
Grinnell.
- Purple Cone-flower. *Echinacea angustifolia*, DC.
Ames ; Grinnell ; Burlington.
- Cone-flower. *Rudbeckia laciniata*, L.
Ames ; Charles City.
- Rudbeckia triloba*, L.
Ames ; Grinnell.
- Rudbeckia hirta*, L.
Ames ; Charles City.
- Lepachys pinnata*, Torr. & Gr.
Indianola ; Grinnell.
- Comm'n Sun-flower. *Helianthus annuus*, L.
Ames. Has become so thoroughly naturalized as to have much the appearance of a native plant.
- Helianthus rigidus*, Desf.
Ames ; Indianola ; Grinnell.
- Helianthus lætiflorus*, Pers.
Ames ; Charles City.
- Helianthus grosse-serratus*, Martens.
Ames ; Grinnell.
- Helianthus doronicoides*, Lam. (?)
Ames.
- Actinomeris. *Actinomeris squarrosa*, Nutt.
Ames.
- Tick-seed. *Coreopsis palmata*, Nutt.
Ames ; Charles City.
- Beggar-Ticks,
Spanish Needles. *Bidens frondosa*, L.
Ames ; Indianola.

- Swamp Beggar-Ticks. *Bidens connata*, L.
Ames.
——— var. *comosa*.
Ames.
- Bur-Marigold. *Bidens chrysanthemoides*, Michx.
Ames ; Grinnell.
These species of *Bidens* are often allowed to grow in corn-fields, along ditches, and in fence rows, by slovenly farmers.
- Fetid Marigold. *Dysodia chrysanthemoides*, Lag.
Ames ; Grinnell.
- Sneeze-Weed. *Helenium autumnale*, L.
Ames ; Grinnell.
- Leptopoda brachypoda, Torr. & Gr.
Indianola.
- May-Weed. *Maruta cotula*, DC.
Ames ; Charles City ; Burlington—common along roadsides.
- Garden Chamomile. *Anthemis nobilis*, L.
Roadsides at Ames.
- Milfoil. *Achillea Millefolium*, L.
Ames ; Indianola : Charles City ; Burlington.
- Ox-Eye Daisy,
White-Weed. *Leucanthemum vulgare*, Lam.
Ames.
Lately introduced, and perhaps not yet established. A miserable weed.
- Wild Wormwood. *Artemisia dracunculoides*, Pursh.
Ames.
- Mugwort, or Sage
Brush. *Artemisia Ludoviciana*, Nutt.
Ames ; Grinnell.
- Biennial Wormwood *Artemisia biennis*, Willd.
Ames.
- Common
Wormwood. *Artemisia Absinthium*, L.
Charles City. Escaped from gardens.
- Everlasting. *Antennaria plantaginifolia*, Hook.
Ames ; Indianola ; Charles City.
- Fire-Weed. *Erechthites hieracifolia*, Raf.
Ames ; Grinnell.
- Indian Plantain. *Cacalia tuberosa*, Nutt.
Ames ; Grinnell ; Charles City.

- Golden Ragwort. *Senecio aureus*, L.
Ames ; Indianola ; Grinnell ; Charles City ; Burlington.
Var. *Balsamita*.
Burlington.
- Bluebottle. *Centaurea Cyanus*, L.
Ames—introduced lately from the east.
- Common Thistle. *Cirsium lanceolatum*, Scop.
Burlington.
- Tall Thistle. *Cirsium altissimum*, Spreng.
Ames ; Indianola ; Charles City. The common Thistle of our fields and woodlands.
- Yellow Thistle. *Cirsium horridulum*, Michx.
Burlington.
- Canada Thistle. *Cirsium arvense*, Scop.
Keokuk ; Ottumwa.
I found this outlawed plant growing in the streets of the city of Keokuk in the autumn of 1870, and am informed on good authority that about Ottumwa it is also found. The strictest enforcement of our State law on this subject should be demanded by every enterprising farmer and gardener.
- Burdock. *Lappa officinalis*. Allioni, var. *Major*.
Ames ; Burlington. A detestable weed.
- Dwarf Dandelion. *Krigia Virginica*, Willd.
Burlington.
- Troximon. *Troximon cuspidatum*, Pursh.
Ames ; Grinnell.
- Long bearded Hawk-Weed. *Hieracium longipilum*, Torr.(?)
Ames.
- Rattlesnake-Weed. *Hieracium venosum*, L.
Grinnell ; Fayette.
- White Lettuce. *Nabalus albus*, Hook.
Ames ; Burlington.
Nabalus asper, Torr. & Gray.
Ames ; Grinnell.
Nabalus crepidineus, DC.
Ames.
- Dandelion. *Taraxacum Dens-leonis*, Desf.
Ames ; Indianola ; Charles City ; Fayette ; Burlington.
Probably introduced from the east at all these localities.

- Wild Lettuce. *Lactuca Canadensis*, L.
Ames.
- var. *sanguinea*, Torr. & Gr.
Ames.
- Prickly Lettuce. *Lactuca Scariola*, L.
Ames.
- False Lettuce. *Mulgedium Floridanum*, DC.
Grinnell.
- Sow Thistle. *Sonchus asper*, Vill.
Grinnell.

LOBELIACEÆ.

- Cardinal Flower. *Lobelia cardinalis*, L.
Ames ; Burlington.
- Great Lobelia. *Lobelia syphilitica*, L.
Ames ; Indianola ; Grinnell ; Burlington.
- Indian Tobacco. *Lobelia inflata*, L.
Cedar Rapids.
- Spiked Lobelia. *Lobelia spicata*, Lam.
Ames ; Grinnell ; Charles City.
- Lobelia paludosa*, Nutt.
Ames ; Burlington.

CAMPANULACEÆ.

- Harebell. *Campanula rotundifolia*, L.
Fayette.
- Marsh Bellflower. *Campanula aparinoides*, Pursh.
Ames ; Charles City.
- Tall Bellflower. *Campanula Americana*, L.
Ames ; Indianola ; Grinnell ; Burlington.
- Venus' Looking-glass. *Specularia perfoliata*, A. DC.
Ames ; Grinnell ; Burlington.

ERICACEÆ.

- Shin Leaf. *Pyrola elliptica*, Nutt.
Cedar Rapids.
- Indian Pipe. *Monotropa uniflora*, L.
Ames ; Grinnell.

- Pine Sap. *Monotropa Hypopitys*, L.
Fayette.

PLANTAGINACEÆ.

- Common Plantain. *Plantago major*, L.
Ames; Burlington, common.
- Rib-grass. *Plantago lanceolata*, L.
Ames.

PRIMULACEÆ.

- Shooting Star. *Dodecatheon Meadia*, L.
Charles City; Fayette; Burlington.
- Tufted Loosestrife. *Lysimachia thyrsiflora*, L.
Ames.
- Loosestrife. *Lysimachia ciliata*, L.
Ames.
- Lysimachia longifolia*, Pursh.
Ames; Grinnell.

BIGNONIACEÆ.

- Trumpet Creeper. *Tecoma radicans*, Juss.
Burlington.

SCROPHULARIACEÆ.

- Mullein. *Verbascum Thapsus*, L.
Ames; Burlington. A slovenly weed coming to us from the East.
- Butter and Eggs. *Linaria vulgaris*, Mill.
Indianola; Des Moines; Charles City. "A pernicious weed."
- Figwort. *Scrophularia nodosa*, L.
Ames; Charles City.
- Beard Tongue. *Pentstemon pubescens*, Solander.
Burlington.
- Pentstemon grandiflorus*, Fraser.
Dubuque.
- Monkey Flower. *Mimulus ringens*, L.
Ames; Grinnell. At the latter place Professor Parker describes it as having a stem four-angled; two opposite sides convex, the other two deeply concave

- Culver's Physic. *Veronica Virginica*, L.
Ames; Grinnell; Charles City.
- Water Speedwell. *Veronica Anagallis*, L.
Ames.
- Purslane Speedwell. *Veronica peregrina*, L.
Ames.
- Purple Gerardia. *Gerardia purpurea*, L.
Ames; Grinnell.
- Slender Gerardia. *Gerardia tenuifolia*, Vahl.
Ames; Grinnell; Burlington.
- Gerardia quercifolia*, Pursh.
Burlington.
- Gerardia auriculata*, Michx.
Ames; Grinnell.
- Scarlet Painted Cup. *Castilleia coccinea*, Spreng.
Grinnell; Charles City; Fayette; Burlington.
- Castilleia sessiliflora*, Pursh.
Ames; Fayette,
- Louse-wort. *Pedicularis Canadensis*, L.
Ames; Indianola; Grinnell; Charles City; Fayette; Burlington.
- Pedicularis lanceolata*, Michx.
Ames; Grinnell; Charles City. Seems to vary from the typical form.

ACANTHACEÆ.

- Ruellia ciliosa*, Pursh.
Indianola.

VERBENACEÆ.

- Blue Vervain. *Verbena hastata*, L.
Ames; Grinnell; Charles City; Burlington.
- White Vervain. *Verbena urticifolia*, L.
Ames; Grinnell; Charles City; Burlington.
- Hoary Vervain. *Verbena stricta*, Vent.
Ames; Charles City; Burlington. At Ames flowers not "blue," but decidedly purple. Stem occasionally branched, and leaves sometimes dentate.
- Low Vervain. *Verbena bracteosa*, Michx.
Ames; Grinnell; Charles City.

LABIATÆ.

- Wood Sage. *Teucrium Canadense*, L.
Ames ; Grinnell ; Burlington.
- Spearmint. *Mentha viridis*, L.
Burlington.
- Wild Mint. *Mentha Canadensis*, L.
Ames.
- Lycopus Europæus*, L. var. *sinuatus*, Gr.
Ames ; Grinnell.
- Basil. *Pycnanthemum lanceolatum*, Pursh.
Ames ; Grinnell ; Charles City ; Burlington.
- Wild Bergamot. *Monarda fistulosa*, L.
Ames ; Indianola ; Burlington.
- Blephilia hirsuta*, Benth.
Ames.
- Giant Hyssop. *Lophanthus scrophulariæfolius*, Benth.
Ames ; Grinnell.
- Anise Hyssop. *Lophanthus anisatus*, Benth.
Grinnell.
- Catnip. *Nepeta cataria*, L.
Ames ; Charles City ; Burlington.
- Gill. *Nepeta Glechoma*, Benth.
Indianola.
- False Dragon-head. *Physostegia Virginiana*, Benth.
Ames.
- Heal-all. *Brunella vulgaris*, L.
Ames ; Grinnell ; Charles City.
- Skull-cap. *Scutellaria versicolor*, Nutt.
Burlington.
- Skull-cap. *Scutellaria parvula*, Michx.
Ames ; Grinnell.
- Scutellaria lateriflora*, L.
Ames.
- Common Hore-
hound. *Marubium vulgare*, L.
Burlington.

BORRAGINACEÆ.

- False Gromwell. *Onosmodium Carolinianum*, DC. (?)
 Ames. Our plant seems intermediate between *O. Carolinianum* and *molle*. Professor Parker gives what I presume is the same plant as "an undescribed variety of *O. Virginianum*."
- Gromwell. *Lithospermum latifolium*, Michx.
 Ames.
- Hairy Puccoon. *Lithospermum canescens*, Lehm.
 Ames; Charles City; Grinnell; Fayette; Burlington.
Lithospermum longiflorum, Spreng.
 Ames; Charles City; Fayette.
- Lungwort. *Mertensia Virginica*, DC.
 Ames; Indianola; Grinnell; Charles City; Fayette; Burlington.
- Stickseed. *Echinospermum Lappula*, Lehm.
 Ames; Grinnell; Charles City.
- Beggar's Lice. *Cynoglossum Morissoni*, DC.
 Ames. Both last mentioned plants are weeds.

HYDROPHYLLACEÆ.

- Waterleaf. *Hydrophyllum Virginicum*, L.
 Ames; Grinnell.
- Ellisia. *Ellisia ambigua*, Nutt.
 Ames; Indianola; Grinnell; Fayette.

POLEMONIACEÆ.

- Greek Valerian. *Polemonium reptans*, L.
 Fayette; Burlington.
- Wild Sweet-william. *Phlox maculata*, L.
 Grinnell; Charles City; Burlington.
- Wild Pink. *Phlox pilosa*, L.
 Ames; Indianola; Grinnell; Charles City; Fayette. The common Wild Pink of the prairies.
- Wood Pink. *Phlox procumbens*, Lehm.
 Ames. Common in timber land.
Phlox divaricata, L.
 Grinnell; Burlington.
Phlox bifida, Beck.
 Burlington.

CONVOLVULACEÆ.

- Hedge Bindweed. *Calystegia sepium*, R. Br.
Ames; Charles City; Grinnell; Burlington. A common and troublesome weed in fields.
- Dodder. *Cuscuta Gronovii*, Willd.
Ames.
- Cuscuta glomerata*, Choisy.
Ames; Indianola.

SOLANACEÆ.

- Black Nightshade. *Solanum nigrum*, L.
Ames, and elsewhere. Flowers purplish tinged! $\frac{1}{8}$ inch broad. Berries eaten in some parts of the State.
- Ground Cherry. *Physalis viscosa*, L.
Ames; Grinnell?
- Physalis Pennsylvanica*, L.
Ames; Charles City.
- "Jimson," or Thorn Apple. *Datura Stramonium*, L.
Ames, Indianola, Knoxville, and Burlington. An unsightly and poisonous weed.

GENTIANACEÆ.

- Five-flowered Gentian. *Gentiana quinqueflora*, Lam.
Ames.
- Fringed Gentian. *Gentiana crinita*, Frœl.
Ames; Grinnell.
- Whitish Gentian. *Gentiana alba*, Muhl.
Ames.
- Closed Gentian. *Gentiana Andrewsii*, Griseb.
Ames; Grinnell; Charles City.
- Soapwort Gentian. *Gentiana Saponaria*, L.
Ames.
- Gentiana puberula*, Michx.
Ames.

APOCYNACEÆ.

- Spreading Dogbane. *Apocynum androsæmifolium*, L.
Ames; Charles City; Burlington.
- Indian Hemp. *Apocynum cannabinum*, L.
Ames; Burlington.

ASCLEPIADACEÆ.

- Milkweed or Silk-weed. *Asclepias Cornuti*, Decaisne.
Ames ; Indianola ; Charles City ; Burlington.
- Purple Milkweed. *Asclepias purpurascens*, L.
Ames.
- Swamp Milkweed. *Asclepias incarnata*, L.
Ames ; Grinnell.
Asclepias obtusifolia, Michx.
Grinnell.
- Pleurisy-root. *Asclepias tuberosa*, L.
Ames ; Indianola ; Grinnell ; Charles City ; Burlington.
- Whorled Milkweed *Asclepias verticillata*, L.
Ames ; Burlington.
- Green Milkweed. *Acerates viridiflora*, Ell.
Ames ; Charles City.

OLEACEÆ.

- White Ash. *Fraxinus Americana*, L.
Ames ; Burlington.

ARISTOLOCHIACEÆ.

- Wild Ginger. *Asarum Canadense*, L.
Ames ; Fayette ; Burlington.

CHENOPODIACEÆ.

- Lamb's Quarters. *Chenopodium album*, L.
Ames.
——— var. *Boscianum*, Gr.
Ames. Both common in gardens.
- Maple-leaved Goose-foot. *Chenopodium hybridum*, L.
Ames.

AMARANTACEÆ.

- Pig-weed. *Amarantus retroflexus*, L.
Ames. Several other species of *Amarantus* are found here, but they have not yet been fully identified. All are weeds, the most prominent of which is the common Tumble-weed (*A. albus*, L. ?)

POLYGONACEÆ.

- Prince's Feather. *Polygonum orientale*, L.
Ames.
- Polygonum. *Polygonum Pennsylvanicum*, L.
Ames.
- Lady's Thumb. *Polygonum Persicaria*, L.
Ames ; Burlington.
- Smartweed. *Polygonum Hydropiper*, L.
Ames ; Burlington.
- Water Persicaria. *Polygonum amphibium*, L., var. *terrestre*, Willd.
Ames.
- Polygonum Virginianum*, L.
Ames.
- Knotgrass. *Polygonum aviculare*, L.
Ames ; Burlington.
- Larger Knotgrass. *Polygonum ramosissimum*, Michx.
Ames.
- Black Bindweed. *Polygonum Convolvulus*, L.
Ames ; Burlington.
- Climb'g False Buck-
wheat. *Polygonum dumetorum*, L. (?)
Grinnell.
- Buckwheat. *Fagopyrum esculentum*, Mœnch.
Ames. Escaped from cultivation.
- Pale Dock. *Rumex Britannica*, L.
Ames.
- Curled Dock. *Rumex crispus*, L.
Ames ; Charles City.
- Sheep Sorrel. *Rumex Acetosella*, L.
Ames. Lately introduced from the East, where it is abundant
in sterile and worn fields, as on unwelcome weed.

SANTALACEÆ.

- Bastard Toad-flax. *Comandra umbellata*, Nutt.
Ames ; Charles City ; Grinnell ; Burlington.

EUPHORBIACEÆ.

- Spurge. *Euphorbia serpyllifolia*, Pers.
Ames ; Charles City.

- Spotted Spurge. *Euphorbia maculata*, L.
Ames ; Charles City.
- Euphorbia hypericifolia*, L.
Ames.
- Euphorbia marginata*, Pursh. (?)
Grinnell.
- Euphorbia corollata*, L.
Ames ; Grinnell ; Charles City ; Burlington.
- Three-seeded
Mercury. *Acalypha Virginica*, L.
Ames ; Charles City.

URTICACEÆ.

- Slippery or Red
Elm. *Ulmus fulva*, Michx.
Ames ; Charles City ; Fayette ; Burlington.
- White Elm. *Ulmus Americana*, L.
Ames ; Charles City ; Fayette ; Burlington.
- Hackberry. *Celtis occidentalis*, L.
Ames.
- Red Mulberry. *Morus rubra*, L.
Ames.
- Wood-Nettle. *Laportea Canadensis*, Gaudich.
Ames ; Grinnell.
- Clear-weed. *Pilea pumila*, Gray.
Ames.
- Hemp. *Cannabis sativa*, L.
Ames. Escaped to road-sides and fence-rows.
- Hop. *Humulus Lupulus*, L.
Ames. Found abundantly in timber land. Certainly indigenous. Also at Burlington.

PLATANACEÆ,

- Button-wood or
Sycamore. *Platanus occidentalis*, L.
Ames ; Fayette ; Burlington.

JUGLANDACEÆ.

- Butternut. *Juglans cinerea*, L.
Ames ; Fayette ; Burlington.
- Black Walnut. *Juglans nigra*, L.
Ames ; Fayette ; Burlington.

- Pecan-nut. *Carya olivæformis*, Nutt.
Dr. White in his Report on the Geology of Iowa, gives this as
one of the trees of Iowa. I have not seen it in the State.
- Shell-bark Hickory. *Carya alba*, Nutt.
Ames ; Burlington.
- Bitternut. *Carya amara*, Nutt.
Ames.

CUPULIFERÆ.

- White Oak. *Quercus alba*, L.
Ames ; Burlington.
- Bur-Oak. *Quercus macrocarpa*, Michx.
Ames ; Burlington.
- Chinquapin Oak. *Quercus prinoides*, Willd.
On authority of Dr. Vasey in 2d vol. Am. Ent. and Botanist,
page 282.
- Laurel Oak. *Quercus imbricaria*, Michx.
In the State, on the authority of Dr. White.
- Black Oak. *Quercus tinctoria*, Bartram.
In the State, on the authority of Dr. White.
- Red Oak. *Quercus rubra*, L.
Burlington.
- Pin Oak. *Quercus palustris*, Du Roi.
Burlington.
- Hazel-nut *Corylus Americana*, Walt.
Ames ; Fayette ; Burlington.
- Beaked Hazel-nut. *Corylus rostrata*, Ait.
Fayette.
- Iron-wood. *Ostrya Virginica*, Willd.
Ames ; Burlington.
- Blue Beech. *Carpinus Americana*, Michx.
Along Des Moines River bluffs, Boone county.

BETULACEÆ,

- White Birch. *Betula alba*, var. *populifolia*, Spach.
Fayette.
- River or Red Birch. *Betula nigra*, L.
On authority of Dr. White.

SALICACEÆ.

- Willow. *Salix* ——— many species, but not yet fully identified.
- Aspen. *Populus tremuloides*, Michx.
Ames ; Charles City ; Burlington.
- Downy Poplar. *Populus heterophylla*, L.
Fayette.
- Cotton-wood. *Populus monilifera*, Ait.
Ames ; Fayette ; Burlington.
- Angled Cotton-wood. *Populus angulata*, Ait.
Ames.

CONIFERÆ.

- Several Pines and Firs grow in the northern portions of the State, but I have been unable as yet to secure reliable information regarding them.
- Red Cedar. *Juniperus Virginiana*, L.
On Rocky bluffs of Des Moines river, Boone county, and in the eastern part of the State along Cedar River ; Burlington.

ARACEÆ.

- Indian Turnip. *Arisæma triphyllum*, Torr.
Ames ; Indianola ; Grinnell ; Charles City ; Fayette ; Burlington.
- Green Dragon. *Arisæma Dracontium*, Schott.
Ames.
- Calamus. *Acorus Calamus*, L.
Hamilton county.

LEMNACEÆ

- Duckweed. *Lemna minor*, L.
Ames.
- Lemna polyrrhiza*, L.
Ames.

TYPHACEÆ.

- Cat-tail Flag. *Typha latifolia*, L.
Ames ; Burlington.

ALISMACEÆ.

- Water Plantain. *Alisma Plantago*, L. var. *Americanum*.
Ames ; Charles City.
- Arrow head. *Sagittaria variabilis*, Engelm.
Ames ; Charles City ; Burlington.
- Sagittaria graminea*, Michx.
Ames.

ORCHIDACEÆ.

- Showy Orchis. *Orchis spectabilis*, L.
Ames ; Fayette.
- Habenaria viridis*, R. Br. var. *bracteata*, Richenbach.
Ames.
- Fringed Orchis. *Habenaria, leucophæa*, Gr.
Ames ; Grinnell ; Charles City.
- Ladies' Tresses. *Spiranthes cernua*, Richard.
Ames.
- Putty-root. *Aplectrum hyemale*, Nutt.
Fayette.
- Small White Lady's Slipper. *Cypripedium candidum*, Muhl.
Ames ; Grinnell ; Charles City.
- Smaller Yellow Lady's Slipper. *Cypripedium parviflorum*, Salisb.
Grinnell ; Burlington.
- Larger Yellow Lady's Slipper. *Cypripedium pubescens*, Willd.
Ames ; Indianola ; Charles City ; Fayette.
- Showy Lady's Slipper. *Cypripedium spectabile*, Swartz.
Ames ; Charles City ; Fayette ; Burlington.

AMARYLLIDACEÆ.

- Star grass. *Hypoxys erecta*, L.
Ames ; Indianola ; Grinnell ; Charles City ; Fayette ; Burlington.

IRIDACEÆ.

- Blue Flag. *Iris versicolor*, L.
Ames ; Charles City ; Fayette ; Burlington.

- Blue-eyed Grass. *Sisyrinchium Bermudiana*, L.
 Indianola ; Fayette.
 Vars. *anceps*, and *albidum*, at Ames.
 Var. *mucronatum*, at Ames and Grinnell.

DIOSCOREACEÆ.

- Wild Yam-root. *Dioscorea villosa*, L.
 Ames ; Charles City ; Grinnell.

SMILACEÆ.

- Greenbrier. *Smilax hispida*, Muhl.
 Ames.
 Carrion Flower. *Smilax herbacea*, L.
 Ames ; Grinnell.

LILIACEÆ.

- Trillium sessile*, L.
 Burlington.
Trillium recurvatum, Beck.
 Burlington.
 Large White Trillium. *Trillium grandiflorum*, Salisb.
 um. Fayette ; Burlington.
Trillium erectum, L., var. *album*.
 Grinnell.
 Nodding Trillium. *Trillium cernuum*, L.
 Fayette.
 Dwarf White Trillium. *Trillium nivale*, Riddell.
 um. Burlington. Rare.
 Bellwort. *Uvularia grandiflora*, Smith.
 Ames ; Grinnell. (?)
Uvularia perfoliata, L.
 Fayette ; Burlington.
Uvularia sessilifolia, L.
 Fayette.
 False Spikenard. *Smilacina racemosa*, Desf.
 Ames ; Fayette ; Burlington.
Smilacina stellata, Desf.
 Ames ; Grinnell ; Fayette ; Burlington.

Great Solomon's Seal.	<i>Polygonatum giganteum</i> , Dietrich. Ames ; Grinnell.
Wild Orange-red Lily.	<i>Lilium Philadelphicum</i> , L. Ames ; Grinnell ; Charles City ; Burlington.
Turk's-cap Lily.	<i>Lilium superbum</i> , L. Ames ; Charles City ; Burlington.
Yellow Adder's Tongue.	<i>Erythronium Americanum</i> , Smith. Fayette.
White Dog's-tooth Violet.	<i>Erythronium albidum</i> , Nutt. Ames ; Indianola ; Grinnell ; Fayette ; Burlington
Wild Leek.	<i>Allium tricoccum</i> , Ait. Ames.
Wild Garlic.	<i>Allium Canadense</i> , Kalm. Ames ; Charles City.

JUNCACEÆ.

Rush.	<i>Juncus tenuis</i> , Willd. Ames.
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COMMELYNACEÆ.

Spiderwort.	<i>Tradescantia Virginica</i> , L. Ames ; Charles City ; Grinnell ; Burlington
	<i>Tradescantia pilosa</i> , Lehm. Fayette.

CYPERACEÆ.

Galingale.	<i>Cyperus Michauxianus</i> , Schultes. Ames.
Spike Rush.	<i>Eleocharis palustris</i> , R. Br. Ames.
	<i>Eleocharis acicularis</i> , R. Br. Ames.
Great Bulrush.	<i>Scirpus validus</i> , Vahl. Ames.
	<i>Scirpus atrovirens</i> , Muhl. Ames.
Cotton Grass.	<i>Eriophorum polystachyon</i> , L. Ames ; Grinnell.

Sedge.

- Carex bromoides*, Schk.
Ames.
- Carex disticha*, Huds.
Ames.
- Carex vulpinoidea*, Michx.
Ames.
- Carex sparganoides*, Muhl.
Ames.
- Carex cephalophora*, Muhl.
Ames.
- Carex rosea*, Schk.
Ames.
- Carex lagopodioides*, Schk.
Ames.
- Carex adusta*, Boott.
Ames.
- Carex straminea*, Schk. var. *Meadii*.
Ames.
- Carex stricta*, Lam.
Ames.
- Carex grisea*, Wahl.
Ames.
- Carex lanuginosa*, Michx.
Ames.
- Carex hystericina*, Willd.
Ames.
- Carex folliculata*, L.
Ames.
- Carex longirostris*, Torr.
Ames.

GRAMINEÆ.

Timothy.

- Phleum pratense*, L.
Ames. Cultivated largely, and becoming spontaneous.

Red-top.

- Agrostis vulgaris*, With.
Ames. Cultivated ; becoming spontaneous.

Drop-seed Grass.	Muhlenbergia glomerata, Trin. Ames.
Porcupine Grass.	Stipa spartea, Trin. Ames.
Cord Grass.	Spartina cynosuroides, Willd. Ames.
Muskit Grass.	Bouteloua hirsuta, Lagasca. Ames. Bouteloua curtipendula, Gray Ames.
Orchard Grass.	Dactylis <i>glomerata</i> , L. Ames. Introduced. Glyceria nervata, Trin. Ames.
Wire Grass.	Poa compressa, L. Grinnell. Probably introduced.
Blue Grass.	Poa pratensis, L. Ames. Introduced as a pasture and lawn grass. Eragrostis reptans, Nees. Ames. Eragrostis <i>poaeoides</i> , Beauv. Ames. Var. <i>megastachya</i> . Ames. Eragrostis Frankii, Myer (?) Ames.
Fescue Grass.	Festuca tenella, Willd. Ames.
Chess.	Bromus <i>secalinus</i> , L. Ames. In wheat-fields.
Wild Chess.	Bromus Kalmii, Gray. Ames. Bromus ciliatus, L. var purgans. Ames.
Reed.	Phragmites communis, Trin. Ames.

- Quack, or
Grass. *Triticum repens*, L.
Ames.
Introduced ?
- Squirrel-tail Grass. *Hordeum jubatum*, L.
Ames.
Found along railroad. Perhaps introduced.
- Wild Rye. *Elymus Canadensis*, L.
Ames.
- Bottle-brush Grass. *Gymnostichum Hystrix*, Schreb.
Ames.
- Vanilla Grass. *Hierochloa borealis*, Roem & Schultes.
Ames.
In dry woods !
- Sweet Vernal Grass. *Anthoxanthum odoratum*, L.
Ames.
Introduced.
Panicum glabrum, Gaudin.
Ames.
- Finger-Grass. *Panicum sanguinale*, L.
Ames.
- Prairie Grass. *Panicum agrostoides*, L.
Ames.
- Old Witch Grass. *Panicum capillare*, L.
Ames. Common.
Breaks off at the ground in early winter, and blows all over the prairies.
Panicum latifolium, L.
Ames.
Panicum xanthophysum, Gray.
Ames.
Panicum dichotomum, L.
Ames.
Several forms of this variable species are found here.
- Barnyard Grass. *Panicum Crus-galli*, L.
Ames.
Introduced. A weed.
- Green Foxtail. *Setaria viridis*, Beauv.
Ames.
A weed in fields and gardens.
- sand Bur, or Bur
Grass. *Cenchrus tribuloides*, L.
Cedar Rapids.

- Beard Grass. *Andropogon furcatus*, Muhl.
Ames.
- Andropogon scoparius*, Michx.
Ames.
- Indian Grass. *Sorghum nutans*, Gray.
Ames.
Common on the prairies.

EQUISETACEÆ.

- Common Horsetail. *Equisetum arvense*, L.
Ames ; Charles City.
At Ames, also, the "accidental state"—var. *serotinum*, Myer.
—"in which the sterile plant produces a spike of fruit from its summit."
- Equisetum palustre*, L.(?)
Ames.
Annual stemmed ; main stems 12-14 grooved, and branches 6-9 grooved !
- Scouring Rush. *Equisetum hyemale*, L.
Ames.

FILICES.

- Polypody. *Polypodium vulgare*, L.
Ames (on Des Moines River bluffs.)
- Maidenhair Fern. *Adiantum pedatum*, L.
Ames ; Charles City.
- Spleenwort. *Asplenium thelypteroides*, Michx.
Ames.
- Walking Fern. *Camptosorus rhizophyllus*, Link.
Ames (on Des Moines River bluffs.)
- Bladder Fern. *Cystopteris fragilis*, Bernh.
Ames.
- Sensitive Fern. *Onoclea sensibilis*, L.
Ames.
- Moonwort. *Botrychium Virginicum*, Swartz.
Ames.

NOTE.—As the preceding catalogue is as yet very imperfect, persons noting omissions or errors will confer a favor by corresponding with C. E. Bessey, Ames, Iowa.

REPORT OF THE DEPARTMENT OF PHYSICS AND MECHANICS.

To the Honorable Board of Trustees of the Iowa Agricultural College:

GENTLEMEN:—I beg leave to present the following report regarding the apparatus and other facilities for instruction needed in the department of Physics and Mechanics.

During the past year about two thousand dollars have been expended for apparatus relating to heat and light mainly, but care has been taken to select instruments having as wide a range of application as possible. The necessity for apparatus is so urgent that I hope that this year a very much larger sum will be appropriated.

This apparatus is needed—

To enable the student to acquire knowledge that is beyond his reach without it.

To enable the student to make more rapid progress.

And most important of all, perhaps, to train the student to experiment and observe; to inculcate those habits of thought that fit him to discover new truth. This is one of the highest aims of the "New Education," to send young men into the active pursuits of life, prepared by their peculiar training to extend the boundaries of human knowledge, as they can only be extended, by experiment and observation. The study of science from text-books alone not only fails to give such training, but engenders habits of thought inconsistent with it. Such teaching is a failure, and worse than a failure, as regards the great object it is desirable to attain.

To accomplish this important object, the *best* apparatus is necessary. It must be capable of, and the student must be trained to attain, the utmost precision. Some single instruments of this class cost from \$1,000 to \$2,000, and the instruments must accompany these to render them available for all the purposes for which they

No. 33

NOTES ON THE
Aquatic Phenogams of Iowa.

By R. I. CRATTY.

Extract from Bulletin Lab. Nat. Sci., State Univ. Iowa.

Vol. III., No. 4.

December 10th, 1895.

NOTES ON THE AQUATIC PHENOGRAMS OF IOWA.

BY R. I. CRATTY.

So large a proportion of our state is suitable for cultivation that our native flora is being rapidly swept away, and while most of the species may survive along roadsides, in hilly and stony localities, and along streams, yet many which are rare or local must eventually disappear entirely. Most of the land too rolling for plowing is valuable for pasturage, and here the destruction of the indigenous flora is nearly as rapid, the introduced grasses, clovers, and weeds appropriating the ground. While the marsh and aquatic plants have a better chance in the struggle for existence than the prairie flora, yet the draining of ponds and marshes, thus greatly restricting the area frequented by such plants, is certain to sweep away some species which were formerly quite common. Those who have lived many years in the state, now see the former haunts of muskrats and aquatic birds covered with waving grain, and while from an economic point of view this change may be desirable, yet to the naturalist it brings the conviction that if we are to secure a full representation of what our flora was, there is no time to lose.

The following list of plants, all marsh or aquatic except our two species of *Arisæma*, while probably not complete, is an attempt to record in one paper a list of the species of the following orders found within our limits, giving as far as possible the geographical distribution of each. Free use has been made of Dr. Arthur's *Flora of Iowa* (1876), and of its several additions, and of Prof. A. S. Hitchcock's *Ames Flora*, as published in the *Transactions of the St. Louis Academy of Science*,

Vol. V. (1891). Much help has also been derived from Prof. Macmillan's *Metaspermæ of the Minnesota Valley* (1892). Dr. Morong's *Naiadaceæ of North America* and J. G. Smith's *Revision of the North American Species of Sagittaria and Lophotocarpus* have been followed in those groups. In the remaining portions the treatment, with a few exceptions, is essentially that of *Gray's Manual*, 6th edition.

Thanks are due Dr. J. C. Arthur, of Purdue University, Lafayette, Indiana, Mr. E. W. D. Holway, of Decorah, Iowa, Prof. A. S. Hitchcock, of the Kansas Agricultural College, Edmund P. Sheldon, of the University of Minnesota, and Prof. B. Shimek, of the Iowa State University, for valuable assistance. Mr. F. Reppert, of Muscatine, Iowa, has greatly aided me by the loan of specimens, literature, and by furnishing many valuable notes. Prof. W. A. Kellerman, of the Ohio State University, kindly looked over for me a portion of Dr. Arthur's collection now in the herbarium of the late Dr. Townshend. Prof. L. H. Pammel, of the Iowa Agricultural College, kindly loaned me for study the collection of Iowa aquatics in the herbarium of that institution. Finally, I desire to thank Prof. T. H. Macbride, of the Iowa State University, for his kindness and the efficient aid he has rendered me in many ways.

ARACEÆ.

ARISÆMA Mart. Flora, II., 459 (1831).

1. A. TRIPHYLLUM (*Linn.*) *Torr.* Fl. N. Y., II., (1843).

Wats. and Coult., *Gray's Man.*, 6th ed., 549; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 521; Macmillan, *Metas. Minn. Val.*, 132.

Common throughout; preferring low, rich ground in woods. Flowering in May or June, the fruit maturing late in August.

Decorah, *Holway*; Iowa City, *Macbride*; Ames and Charles City, *Arthur*; Emmet county, *Cratty*; Le Claire, *Rolfs*; Muscatine, *Reppert*; Winnebago county, *Shimek*.

2. *A. DRACONTIUM* (*Linn.*) *Schott.* Melet. (1832).

Wats. and Coult., Gray's Man., 6th ed., 549; Upham, Fl. Minn., 134; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 521.

Low damp woods; less common than the preceding species.

Decorah, *Holway*; Ames, *Hitchcock*; Iowa City, *Macbride*; Charles City, *Arthur*; Muscatine, *Reppert*; Keokuk, *Rolfs*.

NOTE.—*Calla palustris* Linn., Spec. Ed. 2, 1373 (1762), has been found just outside our limits in southeastern Minnesota. It may be looked for in the northeastern part of our state.

SYMPLOCARPUS *Salisb.* Nutt., Gen. I., 105 (1818).1. *S. FÆTIDUS* *Salisb.* Nutt., Gen. I., 105 (1818).

Wats. and Coult., Gray's Man., 6th ed., 551; Arthur, Fl. Iowa, 30; Macmillan, Metas. Minn. Val., 131.

A homely plant with a most disagreeable odor. Bogs and very moist ground; eastern and southern portions of the state. Rather rare.

Decorah, *Holway*; Muscatine county, *Macbride*, *Reppert*.

ACORUS *Linn.* Spec. Pl. (1753).1. *A. CALAMUS* *Linn.* Spec. Pl. 324 (1753).

Wats. and Coult., Gray's Man., 6th ed., 551; Arthur, Fl. Iowa, 30; Upham, Fl. Minn., 135.

Well distributed throughout the state. Usually only a small percentage of the plants flower. Marshes, June, July.

Decorah, *Holway*; Iowa City and Cedar Rapids, *Macbride*; Emmet county, *Cratty*; Ames, *Hitchcock*; Hancock county, *Arthur*; Jewell Junction, *Rolfs*; Winnebago county, *Shimek*.

LEMNACEÆ.

LEMNA *Linn.* Spec. Pl., (1753).1. *L. MINOR* *Linn.* Spec. Pl. 970 (1753).

Wats. and Coult., Gray's Man., 6th ed., 553; Arthur, Fl.

Iowa, 30; Hitchcock, Ames Fl., 522; Macmillan, Metas. Minn. Val., 133.

Proliferous like the rest of our *Lemnaceæ*, the flowers and fruit being rarely seen. In stagnant water; rarer than the two following.

Ames and Iowa City, *Hitchcock*; Marshalltown, *Stewart*; Muscatine, *Reppert*; Linn county, *Shimek*; Ames (near the var. *orbiculata* Austin), *Bessey*.

2. *L. TRISULCA* Linn. Spec. Pl., 970 (1753).

Wats. and Coult., Gray's Man., 6th ed., 552; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 522; Upham, Fl. Minn., 135.

Common throughout the state, floating on stagnant water, among other vegetation, often in dense mats. June, July.

Emmet county, *Cratty*; Iowa City and Cedar Rapids, *Macbride*; Decorah, *Holway*; Ames, *Arthur*, *Bessey*; Spirit Lake, *Hitchcock*; Muscatine, *Reppert*; Hancock county, *Shimek*.

3. *L. POLYRRHIZA* Linn. Spec. Pl., 970 (1753).

Spirodela polyrrhiza Schleid, Linneæ, XIII., 392 (1839).

Wats. and Coult., Gray's Man., 6th ed., 552; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 521; Macmillan, Metas. Minn. Val., 134.

Very common throughout, floating on stagnant or slow flowing water. July.

Muscatine, *Reppert*; Spirit Lake, *Hitchcock*; Ames, *Arthur*; Decorah, *Holway*; Cedar Rapids and Iowa City, *Macbride*; Emmet county, *Cratty*; Winnebago county, *Shimek*.

NOTE.—*L. perpusilla* Torr., Fl. N. Y., II., 245 (1843), should be looked for in the eastern part of the state.

WOLFFIA Horkel. Linn. XIII., 389 (1839).

I. *W. BRASILIENSIS* Wedd. Ann. Sci. Nat. Ser., 3, XII., 157 (1849).

Grantia brasiliensis (Wedd.) Macmillan, Metas. Minn. Val., 134 (1892).

Wats. and Coult., Gray's Man., 6th ed., 553; Upham, Fl. Minn., 135; Beal and Wheeler, Fl. Mich., 144.

Floating as little grains on the surface of the water.

Iowa City and Cedar Rapids, where it is very common some years, *Macbride*, *Shimek*; Mississippi River near Oquawka, Ill., *Patterson*; Muscatine, *Reppert*.

TYPHACEÆ.

TYPHA Linn. Spec. Pl., (1753).

1. T. LATIFOLIA Linn. Spec. Pl., 971 (1753).

Wats. and Coult., Gray's Man., 6th ed., 547; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 521; Macmillan, Metas. Minn. Val., 31.

A well known plant of wide distribution throughout the northern hemisphere. Fertile portion of spike when mature often 1 in. or more in diameter, and 5 to 8 in. long. Common in marshes and edges of ponds. July, August.

Decorah, *Holway*; Iowa City, *Macbride*; Emmet and Kosuth counties, *Cratty*; Ames, *Arthur*, *Hitchcock*; Hamilton county, *Rolfs*; Muscatine, *Reppert*; Charles City, *Arthur*; Cedar Rapids, Keokuk, Taylor county, *Shimek*; Henry, Scott, Delaware, Jackson counties, *Macbride*.

SPARGANIACEÆ.

SPARGANIUM Linn. Spec. Pl. (1753).

1. S. SIMPLEX Huds. Fl. Angl. Ed. 2, 401 (1762).

S. simplex Huds. var. *nuttallii* Englm. in Gray's Man., 5th ed., 481 (1867).

Wats. and Coult., Gray's Man., 6th ed., 548; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl. 521; Upham, Fl. Minn., 135.

Marshes and edges of lakes; rare or local. July, August. Ames, four miles southwest of College, *Hitchcock*.

2. *S. ANDROCLADUM* (*Engelm.*) *Morong*, *Bull. Torr. Bot. Club*, XV., 78 (1888).

S. simplex Huds. var. *androcladum* Engelm. in Gray's *Man.*, 5th ed., 481 (1867).

Wats. and Coult., Gray's *Man.* 6th ed., 548; Arthur, *Fl. Iowa*, 30; Macmillan, *Metas. Minn. Val.*, 33.

Heads when mature about one inch in diameter, being intermediate in size between the preceding and the next. Ponds; rare. July, August.

Davenport, *Arthur's Fl. Iowa*, No. 775; Wilton, *Hitchcock*.

3. *S. EURYCARPUM* *Engelm.* Gray's *Man.*, 2nd ed. (1852).

Wats. and Coult., Gray's *Man.*, 6th ed., 548; Arthur, *Fl. Iowa*, 30; Hitchcock, *Ames Fl.* 521; Macmillan, *Metas. Minn. Val.*, 33.

Frequent throughout the state on the margin of ponds and lakes, usually being found among a rank growth of grasses and sedges. Mature heads of fruit are often 1½ in. in diameter. July, August.

Emmet county, *Cratty*: Iowa City, *Macbride*; Ames, *Hitchcock*; Humboldt, *Bessey*; Hamilton county, *Rolfs*; Dickinson county, *Hitchcock*; Washington and Winnebago counties, Cedar Rapids, *Shimek*.

NAIADACEÆ.

NAIAS *Linn.* *Spec. Pl.*, 1015 (1753).

1. *N. FLEXILIS* (*Willd.*) *Rost. & Schmidt*, *Fl. Sed.* 384 (1824).

Morong, *Naiad. N. A.*, 59; Wats. and Coult., Gray's *Man.*, 6th ed., 566; Macmillan, *Metas. Minn. Val.*, 40; Hitchcock, *Ames Fl.*, 523; Arthur, *Fl. Iowa*, 30.

A homely little plant, growing entirely under water, and widely distributed throughout the northern hemisphere. Ponds and slow streams. July, August.

Lake Cairo, *Bessey*; Emmet county, *Cratty*; Story and Dickinson counties, *Hitchcock*; Muscatine *Reppert*; Hancock county, *Shimek*.

ZANNICHELLIA *Linn.* Spec. Pl., 969 (1753).1. Z. PALUSTRIS *Linn.* Spec. Pl., 969 (1753).

Morong, Naiad., N. A. 57; Wats. and Coult., Gray's Man., 6th ed., 565; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 523; Upham, Fl. Minn., 136.

A graceful aquatic with capillary stems, sparsely branched; flowering and ripening its fruit under water. Cosmopolitan. Ponds, and slow streams.

Ames, not uncommon, *Hitchcock*; Muscatine, *Reppert*; Storm Lake, *Bessey*.

POTAMOGETON *Linn.* Spec. Pl., 126 (1753).1. P. NATANS. *Linn.* Spec. Pl., 126 (1753).

Morong, Naid. N. A. 13; Wats. and Coult., Gray's Man., 6th ed., 558; Arthur, Cont. Fl. Iowa, III.; Macmillan, Metas. Minn. Val., 34.

Ponds and slow-flowing streams; fruit maturing in August which should be especially collected of all species of the genus.

Lake township, Muscatine county, *Reppert*; Linn county, *Shimek*; Lake Okoboji and Fort Dodge, *Hitchcock*.

2. P. AMPLIFOLIUS *Tuck.* Am. Jour. Sci., 2, VI., 225 (1848).

Morong, Naiad. N. A., 16; Wats. and Coult., Gray's Man., 6th ed., 561; Upham, Fl. Minn., 136; Arthur, Fl. Iowa, 30; Beal and Wheeler, Fl. Mich., 146.

Slow flowing streams; rather rare.

Emmet county, *Cratty*; Muscatine, *Reppert*; Spirit Lake, *Hitchcock*; Tama County, *Sirrinc*; Charles City, *Arthur*.

3. P. NUTTALLII *Ch. & Sch.* Linnæa, II., 226 (1827).

P. pennsylvanicus Ch. & Sch. Linn., II., 227 (1827).

P. claytonii *Tuck.* Am. Jour. Sci. and Arts. 1st Ser., XLV., 38 (1843).

Morong, Naiad. N. A., 18; Wats. and Coult., Gray's Man., 6th ed., 559; Beal and Wheeler, Fl. Mich., 145.

Not before reported from Iowa. Ponds and slow streams along Cedar River near Muscatine, June 25. 1894. Not common. *Herb. Reppert, No. 738.*

4. *P. LONCHITES* *Tuck.* Am. Jour. Sci. and Arts, 2nd Ser., VII., 348 (1849).

P. fluitans *Auc. Amer.*

(?) *P. fluitans* *Roth, Fl. Germ., I., 72 (1788).*

Morong, Naiad. N. A., 20; Wats. and Coult., Gray's Man., 6th ed., 560; Macmillan, Metas. Minn. Val., 34; Arthur, Fl. Iowa, 30.

Slow-flowing streams; common. Forms of this species with the petioles of the submerged leaves 6 to 8 in. long were collected by Mr. Reppert in the Mississippi River near Muscatine.

West Fork of the Des Moines at Estherville, *Cratty*: Ames, streams around Cairo Lake, *Hitchcock*: ponds and sloughs along Cedar River, *Reppert*: Iowa City, Linn and Lee counties, *Shimek*: Charles City, *Arthur*: Storm Lake, *Bessey*: Waterloo and Spirit Lake, *Hitchcock*: Hamilton county, *Rolfs*.

5. *P. HETEROPHYLLUS* *Schreb.* Spic. Fl. Lips, 21 (1771).

P. gramineus, var. *heterophyllus* *Fries.* Nov. 2nd ed., 35 (1828).

Morong, Naiad. N. A., 23; Wats. and Coult., Gray's Man., 6th ed., 561; Hitchcock, Ames Fl., 522; Macmillan, Metas. Minn. Val., 35.

An extremely variable species, preferring quiet water; rare within our limits. When the ponds and sloughs dry up this species often sends up shoots bearing several broad green leaves, in this respect resembling *P. illinoensis*.

Sloughs near Armstrong, Emmet county, *Cratty*: Ames, rare, *Hitchcock*.

6. *P. ILLINOENSIS* *Morong.* Bot. Gaz, V., 50 (1880).

Morong, Naiad. N. A., 27; Wats. and Coult., Gray's Man., 6th ed., 561; Macmillan, Metas. Minn. Val., 36; Arthur, Cont. Fl. Iowa, V.; Hitchcock, Ames, Fl., 522.

Ponds and margins of lakes. This species has the floating leaves more crowded and of a stockier growth than *P. lonchites* with which it is often confounded. "The plant confines itself mostly to rather shallow water on the margin of sloughs and ponds. The plants are often left exposed in the mud, in which, if it does not become too dry, the roots survive and produce short shoots bearing 3 to 4 leaves."—*Reppert*.

Emmet county, rare, *Cratty*; Ames, infrequent, *Hitchcock*; Muscatine, the most common of the large-leaved species, *Reppert*.

7. *P. PRÆLONGUS* *Wulfen*. Roem. Arch., III., 331 (1803-5).

Morong, Naiad. N. A., 32; Wats. and Coult., Gray's Man., 6th ed., 562; Upham, Fl. Minn., 136; Arthur, Fl. Iowa, 30; Beal and Wheeler, Fl. Mich., 146.

Deep water, lakes and ponds. July, August.

Clear Lake, *Arthur*; Okoboji and Spirit Lakes, *Hitchcock*; Iowa Lake, *Cratty*.

NOTE.—*P. lucens* Linn. Spec. Pl., 126 (1753). Specimens without flowers or fruit of what appears to be this species were collected by Professor Hitchcock near Ames and are in the herbarium of the Agricultural College.

8. *P. PERFOLIATUS* *Linn.*, var. *RICHARDSONII* *A. Bennett*. Jour. Bot., XXVII., 25 (1889). *P. lanceolatus* Sm. Eng. Bot., 1985 (1808). *P. perfoliatus* var. *lanceolatus* Robbins in Gray's Man., 5th ed., 488 (1867).

Morong, Naiad. N. A., 33; Wats. and Coult., Gray's Man., 6th ed., 562; Arthur, Cont. Fl. Iowa, V.; Upham, Fl. Minn., 137.

Shallow water in lakes, ponds, and streams—a most beautiful plant. July. I have not seen the typical *P. perfoliatus* from Iowa.

Okoboji and Spirit Lakes, *Hitchcock*; Emmet county, *Cratty*.

9. *P. ZOSTERÆFOLIUS* *Schum.* Enum. Pl. Sael, I., 50 (1801), *P. compressus* Fries. Nov. ed. 2. 44 (1828), non Linn.

Morong, Naiad. N. A., 37; Wats. and Coult., Gray's Man., 6th ed., 562; Macmillan, Metas. Minn. Val., 39; Arthur, Cont. Fl. Iowa, III.; Hitchcock, Ames, Fl., 522.

A beautiful plant with bright, smooth leaves. Shallow water in lakes or slow streams. July, August.

Vinton. *Arthur's Cat.*; Iowa Lake, Emmet county, *Cratty*; Lake Okoboji and Ames, *Hitchcock*; Muscatine, *Reppert*; Cedar Rapids, Iowa City, Hancock county, *Shimek*.

10. *P. FOLIOSUS* Raf. Med. Rep., II., Hex. V., 354 (1808).
P. pauciflorus Pursh. Fl. Am., I., 121 (1814), non Lam.
 Fl. Franc, III., 209 (1778).

Morong, Naiad. N. A., 39; Wats. and Coult., Gray's Man., 6th ed., 563; Arthur, Fl. Iowa, 30; Macmillan, Metas. Minn. Val., 39.

A very variable species, usually growing entirely under water, and widely distributed throughout the United States and Canada. Morong in his *Naiadaceae of North America* says, "spikes about 4-flowered." Emmet county, Iowa, specimens determined by him have the spikes 4- to 6-fruited. Some of Mr. Reppert's specimens vary from the type in having the spikes 6- to 10-fruited, in this respect approaching the var. *niagarensis* (Tuck.) Gray. Similar forms were also collected at Ames by Prof. Hitchcock. June, July.

Shallow water in ponds and lakes, Emmet county, *Cratty*; Muscatine, *Reppert*; Iowa City, Lee, Hancock, and Linn counties. *Shimek*; Mt. Pleasant, *Mills*; Charles City, *Arthur*; Grand Junction, *Bessey*; Dickinson and Woodbury counties. *Hitchcock*.

NOTE.—*P. obtusifolius* Mert. and Kock. Deut. Fl., I., 855 (1823), has been reported from this State, but I have not seen it. Plants so labeled which I have seen are forms of another species.

11. *P. MAJOR* (Fries) Morong, Naiad. N. A., 41 (1893).
P. rutilus Auc. Amer. in part, non Schult., Mant. III., 362 (1827).
P. pusillus Linn., var. *major* Fries. Nov. 48 (1828).
P. compressus Sm. Eng. Bot., III., 418 (1794), non Linn.

Morong, Naiad. N. A., 41; Wats. and Coult., Gray's Man., 6th ed., 563; Upham, Fl. Minn., 137.

A graceful little plant with delicate, bright foliage, somewhat resembling *P. pusillus* but larger. Rare in America. Ponds and shallow lakes. July.

Iowa Lake, Emmet county, *Cratty*; Muscatine, *Herb. Reppert*, No. 746 in part; Spirit Lake, *Hitchcock*.

12. *P. PUSILLUS* Linn. Spec. Pl., 127 (1753).

Morong, Naiad. N. A., 45; Wats. and Coult., Gray's Man., 6th ed., 563; Macmillan, Metas. Minn. Val., 36; Hitchcock, Ames Fl., 522.

A delicate species preferring shallow ponds and lakes. July.

Ames, abundant at Cairo Lake, *Hitchcock*; Muscatine, *Herb. Reppert*, No. 746 in part.

13. *P. SPIRILLUS* Tuck. Am. Jour. Sci. and Arts, 2nd Ser., VI, 226 (1848).

Morong, Naiad. N. A., 49; Wats. and Coult., Gray's Man., 6th ed., 560; Beal and Wheeler, Fl. Mich., 145; Bot. Death Val. Ex., 210.

This interesting little plant, not before reported from the State, was collected in August, 1889, at Carnsforth, Iowa, by Prof. Hitchcock, and again in July, 1894, by Mr. Kenneth McKenzie in ponds along the C., R. I. & P. R. R., between Muscatine and Fruitland. The specimens approach *P. diversifolius* Raf. (*P. hybridus* Michx.) in some characters, but are quite clearly distinguished by the submerged spikes being sessile or nearly so; by the broader submerged leaves, and by the curious snail-like fruit which shows the coiled embryo very conspicuously, even in the dried specimen.

14. *P. PECTINATUS* Linn. Spec. Pl., 127 (1753).

Morong, Naiad. N. A., 51; Wats. and Coult., Gray's Man., 6th ed., 564; Macmillan, Metas. Minn. Val., 35; Arthur, Fl. Iowa, 30.

One of the most widely distributed species of plants, occurring in Europe, Asia, Africa, Australia, and the greater part of North America. Ponds and quiet streams. July, August.

West Fork of the Des Moines, Estherville, *Cratty*; Muscatine, *Reppert*; Woodbine, *Burgess*; Storm Lake, *Bessey*; Lake Okoboji, *Hitchcock*; Hancock and Linn counties, *Shimek*.

JUNCAGINEÆ.

TRIGLOCHIN *Linn.* Sp. Pl., 339 (1753):

1. *T. MARITIMA* *Linn.* Sp. Pl., 339 (1753).

T. elata Nutt. Gen. I., 237 (1818).

T. maritima, var. *elata* Gray's Man., 2nd ed., 437 (1852).

Morong, Naiad. N. A., 8; Wats. and Coult., Gray's Man., 6th ed., 558; Arthur, Cont. Fl. Iowa, V.; Macmillan, Metas. Minn. Val., 41; Hitchcock, Ames Fl., 522.

Widely distributed throughout Canada and the northern half of the United States. Most common in salt marshes, but in the interior it is found in fresh water bogs. Our plant 2 to 3 ft. tall. July, August.

Ames, very rare, *Hitchcock*; bogs near Armstrong, Emmet county, infrequent, *Cratty*.

SCHEUCHZERIA *Linn.* Spec. Pl., 338 (1753):

1. *S. PALUSTRIS* *Linn.* Sp. Pl., 338 (1753).

Morong, Naiad. N. A., 9; Wats. and Coult., Gray's Man., 6th ed., 558; Arthur, Cont. Fl. Iowa, V.; Macmillan, Metas. Minn. Val., 42.

A rush-like perennial plant growing in cold bogs, and flowering early in the spring, the fruit maturing in July. Only one species is known.

Emmet county, two miles north of Armstrong, very rare, *Cratty*. This is about its southern limit in the United States.

ALISMACEÆ.

ALISMA *Linn.* Sp. Pl. (1753).1. A. PLANTAGO *Linn.* Sp. Pl., 342 (1753).

A. plantago var. *americana*, R. and S., Syst. III. (1818).

Wats. and Coult., Gray's Man., 6th ed., 554; Arthur, Fl. Iowa, 31; Hitchcock, Ames Fl., 522; Upham, Fl. Minn., 138.

Common throughout the State. The plant varies greatly, especially in regard to size and foliage, the result of different conditions of its place of growth. June, July.

Emmet county, *Cratty*; Iowa City and Cedar Rapids, *Macbride*; Decorah, *Holway*; Ames and Charles City, *Arthur*; Boone, *Bessey*; Muscatine, *Reppert*; Webster City, *Pammel*; Marshalltown, *Stewart*; Hamilton county, *Rolfs*; Fremont, Washington, Lee, Jackson and Scott counties, *Shimek*.

ECHINODORUS *Richard.* Mem. Mus., 365 (1815)1. E. ROSTRATUS (*Nutt.*) *Engelm.* Gray's Man., 2nd ed., 438 (1856).

Alisma rostrata Nutt.

Wats. and Coult., Gray's Man., 6th ed., 556; Hitchcock, Bull. Torr. Bot. Club, XVI., 70.

Ditches and swamps. Illinois to Iowa and southward; rather rare. August, September.

Hamburg, *Hitchcock*; Iowa City, *Macbride*; Muscatine, *Reppert*; Sioux City, *Pammel*; Keokuk, *Shimek*.

.2 E. PARVULUS *Engelm.* Gray's Man., 2nd ed., 438 (1856).

Wats. and Coult., Gray's Man., 6th ed., 556; Arthur, Fl. Iowa, 31; Upham, Fl. Minn., 138; Beal and Wheeler, Fl. Mich., 145.

Rare or local. No. 786 of *Arthur's Flora of Iowa*, but without locality.

SAGITTARIA Linn. Sp. Pl. (1753).

1. *S. ARIFOLIA* Nutt. in Herb. J. G. Smith, Rev. N. A. Sag. and Loph., 6 (1894).

S. sagittæfolia minor Pursh., Fl. Am., II., 395 (1814).

A species widely distributed in the western half of the United States, but probably rare within our limits. In general appearance closely resembling form *c.* of *S. latifolia* Willd., but the fruit very different, long, winged on both sides, with a very short upright beak, and (in our plant) a prominent vertical sub-epidermal resin passage. Collected at Iowa City by Prof. Hitchcock. Herbarium of Iowa Agricultural College.

2. *S. LATIFOLIA* Willd. Sp. Pl., IV., 409 (1806).

S. variabilis Engelm. Gray's Man., 1st ed., (1848).

S. sagittæfolia Auc. Amer.

(?) *S. sagittæfolia* Linn. Sp. 993 (1753).

Smith, Rev. N. A. Sag. and Loph., 8; Wats. and Coult., Gray's Man., 6th ed., 554; Macmillan, Metas. Minn. Val., 45; Arthur, Fl. Iowa, 31; Hitchcock, Ames Fl., 522.

Very common throughout the State in sloughs and edges of ponds, lakes, and streams. Excessively variable in size, foliage, shapes of the achenia, etc. The typical plant has achenia obliquely or horizontally beaked, both of which forms are common within our limits. J. G. Smith in his recent monograph includes five forms of which form *a*, the var. *obtusa* Engelm., and form *c*, including the varieties *hastata*, *angustifolia*, *gracilis*, and *diversifolia* of most collectors are frequent.

Several species of *Sagittaria* produce tubers, especially *S. latifolia* and its various forms. These tubers are called Wabes-i-pin-ig, or swan potatoes, by the Chippewa Indians, because they furnish nourishment for the larger aquatic fowls. "These tubers sometimes attain the size of a small hen's egg and are then eaten by the Indians with whom they are a great favorite. In their raw state they contain a bitter, milky juice, but in boiling become sweet and palatable."—*Parry*.

Decorah, *Holway*; Emmet and Kossuth counties, *Cratty*;

Jones county, Cedar Rapids and Iowa City, *Macbride*; Ames, *Arthur*; Hamilton county, *Rolfs*; Muscatine, *Reppert*; Marshalltown, *Stewart*; Davenport and Waterloo, *Hitchcock*; Winnebago and Lee counties, *Shimek*.

3. *S. RIGIDA* Pursh. Fl. Am., 397 (1814).

S. heterophylla Pursh. Fl. Am., 396 (1814), not of Schreb. Fl. Erl., II., 119 (1811).

Smith, Rev. N. A. Sag. and Loph., 23; Wats. and Coult., Gray's Man., 6th ed., 555; Hitchcock, Ames Fl., 520; Arthur, Cont. Fl. Iowa, III.

Edges of lakes or streams; rather common in the eastern and southern portions of the State. Very variable, especially in regard to size and foliage, July, August.

Clinton county, *Butler*; Ames, abundant at Cairo Lake, *Hitchcock*; Muscatine, in Muscatine slough at the upper bridge, five miles below the city, *Reppert*; Waterloo, *Hitchcock*; Linn county, *Shimek*. Specimens collected at Iowa City by Prof. Hitchcock have the submersed foliage closely resembling that of *S. teres* Wats.

4. *S. GRAMINEA* Michx. Fl. N. A., I., 190 (1803).

Smith, Rev. N. A. Sag. and Loph., 24; Wats. and Coult., Gray's Man., 6th ed., 555; Arthur, Fl. Iowa, 31; Hitchcock, Ames Fl., 522; Webb, Fl. Neb., 97.

Southeast portion of the State; ponds and streams. July.

Ames and Boone, *Bessey*; Hamilton county, *Rolfs*; Iowa City, *Macbride*; Muscatine, *Reppert*; Nevada, *Fragier*; Carnsforth, *Hitchcock*, a form approaching *S. cristata*.

5. *S. CRISTATA* Engelm. in Arthur, Cont. Fl. Iowa, V., (1882).
Proc. Dav. Acad. Sci., IV., 29 (1886).

S. variabilis var. (?) *gracilis*, S. Watson in Gray's Man., 6th ed., 555, in part, not of Engelm.

Smith, Rev. N. A. Sag. and Loph., 27; Sheldon, Minn. Bot. Studies, Bull. 9. pt. II.

Monœcious aquatic, rooting in the sand or mud in water a

few inches to several feet deep, 6 in. to 2 ft. high; petioles about equaling the scape in height, the leaf slightly resembling the petiole in form and structure, 3 to 5 in. long, linear or linear lanceolate, thick, spongy, somewhat triangular in cross section, and when flattened in the herbarium specimen, appearing more nearly lanceolate in form. Submerged phyllodia linear or linear lanceolate, acute or obtuse, 4 to 8 in. long, rigid, with about five principal and many intermediate nerves, coarsely reticulated, clustered at the base of the plant, and appearing in tufts from the nodes of the stolons by means of which the plant is propagated, and which extend for a considerable distance along the muddy bottom. Scape slender, bearing 4 to 6 whorls of flowers, rarely more than the lower whorl fertile; pedicels of sterile and fertile flowers about equal, $\frac{3}{4}$ to 1 in. long, bracts connate, acute or slightly obtuse; petals white, delicate, wavy; filaments pubescent, thickened below, longer than the anthers. Fruit heads $\frac{1}{2}$ to $\frac{3}{4}$ in. in diameter, shrinking much in drying; achenia obovate with a conspicuous horizontal style, and crested back and sides.

The type specimens of this plant with flowers and mature fruit were collected by the writer in a small lake, since dried up, one mile east of Armstrong, Emmet county, Iowa, in August, 1881, and were sent to Dr. Geo. Engelmann for determination. In his reply he stated that while it was closely allied to *S. graminea* Michx., he could not decide definitely in regard to it without thoroughly revising the genus. However, under date of March 5, 1882, he sent to Dr. Arthur the provisional name *S. cristata*, which was published with a few lines of description in Arthur's *Contribution to the Flora of Iowa* as above noted. The late Dr. Morong, who studied the plant critically, considered it a good species, and it is so regarded in J. G. Smith's recent monograph. Plants collected at Ames and Carnsforth, and conjectured to be this species, are best considered as forms of *S. graminea* Michx.

Besides the locality above given, the plant has also been found in several places in Minnesota. See Sheldon in *Minn. Bot. Stud., Bull.* 9, pt. II.

LOPHOTOCARPUS *T. Durand.* Index Gen.

Pl., 627 (1888).

1. *L. CALYCINUS* (*Engelm.*) *J. G. Smith* in Mem. Torr. Bot. Club, V., 25 (1894).

Sagittaria calycinus Engelm. in Torr., Bot. Mex. Bound., 212 (1858).

Wats. and Coult., Gray's Man., 6th ed., 556; Cont. to U. S. Nat. Herb., II., 455.

Not before reported from the State and very rare within our limits.

Muscatine, margin of a pond just above the city, *Reppert*.

HYDROCHARIDACEÆ.

ELODEA *Richard.* Mich., Fl. Bor. Am., I., 20 (1803).

1. *E. CANADENSIS* *Rich. and Michx.* Fl. N. Am., I., 20 (1803).

Anacharis canadensis Planch. Ann. Mag. and Nat. Hist., 2nd Ser., I., 86 (1848).

Wats. and Coult., Gray's Man., 6th ed., 496; Arthur, Fl. Iowa, 31; Upham, Fl. Minn., 139.

Frequent throughout the State in slow-flowing streams. The staminate flowers are very rarely seen. A few were collected by the writer near Armstrong, in July, 1882.

Emmet county, *Cratty*; Iowa City, *Macbride*; Decorah, *Holway*; Ames and Charles City, *Arthur*; Ft. Dodge, *Bessey*; Spirit Lake, *Hitchcock*; Muscatine, *Reppert*; Hancock county and Cedar Rapids, *Shimek*.

VALLISNERIA *Linn.* Sp. Pl. (1753).

1. *V. SPIRALIS* *Linn.* Sp. Pl., 1015 (1753).

Wats. and Coult., Gray's Man., 6th ed., 496; Arthur, Fl. Iowa, 31; Macmillan, Metas. Minn. Val., 46.

Rather rare in ponds and lakes, or slow streams. August.

Independence, Bluffton and Iowa City, *Macbride*; Iowa Lake, Emmet county, *Cratty*; Ames and Storm Lake, *Bessey*; Mud Lake, Story county, *Hitchcock*; Mason City, *Shimek*.

Webber, H. J. Catalogue of the Flora of Nebraska. Rept. Neb. Board of Agr. 1889: 175-302 (1-162). 1890.

On p. 215 (75) mentions *Exoascus deformans* "on peach leaves and plums."

Webber, H. J. Appendix to the Catalogue of the Flora of Nebraska. Tr. St. Louis Acad. 6: 1-47. 12 Mr 1892.— (Contr. Bot. Dept. Univ. Neb. n. s. 3: 1-44. 14 Je 1892.).

Mentions on p. 15 *Exoascus pruni* on common wild plum and *Prunus pumila*.

Zopf, W. Die Pilze in morphologischer, physiologischer, biologischer und systematischer Beziehung. large 8vo. pp. 500. figs. 163. 1890.*

NOTES ON THE AQUATIC PHENOGRAMS OF IOWA.

BY R. I. CRATTY.

So large a proportion of our state is suitable for cultivation that our native flora is being rapidly swept away, and while most of the species may survive along roadsides, in hilly and stony localities, and along streams, yet many which are rare or local must eventually disappear entirely. Most of the land too rolling for plowing is valuable for pasturage, and here the destruction of the indigenous flora is nearly as rapid, the introduced grasses, clovers, and weeds appropriating the ground. While the marsh and aquatic plants have a better chance in the struggle for existence than the prairie flora, yet the draining of ponds and marshes, thus greatly restricting the area frequented by such plants, is certain to sweep away some species which were formerly quite common. Those who have lived many years in the state, now see the former haunts of muskrats and aquatic birds covered with waving grain, and while from an economic point of view this change may be desirable, yet to the naturalist it brings the conviction that if we are to secure a full representation of what our flora was, there is no time to lose.

The following list of plants, all marsh or aquatic except our two species of *Arisæma*, while probably not complete, is an attempt to record in one paper a list of the species of the following orders found within our limits, giving as far as possible the geographical distribution of each. Free use has been made of Dr. Arthur's *Flora of Iowa* (1876), and of its several additions, and of Prof. A. S. Hitchcock's *Ames Flora*, as published in the *Transactions of the St. Louis Academy of Science*,

Vol. V. (1891). Much help has also been derived from Prof. Macmillan's *Metaspermæ of the Minnesota Valley* (1892). Dr. Morong's *Naiadaceæ of North America* and J. G. Smith's *Revision of the North American Species of Sagittaria and Lophotocarpus* have been followed in those groups. In the remaining portions the treatment, with a few exceptions, is essentially that of *Gray's Manual*, 6th edition.

Thanks are due Dr. J. C. Arthur, of Purdue University, Lafayette, Indiana, Mr. E. W. D. Holway, of Decorah, Iowa, Prof. A. S. Hitchcock, of the Kansas Agricultural College, Edmund P. Sheldon, of the University of Minnesota, and Prof. B. Shimek, of the Iowa State University, for valuable assistance. Mr. F. Reppert, of Muscatine, Iowa, has greatly aided me by the loan of specimens, literature, and by furnishing many valuable notes. Prof. W. A. Kellerman, of the Ohio State University, kindly looked over for me a portion of Dr. Arthur's collection now in the herbarium of the late Dr. Townshend. Prof. L. H. Pammel, of the Iowa Agricultural College, kindly loaned me for study the collection of Iowa aquatics in the herbarium of that institution. Finally, I desire to thank Prof. T. H. Macbride, of the Iowa State University, for his kindness and the efficient aid he has rendered me in many ways.

ARACEÆ.

ARISÆMA Mart. Flora, II., 459 (1831).

I. A. TRIPHYLLUM (Linn.) Torr. Fl. N. Y., II., (1843).

Wats. and Coult., Gray's Man., 6th ed., 549; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 521; Macmillan, Metas. Minn. Val., 132.

Common throughout; preferring low, rich ground in woods. Flowering in May or June, the fruit maturing late in August.

Decorah, *Holway*; Iowa City, *Macbride*; Ames and Charles City, *Arthur*; Emmet county, *Cratty*; Le Claire, *Rolls*; Muscatine, *Reppert*; Winnebago county, *Shimek*.

2. *A. DRACONTIUM* (Linn.) Schott. Melet. (1832).

Wats. and Coult., Gray's Man., 6th ed., 549; Upham, Fl. Minn., 134; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 521.

Low damp woods; less common than the preceding species.

Decorah, *Holway*; Ames, *Hitchcock*; Iowa City, *Macbride*; Charles City, *Arthur*; Muscatine, *Reppert*; Keokuk, *Rolfs*.

NOTE.—*Calla palustris* Linn., Spec. Ed. 2, 1373 (1762), has been found just outside our limits in southeastern Minnesota. It may be looked for in the northeastern part of our state.

SYMPLOCARPUS *Salisb.* Nutt., Gen. I., 105 (1818).1. *S. FÆTIDUS* *Salisb.* Nutt., Gen. I., 105 (1818).

Wats. and Coult., Gray's Man., 6th ed., 551; Arthur, Fl. Iowa, 30; Macmillan, Metas. Minn. Val., 131.

A homely plant with a most disagreeable odor. Bogs and very moist ground; eastern and southern portions of the state. Rather rare.

Decorah, *Holway*; Muscatine county, *Macbride*, *Reppert*.

ACORUS *Linn.* Spec. Pl. (1753).1. *A. CALAMUS* *Linn.* Spec. Pl. 324 (1753).

Wats. and Coult., Gray's Man., 6th ed., 551; Arthur, Fl. Iowa, 30; Upham, Fl. Minn., 135.

Well distributed throughout the state. Usually only a small percentage of the plants flower. Marshes, June, July.

Decorah, *Holway*; Iowa City and Cedar Rapids, *Macbride*; Emmet county, *Cratty*; Ames, *Hitchcock*; Hancock county, *Arthur*; Jewell Junction, *Rolfs*; Winnebago county, *Shimek*.

LEMNACEÆ.

LEMNA *Linn.* Spec. Pl. (1753).1. *L. MINOR* *Linn.* Spec. Pl. 970 (1753).

Wats. and Coult., Gray's Man., 6th ed., 553; Arthur, Fl.

Iowa, 30; Hitchcock, Ames Fl., 522; Macmillan, Metas. Minn. Val., 133.

Proliferous like the rest of our *Lemnaceæ*, the flowers and fruit being rarely seen. In stagnant water; rarer than the two following.

Ames and Iowa City, *Hitchcock*; Marshalltown, *Stewart*; Muscatine, *Reppert*; Linn county, *Shimek*; Ames (near the var. *orbiculata* Austin), *Bessey*.

2. *L. TRISULCA* Linn. Spec. Pl., 970 (1753).

Wats. and Coult., Gray's Man., 6th ed., 552; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 522; Upham, Fl. Minn., 135.

Common throughout the state, floating on stagnant water, among other vegetation, often in dense mats. June, July.

Emmet county, *Cratty*; Iowa City and Cedar Rapids, *Macbride*; Decorah, *Holway*; Ames, *Arthur*, *Bessey*; Spirit Lake, *Hitchcock*; Muscatine, *Reppert*; Hancock county, *Shimek*.

3. *L. POLYRRHIZA* Linn. Spec. Pl., 970 (1753).

Spirodela polyrrhiza Schleid, Linneæ, XIII., 392 (1839).

Wats. and Coult., Gray's Man., 6th ed., 552; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 521; Macmillan, Metas. Minn. Val., 134.

Very common throughout, floating on stagnant or slow flowing water. July.

Muscatine, *Reppert*; Spirit Lake, *Hitchcock*; Ames, *Arthur*; Decorah, *Holway*; Cedar Rapids and Iowa City, *Macbride*; Emmet county, *Cratty*; Winnebago county, *Shimek*.

NOTE.—*L. perpusilla* Torr., Fl. N. Y., II., 245 (1843), should be looked for in the eastern part of the state.

WOLFFIA Horkel. Linn. XIII., 389 (1839).

1. *W. BRASILIENSIS* Wedd. Ann. Sci. Nat. Ser., 3, XII., 157 (1849).

Grantia brasiliensis (Wedd.) Macmillan, Metas. Minn. Val., 134 (1892).

Wats. and Coult., Gray's Man., 6th ed., 553; Upham, Fl. Minn., 135; Beal and Wheeler, Fl. Mich., 144.

Floating as little grains on the surface of the water.

Iowa City and Cedar Rapids, where it is very common some years, *Macbride*, *Shimek*; Mississippi River near Oquawka, Ill., *Patterson*; Muscatine, *Reppert*.

TYPHACEÆ.

TYPHA *Linn.* Spec. Pl., (1753).

1. T. LATIFOLIA *Linn.* Spec. Pl., 971 (1753).

Wats. and Coult., Gray's Man., 6th ed., 547; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 521; Macmillan, Metas. Minn. Val., 31.

A well known plant of wide distribution throughout the northern hemisphere. Fertile portion of spike when mature often 1 in. or more in diameter, and 5 to 8 in. long. Common in marshes and edges of ponds. July, August.

Decorah, *Holway*; Iowa City, *Macbride*; Emmet and Kosuth counties, *Cratty*; Ames, *Arthur*, *Hitchcock*; Hamilton county, *Rolfs*; Muscatine, *Reppert*; Charles City, *Arthur*; Cedar Rapids, Keokuk, Taylor county, *Shimek*; Henry, Scott, Delaware, Jackson counties, *Macbride*.

SPARGANIACEÆ.

SPARGANIUM *Linn.* Spec. Pl. (1753).

1. S. SIMPLEX *Huds.* Fl. Angl. Ed. 2, 401 (1762).

S. simplex Huds. var. *nuttallii* Englm. in Gray's Man., 5th ed., 481 (1867).

Wats. and Coult., Gray's Man., 6th ed., 548; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl. 521; Upham, Fl. Minn., 135.

Marshes and edges of lakes; rare or local. July, August. Ames, four miles southwest of College, *Hitchcock*.

2. *S. ANDROCLADUM* (*Engelm.*) *Morong*, *Bull. Torr. Bot. Club*, XV., 78 (1888).
S. simplex Huds. var. *androcladum* Engelm. in Gray's *Man.*, 5th ed., 481 (1867).

Wats. and Coult., Gray's *Man.* 6th ed., 548; Arthur, *Fl. Iowa*, 30; Macmillan, *Metas. Minn. Val.*, 33.

Heads when mature about one inch in diameter, being intermediate in size between the preceding and the next. Ponds; rare. July, August.

Davenport, *Arthur's Fl. Iowa*, No. 775; Wilton, *Hitchcock*.

3. *S. EURYCARPUM* *Engelm.* Gray's *Man.*, 2nd ed. (1852).

Wats. and Coult., Gray's *Man.*, 6th ed., 548; Arthur, *Fl. Iowa*, 30; Hitchcock, *Ames Fl.* 521; Macmillan, *Metas. Minn. Val.*, 33.

Frequent throughout the state on the margin of ponds and lakes, usually being found among a rank growth of grasses and sedges. Mature heads of fruit are often 1½ in. in diameter. July, August.

Emmet county, *Cratty*: Iowa City, *Macbride*; Ames, *Hitchcock*; Humboldt, *Bessey*; Hamilton county, *Rolfs*; Dickinson county, *Hitchcock*; Washington and Winnebago counties, Cedar Rapids, *Shimek*.

NAIADACEÆ.

NAIAS *Linn.* *Spec. Pl.*, 1015 (1753).

1. *N. FLEXILIS* (*Willd.*) *Rost. & Schmidt*, *Fl. Sed.* 384 (1824).
Morong, *Naiad. N. A.*, 59; Wats. and Coult., Gray's *Man.*, 6th ed., 566; Macmillan, *Metas. Minn. Val.*, 40; Hitchcock, *Ames Fl.*, 523; Arthur, *Fl. Iowa*, 30.

A homely little plant. growing entirely under water, and widely distributed throughout the northern hemisphere. Ponds and slow streams. July, August.

Lake Cairo, *Bessey*; Emmet county, *Cratty*; Story and Dickinson counties, *Hitchcock*; Muscatine *Reppert*; Hancock county, *Shimek*.

ZANNICHELLIA *Linn.* Spec. Pl., 969 (1753).1. Z. PALUSTRIS *Linn.* Spec. Pl., 969 (1753).

Morong, Naiad., N. A. 57; Wats. and Coult., Gray's Man., 6th ed., 565; Arthur, Fl. Iowa, 30; Hitchcock, Ames Fl., 523; Upham, Fl. Minn., 136.

A graceful aquatic with capillary stems, sparsely branched; flowering and ripening its fruit under water. Cosmopolitan. Ponds, and slow streams.

Ames, not uncommon, *Hitchcock*; Muscatine, *Reppert*; Storm Lake, *Bessey*.

POTAMOGETON *Linn.* Spec. Pl., 126 (1753).1. P. NATANS. *Linn.* Spec. Pl., 126 (1753).

Morong, Naid. N. A. 13; Wats. and Coult., Gray's Man., 6th ed., 558; Arthur, Cont. Fl. Iowa, III.; Macmillan, Metas. Minn. Val., 34.

Ponds and slow-flowing streams; fruit maturing in August which should be especially collected of all species of the genus.

Lake township, Muscatine county, *Reppert*; Linn county, *Shimek*; Lake Okoboji and Fort Dodge, *Hitchcock*.

2. P. AMPLIFOLIUS *Tuck.* Am. Jour. Sci., 2, VI., 225 (1848).

Morong, Naiad. N. A., 16; Wats. and Coult., Gray's Man., 6th ed., 561; Upham, Fl. Minn., 136; Arthur, Fl. Iowa, 30; Beal and Wheeler, Fl. Mich., 146.

Slow flowing streams; rather rare.

Emmet county, *Cratty*; Muscatine, *Reppert*; Spirit Lake, *Hitchcock*; Tama County, *Sirrine*; Charles City, *Arthur*.

3. P. NUTTALLII *Ch. & Sch.* Linnæa, II., 226 (1827).

P. pennsylvanicus *Ch. & Sch.* Linn., II., 227 (1827).

P. claytonii *Tuck.* Am. Jour. Sci. and Arts. 1st Ser., XLV., 38 (1843).

Morong, Naiad. N. A., 18; Wats. and Coult., Gray's Man., 6th ed., 559; Beal and Wheeler, Fl. Mich., 145.

Not before reported from Iowa. Ponds and slow streams along Cedar River near Muscatine. June 25, 1894. Not common. *Herb. Reppert*, No. 738.

4. *P. LONCHITES* *Tuck.* Am. Jour. Sci. and Arts, 2nd Ser., VII., 348 (1849).

P. fluitans Auc. Amer.

(?) *P. fluitans* Roth, Fl. Germ., I., 72 (1788).

Morong, Naiad. N. A., 20; Wats. and Coult., Gray's Man., 6th ed., 560; Macmillan, Metas. Minn. Val., 34; Arthur, Fl. Iowa, 30.

Slow-flowing streams; common. Forms of this species with the petioles of the submerged leaves 6 to 8 in. long were collected by Mr. Reppert in the Mississippi River near Muscatine.

West Fork of the Des Moines at Estherville, *Cratty*; Ames, streams around Cairo Lake, *Hitchcock*; ponds and sloughs along Cedar River, *Reppert*; Iowa City, Linn and Lee counties, *Shimek*; Charles City, *Arthur*; Storm Lake, *Bessey*; Waterloo and Spirit Lake, *Hitchcock*; Hamilton county, *Rolfs*.

5. *P. HETEROPHYLLUS* *Schreb.* Spic. Fl. Lips, 21 (1771).

P. gramineus, var. *heterophyllus* Fries. Nov. 2nd ed., 35 (1828).

Morong, Naiad. N. A., 23; Wats. and Coult., Gray's Man., 6th ed., 561; Hitchcock, Ames Fl., 522; Macmillan, Metas. Minn. Val., 35.

An extremely variable species, preferring quiet water; rare within our limits. When the ponds and sloughs dry up this species often sends up shoots bearing several broad green leaves, in this respect resembling *P. illinoensis*.

Sloughs near Armstrong, Emmet county, *Cratty*; Ames, rare, *Hitchcock*.

6. *P. ILLINOENSIS* *Morong.* Bot. Gaz., V., 50 (1880).

Morong, Naiad. N. A., 27; Wats. and Coult., Gray's Man., 6th ed., 561; Macmillan, Metas. Minn. Val., 36; Arthur, Cont. Fl. Iowa, V.; Hitchcock, Ames, Fl., 522.

Ponds and margins of lakes. This species has the floating leaves more crowded and of a stockier growth than *P. lonchites* with which it is often confounded. "The plant confines itself mostly to rather shallow water on the margin of sloughs and ponds. The plants are often left exposed in the mud, in which, if it does not become too dry, the roots survive and produce short shoots bearing 3 to 4 leaves."—*Reppert*.

Emmet county, rare, *Cratty*; Ames, infrequent, *Hitchcock*; Muscatine, the most common of the large-leaved species, *Reppert*.

7. *P. PRÆLONGUS* *Wulfen*. Roem. Arch., III., 331 (1803-5).

Morong, Naiad. N. A., 32; Wats. and Coult., Gray's Man., 6th ed., 562; Upham, Fl. Minn., 136; Arthur, Fl. Iowa, 30; Beal and Wheeler, Fl. Mich., 146.

Deep water, lakes and ponds. July, August.

Clear Lake, *Arthur*; Okoboji and Spirit Lakes, *Hitchcock*; Iowa Lake, *Cratty*.

NOTE.—*P. lucens* Linn. Spec. Pl., 126 (1753). Specimens without flowers or fruit of what appears to be this species were collected by Professor Hitchcock near Ames and are in the herbarium of the Agricultural College.

8. *P. PERFOLIATUS* *Linn.*, var. *RICHARDSONII* *A. Bennett*. Jour. Bot., XXVII., 25 (1889). *P. lanceolatus* Sm. Eng. Bot., 1985 (1808). *P. perfoliatus* var. *lanceolatus* Robins in Gray's Man., 5th ed., 488 (1867).

Morong, Naiad. N. A., 33; Wats. and Coult., Gray's Man., 6th ed., 562; Arthur, Cont. Fl. Iowa, V.; Upham, Fl. Minn., 137.

Shallow water in lakes, ponds, and streams—a most beautiful plant. July. I have not seen the typical *P. perfoliatus* from Iowa.

Okoboji and Spirit Lakes, *Hitchcock*; Emmet county, *Cratty*.

9. *P. ZOSTERÆFOLIUS* *Schum.* Enum. Pl. Sael, I., 50 (1801), *P. compressus* Fries. Nov. ed. 2, 44 (1828), non Linn.

Morong, Naiad. N. A., 37; Wats. and Coult., Gray's Man., 6th ed., 562; Macmillan, Metas. Minn. Val., 39; Arthur, Cont. Fl. Iowa, III.; Hitchcock, Ames, Fl., 522.

A beautiful plant with bright, smooth leaves. Shallow water in lakes or slow streams. July, August.

Vinton, *Arthur's Cat.*; Iowa Lake, Emmet county, *Cratty*; Lake Okoboji and Ames, *Hitchcock*; Muscatine, *Reppert*; Cedar Rapids, Iowa City, Hancock county, *Shimek*.

10. *P. FOLIOSUS* Raf. Med. Rep., II., Hex. V., 354 (1808).
P. pauciflorus Pursh. Fl. Am., I., 121 (1814), non Lam.
Fl. Franc, III., 209 (1778).

Morong, Naiad. N. A., 39; Wats. and Coult., Gray's Man., 6th ed., 563; Arthur, Fl. Iowa, 30; Macmillan, Metas. Minn. Val., 39.

A very variable species, usually growing entirely under water, and widely distributed throughout the United States and Canada. Morong in his *Naiadaceæ of North America* says, "spikes about 4-flowered." Emmet county, Iowa, specimens determined by him have the spikes 4- to 6-fruited. Some of Mr. Reppert's specimens vary from the type in having the spikes 6- to 10-fruited, in this respect approaching the var. *niagarensis* (Tuck.) Gray. Similar forms were also collected at Ames by Prof. Hitchcock. June, July.

Shallow water in ponds and lakes, Emmet county, *Cratty*; Muscatine, *Reppert*; Iowa City, Lee, Hancock, and Linn counties, *Shimek*; Mt. Pleasant, *Mills*; Charles City, *Arthur*; Grand Junction, *Bessey*; Dickinson and Woodbury counties, *Hitchcock*.

NOTE.—*P. obtusifolius* Mert. and Kock. Deut. Fl., I., 855 (1823), has been reported from this State, but I have not seen it. Plants so labeled which I have seen are forms of another species.

11. *P. MAJOR* (Fries) Morong, Naiad. N. A., 41 (1893).
P. rutilus Auc. Amer. in part, non Schult., Mant. III., 362 (1827).
P. pusillus Linn., var. *major* Fries. Nov. 48 (1828).
P. compressus Sm. Eng. Bot., III., 418 (1794), non Linn.

Morong, Naiad. N. A., 41; Wats. and Coult., Gray's Man., 6th ed., 563; Upham, Fl. Minn., 137.

A graceful little plant with delicate, bright foliage, somewhat resembling *P. pusillus* but larger. Rare in America. Ponds and shallow lakes. July.

Iowa Lake, Emmet county, *Cratty*; Muscatine, *Herb. Reppert*, No. 746 in part; Spirit Lake, *Hitchcock*.

12. *P. PUSILLUS* Linn. Spec. Pl., 127 (1753).

Morong, Naiad. N. A., 45; Wats. and Coult., Gray's Man., 6th ed., 563; Macmillan, Metas. Minn. Val., 36; Hitchcock, Ames Fl., 522.

A delicate species preferring shallow ponds and lakes. July.

Ames, abundant at Cairo Lake, *Hitchcock*; Muscatine, *Herb. Reppert*, No. 746 in part.

13. *P. SPIRILLUS* Tuck. Am. Jour. Sci. and Arts, 2nd Ser., VI, 226 (1848).

Morong, Naiad. N. A., 49; Wats. and Coult., Gray's Man., 6th ed., 560; Beal and Wheeler, Fl. Mich., 145; Bot. Death Val. Ex., 210.

This interesting little plant, not before reported from the State, was collected in August, 1889, at Carnsforth, Iowa, by Prof. Hitchcock, and again in July, 1894, by Mr. Kenneth McKenzie in ponds along the C., R. I. & P. R. R., between Muscatine and Fruitland. The specimens approach *P. diversifolius* Raf. (*P. hybridus* Michx.) in some characters, but are quite clearly distinguished by the submerged spikes being sessile or nearly so; by the broader submerged leaves, and by the curious snail-like fruit which shows the coiled embryo very conspicuously, even in the dried specimen.

14. *P. PECTINATUS* Linn. Spec. Pl., 127 (1753).

Morong, Naiad. N. A., 51; Wats. and Coult., Gray's Man., 6th ed., 564; Macmillan, Metas. Minn. Val., 35; Arthur, Fl. Iowa, 30.

One of the most widely distributed species of plants, occurring in Europe, Asia, Africa, Australia, and the greater part of North America. Ponds and quiet streams. July, August.

West Fork of the Des Moines, Estherville, *Cratty*; Muscatine, *Reppert*; Woodbine, *Burgess*; Storm Lake, *Bessey*; Lake Okoboji, *Hitchcock*; Hancock and Linn counties, *Shimck*.

JUNCAGINEÆ.

TRIGLOCHIN *Linn.* Sp. Pl., 339 (1753).

1. *T. MARITIMA* *Linn.* Sp. Pl., 339 (1753).

T. elata Nutt. Gen. I., 237 (1818).

T. maritima, var. *elata* Gray's Man., 2nd ed., 437 (1852).

Morong, Naiad. N. A., 8; Wats. and Coult., Gray's Man., 6th ed., 558; Arthur, Cont. Fl. Iowa, V.; Macmillan, Metas. Minn. Val., 41; Hitchcock, Ames Fl., 522.

Widely distributed throughout Canada and the northern half of the United States. Most common in salt marshes, but in the interior it is found in fresh water bogs. Our plant 2 to 3 ft. tall. July, August.

Ames, very rare, *Hitchcock*; bogs near Armstrong, Emmet county, infrequent, *Cratty*.

SCHEUCHZERIA *Linn.* Spec. Pl., 338 (1753).

1. *S. PALUSTRIS* *Linn.* Sp. Pl., 338 (1753).

Morong, Naiad. N. A., 9; Wats. and Coult., Gray's Man., 6th ed., 558; Arthur, Cont. Fl. Iowa, V.; Macmillan, Metas. Minn. Val., 42.

A rush-like perennial plant growing in cold bogs, and flowering early in the spring, the fruit maturing in July. Only one species is known.

Emmet county, two miles north of Armstrong, very rare, *Cratty*. This is about its southern limit in the United States.

ALISMACEÆ.

ALISMA Linn. Sp. Pl. (1753).

1. A. PLANTAGO Linn. Sp. Pl., 342 (1753).

A. plantago var. *americana*, R. and S., Syst. III. (1818).

Wats. and Coult., Gray's Man., 6th ed., 554; Arthur, Fl. Iowa, 31; Hitchcock, Ames Fl., 522; Upham, Fl. Minn., 138.

Common throughout the State. The plant varies greatly, especially in regard to size and foliage, the result of different conditions of its place of growth. June, July.

Emmet county, *Cratty*; Iowa City and Cedar Rapids, *Macbride*; Decorah, *Holway*; Ames and Charles City, *Arthur*; Boone, *Bessey*; Muscatine, *Reppert*; Webster City, *Pammel*; Marshalltown, *Stewart*; Hamilton county, *Rolfs*; Fremont, Washington, Lee, Jackson and Scott counties, *Shimek*.

ECHINODORUS Richard. Mem. Mus., 365 (1815)

1. E. ROSTRATUS (Nutt.) Engelm. Gray's Man., 2nd ed., 438 (1856).

Alisma rostrata Nutt.

Wats. and Coult., Gray's Man., 6th ed., 556; Hitchcock, Bull. Torr. Bot. Club, XVI., 70.

Ditches and swamps. Illinois to Iowa and southward; rather rare. August, September.

Hamburg, *Hitchcock*; Iowa City, *Macbride*; Muscatine, *Reppert*; Sioux City, *Pammel*; Keokuk, *Shimek*.

2. E. PARVULUS Engelm. Gray's Man., 2nd ed., 438 (1856).

Wats. and Coult., Gray's Man., 6th ed., 556; Arthur, Fl. Iowa, 31; Upham, Fl. Minn., 138; Beal and Wheeler, Fl. Mich., 145.

Rare or local. No. 786 of *Arthur's Flora of Iowa*, but without locality.

SAGITTARIA Linn. Sp. Pl. (1753).

1. *S. ARIFOLIA* Nutt. in Herb. J. G. Smith, Rev. N. A. Sag. and Loph., 6 (1894).
S. sagittæfolia minor Pursh., Fl. Am., II., 395 (1814).

A species widely distributed in the western half of the United States, but probably rare within our limits. In general appearance closely resembling form *c.* of *S. latifolia* Willd., but the fruit very different, long, winged on both sides, with a very short upright beak, and (in our plant) a prominent vertical sub-epidermal resin passage. Collected at Iowa City by Prof. Hitchcock. Herbarium of Iowa Agricultural College.

2. *S. LATIFOLIA* Willd. Sp. Pl., IV., 409 (1806).
S. variabilis Engelm. Gray's Man., 1st ed., (1848).
S. sagittæfolia Auc. Amer.

(?) *S. sagittæfolia* Linn. Sp. 993 (1753).

Smith, Rev. N. A. Sag. and Loph., 8; Wats. and Coult., Gray's Man., 6th ed., 554; Macmillan, Metas. Minn. Val., 45; Arthur, Fl. Iowa, 31; Hitchcock, Ames Fl., 522.

Very common throughout the State in sloughs and edges of ponds, lakes, and streams. Excessively variable in size, foliage, shapes of the achenia, etc. The typical plant has achenia obliquely or horizontally beaked, both of which forms are common within our limits. J. G. Smith in his recent monograph includes five forms of which form *a.*, the var. *obtusæ* Engelm., and form *c.*, including the varieties *hastata*, *angustifolia*, *gracilis*, and *diversifolia* of most collectors are frequent.

Several species of *Sagittaria* produce tubers, especially *S. latifolia* and its various forms. These tubers are called Wabes-i-pin-ig, or swan potatoes, by the Chippewa Indians, because they furnish nourishment for the larger aquatic fowls. "These tubers sometimes attain the size of a small hen's egg and are then eaten by the Indians with whom they are a great favorite. In their raw state they contain a bitter, milky juice, but in boiling become sweet and palatable."—Parry.

Decorah, *Holway*; Emmet and Kossuth counties, *Cratty*;

Jones county, Cedar Rapids and Iowa City, *Macbride*; Ames, *Arthur*; Hamilton county, *Rolfs*; Muscatine, *Reppert*; Marshalltown, *Stewart*; Davenport and Waterloo, *Hitchcock*; Winnebago and Lee counties, *Shimek*.

3. *S. RIGIDA* Pursh. Fl. Am., 397 (1814).

S. heterophylla Pursh. Fl. Am., 396 (1814), not of Schreb. Fl. Erl., II., 119 (1811).

Smith, Rev. N. A. Sag. and Loph., 23; Wats. and Coult., Gray's Man., 6th ed., 555; Hitchcock, Ames Fl., 520; Arthur, Cont. Fl. Iowa, III.

Edges of lakes or streams; rather common in the eastern and southern portions of the State. Very variable, especially in regard to size and foliage, July, August.

Clinton county, *Butler*; Ames, abundant at Cairo Lake, *Hitchcock*; Muscatine, in Muscatine slough at the upper bridge, five miles below the city, *Reppert*; Waterloo, *Hitchcock*; Linn county, *Shimek*. Specimens collected at Iowa City by Prof. Hitchcock have the submersed foliage closely resembling that of *S. teres* Wats.

4. *S. GRAMINEA* Michx. Fl. N. A., I., 190 (1803).

Smith, Rev. N. A. Sag. and Loph., 24; Wats. and Coult., Gray's Man., 6th ed., 555; Arthur, Fl. Iowa, 31; Hitchcock, Ames Fl., 522; Webb, Fl. Neb., 97.

Southeast portion of the State; ponds and streams. July.

Ames and Boone, *Bessey*; Hamilton county, *Rolfs*; Iowa City, *Macbride*; Muscatine, *Reppert*; Nevada, *Fragier*; Carnsforth, *Hitchcock*, a form approaching *S. cristata*.

5. *S. CRISTATA* Engelm. in Arthur, Cont. Fl. Iowa, V., (1882).
Proc. Dav. Acad. Sci., IV., 29 (1886).

S. variabilis var. (?) *gracilis*, S. Watson in Gray's Man., 6th ed., 555, in part, not of Engelm.

Smith, Rev. N. A. Sag. and Loph., 27; Sheldon, Minn. Bot. Studies, Bull. 9. pt. II.

Monœcious aquatic, rooting in the sand or mud in water a

few inches to several feet deep, 6 in. to 2 ft. high; petioles about equaling the scape in height, the leaf slightly resembling the petiole in form and structure, 3 to 5 in. long, linear or linear lanceolate, thick, spongy, somewhat triangular in cross section, and when flattened in the herbarium specimen, appearing more nearly lanceolate in form. Submerged phyllodia linear or linear lanceolate, acute or obtuse, 4 to 8 in. long, rigid, with about five principal and many intermediate nerves, coarsely reticulated, clustered at the base of the plant, and appearing in tufts from the nodes of the stolons by means of which the plant is propagated, and which extend for a considerable distance along the muddy bottom. Scape slender, bearing 4 to 6 whorls of flowers, rarely more than the lower whorl fertile; pedicels of sterile and fertile flowers about equal, $\frac{3}{4}$ to 1 in. long, bracts connate, acute or slightly obtuse; petals white, delicate, wavy; filaments pubescent, thickened below, longer than the anthers. Fruit heads $\frac{1}{2}$ to $\frac{3}{4}$ in. in diameter, shrinking much in drying; achenia obovate with a conspicuous horizontal style, and crested back and sides.

The type specimens of this plant with flowers and mature fruit were collected by the writer in a small lake, since dried up, one mile east of Armstrong, Emmet county, Iowa, in August, 1881, and were sent to Dr. Geo. Engelmann for determination. In his reply he stated that while it was closely allied to *S. graminea* Michx., he could not decide definitely in regard to it without thoroughly revising the genus. However, under date of March 5, 1882, he sent to Dr. Arthur the provisional name *S. cristata*, which was published with a few lines of description in Arthur's *Contribution to the Flora of Iowa* as above noted. The late Dr. Morong, who studied the plant critically, considered it a good species, and it is so regarded in J. G. Smith's recent monograph. Plants collected at Ames and Carnsforth, and conjectured to be this species, are best considered as forms of *S. graminea* Michx.

Besides the locality above given, the plant has also been found in several places in Minnesota. See Sheldon in *Minn. Bot. Stud., Bull.* 9, pt. II.

LOPHOTOCARPUS *T. Durand.* Index Gen.
Pl., 627 (1888).

- I. L. CALYGINUS (*Engelm.*) *J. G. Smith* in Mem. Torr. Bot. Club, V., 25 (1894).
Sagittaria calycinus Engelm. in Torr., Bot. Mex. Bound., 212 (1858).

Wats. and Coult., Gray's Man., 6th ed., 556; Cont. to U. S. Nat. Herb., II., 455.

Not before reported from the State and very rare within our limits.

Muscatine, margin of a pond just above the city, *Reppert*.

HYDROCHARIDACEÆ.

ELODEA *Richard.* Mich., Fl. Bor. Am., I., 20 (1803).

- I. E. CANADENSIS *Rich. and Michx.* Fl. N. Am., I., 20 (1803).
Anacharis canadensis Planch. Ann. Mag. and Nat. Hist., 2nd Ser., I., 86 (1848).

Wats. and Coult., Gray's Man., 6th ed., 496; Arthur, Fl. Iowa, 31; Upham, Fl. Minn., 139.

Frequent throughout the State in slow-flowing streams. The staminate flowers are very rarely seen. A few were collected by the writer near Armstrong, in July, 1882.

Emmet county, *Cratty*; Iowa City, *Macbride*; Decorah, *Holway*; Ames and Charles City, *Arthur*; Ft. Dodge, *Bessey*; Spirit Lake, *Hitchcock*; Muscatine, *Reppert*; Hancock county and Cedar Rapids, *Shimek*.

VALLISNERIA *Linn.* Sp. Pl. (1753).

- I. V. SPIRALIS *Linn.* Sp. Pl., 1015 (1753).

Wats. and Coult., Gray's Man., 6th ed., 496; Arthur, Fl. Iowa, 31; Macmillan, Metas. Minn. Val., 46.

Rather rare in ponds and lakes, or slow streams. August.

Independence, Bluffton and Iowa City, *Macbride*; Iowa Lake, Emmet county, *Cratty*; Ames and Storm Lake, *Bessey*; Mud Lake, Story county, *Hitchcock*; Mason City, *Shimek*.

[From proceedings Iowa Academy of Sciences for 1893. Vol. I, Part IV.]

ADDITIONS TO IOWA FLORA.

PROF. B. FINK, FAYETTE, IOWA.

In my collecting last summer about Fayette, I found the following plants, some of which, so far as I know, have not been reported for Iowa. Those marked with a "star" have been examined by various botanists. The others I report on my own determination:

* *Habenaria tridentata*, Hook. Borders of woods; rare.

* *H. psycodes*, Gray. Wet river banks; rare, new.

* *H. hookeri*, Torr. var. *oblongifolia*, Paine. As common as the type here; new.

Dicentra Canadensis, D. C. Woods, rare. Also reported from Decorah by E. D. W. Holway. (Proceedings Iowa Academy of Sciences, Vol. I, Pt. II, p. 16.)

MILDEWS.

In this list I have adopted the synonymy given by Prof. Burrill in North American Pyrenomycetes.

× SPHAEROTHECA HUMULI (D C) Burrill on *Agrimonia Eupatoria*.

S. PANNOSA, (Wallr.) Lev. on *Rosa blanda*.

*S. MALI, (Duby.) Burrill on *Pyrus Malus* also reported from Ames, by Prof. L. H. Pammel and G. W. Carver abundant on young suckers, New.

S. MORS-UVAE, (Schw.) B. and C. on *Ribes*.

S. CASTAGNEI, Lev. on *Sonchus oleraceus*.

ERYSIPHE COMMUNIS, (Wallr.) Fr. on *Astragalus Canadensis*.

E. CICHORACEARUM, D C on *Phlox Drumondii*.

*E. GALEOPSISIDIS, D C on *Scutellaria lateriflora*, New.

E. GRAMMIS, D C on *Poa pratensis*.

UNCINULA CLINTONII, Peck, on *Tilia Americana*.

U. NECATOR (Schw.) Burrill on cultivated grapes (*Vitis labruscae*).

U. CIRCINATA, C. & P., *Acer barbatum*.

U. MACROSPORA, Peck, on *Alnus Americana*.

U. SALICIS, (D C), on *Populus tremuloides*.

PHYLLACTINIA SUFFULTA (Reb.) Sacc. on *Cornus stolonifer*, *Xanthoxylum Americanum*.

x *S. pilosae* collected Sept 12, 1892. Same to Dr. Fink

- PODASPHÆRA OXYACANTHÆ (D C), Duby on *Prunus Cerasus*.
MICROSPHÆRA RUSSELLII, Clinton on *Oxalis corniculata* var. *stricta*.
* M. GROSSULARIÆ (Wallr.) Lev. on *Sambucus Canadensis*. New.
M. EUPHORBIÆ (Peck), B. & C. on *Euphorbia corollata*. New.
M. ALNI (D C), Winter on *Viburnum lentago*, *Syringia vulgaris*.
M. QUERCINA, (Schw.) Burrill on *Quercus rubra*.

(No. 2)

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Blights, Orchids and Ferns

—AT—

Fayette, Iowa.

—BY—

B. FINK, Professor of Natural Sciences.

—IN—

THE UPPER IOWA UNIVERSITY.

PUBLISHED BY THE UNIVERSITY,
JANUARY, 1894.

News Letter Print.

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INTRODUCTION.

This work is presented with a view to increasing the interest in botanical work in this vicinity and to enlarge the field of research. Until the present school year, the study of botany had been entirely confined to the branch Anthophyta and almost exclusively to Angiospermæ. This way of presenting the study to beginners is a mistake because it is partial in scope, acquainting the student only with those forms which he can easily study for himself and excluding the six branches of the vegetable kingdom which are least likely to be examined independently. Before the beauty and economic interest of the lower forms were so well known, there was some excuse for such a one-sided study of plants, but those days are gone.

It is difficult in a college to get enough literature to carry on work in cryptogamic botany successfully, and therefore another object of this little pamphlet is to get the descriptions of the species of one order into such a form that they may be placed in the hands of each member of future classes.

I have collected at every spare moment from April to December and have made a thorough search for blights, orchids and ferns. During the college months the time was limited, but in the summer vacation my time was divided between this work and a study of cross-fertilization of tomatoes.

Collections were made of all classes of plants, and I have found the flora rich for a region so thoroughly cultivated. Nature has done more for us than for most portions of Iowa. We have in Fayette county six or seven geological formations, which give variety to our soil and flora. Dry hills, shady hill sides, abrupt ledges of lime-rock, prairies, native forests, river waters and banks, sparkling springs, pools, ponds, wet places, and marshes are all within five miles of Fayette. The collection of our phanerogams will be completed as thoroughly as possible next summer, and a list will be published. Six-hundred-fifty plants are now collected for this purpose.

The orchids were collected at the request of Miss Carrie Harrison, for the National Herbarium, this being the first set from Iowa. My thanks are due to her for many favors. In this work as well as in the collection of other phanerogams, I am indebted to Dr. C. C. Parker, whose thorough knowledge of our flowering plants has always been at my service.

I wish to express my thanks to Dr. T. J. Burrill, of the University of Illinois, for the descriptions used, to Dr. J. C. Arthur of Purdue University, and to Mr. Geo. C. Clinton of the University of Illinois, for

examining some of my specimens, and to Prof. L. H. Pammel of the Iowa Agricultural College and Prof. T. H. McBride of the Iowa State University, for literature and information.

The class laboratory work was a help and an incentive to the work, and I am obliged to Dr. M. Y. Baker and Dr. C. C. Parker, for the loan of microscopes for class use.

The works used are *Pyrenomyces of North America*, by Ellis and Everhart; *Erysiphe of Illinois*, by Dr. T. J. Burrill; *Partial List of Iowa Powdery Mildews*, by Prof. A. S. Hitchcock; *The Blights*, by Dr. C. E. Bessey, and the *Host Index* by Farlow and Seymour.

Some of the plants herein recorded seem to be new to the flora of Iowa and others are recorded for the first time so far as I am able to ascertain. Statements will be found in connection with the lists.

So far as I know, this is the first effort at a complete collection of any orders of plants in this vicinity. It is hoped that this attempt will prove to be an incentive to some one else to carry on similar work here.

Erysipheæ.

These fungi are parasitic on various angiosperms and are among the most noticeable of parasitic fungi. Yet, to one who has not given the matter attention, the number of species and hosts in one locality is surprisingly large. Some species are so inconspicuous that they would not be noticed by an inexperienced collector, and in other cases they seem like a pubescence on the leaf.

The vegetative portion (*mycelium*) appears like a white web closely fixed to the host, by means of *haustoria*, above, below, or on both sides of the leaf, though sometimes found on other portions of the host. When this mycelium is conspicuous, the fungus is easily found, but in some instances it is inconspicuous.

The reproductive organs are of two kinds, sexual and asexual. The asexual organs are called *conidia* and are arranged one above another on erect branches (*hyphæ*) of the mycelium. They separate at maturity, blow about and germinate, thus providing for the immediate and rapid increase of the species. The sexual organs are of two kinds, *antheridia* and *carpogonia*. They are also borne on the mycelium at points where two branches cross. The antheridium corresponds to the stamen of a flowering plant, and the carpogonium is analogous to the pistil. After the carpogonium has been fertilized by the antheridium, it develops into the *perithecium*, which corresponds to the fruit of a flowering plant. The perithecia contain vessels called *asci*, and these enclose the *sporidia*, which germinate and produce the plant the following year. These perithecia with their contents furnish the principal means of classifying the Erysipheæ. They appear as little specks, varying from brown to black in color. Sometimes they are so small as to be scarcely visible to the unaided eye, but usually they will be seen on careful examination. A good pocket lens will enable one to distinguish them from dirt or other fungi.

The asexual and sexual organs are sometimes found at the same time, but not always. The former are generally produced earlier than the latter, which are not usually found till in the fall, or sometimes not till after the leaves have fallen. The perithecia fall from the leaves or with them and germinate the following spring. The conidia are not supposed to endure the winter, though in some cases where the perithecia are seldom found, it seems possible if not probable that they do.

The blights are often very injurious to useful and ornamental cultivated plants, even infesting those kept in the house. I watched a chrysanthemum, belonging to Dr. C. C. Parker, till the leaves were

completely destroyed by a blight. The ordinary observer might not easily distinguish between blights and mildews (*Peronosporaceae*), but the treatment is easier in the former, which do not penetrate the tissues of the host. In instances where the damage seems considerable, it would be best to send a sample to some one familiar with these minute forms for determination, and probably he will be able to give such remedies as are found in the bulletins of the agricultural stations.

All the fine print following consists of the descriptions of Dr. T. J. Burrill, which are used by permission, in order that this work may be used in our classes. The descriptions of the Illinois bulletin were followed to the extent of omitting "sometimes colorless" in describing the appendages of *S. Castagnei* and a term meaning the same in describing those of *E. Cichoracearum*. Also the term "inconspicuous" was allowed to remain in describing the mycelium of *U. circinata* as found in the bulletin. Otherwise, the descriptions are those found in *Pyrenomyces of North America*. In the three instances, the descriptions in the bulletin suited our specimens better.

KEY TO THE GENERA OF ERYSPHÆÆ.

- I. Appendages consisting of simple threads similar to the mycelium, and often interwoven with it. . A.
- II. Appendages dissimilar to, and free from mycelium. . B.
 - A. Perithecia containing only one ascus. . SPHÆROTHECA.
Perithecia containing several asci. . ERYSPHÆ.
 - B. Appendages simple, not usually forked at the tip. . 1.
Appendages dichotomously forked at the tip. . 2.
 1. Appendages coiled at the tip, asci several. . UNCINULA.
Appendages needle-shaped, abruptly swollen at base, asci, several. . PHYLLACTINIA.
 2. Perithecia containing only one ascus. . PODOSPHERA.
Perithecia containing several asci. . MICROSPHERA.

Sphærotheca, Lev.

Perithecium containing only one ascus. Appendages simple threads not unlike the mycelium with which they are frequently interwoven. Ascus suborbicular, usually containing eight sporidia. Very rarely two asci have been observed.

I. *S. PANNOSA*, (Wallr.) Lev.

Mycelium abundant on the leaves, stems, etc., often sterile; perithecia more often occurring on the branches, scattered, delicate, 90-100 *u*, reticulations evident, small, 10-15 *u*; appendages short and delicate, much interwoven with the mycelium, sometimes colored; ascus large, delicate, ovate, expanding, when free from the perithecium, to a length greater than its diameter; sporidia 8, large, 29 *u* long.

* Italic *u* is used for micro-millimeter instead of the Greek character.

On *Rosa blanda*.

In my specimens, the appendages were frequently as long as those of *S. Castagnei*, but they were not so flexuous; and the reticulations of the perithecia were much smaller.

2. *S. MORS-UVÆ*. (Schw.) B. & C.

Mycelium abundant, at first white, becoming dark brown, densely covering the leaves, stems and fruit; perithecia most abundant on the stems and fruit, densely aggregated, embedded in the thick felted mycelium, variable in size. 90-120 *u*, dark

brown, reticulations obscure; appendages short, delicate, hyaline or slightly colored, interwoven with and overrun by the dense mycelium; ascus broadly elliptic, eight-spored, both ascus and sporidia smaller than in *S. pannosa*.

On *Ribes rotundifolium*.

This parasite may be found early in the season, at about the time the fruit is ripe.

3. *S. MALI*, (Duby.) Burrill.

Amphigenous. Mycelium white, submembranous, persistent. Perithecia few or numerous, immersed in the mycelium, small 75-85 μ , globose or subpyriform; appendages of two kinds, in part rudimentary, floccose, deeply colored, attached in a broad tuft to the smaller end of the pyriform perithecium, the others strongly developed, rigid, straight or curved, continuous or septate, simple or rarely forked at the extremity, deeply colored at the base, becoming pale outwardly, attached in a loose cluster opposite the rudimentary ones, 2-5 times the diameter of perithecium. Ascus oval to subglobose; sporidia 8, 20-30 μ long.

On *Pyrus Malus*.

I found my specimens on the stems of suckers in Mr. Peter Graf's nursery. I do not find this species reported in the Iowa bulletins. Prof. L. H. Pammel says it is found at Ames and is very injurious.

4. *S. HUMULI*, (D.C.) Burrill.

Mostly hypophyllous. Mycelium inconspicuous or evanescent; perithecia scattered, abundant, mostly rather small, 75-95 μ , wall-texture firm and compact, though thin, surface smooth, reticulations small, often obscure, usually less than 15 μ ; appendages slender, three or more times as long as the diameter of the perithecium, colored throughout when mature, mostly free from the mycelium; ascus broadly elliptical or suborbicular; sporidia usually 8, large, averaging 20 μ long.

On *Agrimonia Eupatoria*.

"The perithecia closely resemble those of *S. pannosa*, but it differs in the larger appendages and the much less abundant mycelium."—Burrill.

5. *S. CASTAGNEI*, Lev.

Mycelium abundant and persistent or sometimes inconspicuous, occurring on either or both sides of leaves; perithecia abundant, scattered or somewhat aggregated, small, usually about 75 μ , but varying from 60-100 μ ; texture soft, surface uneven, reticulations very large and irregular, 20-30 μ ; appendages long, stout, usually colored throughout, flexuous, somewhat uneven in width, more or less interwoven with the mycelium; ascus rather small, elliptical or suborbicular; sporidia usually 8, small, about 15 μ long.

On *Bidens frondosa*, *Erigeron Canadensis* and *Sonchus oleraceus*.

Erysiphe, (Hedw.) Lev.

Perithecium containing several asci; appendages simple threads similar to and frequently interwoven with the mycelium.

1. *E. COMMUNIS*, (Wallr.) Fr.

Amphigenous. Mycelium abundant, persistent or sometimes evanescent; perithecia variable in size and reticulations; appendages variable in length, often quite long, lying on the mycelium or more or less interwoven with it, usually colored in part or throughout, but occasionally all hyaline; asci 4-8, or more; sporidia mostly 4-8, variable in size.

On *Oenothera biennis* and *Astragalus Canadensis*.

The perithecia were about 85 μ on the first named host, and fully 100 μ on the second. The appendages were shorter on the last, and in both they contained little color.

2. *E. GRAMINIS*, D.C.

Amphigenous, or often epiphyllous. Mycelium dense, felt-like, persistent, white or gray, sometimes tinted brown. Perithecia immersed in the mycelium, few and scattered or many and crowded, depressed, large, about 225 μ ; appendages num-

crous, rather short, simple or occasionally branched, rigid, but variously curved, and interwoven with the mycelium, hyaline or tinted. Asci 16-25, oblong to oval, pedicellate. Sporidia 8, or rarely 4, maturing late, often only on the old plants in the spring.

On *Poa pratensis* and *Cinna arundinacea*.

In shady places. Doubtless occurs on other grasses here. No fully developed perithecia were found.

3. E. GALEOPSISIDIS, D C.

Amphigenous. Mycelium abundant, persistent, haustoria of the mycelial threads lobed; perithecia somewhat aggregated; appendages numerous, short, flexuous, colored, interwoven with the mycelium; asci numerous, often 12 or more; sporidia 2, mostly formed late.

On *Scutellaria lateriflora*.

Found only along the limestone bluffs of the Volga. The perithecia are about 100 μ in diameter. I don't find this listed for Iowa. Hardly distinguishable from the next.

4. E. CICHORACEARUM, D C.

Amphigenous. Mycelium abundant, persistent, haustoria rounded, not lobed; perithecia variable; appendages numerous, mostly short, 1-2 times the diameter of the perithecium, colored, much flexed and interwoven with the mycelium; asci variable, 4 or 5 to as many as 20, mostly numerous; sporidia large, quite uniformly 2, but occasionally varying to 3 or even 4.

On *Ambrosia artemisiaefolia*, *A. psilostachya*, *A. trifida*, *Aster laevis*, *A. sagittifolius*, *A. sp.*, *Verbena hastata*, *V. urticaefolia*, *V. bracteosa*, *Cnicus altissimus*, *Solidago Canadensis*, *S. serotina*, var. *gigantea*, *S. rigida*, *Helianthus annuus*, and *Phlox Drummondii*.

The largest perithecia were found on *S. Canadensis*, being 120 μ . The smallest were on *P. Drummondii*, being about 85 μ .

Uncinula, Lev.

Perithecium containing several asci; appendages free from the mycelium, recurved or coiled at the tip.

1. U. NECATOR, (Schw.) Burrill.

Amphigenous or frequently epiphyllous. Perithecia 85-120 μ , dark brown, opaque, reticulations small, rather obscure; appendages from 10 or 12 to 20 or more, varying in length from once and a half to four or more times the diameter of the perithecium, colored for more than half their length, frequently septate, occasionally forked, tips loosely and somewhat spirally coiled; asci mostly 4-6 (4-8 Farlow) ovate, pedicellate; sporidia 4-6.

On cultivated *Vitis* and *Vitis cordifolia*.

2. U. MACROSPORA, Peck.

Amphigenous. Mycelium conspicuous, abundant; perithecia large, 110-165 μ , wall tissue soft; reticulations very small, 5-10 μ , and rather obscure; appendages very numerous, 50 or more, hyaline, slender, smooth, usually shorter than the diameter of the perithecium, tip closely coiled, not enlarged; asci several, 8-10; sporidia 2, large, 20 by 30-35 μ .

On *Ulmus Americana*.

3. U. CLINTONII, Peck.

Amphigenous. Mycelium thin, rather persistent; perithecia scattered, 90-120 μ , firm, nearly black; appendages 15-30, 1-1½ times the diameter of perithecium in length, hyaline or nearly so, uncinately coiled at the tip; asci 4-6, oval, very short beaked; sporidia 4-8, mostly 18-21 μ long, completely filling the ascus.

On *Tilia Americana*,—rare.

4. U. CIRCINATA, C. & P.

Hypophyllous, or sometimes amphigenous. Mycelium inconspicuous; perithecia very large, depressed, 150-225 μ in greatest diameter, texture soft, reticulations

very small and irregular; appendages very numerous, slender, simple, about equal to the diameter of the perithecium, hyaline, smooth, tips not swollen, ascending from the upper half of the perithecium; asci numerous, 14 or more, long and slender, oblong or narrowly ovate, pedicellate, about 30 by 75 μ ; sporidia 8, small, about 10 by 15 μ .

On *Acer saccharinum*.

My specimens have 8 asci; in this they resemble *U. Aceris*. I obtained European specimens of the latter, and mine do not resemble them in other respects.

5. *U. SALICIS*, (DC.) Winter.

Amphigenous. Mycelium abundant, persistent; perithecia usually large, 100-160 μ , wall-tissue soft, elastic, reticulations rather small and indistinct; appendages variable in number, usually very numerous, hyaline, not much swollen at the tip, once to twice as long as the diameter of the perithecium; asci from 4 or 5 to 12 or more, ovate; sporidia usually 4 or 5, sometimes 6-8.

On *Salix* sp. and *Populus tremuloides*.

Besides these species of *Uncinula*, I found, late in the season, specimens on *Polygonum Virginianum* and *Rubus strigosus* which I could not certainly determine. Though no mycelium was found and the perithecia were few, I think neither had blown from other hosts as the perithecia were somewhat clustered in both cases, and no other hosts were found near. After examining quite a number of perithecia on *Polygonum*, I think the parasite will prove to be *Uncinula Clintonii*, Peck. The one on *Rubus* seemed most like *U. geniculata*, Gerard, but no perfect perithecia were found. I shall try to determine these next summer.

Phyllactinia, Lev.

Perithecium containing several asci; appendages free from the mycelium, acicular, acute at the tip, abruptly swollen at base.

1. *P. SUFFULTA*, (Reb.) Sacc.

Mostly hypophyllous. Mycelium abundant, persistent, or scant and evanescent; perithecia very large, 150-275 μ , wall tissue soft, cellular structure and reticulations obscure; appendages few, usually 8-12, easily detached, hyaline, varying in length from less than to three or four times the diameter of the perithecium, asci 4 or 5 to 20 or more, ovate, pedicellate; sporidia normally 2, occasionally 3 or 4, variable in size, mostly large.

On *Desmodium acuminatum*, *Xanthoxylum Americanum*, *Cornus florida*, *C. stolonifera*, *Crataegus* sp., *Fraxinus* sp., *Ulmus Americana*, *Corylus Americana* and *Betula papyrifera*.

I have only reported this species on two hosts not found recorded, viz. *D. acuminatum* and *C. florida*; but it is the most common of the *Erysipheæ* here and is found on other hosts. In collecting fungi in dense woods, I found the perithecia in October on ever; phænogam carefully examined. In two and one half hours, I found perithecia on forty different plants including grasses, ferns, and orchids. In all I have collected sixty-five different kinds of leaves containing perithecia of this species. In most cases no mycelium was found, and the perithecia were doubtless, in many instances, blown from some badly infested host. Yet I think the hosts are unusually numerous here and that some bear the parasite because near the proper hosts, and in a favorable location, which would not in other places. In such cases, I should expect to find the mycelium evanescent and the perithecia scattered. For this reason, scattered perithecia without mycelium might be found in October on some hosts. I shall watch the woods where *Phyllactinia* was

so abundant very carefully next summer, searching especially for mycelium, and in this way I expect to get at the real solution of what seems to be an unusual find.

Podosphæra, Kunze.

Perithecium containing a single ascus; appendages free from the mycelium, dichotomously branched at the end.

1. *P. OXYACANTHÆ*, (DC.) Duby.

Amphigenous. Mycelium variable, often abundant, persistent, perithecia 65-110 μ , dark, opaque, reticulations regular, about 10-15 μ , evident when young, scarcely observable when old, except by the uneven surface; appendages 8-20, dark brown for more than half their length, frequently septate, 1-4 times as long as the diameter of the perithecium, 3-5 times dichotomously forked, branches short, often swollen, tips recurved; ascus broadly elliptic or orbicular, about 50-60 μ , thick walled; sporidia usually 8.

On *Prunus* sp.

This is a widely varying species. In my specimens, the appendages are not branched and arise from the upper surface. They appear somewhat like those of *S. Mali*.

Microsphæra, Lev.

Perithecium containing several asci; appendages free from the mycelium, more or less dichotomously branched at the end.

1. *M. RUSSELLII*, Clinton.

Amphigenous. Mycelium inconspicuous; perithecia small, 75-100 μ , delicate, reticulations regular, distinct, about 10 μ ; appendages 8-18, many times longer than the diameter of the perithecium, colored for half or two-thirds of their length, occasionally septate, simple, bifid, or two or three times irregularly branched, branches long, often distorted, tips not swollen or recurved; asci 4-8; sporidia usually 4, small.

On *Oxalis corniculata*, var. *stricta*.

I did not find any appendages that were branched.

2. *M. EUPHORBIE*, (Peck.) B. & C.

Amphigenous. Mycelium abundant, persistent; perithecia scattered, abundant, usually small, 80-100 μ , but often larger (120 μ), texture soft, elastic, reticulations 10-15 μ , frequently obscure; appendages 15-20, very long, 5-6, or more times the diameter of the perithecium, hyaline, often slightly tinted at base, irregularly flexuous and often nodularly swollen, at first simple, then part of them bifid or three or four times dichotomous, branches long, lax, tips sometimes bifid, but not swollen or recurved; asci 4-8, frequently 6, pedicellate, 35-40 by 65 μ ; sporidia 4-6.

On *Euphorbia corollata*.

On the College campus. Only four or five perithecia were found fully developed though the collection was quite large. Consequently, no specimens were sent away to be examined though I do not find this recorded in Iowa lists.

3. *M. ALNI*, (DC.) Winter.

Amphigenous. Mycelium often delicate and evanescent, sometimes abundant and persistent; perithecia usually small, 75-100 μ , sometimes large, 100-130 μ , wall tissue compact, rather fragile, reticulations not large, 10-15 μ ; appendages 6 or 8 to 15 or 20, hyaline, usually tinted at base, often somewhat roughened, usually about equaling, but varying from less than to more than twice the diameter of the perithecium, 4-6 times dichotomous, branches varying in length and angle of divergence, but always regular and symmetrical, tips acute, distinctly, often strongly, recurved; asci varying with the size of the perithecium from 2 or 3 to 8 or more, usually 4 or 5, ovate when numerous, suborbicular when few; sporidia 4-8, variable, mostly small, averaging about 20 μ long.

On *Syringa vulgaris*, *Corylus Americana*, *Ulmus Americana*, *Viburnum lentago*, *Carpinus Caroliniana*, and *Lonicera Sullivantii*.

The appendages are about equal to the diameter of the perithecia in *Syringa* and *Viburnum* and twice as large in *Ulmus* and *Corylus*. The mycelium is most noticeable in *Viburnum*. The perithecia vary in size from 65 μ in *Corylus* to 100 μ in *Viburnum*.

4. *M. GROSSULARIÆ*, (Wallr.) Lev.

Amphigenous. Mycelium thin or rather dense, white, persistent. Perithecia scattered, 75-120 μ , reticulations about 15 μ ; appendages 10-20, once or twice as long as the diameter of the perithecium, hyaline or tinted at the base, very conspicuously 4-6 times dichotomously forked, with straight, obtuse, digitate branchlets, asci 3-5, sporidia 4-6, variable, 15-30 μ long.

On *Sambucus Canadensis*.

I find no record of this in Iowa lists. It may have been included with *M. Alni*, but the appendages are very different.

5. *M. QUERCINA*, (Schw.) Burrill.

Epiphyllous, hypophyllous, or amphigenous. Mycelium abundant, rather thin and pruinose, forming orbicular patches or spreading over the whole surface of the leaf; perithecia abundant, scattered, varying from 80-140 μ , reticulations evident, small, and irregular; appendages less than 20, varying in length from less than, to 4 or 5 times, the diameter of the perithecium, tinted at base, smooth or sometimes roughened, usually regularly 5-6 times dichotomous, branches short and tips strongly recurved, but presenting many curious and ornate variations caused by the more extended or unequal growth of some of the branches; asci 3-8, often rupturing by slight pressure; sporidia 4-8, variable, usually large, 20-30 μ long.

On *Quercus alba* and *Q. rubra*.

We have six oaks here, and this form doubtless occurs on other species than those named.

Besides the species described, conidiiferous specimens were collected on the following hosts:

1—*Rudbeckia laciniata*. 2—*Cacalia tuberosa*. 3—*Sisymbrium officinale*. 4—*Helenium autumnale*. 5—*Nasturtium sylvestre*. 6—*Potentilla Norvegica*. 7—*Epilobium coloratum*. 9—*Phlox sp.* 10—*Lactuca Canadensis*. 11—*Phystegia Virginiana*. 12—*Ranunculus abortivus*. 13—*Chrysanthemum* (cultivated).

Number ten had immature perithecia also. *Erysiphe Cichoracearum*, DC. is reported elsewhere on numbers two and four. The form on number seven may be *Sphaerotheca Epilobi*, (Link.), which is found elsewhere, the perithecia seldom developing. No *Erysipheæ* are reported on the other numbers so far as I know. *Chrysanthemum* was attacked and killed after the plant was taken into the house in September.

The following hosts occur here, known to bear species of *Erysipheæ* elsewhere, which I have not found here:

Two species of *Rhus*, three of *Desmodium*, three of *Vicia*, *Celtis occidentalis*, *Menispermum Canadense*, *Symphoricarpos occidentalis* and a few cultivated *Catalpas*.

These were all carefully examined, and yet I suppose that the parasites, though surely rare, if present, this year, may be plentiful in other years; and I have given them so that any one who is interested may search these hosts. There are a few other plants found here which bear *Erysipheæ* in California, or in eastern or southern states. These I have omitted.

In instances where a species has been transferred from one genus to another, I have given the name of the botanist who made the change after that of the one who first named the plant. It is somewhat of a question as to whether this should be done, but certainly there is no injustice in it as the first name is retained.

Orchidaceæ.

1. *APLECTRUM HIEMALE*, Nutt. In "Robertson's woods," — common.
2. *POGONIA PENDULA*, Lindl. Found in one spot in "Robertson's woods," about a dozen specimens in bloom in September,—rare.
3. *CALOPOGON PULCHELLUS*, R. Br. Not found nearer than Wadena,—rare.
4. *HABENARIA TRIDENTATA*, Hook. Dr. J. C. Arthur writes that this is the first collection reported for Iowa. The specimens were found near Wadena,—rare.
5. *HABENARIA BRACTEATA*, R. Br. In woods,—rare.
6. *HABENARIA HOOKERI*, Torr. Shady woods,—rare.
7. *HABENARIA HOOKERI*, Torr., VAR. *OBLONGIFOLIA*, Paine. This is also new to Iowa lists. Miss Carrie Harrison, who has charge of the orchids in the National Herbarium, agrees with me in regard to this variety,—occurring with the last.
8. *HABENARIA LEUCOPHÆA*, Gray. This was collected by Dr. C. C. Parker. I have not seen it growing,—rare.
9. *HABENARIA PSYCODES*, Gray. Dr. J. C. Arthur writes that only one specimen has been reported for Iowa before. I found three plants near the twin-bridges, five miles from Fayette on the Maynard road,—rare.
10. *CYPRIPEDIUM CANDIDUM*, Muhl. Low prairies,—rare.
11. *CYPRIPEDIUM PARVIFLORUM*, Salisb. Woods and prairies,—rare.
12. *CYPRIPEDIUM PUBESCENS*, Willd. Same locations as last,—nearly as rare.
13. *CYPRIPEDIUM SPECTABILE*, Salisb. Low places,—rare.
14. *ORCHIS SPECTABILIS*, L. Woods,—our most common species,

Filices.

1. *ADIANTUM PEDATUM*, L. Woods,—common.
2. *PTERIS AQUILINA*, L. Woods,—common.
3. *PELLÆA GRACILIS*, Hook. Shaded lime-stone cliffs,—rather rare.
4. *PELLÆA ATROPURPUREA*, Link. With the last.
5. *ASPLENIUM THELYPTEROIDES*, Michx. Woods,—frequent.
6. *CAMPTOSORUS RHIZOPHYLLUS*, Link. Shaded lime-rocks,—rare.
7. *CYSTOPTERIS BULBIFERA*, Bernh. Shady ravines,—frequent.
8. *ASPIDIUM THELYPTERIS*, Swartz. Low prairies,—frequent.
9. *ONOCLEA SENSIBILIS*, L. Low prairies,—common.
10. *ONOCLEA STRUTHIOPTERIS*, Hoffmann. Borders of woods —frequent.
11. *WOODSIA OBTUSA*, Torr. Lime-rocks,—rare.
12. *OSMUNDA CLAYTONIANA*, L. Woods,—frequent.

Ophioglossaceæ.

1. *BOTRYCHIUM TERNATUM*, Swartz. Very rare. I found only one plant (in "Robertson's woods") though I searched the spot repeatedly.
2. *BOTRYCHIUM VIRGINIANUM*, Swartz. "Robertson's woods," —common.

NEW YORK
BOTANICAL GARDEN

MANUAL
OF THE
FLOWERING PLANTS
OF
IOWA

BY
T. J. FITZPATRICK.
Fellow of the Iowa Academy of Sciences

ATHESIS.

PRIVATELY PUBLISHED

1899.

part 2. . . 721
m 242

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PREFACE.

THIS volume is the result of continued study of the flowering plants of Iowa during a period of seven years. The author has collected in more than thirty counties and in most portions of the state. To the collections thus obtained the author's many friends have made generous additions either by donation or by exchange. So far as possible all the literature relating to Iowa botany has been canvassed and the collections in the State University have been examined. All previous treatises have been in the nature of lists; many annotated, some not; and were mostly confined to the flora of restricted localities. In this volume all the scattered information is gathered and the author endeavors to correct previous errors, to confirm the observations already made, and to add new information obtained by personal effort.

This work is founded primarily upon the private herbarium of T. J. and M. F. L. Fitzpatrick and in this connection the author wishes to state that he is under obligations to the following parties who have sent many rare or infrequent and interesting specimens: Fred Reppert of Muscatine county, Prof. B. Fink of Fayette county, E. W. D. Holway and Herbert Goddard of Winneshiiek county, R. I. Cratty of Emmet county, Prof. Painmel, C. R. Ball and Wilmon Newell of Iowa State College, J. P. Anderson of Decatur county, J. H. Mills of Henry county, and Profs. T. H. Macbride and B. Shimek of the State University, and to many others who have lent aid in a limited amount. In the determination of difficult material the author has received aid from Prof. Wm. Trelease and Prof. J. B. S. Norton of the Missouri Botanical Garden, F. Lamson-Scribner of the U. S. Department of Agriculture, and R. I. Cratty.

The question of nomenclature is as yet unsettled. For some reason the new nomenclature has not been received with much favor by Iowa botanists. Because of this the author has thought it best to pursue a conservative course. All needful changes have been adopted and by the use of synonyms both the old and new systems are presented.

The author shall be pleased at all times to receive information and material so that he may be able to extend his knowledge of a subject the pursuit of which has been a source of much pleasure.

T. J. FITZPATRICK.

LAMONI, Iowa, July 30, 1899

MANUAL OF THE FLOWERING PLANTS OF IOWA.

ANALYTICAL KEY TO THE FAMILIES.

Series 1. PHANEROGAMS or FLOWERING PLANTS: those producing true flowers and seeds.

Class 1. ANGIOSPERMS: plants which have the ovules contained in a closed ovary.

Subclass 1. DICOTYLEDONS: stems differentiated into bark, wood, and pith; leaves netted-veined; embryo with a pair of opposite cotyledons; flowers usually 4 or 5-merous.

Division 1. POLYPETALAE: calyx and corolla present, petals separate. Apetalous forms occur as will be noted farther on.

The following wholly artificial key is taken from various governmental publications and adapted to the Iowa flora.

A. *Stamens ten to many and more than twice the number of sepals.*

* *Calyx entirely free from the ovary.*

Pistils many, distinct, enclosed in a hollow receptacle; leaves alternate, stipulate. Rosa, in ROSACEAE, 49.

Pistils several, contained in pits on the upper surface of a large convex receptacle. Nelumbo, in NYMPHAEACEAE, 7.

Pistils more than one, distinct, not enclosed in the receptacle.

Stamens inserted on the edge of a disk which lines the calyx-tube, distinct; anthers 2-celled. ROSACEAE, 44.

Stamens monodelphous, united with the base of the petals; anthers 1-celled. MALVACEAE, 23.

Stamens inserted on the receptacle.

Small trees; filaments shorter than the anthers. ANONACEAE, 6.

Herbs or woody climbers; filaments longer than the anthers.

Flowers dioecious; twiners; leaves alternate, palmately lobed.

MENISPERMACEAE, 7

Flowers perfect, if climbers the leaves are opposite.

Leaves peltate; petals persistent.

Brasenia, in NYMPHAEACEAE, 7.

Leaves not peltate; petals deciduous. RANUNCULACEAE, 1.

Pistils several-lobed, the ovaries united below the middle.

RESEDACEAE, 16.

Pistils several, their ovaries cohering in a ring around an axis.

MALVACEAE, 23.

Pistil solitary as to the ovary but styles or stigmas may be several.

Leaves punctate with pellucid or black dots. HYPERICACEAE, 22.

Leaves not punctate with pellucid or black dots.

Ovary simple, 1-celled, 2-ovuled; fruit a drupe. DRUPACEAE, 43.

Ovary simple, 1-celled, several-ovuled; fruit a legume.

MIMOSACEAE, 43.

Ovary compound, 1-celled; placenta central. PORTULACACEAE, 21.

Ovary simple, 1-celled; placenta parietal, many-ovuled.

Leaves 2-3-ternately compound or dissected.

RANUNCULACEAE, 1.

Leaves peltate, palmately lobed.

Podophyllum, in BERBERIDACEAE, 7.

Ovary compound, 1-celled; placentae 2 or more, parietal.

Sepals caducous; juice milky or colored. PAPAVERACEAE, 9.

Sepals deciduous, 4. CAPPARIDACEAE, 16.

Sepals persistent, 3 or 5. CISTACEAE, 17.

Ovary compound, several-celled.

Calyx valvate in the bud, and persistent; stamens monodelphous; anthers 1-celled. MALVACEAE, 23.

Deciduous; anthers 2-celled. TILIACEAE, 25.

Calyx imbricated in the bud, persistent.

Ovaries on many partitions; aquatic. NYMPHAEACEAE, 7.

Ovaries on 5 placentae in the axis. SARRACENIACEAE, 9.

*** Calyx more or less coherent with the surface of the compound ovary.*

Ovary 8-30-celled; ovules many, on partitions, aquatic.

NYMPHAEACEAE, 7.

Ovary apparently 10-celled, each division 1-ovuled.

Amelanchier, in POMACEAE, 49.

Ovary 2-5-celled.

Leaves alternate, stipulate. POMACEAE, 49.

Leaves opposite, exstipulate. SAXIFRAGACEAE, 51.

Ovary 1-celled; ovules parietal.

Fleshy jointed prickly plants; petals many. CACTACEAE, 49.

Rough-leaved plants; petals 5 or 10. LOACEAE, 59.

Ovary 1-celled; placenta free, central; pericarp opening by a lid.

PORTULACACEAE, 21.

B. *Stamens of the same number as the petals and opposite them.*

Pistil solitary; flowers mostly perfect; herbs, shrubs, or woody vines.

Ovary 1-celled; anthers opening by valves. BERBERIDACEAE, 7.

Ovary 1-celled; anthers longitudinally dehiscent. PORTULACACEAE, 21

Ovary 2-4-celled.

Calyx-lobes small or wanting; petals valvate. VITACEAE, 29.

Calyx 4-5-cleft valvate in the bud; petals involute. RHAMNACEAE, 29.

Pistils 3-6, separate; flowers dioecious; woody vines. MENISPERMACEAE, 7.

C. *Stamens of the same number as the petals and alternate with them or not more than twice as many.*

** Ovary superior, the calyx entirely free.*

† Ovaries 2 or more, separate.

Stamens hypogynous, distinct.

Leaves pellucid-punctate. RUTACEAE, 27.

Leaves not pellucid-punctate.

Tree; leaves odd-pinnate; lowers paniculate. SIMARUBACEAE, 28.

Herbs; leaves thick, succulent; flowers cymose. CRASSULACEAE, 53.

Herbs; leaves not fleshy; inflorescence various. RANUNCULACEAE, 1.

Stamens inserted on the calyx, distinct.

Stamens twice as many as the pistils. CRASSULACEAE, 53.

Stamens neither the same nor twice the number of the pistils.

Leaves stipulate. ROSACEAE, 44.

Leaves exstipulate. SAXIFRAGACEAE, 51.

†† Ovaries 2-5, separate above, more or less united below.

Leaves pellucid-punctate.

RUTACEAE, 27.

Leaves not pellucid-punctate.

Trees or shrubs: leaves opposite, palmately lobed or pinnate; fruit a samara.

ACERACEAE, 30.

A small shrub; leaves opposite, 3-foliolate.

STAPHYLEACEAE, 31.

††† Ovary 5-lobed, 5-celled; style compound.

GERANIACEAE, 26.

†††† Ovary simple, 1-celled with one parietal placenta.

Flowers irregular, the upper petal enclosing the others in the bud.

PAPILIONACEAE, 33.

Flowers mostly regular, the upper petal enclosed by the lateral in the bud.

CAESALPINACEAE, 42.

††††† Ovary 1, compound, as shown by the number of cells, placentae, styles, or stigmas.

Ovary 1-celled.

Corolla irregular, spurred; petals 4; stamens 6.

FUMARIACEAE, 9.

Corolla irregular, lower petal spurred; petals and stamens 5.

VIOLACEAE, 17.

Corolla regular or nearly so.

Ovule 1; stigmas 3; small trees or shrubs with resinous or milky acrid juice.

ANACARDIACEAE, 32.

Ovules 1 or 2; herbs.

A few of the CRUCIFERAE, 10.

Ovules 2 or more, central or basal.

Petals inserted on the throat of the calyx.

LYTHRACEAE, 55.

Petals not inserted on the throat of the calyx.

CARYOPHYLLACEAE, 19

Ovules several or many, on two or more parietal placentae.

Leaves pellucid-punctate or black-dotted.

HYPERICACEAE, 22.

Leaves non-punctate.

Sepals 5, unequal or only 3.

CISTACEAE, 17.

Sepals and petals 4; stamens 6.

CRUCIFERAE, 10.

Sepals and petals 5; stamens 5 or 10.

SAXIFRAGACEAE, 51.

Ovary 2-several-celled; flowers irregular.

Stamens 6 or 8; anthers 1-celled, opening at the top.

POLYGALACEAE, 21.

Stamens 11 or 12, dehiscence longitudinal; petals inserted on the throat of the gibbous or spurred calyx.

Cuphea, in LYTHRACEAE, 55.

Stamens 5 to 8 or 10; petals mostly hypogynous.

Ovary 3-celled; leaves opposite, digitate; trees.

HIPPOCASTANACEAE, 31.

Ovary 5-celled; leaves alternate, simple; herbs.

BALSAMINACEAE, 27.

Ovary 2-several-celled; flowers regular.

Stamens neither the same nor twice the number of the petals.

Petals 5; stamens collected into 3 clusters.

HYPERICACEAE, 22.

Petals 4; stamens 6, 2 shorter, rarely 2 or 4.

CRUCIFERAE, 10.

Petals 5; stamens more, distinct.

ACERACEAE, 30.

Stamens of the same or twice the number of the petals.

Ovules and seeds 1 or 2 in each cell.

Herbs, with perfect symmetrical flowers.

Ovary deeply lobed, 5-celled; sepals 5.

GERANIACEAE, 26.

Ovary globose, breaking into 5 2-celled carpels, sepals 5.

LINACEAE, 26.

Shrubs or trees.

Leaves 3-foliolate, pellucid-punctate.

RUTACEAE, 27.

Leaves palmately lobed and veined; fruit a 2-winged samara.

ACERACEAE, 30.

- Leaves simple, pinnately veined, non punctate.
 Fruit a globose or lobed pod; seeds arillate. CELASTRACEAE, 28.
 Fruit a berry-like drupe. ILLICINEAE, 29.
- Ovules and seeds several to many in each cell.
 Stipules caducous; leaves opposite, compound. STAPHYLEACEAE, 31
 Stipules wanting when the leaves are opposite.
 Stamens 10, monodelphous below; leaflets 3, obcordate.
 OXALIDACEAE, 27.
 Stamens distinct, hypogynous. CARYOPHYLLACEAE, 19.
 Stamens distinct, perigynous.
 Styles usually 2, simple, sometimes cohering. SAXIFRAGACEAE, 51.
 Style 1; capsule often 1-celled. LYTHRACEAE, 55.
*** Calyx-tube more or less adherent to the ovary.*
- Ours climbing annuals, with 3-forked tendrils. CUCURBITACEAE, 59.
 Mostly erect herbs, not tendril bearing.
 Ovules and seeds two to many in each cell of the ovary.
 Ovary 1-celled; ovules many, basal. PORTULACACEAE, 21.
 Ovary 1-celled; placentae 2 or 3, parietal. SAXIFRAGACEAE, 51.
 Ovary 2-several-celled.
 Anthers dehiscing by apical pores; style 1. MELASTOMACEAE, 55.
 Anthers not dehiscing by apical pores.
 Stamens inserted on a disk which fills the bottom of the calyx.
 CELASTRACEAE, 28.
 Stamens inserted on the calyx.
 Stamens 4 or 8, rarely 5; style 1. ONAGRACEAE, 56.
 Stamens 5 or 10; styles 2 or 3, distinct. SAXIFRAGACEAE, 51.
- Ovules and seeds solitary in each cell of the ovary.
 Stamens 2 or 8; styles 1; stigma 2-4-lobed; herbs. ONAGRACEAE, 56.
 Stamens 4 or 8; styles or stigmas 4; aquatics. HALORAGIDACEAE, 54.
 Stamens 8, but 4 of them sterile, scale-like, styles 2; small tree.
 HAMAMELIDACEAE, 54.
 Stamens 4; style and stigma 1; small shrubs. CORNACEAE, 65.
 Stamens 5; flowers umbellate, rarely capitate.
 Fruit dry, consisting of 2 coherent carpels; styles 2.
 UMBELLIFERAE, 60.
 Fruit a 2-5-celled drupe; styles 2-5. ARALIACEAE, 64.
- Gamopetalous forms in polypetalous families.
 Forms which have their petals more or less united into one piece.
** Stamens more numerous than the lobes of the corolla.*
- Ovary 1-celled, with one parietal placenta.
 The upper petal enclosing the others in the bud. PAPILIONACEAE, 33.
 The upper petal enclosed by the lateral in the bud.
 CAESALPINACEAE, 42.
 Ovary 2-celled, 2-ovuled. POLYGALACEAE, 23.
 Ovary 3-many-celled.
 Stamens 10, hypogynous, united below; styles 5. OXALIDACEAE, 27.
 Stamens many, monodelphous; styles many. MALVACEAE, 23.
*** Stamens as many as the lobes of the ovary.*
- Annuals, climbing, tendril bearing. CUCURBITACEAE, 59.
 Shrub, with alternate simple leaves. ILLICINEAE, 29.

Apetalous forms in polypetalous families.

Forms having the corolla and sometimes the calyx wanting; calyx often petaloid.

** Ovary or its cells with many ovules.*

Ovary inferior, 4-celled; stamens 4. Ludwigia, in ONAGRACEAE, 56.

Ovary inferior, 1-celled; stamens usually 8. Chrysosplenium, in
SAXIFRAGACEAE, 52.

Ovary superior.

Pod 5-celled, 5-beaked, the beaks falling away at maturity; stamens 10.
Penthorum, in CRASSULACEAE, 53.

Pod 3-celled, 3-valved, many-seeded. AIZOACEAE, 60.

Pod 1 or 2-celled; placentae central.

Stamens inserted on the calyx. LYTHRACEAE, 55.

Stamens hypogynous or inserted at the base of the calyx.

CARYOPHYLLACEAE, 19.

Pod 1-celled, with one parietal placenta. RANUNCULACEAE, 1.

Pods 2 or more, separate, simple. RANUNCULACEAE, 1.

*** Ovary or its cells usually with 1 or 2 ovules.*

Pistils 2 or more, distinct or nearly so.

Stamens hypogynous; leaves punctate. RUTACEAE, 27.

Stamens hypogynous; leaves not punctate; calyx usually petaloid.

RANUNCULACEAE, 1.

Pistil 1, simple or compound.

Ovary inferior, 3 or 4-celled; aquatics. HALORAGIDACEAE, 54.

Ovary naked; calyx none. Callitriche, in HALORAGIDACEAE, 55.

Ovary free from the calyx; trees or shrubs.

Ovary 2-celled; fruit a 2-winged samara. ACERACEAE, 30.

Ovary 3-celled; fruit drupaceous or dry. RHAMNACEAE, 29.

RANUNCULACEAE Juss. CROWFOOT FAMILY.

Annual or perennial herbs, with colorless usually acrid juice; and polypetalous or apetalous, regular or irregular flowers. Leaves simple or dissected, opposite or alternate; petioles dilated. Sepals 3-15, frequently petaloid. Petals 3-15. Stamens usually many. Fruit dry achenes, follicles, or berries.

** Leaves opposite, terminating in tendrils; sepals 4, petaloid.*

CLEMATIS. Woody climbing plants.

*** Upper leaves opposite or whorled; peduncles with one apetalous flower.*

ANEMONE. involucre foliaceous, remote from the flower.

HEPATICA. Involucre close to the flower, calyx-like.

ANEMONELLA. Flowers umbellate.

THALICTRUM. Sepals 4, petaloid or greenish.

**** Sepals usually 5; petals present; achenes many.*

RANUNCULUS. Petals yellow, rarely white, with a nectariferous pit or scale at the base inside.

MYOSURUS. Flowers solitary, scapose; petals 5, white.

***** Flowers conspicuous, apetalous, not racemose; sepals petaloid.*

CALTHA. Leaves kidney-shaped, undivided; flowers yellow.

ISOPYRUM. Leaves divided; flowers white.

****** Sepals or petals spurred.*

AQUILEGIA. Petals produced backward into 5 hollow spurs.

DELPHINIUM. Upper sepal produced backward into a long spur.

****** Flowers regular; fruit a berry.*

ACTAEA. Flowers small, in a single short raceme; pistil 1.

HYDRASTIS. Flowers apetalous, solitary; roots yellow.

CLEMATIS L. VIRGIN'S-BOWER. Woody climbing plants, with opposite pinnate leaves, terminating in tendrils; and large purplish flowers. Sepals 4. Petals none. Achenes many, in a globular head, with long persistent styles.

** Flowers cymose-paniculate.*

C. virginiana L. Common V. Leaves petioled, of 3 ovate leaflets; leaflets cut or lobed; styles persistent, plumose. A trailing vine, common in low grounds in thickets or along fence-rows; July-Sept.

*** Flowers solitary.*

C. pitcheri T. & G. Leaflets 3-7, ovate, 1-3-lobed; sepals thin, tips recurved; achenes with filiform, persistent, silky, but not plumose styles. Thickets; June-August; frequent. (C. simsii Sweet.)

C. viorna L. Leather-flower. Similar to the preceding; persistent styles plumose. This species has been frequently reported but the author has seen no reliable specimens, the so-called specimens not being in fruit their identity was questionable.

ANEMONE L. ANEMONE. WIND-FLOWER. Perennial herbs, with the leaves mostly radical, long-petioled, the few cauline whorled so as to form a foliaceous involucre remote from the flower, all compound or dissected. Peduncles 1-flowered. Sepals 5-20, petal-like. Petals none or in one of abortive stamens. Fruit compressed 1-seeded achenes.

* *Involucre forming a cup; carpels in a globular head, with long persistent plumose styles.*

A. patens nuttalliana Gray. *Pasque-flower*. Stem 4-10 inches high, villous; flowering before leafing; leaves ternately-parted, the divisions dissected into narrow linear lobes; involueral lobes linear; peduncle solitary, lengthening after flowering; flower large; sepals 5-7, ovate, whitish or purplish. High prairies; March-May; once common, becoming scarce as the prairies are broken up. Winneshiek, Allamakee, Fayette, Delaware, Story, Hardin, Emmet, Lyon, Woodbury, Calhoun, Crawford, and Shelby counties. (*Pulsatilla hirsutissima* (Pursh) Britton.)

* * *Styles short, not plumose.*

† *Leaves of the involucre 3, sessile.*

A. pennsylvanica L. Stem 1-2 feet high, hairy; radical leaves 5-7-parted or cleft, divisions cut or toothed toward the apex; primary peduncle naked, two lateral ones with a 2-leaved involucre; sepals 5, obovate, white; achenes in a globose head, flat, nearly orbicular, pubescent. Low places; June-July; common. (*A. canadensis* L.)

†† *Leaves of the involucre long-petioled; sepals 5-8, usually silky beneath.*

A. cylindrica Gray. Stem 1-2 feet high, silky-pubescent; flowers 2-6, on exerted naked peduncles, sometimes one involucellate; involueral leaves 4-18, 3-divided, the divisions cuneate-lanceolate, cleft, toothed toward the apex; head cylindrical, 1 inch long; achenes pubescent. Prairies and woods; June-July; common.

A. virginiana L. Stem 2-3 feet high, pubescent; involueral leaves 3, 3-parted, the divisions ovate-lanceolate, cleft and serrate; the first peduncle naked, the later with a 2-leaved involucre near the middle; sepals 5; head of fruit oval to oblong. Woods; June-August; frequent and widely distributed.

A. quinquefolia L. Stem 4-8 inches high, smooth or slightly pubescent, from horizontal rootstocks; involueral leaves 3, leaflets wedge-shaped, conspicuously toothed, somewhat lobed; sepals 4-7, ovate, white varying to blue or purple. Rich upland woods; April-May; common locally; Winneshiek, Fayette, Scott, Muscatine, Johnson, and Story counties. (*A. nemorosa* L. of Gray's Manual.)

* * * *Involucre far below the flower.*

A. caroliniana Walt. Stem 3-8 inches high, pubescent, from a small tuber; root-leaves 3-parted or cleft; sepals 6-20, linear, purplish varying to whitish. Dry soil, open places; April-May; infrequent; Fayette, Scott, Muscatine, Story, Hardin, Hancock, and Sioux counties.

HEPATICA Scop. Low perennial scapose herbs, with thick heart-shaped 3-lobed radical leaves and solitary flowers. Stamens many; filaments short; anthers 2-celled. Involucre 3-leaved, close to the flower, calyx-like.

H. acutiloba DC. Scapes 4-8 inches high, villous; leaves thick, evergreen, 3-lobed or sometimes 5-lobed; leaf-lobes and those of the involucre acute or acutish; flowers blue, purple, or white. Upland woods; March-April; common in the eastern half of Iowa, but apparently rare in the western portion. (*H. acuta* (Pursh) Britton.)

H. triloba Chaix. Lobes of leaves and involucre rounded or obtuse. A species closely resembling the preceding. It has been reported from Scott county, and various other localities but there is much doubt as to whether it belongs to our flora. (*H. hepatica* (L.) Karst.)

ANEMONELLA Spach. Leaves 2-3-ternately compound; involueral leaves

similar, sessile; leaflets more or less 3-lobed, rounded to heart-shaped at the base and long petiolate. Flowers white or pinkish, umbellate. Sepals 5-10, large, broad ovate. Achenes terete, ribbed, sessile.

A. thalictroides (L.) Spach. *Rue Anemone*. A low glabrous perennial herb, 3-5 inches high with stem and radical leaves rising from a cluster of tuberous roots. Upland woods; April-May; common. Occasionally double flowered forms are found. (*Synedemon thalictroides* (L.) Hoffmg.)

THALICTRUM L. MEADOW-RUE. Perennials, with alternate 2-3-ternately compound leaves, the divisions and leaflets stalked; and perfect, polygamous or dioecious, paniculate or racemose flowers. Sepals 4-5, frequently petaloid. Petals none. Stamens many, exserted. Fruit achenes.

T. purpurascens L. *Purple M.* Stem 2-6 feet high, frequently purplish; leaves 3-4-ternate, the cauline nearly sessile; leaflets oblong-ovate to nearly lanceolate, veiny, often waxy beneath, usually with three apical lobes; flowers greenish or purplish, dioecious or polygamous; filaments narrow. Low prairies and woods; May-June; common.

T. polygamum Muhl. *Tall M.* Similar to the preceeding; plant not glandular or waxy; filaments broadened. Reported as belonging to our flora.

T. dioicum L. *Early M.* Stem 1-2 feet high, glabrous; leaves 3-4-ternate, petioled; leaflets drooping, 3-9-lobed, rounded; flowers dioecious, purplish or greenish. Rich upland woods and meadows; April-May; frequent; Winneshiek, Allamakee, Clayton, Fayette, Scott, Story, Cerro Gordo, Webster, Dallas, and Dickinson counties.

RANUNCULUS L. CROWFOOT. BUTTERCUP. Annual or perennial herbs, with alternate leaves, and white or yellow flowers. Flowers solitary, sometimes corymbed. Sepals 5, deciduous. Petals 5, rarely more or less, sometimes minute, with a nectariferous pit or scale at the base inside. Achenes many, usually flattened, pointed, capitate or spicate.

* *Aquatics.*

R. trichophyllus Chaix. *White Water C.* Stem about 1 foot long; leaves petioled, flacid, divided into capillary divisions, *collapsing* when withdrawn from the water; petals ovate, twice as long as the calyx, white. Growing in the soft mud in shallow water, immersed except the flower; June-August; infrequent; Winneshiek, Fayette, and Muscatine counties; reported from Hamilton county. (*R. aquatilis* var. *trichophyllus* of Gray's Manual. *Batrachium trichophyllum* (Chaix.) Bossch.)

R. circinatus Sibth. *Stiff Water C.* Similar to the preceeding but leaves sessile or nearly so, rigid, *not collapsing*; stipules conspicuous. In similar situations; June-August; infrequent; Fayette, Muscatine, Johnson, and Emmet counties. (*B. divaricatum* (Schränk) Wimm.)

R. multifidus Pursh. *Yellow Water C.* Stems floating or immersed, sometimes emersed; leaves repeatedly 3-forked, the ultimate divisions long, capillary; out of water the leaves are often reniform, lobed or toothed or else the divisions are shorter and linear; petals 5-8, bright yellow. In ponds and slow streams; May-July; infrequent; Fayette, Scott, Muscatine, Johnson, Story, Hardin, Emmett, Hamilton, Decatur, and Lyon counties. (*R. delphinifolius* Torr.)

* * *Terrestrial, but frequently growing in wet places; flowers yellow.*

† *Radical leaves deeply cleft or divided.*

R. fascicularis Muhl. Plant pubescent, low; 3-10 inches high, fibrous roots thickened; leaves 3-5-divided, divisions lobed and cleft, the ultimate segments

oblong or linear: petals 5-7, spatulate-oblong; achenes flat, beaked by a subulate style. Prairies and wooded hillsides: April-May common; Winneshiek, Fayette, Scott, Muscatine, Henry, Johnson, Polk, Mahaska, and Pottawattomie counties.

R. septentrionalis Poir. Low, 6-20 inches high, pubescent, erect or in wet places mostly procumbent and forming runners, roots many, fibrous; leaves petioled, 3-divided: the divisions usually all stalked, 3-cleft or -divided, the segments toothed or cut; achenes margined, tipped by a sword-shaped style of about their length. Moist soil; April-May; common in all portions of the state.

R. repens L. Habit and foliage closely resembling the preceeding; leaves often white-spotted; achenes margined; the beak stout, short, and slightly bent. Low grounds; May-July; Muscatine and Johnson counties.

R. recurvatus Poir. *Hooked C.* Stem 1-2 feet high, hirsute, leaves all similar, long-petioled, broadly reniform, deeply 3-cleft, the divisions toothed and lobed beyond the middle; flowers small, on long peduncles; calyx reflexed; petals shorter; achenes compressed, tipped by a recurved beak which is half their length. Woods; May-June; Scott, Muscatine, and Johnson counties.

R. pennsylvanicus L. f. *Bristly C.* Annual; stem 1-2 feet high, branching, bristly hairy, leaves ternately compound; divisions frequently 3-cleft, the lobes lanceolate, cuneate, cut or toothed; flowers small; calyx reflexed; head of fruit oblong; achenes tipped by a sharp beak one-third their length. Wet soil; June-August, infrequent; Winneshiek, Allamakee, Scott, Muscatine, Henry, Linn, Story, Emmet, Cerro Gordo, Hancock, Dickinson, Winnebago, and Woodbury counties.

R. hispidus Hook. *Hispid C.* Resembles the preceeding; annual or biennial; ascending or declined, hairy or somewhat hispid; stems 1-2 feet long, rarely rooting; leaves 3-divided, leaflets petiolate, ovate or broadly oblong, cuneate, mostly 3-parted or -cleft, or variously lobed or cleft, somewhat toothed; head of fruit oblong; achenes smooth, the sharp straight beak about one-fourth their length. This species has been confused with *R. pennsylvanicus* L. and *R. septentrionalis* Poir.; probably frequent; Fayette county. (*R. macounii* Britton.)

R. bulbosus L. *Bulbous C.* Stem about 1 foot high, from a bulbous base; radical leaves 3-divided, lateral divisions sessile, the terminal stalked and 3-parted, all more or less cleft and toothed; calyx reflexed; petals much longer; head of fruit globose; achenes compressed, short beaked. Fields and waste places; May-July; reported as an Iowa weed.

R. acris L. *Tall C.* Stem 2-3 feet high, hairy; leaves of 3 sessile divisions, the basal 3-7-divided, the divisions 3-cleft or -parted, the segments cut into narrow or linear lobes; petals obovate, 2-3 times longer than the calyx; head of fruit globose; achenes compressed, short beaked. Fields and waste places; June-August; infrequent; Jones, Story, and Page counties.

†† *Root-leaves frequently undivided; roundish, sometimes lobed or cleft.*

R. abortivus L. *Small flowered C.* Biennial, conspicuous by having the primary root-leaves round, heart- or kidney-shaped, obscurely crenate and long-petioled, other leaves 3-5-lobed or -parted and variously toothed, petiolated or nearly sessile; flowers small, inconspicuous, pale yellow; petals shorter than the reflexed sepals. Very common in moist places in meadows and woods; April-June.

R. sceleratus L. *Cursed C.* Annual; stem 6-20 inches high, glabrous, thick, hollow, with acrid juice; root-leaves of 3-5 rounded lobes, others 3-parted, cut

and toothed, the upper nearly sessile, deeply lobed or divided: lobes oblong or linear, obtuse, entire or toothed: petals about as long as the sepals, pale yellow: head of fruit oblong or cylindric: achenes mucronulate. Wet ditches: June-August: frequent: Scott, Emmet, and Calhoun counties.

R. rhomboideus Goldie. *Prairie C.* Stem 4-16 inches high, hairy, some branched: root-leaves roundish to rhombic-ovate, toothed or crenate, others 3-5-lobed or -parted, the upper sessile or nearly so: petals large, deep yellow: head of fruit spherical: achenes orbicular, minutely beaked. Prairies: April-May: frequent: Winneshiek, Fayette, Emmet, Lyon, and Calhoun counties. (*R. ovalis* Raf.)

R. cymbalaria Pursh. *Sea-side C.* Low, smooth, spreading by long rooting runners, leaves clustered at the roots and on the joints of the runners, long-petioled, cordate or kidney-shaped, crenate: scapes 1-several flowered, sometimes leaf bearing toward the base: petals sometimes as many as 8. Dry prairies and sandy shores: June-August: infrequent: Story, Dickinson, Emmet, Sioux, and Lyon counties. (*Oxygraphis cymbalaria* (Pursh.) Prantl.)

R. affinis R. Br. A small hairy or glabrous plant, from 4-10 inches high: flowers small, pale yellow: root-leaves pedately cleft, stem leaves with narrow oblanceolate divisions: heads oblong. Reported from Iowa. (*R. pedatifidus* J. E. Smith.)

MYOSURUS Dill. Small annual herbs, with linear basal leaves, and 1-flowered scapes. Sepals 5, spurred. Petals small, narrow. Stamens usually many. Pistils numerous.

M. minimus L. *Mouse-tail.* Low, 1-6 inches high, glabrous: roots fibrous: leaves tufted, entire: achenes numerous, on an elongated receptacle, glabrous, apiculate. Alluvial soil: April-July: Muscatine county, reported from Scott county.

CALTHA L. Glabrous perennial succulent herbs, with orbicular or kidney-shaped leaves, and conspicuous flowers. Sepals 5-9, petaloid, deciduous. Petals none. Stamens many. Pistils 5-10: styles obscure. Pods compressed, spreading, bearing the many seeds in two rows along the ventral suture.

C. palustris L. *Marsh Marigold.* Stems 1-2 feet high, hollow, grooved, stout: basal leaves long-petioled, cordate or reniform, with a narrow sinus, entire or crenate, the upper with shorter petioles and more or less truncate bases: sepals oval, obtuse, yellow. Swamps, banks of streams: April-May: frequent: Winneshiek, Fayette, Scott, Muscatine, Johnson, Story, Emmet, Dickinson, and Woodbury counties.

ISOPYRUM L. Smooth perennial herbs, with ternately decomposed leaves, and axillary or terminal long-peduncled flowers. Sepals 5, petaloid, deciduous. Petals in ours none. Stamens many. Pistils usually 4. Pod ovate or oblong, sessile, 2-several seeded.

I. biternatum (Raf.) T. & G. Roots many, fibrous, occasionally thickened into small tubers. Moist woods: May: common: Winneshiek, Fayette, Scott, Muscatine, Henry, Johnson, Story, Emmet, Decatur, and Calhoun counties.

AQUILEGIA L. Perennial herbs, with ternately compound long-petioled leaves, and showy flowers. Sepals 5, petaloid. Petals 5, prolonged backward into long hollow spurs. Stamens numerous, exserted. Pistils 5.

A. canadensis L. *Wild Columbine.* Stem 1-3 feet high, branched: leaflets lobed: flowers solitary, large, scarlet, nodding, spurs pointing upward: pods erect. Woodlands: May-June: common throughout.

DELPHINIUM L. LARKSPUR. Herbs, with palmately cut or divided leaves, and racemose flowers. Sepals 5, upper one prolonged into a spur, petal-like. Petals irregular 4 or 2, upper pair prolonged back into the spur of the calyx. Pistils becoming many seeded pods in fruit.

* *Perennials; leaves long-petioled; pistils 3.*

D. tricorné Mx. Dwarf L. Stem simple, hollow, 1-3 feet high, glabrous or pubescent; roots a cluster of small tubers; leaves about 5-parted, divisions 2-3-cleft; raceme open; flowers blue or whitish; spur ascending, nearly straight; pods diverging. Prairies and rich woods; May; frequent; Decatur, Union, Clark, Pottawattomie, Mahaska, and Shelby counties.

D. azureum Mx. Stem slender, 1-3 feet high, nearly solid, more or less pubescent; leaves 3-5-parted, the divisions cleft into linear segments; raceme strict; flowers blue to whitish; pods erect. Prairies; June; common and widely distributed. (*D. carolinianum* Walt.)

D. exaltatum Ait. Raceme narrow, elongated, many-flowered; pods erect. Reported; so-called specimens proved to be *D. azureum* Mx. (*D. uccolatum* Jac.)

** *Annuals, escapes; petals 2, pistil 1.*

D. ajacis L. Leaves nearly sessile; the divisions narrow, numerous; flowers numerous; spur long and narrow; pods erect, pubescent. Sparingly escaped from gardens; Fayette and Johnson counties.

D. consolida L. Field L. Differs from the above by its glabrous pods, longer and slightly bent spurs, and shorter and more open racemes. Reported as an escape in Adams and Mahaska counties.

ACTAEA L. BANEERRY. COHOSH. Perennial herbs, 2-4 feet high, with 2-3-ternately compound leaves, leaflets sharply cleft and toothed, and racemose flowers. Sepals 5, white, deciduous. Petals 4-10. Stamens numerous. Pistil 1. Fruit a globular many-seeded berry.

A. rubra (Ait.) Willd. Red B. Stem 1-2 feet high, bushy, raceme ovate; petals spatulate, shorter than the stamens, pedicels slender; berries red. Rich woods; April-May; infrequent; Winneshiek, Fayette, Muscatine, Johnson, Story, Shelby, Emmet, Winnebago, Pottawattomie, and Woodbury counties. (*A. spicata* var. *rubra* Ait.)

A. alba (L.) Mill. White B. Resembles the preceeding in general appearance; flowers appear 2-3 weeks later; raceme oblong, petals slender; pedicels usually red, thickened in fruit; berries white. Rich woods; April-June; frequent; Winneshiek, Fayette, Scott, Muscatine, Johnson, Henry, Story, Emmet, Floyd, Winnebago, and, Decatur counties.

HYDRASTIS Ellis. Low vernal perennial plants, from thick yellow rootstocks, with one radical leaf, and a hairy stem which is two-leaved above and terminated by a solitary greenish-white flower. Sepals 3, soon falling. Petals none. Stamens numerous. Pistils 12 or more. Fruit 1-2 seeded crimson berries.

H. canadensis L. Orange-root. Golden Seal. Stem about 1-foot high, erect; leaves rounded, 4-9-inches wide, 5-7-lobed, doubly serrate, veiny, base cordate, rootstock contains a yellow dye. Rich woods; April; rather rare; Winneshiek, Fayette, and Muscatine counties; reported from Lee county.

ANONACEAE DC. CUSTARD-APPLE FAMILY.

Trees or shrubs, with alternate entire exstipulate leaves, and solitary axillary flowers. Sepals 3, valvate in our species. Petals about 6, in 2 rows, thickish, valvate in the bud, hypogynous. Stamens many; anthers adnate, extrorse. Represented in our flora by a single species of the ge-

nus *ASIMINA* Adans.

A. triloba (L.) Dunal. *Common Papaw*. A small tree. 10-30 feet high; shoots and young leaves rusty pubescent, becoming glabrous; leaves obovate-lanceolate, thin, acute, 6-12 inches long, very short-petioled, base cuneate; flowers appearing with the leaves, on shoots of the preceeding year; peduncles and ovate sepals dark-pubescent; petals dull purple, the outer much longer than the calyx; fruit a fleshy yellowish edible berry. Borders of rivers; flowers in April; fruit edible, ripe in October; infrequent; Clayton, Dubuque, Louisa, Des Moines, Lee, Johnson, and Fremont counties.

MENISPERMACEAE DC. MOONSEED FAMILY.

Climbing woody plants, with alternate leaves, and small diœcious panicle flowers. Sepals and petals similar. Fruit a 1-seeded drupe.

MENISPERMUM L. MOONSEED. Vine pubescent. Leaves long-petioled, large, entire or 3-7-lobed, palmately veined, downy beneath, flowers small, white, on long axillary peduncles, panicle. Sepals 4-8. Petals 6-8. Stamens 12-24; anthers 4-celled. Pistils 2-4. Drupe globular, black.

M. canadense L. A common vine found in all parts of the state in rich woodlands. The flowers appear from the last of May until the end of July. Fruit ripe in September.

BERBERIDACEAE T. & G. BARBERRY FAMILY.

Perennial herbs or shrubs, with alternate stipulate or exstipulate leaves, and regular perfect flowers. Sepals and petals imbricated in the bud, usually in two rows of three each. Pistil single. Fruit a berry or capsule.

PODOPHYLLUM. Flowers large, white; fruit a large berry.

CAULOPHYLLUM. Flowers greenish; the ovary soon bursting and exposing 2 naked seeds.

PODOPHYLLUM L. Herbs, with long running rootstocks, and 2 large peltate 1-sided 5-9-parted leaves, the divisions variously lobed and toothed. Flowers 1-2, perfect, nodding, white, 1-2 inches across, in fork of 2 leaves; flower bud with 3 green early deciduous bractlets. Petals 6-9. Stamens 12-18. Fruit a large many seeded berry.

P. peltatum L. *May Apple*. Plant 1-2 feet high; common in rich woodlands; flowers in May; fruit ripe in July; then the plant decays. Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Scott, Muscatine, Henry, Johnson, Story, Appanoose, Decatur, Ringgold, Union, and Page counties.

CAULOPHYLLUM Mx. Peduncles 2-3 inches long; pedicels a little longer than the flower. Flowers paniculate, yellowish-green. Calyx petal-like, with 3 or 4 small lance-linear bracts; sepals 6, ovate. Petals 6, small, opposite, gland-like, thick. Stamens opposite, 6; anthers large, oblong, 2-celled; filaments short. Style short, stigma small.

C. thalictroides (L.) Mx. *Blue Cohosh*. Stem 1-2 feet high, glabrous, green, glaucous when young, with 2 or 3 large sheathing bracts at the base, from thick matted rootstocks; leaves 3-ternately compound, one near the summit and usually one near the base of the panicle; leaflets wedge-ovate, 3-cleft, middle division frequently with 3 large teeth; seeds the size of a grape, deep blue, drupe-like. Rich woods; April-May; frequent; Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Scott, Muscatine, Johnson, Story, Emmet, Winnebago, Cerro Gordo, Woodbury, Shelby, and Decatur counties.

NYMPHAEACEAE DC. WATER LILY FAMILY.

Aquatic perennial herbs, with horizontal rootstocks; peltate or cordate, floating, immersed or emersed leaves; and solitary axillary flowers. Flowers showy, regular. Sepals 3-5. Petals and stamens many in most of

our species. Fruit indehiscent. Seeds enclosed in pulpy arils or naked.

BRASENIA. Sepals and petals 3; stamens 12-18; leaves peltate.

NELUMBO. Sepals about 4-5; petals numerous; carpels 1-ovuled, separately immersed in the top of an obconical receptacle.

NYMPHAEA. Petals large, adnate to the ovary; stamens from the summit of the ovary.

NUPHAR. Petals small, stamen-like; stamens hypogynous.

BRASENIA Schreber. Stems branching, slender, lengthy, from creeping rootstocks. Leaves alternate, oval, centrally peltate, palmately veined, long-petioled, floating. Carpels 4-18, separate, indehiscent, 1-2-seeded.

B. peltata Pursh. Leaves oval, entire, 1-3 feet across; flowers small, dull-purple, long-peduncled; fruit oblong. Ponds: rare; Muscatine and Story counties. (*B. purpurea* (Mx.) Casp.)

NELUMBO Adans. Rootstock tuberous. Leaves centrally peltate. Flowers very large. Sepals 4-6. Petals many, in several rows. Stamens indefinite. Sepals, petals, and stamens passing gradually into each other. Petals and stamens inserted on the calyx, caducous. Carpels many, distinct, contained in pits in the large convex top-shaped receptacle.

N. lutea (Willd.) Pers. *Yellow Nelumbo.* Leaves much above water, large, with a cupped or depressed center or else floating and plane, circular, 1-2 feet in diameter; flowers pale yellow, 5-10 inches broad; tubers and seed edible. Sloughs of the Mississippi and Missouri rivers and interior lakes; July-August; frequent; Allamakee, Clayton, Muscatine, Louisa, Des Moines, Henry, Iowa, and Monona counties.

NYMPHAEA L. WATER LILY. Flowers large, white or pinkish. Sepals 4-5, green outwardly. Petals numerous, in many rows, gradually passing into the stamens. Stamens very numerous, inserted on the ovary. Ovary 12-35-celled. Fruit depressed globular, covered with the bases of decaying petals, maturing under water.

N. odorata Ait. *Sweet-scented W. L.* Rootstock with a few persistent branches; leaves orbicular, entire, cleft at the base to the insertion of the petiole, usually purplish beneath; stipules broadly triangular to kidney-shaped, notched at the apex; flowers usually white, sometimes pinkish, *very fragrant*, large, frequently 6 inches in diameter, opening in the morning and closing in the afternoon; petals narrowly oblong, obtuse. Ponds: June-September; infrequent; range rather uncertain as it has been confused with the following species. (*Castalia odorata* (Dryand.) W. & W.)

N. reniformis D.C. *Tuber-bearing W. L.* Rootstock with numerous detachable tubers by means of which the plant propagates; leaves reniform, orbicular, larger than the preceeding, 8-15 inches wide, green both sides, ribs prominent; flowers very large, *scentless* or nearly so, white; petals oblong, broader than those of the preceeding species. Ponds: July-September; infrequent; widely distributed; Muscatine, Linn, Story, Hamilton, Cerro Gordo, Winnebago, Hancock, Lyon, Emmet, and Fremont counties. (*C. tuberosa* (Paine) Greene.)

NUPHAR Smith. **YELLOW POND LILY.** Rootstock creeping, cylindrical, flowers yellow. Sepals 5 or 6, greenish outward, roundish or concave. Petals numerous, small, thick, stamen-like or scale-like. Stamens numerous, short, inserted with the petals on the receptacle; stigmas united into a radiate disc. Fruit ovoid, naked, usually ripening above water.

N. advena Ait. f. Leaves floating, emersed or erect, thick, orbicular, entire, palmately veined, base deeply heart-shaped; sepals 6, oblong,

unequal; petals shorter than the stamens, resembling them; stigmatic disc undulate or nearly entire, pale red, 12-24 rayed. Ponds and slow streams: May-August: frequent: Winneshiek, Allamakee, Fayette, Scott, Muscatine, Johnson, Linn. Story, Hamilton, Cerro Gordo, Winnebago, Dickinson, Emmet, and Lyon counties. (*Nymphaea advena* Sol.)

SARRACENIACEAE *La Pyl.* PITCHER-PLANT FAMILY.

Marsh plants, with hollow pitcher-shaped or trumpet-shaped leaves, and scapose nodding flowers. The principal genus of the order is **SARRACENIA** L.

S. purpurea L. *Pitcher-plant. Side-saddle Flower.* Leaves ascending, curved, broadly winged; hood erect, open, round heart-shaped; scapes 10-20 inches high, bearing a solitary deep purple flower; calyx of 5 sepals with 3 bractlets at the base; petals 5, obovate. Bogs: May-June: reported from N. E. Iowa (Gray's Manual.) and also from Scott county (Nagel and Haupt.). W. D. Barnes of Blue Grass thinks the latter locality is a mistake as there is no specimen in the collection of the Davenport Academy of Sciences and the species has not been found in the vicinity after thorough search.

PAPAVERACEAE *B. Juss.* POPPY FAMILY.

Herbs, with milky or colored acrid juice, alternate exstipulate leaves, and long peduncled solitary regular flowers. Sepals 2, early deciduous. Petals usually 4, imbricated, deciduous. Stamens 16-24. Ovary usually 1-celled, many-ovuled; style short or none; stigmas 1 or 2. Pods 2-valved, 1-celled, many seeded.

SANGUINARIA. Juice red; flowers on scapes, white.

ARGEMONE. Juice yellow; leaves spiny-toothed.

SANGUINARIA L. Flowers white. Petals 8-12, spatulate-oblong. Stamens numerous. Stigma 2-grooved. Pod oblong, dehiscent, 1-celled, 2-valved, many seeded.

S. canadensis L. *Bloodroot.* A low perennial; rootstock horizontal, large, with a red juice; leaf solitary, long petioled, kidney-shaped, palmately lobed, the lobes repand or cleft at the apex. Rich woods; flowers mostly in April, fruits in June; frequent.

ARGEMONE L. *PRICKLY POPPY* Annual or biennial herbs, with yellow sap, sessile sinuate-lobed prickly-toothed leaves, and large showy flowers. Sepals 2-3. Petals 4-6. Style short; stigmas 3-6, radiate. Pod oblong, prickly, opening at the apex by 3-6 valves. Seeds numerous, crested.

A. mexicana L. Whole plant setose-prickly; stem 1-2 feet high, simple or somewhat branched; leaves blotched; petals yellow. Waste places; infrequent; Muscatine county.

A. alba Lestib. Similar to the preceeding; leaves glaucous or green; petals white. Waste places; infrequent: Johnson and Wapello counties.

FUMARIACEAE *DC.* FUMITORY FAMILY.

Smooth delicate herbs, with watery juice, delicate alternate exstipulate compound dissected leaves, and irregular flowers. Sepals 2, minute. Corolla flattened; petals 4, in 2 pairs, outer pair with spreading tips one or both saccate or spurred at base, inner pair narrow, their tips united over the stigma. Stamens 6, in 2 equal sets: the sets opposite the outer petals. Pod 1-celled, in our species deciduous by 2 valves, with 2 parietal placentae, several-seeded. Often placed in the preceeding order.

DICENTRA. Corolla cordate or 2-spurred at the base.

CORYDALIS. Corolla 1-spurred; flowers large, yellow.

DICENTRA Borkh. Low stemless perennials with ternately compound and dissected leaves, and racemose nodding flowers. Pedicels 2-bracted. Petals slightly cohering. Stigma 2-crested.

D. cucullaria DC. *Dutchman's Breeches*. Plant from a scaly bulb of grain-like tubers; leaf-lobes linear; flowers 5-8, white, on a scape, alternate, pedicelled; the 2 outer sepals with their divergent spurs longer than the pedicels. Rich woods; April-May; common. (*Bicuculla cucullaria* (L.) Millsp.)

D. canadensis DC. *Squirrel Corn*. Leaves similar to the preceding; roots with yellow grain-like tubers resembling corn whence the name; flowers 4-7, short pedicelled, greenish-white with a purplish tinge; spurs short, rounded. Woods; May; rare: Winneshiek and Fayette counties. (*B. canadensis* (Goldie) Millsp.)

CORYDALIS Vent. Pale or glaucous leafy-stemmed biennials, with basal and cauline decompound leaves, and racemose flowers. Petals erect-connivent, deciduous, one of the outer pair spurred. Style dilated or lobed, persistent. Pod linear or oblong, with many crested seeds.

C. micrantha Gray. Much branched, diffuse or spreading; corolla pale yellow; spur short, the crest entire or flowers very small and cleistogamous; pods ascending, torulose, short pedicelled; seeds obtuse-margined. smooth. Sandy soil; July; local; Muscatine, Lee, Linn, Winneshiek, Calhoun, and Hardin counties. (*Capnoides micranthum* (Englm.) Britton.)

C. curvisiliqua Englm. Stem 6-15 inches high, branched, more or less rigid; flowers spicate, bright yellow, spur conspicuous; pods short-pedicelled, curved upward, somewhat 4-sided. Sandy soil; April-June; frequent; Muscatine and Henry counties, reported from Page county. (*C. curvisiliqua* (Englm.) Kuntze.)

CRUCIFERAE B. Juss. MUSTARD FAMILY.

Herbs, with a pungent watery juice, alternate exstipulate leaves, and corymbose or racemose flowers. Sepals 4, deciduous, persistent in Alyssum. Petals 4, hypogynous placed opposite in pairs, thus forming a cross. Stamens 6, 2 in *Lepidium*, 2 shorter and inserted lower down. Pods 2-celled, rarely 1-celled, linear, oblong, or short, dehiscent by 2 valves, except in *Raphanus*. Seeds in one or two rows, oblong, ovoid, or globular, sometimes wing-margined. The determinative characters of this order depend largely upon the pods and seed.

* Pod short, flattened contrary to the narrow partition; flowers white.

CAPELLA. Pod obovate, triangular, wingless, several seeded.

LEPIDIUM. Pod flat, oval, 2 seeded; stamens 2.

THLASPI. Pod obovate or obovate, winged, several seeded.

** Pod linear, sometimes short, terete, turgid, or 4-angled; seed wingless.

NASTURTIUM. Pod oblong to short linear, valves strongly convex, nerveless; seeds in 2 rows; flowers white or yellow.

BARBAREA. Pod linear, terete, obscurely 4-angled; seeds in one row; flowers yellow.

ERYSIMUM. Pod 4-angled, valves with prominent veins; stigma 2-lobed; flowers yellow.

SISYMBRIUM. Pod slender, short-pointed, teretish, or angled, valves 1-3-nerved; flowers small, yellow or white.

THELYPODIUM. Pod terete, valves 1-nerved; flowers large, purplish.

BRASSICA. Pod with a long stout beak; seeds globose.

HESPERIS. Pod terete, long; flowers large, purple.

*** Pod compressed parallel to the broad partition; seeds flat or flattish, orbicular or oval, mostly wingless.

ARABIS. Pod flat, long-linear; seeds winged or wingless; flowers white or purple.

DRABA. Pod oval to narrowly lanceolate, flat; flowers racemose.

DENTARIA. Stem simple, mostly naked.

CARDAMINE. Stem leafy; pod linear.

ALYSSUM. Pod orbicular, thin margined, 4 seeded.

CAMELINA. Pod pear-shaped, seeds numerous; flowers yellow.

* * * * Pod indehiscent.

RAPHANUS. Pod elongated, long pointed, constricted; seeds cushioned.

CAPSELLA Medic. An erect annual herb, with a long descending root-stock, clustered pinnatifid or toothed root-leaves, the cauline sessile, saggitate, and small white racemose flowers. Pods obcordate, many-seeded, long pedicelled.

C. bursa-pastoris (L.) Moench. *Shepherd's Purse*. Stem 4-20 inches high, pubescent below, more or less glabrous above. Fields and waste places; April-October; a very common weed. (*Bursa bursa-pastoris* (L.) Britton.)

LEPIDIUM L. Annual or biennial herbs with pinnatifid, lobed, or entire leaves and small white or whitish racemose flowers. Stamens 2 in our species. Pods roundish, flat, notched above, 1 seed in each cell. Weeds, commonly known as pepperwort or peppergrass.

L. virginicum L. *Wild P.* Plant leafy, somewhat branched; stem 6-20 inches high; leaves cut-serrate. Petals usually present; pods marginless or nearly so, on slender pedicels; cotyledons accumbent. Fields and waste places, preferring moist shady places; May-October; common.

L. intermedium Gray. Similar to the preceeding but stem less leafy and more bushy-branched, nearly entire; petals minute or wanting; pods wing-margined at the top; cotyledons incumbent. Dry or sterile soil, fields and pastures; May-September; very common. (*L. apetulum* Willd.)

THLASPI L. Low herbs, with undivided leaves, the basal forming a rosette, those of the stem auriculate, clasping, and small white or purplish racemose flowers.

T. arvense L. *Field Penny-cress*. Annual, 6-18 inches high, smooth, simple or branched above; basal leaves petioled, oblanceolate, early deciduous, stem leaves oblong or lanceolate, remotely dentate; flowers white; pods flat, nearly orbicular, broadly winged, notched at the apex; seeds about 6 in each cell. Waste places; rare; Muscatine county.

NASTURTIUM R. Br. **WATER CRESS**. Glabrous, usually marsh or aquatic plants, with deeply incised or pinnatifid leaves, and white or yellow flowers. Pods oblong-linear to almost globular, terete or teretish, with convex nerveless valves. Seeds in 2 imperfect rows, marginless.

* Annual or biennial; roots simple, fibrous; flowers small, yellow or yellowish.

N. palustre D C. *Marsh C.* Plant 1-3 feet high, erect, simple or much branched, usually smooth; leaves oblong-lanceolate, pinnately cleft or parted; pedicels about one-fourth inch long; pods erect, shorter than the pedicels, ovoid or oblong. Shallow water or moist depressions; June-September; common. (*Roripa palustris* (L.) Bess.)

N. hispidum D C. Similar to the preceeding; stem stouter, often 4 feet high, hirsute; leaves lyrate-pinnatifid, hirsute on the veins beneath; pedicels slender, spreading, longer than the ovoid or globose pod. Wet places; July; reported from Scott county. (*R. hispida* (Desv.) Britton.)

N. sessiliflorum Nutt. Stem erect, simple, 1-2 feet high; leaves petioled, obovate or oblong, obtusely incised, crenate, or nearly entire; flowers small, nearly sessile; pods about one-half inch long or less, thick, pedicelled.

Wet places: April-July: infrequent: Clinton, Muscatine, Story, Van Buren, Decatur, and Page counties. (*R. sessiliflora* (Nutt.) A. S. H.)

N. obtusum Nutt. Stem much branched, diffusely spreading; leaves pinnately parted or divided; flowers very small on short pedicels; pods longer than the pedicels, varying from linear-oblong to short-oval. Moist places: April-August: infrequent: Scott, Johnson, and Decatur counties. (*R. obtusa* (Nutt.) Britt.)

* * Perennial; flowers white or yellow, usually large and showy; leaves undivided or pinnatifid.

† Flowers white.

N. armoracia (L.) Fries. *Horseradish*. Stem erect, 2-3 feet high, from a large descending root; root-leaves long-petioled, very large, oblong, crenate, sinuate or sometimes pinnatifid; cauline leaves oblong-ovate to lanceolate, sessile, dentate or crenate; pods globular, or oblong, pedicels erect, many times longer than the pod; style short. Frequently found near old building sites and about gardens: May-June: infrequent; fruit rarely found. (*R. armoracia* (L.) A. S. H.)

N. lacustre Gray. *Lake Cress*. Aquatic; stem 1-2 feet long, branched, immersed leaves dissected into many filiform divisions, emersed leaves oblong, obtuse or acute, entire, serrate, lobed, or pinnatifid; pedicels slender, widely spreading; petals longer than the sepals; pods ovoid, 1-celled. Ponds and streams: July-August: infrequent; local. Clinton and Muscatine counties. (*R. americana* (Gray) Britton.)

N. officinale R. Br. *True W. C.* Stem spreading, rooting; leaves pinnate; leaflets 3-11, nearly entire, rounded to oblong; petals twice the length of the calyx; pods linear, about an inch long, pedicels slender, widely divergent. In water or wet places; April-August: rather rare; Winneshiek, Fayette, Story, and Page counties.

† † Flowers yellow.

N. sinuatum Nutt. Plant low, decumbent, some branched; leaves oblong, pinnately cleft, divisions linear or oblong, entire or sparingly dentate; pods linear-oblong, slightly curved, slender pedicelled; styles slender. Mississippi and Missouri river bottoms; June-September: common: Scott, Henry, Page, Pottawattomie, and Fremont counties. (*R. sinuata* (Nutt.) A. S. H.)

BARBAREA R. Br. *Winter Cress*. Pods linear-terete, obscurely 4-sided; seeds marginless, one row in each cell.

B. vulgaris R. Br. *Yellow Rocket*. Stems tufted, 1-2 feet high; lower leaves petioled, pinnatifid, the divisions oval or obovate, repand-toothed or entire, the terminal division much larger than the lateral ones; cauline leaves usually sessile, sometimes clasping by an auricled base, obovate, cut-toothed or pinnatifid; pods half-inch long; pedicels one-third the length of the pods, erect or spreading. Fields and waste places: May-June; infrequent: Jones, Johnson, Story, Boone, and Shelby counties. (*B. barbarea* (L.) Mac M.)

ERYSIMUM L. Mostly biennials, with entire, toothed, or lobed leaves, and small yellow flowers. Pods 4-angled, small, linear; valves keeled by a prominent vein. Seeds marginless, oblong, in 1 row.

E. cheiranthoides L. *Worm-seed Mustard*. Stem 1-2 feet high, slender, simple, erect; leaves narrowly lanceolate, entire or scarcely toothed; pods about an inch long; pedicels scarcely shorter, divergent; pod and pedicels angled to each other. Woods; June-August; common.

E. asperum DC. *Western Wall-flower*. Lower leaves lanceolate or linear.

somewhat petioled, dentate or entire, the upper sessile, entire or toothed; flowers large; pedicels short, stout; pods elongated. Waste places; has been collected near Ames, Story county; introduced.

SISYMBRIUM L. **MUSTARD.** Pubescent annuals or biennials, with variously pinnatifid leaves, and small white or yellow flowers. Pods elongated, terete or flattish. Seeds oblong, in 1-2 rows.

S. officinale (L.) Scop. *Hedge M.* Stem 1-3 feet high, erect, slender, mostly simple; leaves runcinate-pinnatifid, the lobes crenate, dentate, or nearly entire; pods small, pointed, appressed to the stem, constricted, nearly sessile. Waste places; May-September; common.

S. canescens Nutt. Whole plant densely canescent; stem 1-2 feet high, branched; leaves twice pinnatifid, divisions small, toothed or entire, obtuse; pods shorter than their horizontal slender pedicels, in long open racemes, oblong, linear, or club-shaped; seeds in 2 rows in each cell. Rocky or dry soil; May-July; rather frequent and widely distributed. (*Sophia pinnate* (Walt.) Britton.)

S. sophia L. Similar to the preceeding; pods slender, ascending; seeds in 1 row in each cell. Reported from Scott county. (*Sophia sophia* (L.) Britton.)

S. altissimum L. *Tumbling M.* Stem erect, 2-4 feet high, branched, glabrous; lower leaves petioled, runcinate-pinnatifid, the upper leaves short petioled, pinnatifid, the segments linear or lanceolate, dentate or entire, the uppermost leaves linear, bract-like; flowers yellowish; pedicels short, spreading; pods narrowly linear, 3-4 inches long. Waste places along the railway; June-September; infrequent; Allamakee, Clayton, Dubuque, Scott, Clay, and Story counties.

THELYPODIUM Endl. A glabrous perennial herb, with root leaves and lower ones lyrate-pinnatifid, the stem leaves ovate or ovate-lanceolate, tapering both ways, sessile, auricled, or the lower short-petioled, sharply and sometimes doubly toothed, and large purplish flowers. Pods terete, an inch long, on short divergent pedicels; valves nerveless. Seeds in one row, oblong, marginless.

T. pinnatifidum Watson. Stem 1-3 feet high. Frequent in low woods; May-June; Winneshiek, Fayette, Muscatine, Johnson, Story, and Cerro Gordo counties. (*Iodanthus pinnatifidus* (Mx.) Steud.)

BRASSICA L. **MUSTARD.** Introduced weeds, annual or biennial, with opposite, incised or lyrate-pinnatifid leaves, and racemose yellow flowers. Pods linear and nearly terete or 4-sided, with a long 1-seeded beak, valves 1-5 nerved. Seeds in 1 row in each cell. Style persistent. Fields and waste places.

B. nigra (L.) Koch. *Black M.* Stem 2-6 feet high, erect, branched; lower leaves long-petioled, with a large terminal lobe and 2 or more lateral ones, dentate, somewhat spiny pubescent; flowers in a large terminal raceme; pods slender, appressed. June-August; very common.

B. sinapistrum Boiss. Wild. *M. English Charlot.* Leaves similar to the preceeding but less pinnatifid, upper leaves scarcely toothed; pods knotted, armed with a long 2-edged beak; valves strongly 1-nerved. May-September; frequent. (*B. arvensis* (L.) B. S. P.)

B. alba Boiss. *White M.* Lower leaves obovate, deeply pinnatifid, the upper lanceolate or oblong, dentate; pods bristly, ascending, beak sword-shaped, as long as the pod, 1-seeded. Rather rare; reported from Muscatine, Story, and Decatur counties. (*Sinapsis alba* L.)

B. campestris L. *Turnip*. Sometimes persists for a year or two as an escape near fields where the species was cultivated.

HESPERIS L. Biennial or perennial herbs, with simple, sessile, or petioled, ovate or ovate-lanceolate toothed leaves, and large racemose purple or white flowers. Pods spreading, linear, cylindrical. Seeds oblong, marginless, in 1 row. Stigma erect, lobed.

H. matronalis L. *Dame's Violet*. Stem 2-3 feet high, simple or somewhat branched; pods 2-4 inches long. An infrequent escape from gardens; reported from Fayette and Story counties.

Arabis L. *Rock Cress*. Annual or perennial herbs, with undivided or pinnatifid leaves, and white or purple flowers. Pods elongated, flattened parallel to the partition; valves 1-3-nerved. Style short. Seeds usually margined or winged, in 1 row or in 2 indistinct rows.

* *Flowers small, whitish; pods recurved; seeds broadly winged.*

A. canadensis L. *Sickle-pod*. Stem 2-3 feet high, erect, mostly simple, smooth; stem leaves sessile, pubescent, pointed at both ends, oblong-lanceolate, obscurely veined, lower remotely toothed; petals twice the length of the calyx; pods narrow, 4-6 inches long, scythe-shaped, pendulous; pedicels one-half inch long, rough hairy. Woods: June-August; infrequent but well distributed; Winneshiek, Allamakee, Clayton, Scott, Fayette, Henry, Johnson, Story, Cerro Gordo, Webster, Decatur, and Page counties.

A. laevigata (Muhl.) Poir. *Smooth R.* Glabrous, glaucous, stem 1-3 feet high, erect; basal leaves spatulate or obovate, dentate, petioled; stem leaves sagittate-clasping, entire or toothed; petals longer than the calyx; pods narrow, long; pedicels erect or spreading. Wooded hillsides; May; Fayette and Muscatine counties; rare.

** *Seeds wingless, oblong or elliptical, stem branching from base.*

A. dentata T. & G. *Toothed R.* Stem 1-2 feet high, pubescent; root leaves on short margined petioles, obovate, dentate; stem leaves oblong, obtuse, sharply and unevenly toothed, auriculate clasping; pods slender, spreading, short pedicelled. Low grounds; May-June; infrequent; Winneshiek, Fayette, Scott, Muscatine, Henry, Story, and Decatur counties.

A. lyrata L. *Lyre-leaved R.* Tufted, 4-12 inches high; glabrous or pubescent below; radical leaves lyrate-pinnatifid; stem leaves linear to spatulate, entire or toothed; petals white, longer than the calyx; pods ascending, spreading, long, slender. Rocky woods; April-July; common in N. E. Iowa; Winneshiek, Allamakee, Clayton, Dubuque, and Scott counties.

*** *Seeds in 2 indistinct rows; cauline leaves sagittate-clasping.*

A. confinis Watson. Stem 1-3 feet high, erect, somewhat glaucous; root-stock running; root-leaves petioled, narrow spatulate; stem-leaves sessile, lanceolate or oblong-linear, entire, or lower ones occasionally toothed; petals white to rose purple, twice the length of the calyx; pods 2-4 inches long, flat, pedicels and pods erect or spreading; seeds wing-margined. Rocky woods; June-July; frequent; Winneshiek, Allamakee, Scott, Johnson, and Emmet counties. (*A. brachycarpa* (T. & G.) Britton.)

A. perfoliata Lam. *Tower Mustard*. Stem 2-4 feet high, erect, glaucous above, smooth; root-leaves petioled, oblanceolate or oblong; stem-leaves sessile, entire, oblong or lanceolate; corolla yellowish white, little longer than the calyx; pods narrow, 3-6 inches long; seeds marginless. Reported from Benton and Johnson counties. (*A. glabra* (L.) Bernh.)

**** *Seeds nearly wingless, leaves simple, flowers greenish white.*

A. hirsuta Scop. Erect, simple. 1-2 feet high, rough-pubescent or nearly glabrous; root-leaves obovate or spatulate, dentate or repand, petioled; stem-leaves oblong to lanceolate, sessile, auricled; petals longer than the calyx; pedicels and pods erect, immature seeds in 2 rows. Rocky woods: May-June; infrequent; Clinton, Jackson, Muscatine, Johnson, Story, Woodbury, and Lyon counties.

DRABA L. WHITLOW GRASS. Ours low annuals, with sessile hairy leaves, and racemose white flowers. Petals 2 or more times the length of the calyx. Pods oval to oblong or linear, flattened; valves nerveless. Seeds in two rows, marginless.

D. caroliniana Walt. Stem 1-5 inches high; leaves tufted, oblong or obovate, entire or rarely toothed; flowers on scape-like peduncles; raceme short or corymbose in fruit; pods linear, broad, smooth, longer than the pedicels. Sandy places: March-May; infrequent; Winneshiek, Fayette, Muscatine, Johnson, Linn, Story, and Hardin counties.

D. cuneifolia Nutt. Stem 4-8 inches high, branched below, leafy; leaves obovate to wedge-shaped or spatulate, toothed; raceme elongated in fruit, pods oblong-linear, longer than the horizontal pedicels; March-April; Reported from Scott county.

D. verna L. Stems scapose, 1-5 inches high; leaves basal, tufted, oblong or oblanceolate, entire or dentate; petals deeply 2-cleft. Reported from Scott county.

DENTARIA L. TOOTHWORT. PEPPER-ROOT. Perennials. Stem-leaves few, opposite or whorled, about 3-divided, the divisions coarsely toothed or lobed. Flowers large, showy, white, in terminal clusters, pedicelled. Pods linear, flat, valves nerveless or with a faint midnerve.

D. laciniata Muhl. Stems 6-14 inches high, scapose; tubers several, deep seated; leaves petioled, the cauline usually 3, verticillate, 3-parted, the divisions lanceolate, oblong or linear, toothed or incisely lobed; flowers white or rose color. Rich woods: April-June; not uncommon, widely distributed.

D. diphylla L. Rootstock elongated, continuous; stem leaves 2, opposite; leaflets 3, ovate, crenate; flowers white. Hancock county, near Twin Lakes, collected in 1882 by Prof. Shimek. The species is also given in Arthur's catalogue without locality.

CARDAMINE L. Herbs, with alternate leaves, and racemose or corymbose white or purple flowers. Pods linear, flattened, pedicelled; valves veinless.

C. rhomboidea DC. *Spring Cress*. Perennial, glabrous; stem 6-18 inches high, from a tuberous base; root-leaves oval or orbicular, entire or angled, long-petioled; stem-leaves simple oblong or oblong-ovate, sessile to short-petioled; flowers large, white; petals 3 or 4 times the length of the calyx. Wet meadows; April-June; common. (*C. bulbosa* (Schreb.) B. S. P.)

C. purpurea (Torr.) Britton. *Purple C.* Stem 4-10 inches high, from tuberous rootstocks; leaves similar to the preceeding; flowers purple, appearing 2 weeks before the last. Common in Johnson county. (*C. rhomboidea purpurea* T. & G.)

C. hirsuta L. *Small or hairy Bitter C.* Somewhat pubescent; leaves mostly basal, pinnate, the terminal segments orbicular, entire, or few toothed, the lateral obovate or narrower; the stem-leaves few, low, segments linear; flowers small, white; pods linear, erect. Wet places: May-July; frequent.

ALYSSUM L. Flowers small, yellow, racemose. Pods small, orbicular; valves convex, nerveless, the margins flattened. Seeds 1-several in each cell.

A. calycinum L. Plant a small hoary annual, 3-10 inches high, with linear-spatulate leaves, and pale yellow or whitish flowers; petals slightly exceeding the persistent calyx; pods orbicular, margined, 2-celled, with 2 seeds in each cell. Reported as rare from Story county.

CAMELINA Crantz. Flowers small, yellow. Pods pear-shaped, pointed, flattish parallel to the broad partition; valves 1-nerved. Seeds oblong, numerous.

C. sativa (L.) Crantz. *False Flax*. Annual; lower leaves lanceolate, petioled, entire or toothed; upper sessile, entire, clasping by a sagittate base; pods large, margined. Waste places, along railways and in flax fields; June-July; infrequent; Winneshiek, Buchanan, Story, and Emmet counties.

RAPHANUS L. RADISH. Biennials with lyrate-pinnatifid leaves and showy flowers. Pods linear, terete, long pointed, constricted, indehiscent. Seeds in a single series, globose, cushioned.

R. sativus L. Stem 2-4 feet high, from a descending fusiform root, branched, covered with scattered spines; leaves petioled, roughly pubescent; flowers white to pinkish. Waste places; June-September; occasionally an escape from cultivation.

CAPPARIDACEÆ Lindl. CAPER FAMILY.

Herbs, with alternate compound exstipulate leaves, and cruciform hypogynous flowers. Stamens 6 or more, never tetradynamous. Fruit a 2-valved, 1-celled pod with 2 parietal placentæ. Seeds many, reniform.

POLANISIA. Stamens 8 or more; pod sessile or nearly so, many seeded.

CLEOME. Stamens 6; pod long-stipitate, few-seeded.

POLANISIA Raf. Strong scented annuals, with glandular viscid hairs, and palmately compound leaves. Flowers in leafy racemes. Sepals 4, spreading, deciduous. Petals 4, with claws, notched at the apex. Stamens 8-many, unequal. Pod linear or oblong, veiny, many-seeded.

P. graveolens Raf. Stem 4-15 inches high; leaflets 3, oblong; flowers axillary, solitary, small; calyx and filaments purplish; petals yellowish white, cuneate; stamens about 11, about the length of the petals; styles short; pod 1-2 inches long, slightly stipitate. Sandy shores; May-July; infrequent; Muscatine and Emmet counties, and reported from a number of other localities.

P. trachysperma T. & G. Flowers larger; stamens 12-16, long exerted; pod sessile or nearly so. Sandy shores; May-July; common. This and the preceding species have been confused in Iowa herbaria.

CLEOME L. Ours a glabrous branching herb, with digitately 3-foliate leaves and white or rose colored flowers in leafy-bracteate racemes. Sepals and petals 4. Stamens 6. Pod linear or oblong, stipitate, many-seeded.

C integrifolia T. & G. Stem erect 2-3 feet high, branching; leaflets lanceolate or oblong, entire or serrulate; calyx 4-cleft; racemes elongated in fruit; bracts lanceolate or linear; stipe and pedicel about equal. Waste places; July-September; common in western Iowa, infrequent elsewhere; Muscatine, Linn, Woodbury, Monona, Harrison, Pottawattomie, and Fremont counties. (*C. serrulata* Pursh.)

Reseda luteola L. of the order RESEDACEÆ S. F. Gray has been reported from Lee county by Arthur. The species is known as Dyer's Weed or Weld. It has simple entire sessile lanceolate or linear leaves and green-

ish yellow flowers in long slender spikes. Sepals 4. Petals 4 or 5, the upper lobed, the lower entire. The species is found in waste places near New York and other seaports and is doubtful as an Iowa plant.

CISTACEAE *Lindl.* ROCK-ROSE FAMILY.

Herbs or shrubs: stems terete. Leaves simple, alternate or opposite, entire, sessile or petioled; stipules foliaceous. Flowers perfect, solitary or in cymose or paniculate clusters. Sepals 5, unequal, persistent. Petals 3-5, convolute in the bud. Stamens indefinite; anthers 2-celled, introrse. Capsule 1-celled, 3 5-valved, sometimes with 3-5 imperfect cells and with 3-5 parietal placentæ. Seeds few to many.

HELIANTHEMUM. Petals 5, large, yellow, fugaceous or none: stamens many.

LECHEA. Petals 3, small, brown-purple: stamens 3-12.

HELIANTHEMUM Pers. Sepals 5, the 2 outer smaller, bract-like. Petals 5. Styles short or none; stigma 3-lobed. Capsules triangular, 1-celled, opening at the top. Flowers frequently of two kinds, the early ones larger, yellow, with many stamens and many-seeded pods: petals lasting only one day; later flowers smaller, often apetalous, stamens 3-10, pods small, few-seeded.

H. majus (L.) B. S. P. Whole plant hoary-canescant: stem 1-2 feet high, erect, simple, at length much branched, the branches ascending; leaves oblong-lanceolate, short-petioled, stellate-canescant beneath, petaliferous flowers in a terminal cymose panicle, 6-11, their capsules about twice the size of those of the apetalous flowers which appear later in axillary clusters. Dry soil, prairies: June-July: frequent. Iowa specimens have usually been referred to *H. canadense* Mx. of Gray's Manual.

LECHEA Kalm. PINWEED. Perennial herbs, somewhat woody below, with purplish or greenish flowers. Sepals 5, 2 outer bract-like. Petals 3, lanceolate, not longer than the calyx. Stamens 3-12. Style nearly obsolete: stigmas 3, scarcely distinct. Pod globular, 3-valved, imperfectly 3-celled: placentæ 3, each 2-seeded.

L. stricta Legget. Stems about 1 foot high, reddish below, fastigiately branched, strigose-canescant; leaves linear, acute; flowers numerous, racemiform, small, on pedicels twice the length of the flower. Dry upland soil; July-August; reported as belonging to the flora of Iowa.

L. tenuifolia Mx. Stems tufted, 4-10 inches high, much branched, minutely strigose-pubescent; leaves narrowly linear to filiform, sessile or nearly so: flowers more or less secund. Dry soil: July-August: Van Buren, Henry, and Johnson counties. *L. minor* L. has been frequently reported but the specimens probably belong here.

VIOLACEAE *DC.* VIOLET FAMILY.

Low perennial herbs, with alternate or basal leaves, usually scarious stipules and axillary nodding flowers. Sepals 5, persistent, auriculate at the base. Petals 5, unequal, inferior one spurred. Stamens 5, hypogynous, 2 with appendages extending into the hollow spur of the inferior petal; anthers connate, filaments broad, extending beyond the anthers and uniting over the stigma. Pistil 1, club-shaped; stigma turned to one side. Pod 1-celled, 3-valved, with 3 parietal placentæ. Represented in Iowa by the genus *VIOLA* L., the violets.

* *Stemless plants with a short and thick rootstock.*

† *Lateral petals bearded.*

V. cucullata Ait. Common Blue V. Glabrous or slightly pubescent: leaves

cordate-reniform or ovate, crenate; flowers blue, purple, white or intermediate. Moist low woodlands; April-June; common. (*V. obliqua* Hill. *V. communis* Pollard.)

V. palmata L. *Hand-leaved V.* Pubescent to glabrous; leaves cordate, palmately to hastately-lobed, middle lobe the longest; lobes ovate to linear; flowers blue, pale, or whitish. Moist or dry sterile soil; April-May; frequent; Scott, Muscatine, Henry, Appanose, Decatur, Fremont, and Story counties.

V. pedatifida Don. *Prairie V.* Leaves 5-7-parted, divisions 2-3-cleft; lobes linear, obtuse; flowers blue. Prairies; April-May; common.

V. sagittata Ait. *Arrow-leaved V.* Smooth or somewhat pubescent: leaves on short margined petioles, or on long naked ones, ovate to oblong-ovate or lanceolate, denticulate, frequently cut-toothed near the sagittate base. Dry or moist grassy places; April-May; Muscatine and Johnson counties, reported from Fayette, Scott, and Henry counties. Forms of this and of the first two are with difficulty distinguished.

† † *Lateral petals not bearded.*

V. pedata L. *Bird's-foot V.* Leaves 3-5-divided, divisions 2-3-lobed, frequently toothed at the apex; flowers large, an inch across, deep purple to blue, the two upper petals sometimes dark purple. Prairies and open upland woods; April-June; frequent; Winneshiek, Fayette, Scott, Muscatine, Henry, Johnson, Decatur, Polk, Story, and Calhoun counties.

* * *Stemless plants, with long, filiform creeping rootstocks and white flowers.*

V. blanda Willd. *Sweet White V.* Leaves cordate or reniform, usually glabrous; flowers faintly sweet scented; petals usually beardless. Meadows; May; rare; Reported from Fayette, Scott, and Muscatine counties.

V. lanceolata L. *Lance-leaved V.* Plant glabrous; stolons extensive, rooting at the nodes and bearing apetalous flowers; leaves lanceolate, erect, obtuse, tapering into a long margined petiole, obscurely crenate; petals beardless. Damp soil, local; June; Cedar river region, Muscatine county.

V. primulaefolia L. *Primrose-leaved V.* Glabrous to pubescent; leaves oval or ovate, blade decurrent on the petiole or frequently cordate at the base; sepals lanceolate, acuminate; petals often acute; lateral usually slightly bearded. Damp soil, local; June; Cedar river region, Muscatine county.

* * * *Rootstocks short and thick; leafy-stemmed plants.*

V. pubescens Ait. *Downy Yellow V.* Soft pubescent; leaves broadly ovate or reniform, base cordate, obtusely toothed and pointed; stipules large ovate or ovate-lanceolate, entire or somewhat toothed; flowers yellow, lower petals purple-veined, spur short; stigma beakless, pubescent. Rich woods; May; common throughout.

V. canadensis L. *Canada V.* Stem 4-16 inches high; leaves broadly ovate, cordate, serrate, acute or pointed; flowers whitish, upper petals purple-tinged, the lateral bearded. First found at Decorah, Winneshiek county, with small pink flowers and beardless petals (Arthur). Also reported from Woodbury county by Prof. Pammel. Found by the writer in Winneshiek and Allamakee counties, in damp woods; June-July; infrequent.

* * * * *Rootstocks annual, biennial, or perennial; leafy throughout; stipules large, foliaceous, lyrate-pinnatifid.*

V. tricolor L. *Pansy, Heart's-ease.* Stem angled and branched, leafy; leaves oval or heart-shaped, crenate or entire; petals blue, purple, yellow or white. The so-called var. *arcensis* DC. has the petals shorter or but little

exceeding the calyx and is the wild representative of the common garden pansy. Occasionally escaped: reported by Arthur as belonging to the Iowa flora, also by Gray's Manual.

CARYOPHYLLACEAE *Richenb* PINK FAMILY.

Annual, biennial, or perennial herbs, often with swollen joints, opposite or verticillate entire leaves, and regular sometimes apetalous flowers. Calyx persistent: sepals 4 or 5, separate or united into a calyx tube. Petals 4 or 5. Stamens double the number of the sepals or fewer. Styles 2-5, stigmatic along the inside. Ovary usually 1-celled. Fruit a membranous capsule, dehiscing by teeth or valves or else an indehiscent achene or utricle. Stipules wanting in our species.

* *Calyx of united sepals, tubular or ovoid.*

DIANTHUS. Calyx terete, with scaly bractlets; styles 2.

SAPONARIA. Calyx oblong cylindrical, obscurely nerved or 5-angled; styles 2.

SILENE. Calyx 5-toothed or 5-cleft, 10-nerved; styles 3.

LYCRNIS. Calyx 5-toothed, 10-nerved; styles 5, opposite the calyx lobes.

AGROSTEMMA. Calyx 5-toothed, 10-nerved; styles 5, alternate with the calyx lobes.

** *Calyx of distinct sepals, or united only at the base.*

ARENARIA. Petals entire; styles usually 3.

STELLARIA. Petals 2-cleft or wanting; styles usually 3.

CERASTIUM. Petals notched or 2-cleft; styles 4 or 5.

DIANTHUS L. PINK. This genus is represented in our flora by an annual, with linear leaves, and small pink flowers borne in terminal clusters. Calyx terete, bracted at the base, tubular, 5-toothed, many-striate. Petals 5, long-clawed, dentate or crenate. Stamens 10. Styles 2. Ovary 1-celled, stipitate. Capsule oblong, opening at the summit by means of 4 or 5 valves or teeth.

D. armeria L. Deptford P. Stem $\frac{1}{2}$ -1 $\frac{1}{2}$ feet high; lanceolate; leaves acute or lower obtuse; bractlets lanceolate-subulate; flowers white-dotted. Upland woods; June-July; infrequent; Johnson county; introduced.

SAPONARIA L. Annual or perennial glabrous herbs, with broad leaves, and conspicuous flowers. Calyx ovoid or oblong, 5-toothed, faintly nerved, naked. Stamens 10. Styles 2. Capsule 1-celled, or partially 2-4-celled, 4-toothed at the summit.

S. officinalis L. Soapwort. Bouncing Bet. Perennial; stem 1-2 feet high, sparingly branched; leaves oval-lanceolate, 3-5-ribbed, short petioled; flowers whitish or pink, in terminal corymbs; petals obcordate, clawed, appendaged. Waysides, waste places, old garden sites; July-August; frequent.

S. vaccaria L. Cow-herb. Annual, stem 1-3 feet high, branched above; leaves lanceolate or ovate-lanceolate, acute, connate; flowers pale red, in loose corymbed cymes; calyx 5-ribbed, in fruit inflated and wing-angled; petals crenulate, not appendaged. Fields and waste places; June-August; infrequent; Winneshiek, Scott, Henry, Johnson, Story, and Lyon counties.

SILENE L. Annual or perennial herbs with opposite or verticillate leaves and solitary or cymose flowers. Calyx 5-toothed or 5-cleft, 10-many-nerved, bractless. Petals 5, clawed. Stamens 10. Styles usually 3. Pod 1-celled, sometimes 3-celled below, opening above by 3 or 6 teeth.

* *Perennials; calyx inflated.*

S. stellata (L.) Ait. Starry campion. Stem 2-4 feet high; leaves mostly in 4's, a few opposite, ovate-lanceolate, acuminate, margins ciliate; flowers in panicle cymes; calyx campanulate, inflated, teeth triangular; petals white, fringed. Woods; June-August; common.

S. nivea Otth. Stem 1-3 feet high, rather weak, erect or ascending, sim-

ple or some branched; leaves opposite, lanceolate or oblong-lanceolate, acuminate; petals white, cuneate, 2-cleft or 2-lobed. Low prairies and woods; June-July; infrequent: Winneshiek, Allamakee, Fayette, and Johnson counties. (*S. alba* Muhl.)

S. cucubalus Wibel. *Bladder campion*. Glaucous; stem $\frac{1}{2}$ -1 $\frac{1}{2}$ feet high, branched from the base, usually glabrous; flowers numerous, in leafless cymes; calyx globular, much inflated. Reported from Ames, Story county. (*S. vulgaris* (Moench) Gareke.)

* * * *Annuals; calyx not inflated.*

S. antirrhina L. *Sleepy Catchfly*. Stem 1-3 feet high, pubescent or glabrous, simple or branched, slender, a portion of the internodes glutinous; leaves linear or narrowly lanceolate, sessile, the upper passing into bracts, the lower spatulate, tapering into a petiole; flowers small, paniculate, pink, transient in the sunshine; calyx ovoid, petals obcordate. Dry soil; June-September; common.

S. noctiflora L. Stem 1-3 feet high, viscid-hairy; lower leaves large, spatulate or oblanceolate, narrowed into a broad petiole, upper leaves lanceolate, acute; flowers fragrant, opening in the evening, closing next morning; calyx tubular, becoming ovoid, teeth linear; petals 2-parted. Waste places; July-September; infrequent; Fayette, Scott, Story, Emmet, Lyon, Calhoun, and Fremont counties.

LYCHNIS L. Ours a biennial herb. Petals 5, narrowly clawed, 2-cleft. Stamens 10. Styles 5, opposite the calyx lobes. Ovary 1-celled, many-ovuled. Capsule dehiscing by 10 or fewer apical teeth.

L. vespertina Sibth. Plant viscid pubescent, often dioecious, much the aspect of *Silene noctiflora* L.: stem 1-2 feet high, branched; leaves ovate-oblong or lanceolate, acute, lower with margined petioles; flowers paniculate, white or pinkish, opening at dusk and closing next morning; calyx tubular, ovoid in fruit, petals crowned. Waste places; June-August; rare; reported from Winneshiek, Story, and Montgomery counties. (*L. alba* Mill.)

AGROSTEMMA L. Annual pubescent herb, with linear-lanceolate sessile leaves, and large red flowers. Calyx oblong, 5-lobed, 10-ribbed, not inflated. Petals 5, shorter than the calyx lobes, not appendaged. Styles 5, alternate with calyx lobes. Capsule 1-celled.

A. githago L. *Corn Cockle*. Stem 1-3 feet high, mostly simple; flowers solitary, on long axillary peduncles; petals obovate-cuneate, slightly emarginate. Waste places; July-September; infrequent, but widely distributed. (*Lychnis githago* Lam. of Gray's Manual.)

ARENARIA L. Ours perennials, with sessile leaves, and small white flowers. Sepals and petals 4 or 5. Stamens 10. Styles 2. Pod 1-celled, dehiscing at the apex by 3 or 6 valves.

A. michauxii Hook. f. Stems 6-14 inches high, tufted, erect or nearly so; leaves filiform or subulate, 1-ribbed; flowers cymose, bracted, parts in 5's sepals ovate, pointed, 3-ribbed, slightly shorter than the ovoid pod, and half the length of the petals. Dry prairies; May-July; infrequent; Fayette county, reported from Clinton county. (*A. stricta* Mx.)

A. lateriflora L. Stems 4-12 inches high, erect or ascending, mostly simple, finely pubescent; leaves thin, oval or oblong, obtuse, margin and nerves ciliate; flowers solitary or in few-flowered lateral or terminal cymes, white, parts in 4's or 5's; sepals oblong, obtuse or acute, half the length of the petioles; ovary at first 3-celled; capsule ovoid, about twice the length of the

calyx, dehiscent by 3 2-cleft valves. Sandy shores: May-July: frequent: Winneshiek, Fayette, Scott, Muscatine, Henry, Johnson, and Chickasaw counties. (*Moehringia lateriflora* (L.) Fenzl.)

STELLARIA L. Tufted annual herbs, with solitary or cymose white flowers. Sepals 4-5. Petals 4-5, deeply 2-cleft. Stamens 10, 8, or less. Pod ovoid, 1-celled, dehiscing by about 6 valves.

S. media Smith. *Common Chickweed*. Stem angled, erect or ascending, much branched, glabrous except 1 or 2 pubescent lines; leaves ovate or oval, acute, with ciliate petioles, the upper sessile; flowers solitary, axillary, or in terminal leafy cymes; petals shorter than the calyx; stamens 2-10. Waste places, fields and woods: June-August: infrequent: Muscatine county: reported from Winneshiek, Fayette, Woodbury, and Lyon counties. (*A. longifolia* (Muhl.) Britton.)

S. longifolia Muhl. *Long-leaved Stitchwort*. Stems erect, weak, glabrous, or with rough angles; leaves linear, spreading, acutish at both ends; pedicels slender, divaricate; sepals lanceolate, acute, 3-nerved, equalling or shorter than the petioles; capsule ovoid-oblong, about twice the length of the calyx. Grassy places, meadows and woods: May-July: frequent: Winneshiek, Fayette, Muscatine, Johnson, Linn, Story, Emmet, Woodbury, and Lyon counties. (*A. longifolia* (Muhl.) Britton.)

CERASTIUM L. Annuals or perennials, mostly pubescent or hirsute, with mostly flat leaves, and white flowers in terminal cymes. Sepals and petals in our species 5. Petals notched or 2 cleft. Stamens usually 10. Styles 5, opposite the sepals. Pod membranous, dehiscing at the apex by 10 teeth, elongated, many-seeded.

C. nutans Raf. Annual: stem 6-20 inches high, weak, reclining or ascending, clammy-pubescent, rarely glabrate; leaves oblong-lanceolate, acute, lower spatulate; cymes loose, many-flowered; pods nodding, much exceeding the calyx, curved upward. Grassy moist places: May-June: frequent: Winneshiek, Scott, Muscatine, Henry, Johnson, and Decatur counties.

C. vulgatum L. Biennial or perennial; stems viscid-pubescent, tufted, erect or ascending, 6-18 inches high; leaves oblong, the lower spatulate-oblong, obtuse; bracts scarious-margined; petals about equalling the calyx; pod elongated, curved upward. Grassy banks: May-September: frequent: Allamakee, Fayette, Scott, Muscatine, Henry, Johnson, Linn, and Decatur counties.

C. arvense L. Perennial: stems tufted; lower leaves linear-oblong, the upper distant, linear or linear-lanceolate; flowers larger, petals obcordate, twice the length of the calyx; pod equal or but little exceeding the calyx. Winneshiek county. The variety *oblongifolium* (Torr.) Holl. & Britt. larger, leaves oblong or lanceolate, pod twice the length of the calyx, is reported from Fayette county. Various other localities are claimed for both species and variety.

PORTULACACEAE *Reichenb.* PURSLANE FAMILY.

Herbs, with fleshy entire exstipulate leaves, and regular mostly ephemeral flowers which open only in the sunshine. Sepals 2. Petals 5. Stamens 5, opposite to the petals, or often many. Styles 2-8, united below, stigmatic along the inner surface. Ovary free, 1-celled. Pod 1-celled, few to many-seeded.

TALINUM. Stamens usually many; pod 3-valved, with many seeds on a globular stalked placenta.

CLAYTONIA. Stamens 5; pod 3-valved.

PORTULACA. Stamens 7-20; pod globular, opening by a lid.

TALINUM Adans. Ours perennial, with alternate linear leaves, and cymose flowers. Sepals ovate. Petals fugaceous. Styles 3-lobed.

T. teretifolium Pursh. Plant 4-12 inches high, leafy below, scapose above; leaves cylindrical; peduncles slender, bracted, branched; flowers pink; sepals membranous, half the length of the petals; stamens 10-30; style as long as the stamens. Sioux quartzite exposures; June-August; common; Lyon and Woodbury counties.

CLAYTONIA L. Low perennial spring plants, with simple stems from tuberous roots, and entire leaves. Sepals ovate, persistent. Petals 5, hypogynous. Stamens 5, adhering to the short claws of the petals. Style 3-cleft. Pod 3-valved, 2-5-seeded.

C. virginica L. *Spring Beauty*. Tuber globular, deep seated; stems 6-9 inches high, weak, with 2 opposite linear or linear-lanceolate leaves; flowers white or roseate, in a terminal loose raceme. Rich woods; April-May; common.

C. caroliniana Mx. Similar to the preceeding; basal leaves ovate-lanceolate or oblong, cauline leaves petioled. Reported as an Iowa species by Arthur.

PORTULACA L. PURSLANE. Annuals, with succulent stems and leaves, and small yellow mostly ephemeral flowers. Calyx 2-cleft, upper portion deciduous, the tube cohering with the ovary. Petals 5, rarely more or less, equal, fugaceous. Stamens 8-20, inserted on the calyx along with the petals. Style 3-8-parted. Pod globular, 1-celled, many-seeded, opening transversely near the middle by a lid.

P. oleracea L. *Common P.* Stems prostrate, smooth, reddish; leaves obovate or cuneate, apex rounded; flowers sessile, solitary, pale yellow; sepals keeled; stamens 7-12; style about 6-parted. Cultivated grounds and waste places; June-September; common.

P. retusa Englm. Similar to the preceeding but the leaves cuneate, the apex retuse or emarginate. Reported from Scott county.

HYPERICACEAE Lindl. ST. JOHN'S-WORT FAMILY.

Herbs or small shrubs, with opposite entire punctate or dotted exstipulate leaves, and regular and perfect solitary or cymose flowers. Sepals 4-5, imbricated. Petals 4-5, mostly oblique or contorted, convoluted or imbricated in the bud. Stamens few or many, usually in 3 or more clusters. Ovary 1-7-celled; styles 1-7. Pod 1-7-celled, with septical dehiscence.

HYPERICUM. Petals yellow, convolute.

ELODES. Petals purplish, imbricate.

HYPERICUM L. The principal genus of the order.

* *Perennials; styles 5.*

H. ascyron L. *Great St. John's-wort*. Stems 2-6 feet high; leaves ovate-oblong or ovate-lanceolate, sessile, clasping, acute or obtuse; flowers large, in terminal cymes; styles numerous, in 5 sets; styles united below; pod conical or ovoid. Rich woods, banks; July; infrequent; Winneshiek, Allamakee, Clayton, Fayette, Scott, Muscatine, Henry, Johnson, Story, Winnebago, and Cerro Gordo counties.

** *Perennials; stamens numerous; styles 3.*

H. prolificum L. *Shrubby St. J.* A small shrub, 1-6 feet high; leaves nar-

rowly oblong or oblanceolate, base tapering into a short petiole; stamens distinct; pod 3-celled. Dry soil, fence rows and thickets; July-August; infrequent; Johnson, Jefferson, Henry, Des Moines, Lee, and Appanoose counties.

H. cistifolium Lam. Stem 1-2 feet high, 4-angled, from a somewhat woody perennial base; leaves linear-oblong, obtuse, sessile, somewhat clasping, with smaller leaves in the axils; cyme compound, many-flowered; sepals ovate, varying to linear; stamens distinct; capsule 1-celled, with 3 parietal placentæ. Sterile soil; July-August; frequent; Dubuque, Muscatine, Johnson, Henry, Appanoose, and Fremont counties, reported from Clinton and Benton counties. (*H. sphaerocarpum* Mx.)

H. maculatum Walt. Stem 1-3 feet high, from a woody perennial base; leaves short-petioled, sessile or clasping, oblong or ovate-lanceolate, obtuse, black-dotted; flowers small, numerous; sepals ovate; petals longer, pale-yellow; stamens in 3 or 5 sets; capsules 3-celled. Moist soil, fields and open woods; July-September; frequent.

H. perforatum L. Leaves oblong or linear; sepals lanceolate. Introduced, Henry county, and probably other localities.

*** *Annuals; stamens few; styles 3.*

H. mutilum L. Stems tufted, $\frac{1}{2}$ -2 $\frac{1}{2}$ feet high, branched; leaves ovate or oblong, obtuse, sessile or partly clasping, 5-nerved; flowers small, subulate-bracted; sepals linear to oblanceolate; pods ovate-conical, exceeding the calyx. Low places, open woods; July-September; common; Decatur and Johnson counties, reported from Muscatine and Scott counties.

H. majus (Gray.) Britton. Stems varying from $\frac{1}{2}$ -2 feet high, with nearly erect branches; leaves lanceolate or oblong-lanceolate, sessile, 5-7-nerved, obtuse or acute; bracts subulate; sepals lanceolate, acuminate. Moist soil; June-September; frequent.

H. canadense L. Stems $\frac{1}{2}$ -2 feet high, with erect or ascending angular branches; leaves linear, 3-nerved, obtuse, tapering toward the base; bracts and sepals similar to those of the last. Sandy soil; July-September; probably frequent.

H. drummondii (G. & H.) T. & G. A bushy branched annual, 1-2 $\frac{1}{2}$ feet high, with small linear-subulate 1-nerved leaves, and scattered flowers; sepals lance-linear, exceeding the petals; stamens 10-20; styles 3. Dry soil; July-September; reported from Iowa.

ELODES Adans. Perennial herbs of marshy places with opposite leaves and pink or greenish purple flowers in terminal or axillary cymes. Sepals 5, equal. Petals 5, imbricated in the bud, not contorted. Stamens 9 or more, in 3 sets which are separated by large orange-colored glands. Styles 3. Pods oblong, 3-celled.

E. campanulata Pursh. Stem 1-2 feet high, nearly simple; leaves ovate or oblong, sessile or cordate-clasping, glaucous beneath, apex very obtuse or emarginate; capsule and frequently the stem red purple. Borders of swamps; July-September; infrequent; Fayette, Muscatine, Cerro Gordo, and Emmet counties. (*Triadenum virginicum* (L.) Raf.)

MALVACEAE Neck. MALLOW FAMILY.

Herbs or shrubs, with fibrous bark, simple alternate stipulate usually palmately-veined leaves, and axillary flowers on jointed pedicels. Calyx 5-lobed, valvate, often with an involucre of few or many bractlets at the

base. Petals alternate with the calyx lobes, hypogynous, convolute in the bud. Stamens many, united at the base with the short claws of the petals, filaments more or less monodelphous; anthers 1-celled, reniform. Pistils several; stigmas various. Ovaries circularly arranged or forming a several-celled pod.

* *Carpels 5-20; united in a ring around a central axis.*

† *Styles stigmatic down the inside; carpels 1-seeded.*

MALVA. Involucel of 3 bractlets; carpels beakless; petals obcordate.

CALLIRHOE. Involucel of 3 bractlets; carpels beaked; petals truncate.

NAPAEA. Involucel none; flowers dioecious; carpels beakless.

†† *Styles with terminal capitate stigmas; carpels 1-few-seeded.*

ABUTILON. Involucel none; carpels 12-13, 3-seeded.

SIDA. Involucel none; carpels 1-seeded.

MALVASTRUM. Involucel of 3 bractlets; seeds solitary, ascending, filling the cell.

** *Fruit a 5-celled loculicidal pod.*

HIBISCUS. Involucel of many bractlets; pod 5-celled, many-seeded.

MALVA L. MALLOW. Calyx 5-cleft. Involucel 3-leaved. Petals obcordate. Styles many, stigmatic down the inner side. Carpels as many as the styles, blunt, depressed, 1-seeded.

M. rotundifolia L. Common M. Root large, biennial; stems procumbent; leaves on long petioles, round-reniform, cordate, obscurely 5-lobed, crenate; flowers axillary; petals white, twice the length of the calyx; fruit depressed, pubescent. Waysides and waste places; June-September; common.

M. sylvestris L. High M. Stem 2-3 feet high, erect, branched; leaves orbicular or reniform, sharply 5-7-lobed, crenate; flowers in axillary clusters; petals 3 times the length of the calyx, reddish-purple; carpels wrinkled-veiny. Waste places near gardens; June-July; rather infrequent; Fayette, Scott, Muscatine, Johnson, Story, Shelby, and Emmet counties.

M. crispa L. Curled M. An erect annual, glabrous or nearly so; leaves nearly orbicular, with 5-11 shallow angular lobes, the margin dentate, crisped and wrinkled; flowers small, sessile, in axillary clusters. Waste places; infrequent; Winneshiek and Decatur counties. (*M. verticillata crispa L.*)

CALLIRHOE Nutt. Herbs with lobed or divided leaves and axillary or terminal flowers. Calyx deeply 5-parted, naked or with a 3-leaved involucel. Petals cuneate, truncate, rose-purple. Styles 10-20, stigmatic down the inner side. Carpels as many as the styles, short-beaked, 1-seeded.

C. involucrata Gray. Stems 1-2 feet long, from a large descending tuberous root, procumbent or ascending, hirsute; leaves rounded, 5-7 palmately-cleft or parted, segments incisely cut or lobed; flowers large, axillary, on long peduncles; sepals long-lanceolate, 3-5-nerved, longer than the involucel; carpels indehiscent, reticulated. Dry soil; May-August; locally frequent; Scott and Shelby counties. In most cases apparently an escape from cultivation.

C. triangulata Gray. Stems from a tuberous root, erect, pubescent; leaves triangular or halberd-shaped, crenate, sometimes heart-shaped and lobed; involucel about as long as the short calyx; sepals ovate-lanceolate, 5-nerved; flowers panicle, short-pedicelled, purple. Dry prairie soil; June-August; reported from Iowa. The author has found the species near the border.

NAPAEA L. An erect perennial with 5-9-palmately-parted leaves and small white flowers in leafy corymbose panicles. Calyx 5-cleft; involucel wanting. Petals 5, alternate, entire. Flowers dioecious. Staminate flowers

with 15-20 anthers. Pistillate flowers with 6-10 styles. Carpels 6-10, 1-seeded, beakless, minutely tipped, indehiscent, imperfectly 2-valved, separating at maturity from the axis.

N. dioica L. *Glade M.* Stem 4-6 feet high, but little branched, glabrous to appressed pubescent; leaf divisions lanceolate, acuminate, incisely lobed or toothed. Frequent in alluvial soil along the Upper Iowa river in Winneshiek and Allamakee counties, also found in Fayette county; July.

ABUTILON Gaertn. Ours an annual weed, with cordate leaves and axillary yellow flowers. Calyx deeply 5-cleft. Petals 5, alternate. Stamens many. Styles in ours about 12 or 13; stigmas capitate. Carpels 12 or 13.

A. avicennae Gaertn. *Velvet-leaf. Cake-print.* Whole plant clothed with a soft pubescence; stem 2-5 feet high; leaves long-petioled, broadly ovate, taper-pointed, entire or obscurely dentate, base cordate; pedicels shorter than the petioles; calyx persistent; petals yellow; carpels 2-valved, each valve beaked, hairy, usually 3-seeded; flowers axillary. Waste places; June-September; common.

SIDA L. Calyx 5-cleft. Petals 5, entire, usually oblique. Styles 5 or more; stigmas capitate. Carpels as many as the styles, 1-seeded, tardily separating. Seeds pendulous.

S. spinosa L. Annual; stem 1-2 feet high, branched, minutely pubescent, leaves ovate to oblong-lanceolate, serrate, with a spinous tubercle at the base of the slender petiole; stipules bristle-like; peduncles axillary, shorter than the petioles, 1-flowered; flowers small, yellow; carpels 5. Waste places, spreading; July-September; Muscatine, Des Moines, Henry, Van Buren, Decatur, Page, and Fremont counties.

MALVASTRUM Gray. Flowers in ours solitary, in the axils of the upper leaves, short-peduncled, yellow. Bractlets of the involucre 2 or 3, linear. Calyx 5-cleft, the lobes ovate-triangular, pubescent.

M. angustum Gray. Annual, somewhat hairy, 6-12 inches high; leaves oblong-lanceolate or linear-oblong, remotely dentate; carpels 5, reniform, at length 2-valved. Reported from Scott county.

HIBISCUS L. Herbs, with dentate or lobed leaves and showy axillary or paniculate flowers. Calyx 5-cleft, involucrellate at the base by a row of linear bractlets. Column long, with many lateral stamens. Styles 5, stigmas capitate. Fruit a 5-celled capsule, loculicidal. Seeds 3-many in each cell.

H. militaris Cav. *Halberd-leaved Rose-Mallow.* Perennial; stem smooth, 3-4 feet high, leaves hastately 3-lobed; lobes long acuminate, serrate, middle lobe much longer; flowers axillary, large, showy; calyx enlarged in fruit; corolla somewhat campanulate, purplish; capsule smooth; seeds hairy. Along rivers and marshy lakes; July-August; locally frequent; Muscatine, Louisa, Des Moines, Johnson, and Fremont counties.

H. trionum L. *Bladder Ketmia.* Annual; stems sub-erect, hispid; leaves 3-parted, middle segments long, all segments sinuate-lobed or cleft; fruiting calyx enlarged, membranaceous, 5-winged; flowers yellowish, with a dark centre, lasting only for the day. Waste places; July-September; becoming frequent.

TILIACEAE *Juss* LINDEN FAMILY.

Trees with simple alternate stipulate leaves and fibrous bark. Sepals 4-5, deciduous. Petals imbricated in the bud. Stamens many, polyadelphous, with 2-celled anthers.

TILIA L. LINDEN. BASSWOOD. Sepals 5, petaloid. Petals 5, oblong, obtuse. Each set of stamens with a petaloid scale at the base. Pistil 1. Ovary superior, 5-celled, each cell 2-ovuled. Fruit dry, becoming by abortion 1-celled, 1-2-seeded.

T. americana L. Tree 40-70 feet high; wood white, soft; leaves alternate, broadly ovate, pointed, sharply serrate, base cordate; stipules deciduous; flowers cream colored, fragrant, appearing after the leaves, in axillary cymes; peduncles hanging and united to a ligulate membranaceous bract; fruit ovoid. Rich woods; July; frequent, widely distributed.

LINACEAE *Dumort.* FLAX FAMILY.

Herbs, with alternate simple leaves, and perfect regular flowers. Stipules none or gland-like. Sepals 4-5, imbricated, persistent. Petals 4-5, hypogynous, imbricated, usually contorted. Stamens as many as the petals and alternate with them. Styles 3-5. Ovary 4-5-celled, with 2 ovules in each cell. Capsule globose.

LINUM L. FLAX. Herbs, with fibrous bark and sessile leaves. All parts of the flower in 5's, each series regularly alternate with the preceeding. Capsule 5-celled, breaking into 5 carpels in dehiscence, each cell wholly or partly divided by a false partition. Cells with 2-suspended mucilaginous seeds.

L. usitatissimum L. *Common-F.* Annual, stem terete, striate, erect, 1-2 feet high, much branched; leaves lanceolate, sessile; stipules none; flowers blue, axillary; sepals lanceolate, ciliate; petals twice the length of the sepals, crenulate; capsule globular. Spontaneous in fields and waste places, June-August; infrequent.

L. sulcatum Riddell. Annual, erect, 1-2 feet high, somewhat branched above, stem and branches narrowly wing-angled and grooved; leaves lanceolate or linear; stipules a pair of dark colored glands; flowers yellow; sepals acuminate, glandular ciliate, 1-nerved; styles united below the middle. Dry soil, prairies; June-August; common.

L. rigidum Pursh. Probably perennial, glaucous, glabrous or puberulent; branches rigid, more or less angular; upper leaves and sepals glandular-serulate. Loess hills; Woodbury and Fremont counties; frequent.

GERANIACEAE *J. St. Hil.*

Herbs, with alternate or opposite leaves, and perfect hypogynous regular or irregular flowers. Parts of the flower usually in 5's. Stamens as many or twice as many as the sepals, some often rudimentary. Ovary 5-celled, each cell 2-ovuled, beaked with the compound style.

GERANIUM L. Herbs, with stipulate palmately lobed leaves and axillary 1-3 flowered peduncles. Sepals and petals 5, regular, the sepals imbricated in the bud, persistent. Stamens usually 10, the 5 alternate ones longer, and provided with glands at their bases, alternate with the petals. Ovary deeply 5-lobed, 5-celled, separating into 5, 1-seeded long-tailed carpels from a persistent axis.

G. maculatum L. *Wild Crane's-bill.* Perennial, from a thick rootstock; stem 1-2 feet high, erect, hairy, branching above; leaves usually 5-parted, divisions cuneate toward the base, incisely lobed or toothed above, root-leaves on long petioles; flowers light purple, sepals ovate, pointed; petals entire, broadly oval, bearded on the claw. Rich woods; May-July; common.

G. carolinianum L. Root annual; stem 5-14 inches high, much branched, hairy; leaves about 5-parted, divisions cut into narrow lobes; flowers clus-

tered at the ends of the branches: sepals ovate, awn-pointed; petals scarcely longer than the sepals, light rose-tinted or whitish; stamens sometimes only 5. Waste places: May-August; infrequent; Fayette, Muscatine, Lee, and Johnson counties.

OXALIDACEAE *Lindl.* WOOD-SORREL FAMILY.

Annual or perennial herbs, with acidic juice, palmately trifoliate leaves, and perfect regular flowers in umbel-like or forking cymes. Represented in Iowa by the genus,

OXALIS L. WOOD-SORREL. Leaflets obovate. Sepals 5, persistent, imbricated. Petals 5, withering after flowering, sometimes united at the base, longer than the sepals. Stamens 10, monodelphous at the base, alternately shorter. Styles 5, distinct; stigmas terminal. Capsule oblong, somewhat 5-lobed, 5-celled, cells 1-several seeded.

O. stricta L. *Yellow W.* Annual or perennial, rootstock slender; stem leafy, glabrous to villous; leaves long-petioled, sensitive; stipules none; flowers yellow, peduncles long, axillary. Fields and woods: May-September; common.

O. violacea L. *Violet W.* Stemless perennials, from a brownish scaly bulb; leaflets broadly obovate; scapes 2-7 inches high, longer than the petioles, umbellately flowered; flowers nodding, violet. Fields and woods: May-June; common.

Floerkea proserpinacoides Willd. of the order LIMNANTHACEAE *Lindl.* has been reported from Lee county by Arthur. Annual, with 3-5 oblong or linear-oblong sometimes 2-3-cleft leaflets; and solitary axillary peduncled white flowers. Sepals and petals 3. Stamens 6. Ovaries and stigmas 3. Fruit 1-3 roughish fleshy achenes. River banks; April-June.

BALSAMINACEAE *Lindl.* JEWEL-WEED FAMILY.

Succulent herbs, with smooth weak hollow stems, simple petioled alternate exstipulate leaves, and showy irregular axillary nodding flowers. Sepals 3, the lateral 2 small, green, nerved; the posterior one large, petaloid, saccate, spurred. Petals 3, 2 of them 2-cleft. Stamens 5; filaments appendaged by scales on their inner side which connive over the stigma.

IMPATIENS L. TOUCH-ME-NOT. Leaves ovate, coarsely toothed. Ovary 5-celled, oblong; stigmas sessile, 5-lobed. Pod 5-valved, 5-celled, sometimes partitions not apparent, valves coiling elastically in dehiscence projecting the seed. Seeds several in each cell. Ours annuals, 2-4 feet high.

I. pallida Nutt. *Pale T.* Leaves ovate-oblong; pedicels 2-4 flowered; flowers pale yellow, sparingly dotted; sepals dilated transversely, broader than long, tipped with a short recurved spur. Moist alluvial soil; July-September; common. (*I. aurea* Muhl.)

I. fulva Nutt. *Spotted T.* Leaves rhombic-ovate; pedicels 2-4 flowered; flowers orange-yellow, thickly spotted with reddish-brown; sepals dilated lengthwise, longer than broad; spur elongated, closely reflexed. With the preceeding but less frequent. (*I. biflora* Walt.)

RUTACEAE *Juss.* RUE FAMILY.

Shrubby plants, with alternate or opposite exstipulate compound leaves dotted with transparent glands which contain a volatile aromatic

or acrid oil. Parts of the flower in 3's-5's. Stamens in ours as many as the petals and alternate with them. Pistils 2-5, separate or united; styles conniving. Fruit a capsule or a samara.

XANTHOXYLUM. Flowers dioecious; fruit capsular.

PTELEA. Flowers polygamous; fruit a samara.

XANTHOXYLUM L. Small trees with prickly branches and umbel-like clusters of flowers and odd-pinnate leaves. Calyx in ours wanting. Petals 4-5, imbricated in the bud. Pistils 3-5; styles distinct below but slightly united above. Capsule coriaceous, 2-valved, with 1-2 black seeds.

X. americanum Mill. *Prickly Ash. Toothache-tree.* A small shrub, 4-10 feet high, bark and leaves pungent and aromatic; leaflets 5-9, ovate-oblong, pubescent when young; flowers appearing before the leaves, yellowish green, in sessile axillary umbels; capsules globose, short-stipitate. Upland thickets; April-May; common generally.

PTELEA L. Ours a small shrub, with 3-foliate, long-petioled leaves, the leaflets sessile, crenulate, and corymbose-paniculate greenish white flowers. Sepals and petals 3-5. Ovary flattened, 2-celled; stigmas 2. Samara orbicular, the wing membranous, reticulated, emarginate.

P. trifoliata L. *Hop-tree.* Woods; June; infrequent; Scott, Muscatine, Lee, Henry, and Johnson counties.

CELASTRACEAE Lindl. STAFF-TREE FAMILY.

Small trees or shrubs, often climbing, with alternate or opposite simple entire or toothed leaves, small caducous stipules, and small regular flowers. Sepals and petals imbricated in the bud. Petals 4-5, alternate with the sepals. Stamens 4-5, alternate with the petals, inserted on a disk which fills the bottom of the calyx. Styles united, Ovary sessile, 2-5-celled, free from the calyx.

EUONYMUS. Leaves opposite; a small tree.

CELASTRUS. Leaves alternate; a shrubby climber.

EUONYMUS L. Represented in our flora by the following species.

E. atropurpureus Jacq. *Burning Bush.* Shrub 5-15 feet high; leaves petioled, ovate-oblong, serrate, acuminate; flowers perfect, purple, solitary or in axillary cymes, parts usually in 4's; styles short or none; pod deeply 3-4-lobed, 3-4-valved, 3-4-celled, each cell 1-4-seeded; seeds covered with a scarlet aril. Rich woods; June; frequent throughout the state.

CELASTRUS L. Flowers small, dioecious or polygamous, small, greenish, in terminal raceme-like clusters. Sepals, petals and stamens 5. Disk 5-lobed, bearing the crenulate petals and stamens on the edge.

C. scandens L. *Climbing Bitter-sweet.* Shrubby, climbing; leaves petioled, ovate, thin, acuminate, serrate; pod globose, orange colored, 3-celled, 3-valved, opening in the fall and displaying the scarlet covering of the seeds; seeds 1-2 in each cell. Thickets; June; frequent.

SIMARUBACEAE DC. AILANTHUS FAMILY.

Distinguished from the preceeding order by the non-punctate leaves. Represented in our flora by the genus **AILANTHUS** Desf.

A. glandulosa Desf. *Tree-of-Heaven.* Tree, 20-60 feet high, with long odd-pinnate petioled leaves and greenish white polygamous paniced flowers; the staminate flowers ill-scented; samaras oblong, membranous, 1-seeded, twisted. Established in and about Keokuk, Lee county.

ILICINEAE *Low.* HOLLY FAMILY.

Shrubs, with alternate petioled simple leaves, and small solitary or clustered axillary polygamo-dioecious flowers. The principal genus in the United States is *ILEX* L.

I. verticillata (L.) A. Gray. Shrub 6-20 feet high; leaves oval, obovate to oblong-lanceolate, pointed, serrate, turning black in autumn; flowers all short peduncled, in clusters or the fertile solitary. Reported from Mitchell county by Arthur.

RHAMNACEAE *Dumort.* BUCKTHORN FAMILY.

Small trees or shrubs, with simple alternate leaves, and regular sometimes apetalous flowers. Sepals 4-5. Petals 4-5, valvate in the bud. Stamens 4-5, opposite to the petals and alternate with the sepals, inserted along with the petals into the edge of the fleshy disk which lines the calyx and sometimes the ovary. Stigmas 2-5. Ovary 2-5-celled, sessile; ovules solitary.

RHAMNUS. Calyx and disk free from the ovary; petals none or small and short clawed.

CEANOTHUS. Calyx and disk adherent to the base of the ovary; petals long clawed.

RHAMNUS L. Leaves pinnately veined. Flowers in axillary clusters, greenish. Calyx campanulate, 4-5-cleft, tube lined with the disk. Ovary free, 2-4-celled; styles 2-4. Fruit a small berry-like drupe.

R. lanceolata Pursh. *Buckthorn*. A thornless shrub, 3-10 feet high; leaves ovate-lanceolate, acute or obtuse, serrulate, petioled; flowers appearing closely after the leaves, of two sorts on different individuals, one form in short axillary clusters with a short included style, the other with often solitary longer pedicels and exserted style; petals 4, minute, deeply notched, sometimes not apparent; styles 2; fruit dark colored, 2-seeded. Upland thickets; May; a frequent shrub, widely distributed over the southern half of the state and extending far into the northern portion.

R. alnifolia L'Her. A low shrub with oval acute serrate leaves; flowers solitary or 2-3 together in the axils of the leaves, mostly dioecious, apetalous; calyx-lobes 5; stamens 5. Reported from Winneshiek county. (Arthur.)

CEANOTHUS L. Low shrubby plants, with white flowers in umbel-like clusters. Calyx 5-cleft, persistent, petaloid. Petals 5, longer than the calyx, hooded. Stamens mostly exserted. Style 3-cleft. Capsule 3-celled, 3-seeded.

C. americanus L. *New Jersey Tea*. Stems 1-3 feet high, from a dark red root, branches slightly pubescent; leaves ovate, 3-ribbed, acuminate, serrate, somewhat pubescent; peduncles axillary and terminal, elongated. Upland woods and prairies; June; common.

C. ovatus Desf. Usually smaller than the preceding; leaves oval-lanceolate or oblong, glandular serrate, peduncle short, pubescent. Prairies; May; common; Story, Shelby, Decatur, Adams, Montgomery, and Pottawattomie counties. Iowa specimens are more or less pubescent, the typical plant being glabrous throughout, hence our specimens are usually referred to the var. *pubescens* T. & G.

VITACEAE *Lindl.* GRAPE FAMILY.

Climbing shrubs, with copious watery juice, nodose joints, climbing by tendrils, alternate petioled leaves, and small regular greenish perfect or polygamo-dioecious flowers. Calyx entire or 4-5-toothed. Petals 4-5, caducous. Stamens 4-5, opposite the petals. Ovary 2-celled. Fruit a 2-celled 2-4-seeded berry.

VITIS. Leaves simple; petals united into a cap, falling away without separating; fruit pulpy, edible.

CISSUS. Leaves simple in our species; petals separate, spreading; fruit scarcely pulpy, inedible.

AMPELOPSIS. Leaves digitate; corolla expanding.

VITIS L. Shrubs, climbing by aid of coiling tendrils, with dentate or palmately lobed leaves, small caducous stipules, and fragrant thyrsoid flowers.

V. riparia Mx. Leaves shining, glabrous, sometimes pubescent on the veins beneath, sharply 5-7-lobed, sinuses acute, lobes coarsely toothed, acute. Low woods; May-June; fruit ripening July-September; common. (*V. vulpina* L.)

V. aestivalis Mx. Branches terete; leaves large, more or less deeply 3-5-lobed, dentate, whitish or rusty pubescent especially when young; berries black, with bloom. Reported from Clinton county by Arthur.

V. cinerea Engelm. Branches angled; leaves dentate, somewhat 3-lobed; pubescence whitish or grayish, persistent; berries black, without bloom. Low woods; May-June, fruit ripe in September; Muscatine, Louisa, Page, and Fremont counties.

CISSUS L. Represented in our flora by the single species,

C. ampelopsis Pers. Climbing, nearly glabrous; leaves ovate, coarsely toothed, sometimes slightly 3-lobed, acuminate, base cordate or truncate; berries 1-2-seeded. Low woods; May-June; Fremont county. (*Ampelopsis cordata* Mx.)

AMPELOPSIS Mx. Leaves digitate. Flower clusters cymose. Calyx slightly 5-toothed. Petals 5, thick, spreading. Stamens 5. Tendrils attaching by sucker-like disks.

A. quinquefolia Mx. *Virginia Creeper.* Climbing by rootlets as well as by tendrils; leaflets stalked, oval to oblong-lanceolate, narrowed both ways, usually 5, serrate above the middle, dark green above, pale beneath, turning crimson in autumn. Thickets and low woods; July; fruit ripe in October; common. (*Parthenocissus quinquefolia* (L.) Planch.)

ACERACEAE *St. Hil.* MAPLE FAMILY.

Trees or shrubs, with opposite palmately lobed or pinnate leaves, and small regular unsymmetrical polygamous or dioecious flowers. Sepals and petals 5, the latter often wanting, imbricated in the bud. Stamens 5-10; filaments filiform. Ovary 2-lobed, 2-celled; styles 2, inserted between the lobes. Fruit of 2 winged samaras, joined below, 1-seeded. Represented in our flora by the genus **ACER** L., the maples.

* *Leaves simple, palmately lobed; flowers polygamous.*

A. saccharinum L. *Soft or White M.* Usually 40-100 feet high; leaves palmately 5-lobed, sinuses obtuse or acute, unequally toothed, silvery white beneath and more or less downy when young, base truncate; flowers appearing before the leaves, in umbel-like clusters, nearly sessile, greenish, apetalous; fruit with large divergent wings. Rich soil; March-April; common. (*A. dasycarpum* Ehrh.) A common grove tree. The sap yields small quantities of sugar.

A. saccharum Marsh. *Rock or Sugar M.* A large tree; leaves dark green above, pale beneath, 3-7-lobed, lobes sinuate, sinuses rounded and shallow, base subcordate; flowers appearing with the leaves, in terminal or lateral sessile corymbose clusters, apetalous, on drooping hairy pedicels; samaras glabrous, slightly diverging, the wings shorter than the preceeding. River

bluffs: April: a frequent tree along the water courses of eastern and southern Iowa, extending far into the interior. Allamakee to Lee county, thence west as far as Decatur county. (*A. saccharinum* Wang.)

A. nigrum Mx. Similar to the preceding; leaves green both sides, pubescent beneath at least on the veins, lobes shorter, broader, but little undulate or often entire, sinuses very obtuse, the basal one nearly closed. With the preceding: Fayette, Story, Decatur and Emmet counties: infrequent or rare: often put as var. *nigrum* T. & G. of the preceding.

A. rubrum L. *Red or Swamp M.* Twigs reddish: leaves 3-5-lobed, lobes serrate, acuminate, green above, pale or whitish beneath, sinuses acute, base cordate: flowers reddish or yellowish, short pedicelled: petals linear-oblong: fruiting pedicels elongated. Low grounds along river: rare: Johnson county.

A. spicatum Lam. *Mountain M.* A shrub or small tree: leaves 3-5-lobed, glabrous above, pubescent beneath, coarsely serrate, lobes acuminate: flowers in a dense erect compound raceme, greenish yellow, appearing after the leaves: petals linear-spatulate: samaras small somewhat divergent. Bluffs of the Mississippi river: Allamakee, Clayton, and Dubuque counties: rather rare.

* * *Leaves pinnate; flowers dioecious.*

A. negundo L. *Box Elder, Ash-leaved M.* Tree of average size: leaflets 3-5, ovate or oval, pubescent when young, becoming glabrous, acute, dentate or entire: flowers dioecious, appearing shortly before the leaves, drooping, small, apetalous: samaras glabrous somewhat incurved. Low woods: April: common. (*Negundo aceroides* Moench)

HIPPOCASTANACEAE T. & G. BUCKEYE FAMILY.

Trees or shrubs, with opposite petioled digitately 5-7-foliate leaves, and irregular polygamous paniculate flowers. Calyx tubular, 5-toothed. Petals 4-5, unequal, clawed. Stamens 7, filaments slender, unequal. Ovary 3-celled, with 2 ovules in each cell. Fruit coriaceous, 3-celled, 3-valved, 3-seeded or by abortion 1-celled, 1-seeded. Represented by the genus *AESCULUS* L.

AE. glabra Willd. *Ohio Buckeye.* Tree 10-40 feet high, bark fetid: leaves long-petioled: leaflets 5, ovate to lanceolate, acuminate, finely serrate: flowers in terminal thyrsoid panicles, pale yellow: petals 4: stamens curved, exerted: fruit globular, covered with prickles: seed large, shining, red; scar large, roundish, pale. Alluvial soil and rich uplands: May: frequent: Des Moines, Lee, Henry, Van Buren, Jefferson, Johnson, Boone, Polk, Appanoose, Decatur, Ringgold, Union, and Taylor counties.

AE. octandra Marsh. *Sweet B.* Flowers yellow: petals 4, conniving, long-clawed: stamens included: fruit smooth. May: Jasper county, reported by Prof. Shimek: apparently infrequent. (*AE. flava* Ait.)

STAPHYLEACEAE DC. BLADDER-NUT FAMILY.

Ours a small shrub, with 3-foliate stipulate leaves, and axillary drooping racemose flowers. Sepals, petals, and stamens 5. Styles 3. Pod large, membranous, inflated, 3-lobed, 3-celled, separating above, each cell with 1-4 bony seeds. Represented by the genus *STAPHYLEA* L.

S. trifolia L. *American Bladder-nut.* Shrub 4-12 feet high: flowers white. Moist woods: May: frequent throughout.

ANACARDIACEAE *Lindl.* SUMAC FAMILY.

Small trees or shrubs, with milky acrid juice, alternate odd-pinnate exstipulate leaves, and perfect or polygamous greenish or yellowish flowers. Sepals, petals, and stamens 5. Styles or stigmas 3. Fruit a small dry drupe. Represented by the genus *Rhus* L.

* *Flowers polygamous, in terminal thyrsoid panicles.*

R. typhina L. *Staghorn Sumac*. Tree 10–20 feet high; wood yellow, young branches densely villous; leaflets 11–31, sessile, lanceolate, acuminate, serrate, pale pubescent beneath; fruit red, with long crimson hairs. Wooded hillsides; May–June; frequent; Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Jackson, Delaware, Scott, Jones, and Emmet counties. (*R. hirta* (L.) Sudw.)

R. glabra L. *Common S.* Shrub 3–15 feet high; branches smooth, somewhat glaucous; leaflets 11–31, sessile, lanceolate-oblong, acuminate, serrate, pale beneath; fruit red, with short crimson hairs. Open uplands, thickets; June; common.

** *Flowers polygamous, in loose axillary panicles.*

R. radicans L. *Poison Oak. Poison Ivy*. Bushy, 1–2 feet high or else a woody vine, climbing high; leaflets 3, ovate, acuminate, entire, sinuate or somewhat lobed, more or less pubescent beneath; fruit globular, smooth, white or yellowish. Rich soil, waysides and thickets; June; common. Usually given as *R. toxicodendron* L.

*** *Flowers polygam-dioecious, appearing before the leaves, in terminal spicate clusters.*

R. canadensis Marsh. Shrub 2–6 feet high; leaflets 3, crenately toothed, pubescent when young, later glabrate, lateral ones ovate, sessile, terminal one ovate with a cuneate base, short stalked; fruit globose, red, pubescent. Rocky woods; April; frequent; Delaware, Muscatine, Lee, Henry, Wapello, Van Buren, Jefferson, and Linn counties. (*R. aromatica* Ait.)

POLYGALACEAE *Richenb.* MILKWORT FAMILY.

Ours herbs, with simple entire alternate, opposite or verticillate exstipulate leaves, and mostly racemose, spicate, or axillary flowers. Pedicels frequently 2-bracted at the base. Flowers perfect, irregular. Sepals 5, the upper and 2 lower small and often greenish, the 2 lateral large, colored. Petals 3, united into a split tube, more or less adnate to the stamens. Stamens 6 or 8, monodelphous or diadelphous; anthers 1-celled, opening at the apex by a hole or chink. Ovary 2-celled, 2-ovuled; style simple. Fruit a 2-celled 2-seeded capsule. Seeds usually caruncled and hairy. Represented in our flora by the genus *Polygala* L.

P. senega L. *Seneca Snakeroot*. Perennial; glabrous or nearly so; root-stocks hard, knotty; stems several; 6–12 inches high; leaves lanceolate or oblong-lanceolate, alternate, sessile, lower small, scale-like; flowers white, in a solitary close spike; wings round-obovate. Rocky woods; May–June; frequent; Winneshiek, Fayette, Scott, Muscatine, Johnson, Story, and Cerro Gordo counties.

P. sanguinea L. Annual; stem mostly simple, 6–15 inches high, glabrous; leaves oblong-linear, alternate, sessile; flowers in a globular or oblong head, rose-purple, greenish, rarely white; wings broadly ovate, sessile, exceeding the pod. Moist prairies; June–September; common. (*P. viridescens* L.)

P. incarnata L. Annual, glaucous; stem simple, slender; leaves distant,

sessile, linear or subulate; flowers pink or rose, in a dense terminal spike. Sandy moist soil. July-August; infrequent; Fayette, Muscatine, Johnson, and Story counties.

P. cruciata L. Annual; stem 4-10 inches high, square or slightly wing-angled, with spreading branches; leaves mostly in 4's, linear or oblanceolate; spikes sessile or nearly so; flowers purple, greenish, or white; wings triangular-ovate, slightly cordate, awn-pointed. In mossy shaded places; July-September; Lake township, Muscatine county.

P. verticillata L. Annual, glabrous; stems 4-12 inches high, branches mostly opposite, spreading; leaves in whorls of 4 or 5, a few scattered, acute, punctate, linear; spikes long-peduncled; flowers purplish or greenish; wings broadly oval, clawed, shorter than the pod. Prairies and open woods; June-September; common.

PAPILIONACEAE L. PEA FAMILY.

Trees, shrubs, vines or herbs, with alternate compound, stipulate leaves, and papilionaceous perfect flowers in spikes, heads, panicles or racemes. Calyx of 5 sepals, often unequal, more or less united. Corolla of 5 petals: the upper one known as the standard is the largest and in the bud encloses the others, usually reflexed; the lateral petals or wings are oblique and exterior to the two lower petals: the lower more or less conniving by their edges to form the keel which encloses the stamens and pistil. Stamens monodelphous, diadelphous or distinct, 10, rarely 9 or 5. Ovary simple, superior, usually 1-celled; style simple. Fruit a legume, 2-valved, 1-many seeded, dehiscent or indehiscent, or else a loment. This and the following two families are usually included under LEGUMINOSÆ.

Tribe *Podalyrieæ*. Leaves 3-foliolate; stamens distinct.

BAPTISIA. A single genus in our area.

Tribe *Genisteæ*. Leaves digitate or simple; stamens monodelphous; anthers of 2 kinds.

CROTALARIA. Leaves simple; calyx nearly equally 5-lobed.

LUPINUS. Leaves digitate; calyx deeply 2-lipped.

Tribe *Trifolieæ*. Leaves 3-foliolate, leaflets denticulate; stamens diadelphous.

TRIFOLIUM. Flowers capitate; pods straight.

MELILOTUS. Flowers racemose; pods coriaceous.

MEDICAGO. Flowers racemose or spicate; pods curved or coiled.

Tribe *Loteæ*. Leaves 3-foliolate, leaflets entire; stamens diadelphous.

HOSACKIA. With us the only genus.

Tribe *Psoraleæ*. Leaves glandular-dotted; stamens mostly monodelphous; pod small, indehiscent.

PSORALEA. Leaves digitately 3-5-foliolate.

AMORPHA. Corolla of one petal, the standard.

DALEA. Wings and keel adnate to the middle of the cleft stamen tube.

PETALOSTEMON. Corolla nearly regular; stamens 5.

Tribe *Galegeæ*. Leaves usually not dotted, pinnately several-foliolate; flowers racemose; stamens mostly diadelphous.

TEPHROSIA. Herb; leaves odd-pinnate; pod flat.

ROBINIA. A small tree; leaves odd-pinnate.

ASTRAGALUS. Pod inflated, partly or entirely 2-celled.

OXYTROPIS. Stemless silky-pubescent herbs; keel pointed.

GLYCYRRHIZA. Leaves scaly or dotted; pod covered with hooked prickles.

Tribe *Hedysareae*. Herbs without tendrils, with pinnate leaves; pod a loment or rarely 1-seeded.

DESMODIUM. Leaflets stipellate; flowers of one kind; pod several-jointed.

LESPEDEZA. Leaflets not stipellate; flowers of 2 kinds; pod 1-2-jointed.

Tribe *Vicieae*. Leaves evenly pinnate, terminating in tendrils.

VICIA. Wings adherent to the keel; style bearded at the summit.

LATHYRUS. Wings nearly free; style bearded along the inner side.

Tribe *Phaseoleae*. Leaves odd-pinnate; twining or trailing plants.

APIOS. Twining; leaflets 5-7.

STROPHOSTYLES. Leaflets 3; flowers in capitate clusters, keel of the corolla strongly incurved.

AMPHICARPAEA. Leaflets 3; flowers racemose, gamopetalous and apetalous.

BAPTISIA Vent. FALSE INDIGO. Ours perennial herbs, with palmately 3-foliate leaves which blacken in drying, and white or yellowish flowers in terminal or lateral racemes. Calyx 4-5-toothed. Petals 5, nearly distinct and about equal in length. Stamens 10, distinct. Pod stalked, roundish or oblong, inflated, pointed, many-seeded.

B. leucophaea Nutt. Stem 1-2 feet high, hairy, branches divergent; leaves sessile or nearly so, leaflets oblanceolate or spatulate, obtuse or acutish; stipules and bracts large, leafy, persistent; flowers in a long reclined raceme, white or yellowish; pedicels slender; pod short stalked, hairy, with a long recurved apical point. Prairies and pastures; May; common. (*B. bracteata* Ell.)

B. leycantha T. & G. Stem smooth, 1-3 feet high, much branched; leaves petioled; leaflets obovate or oblanceolate, obtuse; stipules lanceolate, usually a little shorter than the petioles, deciduous; raceme elongated, loosely flowered; flowers white; pod ellipsoidal, long-stalked, tipped with a subulate style. Low grounds; June-July; common.

B. tinctoria (L.) R. Br. Plant glabrous; flowers yellow, in numerous terminal racemes; pods ovoid to nearly globose, tipped with a subulate style. Reported from Johnson county by Prof. Shimek.

CROTALARIA L. Herbs, with simple leaves, and yellow flowers on long peduncles which are 2-4-flowered. Calyx 5-cleft, slightly 2-lipped. Standard large, cordate; keel scythe-shaped; sheath of the stamens cleft on the upper side; 5 of the anthers smaller; pod inflated, with many loose seeds.

C. sagittalis L. *Rattle-box*. Annual, 1 foot high or less, hairy, branched; leaves sessile or nearly so, entire, oval, oblong or lanceolate, stipules acuminate, united, decurrent; corolla equal or shorter than the calyx. Sandy soil, along water courses or dry uplands; June-September; frequent; Muscatine, Johnson, Woodbury, and Fremont counties.

LUPINUS L. Herbs, with palmately many-foliate leaves, and terminal racemose flowers. Calyx deeply 2-lipped, upper lip 2-cleft, lower entire or 3-toothed; standard reflexed laterally; keel crescent shaped; stamens monodelphous, sheath entire; anthers alternately oblong or globose; pod knotty, oblong, compressed.

L. perennis L. *Wild Lupine*. Perennial; stem 1-2 feet high, more or less pubescent; leaves 5-9-foliate, leaflets oblanceolate, mucronate; flowers in a long raceme, purplish blue to white, showy; pod linear-oblong, hairy, 5-6-seeded. May-June; Winneshiek county.

TRIFOLIUM L. CLOVER. Herbs, with 3-foliate denticulate leaves, and capitate or spicate flowers. Stipules large, adnate to the petiole. Calyx 5-toothed, persistent, teeth nearly equal. Corolla withering or persistent;

petals united at the base; standard oblong or obovate, reflexed. Stamens diadelphous, 9 and 1; pod included in the calyx or scarcely longer, 1-3-seeded.

T. pratense L. *Red C.* Perennial; stems ascending, somewhat pubescent; leaflets oval or obovate, obtuse or emarginate, with a pale spot on the upper surface; stipules large, bristle pointed; heads globular, sessile; flowers rose purple, sweet scented; lower tooth of the calyx longer than the 4 other equal ones. Meadows; May-September; common.

T. repens L. *White C.* Perennial, low, creeping; leaves long-petioled; leaflets obcordate, minutely toothed; stipules narrow, scarious; flowers in a long-peduncled globular head, white; calyx small, teeth short; corolla twice the length of the calyx. Fields and waste places; May-September; common.

T. hybridum L. *Alsike C.* Perennial, stems erect or suberect, somewhat pubescent; leaflets much as in *T. repens*; flowers rose-tinted. Fields and waste places; May-September; frequent.

T. reflexum L. *Buffalo C.* Annual or biennial, erect or procumbent, glabrous or pubescent; leaflets obovate or ovate-oblong; stipules foliaceous, ovate-acuminate; flowers in a large head, slender pedicelled, at length reflexed; calyx short; calyx-teeth very long and narrow; standard rose-red, wings and keel whitish. Sandy soil near river banks; April-August; infrequent; Muscatine, Johnson, Benton, Clinton, and Union counties.

T. stoloniferum Muhl. Perennial; glabrous, with long basal runners; leaflets obovate or obcordate; stipules ovate-lanceolate, membranous; flowers white, with a purplish tinge. Reported from Woodbury county.

T. arvense L. Annual, silky, about 8 inches high, simple or branched; leaflets oblanceolate; heads oblong; calyx-teeth bristle-like, plumose; petals whitish. Fields; infrequent; Winneshiek and Story counties.

T. agrarium L. *Yellow C.* Annual, six inches or more high, upright; leaflets obovate or oblong; stipules linear-lanceolate; flowers in oblong or oval heads, yellow. Waste places; infrequent; Story county.

T. procumbens L. *Low Hop C.* Annual, 3-6 inches high, procumbent or ascending, pubescent; leaflets cuneate-obovate; stipules ovate; heads globose, yellow. Meadows and pastures; infrequent; Fayette, Johnson, Lee, Story, and Winnebago counties.

MELILOTUS Juss. Biennial smooth herbs, with 3-foliate petioled leaves, dentate leaflets; subulate stipules, and small flowers in slender spike-like racemes. Calyx small, 5-cleft; teeth short, nearly equal. Corolla about twice the length of the calyx. Stamens diadelphous. Pod longer than the calyx, ovoid, wrinkled, coriaceous, 1-2-seeded.

M. alba Desv. *White Melilot. Sweet Clover.* Stem 2-6 feet high; leaflets oblong or oblanceolate; flowers white, standard longer than the other petals. Waste places; June-September; becoming common.

M. officinalis (L.) Lam. *Yellow M.* Resembling the preceeding; leaflets ovate, oblong, or oblanceolate; flowers yellow, standard about equaling the wings and keel. Waste places; infrequent.

MEDICAGO L. Leaves pinnately 3-foliate, petioled; leaflets denticulate. Calyx 5-cleft. Stamens diadelphous, 9 and 1. Pod 1-several seeded, incurved or coiled.

M. sativa L. *Lucerne. Alfalfa.* Perennial, suberect, glabrous; leaflets ovate or oblanceolate; stipules lance-linear; raceme few flowered; flowers violet-purple; pod spirally coiled. Waste places; June-September; infrequent, widely distributed.

M. lupulina L. Annual. pubescent; leaflets obovate, oval or orbicular; stipules dentate; flowers yellow, small; pod 1-seeded, curved into a partial spire. Reported from Story county.

HOSACKIA Douglas. Ours an annual herb, with 1-3-foliate leaves and rose-colored flowers. Calyx-teeth nearly equal. Petals free from the stamen tube; standard ovate to roundish, claw remote; wings oblong or obovate; keel incurved. Stamens diadelphous, 9 and 1; anthers all alike.

H. purshiana Benth. Stem 1-2 feet high, branched, more or less villous-pubescent; leaves sessile or nearly so, leaflets usually 3, ovate to lanceolate; peduncles axillary, 1-flowered; pods linear, about 1 inch long, 4-7-seeded. Dry soil; June-July; infrequent; Henry, Boone, Lyon, and Woodbury counties.

PSORALEA L. Herbs, with usually glandular-dotted 3-5-foliate leaves, and spiked or panicle flowers. Calyx 5-cleft, campanulate, persistent, the lower lobe the longest. Stamens monodelphous or diadelphous. Pod about the length of the calyx, 1-seeded, indehiscent.

P. esculenta Pursh. *Prairie Apple*. Stem 5-9 inches high, very hairy, from a turnip-shaped farinaceous root; leaves palmately 5-foliate; leaflets entire, oval or obovate, nearly smooth above but hairy below; spike short, dense, long-peduncled; lobes of the calyx and the bracts lanceolate, corolla but little exceeding the calyx, standard ovate, reflexed, wings attached to the middle of the keel; flowers bluish. Prairies; May-June; frequent; Emmet, Lyon, Shelby, Pottawattomie, and Fremont counties.

P. argophylla Pursh. Stem 1-3 feet high, clothed with silky white hairs; leaves usually 3-foliate; leaflets oval, oblong or obovate; flowers in interrupted spikes; calyx and bracts lanceolate. Prairies; common in the western half of the state; June-August.

P. tenuiflora Pursh. Stem slender, erect, 2-4 feet high, much-branched, appressed pubescent; leaves palmately 3-5-foliate; leaflets linear, oblong or oval; racemes loosely few flowered; Prairies; June-August; frequent; Decatur, Union, and Ringgold counties.

AMORPHA L. Low perennial shrubs, with odd-pinnate glandular-punctate leaves, the leaflets stipellate, midvein excurrent, and bluish or purplish flowers in dense terminal clustered spikes. Calyx 5-toothed. Standard enveloping the stamens and style; wings and keel wanting. Stamens 10, exserted, monodelphous at the base. Pod oblong, longer than the calyx, beaked.

A. fruticosa L. *Willow Herb*. *False Indigo*. Shrub 4-7 feet high, somewhat pubescent or glabrate, leaves petioled, 9-19, oval or oblong, obtuse, not crowded, short-stalked; pod 2-seeded. Common along streams; May-June.

A. canescens Pursh. *Lead Plant*. Stems about a foot high, clothed with a white velvety pubescence; leaves sessile; leaflets 21-49, crowded, nearly sessile; pod 1-seeded. Common in dry soil, prairies; June-August.

A. microphylla Pursh. Stems a foot high or less, nearly glabrous, spike solitary or few in a cluster. Prairies and upland woods; May; Emmet, Cerro Gordo, Palo Alto, Clay, Dickinson, Delaware, Louisa, and Decatur counties. (*A. nana* Nutt.)

DALEA L. Herbs, with odd-pinnate glandular-punctate leaves, minute stipules, and small flowers in terminal spikes or heads. Calyx 5-toothed or cleft, teeth about equal. Standard cordate, inserted in the bottom of the calyx; wings and keel adnate to the center of the cleft stamen tube. Stamens 9 or 10. Pod 1-seeded, enclosed in the calyx.

D. alopecuroides Willd. Stem erect, 1-3 feet high, glabrous; leaflets 15-41, oblanceolate or oblong; calyx densely villous, teeth linear-lanceolate, plumose. Roadsides and waste places; July-September; frequent. (*Parosela dalea* (L.) Britton.)

D. laxiflora Pursh. Stem 1-4 feet high, from a long thick root, smooth, much branched; leaflets 5-11, linear-oblong or linear; flowers in small loose spikes; calyx villous; teeth subulate, plumose; petals white; stamens 9. Loess hills; June-August; common in the west counties: Woodbury, Harrison, Monona, Pottawattomie, and Fremont counties. (*P. enneandra* (Nutt.) Britton.)

PETALOSTEMON Mx. PRAIRIE CLOVER. Perennial herbs, with odd-pinnate leaves, minute stipules, and small flowers in peduncled oblong heads. Calyx 5-toothed. Sepals 5, much alike, 4 of them borne on the top of the cleft sheath of monodelphous filaments and alternate with the 5 anthers, the standard cordate or oblong, inserted in the bottom of the calyx.

P. violaceus Mx. Glabrous or somewhat pubescent; leaflets 5, narrowly linear; flowers in a dense globose or oblong head, violet purple. Prairies; July-August; common. (*Kuhnistera purpurea* (Vent.) Mac M.)

P. candidus Mx. Glabrous; leaflets 7-9, lanceolate or oblong-linear; flowers in an oblong or cylindrical spike, white. With the last. (*K. candida* (Willd.) Kuntze.)

P. villosus Nutt. Decumbent or ascending, densely villous; leaflets 13-17, linear or oblong, spikes cylindric, villous; flowers rose-purple. Reported from Story county. (Hitchcock.) (*K. villosa* (Nutt.) Kuntze.)

TEPHROSIA Pers. Ours a perennial herb, with odd-pinnate non-punctate leaves, and flowers in a terminal often compound raceme. Calyx teeth 5, nearly equal; bractlets none. Petals clawed; standard large, orbicular, silky externally; keel bluntish, cohering with the wings. Pod linear, flat, several-seeded.

T. virginiana Pers. Goat's Rue, Catgut. Stem 1-2 feet high, erect, hairy; leaflets 9-20, linear-oblong, mucronate, odd leaflet notched or obcordate and base cuneate; flowers yellowish white, marked with rose or purple, short-pedicelled, large, clustered; pod villous, bristle-pointed. Sandy soil; June-July; infrequent; Winneshiek, Allamakee, Fayette, Jackson, Delaware, Scott, Muscatine, Louisa, and Johnson counties. (*Cracca virginiana* L.)

ROBINIA L. Ours a small tree, with odd-pinnate leaves, spine-like stipules, and flowers in hanging axillary racemes. Calyx short, 5-toothed, 2 upper teeth more or less united. Standard large, reflexed, but little longer than the keel; wings free. Stamens diadelphous, 9 and 1. Pod linear, flat, several-seeded, margined.

R. pseudacacia L. False Acacia. Leaflets ovate-oblong; flowers showy, fragrant, white; pod glabrous. Roadsides and waste places; May; an escape from cultivation, frequent in the older settlements.

ASTRAGALUS L. Perennial herbs, with odd-pinnate leaves, and racemose or spicate flowers. Calyx 5-toothed. Corolla slender, much exceeding the calyx; standard narrow, equaling or exceeding the obtuse keel, reflexed or spreading. Stamens diadelphous, 9 and 1. Pod varies, usually turgid, 2-valved, 1 or 2-celled, few-many-seeded.

* Pod 2-celled.

A. caryocarpus Ker. Ground Plum. Low, prostrate, whitish pubescent; root long, descending; leaflets 11-21, narrowly oblong; calyx tubular; corolla

twice as long, violet purple; flowers 6-10, in a spike-like raceme; pod thick, succulent, obovoid, corky when dry. Prairies; May; frequent; Fayette, Polk, Calhoun, Cerro Gordo, Story, Shelby, Emmet, Lyon, Woodbury, Pottawattomie, and Decatur counties. (*A. crassicaarpus* Nutt.)

A. plattensis Nutt. Prostrate or ascending, villous; leaflets oblong or obovate; flowers yellowish-white, with purple tinge; pod ovoid, pubescent, not wrinkled. Reported from Harrison county. (Arthur.)

A. canadensis L. Stem 2-4 feet high, smooth or somewhat pubescent; leaflets 21-31, oblong-ovate or elliptical; flowers thickly set in an elongated spike, greenish yellow; pod oblong, glabrate, terete. Bank of streams; July-August; frequent throughout. (*A. carolinianus* L.)

** Pod 1-celled, sometimes partially 2-celled by intrusion of the sutures.

A. distortus T. & G. Low, diffuse or ascending, sub-glabrous; leaflets 11-25, obovate or oval, apex rounded or emarginate; flowers purple, in a short loose spike; pod sessile, glabrous, curved, grooved on the lower side. Muscatine county; reported from Scott county.

A. lotiflorus Hook. Nearly stemless, branched from the base, villous-pubescent with whitish hairs; leaflets 7-15, oval or oblong; flowers yellow, in dense short spikes; pod sessile, ovoid-oblong, pubescent. Lyon and Fremont counties. Fremont county specimens are low, 1-3-flowered; pods near the ground. Loess hills, frequent. These have been referred to *A. lotiflorus brachypus* Gray.

A. cooperi Gray. Stem 1-2 feet high, glabrous; leaflets 9-21, oblong or elliptic, apex obtuse or emarginate; flowers short-pedicelled; pod sessile. Reported from Lee county. (Arthur.) (*Phaca neglecta* T. & G.)

OXYTROPIS DC. Mostly stemless herbs, with odd-pinnate leaves, and racemose or spicate flowers on scape-like peduncles. Calyx-teeth nearly equal. Petals clawed; keel pointed or appendaged. Stamens diadelphous. Pod 2-valved, 1-celled or partially 2-celled.

O. lamberti Pursh. *Stemless Loco-Weed*. Silky-pubescent; stipules membranous, pubescent, lanceolate, imbricated; leaflets 9-19, linear or oblong; flowers purple or yellowish; pod coriaceous, ovoid-cylindric, pubescent, long-acuminate. Prairies; May-August; Lyon, Woodbury, and Fremont counties; found usually on the loess hills. (*Spesia lamberti* (Pursh) Kuntze.)

GLYCYRRHIZA L. Perennials; root large, sweet, descending. Leaves odd-pinnate; stipules small. Flowers in dense axillary spikes; anthers alternately smaller.

G. lepidota Nutt. *Wild Liquorice*. Stem 1-3 feet high, appressed pubescent; leaflets 15-19, ovate-oblong or lanceolate, scaly when young, dotted when old, mucronate; flowers whitish; pods oblong, covered with hooked prickles, few seeded. Fields and waste places; May-August; common in the west counties, spreading eastward.

DESMODIUM Desv. Perennial herbs, with stipellate 3-foliate leaves, scale-like stipules and bracts, and usually small flowers in axillary or terminal racemes or bracts. Calyx more or less 2-lipped, the upper with 2 and the lower with 3 teeth. Standard oblong, ovate or orbicular; wings obliquely oblong, adherent by a transverse appendage; keel straight or straightish, obtuse or truncate. Stamens monadelphous or diadelphous, 9 and 1. Ovary sessile or stalked; ovules 2-many. Pod sessile or stalked, flat, several jointed; joints readily separable, indehiscent or nearly so, mainly coriaceous, pubescent or mucicate. (MEIBOMIA Adans.)

* *Pod long-stalked, not constricted above but deeply constricted below; stamens monodelphous below; leaves petioled.*

D. acuminatum DC. Stem erect, glabrous or somewhat pubescent, 1-4 feet high; leaves clustered at the summit of the stem; leaflets ovate, acuminate, remotely pubescent; stipules subulate, mostly persistent; peduncle arising from the cluster of leaves; panicle large, naked, bracts deciduous; flowers large, purple; pods 2-3-jointed. Rich woods; June-September; common. (*M. grandiflora* (Walt.) Kuntze.)

D. nudiflorum DC. Leaves crowded at the summit of the sterile stems; leaflets ovate or oval, acuminate or bluntish; peduncle elongated, arising from the base of the plant; panicle narrow, the few flowers rose-purple. Hilly woodlands; July-August; infrequent; Muscatine and Cedar counties. (*M. nudiflora* (L.) Kuntze.)

** *Pod constricted on both margins, more deeply below than above; leaves petioled.*

† *Joints of the pod longer than broad; stipe about the length of the calyx-lobes.*

D. canescens DC. Stem much branched, 3-5 feet high, hairy; leaflets ovate, acutish or obtuse, equalling the petioles, scabrous above, whitish and somewhat pubescent beneath, ciliate; stipules ovate, acuminate, persistent; pods 4-6-jointed, joints unequally rhomboidal, longer than wide. Rich soil; July-September; infrequent; Muscatine, Johnson, and Lee counties. (*M. canescens* (L.) Kuntze.)

D. longifolia (T. & G.) Stem 2-5 feet high, angled, branched, minutely pubescent; leaves petioled; leaflets ovate or ovate-lanceolate, long-acuminate, scabrate above, slightly villous beneath; pods with 4-6 triangular-oblong or lozenge-shaped joints. Woods; July-August; infrequent; Decatur and Page counties. (*M. longifolia* (T. & G.) Vail.)

D. cuspidatum T. & G. Stem 3-6 feet high mostly glabrous below, finely pubescent above; leaflets ovate or ovate-lanceolate, long-acuminate, glabrous, above, glaucous beneath; pods 3-7-jointed, joints obliquely oblong, twice as long as wide. Reported by Arthur as belonging to the flora of Iowa. (*M. bracteosa* (Mx.) Kuntze.)

†† *Pod sessile or nearly so; joints oval.*

D. illinoense Gray. Stem erect, 2-4 feet high, uncinately pubescent; leaflets lanceolate or ovate-lanceolate, bluntish, coriaceous, scabrous above, strongly reticulated and cinereous beneath; stipules ovate, acute, persistent; pods of 3-6 oval or orbicular joints. Dry soil, prairies and woods; June-September; frequent; Fayette, Muscatine, Henry, Story, Decatur, Page, and Ringgold counties.

††† *Pods long-stalked; joints little longer than broad.*

D. dillenii Darl. Stem 2-3 feet high, glabrous or pubescent; leaflets thin, oval to oblong-ovate, obtuse, pubescent or villous beneath; stipules small, subulate; pods of 2-4 triangular joints; stipes shorter than the calyx lobes. Borders of upland woods; June-August; frequent; forms have been referred to this species from Jones, Muscatine, Lee, Johnson, Story, Chickasaw, and Fremont counties. (*M. dillenii* (Darl.) Kuntze.)

D. paniculatum DC. Stem nearly glabrous, 2-4 feet high; leaflets oblong-lanceolate or linear-lanceolate, obtuse, thin; stipules small, subulate, deciduous; pods of 4-6 obliquely triangular or rhomboidal joints. Dry woods; July-September; infrequent; Fayette, Johnson, Des Moines, Van Buren, Decatur, and Fremont counties. (*M. paniculata* (L.) Kuntze.)

† † † *Pod sessile or nearly so; joints roundish-triangular.*

D. canadense DC. Stem 2-8 feet high, pubescent; leaves petioled, the upper nearly sessile; stipules linear-lanceolate, persistent; leaflets oblong or ovate-lanceolate, obtuse, glabrous or roughish above, appressed pubescent beneath; flowers showy, larger than in any other species; pods numerous; joints triangular, back straight or convex. Upland woods: July-September; frequent. (*M. canadense* (L.) Kuntze.)

* * * *Leaves sessile or nearly so.*

D. sessilifolium T. & G. Stem 2-4 feet high, pubescent; leaflets thickish, linear or linear-oblong, obtuse at each end, nearly glabrous above, pubescent beneath; flowers small; panicle with long branches; pods with 1-3 obliquely obovate hispid joints. Prairies, infrequent; Fayette county (Fink); copses, abundant, Story county (Hitchcock); July-September. (*M. sessilifolia* (Torr.) Kuntze.)

LESPEDEZA Mx. BUSH CLOVER. Perennial herbs, with pinnately 3-foliate leaves, small stipules, and small flowers in axillary clusters, heads or panicles. Calyx 5-cleft, the lobes about equal. Stamens diadelphous, 9 and 1; anthers equal. Pod short, oval or ovoid, reticulated.

L. capitata Mx. Stem 2-4 feet high, hairy; leaves short-petioled; leaflets oblong or oval, smooth above, hairy or woolly below; flowers in short globular heads, on peduncles shorter than the leaves; pod shorter than the calyx, pubescent. Prairies; July-August; common.

L. leptostachya Engelm. Stem 1-3 feet high, simple or branched, silvery-pubescent; leaflets linear to narrowly oblong; spikes slender, loosely flowered, peduncles equalling or exceeding the leaves; pod ovate, pubescent, about equalling the calyx. Prairies; August-September; Emmet county, reported from Winneshiek, Fayette, Webster, Floyd, Story, and Lyon counties.

L. violacea (L.) Pers. Stems sparingly pubescent, clustered and mostly spreading; petioles slender, as long as the leaflets; leaflets ovate or elliptical, smooth above, minutely pubescent beneath; flowers several, in a loose panicle, violet-purple; pod ovate, nearly glabrous. Dry soil; August-September; frequent; Scott, Muscatine, Henry, Lee, Johnson, Van Buren, Appanoose, Decatur, Ringgold, and Page counties.

L. reticulata Pers. Stem erect, simple or branched; leaflets linear or linear-oblong, glabrate or pubescent beneath; flowers in dense axillary clusters, violet-purple; pod ovate, acute, glabrous or somewhat pubescent. Dry soil, woods; August; infrequent; Muscatine and Decatur counties. (*L. virginica* (L.) Britton).

VICIA L. Trailing or climbing herbs, with pinnate leaves terminating in tendrils, semi-sagittate stipules, and axillary pedunculate flowers. Calyx campanulate, 5-toothed, teeth nearly equal. Wings cohering to the middle of the keel. Stamens diadelphous, 9 and 1. Style slender, bent at right angles to the ovary, villous at the apex. Pod 2-valved, flat, 2-several-seeded.

* *Perennial; peduncle elongated, many-flowered.*

V. americana Muhl. Stem glabrous, 2-3 feet long; stipules triangular-ovate, sharply dentate; leaflets 8-14, elliptic, ovate or oblong, obtuse, slightly mucronate; corolla purplish, one-half inch long; peduncles 4-8-flowered. Rich soil, banks and woods; May-June; Winneshiek, Allamakee, Fayette, Linn, Story, Shelby, Cerro Gordo, Emmet, Lyon, and Pettawattomie counties. Some forms approach the variety *truncata* (Nutt.) Brewer, which has the leaves truncate and dentate at the apex.

V. cracca L. Plant pubescent or rarely glabrous; spike-like racemes dense, 15-40-flowered; stipules linear, entire, acute; leaflets linear or linear-oblong. Rare; reported from Story county.

V. caroliniana Walt. Glabrous or nearly so; stipules linear or oblong, entire; leaflets oblong, obtuse; peduncles loosely flowered; flowers smaller than the preceding. River banks; rare; reported from Fayette county.

** *Annual; flowers nearly sessile, 1 or 2 in the axils.*

V. angustifolia Roth. Glabrous or puberulent; stipules semi-sagittate, toothed or entire; leaflets linear, lanceolate, or oblanceolate, apex acute, truncate, or emarginate, mucronulate; pod linear, 1-2 inches long. One specimen in my collection from Winneshiek county, probably rare, introduced.

LATHYRUS L. Ours perennial climbing vines, with pinnate leaves terminating in tendrils, and solitary racemose flowers. Calyx campanulate, 5-toothed, the 2 upper teeth shorter. Wings nearly free. Stamens diadelphous, 9 and 1. Style bent at right angles to the ovary, flattish, dilated above, pubescent next the free stamen.

L. polustris L. Stem smooth or slightly pubescent, winged; stipules large, semi-sagittate, acute; leaflets 2-5 pairs, narrowly oblong to linear; flowers purple, 2-6 to each peduncle, half-inch long. Thickets; June-July; frequent; Fayette, Muscatine, Johnson, Story, Hamilton, Emmet, Lyon, and Page counties.

L. venosus Muhl. Stem firm, pubescent or glabrous, 4-angled; stipules small, slender, acute, semi-sagittate; leaflets 5-7 pairs, broadly ovate, obtuse, mucronulate; peduncles shorter than the leaves, 10-16-flowered. Wooded hillsides and banks; June-July; frequent; Winneshiek, Fayette, Scott, Floyd, Winnebago, Story, Cerro Gordo, Dickinson, Emmet, and Lyon counties.

L. ochroleucus Hook. Glabrous, somewhat glaucous; stipules large, foliaceous, semi-ovate and semi-sagittate; leaflets 3-5 pairs, ovate or oval, thin, pale beneath; flowers yellowish-white. Borders; May-July; rare; Emmet county, reported from Fayette county.

APIO Boerhaave. Ours a perennial vine, with milky juice, twining over bushes, bearing edible tubers, with pinnately 5-7-foliate leaves, minute stipules, and rather large purplish flowers in axillary racemes.

A. tuberosa Moench. Flowers in dense short racemes, brown purple, violet-scented. Rich soil, moist thickets; July-September; common; Allamakee, Scott, Muscatine, Lee, Johnson, Linn, Story, Emmet, Woodbury, Decatur, Ringgold, Taylor, and Fremont counties. (*A. apios* (L.) Mac M.)

STROPHOSTYLES Ell. Ours annual prostrate or climbing plants, with 3-foliate leaves, and flowers in capitate long-peduncled axillary clusters. Calyx 5-toothed, the 2 upper teeth more or less united. Corolla with the included stamens and style elongated, incurved. Stamens diadelphous, 9 and 1. Pod linear, elongated, nearly terete or somewhat compressed.

S. angulosa Ell. Stems 2-6 feet long, branched, retrorsely hairy; leaflets oblong-ovate, with one or the terminal with two rounded lobes near the base; pod obscurely hairy, terete, 2-3 inches long; seed quadrate, $\frac{1}{4}$ inch long, truncate, pubescent, mealy. Sandy soil; July-September; common. (*S. helveola* (L.) Britton.)

S. pauciflora (Benth.) Wats. Low, pubescent; leaflets few, oblong-linear to linear, not lobed; pod pubescent, flattish, 1-1 $\frac{1}{2}$ inches long; seeds as in the last. Sandy soil; August-September; frequent; Muscatine, Wapello, Fremont, Dickinson, and Lyon counties.

AMPHICARPAEA Ell. Trailing perennials from ovate tubers, with pinately 3-foliate long-petioled leaves, and perfect flowers in axillary racemes or solitary apetalous ones in the lower axils or on slender creeping branches. Calyx 4-5-cleft; bracts minute or none. Standard obovate, enfolding the other petals; keel and wings straightish, similar. Stamens diadelphous, 9 and 1. Style beardless. Pods of the upper flowers, flat, recurved, short-stalked, 2-3-seeded; those of the lower flowers underground, fleshy, globose, 1-seeded.

A. monoica Nutt. Pubescent or glabrate; leaflets ovate, thin, $\frac{1}{2}$ -2 inches long; stipules small, ovate; racemes nodding, purple; calyx short; pod an inch long, $\frac{1}{4}$ inch wide, hairy on the margin. Rich woodlands; August-September; frequent. (*Falcata cernosa* (L.) Kuntze.)

A. pitcheri T. & G. Villous-brown-pubescent; leaflets 2-4 inches long; pods of the large flowers frequent, pubescent, subterranean pods infrequent. Rich woodlands; August-September; frequent. (*F. pitcheri* (T. & G.) Kuntze.)

CAESALPINACEAE Kl. & Garcke. SENNA FAMILY.

Trees, shrubs or herbs, with alternate simple or compound leaves, and regular or irregular monœcious, diœcious or polygamous flowers. Calyx mostly 5-toothed or 5-parted. Petals 5, the upper enclosed by the lateral in the bud. Stamens 10 or fewer; filaments distinct or somewhat united. Fruit a legume, dehiscent into two valves.

CERCIS. Trees, with simple leaves, perfect roseate apparently papilionaceous flowers, and flat wing-margined pods.

CASSIA. Herbs, with pinnate leaves, and nearly regular perfect flowers.

GYMNOCLADUS. Trees, with bipinnate leaves, and regular polygamous or diœcious flowers. Stamens 10.

GLEDITSCHIA. Thorax trees, with 1-2 pinnate leaves, and greenish polygamous flowers. Sepals, petals, and stamens 3-5.

CERCIS L. Leaves large, ovate-cordate. Flowers reddish-purple, clustered, appearing before the leaves, on old branches. Calyx persistent, 5-toothed. Corolla imperfectly papilionaceous; wings larger than the standard and enveloping it; lower petals large, free. Pods 2-3 inches long, $\frac{1}{4}$ - $\frac{1}{2}$ inch wide, wing-margined on the upper suture.

C. canadensis L. Leaves pointed, entire, petioles somewhat shorter than the leaves; pods flat, many-seeded, veiny, nearly sessile. A small tree frequent along water courses, preferring the bluffs; April-May; Scott, Muscatine, Louisa, Des Moines, Lee, Henry, Van Buren, Jefferson, Johnson, Appanoose, Polk, Decatur, and Fremont counties.

CASSIA L. Herbs, with abruptly pinnate leaves, and mostly yellow flowers. Sepals 5, nearly equal, scarcely united at the base. Petals 5, unequal, but not papilionaceous, spreading. Stamens normally 10, sometimes fewer by abortion, often unequal; anthers opening by two terminal pores. Pods flat, 1-celled, many-seeded.

C. chamaecrista L. *Partridge Pea.* Annual, stem 1 foot high, much branched; leaflets 10-15 pairs, oblique at the base, sessile or nearly so, linear-oblong, obtuse, mucronate, a cup shaped gland situated on the petiole below the first pair of leaflets; stipules lanceolate, striate, persistent; flowers large, on slender pedicels; 2 or 3 of the petals with a purple spot at the base; anthers 10, unequal, elongated, 4 yellow, 6 purple. Sandy soil, fields and waste places; July-August; common.

C. marylandica L. *Wild Senna.* Perennial, stem 3-4 feet high; leaflets 6-9 pairs, short-stalked, oblong-lanceolate, obtuse, mucronate, a club-shaped

gland near the base of the petiole; stipules deciduous; flowers in a raceme; stamens 10, 3 upper small, imperfect; pod curved, 10-20-seeded. Low grounds; July-August; infrequent; Dubuque. Scott. Muscatine, Louisa, Linn, Appanoose, Ringgold, Page, and Fremont counties.

C. tora L. *Low Senna*. Annual; leaflets 2-4 pairs, obovate, gland between or above lowest pair; pod long and slender, strongly curved. Reported from Story county; introduced.

GYMNOCLADUS Lam. Flowers diœcious or polygamous, regular, in terminal racemes. Calyx tubular, 5-cleft, divisions linear. Petals equal, oblong, inserted on the calyx tube. Stamens 10, distinct, alternately shorter, inserted with the petals, included. Pod large, compressed, oblong, 4-8 inches long, 2 inches wide, tough, pulpy within, several-seeded.

G. canadensis Lam. *Kentucky Coffee-tree*. A large tree, with rough grayish bark, and a large pith-like center; leaves unequally bipinnate, the lower two pairs of pinnae of single leaflets, the upper of 7-13 ovate acuminate leaflets; stipules none, seeds $\frac{1}{2}$ an inch in diameter, polished. Rich soil; May-June; locally infrequent throughout the state; Allamakee, Clayton, Dubuque, Fayette, Delaware, Scott, Muscatine, Louisa, Lee, Johnson, Henry, Story, Dallas, Decatur, Fremont, Pottawattomie, Shelby, and Woodbury counties.

GLEDITSCHIA L. Trees, with pinnate or bipinnate leaves, and usually well developed thorns above the axils. Flowers polygamous, small, greenish, in spike-like racemes. Sepals 3-5, spreading, united at the base. Petals 3-5, equal in length to the sepals, the two lower sometimes united. Stamens 3-5, opposite the sepals. Pod compressed, continuous, usually pulpy between the seeds. Seeds flat.

G. triacanthos L. *Honey Locust*. A large tree; spines branched; leaflets lanceolate-oblong, alternate, obscurely serrate, pod a foot or more in length and fully an inch in width, flat, linear-oblong, often twisted, hanging, interspaces filled with a sweetish pulp; seeds flattened, globose, dark. Rich woods; June; frequent throughout the state.

MIMOSACEAE *Richenb.* MIMOSA FAMILY.

Ours a perennial herb, with alternate bipinnate leaves, small stipules, and small regular perfect greenish flowers in pedunculate axillary heads. Represented by the genus *DESMANTHUS* Willd.

D. brochylobus Benth. Stem angled, glabrous or nearly so, 1-4 feet high; pinnae and leaflets numerous; calyx campanulate, 5-toothed; petals 5, distinct; stamens 5, distinct; pods many, in a dense globose head, flat, linear, curved, 2-valved, several-seeded. Alluvial soil; June-August; frequent; Dickinson, Calhoun, and Fremont counties.

DRUPACEAE *DC.* PLUM FAMILY.

Trees or shrubs, with alternate petioled serrate leaves, and regular mostly perfect flowers which are solitary or variously clustered. The bark exudes a gum and the leaves, seed, and bark contain a bitter principle called prussic acid. Calyx inferior, deciduous, 5 lobed, the lobes imbricated in the bud. Petals 5, inserted along with the many stamens on the calyx. Style simple, stigma small, capitate. Ovary 1-celled, 2-ovuled. Fruit a drupe. Often included with the following family.

PRUNUS. Drupe glabrous; native species.

AMYGDALUS. Drupe velvety; introduced species.

PRUNUS L. PLUM CHERRY. Calyx 5-toothed, urn-shaped or campanulate, falling away after flowering. Petals 5. Stamens 15–20. Pistil 1. Ovary 1, with 2 pendulous ovules. Fruit a fleshy drupe, with a bony nucleus.

* *Flowers expanding before the leaves.*

P. americana Mars. *Wild Plum.* A shrub or small tree, 10–20 feet high, thorny; leaves oblong, ovate or obovate, serrate, sometimes doubly serrate, petioled, veiny; flowers in clusters, white, fragrant, fruit roundish, $\frac{1}{2}$ inch or more in diameter, yellowish or red, edible, skin tough. Flowers in April, fruit ripe in August; rich woods; common throughout the state.

** *Flowers expanding with the leaves.*

P. pennsylvanica L. f. *Wild Red Cherry.* A small tree, 15–30 feet high; leaves oblong-lanceolate, pointed, finely and sharply serrate, glabrous, shining on both sides; flowers white, in lateral corymbose leafless clusters; drupe globose, small, red, flesh sour. Woods; April–June; rare; Fayette county, reported from Story county.

*** *Flowers terminating leafy branches, appearing after the leaves.*

P. serotina Ehrh. *Wild Black Cherry.* Tree 20–30 feet or more high. branches reddish brown; leaves ovate-oblong or elliptical, taper pointed, serrate, teeth glandular, incurved; petioles with 2–4 glands; flowers small, white, in an elongated raceme; drupe small, black. Woods; May; common.

P. virginiana L. *Choke Cherry.* Shrub 4–15 feet high, bark grayish; leaves oval or obovate, short pointed, finely and sometimes doubly serrate, teeth slender, petioles with two glands; flowers white, in a short raceme; drupe small, red, turning dark. Woods; May; common; usually blooming a week or more before the preceeding.

AMYGDALUS L. Represented in cultivation by the Peach.

A. persica L. This species is a not infrequent escape in southern Iowa. Waysides; April; Ringgold, Fayette, Page, and Fremont counties.

ROSACEAE B. Juss. ROSE FAMILY.

Trees, shrubs, or herbs, with alternate mostly stipulate simple or compound leaves, and regular perfect or polygamo-dioecious flowers. Calyx usually 5-lobed, free or adnate to the ovary, often with a row of bractlets. Petals usually 5, sometimes none. Stamens usually many, distinct, inserted with the petals on the edge of the disk which lines the calyx-tube. Carpels 1–many. Ovary 1-celled or imperfectly 2-celled; style lateral or terminal. Commonly includes the preceeding and the following families.

* *Pistils usually 5, becoming 2–4-seeded follicles.*

SPIRAEA. Leaves simple or pinnate; flowers perfect or dioecious; pods 1-valved.

PHYSOCARPUS. Leaves palmately lobed; flowers perfect; pods 2-valved.

** *Pistils few or many, 2-ovuled, becoming 1-seeded drupelets.*

RUBUS. Pistils many; drupelets pulpy, crowded upon a spongy receptacle,

*** *Pistils few or many, 1-ovuled, becoming dry achenes.*

GEUM. Leaves interruptedly pinnate; styles persistent, often hairy or plumose.

FRAGARIA. Leaves 3-foliate; styles deciduous; receptacle enlarged and pulpy in fruit.

POTENTILLA. Leaves pinnately compound or digitate; calyx with a row of bractlets alternate with the calyx-lobes; stamens and achenes many; receptacle dry.

**** *Pistils 1–4, becoming achenes and enclosed in the dry persistent calyx-tube.*

AGRIMONIA. Flowers yellow, in long racemes; calyx bearing hooked prickles.

***** *Pistils many, becoming bony achenes and enclosed in a fleshy persistent pome-like calyx-tube.*

ROSA. Prickly shrubs or herbs; the only genus.

SPIRÆA L. Herbs or shrubs, with simple or pinnate leaves, and paniculate or corymbose flowers. Calyx 5-cleft, short. Petals 5, roundish. Stamens many. Carpels 5-8, 1-celled, 1-valved, 1-10-seeded, scarcely dehiscent or indehiscent.

S. salicifolia L. *Common Meadow-sweet*. Erect, 2-3 feet high, smooth, leafy; leaves sessile, lanceolate or oblanceolate, simply or doubly serrate; flowers white, perfect, in a dense panicle. Woods and meadows: July-August; widely distributed, frequent in the eastern counties, infrequent westward. Winneshiak, Fayette, Delaware, Jones, Scott, Muscatine, Johnson, Linn, Henry, Taylor, Page, Hancock, Cerro Gordo, Chickasaw, Winnebago, and Emmet counties.

S. aruncus L. *Goat's Beard*. A perennial glabrous herb, 3-7 feet high, with long-petioled 2-3 pinnate leaves; leaflets oval or lanceolate, sharply doubly serrate, and numerous white dioecious flowers in panicle spikes; stipules wanting; spikes slender, elongated. Rich woods; May-July; frequent; Clinton, Dubuque, Jackson, Muscatine, and Lee counties. (*Aruncus aruncus* (L.) Karst.)

S. lobata Jacq. *Queen-of-the-Prairie*. A perennial glabrous herb, 2-8 feet high, with large interruptedly pinnately 3-7-foliolate leaves, and fragrant perfect pink or purple panicle or cymose flowers; stipules serrate, persistent, reniform; capsules glabrous, 1-seeded, indehiscent. Moist soil, prairies; June-July; reported from Muscatine county. (*Ulmia rubra* Hill.)

PHYSOCAPPUS Maxim. Shrubs, with palmately lobed leaves, and corymbose white flowers. Calyx 5-cleft, persistent. Petals 5. Stamens many. Carpels 1-5, 2-valved, inflated, dehiscent.

P. opulifolius Maxim. *Ninebark*. Shrub 3-7 feet high, stems and branches slender, recurved, old bark loose and shreddy; leaves roundish, more or less 3-lobed, somewhat doubly serrate; calyx pubescent, corolla 2-3 times the length of the calyx, petals lance-oval. Rocky woods; June; infrequent: Winneshiak, Allamakee, Clayton, Fayette, Jackson, Jones, Muscatine, Henry, Johnson, Linn, and Decatur counties. (*Opulaster opulifolius* (L.) Kuntze.)

RUBUS. L. Perennial herbs or shrubs, upright or trailing, with alternate simple lobed or 3-7-foliolate leaves, adnate stipules, and perfect rarely dioecious flowers which are solitary, racemose or panicle, usually white. Calyx persistent, 5-parted, bractless. Petals 5, deciduous. Stamens many, distinct, inserted on the calyx. Carpels many, inserted on a convex or elongated receptacle. Fruit an aggregation of drupelets, edible

R. occidentalis L. *Black Raspberry*. Very glaucous, stems long, slender, recurved, often rooting at the tip, sparingly armed with stout hooked prickles; leaflets usually 3, ovate, acuminate, white pubescent beneath, coarsely doubly serrate; petals shorter than the sepals; fruit purple-black. Thickets, fence ways; May-June, fruit ripe in July; common.

R. strigosus Mx. *Wild Red Raspberry*. A shrubby biennial; not glaucous; densely clothed with weak glandular bristles, the older stems with a few hooked prickles; leaflets 3 or 5; whitish pubescent beneath; sepals and petals about equal in length; fruit light red. Dry or rocky soil; May-July, fruit ripe in July-September; infrequent; Emmet, Fayette, Delaware, Johnson, Henry, Lee, Dallas, Woodbury, and Lyon counties.

R. triflorus Richardson. *Dwarf Raspberry*. A small herbaceous unarmed annual, 6-18 inches high or trailing; stipules oval, entire or few toothed; leaflets 3 or 5, rhombic-ovate, glabrous or nearly so; fruit red purple. Reported

from Winneshiek county. (*R. americanus* (Pers.) Britton.)

R. villosus Ait. *Common Blackberry*. A perennial shrub, branched, glandular-pubescent; stems 3-6 feet high, furrowed, erect or reclining, armed with stout recurved prickles; stipules linear or lanceolate; leaflets 3 or 5, ovate or ovate-oblong, coarsely serrate, pubescent beneath; flowers numerous, racemose, petals spreading, much exceeding the sepals; fruit black. Thickets: May-June, fruit ripe July-August; common.

R. baileyanus Britton. Intermediate; stem trailing or ascending, sparingly prickly; upper leaves unifoliate; leaflets ovate or oval, pubescent, base rounded or cordate. Forms from Decatur county referred to this species.

R. canadensis L. *Dewberry*. Shrubby, trailing, somewhat prickly; bractlets 4-12 inches long, erect or ascending; leaflets 3 or pedately 5-7, oval or ovate-lanceolate, thin, cut-serrate; fruit black. Dry soil, fields and woods: April-May, fruit ripe June-July; frequent; Clinton, Muscatine, Johnson, Henry, Appanoose, and Decatur counties. The variety *invisus* Bailey, is stouter, partly ascending, leaflets larger, coarsely dentate, peduncles elongated. Dry soil; woods; Decatur county.

GEUM L. Perennial herbs, with odd-pinnate or pinnatifid leaves, and solitary or cymose-corymbose flowers. Calyx deeply 5-cleft, usually bracteolate. Petals 5, exceeding the calyx. Stamens many, inserted on a disk at the base of the calyx. Achenes many.

G. album Gmel. Stems 1-2½ feet high, glabrate to softly pubescent; stipules small, dentate; basal leaves long-petioled, 3-foliate or of 3-5 pinnately divided divisions, dentate, somewhat lobed; cauline-leaves short-petioled or sessile, 3-5-lobed or divided; flowers white; sepals lanceolate, reflexed; petals obovate, equalling or shorter than the sepals; head of fruit globose-ovoid, receptacle densely bristly-hirsute. Open woods, borders; June-August; frequent. (*G. canadense* Jacq.)

G. virginianum L. Similar to the preceding, stouter, bristly-hairy; peduncles pubescent with reflexed hairs; sepals reflexed; petals creamy-white, spreading, shorter than the sepals; receptacle glabrous or nearly so; style pubescent below. Low prairies, woods; June-July; infrequent; Fayette, Benton, Muscatine, Johnson, Decatur, Fremont, Story, Dickinson, and Lyon counties.

G. macrophyllum Willd. Stem stout, 1-3 feet high, bristly-hairy; stipules broad, foliaceous; basal leaves long-petioled, lyrate and interruptedly pinnate, terminal segment large, reniform to cordate, 3-7-lobed, lateral leaflets oval or obovate; stem-leaves short-petioled or sessile, lateral leaflets small, terminal roundish, 3-cleft, lobes cuneate-ovate, all leaflets dentate; flowers terminal, yellow; sepals reflexed, acute; petals obovate, exceeding the sepals; receptacle nearly glabrous; style pubescent below. Low grounds; May-July; infrequent; Winneshiek, Clinton, Winnebago, Cerro Gordo, and Pottawattomie counties.

G. strictum Ait. Similar to the preceding, pubescent; basal leaves interruptedly pinnate, terminal leaflet ovate or cuneate; stem-leaves of 3-5 rhombic-ovate or oblong acute leaflets; receptacle downy. Low grounds; June-August; reported from Fayette county.

G. triflorum Pursh. Hairy, scapose, 4-14 inches high; root-leaves interruptedly pinnate, divisions laciniate, scape-leaves 2 pairs, opposite; peduncles elongated, bractlets linear, exceeding the erect purple calyx-lobes; petals purple; styles long filiform, plumose in fruit. Prairies and open upland woods; May-June; infrequent; Winneshiek, Allamakee, and Fayette counties. (*G. cil-*

iatum Pursh.)

FRAGARIA L. STRAWBERRY. Stemless perennial stoloniferous hairy herbs, with trifoliolate radical leaves, and white scapose polygamo-dioecious flowers. Calyx deeply 5-cleft, with 5 narrow bractlets at the base of the sinuses giving it the appearance of being 10-cleft. Petals 5, obcordate. Stamens and styles many. Receptacle in fruit becoming globose or conical, pulpy, scarlet, bearing the dry achenes on or near the surface.

F. virginiana Duchesne. Stout, tufted, more or less villous-pubescent; leaflets obovate-cuneate, coriaceous, serrate; calyx becoming erect-spreading; achenes imbedded in pits of the oblong receptacle. Fields and woods; May-June; common.

F. vesca L. Fruiting receptacle conical, without pits; achenes projecting on the nearly even surface; fruiting calyx spreading or reflexed; leaflets thickish. Introduced; May; reported from several counties but is confused with the following species.

F. americana Porter. Villous-pubescent or glabrate, runners produced freely; leaflets thin, ovate or oval, the terminal cuneate-ovate, all incised-dentate; fruit ovoid or elongated-conic, reddish or pink, achenes borne on the even surface. Rocky woods; May-June; infrequent; forms from Winneshiek, Johnson, and Decatur counties referred to this species.

POTENTILLA L. Herbs or shrubs, with alternate stipulate compound leaves, and solitary or cymose flowers. Calyx 5-lobed, 5-bracteolate. Petals 5. Stamens many. Achenes many, collected in a head, on a dry usually pubescent or hairy receptacle.

* *Perennials; flowers white; style nearly basal.*

P. arguta Pursh. *Glandular Chinquapin*. Stem 1-4 feet high, mostly simple, glandular and brownish-hairy; basal leaves petioled, pinnately 7-11-foliolate, leaflets incised dentate, the lateral ovate, oval or rhomboid, the terminal one cuneate; stem-leaves short-petioled or sessile, leaflets fewer; flowers white, cyme dense; stamens 25-30, borne on a thick glandular disk. Prairies; June-July; common.

** *Annual or biennial, flowers yellow; style terminal.*

† *Leaves not white tomentose; stamens 5-20.*

P. norvegica L. Annual or biennial, 6-30 inches high, hirsute leaves ternate, basal and lower petioled, the upper sessile; leaflets obovate, obtuse, incisely-serrate, pubescent; flowers small, in a close leafy cyme; calyx large, lobes ovate; petals obovate, retuse, shorter than the calyx lobes; stamens 15-20. Dry soil; June-September; common. (*P. montspeliensis* L.)

P. paradoxa Nutt. Stems decumbent to erect, subvillous, 1-3 feet high; leaves mostly petioled, pinnately 5-11-foliolate; leaflets obovate or oval, obtuse; flowers in a loose leafy cyme; stamens about 20; achenes glabrous, strongly gibbous. Wet soil, shores; June-September; frequent; Cerro Gordo, Dickinson, and Woodbury counties. (*P. supina* L. of Gray's Manual.)

P. nicolletii (Wats.) Sheldon. Similar to the preceding but leaves mostly 3-foliolate; flowers falsely racemose; stamens 10-15. Reported from Iowa.

P. pentandra Engelm. Stem 1-4 feet high, erect, hirsute, branched above; basal and lower leaves petioled, 3-foliolate, the lateral leaflets deeply parted, the upper ternate; leaflets oblanceolate or oblong, obtuse, incised-dentate; flowers terminal, more or less cymose; stamens 5-8, when 5 opposite the sepals. Reported from Scott, Story, Humbolt, Woodbury, and Fremont counties.

P. leucocarpa Rydberg. A decumbent or ascending annual, 6-30 inches high, pubescent or glabrate; leaves all 3-foliolate; leaflets oblong, cuneate, thin, incisely-serrate; flowers terminal, loosely cymose; stamens about 10; achenes small, glabrous. Reported from Woodbury county. (*P. millegrana* Watson.)

P. rivalis Nutt. Stem slender, branched, villous; leaves pinnately 5-foliolate or 3-foliolate and the terminal leaflet 3-parted; cyme loose; calyx small; petals minute; stamens 10-20. Reported from Fayette and Woodbury counties.

† † *Leaves more or less white tomentose; stamens 20-25.*

P. pennsylvanica L. Stems usually erect, 15-30 inches high; leaflets 5-9, grayish-tomentose beneath, glabrous above, oblong, obtuse, incisely-pinnatifid into linear segments; flowers in a dense cyme; stamens 20-25. Reported from Lyon and Jones counties.

*** *Perennial; flowers purple; receptacle hairy, becoming large and spongy; style lateral; achenes glabrous.*

P. palustris (L.) Scop. Base decumbent, woody, perennial; stem glabrous below, pubescent above; leaves pinnate, the lower long-petioled, 5-7 foliolate; leaflets oblong or oval, serrate; flowers few, showy, in an open cyme; calyx with narrow bractlets, purple within; petals shorter, purple; stamens many. Swampy places; June-August; infrequent; Emmet, Cerro Gordo, and Hancock counties. (*Comarum palustre* L.)

**** *Shrubby perennials; receptacle and achenes villous; style attached below the middle.*

P. fruticosa L. Erect, shrubby, $\frac{1}{2}$ -3 feet high, much branched, bark shreddy; leaflets 5-7, oblong, entire, silky, margins revolute; petals yellow, orbicular; stamens 15-20. Rocky bluffs; June-September; infrequent; Winnishiek and Allamakee counties.

P. tridentata Ait. Stems tufted, woody, 1-10 inches high; leaves petioled, 3-foliolate; lower leaflets oblanceolate, cuneate toward the base, apex truncate, 3-toothed or sometimes 2-6-toothed, upper leaflets linear or oblong, often entire; petals white; stamens about 20. Rocky places; June-August; reported from Winneshiek county.

***** *Herbaceous perennials; flowers solitary, on slender axillary peduncles, yellow; styles slender, lateral achenes glabrous.*

P. canadensis L. Stems slender, prostrate or decumbent; leaves petioled, digitately 5-foliolate; leaflets oblanceolate or oblong, obtuse at the apex, serrate; stamens about 20. Dry soil, woods and fields; April-August; common.

P. anserina L. Leaves petioled, pinnate; leaflets 7-25, oblong to obovate, obtuse, serrate, white and silky-pubescent beneath. Abundant along railroad embankment at Jewel Junction, Hamilton county. (Hitchcock).

AGRIMONIA L. Perennial herbs, with alternate interruptedly pinnate leaves, and small yellow flowers in spike-like racemes. Calyx-tube inversely conical, constricted at the throat, armed with hooked prickles on the upper portion, 5-cleft, hardened in fruit, and enclosing the 2 achenes. Petals 5. Stamens 12-15. Styles terminal.

A. hirsuta (Muhl.) Bicknell. Stem 2-4 feet high, erect, simple, hairy, from fibrous roots; leaflets 5-7, with minute ones intermixed, elliptic to broadly oblong, coarsely dentate, usually glabrous below; petals twice the length of the reflexed sepals. Woods; July-August; common. (*A. eupatoria* L. of Gray's Manual.)

A. mollis (T. & G.) Britton. Stem 1-4 feet high, villous below, pubescent or canescent above, paniculately branched; roots *tuberous*; leaflets 5-11, narrowly oblong to obovate, *velvety pubescent* beneath, crenate to dentate, interposed leaf-segments mostly in single pairs. Dry woods; July-September; frequent; Johnson, Van Buren, Ringgold, and Page counties.

A. parviflora Soland. Stem 2-5 feet high, virgately branched, densely *hirsute* with brownish hairs; roots *not* tuberous; leaflets crowded, 11-19, lanceolate or linear-lanceolate, serrate; flowers numerous, in long racemes; petals small. Prairies and woods; July-September; frequent; Muscatine, Lee, Decatur, Ringgold, and Page counties.

ROSA L. Erect or climbing shrubs, usually prickly, with alternate odd-pinnate leaves, adnate stipules, and solitary or corymbose showy flowers. Calyx-tube cup-shaped or urn-shaped, constricted at the throat, fleshy in fruit, usually 5-lobed. Petals usually 5, spreading. Stamens many, inserted with the petals into the edge of the hollow annular disk. Achenes several, enclosed in the fruiting calyx-tube. A difficult genus and perfect specimens are requisite for positive determination.

* *Sepals persistent*.

R. arkansana Porter. Stems 1-2 feet high, densely prickly, infrastipular spines none; stipules narrow; leaflets 7-11, oval or obovate, sharply serrate; outer sepals lobed; fruit globose, glabrous. Prairies; June-July; common. Often mistaken for the following species.

R. blanda Ait. Stems 2-4 feet high, entirely unarmed or with a few prickles; stipules dilated; leaflets 5-7, short-stalked, oval or obovate, obtuse, serrate; sepals entire, hispid. Specimens from Emmet, Winneshiek, and Johnson counties have been referred to this species but the determinations are doubtful. The species has been reported from several localities.

R. woodsii Lindl. Stems 4-30 inches high; armed with slender straight spines or naked above; infrastipular spines present; stipules rather broad, entire; leaflets 5-9, oval or obovate, sharply serrate, somewhat glaucous beneath; sepals lobed or entire; fruit globose or globose-ovoid, glabrous, sometimes glaucous. Thicket near a swamp; Fremont county.

** *Sepals deciduous*.

R. humilis Marsh. Stems 1-3 feet high, more or less prickly, infrastipular spines present; stipules narrow; leaflets 5 or 7, ovate or obovate, coarsely and sharply serrate; outer sepals more or less lobed; fruit globose or depressed-globose, glandular hispid. Woods; May-July; frequent; Muscatine, Johnson, and Henry counties.

R. rubiginosa L. *Sweetbrier. Eglantine*. Stems 3-5 feet high, armed with stout recurved spines; leaflets 5-7, ovate or oval, doubly serrate, glandular-pubescent and resinous beneath, aromatic. Introduced; June-July; infrequent; Muscatine, Henry, and Decatur counties.

POMACEAE L. APPLE FAMILY

Trees or shrubs, with alternate petioled leaves, small free deciduous stipules, and regular perfect flowers, solitary or in cymes or racemes. Calyx 5-lobed or 5-toothed, tube adnate to the ovary. Petals usually 5, clawed. Stamens few to many. Ovary usually 5-celled. Carpels 1-5, wholly or partially united, 1-2-ovuled. Styles 1-5. Fruit a pome.

* *Cells of the ovary as many as the styles*.

PYRUS. Pome large, fleshy; carpels papery, 2-5.

CRATAEGUS. Pome small; carpels bony, 1-5.

* *Cells of the ovary apparently twice as many as the styles.*

AMELANCHIER. With us the only genus.

PYRUS L. Small trees or shrubs, with toothed or lobed leaves, and fragrant flowers in simple terminal cymes. Calyx urn-shaped, 5-cleft. Petals 5, roundish. Stamens many. Styles 2-5. Fruit a pome. with the central portion papery, 2-5-celled, each cell 2-seeded.

P. ioensis (Wood) Bailey. *Western Crab Apple*. A small tree, 10-15 feet high, bushy, often spiny; leaves ovate, oval or oblong, dentate or crenate, or often with a few rounded lobes, obtuse, white-pubescent beneath, mostly glabrous above; flowers white to rose-color, appearing with the leaves; fruit globular, about an inch in diameter, green, sour. Thickets; May; common. Usually labeled *P. coronaria* L. (*P. coronaria* var. *ioensis* Wood. *Malus ioensis* (Wood) Britton.)

P. malus L. *Common Apple*. This species is becoming a frequent escape along roadsides and in waste places. Observed in Appanoose, Decatur, Ringgold Union, Adams, Page, Montgomery, and Pottawattomie counties.

CRATAEGUS L. Thorny trees or shrubs, with alternate petioled serrate lobed or pinnatifid leaves, and usually white flowers in terminal corymbose clusters. Calyx urceolate or campanulate, limb 5-cleft. Petals 5. Stamens many. Ovaries 1-5, with corresponding number of styles. Pome drupe-like, containing 1-5 bony carpels.

* *Leaves obovate, spatulate or oblanceolate.*

C. crus-galli L. *Cockspur Thorn*. Shrub or small tree, 8-25 feet high; branches grayish, horizontal; thorns long and slender; leaves cuneate-obovate, coriaceous, dull green, glabrous on both sides, serrate above the middle; corymbs many-flowered, pedicels and calyx glabrous; fruit globular. Thickets; May; common.

C. punctata Jacq. Similar to the preceding; leaves obovate, short-pointed or obtuse, cuneate toward the base and entire below, irregularly serrate, slender petioled, glabrous above, mostly pubescent beneath; corymbs many-flowered; calyx and pedicels mostly pubescent; fruit globose or oval. Thickets; May; frequent; Allamakee, Fayette, Webster, Story, Cerro Gordo, and Emmet counties.

* * *Leaves ovate or broadly oval or somewhat orbicular.*

† *Leaves pubescent, especially on the veins beneath.*

C. mollis (T. & G.) Scheele. A small tree or shrub, 10-25 feet high; leaves usually broadly ovate, base *truncate*, incised, sharply serrate, teeth gland-tipped, rough above, very pubescent beneath; twigs, petioles, pedicels, and calyx densely pubescent. Rich woods, thickets; April-May; common. (*C. coccinea* var. *mollis* T. & G.)

C. tomentosa L. Ranging from 10-25 feet high; spines stout; leaves ovate-oval or broadly oval, acute or acutish, sharply serrate, frequently incisely lobed, base *tapering* or *cuneate*, petioles margined; twigs, shoots, and lower surface of the leaves, especially along the veins pubescent or villous-pubescent; flowers small, ill-scented. Lowlands woods, thickets; May-June; frequent.

†† *Leaves glabrous or nearly so; teeth mostly gland-tipped.*

C. rotundifolia (Ehrh.) Berek. A shrub or small tree similar to the preceding, but with slender spines, and mostly smaller leaves which are oval or obovate, slender-petioled, glabrous or nearly so, base *tapering* or *cuneate*, incised-serrate or somewhat lobed. Uplands; April-May; infrequent; Johnson county.

C. coccinea L. Spines stout; leaves ovate or orbicular, apex acute or acuminate, base *truncate* or *subcordate*, thin, sharply incised and serrate; flowers numerous. Woods, thickets: April-May: common: Johnson county. The species has been reported from many localities but is confused with *C. mollis* (T. & G.) Sheele.

AMELANCHIER Medic. Small trees or shrubs, with simple alternate petioled leaves, and white racemose flowers. Calyx 5-cleft, the lobes reflexed, persistent. Petals 5, oblong-spatulate or oblong. Stamens short, many. Styles 5, united below. Fruit a berry-like pome, 5-celled, each cell with a false partition, thus apparently 10-celled, and each cell 2-seeded.

* *Leaves usually serrate all around.*

A. canadensis (L.) Medic. *Junc-berry*, *Service-berry*. A small tree, usually 10-25 feet high; leaves ovate or oval, acute or acuminate, base rounded or cordate, sharply or finely serrate, sparingly pubescent when young, soon glabrous; racemes spreading or drooping, pedicels slender, long; petals linear-oblong to linear-spatulate, 3-4 times the length of the calyx; pome globose, red or purple, on long slender pedicels. Wooded bluffs: April-May, fruit ripe in July; frequent: Winneshiek, Allamakee, Fayette, Delaware, Johnson, Story, and Decatur counties.

A. botryapium (L. f.) DC. Usually a small shrub, with leaves and racemes densely white-woolly when young, often glabrous when old; leaves oblong, oval to obovate, acute, base rounded or narrowed, sharply serrate; raceme dense, short; pedicels short; petals spatulate, 2-3 times the length of the calyx-lobes. Wooded bluffs; April-May; infrequent; Fayette and Johnson counties. (*A. canadensis* var. *oblongifolia* T. & G.)

** *Leaves dentate above the middle.*

A. alnifolia Nutt. A shrub, 3-7 feet high, mostly glabrate, somewhat glaucous; leaves thickish, broadly elliptical to nearly orbicular, obtuse or sometimes truncate at the apex, base rounded or subcordate, coarsely dentate above; raceme short, dense; pedicels short; petals cuneate-oblong. Dry soil; April; infrequent; Winnebago county; reported from Winneshiek county.

SAXIFRAGACEAE *Dumort.* SAXIFRAGE FAMILY.

Herbs or shrubs, with alternate or opposite usually exstipulate leaves, and mostly regular flowers. Calyx of 4 or 5 distinct or slightly united sepals. Petals as many as the sepals and alternate with them or none. Stamens 4 or 5, inserted alternately with the petals, or twice the number of the petals. Fruit a capsule or a berry.

* *Herbs; leaves usually alternate.*

SAXIFRAGA. Flowers perfect; stamens 10; ovary 2-celled.

SULLIVANTIA. Flowers perfect; stamens 5; ovary 2-celled; seeds wing-margined.

MITELLA. Calyx adnate to the base of the 1-celled ovary; petals pinnatifid; stamens 10.

HEUCHERA. Calyx adnate to the base of the 1-celled ovary; petals small, entire; stamens 5; carpels 2.

CHRYSOSPLENIUM. Petals wanting; stamens 10; styles 2.

PARNASSIA. Flowers showy, terminal; fertile stamens 5, sterile stamens clustered at the base of the petals.

* *Shrubs; leaves opposite.*

HYDRANGEA. Flowers in compound cymes; stamens 8 or 10.

SAXIFRAGA L. Perennials, with simple leaves, in ours clustered at the root, and perfect flowers. Sepals 5, more or less connivent. Petals 5, entire, inserted on the calyx-tube, imbricated in the bud. Stamens 10; anthers 2-celled. Styles 2. Ovary 2-celled. Capsule 2-celled, 2-beaked.

S. pennsylvanica L. Scape 1-3 feet high, downy-pubescent; leaves oblong-lanceolate, entire or denticulate, petiole broad; flowers cymose-paniculate; calyx adnate to the base of the ovary, lobes recurved; petals greenish, linear-lanceolate, but little exceeding the calyx; capsule diverging by the beaks into nearly separate foliicles. Moist meadows and woods; May-June; frequent; Winneshiek, Allamakee, Fayette, Scott, Linn, Johnson, and Cerro Gordo counties.

SULLIVANTIA T & G. Perennials, with lobed or cut-toothed petioled rounded leaves, and small white flowers in a loose cymose-panicle. Calyx campanulate, adherent to the base of the ovary, 5-cleft. Petals 5, oblanceolate, twice the length of the calyx. Stamens 5, included. Capsule 2-celled, 2-beaked, with many wing-margined seeds.

S. ohionis T. & G. Stem low, 4-10 inches high, weak, nearly leafless; leaves palmately veined. Limestone cliffs; May-August; infrequent; Jones, Delaware, Jackson, and Cedar counties. (*Sullivantia sullivantia* (T. & G.) Brit.)

MITELLA L. Perennials, with alternate radical leaves and opposite cauline leaves, and small flowers in a slender spike. Calyx 5-cleft, short, adnate to the base of the ovary. Petals 5, pinnatifid. Stamens 10, included. Styles 2, short. Capsule 1-celled, 2-beaked, opening by two equal valves.

M. diphylla L. *Bishop's cap* or *mitre-wort*. Stem hairy, 8-16 inches high; leaves cordate acute, dentate, sublobate; radical leaves long-petioled, cauline leaves 2; very short-petioled; flowers white. Rich woods; May-June; frequent; Winneshiek, Fayette, Scott, Muscatine, Henry, and Johnson counties.

HEUCHERA L. Perennials, with long-petioled radical leaves, and greenish or purplish flowers in small clusters, paniculate. Calyx campanulate, 5-cleft, segments obtuse, tube adnate to the base of the ovary. Petals 5, small, spatulate, entire, inserted with the 5 stamens on the throat of the calyx. Styles 2. Capsule 1-celled, 2-beaked, opening between the beaks.

H. hispida Pursh. Stem 2-4 feet high; stem, petioles, and veins hirsute with long spreading hairs; leaves rounded, cordate at the base, 5-9-lobed, toothed; flowers greenish, oblique; stamens exserted. Prairies; May-June; common.

CHRYOSPLENIUM L. Stems low. Calyx 4-5-lobed, yellow inside, adnate to the ovary. Petals wanting. Stamens 8-10, short. Styles 2. Capsule obcordate, 1-celled, 2-valved, many-seeded.

C. alternifolium L. *Golden Saxifrage*. Found in a deep ravine among moss; Winneshiek county, the only locality in the state.

PARNASSIA L. Scape-like perennials with solitary terminal flowers. Calyx deeply 5-parted, imbricated in the bud, persistent. Petals 5, spreading, white, imbricated in the bud. Fertile stamens 5, alternate with the petals, sterile stamens in clusters at the base of the petals. Stigmas 4, sessile. Ovary 1-celled, with 4 parietal placentæ. Seeds winged.

P. caroliniana Mx. Scapes glabrous, 10-20 inches high, with one sessile leaf near the base; radical leaves petioled, round-oval; sterile stamens in each cluster 3, gland-tipped; petals ovate, obtuse, greenish veined, 3-4 times the length of the sepals. Wet meadows and river banks; June-August; infrequent; Emmet, Fayette, Muscatine, Johnson, and Story counties.

HYDRANGEA L. Shrubs, with opposite petioled exstipulate leaves, and corymbose often apetalous flowers. Calyx-tube hemispheric, adnate to the ovary, 8-10-ribbed, 4-5-lobed. Petals 4-5. Stamens 8-10, inserted on the disk. Styles 2, diverging. Ovary 2-4-celled. Capsule membranous, 2-celled, many-seeded, about 15-ribbed.

H. arborescens L. *Wild Hydrangea*. A shrub, 4-10 feet high, with ovate pointed serrate leaves, and mostly fertile flowers in cymes. Reported from Lee county.

GROSSULARIACEAE *Dumort.* GOOSEBERRY FAMILY.

Low shrubs, with alternate palmately-lobed single or clustered leaves, and solitary or racemose flowers. Calyx 5-lobed, adherent to the ovary, withering persistent. Petals 5, small. Stamens 5, alternate with the petals, inserted with the petals on the top of the calyx-tube. Styles 2, distinct or united. Ovary 1-celled, with 2-parietal placentæ. Fruit a berry. Represented by the genus *RIBES* L.

* *Peduncles axillary, solitary, 1-3-flowered.*

R. gracile Mx. *Common Wild Gooseberry*. Stems recurved, often with long and stout red thorns: leaves rounded: lobed and incised; flowers whitish; calyx-tube short and narrow; calyx-lobes oblong-linear, filaments slender, connivent or parallel, much exerted; berry smooth. Woods: May; common.

R. cynosbati L. *Prickly G.* Leaves similar to the preceding, pubescent; calyx campanulate, tube longer than the lobes, stamens and style not exerted, styles united; berry armed with long spines. Woods: May; frequent; Winneshiek, Clayton, Dubuque: Fayette, Delaware, Scott, Muscatine, Henry, Johnson, Story, Dallas, Webster, and Cerro Gordo counties.

R. oxyacanthoides L. Flowers greenish or purplish, peduncles short; stamens not exceeding the oblong calyx-lobes. Hillsides; April-May; reported as frequent from Delaware and Henry counties.

** *Flowers in drooping racemes.*

R. floridum L'Her. *Wild Black Currant*. Stems without thorns or prickles: leaves heart-shaped, 3-5-lobed, toothed: flowers large, whitish; bracts longer than the pedicels: stamens and style short; berry smooth, black. Woods: May; frequent: Winneshiek, Allamakee, Clayton, Delaware, Scott, Muscatine, Fayette, Johnson, Emmett, Story, Winnebago, Floyd, Cerro Gordo, Lyon, Woodbury, and Taylor counties.

R. rubrum L. *Red Currant*. Fruit globose, red. This species is the common garden currant, occasionally an escape.

R. aureum Pursh. *Golden, Buffalo, or Missouri Currant*. Shrub 5-12 feet high, with 3-5-lobed, leaves, and showy golden-yellow flowers in short racemes. Frequent in cultivation, occasionally spontaneous; April-May.

CRASSULACEAE *DC.* ORPINE FAMILY.

Herbs with cymose flowers. Sepals and pistils of the same number. Petals as many as the sepals or wanting. Stamens twice as many as the sepals. Fruit capsular, dehiscent.

PENTHORUM. Plants not succulent; carpels united.

SEDUM. Plants very succulent; carpels distinct.

PENTHORUM L. Perennials, with leafy stems, and yellowish green apetalous flowers. Sepals and pistils 5. Stamens 10. Fruit of 5 one-celled carpels, united at the base, each horned above. Seeds small, many.

P. sedoides L. *Ditch Stonewort*. Stem 1-3 feet high: leaves scattered, sessile, lanceolate, tapering both ways, serrate. Common in wet soil; July-September.

SEDUM L. Leaves thick, succulent, sepals, petals, and pistils 4-5. Stamens 8-10. Carpels distinct, many-seeded.

S. telephium L. *Orpine. Live-forever*. A glabrous somewhat glaucous

perennial with ovate to obovate, obtuse, coarsely dentate leaves, and purple flowers in a dense cyme. A rare garden escape observed in Muscatine and Johnson counties.

HAMAMELIDACEAE *Lindl.* WITCH HAZEL FAMILY.

Small trees, with alternate simple petioled pinnately-veined leaves, deciduous stipules, and axillary clustered or capitate flowers. Calyx superior, imbricated in the bud, deciduous. Petals inserted on the calyx, valvate in the bud, deciduous. Ovary 2-celled. Styles 2, distinct. Represented with us by the genus *HAMAMELIS* L.

H. virginiana L. *Witch-hazel*. Tree 10-20 feet high; leaves oval or obovate, wavy-toothed; flowers yellow; calyx 4-parted, with 3 scale-like leaves immediately below; petals 4, long-linear; stamens 8, 4 fertile and alternate with the petals, the remainder sterile; fruit a 2-celled woody capsule, opening at the top, cells 1-seeded; seeds pendulous. Wooded ravines; flowers appearing in October and the fruit the following July; infrequent; Clayton, Dubuque, and Delaware counties.

HALORAGIDACEAE *Kl. & Garcke.* WATER-MILLFOIL FAMILY.

Marsh or aquatic plants. Leaves alternate, opposite or whorled, entire or toothed; submerged leaves pinnately divided into narrow segments. Flowers solitary, fascicled or whorled, sessile. Calyx superior; tube coherent with the ovary. Petals small, inserted on the calyx, alternate with its segments. Calyx and corolla sometimes wanting. Stamens 1-8, inserted with the petals. Ovary inferior, with 2-4 1-ovuled cells.

MYRIOPHYLLUM. Leaves whorled; flowers monœcious or polygamous, the parts in fours.

PROSERPINACA. Leaves alternate; flowers perfect, the parts in threes.

CALLITRICA. Leaves opposite; flowers monœcious; sepals and petals wanting.

MYRIOPHYLLUM L. *WATER MILLFOIL*. Perennial aquatics. Leaves crowded or whorled, the submerged dissected into capillary divisions. Flowers monœcious or polygamous in the axils of the upper leaves; the upper staminate. Stamens 4-8. Fruit nut-like, 4-lobed, 4-celled.

M. scabratum Mx. Stem slender; leaves in whorls of 4 or 5, lower pinnately parted, floral linear, toothed or serrate; stamens 4. Shallow lakes; July; frequent; Muscatine, Appanoose, Ringgold, and Fremont counties. (*M. pinnatum* (Walt.) B. S. P.)

M. heterophyllum Mx. Stem stout; leaves in 4's and 5's; floral leaves ovate or lanceolate, crowded, serrate, stamens 4. Lakes; July; Winnebago, Cerro Gordo, and O'Brien counties.

M. spicatum L. Leaves mostly pinnately-parted, capillary; floral leaves small, shorter than the flowers, ovate, entire or toothed; flowers in an interrupted spike; petals deciduous; stamens 8. Ponds; July; Muscatine, Cerro Gordo, Story, and Dickinson counties.

PROSERPINACA L. Perennial aquatics, with alternate lanceolate leaves, and perfect small sessile axillary flowers. Calyx 3-sided, adnate to the ovary, limb 3-parted. Petals wanting. Stamens 3-4. Stigmas 3, cylindrical. Fruit bony, 3-4-angled, 3-4-celled, 3-4-seeded.

P. palustris L. *Mermaid weed*, Glabrous, mostly simple; emersed leaves oblong or linear-lanceolate, sharply serrate; the immersed leaves pectinate or pectinate-pinnatifid, the segments linear, stiff, acute, often serrulate, flowers

solitary or several together; fruit sharply angled. Ponds; July; rather rare; Muscatine, Story, and Boone counties.

CALLITRICHE L. Leaves spatulate or linear, opposite. Flowers monœcious. 1-3 together, axillary, sessile. Sepals and petals wanting. Sterile flowers with one stamen: anther cordate, 4-celled, becoming 1-celled. Ovary 4 celled. Styles 2, distinct. Fruit nut-like, 4-lobed, 4-celled, membranous, indehiscent.

C. verna L. Perennial; floating leaves tufted, obovate, 3-nerved, narrowed into a petiole; submerged leaves linear; flowers usually between a pair of bracts: fruit ovate, styles shorter than the fruit. In a slough near Cedar river, Muscatine county; June-September. (*C. palustris* L.)

C. heterophylla Pursh. Similar to the preceding species: floating leaves broadly spatulate, often retuse, narrowed into a petiole; fruit obovate; styles longer than the fruit. Wet slough; July; infrequent; Decatur county.

MELASTOMACEAE *R. Br.* **MEADOW-BEAUTY FAMILY.**

Herbs with opposite parallel-veined leaves and perfect regular cymose flowers. Petals inserted on the calyx-throat, alternate with the calyx-lobes, stamens inserted with the petals, double their number; anthers opening by pores at the apex. Represented with us by the genus **REXIA** L.

R. virginica L. *Meadow-Beauty*. Stem 1-2 feet high, square, angles somewhat winged, rootstock tuberiferous; leaves with 3-5 nerves, sessile, acute, oval-lanceolate, nerves and margin more or less bristly; flowers peduncled, bright, purple: calyx persistent 4-cleft, lower portion of the tube coherent with the ovary, the upper free; petals 4; stamens 8; anthers long-linear, 1-celled, with a short spur near the filament; fruit a capsule, 4-celled, with 4 placentæ from the central axis, many-seeded. In swampy places along Cedar river; July; Muscatine county.

LYTHRACEAE *Lindl.* **LOOSESTRIFE FAMILY.**

Herbs, with mostly opposite entire exstipulate leaves and axillary or whorled flowers. Calyx free from the ovary but enclosing it, persistent, 4-7-toothed. Petals inserted on the top of the calyx-throat, equal in number to the calyx-teeth, deciduous. Stamens 4-14, inserted on the calyx-tube. Style 1; stigma capitate. Capsule 2-4-celled, with axial placentæ, many-seeded.

** Flowers regular.*

LYTHRUM. Flowers rarely solitary; calyx tubular; petals usually 6.

AMMANNIA. Flowers solitary; calyx globular; petals and stamens usually 4.

RODALA. Flowers solitary; sinuses of the calyx appendaged; petals and stamens 4.

DIDIPLIS. Flowers solitary; petals none; stamens 4.

*** Flowers irregular.*

CUPHEA. Calyx more or less spurred; petals 6; stamens 11 or 12.

LYTHRUM L. Leaves opposite or scattered, sessile. Flowers purple, solitary, axillary. Calyx tubular, striated, 5-toothed, with appendages in the sinuses. Petals 5-7. Stamens 5-14. Capsule oblong, 2-celled.

L. alatum Pursh. *Wing-angled Loosestrife*. Perennial, smooth; stem 1-3 feet high, with many long slender branches; leaves oblong-ovate to linear-lanceolate, acute, base rounded or cordate, the upper mostly alternate; petals deep purple; stamens of the short styled flowers exserted. Rich soil; July-August; common.

AMMANNIA L. Low smooth herbs, with opposite narrow leaves, and sub-

sessile cymose axillary flowers. Calyx globular, 4-angled, 4-toothed; sinuses with horn-like appendages. Petals 4, purplish, deciduous. Stamens 4-8. Capsule globular 2-4-celled.

A. coccinea Rottb. Stem 4-8 inches high, branched from below; leaves linear-lanceolate; stamens more or less exserted; style slender, elongated. Swampy places, shores; July-September; infrequent; Muscatine, Louisa, Johnson, Decatur, Story, and Lyon counties.

ROOTALA L. Low herbs. Calyx semiglobose or campanulate; sinuses with tooth-like appendages. Petals and stamens 4. Capsule globular, 4-celled.

R. ramosior (L.) Koehne. Stem 5-6 inches high, smooth, simple; leaves linear-oblongate, opposite, tapering to a petiole; flowers solitary, axillary, sessile; appendages shorter or as long as the calyx-teeth. Low wet places; July-September; infrequent; Muscatine, Henry, Benton, and Lyon counties.

DIDIPLIS Raf. Aquatic or marsh plants, with opposite leaves, 4-angled stems, and mostly solitary axillary flowers. Calyx 4-lobed, appendages none. Petals wanting. Stamens usually 4, inserted on the calyx-tube. Capsule globose, 2-celled.

D. linearis Raf. A low glabrous much branched plant, 2-6 inches long; leaves long-linear or lanceolate, mostly sessile; flowers small, greenish; calyx-lobes broad, triangular; style short; capsule small. Mud flats, shallow water; June-August; infrequent; Decatur and Ringgold counties. (*D. diandra* (Nutt.) Wood.)

CUPHEA P. Br. Herbs, with opposite or verticillate leaves, and axillary irregular unsymmetrical flowers. Calyx tubular, gibbous or spurred at the base, apex 6-toothed, with 6 appendages, mouth oblique. Petals 6, unequal. Stamens 11 or 12, inserted on the throat of the calyx, unequal. Capsule oblong, included, 1-celled, dehiscent.

C. viscosissima Jacq. An erect viscid-pubescent annual, 6-20 inches high, branched; leaves ovate-lanceolate, slender petioled, apex bluntish, base rounded; flowers purple, axillary, short-peduncled; petals ovate, clawed. Dry soil; July-September; reported as belonging to the flora of Iowa by Arthur. (*Parsonia petiolata* (L.) Rusby.)

ONAGRACEAE *Dumort.* EVENING-PRIMROSE FAMILY.

Herbs, with alternate or opposite leaves, and perfect symmetrical flowers. Calyx herbaceous or colored, of 4 lobes, rarely less, valvate in the bud, tube cohering with the ovary. Stamens as many or twice as many as the petals and inserted with them on the top of the calyx-throat; anthers 2-celled, introrse; pollen grains often cohering by threads. Ovary inferior, 4-celled. Fruit a 2-4-celled many-seeded capsule.

* *Parts of the flower in fours.*

† *Calyx-tube not prolonged beyond the summit of the ovary; fruit dehiscent.*

LUDWIGIA. Leaves opposite or alternate, stamens 4; capsule short.

†† *Calyx-tube prolonged beyond the summit of the ovary; fruit dehiscent.*

EPILOBIUM. Leaves often opposite; seeds silky tufted.

OENOTHERA. Leaves alternate; seeds naked.

††† *Fruit indehiscent.*

GAURA. Filaments appendaged at the base; fruit indehiscent.

** *Parts of the flower in twos.*

CIRCAEA. Sepals, petals, and stamens 2; fruit bristly.

LUDWIGIA L. Perennial herbs, with opposite or alternate leaves, and solitary axillary flowers. Calyx-lobes, petals, and stamens 4, or petals wanting. Capsule short, many-seeded.

L. alternifolia L. *Seed-box*. Stem 2-3 feet high, branched, smoothish slightly wing-angled; leaves lanceolate to linear-lanceolate, alternate, sessile; flowers short peduncled; calyx-lobes ovate, acute, reddish; petals yellow; capsule cubical, wing-angled. Damp soil; June-August; rare; Johnson, and Decatur counties.

L. polycarpa Short & Peter. Stem 2-4 feet high, glabrous; leaves narrowly lanceolate, alternate, sessile, tapering both ways, those of the runners oblong spatulate; flowers small, sessile; capsule 4-sided, longer than the calyx-lobes, with 2-linear awl-shaped bractlets from the base. Borders of ponds and in shallow water; July-September; frequent; Fayette, Scott, Muscatine, Johnson, Story, Appanoose, Decatur, Ringgold, and Taylor counties.

L. palustris (L.) Ell. *Marsh or Water Purslane*. Stem smooth, creeping or floating; leaves ovate or oval, petioled, opposite; calyx-lobes short; petals small or wanting, reddish in terrestrial forms; capsule oblong, 4-sided, sessile. Wet places; July-September; infrequent; Fayette, Muscatine, Johnson, Benton, and Emmet counties. (*Isnardia palustris* L.)

EPILOBIUM L. Mostly perennials. Leaves nearly sessile, opposite or scattered. Flowers violet, purple, or white. Calyx-tube scarcely prolonged beyond the ovary; limb 4-5-lobed, deciduous. Petals 4. Stamens 8, with short anthers. Capsule linear, many-seeded. Seeds with a tuft of long hairs at the end, the coma.

E. angustifolium L. *Great Willow-herb*. *Fire-weed*. Stem simple, 4-6 feet high, glabrous or finely pubescent; leaves scattered, mostly entire, narrowly lanceolate, tapering both ways; flowers large, purple, in a long raceme; calyx-limb deeply parted; petals entire; lobes of the stigma long. Rich woods; June-September; frequent; Dubuque, Scott, Johnson, Winnebago, and Shelby counties. (*Chamaenerion angustifolium* (L.) Scop.)

E. coloratum Muhl. Stem 1-3 feet high, much branched, 4-angled, hoary pubescent; leaves lanceolate, contracted to slender petioles or sessile, acuminate, sharply serrulate or denticulate, lower opposite; flowers small, pale, somewhat nodding, short-peduncled; coma reddish-brown. Low grounds; July-September; common.

E. adenocaulon Haussk. This species resembles the preceding; leaves lanceolate or ovate-lanceolate, somewhat serrulate or denticulate; inflorescence and capsules glandular-pubescent; coma white. Wet places; July-September; frequent; Johnson, Story, Hamilton, Floyd, Hancock, Dickinson, and Emmet counties.

E. lineare Muhl. Stems somewhat branched, mintely hoary-pubescent; leaves numerous, linear or linear-lanceolate, short-petioled; flowers many, small, pale; capsules hoary; coma dingy. Wet places; July-September; infrequent; Fayette, Scott, Story, Hamilton, and Emmet counties.

OENOTHERA L. EVENING PRIMROSE. Leaves alternate. Calyx-tube prolonged beyond the ovary, deciduous, limb of 4 reflexed lobes. Petals 4, yellow in our species. Stamens 8; anthers linear, versatile.

OE. biennis L. Stem 1-5 feet high, sometimes branched, pubescent or hairy; leaves lanceolate or ovate, tapering both ways, acuminate, remotely toothed, the lowest petioled; flowers in a leafy spike; calyx-tube long; cap-

sules oblong, pubescent or hirsute, sessile, seeds prismatic-angled. Fields and waste places; July–September; common. (*Onagra biennis* (L.) Scop.)

OE. rhombipetala Nutt. Stem 1–4 feet high; simple, appressed pubescent; leaves narrowly lanceolate to linear, entire or denticulate, the lowest tapering to a petiole; flowers in a leafy or bracted spike; calyx silky canescent; petals rhombic-ovate; capsules linear; seeds obovoid, not angled. Sandy soil, prairies; July–September; Muscatine county, reported from Fayette, Story, and other counties, often confused with the preceding.

OE. fruticosa L. *Sundrops*. Biennial or perennial; stem 1–3 feet high, branched, villous to nearly glabrous; leaves oblong-lanceolate, entire or denticulate; flowers in a loose corymb; capsule short-pedicelled, ribbed and winged. Low grounds; June–August; infrequent; Muscatine, Johnson, and Henry counties. (*Kneiffia fruticosa* (L.) Raimann.)

OE. serrulata Nutt. Stem 6–16 inches high, perennial, woody below, canescent or glabrous; leaves mostly linear or lanceolate, irregularly and sharply denticulate; flowers axillary; calyx-tube funnelform, nerved; petals obovate, crenulate. Dry soil, pastures and waysides; June–July; frequent; Winneshiek, Allamakee, Fayette, Story, Shelby, Fremont, Cerro Gordo, Hancock, Dickinson, Ida, Emmet, Sioux, Woodbury, and Lyon counties. (*Merioltia serrulata* (Nutt.) Walp.)

GAURA L. Leaves alternate, sessile. Flowers white or rose-color, in spikes or racemes. Calyx-tube much prolonged beyond the ovary, deciduous; calyx-lobes 4, reflexed. Petals 4, unequal, clawed. Stamens usually 8. Stigma 4-lobed. Fruit nut-like, indehiscent, 1-celled, 1–4-seeded.

G. biennis L. Stem 3–6 feet high, much branched, villous or downy-pubescent; leaves oblong-lanceolate or lanceolate, remotely denticulate; flowers sessile, white, turning pink, in numerous slender spikes; fruit sessile, 4-ribbed, oval or oblong, villous pubescent. Fields and waste places; July–September; common.

G. coccinea Pursh. Stem 6–20 inches high, erect or ascending, much branched, canescent, pubescent or glabrate; leaves oblong-lanceolate to linear-oblong, entire, repand or denticulate; flowers sessile, red, turning scarlet; fruit sessile, terete below, 4-sided above, canescent. Dry soil, prairies; May–August; frequent; Woodbury, Harrison, Monona, and Fremont counties.

G. parviflora Dougl. Stem 2–6 feet high, villous-pubescent; leaves ovate-lanceolate, acuminate, repand-denticulate, base narrowed, softly pubescent; flowers many, pink, sessile, in an elongated spike; fruit sessile, 4-nerved, obtusely 4-angled, glabrous or nearly so. Meadows and fields; May–August; frequent; Woodbury, Harrison, Pottawattomie, and Fremont counties.

CIRCAEA L. Perennials, with opposite petioled thin leaves, and small whitish racemose flowers. Calyx-tube slightly prolonged, the end filled by a cup-shaped disk, deciduous. Petals 2, obcordate. Stamens 2. Fruit small, bur-like, indehiscent, clothed with white hooked hairs.

C. lutetiana L. Stem simple, 1–2 feet high; leaves ovate, long-petioled, base rounded, acuminate, entire or slightly toothed; bracts none; fruit 2-celled, slender pedicelled, bristly. Rich woods; June–August; common.

C. alpina L. Stem weak, 3–9 inches high; leaves cordate, thin, shining, coarsely toothed; bracts minute; fruit 1-celled, obovate-oblong, soft hairy. Rich woods; June–August; infrequent; Winneshiek, Clayton, and Muscatine counties.

LOASACEAE *Reichenb* LOASA FAMILY.

Erect herbs, with stinging or viscid pubescence, alternate or opposite exstipulate leaves, and regular perfect solitary or cymose flowers. Calyx-tube adnate to the ovary, limb 4-5-lobed, persistent. Petals 4-10, inserted on the throat of the calyx. Stamens many, inserted with the petals. Ovary 1-celled, with 1-3 parietal placenta. Capsule 1-celled. Represented in our flora by the genus *MENTZELIA* L.

M. ornata T. & G. Stem stout 1-2 feet high, roughish-pubescent; leaves sessile, or lower petioled, oval to lanceolate or oblong, sinuate-pinnatifid, flowers usually solitary, terminal, yellowish white, opening in the evening, petals 10, twice as long as the calyx-lobes; capsules oblong. Sandy and rocky bluffs along the Big Sioux river, Cedar Bluffs: June-September; common; Woodbury county. (Pammel) (*M. decapetala* (Pursh.) Urban & Gilg.)

CUCURBITACEAE *B. Juss.* GOURD FAMILY.

Climbing or trailing succulent herbs with tendrils. Leaves alternate, petioled, palmately lobed, palmately veined. Flowers monœcious or diœcious, axillary, sometimes gamopetalous. Calyx usually campanulate, 5-toothed or 5-lobed, imbricated in the bud. Corolla monopetalous, rotate or campanulate. Stamens 5 or 3, of which one is usually 1-celled. Stigmas 2 or 3. Ovary inferior, 1-celled, with 3 parietal placenta. Represented in cultivation by the gourd, pumpkin, melon, squash, cucumber, etc.

ECHINOCYSTIS. Fruit echinate, 4-seeded.

SICYOS. Fruit prickly, 1-seeded.

ECHINOCYSTIS T. & G. Annuals with 3 forked tendrils, climbing high. Flowers monœcious, small, greenish white; the sterile in a long compound raceme, the fertile solitary or in small clusters; petals 6; anthers 3, more or less united; stigmas 2; fruit fleshy, inflated, becoming dry, bursting above, clothed with weak prickles, 4-seeded.

E. lobata T & G. *Wild Cucumber*. Leaves broad, thin, sharply and deeply 5-lobed; fruit oval, spines nearly half an inch long; seeds black. Low grounds along waterways: July-September: common. (*Micrampelis lobata* (Mx.) Greene.)

SICYOS L. Annuals with 3 forked tendrils, climbing high. Flowers monœcious, from the same axil, small, whitish. Petals 5, united below. Anthers cohering in a mass. Style slender, with 3 stigmas. Ovary 1-celled, with a single suspended ovule. Fruit ovate, dry, indehiscent, filled by the seed, spiny.

S. angulatus L. *One-seeded Bur-Cucumber*. Clammy hairy; leaves roundish cordate, with 5 pointed angles or lobes. Rich soil, along rivers and in waste places: July-September: frequent: Scott, Muscatine, Louisa, Des Moines, and Dallas counties.

CACTACEAE *Lindl.* CACTUS FAMILY.

Ours green and fleshy plants, with flattened and joined stems armed with spines and prickles, and solitary sessile flowers. Sepals, petals, and stamens numerous, their bases cohering and adnate to the inferior 1-celled many-ovuled ovary. Fruit a 1-celled berry. Represented in our flora by the genus *OPUNTIA* Mill.

O. rafinesquii Engelm. *Prickly Pear*. Prostrate, green; joints obovate to suborbicular or oval; leaves spreading, subulate; spines axillary, 1-5 together; prickles tufted, axillary, reddish brown; flowers large, yellow, with a reddish center; stamens shorter than the petals; stigmas 4-10; fruit fleshy, edible. Sandy soil; June-July; infrequent; Muscatine and Lyon counties. (*O. humifusa* Raf.)

O. fragilis (Nutt.) Haw. Prostrate or decumbent; joints ovate, nearly terete or flattish; leaves small, reddish; flowers yellow, smaller than those of the preceding; fruit dry at maturity. Dry soil; July-August; common; Lyon county.

AIZOACEAE A. Br. CARPET-WEED FAMILY.

Mostly prostrate and branching herbs, with opposite or verticillate leaves, and small regular perfect flowers, either solitary, cymose or glomerate. Calyx of 5 sepals, free from the ovary. Petals wanting. Represented in our flora by the genus *MOLLUGO* L.

M. verticillata L. *Carpet-weed*. Prostrate, much branched, annual, forming patches; leaves spatulate, whorled at the joints; pedicels slender, 1-flowered, clustered with the leaves; stamens mostly 3; stigmas 3; capsule 3-celled, 3-valved; seeds reniform. Sandy shores, waste places; July-September; common. This species is included by different botanists under *FICOIDEAE* or *CARYOPHYLLACEAE*.

UMBELLIFERAE B. Juss. CARROT FAMILY.

Herbs, with usually hollow stems, alternate compound or simple leaves, sheathing petioles, and small flowers in compound umbels, rarely in heads. Calyx adherent to the ovary, limb obsolete or 5-toothed. Petals and stamens 5, inserted on a fleshy disk which covers the ovary. Styles 2, distinct or united at their thickened bases. Ovary 2-celled, 2-ovuled. Fruit dry, consisting of 2 coherent carpels. A well defined but difficult order.

* *Flowers white.*

† *Fruit flattened dorsally.*

DAUCUS. Leaves pinnately decomposed; calyx 5-toothed; fruit prickly along the ribs.

CONIOSELINUM. Leaves 2-3-pinnately decomposed; fruit winged on the lateral lobes.

TIEDEMANNIA. Leaves simply pinnate.

HERACLEUM. Leaves large, ternately compound; flowers large.

†† *Fruit flattened laterally.*

Sium. Leaves once pinnate; ribs prominent, equal, corky.

CARUM. Leaves decomposed; fruit ovoid or oval; ribs filiform, inconspicuous.

CICUTA. Leaves pinnately compound, the veins running to the notches; ribs flattish, corky.

CONIUM. Stems spotted; leaves tripinnately dissected; ribs wavy.

††† *Fruit linear-oblong, slightly flattened laterally.*

CRYPTOTAENIA. Leaves 3-foliolate; fruit glabrous; ribs obtuse, equal.

BERULA. Aquatics; leaves simply pinnate; fruit globrous, nearly galbose; ribs inconspicuous.

CHAEROPHYLLUM. Leaves ternately decomposed; fruit glabrous.

OSMORRHIZA. Leaves biternately divided; fruit bristly.

†††† *Fruit ovate or obovate.*

ERYNGIUM. Leaves parallel-veined, coriaceous, bristly-toothed; flowers in dense bracted globose heads.

** *Flowers yellow.*

† *Fruit globular, armed with hooked prickles.*

SANICULA. Leaves palmately divided; flowers greenish yellow.

† † *Fruit flattened dorsally; slightly in Thaspium.*

PASTINACA. Leaves pinnately compound; dorsal ribs filiform, the lateral extending into wings.

POLYTAENIA. Leaves 2-pinnate; fruit with the lateral ribs thick corky, dorsal ribs obscure.

THASPIUM. Leaves 2-3-ternate; fruit oblong, with 5-7 wings, slightly flattened.

† † † *Fruit flattened laterally.*

FOENICULUM. Leaves dissected into filiform segments; ribs prominent.

PIMPINELLA. Leaves ternately compound; ribs slender.

ZIZIA. Leaves 2-3-ternate; fruit oblong, with filiform ribs; stylopodium wanting.

DAUCUS L. Biennials, with bristly stems, and pinnately decomposed leaves. Involucre of foliaceous pinnately parted bracts. Involucels of many entire or toothed bracts. Flowers white, umbels compound, concave. Calyx teeth obsolete.* Petals 5, the 2 outer often larger and deeply 2-cleft. Fruit oblong, dorsally, flattened, with 5 bristly primary ribs and 4 winged secondary ones. Stylopodium depressed.

D. carota L. The common cultivated carrot, frequently found wild in cultivated fields and waste places; July–September; Dubuque, Fayette, Story, Appanoose, and Decatur counties.

CONIOSELINUM Hoffm. An erect glabrous perennial, with pinnately decomposed leaves, involucre none or of few bracts, involucels of narrow linear bracts, and compound umbels of white flowers. Calyx-teeth none. Fruit oval or oblong, flattened, glabrous; dorsal ribs large, lateral broadly winged; oil-tubes usually 2 or 3 in the intervals. Stylopodium slightly conical.

C. canadense T. & G. Stem striate, 2-5 feet high; leaves decomposed into linear oblong segments. Reported from Scott and Story counties.

TIEDEMANNIA DC. Glabrous perennials. Involucre and involucels present. Flowers white. Calyx 5-toothed. Fruit elliptic-ovate, dorsally compressed, glabrous; ribs equidistant, obtuse, the lateral ones broadly winged; oil-tubes solitary in the intervals and 2-6 on the inner face. Stylopodium short, thick, conical.

T. rigida (L.) Coult. & Rose. Whole plant smooth; stem 2-6 feet high, terete, striate, hollow, simple or sparingly branched; leaves all simply pseudo-pinnate; common petiole channeled, somewhat margined; leaflets lanceolate to linear, often slightly falcate, sessile, entire or remotely toothed toward the apex; umbels terminal and lateral. Sloughs and uplands; August; common; Johnson, Benton, Jasper, Story, Decatur, and Ringgold counties. (*Oxypolis rigidus (L.) Britton*.)

HERACLEUM L. Perennials, with ternately compound leaves, and white flowers in large umbels. Involucre of few bracts, deciduous. Involucels of small bracts. Calyx-teeth small or obsolete. Petals obcordate, the 2 outer often larger and 2-cleft. Fruit obovate, flattened, somewhat pubescent; dorsal ribs 3, obtuse, the lateral broadly winged. Stylopodium thick, conic.

H. lanatum Mx. Cow-Parship. Pubescent or woolly, 4-8 feet high; petioles much dilated; leaflets 3, petiolulate, round cordate, about 3-lobed; irregularly cut-toothed. Moist woods; June–July; frequent and generally distributed; Winneshiek, Allamakee, Fayette, Story, Winnebago, Webster, Calhoun, Cerro Gordo, Decatur, Union, Pottawattomie, Shelby, Woodbury, and Emmet counties.

SIUM L. Smooth perennials, with simply pinnate leaves, the lower often pinnatisected, and compound umbels of white flowers. Involucre and involucels of numerous narrow bracts. Calyx-teeth minute. Fruit glabrous, ovate

to oblong; ribs prominent, corky, nearly equal, oil-tubes 1-3 in the intervals. Stylopodium depressed.

S. cicutaeifolium Gmel. Stem 2-6 feet high, striate; leaflets 3-8 pairs, linear to lanceolate, sharply serrate, the submerged leaves finely dissected; rays numerous. Sloughs and swamps; July-September; frequent.

CARUM L. Ours a glabrous biennial or perennial, with pinnatisected leaves, divisions filiform, and small white flowers in terminal compound umbels. Calyx-teeth minute. Petals inflexed at the apex. Fruit ovate or oblong, glabrous, slightly compressed. Stylopodium conical.

C. carui L. *Caraway*. Stem erect, 1-2 feet high, branching; lower leaves long-petioled, the upper sessile or nearly so, bases of the petioles dilated. Introduced, waste places; May-July; Emmet county, reported from Fayette county.

CICUTA L. Smooth poisonous perennials. Leaves pinnately compound; leaflets serrate. Involucre usually wanting. Involucels of many slender bractlets. Flowers white. Calyx-teeth 5, broad. Fruit subglobose, glabrous, with 5 equal flattish corky ribs; oil-tubes solitary in the intervals. Stylopodium depressed.

C. maculata L. *Water Hemlock*. Stem 2-6 feet high, spotted or streaked; leaves bipinnate or tripinnate; leaflets lanceolate, mucronately serrate; veins running to the notches; fruit nearly terete. Sloughs and marshes; June-August; common.

C. bulbifera L. Stem 1-3 feet high; leaves 2-3 pinnate; leaflets linear, remotely toothed; upper axils bearing clustered bulblets. Swamps; July-September; infrequent; Muscatine, Linn, and Emmet counties.

CONIUM L. Biennials, with tripinnately dissected leaves, and white flowers. Involucre and involucels of narrow bracts. Calyx-teeth obsolete, fruit ovate, compressed; ribs equal, prominent, wavy when immature; oil-tubes wanting. Stylopodium depressed.

C. maculatum L. *Poison Hemlock*. Stem 2-6 feet high, spotted, glabrous, striate, sometimes glaucous; roots fusiform, fleshy; petioles very much dilated. Waste places; June-July; Winneshiek and Scott counties.

CRYPTOTAENIA DC. Glabrous perennials, with 3-foliolate leaves, and white flowers. Involucre and involucels none. Calyx-teeth obsolete. Fruit glabrous, linear-oblong, with 5 obtuse equal ribs; oil-tubes solitary, beneath each rib and in the intervals. Stylopodium slender-conical.

C. canadensis DC. Stem smooth, 1-3 feet high; leaflets large, pointed, ovate, doubly serrate, often lobed; umbels irregular, unequally few-rayed; pedicels unequal; fruit often curved. Moist woods; June-September; common. (*Deringa canadensis* (L.) Kuntze.)

BERULA Hoffm. A glabrous aquatic or marsh perennial, with simple pinnate leaves, leaflets serrate and variously cut, involucre and involucels of narrow bracts, and terminal umbels of white flowers. Calyx-teeth minute. Fruit glabrous; ribs slender; pericarp thick, corky; oil-tubes numerous. Stylopodium conic; styles short.

B. angustifolia (L.) Mert. & Koch. Stem 6-30 inches high; leaflets 7-19, ovate to linear-oblong, serrate, laciniate, or lobed. Reported from Sioux county. (*B. erecta* (Huds.) Coville.)

CHAEROPHYLLUM L. Annuals, with ternately decompound leaves, pinatifid leaflets, and white flowers. Involucre usually none. Involucels of many bractlets. Fruit narrowly oblong to linear, notched at the base, with

5 equal ribs; oil tubes solitary in the intervals. Stylopodium conical.

C. procumbens (L.) Crantz. Stems weak, spreading, smoothish or somewhat hairy, 4-16 inches high; umbels few-rayed; leaflets trifid or pinnatifid; fruit acute. Low woods; April-May; infrequent; Johnson, Henry, Story, and Decatur counties.

OSMORRHIZA Raf. Glabrous or hirsute perennials, with large aromatic roots, and biternately divided leaves. Involucre and involucels few-leaved. Flowers white. Calyx-teeth obsolete. Fruit long, linear, bristly, attenuate at the base. Stylopodium small, conic.

O. longistylis DC. Glabrous or somewhat pubescent; stem 1-2 feet high; style nearly as long as the ovary. Rich woods; May-June; common. (*Washingtonia longistylis* (Torr.) Britton.)

O. brevistylis DC. Villous; stylopodium and style about as long as the width of the ovary. With the preceding. (*W. claytoni* (Mx.) Britton.)

ERYNGIUM L. Perennials, with coriaceous leaves, and bracted sessile flowers in dense heads. Calyx-lobes prominent, rigid, persistent. Petals inflexed. Fruit ovate or obovate, scaly; ribs obsolete; oil-tubes usually 5. Stylopodium wanting; styles filiform.

E. yuccaeifolium Mx. *Button Snakeroot*. Stem 2-4 feet high, glabrous, striate; leaves often 1-2 feet long, rigid, grass-like, parallel-veined, tapering to a point, remotely bristly; heads ovate-globose; flowers white. Prairies; July-August; common. (*E. aquaticum* L.)

SANICULA L. Smooth biennials or perennials, with few palmately divided leaves, and greenish yellow flowers. Umbels irregular, few-rayed. Involucre and involucels few-leaved. Calyx-teeth prominent and persistent. Fruit globular, ribless, with 5 oil-tubes, densely clothed with hooked bristles.

S. marylandica L. Stem 1-3 feet high, but little branched; leaves 3-7-parted, root-leaves long-petioled; segments irregularly serrate or dentate, often incised; staminate flowers many, long-pedicelled; calyx-segments lanceolate, cuspidate; petals and anthers greenish white; pistillate flowers sessile; styles slender, recurved, longer than the bristles. Low woods; May-July; common.

S. gregaria Bicknell. Stems usually clustered, weak, erect, 1-3 feet high; leaves 5-divided; segments doubly serrate, teeth bristle-tipped, incised; calyx lobes ovate, obtuse; petals and anthers yellow; styles longer than the bristles. This species probably belongs to our flora.

S. canadensis L. Biennial, stem 1-4 feet high, branched; leaves 3-5 divided; segments cuneate-obovate to oblong, serrate and incised; staminate flowers never in separate heads; styles shorter than the bristles. Low woods; May-August; common.

PASTINACA L. Biennial, with pinnately compound leaves, involucre and involucels mostly wanting, and yellow flowers. Calyx-teeth obsolete. Fruit flat, oval, the dorsal ribs filiform, the lateral broad and nerved. Stylopodium depressed.

P. sativa L. Stem 3-4 feet high, grooved, glabrous; root fusiform; leaves downy beneath; leaflets ovate to oblong, toothed, terminal 3-lobed, all more or less lobed or incised. Fields and waste places; July-September; frequent.

POLYTAENIA DC. Perennial, glabrous herb, with pinnately decomposed leaves, upper opposite, lower alternate and long-petioled, involucre wanting, involucels of narrow bractlets, and bright yellow flowers in compound umbels. Calyx 5-toothed. Fruit flattened, obovate to oval, glabrous, dorsal ribs small, obscure, lateral thick and corky. Stylopodium wanting.

P. nuttallii DC. Stem 2-4 feet high; pedicels and involucels pubescent; leaf-segments narrow, entire or lobed. Prairies and upland woods; May-July; rather rare; Scott. Muscatine, Johnson, Story, Appanoose, Decatur, Ringgold, and Montgomery counties.

THASPIUM Nutt. Perennials, with ternately divided leaves, and yellow flowers. Involucre wanting. Involucels 3-leaved. Calyx 5-toothed. Stylopodium wanting; styles slender, exserted. Fruit oblong, ovoid, with prominent wings; oil-tubes solitary in the intervals, 2 on the inner face of the carpels.

T. barbinode Nutt. Stem 2-3 feet high, somewhat angular, striate, loosely branched, somewhat pubescent on the joints or in the umbels; leaves 1-3-ternate, mostly biternate; leaflets ovate, with cuneate base, coarsely serrate, often cleft or parted; flowers light yellow; fruit broadly oblong, 5-7 winged. Rich woods; May-June; probably common.

FOENICULUM Adans. Biennials or perennials, with striate stems, leaves biternately dissected into numerous filiform segments, and yellow flowers. Calyx-teeth obsolete. Involucre and involucels wanting. Fruit elliptic-oblong, subterete; ribs 5, prominent; oil-tubes solitary. Stylopodium large, conic.

F. officinale All. Whole plant aromatic; stem 4-6 feet high, purplish green, somewhat glaucous. Waste places; July-September; rarely escaped from cultivation; Johnson and Story counties. (*F. foeniculum* (L.) Karst.)

PIMPINELLA L. Glabrous perennial, with ternately compound leaves, involucre and involucels scanty or wanting, and yellow flowers. Calyx-teeth obsolete. Fruit ovate to oblong, laterally compressed; ribs slender, equal; oil-tubes numerous, 2-6 in the intervals. Stylopodium thick, broadly conic.

P. integerrima (L.) A. Gray. Stem smooth, glaucous, 1-3 feet high; leaves 2-3-ternate, leaflets ovate to lanceolate, entire; fruit broadly oblong; stylopodium small or wanting. Rocky woods; May-June; common.

ZIZIA Koch. Glabrous perennials, with undivided or ternately divided leaves, and yellow flowers. Involucre wanting. Involucels of small bractlets. Calyx-teeth prominent. Fruit glabrous, with slender ribs; oil-tubes large, solitary, in the intervals and one in each rib. Stylopodium wanting. A genus distinguished from *Thaspium* by the wingless fruit.

Z. aurea (L.) Koch. Stem 2-3 feet high, radical leaves long-petioled, all except the uppermost 2-3-ternate; leaflets ovate to lanceolate, sharply serrate, sometimes incisely lobed or parted; rays 15-20; fruit oblong. Low grounds, prairies and meadows; May-June; common.

Z. cordata (Walt.) DC. Stem 2-3 feet high; lower leaves long-petioled, ovate to orbicular, crenate, base deeply cordate, stem leaves short-petioled, ternate or quinate, segments ovate or oval, crenate or lobed; rays 7-16; fruit ovate or oval. Woods; May-June; Lyon county.

ARALIACEAE Vent. GINSENG FAMILY.

Ours perennial herbs or shrubs, with alternate pinnate leaves, and umbellate flowers. Petals not inflexed, valvate in the bud. Styles usually 2-5. Ovary 2-5-celled; cells 1-ovuled. Fruit a 2-5-celled drupe.

ARALIA. Leaves alternate, decomposed; styles 5.

PANAX. Leaves verticillate, palmately 3-7-foliate; styles 2-3.

ARALIA L. Herbs or shrubs from thick perennial roots. Flowers white or greenish, more or less polygamous. Calyx-tube adherent to the ovary, limb 5-toothed. Petals 5, oblong, spreading, deciduous. Stamens 5, alter-

nate with the petals. Styles slender, recurved above, persistent. Cells of the ovary with a single suspended ovule.

A. racemosa L. *Spikenard*. Stem smooth, branched; leaves large, biternate-pinnate; leaflets ovate, base cordate, doubly serrate, taper-pointed; umbels numerous, racemose; styles 5, united; fruit 5-celled. Rich woods; July; frequent.

A. nudicaulis L. *Wild Sarsaparilla*. Nearly stemless; roots long, horizontal; leaf long-stalked, ternate, divisions 3-5-foliolate; leaflets ovate, taper-pointed, serrate; umbels 2-5, on a scape shorter than the leaf-stalk; fruit 5-celled. Rich woods; May-June; infrequent; Winneshiek, Allamakee, Fayette, Scott, Muscatine, Henry, Johnson, Story, and Winnebago counties.

A. spinosa L. *Hercules Club*. A shrub or low tree, 8-30 feet high, stem and stalks prickly; leaves long-petioled, bipinnate; leaflets ovate, pointed, serrate, glaucous and more or less pubescent beneath; umbels in terminal compound panicles, peduncles and pedicels pubescent; flowers white. Rich soil; June-August; an escape from cultivation; Johnson county.

PANAX L. Ours a perennial herb, from a fusiform, simple or branched root. Leaves at the summit of the stem, verticillate, digitately compound. Umbel simple, solitary, terminal. Calyx-limb obscurely 5-toothed. Petals 5, spreading. Stamens 5, alternate with the petals. Styles 2-3.

P. quinquefolia L. *Ginseng*. Stem slender, 1-foot high; leaves palmately 3-7-foliolate; leaflets mostly 5, stalked, obovate-oblong, taper-pointed, coarsely serrate; flowers greenish yellow; styles 2; fruit 2-celled, bright red. Rich woods; July-August; becoming infrequent; Winneshiek, Fayette, Jackson, Delaware, Muscatine, Henry, Johnson, Story, and Cerro Gordo counties. (*A. quinquefolia* Dec. & Pl.)

CORNACEAE Link. DOG-WOOD FAMILY.

Ours shrubs, with simple opposite or alternate exstipulate leaves, and cymose flowers. Calyx-tube adherent to the 1-2 celled ovary; limb minute, toothed or lobed. Petals valvate in the bud, distinct, alternate with the calyx-teeth, epigynous, sometimes wanting. Stamens as many as the petals, and alternate with them. Ovules pendulous. Fruit a 1-2-seeded drupe, crowned with the calyx.

CORNUS L. Leaves with one exception opposite, entire. Flowers perfect, white in our species. Sepals, petals, and stamens 4. Style 1, slender; stigma terminal, flat or capitate. Drupe with a 2-celled, 2-seeded stone.

* *Leaves opposite.*

† *Leaves glabrate or minutely pubescent beneath.*

C. paniculata L'Her. *Panicked Cornel*. *Dogwood*. A shrub 3-10 feet high, branches erect, grayish, smooth; leaves lanceolate or ovate-lanceolate, long-acuminate, base acute, minutely appressed-pubescent on both sides, pale beneath; flowers cymose-paniculate, white; fruit globose, white; stone subglobose, slightly furrowed. Rich soil, woods and thickets; May-June; common. (*C. candidissima* Marsh.)

C. stolonifera Mx. *Red-osier Dogwood*. Shrub 3-12 feet high, multiplies freely from stolons thus forming clumps; the branches bright red-purple, glabrous or slightly appressed pubescent; leaves oval, ovate, or ovate-lanceolate, acute or short acuminate, base rounded or narrowed, minutely pubescent on both sides, whitish beneath; flowers in flat-topped cymes, white; fruit

whitish or white, globose; stone variable. Moist soil; June-July; a species frequently reported but is confused with the others

† † *Leaves downy-pubescent beneath, sometimes becoming glabrate.*

C. sericea L. *Silky Cornel. Kinnikinnik.* A shrub 3-10 feet high; branches mostly purplish; branchlets and inflorescence silky-downy; leaves lanceolate, ovate or elliptical, base rounded or acute, glabrous above, white or silky-downy often rusty beneath; cymes broad, flat, compact; calyx-teeth lanceolate, conspicuous; fruit globose, pale blue; stone oblique, base somewhat pointed. Moist woods; May-July; common. (*C. amonum* Mill.)

C. asperifolia Mx. Shrub 4-8 feet high; branches reddish brown, mostly pubescent; branchlets and inflorescence rough-pubescent; leaves narrowly ovate to round-ovate or oblong, more or less acuminate, base acute or obtuse, rough pubescent above, whitish and roughish woolly beneath; cymes loose, broad, often paniculate; calyx-teeth small; petals oblong-lanceolate, white; fruit globose, white; stone slightly furrowed. Low woods; May-June; common.

C. circinata L'Her. A shrub 4-10 feet high; branches greenish, warty, glabrous; leaves broadly oval, acuminate, white; tomentose beneath; cymes depressed, dense; fruit globose, light blue; stone globose, ridged. Rich woods, May-June; rare; Winneshiek, Fayette, and Cerro Gordo counties, reported from Story and Benton counties.

* * *Leaves alternate.*

C. alternifolia L. f. Shrub 8-20 feet high; leaves often clustered at the ends of the branches, oval, acuminate, base narrowed or rounded, hoary beneath; cymes pubescent; fruit globular, blue; stone obovoid. Rocky woods; May-July; rather rare; Fayette, Jackson, Delaware, Muscatine, Henry, and Johnson counties.

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ERRATA.

Errors are an especial nuisance.

Page 3 line 2 for petiolate read petiolulate.

Page 3 line 37 for preceeding read preceding.

Page 3 line 46 for Emmett read Emmet.

Page 4 line 28 for petiolate read petiolulate.

Page 16 line 38 for preceeding read preceding.

Page 16 line 39 for foliate read foliolate.

Page 27 line 6 for trifoliate read trifoliolate.

Page 28 line 1 for Celistraceae read Celastraceae.

Page 31 line 8 for preceeding read preceding.

Page 31 line 14 for mountaim read mountain.

Page 31 lines 27 and 44 for foliate read foliolate.

Page 33 line 7 coralla read corolla.

Page 33 lines 26, 32, 37, 41, and 45 for foliate read foliolate, and so on through the Pea Family.

Page 53 line 29 for Emmett read Emmet.

Page 60 line 44 for globrous read glabrous.

Page 60 line 44 for galbous read globose.

All other mistakes are so obvious that the reader may correct, overlook or condemn at his pleasure.

By the time December comes, and with it the season for the winter festivals, everybody in the village has his new clothes for the year, and all look neat and trim in fresh brown deer-skins and clean white mittens and breeches.

PRAIRIE FLOWERS OF LATE AUTUMN.

By BYRON D. HALSTED,

PROFESSOR OF BOTANY IN RUTGERS COLLEGE, N. J.

IT is not easy to satisfactorily decide why some plants bloom in autumn, while others produce their flowers only in spring. To have hepaticas in April is as much a matter of common expectation as for August to bring the first golden-rods and October a gorgeous display of asters. An unwritten law of Nature has been conformed to, and the result is a floral time-piece of the seasons, so accurate in its wonderful mechanism that one only needs to see the bouquet of a school-girl returning from her Saturday afternoon ramble in the woods to know the month of the passing year. Some time ago (The Popular Science Monthly, May, 1887) the writer prepared a paper upon "Prairie Flowers of Early Spring," in which it was stated that the first blossoms of the season gained an advantage by being first. There is a mutual adaptation existing between flowers and insects that the most casual observer can not gainsay. It is not only an advantage, but in many cases a positive necessity, that flowers be visited by insects in order to secure that transfer of pollen from one blossom to another which results in fertilization. The modern accepted view of all floral display is that it serves the purpose of attracting insects, and acts as a contrivance by means of which the fertilization of a flower by its own pollen is prevented. Botanists of earlier days did not force this truth upon the attention of others, and many persons better qualified to judge of human than natural history arrived at the erroneous, if not somewhat selfish, conclusion that floral forms and colors were primarily to beautify the earth and render it a pleasant habitation for man. No one can for a moment doubt that flowers are beautiful, but beauty is a secondary matter so far as the gratifying of man's taste for beauty in forms and colors is concerned. It is so planned that the qualities which render the floral structures so well adapted to the peculiarities of the insects are the ones which at the same time render them beautiful and thereby contribute to the pleasure of man. In this adjustment we may see the working of an Infinite Mind able to combine the two elements of utility and beauty so completely that it is not extravagant to say they are often inseparable.

In the present paper the reader's attention is invited to some of the plants that continue to bloom after the fingers of Jack Frost have silently pulled down the dark curtain of the waning autumn and shut out the warmth of vitality from all the tender sorts of vegetation. The first day of October opened upon a landscape of varied hues, some of a most somber character, for late in September the leaves of the box-elder, for example, had been blasted by freezing and the vineyards were prematurely brown with the curled and dying foliage rustling in the breeze. Corn and other plants of a like subtropical nature, not previously harvested, were stricken lifeless by the low temperature, and house plants carelessly left out of doors melted away into a mass of rapid decay. As one looked about him the scene could but remind the observer of the Scripture injunction concerning the two women grinding at the mill. Two plants side by side had been growing with equal vigor, and both bespoke an equally long life, but one was taken and the other left. The reason for this is not easy to find.

Many mysteries flood the mind in contemplating the world of vegetable life, but none more thoroughly baffles the keenest observer as well as the most penetrating microscopist than that of hardiness. We freely use the word in ignorance, or worse, to conceal our ignorance, as physicians may employ longer terms among their admiring, awe-struck, ignorant patients, but when the thoughtful pause comes it brings us face to face with a half-clothed skeleton that nearly frightens all save the brazen-faced. We may attempt to explain the real meaning of hardiness in a dozen ways, and in the very offering of so many reasons we exhibit the weakness of all the arguments. If we say that it is due to denser structure, the statement is met with the bald-faced fact that the hardest plants do not have necessarily the denser tissues. A box-elder, which is considered a type of hardiness, yields a wood less than half as heavy as the hickory. Of the sixteen sorts of trees in the United States with wood heavier than water, all are in the warmer portions of the country, where no winter tests their hold upon vitality. Perhaps it is as much the plan of one species to have its twigs killed back as it is for another to withstand the sudden changes of temperature and the severe cold. It demands a more than human penetration to decide that the horse-chestnut, with its large and well-protected terminal buds in autumn, is better adapted to its conditions than the raspberry, with young, immature wood and imperfect buds, which die before the spring-time comes. The two are working out the problem of existence along widely diverging lines. The tree grows slowly and builds for a century, while the bramble forms only transient stems and runs its chances of making all it can out of a favor-

able growing season. No one would care to say that a *Rubus* is less hardy than an *Æsculus*. They are not to be compared, and there the matter ends. If two species in the same genus have similar habits of growth, and one fails to bear the surrounding conditions while the other thrives, the case is very different, and it is more natural to seek the reason, for the answer, if it could be given, might be a blessing to every orchardist and gardener suffering from losses among his tender plants. And even here it may be that the explanation turns upon surroundings to which each plant has been subjected. We know that species migrate from the home of the parent as birds from the parental nest or the sheep from the fold. It is not difficult to believe that offspring from common stock in time develop progeny subjected to very unlike conditions. Under dissimilar circumstances they develop unlike tendencies; and when, after centuries, these new forms are again brought together through man's culture, while they may be outwardly the same, the one is tender while the other is not. It is a question of the resistive power which, whenever we reach for it, whether with the high-power lens or the chemist's test-tube, the result is much the same. This generation seeks after a sign, and it might do many worse things. It may be a long time before there will be a better test for hardiness than that which is applied when a plant is subjected to the actual conditions. At present there is no rule without innumerable exceptions, which not only "prove the rule," but prove that it is valueless. The Greenlander may easily fall a victim to small-pox, because, we say, his system has not been so situated as to develop the resistive power to this direful malady. The Northern man goes south and is stricken with a fever that does not cause death to those "to the manor born."

In the field we see the corn falls with the first hard frost, while the asters along the roadway hold their freshness and continue to blossom until early winter congeals the sap. Turn to the flower-garden, and we see many of our tender plants in the withered brownness of death, and by their side stands the *Anter-rhinum* in the beauty of its pristine freshness, bearing its blossoms of every size from the minutest bud up to the full flower. The *pelargonium* has its dead branches intermingled with the living stems of the *petunia*. The moss-rose is lifeless upon the ground, while the prostrate *verbena* is fragrant with new blossoms. Snows come and go long after the Indian summer has been succeeded by the chill November days, and the pansies smile from among frosty fallen leaves. Death and life are closely associated, and, while we can not comprehend it all, there are few who would lose the exhilaration of a prolonged search for the sake of knowing it all at once.

Along my daily pathway have thronged the shepherd's-purse and the purslane. The former passed the winter as seedlings from self-sowed seed in early autumn, and closely hugged the frozen soil unprotected, or perchance benignly covered with a blanket of snow. When the November blasts are howling and whirling down the snows, some belated plants—or, more properly, some hasty specimens ahead of their time—are left blooming alone. The pepper-grass (*Lepidium virginicum*) is closely related to the shepherd's-purse, and has the same times and seasons and habits of growth. On the other hand, the hot-blooded purslane, which was able to sprawl at full length upon the superheated ground in August, and thrive, to the great annoyance of the tidy gardener, falls a lifeless victim at the first firm grasp of the frost-king. In its obeseness it blackens with the rising sun, and soon leaves little else behind except the thousands of almost microscopic seeds, for which the icy winter only seems to serve as a fitting introduction to new activities when the long-delaying spring arrives. Look into the vegetable garden, if you please, and recall the two classes of plants therein grown for the table. There are sorts, the seeds of which may be sown as soon as the ground can be worked; while other seeds are of the tender sort and can not be committed to the earth until the settled weather has come and the danger of the laggard frosts is past. Toward the end of the season there is a like distinction. In short, some of the garden favorites must make all their growth during warm weather, and perish with the frosts of autumn; while others can be gathered at pleasure, even left in the earth until the following spring, and improved by the seeming neglect. Of meadow and pasture crops there are few that flower later than the red clover. This may be found in full bloom until the snows cover the melliferous heads for the balance of the year. The alsike also is a late bloomer, but the white sort gives up much earlier.

Let us turn now to the wild plants which are in flower upon or after the first of October in the climate of central Iowa—a prairie region—where autumn is more than past its middle by that date. At the outset, it is manifest of the plants in flower that a large number belong to the sunflower family. Among the most conspicuous are the asters and golden-rods, and the most beautiful of them all is the *Aster Novæ Angliæ*. This is a common species, and because at home in New England—as the name indicates—is none the less attractive, and one, the charm of whose purple rays of the large heads never flags. I have been upon long tramps through the low meadow-land where this species is the chief blossom, and never tired of the variability which the many plants exhibit. The leaves are clasping as if a strong affection existed between the blade and the stem from which it sprang.

Intermixed with this most richly attired of all the asters is the Riddell golden-rod (*Solidago Riddellii*); quite different from all the other *Solidagos* in having the stems clothed with long, smooth, narrow leaves, which gradually curve upward and then describe a half circle downward. The large clusters of flowers in the medium-sized heads have a depth of auriferous color which can not fail to attract all lovers of yellow. The golden-rod most nearly like the above is *Solidago rigida*, an earlier bloomer but holds its own against the early frosts. As the name suggests, the stem is large and stiff or rigid, the leaves are sessile, large, thick, and the heads of the blossoms form a broad, flat-topped inflorescence, standing three or more feet from the high, dry prairie soil. Among the other golden-rods were *Solidago speciosa* and the altogether common and yet far from the least attractive species, *Solidago canadensis*. This furnishes a serious puzzle to the careless student, but the lover of slight differences in plants finds in this species with its various varieties a subject of absorbing interest. *Aster longifolia* and *A. multiflorus* vie with each other in making the waste places bright and attractive during the October days, and exhibit their powers to resist the destructive agencies of the closing days of autumn by shaking their leafy stems and bright fresh heads of blossoms in the storms of bleak November. The three asters already named are among the last of all the prairie flowers, and seem to be full of life when the streams are icy in the morning and the sunny side of a log is a favorite haunt of the birds of winter.

Along the small brooks and over the lowland, where the fog damp and chill settle at early sunset, the great sunflower (*Helianthus grosse-serratus*) may wave its head, while around it is the retirement of the winter condition. *Helenium autumnale*, with its handsome heads, with lemon-yellow notched ray flowers and peculiar velvety decurrent leaves, is not common but attractive. We do not wonder that it lingers in the lap of early winter, because the atmosphere of its whole being is one of endurance, but of the quiet sort befitting the Quaker and not that of the bully.

But there are many late autumn plants scattered through other than the sunflower family. Along the streams and standing knee-deep in the wasted and decaying rubbish of the borders is the long, leafy stem of the *Physostegia virginica*, with its slender spike of showy rose and purplish-white blossoms. It is one of the mints in all save the minty quality, and for this peculiar lacking it is often a source of trouble to the tyro in classification. The flowers are complex, the stamens possess an abundance of hairs, in which the circulation of protoplasm may be seen; and, besides, insects visit them.

Of a very different type, perhaps more showy and certainly as interesting to the student of floral structures, is the great blue lobelia (*Lobelia syphilitica*), a frequenter of all low places, where its rank growth and bright deep blue render it a prominent object. This plant with its insect attendants has often furnished amusement for me by the half-hour. The insects seem always in haste, and dodge in and out of these blossoms with a methodical rapidity, each time receiving a new invoice of pollen to be scattered upon the stigmas of other blossoms subsequently visited. Among the most seemingly out-of-place blossoms as to time of appearing were those of the common blue violet. This is strictly one of the spring flowers, but with us for years it makes a second advent, and in some places blossoms so freely as to be no rarity. It has been used for classes of a hundred members for dissection in October. This favorite plant is not as well known in habit as it deserves. Its underground close-fertilized flowers, for example, are unseen, therefore passed by by those who only pick the showy aerial blossoms. The little low, round-leaved mallow, or prostrate mallow—in my boyhood days we called it “cheeses”—is one of our October flowers.

It will be seen that a fair share of the late autumn blossoms are weeds and useless plants. The May-weed (*Anthemis cotula*) is one of those which, if less common and without its rank odor, would be a very attractive plant in both foliage and flower; but, as it is, no one is anxious to give this wayside intruder any high place among the purely ornamental species. In like manner the mullein, or “great American velvet-leaf” as it is sometimes called in Europe (*Verbascum thapsus*), is a plant with some inherent attractions; but, owing to its obtrusive habit, combined with a coarseness and boldness, it can only rank with the weeds. It will accommodate itself remarkably to unfavorable conditions and come up blooming under all sorts of rough if not abusive treatment. There is a strict military air to this plant as well as to one of its October associates in the pasture (*Verbena stricta*). Both have stems much straighter than some ramrods, and one time a friend, seeing the mullein in great abundance upon rolling ground, remarked that they were like ten thousand men marching up a hill. The species of liatris, or blazing-stars, are of the same strict habit but vastly more showy. We have three species of these charming rose-purple composites, all of which flower late in summer and remain to display their marvels of beauty long after the tender plants have served their time.

Among all the late blossoms there are none for which I have a greater fondness than the gentians. They come, with their mingled purple and blue, at a time when those colors have become unusually rare, for they are never common at any time of

year. Some of the species bear flowers that long seem upon the verge of coming into full bloom, and disappoint those who look for wide-open flowers. They are somewhat bell-shaped; into the plaited opening, otherwise nearly closed, the bee or other insect pushes its way in search of nectar and pollen. Upon the exit of the winged visitant the corolla again closes, to the exclusion of everything except its insect attendants. The most charming of all the species of this late-flowering genus is the celebrated fringed gentian, so named because its long corolla ends in a most delicate row of long, fine, hair-like projections, suggesting the heavy eyelashes of a beautiful girl. The tint of the whole blossom is a pure and delicate blue, caught, as it would seem, from some patch of October sky, margined by flecks of fleecy clouds. These gentians, as well as rich specimens of a cousin to the thoroughwort and boneset, with great clusters of pure white flowers, might be gathered any late autumn day, the former in the low prairie, the latter in the tangle of frost-bitten herbage in "the timber" along the water-courses. The boneset flowers suggested, in their exhibition of white, the approach of winter, when all the copse is covered with a mantle of snow and the stream is locked in the embrace of the frost-king.

One of the latest of the autumn prairie flowers—and one not found by me until drear November has come in the wake of Indian summer weather—is the ladies-tresses, an orchid of no striking beauty, but, in a region where orchids are rare and arriving after the eleventh hour, it has its full share of interest. The plants are single-stemmed, few-leaved, and the small, pure white flowers are so arranged upon the long spike as to assume a spiral inflorescence, from which fact the common name doubtless originated in the fertile mind of some imaginative lover of plants. If the witch-hazel had been a member of the prairie flora under consideration, it would have been in its place of honor at the close of this list; but, as it is, the orchid and the aster, the shepherd's-purse of the wayside and the prairie must vie with the pansy in the flower-garden for the last place in the floral calendar of the year.

The reasons assigned in a previous article for the early blooming of plants hold good here for those that develop their flowers late in the year, and can be briefly condensed into the expression that, in the experience of the species, it is probably found an advantage to be somewhat out of the season. A single store upon a side street may do as well as any one in the market-place, provided it is thoroughly accommodated to the situation: competition, or the absence of it, is likewise an element not to be ignored in the consideration of the time of blooming of flowers; and no one can but rejoice that all plants do not produce

their blossoms during the same day or week or even month of the year.

[The above article has been prepared from notes taken by the writer while occupying the chair of botany in the Iowa Agricultural College.]

THE DUK-DUK CEREMONIES.

By WILLIAM CHURCHILL.

RELIGION is a vanishing quantity in the western Pacific, and the farther west one goes by so much the more rapidly does this sentiment vanish; dogmatic theology and its practical profession are alike absent from the thought and practice of the dark Melanesian. Simplicity marks all the desires of this island savagery, and this same simplicity marks all the spiritual side of life; instead of wondering puzzlement over the hazy ideas of a great first cause, or a hereafter which may in some sort be molded by the conduct of life in the present, the remote islander limits his religion and the spiritual side of him to an ill-defined, scarcely acknowledged fear of the unknown. Worship he has none; even the idea of propitiation of the malign power has not yet occurred to him; and the most that he can conceive of is sedulously to refrain from naming this terrible unknown.

Another circumstance deserves note because of its interesting coincidence with this absence of faith. What internal connection there may be between the two, if indeed there be any, is most obscure, for the reason that these people are as yet little known, and are very chary of communicating any information concerning these two features of their life. It is noticed by the careful observer that just in proportion as the forms and formulas of religion disappear from the life of the savage communities he visits, so there is a marked increase in the prevalence and power of the secret societies which seem to take the place of priestcraft and kingcraft.

Melanesia presents a very long list of these associations of men who are inducted into some secret or other, who are threatened with the most severe penalties if they divulge any part of these mysteries to the profane, and who are provided with signals for the recognition of other possessors of the same mysteries; and in more than one instance it has been observed that these signals have been recognized and regarded by people on far-distant islands, speaking a dissimilar tongue, and so remote as at once to preclude any chance of frequent communication. The very existence of these mystic orders is as far as possible kept secret, and it is only by long and patient study of the people that even the merest out-

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(No. 7)
Contributions from the Shaw School of Botany
Vol. V. No. 3

CONTRIBUTIONS FROM THE SHAW SCHOOL OF BOTANY.

No. 7.

A CATALOGUE
OF THE
ANTHOPHYTA AND PTERIDOPHYTA
Of Ames, Iowa.

By A. S. HITCHCOCK.

From the St. Louis Acad. of Science, Vol. V., No. 3.

Issued February 4, 1891.

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By A. S. HITCHCOCK.

Read Oct. 20, 1890.

INTRODUCTION.

The following list is based upon collections made during the years 1882 to 1889. All the names are founded upon specimens in my herbarium unless otherwise stated. A few specimens are in the herbarium of the Agricultural College at Ames, while a very few names, indicated in each instance, are admitted on good authority without specimens.

Considerable care has been taken in the identification of species, and in doubtful cases the name has been omitted from the list. As *Aster*, *Salix*, *Potamogeton*, *Carex*, and *Equisetum* have not been thoroughly worked up, there will doubtless be many additions in these genera. In order that the names in difficult genera should be authentic, the specimens have been submitted to specialists, to whom I wish to acknowledge my obligations. Many grasses were sent to Dr. Vasey and Prof. Scribner; carices to Prof. L. H. Bailey; *Cyperus* and *Eleocharis* to Dr. Britton; *Euphorbia* to Dr. Millspaugh; *Umbelliferae* to Dr. Coulter; *Fraxinus* and *Crataegus* to Prof. Sargent; roses to Dr. Best; miscellaneous specimens to Dr. Watson.

Gray's Manual, sixth edition, has been followed for the names and sequence of the orders, and, in most cases, of the genera. The principle of using the earliest specific name has been adhered to as closely as possible; that is, commencing with Linnæus' Species Plantarum, in 1753, the earliest specific name, in whatever genus first used, is retained, provided it does not result in two species of the same name in one genus, or in the specific

name being identical with, or too nearly resembling, that of the genus. The same principle has been applied to varietal names. Date of publication as indicated by the title-page or collateral evidence, and lineal sequence in a given publication, have been taken as the grounds for deciding priority. In the absence of some works, recourse has been had to dated lists in Pritzel, Thesaurus; DC. Syst.; Don, Mill. Dict.; Torr. Fl. N. Y., etc.

The question of identity and synonymy has been a difficult one. For this I have depended upon the standard authorities, as I have been able to refer to the specimens in but few cases. I have used the earliest name concerning which there seems to be no reasonable doubt, while those which were less certain have not been taken up. Consequently there are names which may give way to earlier ones when investigated by those more competent for the task; but the bibliography of each name has been worked out as thoroughly as my resources would permit. In this work I have been very materially aided by Dr. Watson, Dr. Britton, Prof. Scribner, and Mr. D. G. Fairchild.

Following each name is the place and date of publication, so far as this could be ascertained. To avoid repetition, a dated list of the principal works quoted has been appended to the catalogue. Where a species was originally placed under a different genus from the one accepted, the author of the specific name is quoted in parenthesis, followed by the author of the accepted combination. A name has been considered published when, in connection with the generic and specific name, there is sufficient description to identify the species. The date of publication has been taken to be that of issue. For example, a description of *Cypripedium spectabile*, Salisbury, was read before the Linnæan Society in 1788, but was not published until 1791, subsequent to *C. reginæ*, Walt., and *C. album*, Ait. When an author transfers a species from one genus to another, but does not make the combination under the new genus, he is nevertheless quoted for that combination if he singles out the species. For example, Robert Brown in his *Prodromus Floræ Novæ Hollandiæ* establishes the genus *Eleocharis*. In a note he says, "genus naturale efformat cui pertinent *Scirpus palustris*, L., et *acicularis*, L." I have quoted Brown as the author of *E. palus-*

tris and *E. acicularis*, though these combinations first formally appeared in Roemer and Schultes' *Systema Vegetabilium*.

Following the accepted names in the list, is the synonymy: first, the original combination; second, the combination used in the last edition of Gray's *Manual*; third, any others having a critical bearing on the nomenclature. Following this, is the habitat and frequency of occurrence. The latter is indicated by the following terms, in the order given: common, abundant, frequent, not uncommon, infrequent, scarce, rare. When the species is rare, or known only for a few stations, these are indicated. Names of indigenous and well established introduced species are in small capitals; those of species which do not appear to be established, and hence are not really a part of the flora, are placed in lower-case type; but those which were formerly abundant, and have become scarce, are retained in small capitals. No distinction has been made in the list between well marked varieties and forms which have received varietal names. As the species have been arranged under the genus on an equal footing, the same has been done with the varieties.

Notes have been frequently introduced in order to call attention to difficult points, and that errors may be the more easily located. An attempt has also been made to discriminate between closely allied species.

In conclusion, I wish to thank those botanists whom I have mentioned above, and also Dr. Trelease, who has given me valuable advice throughout the work; Prof. L. H. Pammel, to whom the inception of the work was due, for notes and specimens; Mr. Sirrene, for specimens collected during 1890,—and last, but by no means least, Mr. H. J. Webber, who has kindly consented to undertake, in my absence, the arduous task of proof-reading.

SCOPE OF THE FLORA.

The region included in this catalogue is essentially the vicinity of the Agricultural College at Ames. Quite thorough explorations have been made within a radius of three or four miles about this point. From four to nine miles they have been confined to certain directions; viz., along the railroad from Ames to Gilbert,

and from Ames to Nevada; southwest to the "Big prairie," and southeast to a small "lake" about ten miles from the College. A few plants have been included from the Des Moines river west of Boone, eighteen miles distant; several have also been included from Cairo lake and vicinity, about twenty-two miles away. But in all cases it is so stated if the plant has been found only beyond the three-mile circle.

The topography of the region presents little diversity. We have: *prairie*, the treeless, grassy land, which has not been brought under cultivation. This is fast disappearing, and in a very few years none will be found except along the roadsides and railways. A large tract known as the "Big prairie" lies about six miles southwest of the College, just across the Boone county line. Formerly this was a good collecting ground, especially on account of the ponds it contained, but its distinctive characters have been lost as a result of close grazing and a succession of dry seasons. I have designated as "low" or "wet prairie" depressions which are wet most of the season, but not sufficiently so to be called ponds. In such places may be found *Caltha palustris* and *Cardamine bulbosa*.

Then there are *sterile hills*, where the soil is usually stony. Such is the land northeast of the College beyond Squaw creek. The hills forming the east side of the valley of Skunk river, from the northwest school south to the "lake," are very sandy. Here are found *Cyperus filiculmis* and *Oenothera rhombipetala*.

The wooded portions are mostly confined to the proximity of the streams, five of which are included in our region. The *upland woods* are found along the bluff side of the streams, or, in case of the smaller streams, all is upland. Here are found *Quercus alba*, *Hicoria ovata*, etc. Frequently near by, or often at considerable distance, occur thickets or copses composed of *Prunus Americana*, *Pirus Americana*, *Corylus Americana*, etc. The *lowland woods* are found on the lower and moister portions. Here thrive *Platanus*, *Juglans*, and *Ulmus*. *Bottom land* is the low land along streams, especially the treeless portion. It is subject to overflow in the spring, and later is covered with a rank growth of *Vernonia fasciculata*, *Spartina*, *Verbe-*

nas, etc. The portion in the angle formed by the junction of Squaw creek and Skunk river is called "The forks."

There yet remains to be spoken of, the habitat of water-plants. A few can be found in the streams, but the greater part are only found in still or slow-flowing water. The nearest lakes are Cairo lake and the walled lakes of Hamilton county. Besides these there are ponds, of which there are two kinds: First, those which have muddy banks and water, and which are often bayous from the streams; in these scarcely any vegetation grows. The second class is found in depressions in the prairie. The vegetation is very dense, and the bottom is of peat. Here will be found water-lilies, pond-weeds, and *Utricularia*. Formerly these prairie ponds were very numerous, but the extensive system of drainage employed of late years, and the series of droughts from 1884 to 1887, have caused them to almost disappear. For this reason many water-plants, which were abundant a few years ago, have been marked in the catalogue as "becoming rare." During the summer of 1889 I was unable to find a single specimen of *Castalia tuberosa*, *Utricularia vulgaris*, *Pontederia cordata*, and a number of other aquatics, though I collected them frequently five or six years ago. It is for this reason, chiefly, that plants from Cairo lake are included, as the excursion was made for water-plants.

On the other hand, introduced species become established in our flora, and may soon become a constituent part. *Lactuca Scariola* is an example. Within a few years this species has increased to a marked extent. *Solanum rostratum*, now common in Southwestern Iowa, will undoubtedly reach Story county in a few years.

It is hoped that the following catalogue may be of value as a record useful in studying the changes in the flora of which it treats.

CATALOGUE.

RANUNCULACEÆ.

CLEMATIS VIRGINIANA, L. Amoen. iv. 1760.

Thickets and banks; frequent.

C. PITCHERI, Torr. & Gray, Fl. i. p. 10.

River banks; frequent.

ANEMONE PATENS, L., var. HIRSUTISSIMA, (Pursh).—*Clematis hirsutissima*, Pursh, Fl.—*A. patens*, L., var. *Nuttalliana*, Gray, Man. 5th ed.

Prairie; rare.

Flowering in early spring. It has been collected about two miles southeast of the College.

A. CAROLINIANA, Walt. Fl.

Dry hills; infrequent.

Along the ridge east of the barns, and elsewhere.

Dr. Watson writes that, according to Dr. Gray, our plant is distinct from the South American *A. decapetala*, L., which extends as far north as Arkansas and Texas.

A. CYLINDRICA, Gray, Ann. N. Y. Lyc. iii. p. 221.

Dry woods; frequent.

A. VIRGINIANA, L. Spec.

Dry woods and banks; frequent.

A. PENNSYLVANICA, L. Mant. ii. p. 247.

Moist prairies near sloughs; abundant.

Dr. Watson writes that *A. dichotoma*, L., is a Siberian plant.

I have not access to *A. Canadensis*, L. Syst. 12th ed. 3d appx. 1768. It may be that this name should be used.

A. NEMOROSA, L. Spec.

Rich upland woods; abundant.

Plentiful in early spring around cemetery.

A. HEPATICA, L., var. ACUTA, (Pursh).—*Hepatica triloba*, Chaix, var. *acuta*, Pursh, Fl.—*H. acutiloba*, DC. Prod. i.—*Anemone acutiloba*, Lawson, Ranunc. 1876.

Rich upland woods; abundant.

The first flower to appear in the spring, preferring northern slopes.

Watson's Index cites for *Anemone Hepatica*, var. *acuta*, Bigel. Fl. Bost. p. 135; which is evidently an error as this name does not appear. The Index also cites *Hepatica triloba*, var. *acuta*, Bigel. Fl. Bost. 2d ed. p. 222. What is really said is, "*Hepatica triloba*, β , Lobes acute." In Hooker, Fl. Bor.-Am. i. p. 18, is, "*H. triloba*, β , foliorum segmentis acutis" with synonym, "*Anemone triloba*, var. β , *acuta*, Bigel. Fl. Bost. ed. 2, p. 222," a combination which Bigelow does not use.

ANEMONELLA THALICTROIDES, (L.) Spach, Hist. Veg. vii. 1839.—

Anemone thalictroides, L. Spec.

Rich upland woods; abundant.

THALICTRUM DIOICUM, L. Spec.

Rich upland woods; not uncommon.

T. PURPURASCENS, L. Spec.

Low prairie and rocky woods; abundant.

RANUNCULUS CYMBALARIA, Pursh, Fl.

Dry hills; scarce.

Northeast corner of "Big Prairie."

R. LACUSTRIS, Beck & Tracy, in Eat. Man. 3d ed. 1822.—*R. multifidus*, Pursh, Fl.

Ponds; becoming rare.

When a pond containing it is drained, the plant persists for a year or two, but the finely divided leaves are replaced by lobed or incised forms.

For remarks on the nomenclature of this species, see Greene, Pittonia, ii. 8; Eat. Man. 5th ed. p. 359, note 3; DC. Syst. i. 270 & 303; Prod. i. 34 & 43. DeCandolle places *R. multifidus*, Forsk. Fl. Æg. 1775. under *R. Forskøhlilii*, among "*Ranunculi non satis notii*."

R. ABORTIVUS, L. Spec.

Low woods; common.

R. SEPTENTRIONALIS, Poir. Dict. vi. p. 125.

Moist prairies and meadows; common.

R. PENNSYLVANICUS, L. f. Suppl. 1781.

Wet ground; south shore of Cairo lake.

R. ACERIS, L. Spec.

Waste places. A small patch has persisted for several years near the northwest corner of the Chemical Laboratory, probably introduced with packing material, but it has shown no tendency to spread.

ISOPYRUM BITERNATUM, (Raf.) Torr. & Gray, Fl. i. p. 660.—*Encymion biternatum*, Raf. Journ. Phys. ii. 1820.

Low woods; common.

CALTHA PALUSTRIS, L. Spec.

Swamps; frequent.

Bog near pump-house, and elsewhere.

AQUILEGIA CANADENSIS, L. Spec.

Rocky woods; frequent.

DELPHINIUM AZUREUM, Michx. Fl.

Prairie; not uncommon.

Quite abundant along railroad west of lower gate.

Dr. Watson writes that *D. Carolinianum*, Walt. Fl. is doubtful.

ACTEA SPICATA, L., var. RUBRA, Ait. Hort. Kew.

Rich woods; infrequent.

Woods near cemetery, Onion creek, Skunk river, and elsewhere. The red berries ripen in early August.

A. ALBA, (L.) Bigel. in Eat. Man. 4th ed.—*A. spicata*, L., var. *alba*, L. Spec.

Rich woods; scarce.

Onion creek, growing with the preceding which it much resembles, but its white berries ripen later.

MENISPERMACEÆ.**MENISPERMUM CANADENSE, L. Spec.**

Low woods; frequent, but rare in fruit.

BERBERIDACEÆ.

CAULOPHYLLUM THALICTROIDES (L.) Michx. Fl.—*Leontice thalictroides*, L. Spec.

Rich woods; infrequent.

It has been suggested that *Leontopetalon thalictroides*, Hill, Syst. Veg. xvi. p. 26, be taken up, but I have not been able to satisfy myself that this should be done. The above work gives under the genus *Leontopetalon* the following species: 1. *Leontice crysogonum*; 2. *Leontice Leontopetalum*; 3. *Leontopetalon thalictroides*; 4. *Leontice Leontopetaloides*. These are the four species that are included by Linnæus in his genus *Leontice*.

PODOPHYLLUM PELTATUM, L. Spec.

Rich woods; frequent.

NIMPHÆACEÆ.*

BRASENIA NYMPHOIDES, (Thunb.) Baill. Hist. Pl. iii. p. 82, 1872.

—*Menyanthes nymphoides*, Thunb. Fl. Jap. 1784.

Ponds; rare.

Along railroad a few miles northwest of Ames.

CASTALIA TUBEROSA, (Paine) Greene, Torr. Bull. xv. 1888.—*Nymphæa tuberosa*, Paine, Cat. Pl. Oneida Co. 1865.—*Nymphæa reniformis*, DC. Syst. ii. (?)

Ponds; becoming rare.

In the immediate vicinity of the College there is no suitable habitat, but it occurs frequently in the prairie ponds of the Big prairie and elsewhere.

If *Nymphæa tuberosa*, Paine, and *N. reniformis* are the same, as indicated in Gray's Manual, 6th ed., our plant becomes *Castalia reniformis* (DC.); but there seems to be much doubt as to the identity of DeCandolle's plant.

NYMPHÆA ADVENA, Solander, in Ait. Hort. Kew.—*Nuphar advena*, Ait. f. Hort. Kew.

Ponds and slow streams; infrequent.

In the vicinity of Gilbert and Story City.

PAPAVERACEÆ.

SANGUINARIA CANADENSIS, L. Spec.

Rich woods; not uncommon.

FUMARIACEÆ.

DICLYTRA CUCULLARIA, (L.) DC. Syst. ii.—*Fumaria Cucullaria*, L. Spec.

Rich woods; abundant.

The original spelling of the genus has been retained, since the evidence seems to show that Borckhausen intended the word to be *Diclytra*. If the error be purely typographical it should be corrected. I have not access to Borckhausen's paper (Römer, Archiv. f. d. Bot. i. 2, p. 46), but Bernhardt quotes from this paper (Linnæa xii, p. 668, 1838), "Diclytra nenne ich (Borckhausen) sie (die Gattung) von $\delta\iota\varsigma$, zwei, und $\kappa\lambda\upsilon\tau\rho\nu$, Sporn, weil sich die Blume so deutlich durch ihre zwei Sporne auszeichnet."

Prof. Trelease suggests that the error may have arisen in a transfer of *kentron* from the original script into the Greek letters. The ϵ , being made too high, became an l , and then the n was read as u , making *klutron*.

* For valuable notes on this Order, see Lawson, *Nymphæacæ*.

CRUCIFERÆ.

DENTARIA LACINIATA, Muhl. in Willd. Spec. ii.

Rich woods; not uncommon.

Most abundant along Skunk river.

If *Dentaria* is referred to *Cardamine*, this becomes *Cardamine laciniata* (Muhl.) Wood, Bot. & Fl. 1871.

CARDAMINE BULBOSA, (Schreb.) B. S. P. Cat. — *Arabis bulbosa*, Schreb. in Muhl. Ind. Fl. Lanc. 1793.

Springs and ditches; frequent.

C. FLEXUOSA, With. Bot. Arr. Brit. Pl. 3d ed. 1796. — *C. hirsuta*, L., var. *sylvatica*, Gray, Man. 5th ed.

Springs and bogs on wooded hillsides; infrequent.

Spring on bank of Squaw creek north of the College, and elsewhere.

Comparison with European specimens shows that our plant is this rather than *C. hirsuta*, L. For notes see Britton, Contr. Herb. Columb. Col. 13, (Trans. N. Y. Acad. Sci. ix. 1889).

ARABIS HIRSUTA, (L.) Scop. Carn. 2d ed. 1772. — *Turritis hirsuta*, L. Spec.

Rocky woods; infrequent.

Skunk river, northeast of Ames. An Ames specimen in the I. A. C. herbarium, labelled *A. levigata*, belongs here.

A. CANADENSIS, L. Spec.

Rocky woods; infrequent.

Hoggatt's woods; Skunk river.

A. DENTATA, Torr. & Gray, Fl. i. p. 80. — *Sisymbrium dentatum*, Short, Pl. Ky. 3d suppl. 1837 (name only).

Low ground; scarce.

Squaw creek north of College.

DRABA CAROLINIANA, Walt. Fl.

Sandy places; infrequent.

In the gravel near Prof. Budd's house; north of the barns; and elsewhere. The flowering season is short and the pods mature quickly, hence it often escapes the collector.

Alyssum calycinum, L. Spec.

"Ames-Bessey." Specimen in I. A. C. herbarium.

Camelina sativa, (L.) Crantz, Stirp. Austr. i. 1762. — *Myagrum sativum*, L. Spec.

Waste places; scarce. Occasionally occurs along the railroad.

Nasturtium officinale, R. Br. in Ait. f. Hort. Kew. — *Sisymbrium Nasturtium*, L. Spec.

A few specimens found in 1883 in Hoggatt's woods, about 20 rods north of the slaughter-house.

N. sessiliflorum, Nutt. in Torr. & Gray Fl. i. p. 73.

Wet places; rare.

Near iron bridge four miles southeast of Ames. Common in the eastern part of the State.

- N. PALUSTRE, (Leys.) DC. Syst. ii. — *Sisymbrium palustre*, Leys. Fl. Hal. 1761.

Wet ground; common.

As a synonym of *N. palustre*, Watson's Index gives *Sisymbrium palustre*, L. The New York Catalogue gives *Nasturtium palustre*, (L.) DC. But I have been unable to find *Sisymbrium palustre* in any of Linnæus' works, so I have followed the synonymy given in DC. Syst.

- N. ARMORACIA, (L.) Fries. Fl. Scan. 1835. — *Cochlearia Armoracia*, L. Spec.

Escaped from gardens into wet places.

- BARBAREA VULGARIS, R. Br. in Ait. Hort. Kew. — *Erysimum Barbarea*, L. Spec.

Grain fields; infrequent.

- Hesperis matronalis, L. Spec.

Occasionally spontaneous around gardens; a few plants found in the lower part of "The forks."

- ERYSIMUM CHEIRANTHOIDES, L. Spec.

Woods; common.

- SISYMBRIUM CANESCENS, Nutt. Gen.

Rocky places, infrequent.

Along railroad south of Ames, and elsewhere.

S. pinnatum, (Walt.) Greene, Bull. Calif. Acad. ii., is invalidated by *S. pinnatum*, Barneoud in Gay, Fl. Chili.

- S. OFFICINALE, (L.) Scop. Carn. 2d ed. ii. 1772. — *Erysimum officinale*, L. Spec.

Roadsides and waste places; common.

- THELYPODIUM PINNATIFIDUM, (Mich.) Wats. in King's Rep. v. 1871. — *Hesperis pinnatifidum*, Mich. Fl.

Low woods; frequent.

- BRASSICA SINAPISTRUM, Boiss. Voy. Esp. p. 39, 1839-1845.

Fields and waste places; common.

Specimens with sparsely hirsute pods were collected three miles east of Ames.

- B. alba, (L.) Boiss. Voy. Esp. p. 39. — *Sinapis alba*, L. Spec.

A specimen was collected along the railroad, between Ames and the College, by Mr. Corbett, and it has been reported by others.

By the accidental omission of the authority in the 5th and 6th editions of the Manual, this would appear to be one of Dr. Gray's species.

- B. NIGRA, (L.) Koch in Roehl, Deutsch. Fl. 3d ed. iv. 1833. — *Sinapis nigra*, L. Spec.

Waste places; common.

- CAPSELLA BURSA-PASTORIS, (L.) Moench, Meth. 1794. — *Thlaspi Bursa-pastoris*, L. Spec.

Gardens and waste places; common.

- LEPIDIUM VIRGINICUM, L. Spec.

Woods and waste places; common.

Plant more leafy, usually less branched, pedicels rather longer and pods somewhat larger than in the next; leaves cut-serrate; petals usually present; cotyledons accumbent. Prefers shady or moist places.

L. INTERMEDIUM, Gray, Pl. Wright. ii. 1853.

Dry or sterile soil; common.

Plant bushy-branched, with nearly entire linear leaves; petals usually minute or absent; cotyledons incumbent. To determine this last and decisive distinction, examine the seed, or, much better, a cross-section, with a good hand-lens or compound microscope.

Raphanus sativus, L. Spec.

Often persists for a year or two in neglected gardens.

CAPPARIDACEÆ.

POLANISIA GRAVEOLENS, Raf. Am. Jour. Sci. I. i. 1819.

Sand or gravel; abundant.

CISTACEÆ.

HELIANTHEMUM MAJUS, (L.) B.S.P. Cat.—*Lechea major*, L.

Amœn. iii. 1756.

Dry hills; infrequent.

Northeast of College beyond Squaw creek; sand-hills near Enterprise School.

"*Lechea minor*."

"Ames-Bessey, 1876." Specimen in I. A. C. herbarium.

VIOLACEÆ.

VIOLA PEDATA, L. Spec.

Prairie and open woods, frequent.

V. PINNATIFIDA, Don, Mill. Dict. i. 1831.

Prairie; not uncommon.

V. PALMATA, L. Spec.

Low ground; not uncommon.

Var. **OBLIQUA**, (Hill)—*V. obliqua*, Hort. Kew. 1768.—*V. palmata*, L., var. *cucullata*, Gray, Bot. Gaz. 1886.

Low ground; common.

The leaves vary from reniform to narrowly hastate, and from glabrous to downy-pubescent. All the Ames specimens in the I. A. C. herbarium labelled *V. sagittata*, Ait., belong here. The latter is frequent in the eastern part of the State; but I have not seen it within our limits.

V. PUBESCENS, Ait. Hort. Kew.

Low woods; abundant.

CARYOPHYLLACEÆ.

Saponaria officinalis, L. Spec.

Escaped from gardens in many places.

S. VACCARIA, L. Spec.

Waste places; rare.

Specimens occasionally appear along the railroad between the College and Ames.

SILENE STELLATA, (L.) Ait. Hort. Kew.—*Cucubalus stellatus*, L. Spec.

Upland woods; common.

S. NIVEA, DC. Prod. i.

Low woods; infrequent.

DeCandolle cites "Mühlenb. Catal.," but does not adopt his name;—*S. alba*.

S. ANTIRRHINA, L. Spec.

Gravelly soil; infrequent.

LYCHNIS Githago, (L.) Lam. Dict. iii. p. 643.—*Agrostemma Githago*, L. Spec.

Fields and waste places; scarce.

Stellaria media, (L.) Vill. Delph. iii. 1785.—*Alsine media*, L. Spec.

Damp, shady places; scarce.

Quite abundant in east end of flower garden.

Smith, Engl. Bot. 1790-1814, is given in many places as the authority for *S. media*.**S. LONGIFOLIA**, Muhl. in Willd. Enum.

Low, grassy places; not uncommon.

PORTULACACEÆ.

PORTULACA OLERACEA, L. Spec.

Cultivated ground and waste places; very common.

CLAYTONIA VIRGINICA, L. Spec.

Low woods; abundant.

HYPERICACEÆ.

HYPERICUM ASCYRON, L. Spec. 2d ed.

Moist places in woods; scarce.

Hoggatt's woods near bridge; Onion creek; woods south of College.

H. MACULATUM, Walt. Fl.

Wet places; rare.

Near mouth of Onion creek.

H. CANADENSE, L., var. **MAJUS**, Gray, Man. 5th ed.

Sloughs; not uncommon.

MALVACEÆ.

MALVA ROTUNDIFOLIA, L. Spec.

Yards and roadsides; infrequent.

Quite abundant east of Skunk river.

M. sylvestris, L. Spec.

One specimen found along roadside one mile south of College.

ABUTILON AVICENNÆ, Gaertn. Fr. ii. 1791, p. 251.—*Sida Abutilon*, L. Spec.

Waste places; infrequent.

Hibiscus Trionum, L. Spec.

Around flower gardens occasionally.

TILIACEÆ.

TILIA AMERICANA, L. Spec.

Woods; frequent.

Prefers clay bluffs.

LINACEÆ.

LINUM SULCATUM, Riddell, Cat. Pl. Ohio, suppl. 1836.

Dry hills; frequent.

Linum usitatissimum, L. Spec.

Escaped from cultivation; frequent.

GERANIACEÆ.

GERANIUM MACULATUM, L. Spec.

Upland woods; abundant.

OXALIS VIOLACEA, L. Spec.

Rocky places and cultivated ground; frequent.

O. CORNICULATA, L. Spec.

Woods and pastures; common.

Var. **STRICTA**, (L.) Sav. in Lam. Diet. iv.—*O. stricta*, L. Spec.

Woods and pastures; common.

IMPATIENS AUREA, Muhl. Cat.—*I pallida*, Nutt. Gen.

Low places in woods; abundant.

I. BIFLORA, Walt. Fl.—*I. fulva*, Nutt. Gen.

Low woods; frequent.

RUTACEÆ.

XANTHOXYLUM AMERICANUM, Mill. Dict.

Low woods; abundant.

CELASTRACEÆ.

CELASTRUS SCANDENS, L. Spec.

Thickets and woody bluffs; not uncommon.

Frequent along clay bluffs of Skunk river.

EUONYMUS ATROPURPUREUS, Jacq. Hort. Vind. ii. 1772.

Low woods; not uncommon.

RHAMNACEÆ.

CEANOTHUS AMERICANUS, L. Spec.

Prairie and open woods; abundant.

C. OVATUS, Desf., var. **PUBESCENS**, Torr. & Gray, Fl. i.

Dry hills; scarce.

Northeast of the College, beyond Squaw creek. Fruit matures earlier than in the above.

VITACEÆ.

VITIS RIPARIA, Michx. Fl.

Woods and thickets, both upland and lowland; common.

AMPELOPSIS QUINQUEFOLIA, (L.) Michx. Fl.—*Hedera quinquefolia*, L. Spec.—*Vitis quinquefolia*, Lam. Ill. ii.

Lowland woods; abundant.

SAPINDACEÆ.

Æsculus glabra, Willd. Enum.

Des Moines river at Boone (Prof. Budd).

ACER SACCHARUM, Marsh., var. NIGRUM, (Michx. f.) Britton, Trans. N. Y. Acad. Sci. ix 1889.—*A. nigrum*, Michx. f. Arb. Amer. ii. 1810.—*A. saccharinum*, Wang., var. *nigrum*, Torr. & Gray, Fl. i. p. 248. Upland woods; frequent.

A. SACCHARINUM, L. Spec.—*A. dasycarpum*, Ehrh. Beitr. iv. 1789. Low woods; common.

NEGUNDO ACEROIDES, Moench, Meth. 1794.—*Acer Negundo*, L. Spec.

Low woods; abundant.

STAPHYLEA TRIFOLIA, L. Spec.

Moist woods; not uncommon.

ANACARDIACEÆ.

RHUS GLABRA, L. Spec.

Open upland woods, especially along the borders; abundant.

R. RADICANS, L. Spec.—*R. Toxicodendron*, L. Spec.

Two species, *R. radicans* and *R. Toxicodendron*, were recognized in the Species Plantarum. These are now quite generally considered as but forms of one species, which should take the name having priority of position. Engler (Anacard. in DC. Mon. Phan. iv. 1883) uses *R. Toxicodendron*, L. emend. Torr. & Gray, which includes four subspecies. The first is the only one with which we are concerned: *℄ vulgaris*, Pursh, Fl. Under this two forms are recognized—1. *radicans* (*R. radicans*, L.); 2. *volubilis*, DC. Prod. ii. (*R. Toxicodendron*, L.)

We have both forms: 1. climbing high on trunks by rootlets, leaves usually large and entire or sparingly dentate; frequent on bottom-land. 2. Low, erect, or twining, leaves smaller and usually deeply notched; found on drier soil, fence rows, etc. But the low form occasionally has entire leaves, and the rooting form dentate leaves. If the latter form is kept as a variety it is *R. radicans*, L., var. *Toxicodendron*, Pers. Syn. i.

POLYGALACEÆ.

POLYGALA SENEGA, L. Spec.

Rich upland woods; frequent.

P. INCARNATA, L. Spec.

Moist prairie; infrequent.

P. SANGUINEA, L. Spec.

Along sloughs; frequent.

P. VERTICILLATA, L. Spec.

Prairie and open woods; infrequent.

LEGUMINOSÆ.

BAPTISIA LEUCOPHÆA, Nutt. Gen.

Prairie; not uncommon.

B. LEUCANTHA, Torr. & Gray, Fl. i. p. 385.

Low ground; frequent.

This appears first as *Podalyria alba*, Sims, Bot. Mag. 1809. *Baptisia*, Vent. was separated in 1808. Our plant loses its birthright in the specific name *alba* by being transferred to *Baptisia* too late (*B. alba*, Hook. Fl. Bor.-Am.), there being already *B. alba*, R. Br. 1810.

Trifolium arvense, L. Spec.

"Ames, 1871, Bessey." One specimen in I. A. C. herbarium.

T. PRATENSE, L. Spec.

Meadows and pastures; common.

T. REPENS, L. Spec.

Meadows and open woods; common.

T. agrarium, L. Spec.

Several specimens collected along the railroad two miles east of Ames in 1886.

T. procumbens, L. Spec.

Meadows and pastures; infrequent.

College campus; Union creek; Skunk river northeast of Ames.

MELILOTUS OFFICINALIS, (L.) Willd. Enum. — *Trifolium Melilotus officinalis*, L. Spec.

Roadsides and waste places; infrequent.

Streets of Ames, three miles north of College, and elsewhere. Pods plump and smooth.

M. ALBA, Lam. Dict. iv. p. 63.

Roadsides and waste places; infrequent.

Abundant along road two miles west of College.

Medicago sativa, L. Spec.

Sparingly escaped along roadsides.

M. lupulina, L. Spec.

Occasionally found in waste places.

PSORALEA ARGOPHYLLA, Pursh, Fl.

Prairie; abundant.

AMORPHA CANESCENS, Pursh, Fl.

Prairie; common.

The name first appears in Fraser's Catalogue, which is a seedsman's catalogue and contains no description of it. Pursh uses the same name and publishes a description, but does not quote Fras. Cat., although he does quote it for other species. Nuttall in his *Genera* publishes a description, and quotes "T. N. Fras. Cat." He prefixes the ★, which indicates *n. sp.* The remark is made that Pursh saw a flowering specimen only, in Nuttall's herbarium.

A. FRUTICOSA, L. Spec.

Sloughs and river banks; frequent.

Dalea alopecuroides, Willd. Spec. iii.

Infrequent along the railroad.

PETALOSTEMON VIOLACEUS, (Willd.) Michx. Fl. — *Dalea violacea*, Willd. Spec. iii. p. 1337.—*D. purpurea*, Vent. Hort. Cels. 1800.

Prairies; abundant.

P. CANDIDUS, (Willd.) Michx. Fl.—*Dalea candida*, Wild. Spec. iii.

Prairie; abundant.

P. villosus, Nutt. Gen.

A few plants collected along the railroad two miles east of Ames in 1886.

Robinia pseudacacia, L. Spec.

Sparingly introduced along hedges, two miles south of the College; four miles south of Northwest School.

ASTRAGALUS CARYOCARPUS, Ker, Bot. Reg. 1816.

Prairie; not uncommon.

A. CANADENSIS, L. Spec.

Moist clay banks; frequent.

GLYCYRRHIZA LEPIDOTA, Pursh, Fl.

Prairie; scarce.

North of College beyond Squaw creek; near Ontario depot.

DESMODIUM GRANDIFLORUM, (Walt.) DC. Prod. ii. — *Hedysarum grandiflorum*, Walt. Fl. — *D. acuminatum*, DC. Prod. ii.

Upland woods; common.

D. ILLINOENSE, Gray, Proc. Amer. Acad. viii. 1870.

Prairie; not uncommon.

D. DILLENII, Darl. Fl. Cest. 2d ed.

Borders of upland woods; abundant.

Stem pubescent at summit, glabrate below; racemes usually simple and rather few-flowered; pods often with as many as six joints.

D. CANADENSE, (L.) DC. Prod. ii. — *Hedysarum Canadense*, L. Spec.

Upland woods; frequent.

D. SESSILIFOLIUM, (Torr.) Torr. & Gray, Fl. i. p. 363. — "*Hedysarum sessilifolium*, var. *angustifolium*, Tor." in Curtis, Pl. Wilming-ton, 1834.

Copses; abundant.

LESPEDEZA FRUTESCENS, (Willd.) Ell. Sk. ii. — *Hedysarum frutescens*, Willd. Spec. iii. — *L. capitata*, Michx. Fl.

Prairie; abundant.

L. LEPTOSTACHYA, Engelm. in Gray, Proc. Amer. Acad. xii. 1876.

Prairie; rare.

Beyond road south of Veterinary Barn. There is also a specimen in the Engelm. herbarium from Ames, collected by Dr. Arthur.

Vicia Cracca, L. Spec.

A few plants collected on the campus near South Hall.

V. AMERICANA, Muhl. in Willd. Spec. iii.

Low ground; frequent.

LATHYRUS VENOSUS, Muhl. in Willd. Spec. iii.

Upland woods; infrequent.

Skunk river northeast of Ames, and elsewhere.

L. PALUSTRIS, L. Spec.

Sloughs; not uncommon.

APIOS TUBEROSA, Moench, Meth. 1794.

Moist thickets; not uncommon.

STROPHOSTYLES ANGULOSA, (Ort.) Ell. Sk. ii. — *Phaseolus angulosus*, Ort. Nov. Pl. 1797-1800.

AMPHICARPEA COMOSA, (L.) Riddell, Synops. 1835.—*Glycine comosa*, L. Spec.—*A. monoica*, Ell. Journ. Acad. Phil. i. 1818.?

Low copses; frequent.

CASSIA CHAMECRISTA, L. Spec.

Dry, sterile soil; frequent.

GYMNOCLADUS DIOICUS, (L.) Koch, Dendr. 1869-1873. — *Guilandina dioica*, L. Spec.—*Gymnocladus Canadensis*, Lam. Dict. i.

Low woods; infrequent.

GLEDITSCHIA TRIACANTHOS, L. Spec.

Lowland woods; frequent.

ROSACEÆ.

PRUNUS AMERICANA, Marsh. Arbust.

Thickets; frequent.

P. PENNSYLVANICA, L. f. Suppl. 1761.

According to Prof. Budd, this is not uncommon in upland woods.

P. VIRGINIANA, L. Spec.

Upland woods; frequent.

P. SEROTINA, Ehr. Beitr. iii. 1789.

Woods; frequent.

RUBUS OCCIDENTALIS, L. Spec.

Upland woods; frequent.

R. VILLOSA, Ait. Hort. Kew.

Upland woods; frequent.

GEUM ALBUM, Gmel. Syst. ii. 1791.

Woods; frequent.

Watson's Index gives as synonyms of this: *G. Canadense*, Jacq. Hort. Vind. ii. 1772, [*G. Canadense*, Murr. in Comm. Soc. reg. sci. Goett. v. 1783? is *G. strictum*, Ait. Hort. Kew.] and *G. Carolinianum*, Walt. Fl. In the absence of sufficient literature, I have retained *G. album*, as given in the N. Y. Catalogue and Britton, Fl. N. Jersey.

G. VIRGINIANUM, L. Spec.

Low ground; frequent.

FRAGARIA VIRGINIANA, Duch., var. ILLINOENSIS, (Prince), Gray, Man. 5th ed. — *F. Illinoensis*, Prince (said to be in a seedsman's catalogue).

Moist prairie and banks; abundant.

POTENTILLA ARGUTA, Pursh, Fl.

Prairie; abundant.

P. NORVEGICA, L. Spec.

Low ground; abundant.

Erect, simple, or branching above; leaves all 3-foliate; petals about the length of the calyx.

- P. RIVALIS*, Nutt., var. *PENTANDRA*, (Engel.) Watson, Proc. Amer. Acad. 1873 (Revision Poten.)—*P. pentandra*, Engel. in Torr. & Gray, Fl. i. p. 447.

Sandy soil; infrequent.

Along the railroad near lower gate; near first bridge on wagon road south of Ames; bottom-land in "the forks."

Resembles *P. Norvegica*, and often grows with it, but always in sandy soil. Usually much branched at the very base, but sometimes simple; branches ascending; lower leaves 3-foliolate, but lateral leaflets parted almost to the base, thus appearing as if palmately 5-foliolate; petals minute; stamens usually 6, sometimes more; flowers smaller and pedicels more slender than in the last. The same was collected at Davenport, Sioux City, and Hamburg. The descriptions of this read, "stamens 5, opposite the sepals," but all the flowers examined showed usually 6, or sometimes 7 or 8. In the Engelmann herbarium is a specimen from Neosho river bottom, labelled "*P. pentandra*, Engel.," accompanied by a sketch showing 5 stamens. Another specimen from Humboldt county, Iowa, collected by Dr. J. C. Arthur, is accompanied by a note, "stamens 6-8 (10?)," etc.

- P. Anserina*, L. Spec.

Abundant along the railroad embankment at Jewell Junction.

- P. CANADENSIS*, L. Spec.

Dry banks; abundant.

- AGRIMONIA EUPATORIA*, L. Spec.

Woods; abundant.

- ROSA BLANDA*, Ait., var. *ARKANSANA*, (Porter) Best, Torr. Bull. xvii. 1890.—*R. Arkansana*, Porter, Syn. Fl. Col. 1874.

- / Prairie; abundant.

This is the common wild rose of central Iowa. It has passed for *R. blanda*, Ait.

- PIRUS CORONARIA*, L. Spec.

Copses; frequent.

- CRATÆGUS COCCINEA*, L., var. *MOLLIS*, Torr. & Gray, Fl. i. p. 465.

Woods; frequent.

- C. TOMENTOSA*, L. Spec.

Woods, chiefly lowland; frequent.

- C. PUNCTATA*, Jacq. Hort. Vind. i. 1770.

Thickets; frequent.

- AMELANCHIER CANADENSIS*, (L.) Torr. & Gray, Fl. i. p. 473.

Mespilus Canadensis, L. Spec.

Clay bluffs; not uncommon. Hoggatt's woods; more abundant on Skunk river.

SAXIFRAGACEÆ.

- HEUCHERA HISPIDA*, Pursh, Fl.

Prairie; frequent.

- PARNASSIA CAROLINIANA*, Michx. Fl.

Swamps; scarce.

Bog near pump-house, and elsewhere.

- RIBES CYNOSBATI*, L. Spec.

Woods; not uncommon.

- R. GRACILE*, Michx. Fl.

Woods; abundant.

R. FLORIDUM, L'Her. Stirp. i. 1784.

Woods; not uncommon.

*CRASSULACEÆ.***PENTHORUM SEDOIDES**, L. Spec.

Wet places; common.

*HALORAGÆ.***MYRIOPHYLLUM SPICATUM**, L. Spec.

Ponds; scarce.

Big Prairie; abundant at Cairo lake and all the larger ponds in the county.

PROSERPINACA PALUSTRIS, L. Spec.

Ponds; scarce.

*LYTHRACEÆ.***AMMANIA COCCINEA**, Rottb. Pl. Hort. rar. 1773 (fide Koehne).

Sloughs and river banks; scarce.

LYTHRUM ALATUM, Pursh, Fl.

Low ground; abundant.

*ONAGRACEÆ.***LUDWIGIA POLYCARPA**, Short & Peter, Pl. Ky. 2d suppl. 1835.

Wet places; frequent.

EPILOBIUM LINEARE, Muhl. Cat.

Wet places; scarce.

E. COLORATUM, Muhl. in Willd. Enum.

Low ground; abundant.

E. ADENOCALON, Hausskn. in Oesterr. bot. Zeitschr. xxix. 1879.

Wet places; frequent.

ÆNOTHERA BIENNIS, L. Spec.

Neglected ground; abundant.

Æ. RHOMBIPETALA, Nutt. in Torr. & Gray, Fl. i. p. 493.

Sandy soil; abundant along sand-hills south of Northwest School.

Æ. SERRULATA, Nutt. Gen.

Dry clay soil; infrequent.

CIRCÆA LUTETIANA, L. Spec.

Woods; abundant.

*CUCURBITACEÆ.**E. lobata* (Nutt.) Moench, &c. — *Momordica* (Nutt.) Greene, Proc. 880**ECHINOCYSTIS ECHINATA** (Muhl.) B. S. P. Cat. — *Momordica echi-**nata*, Muhl. Ind. Fl. Lanc. 1793. — *Seymouria lobata* (Nutt.) L.

Banks of streams; frequent.

*FICOIDEÆ.***MOLLUGO VERTICILLATA**, L. Spec.

Sandy places; common.

UMBELLIFERÆ.

Daucus Carota, L. Spec.

Occasionally spontaneous around gardens.

CONIOSELINUM CHINENSE, (L.) B. S. P. Cat.—*Athamanta Chinensis*, L. Spec.—*C. Canadense*, Torr. & Gray, Fl. i. p. 619.

Woody hillside a mile and a half east of Ames.

TIEDEMANNIA RIGIDA, (L.) C. & R. Bot. Gaz. xii. 1887.—*Sium rigidum*, L. Spec.

Sloughs; abundant.

HERACLEUM LANATUM, Michx. Fl.

Rich moist woods; not uncommon.

Pastinaca sativa, L. Spec.

Frequently spontaneous in proximity to gardens.

POLYTÆNIA NUTTALLII, DC. Mem. Umbel. 1829.

Dry places; scarce.

Field two miles and a half east of Ames.

Fœniculum officinale, Alli. Pedem. 1785 (1795, ex Nyman's Conspectus).—*Anethum Fœniculum*, L. Spec.

Occasionally escapes from gardens.

PIMPINELLA INTEGERRIMA, (L.) Benth. & Hook. Gen. Pl. 1. 1867.

—*Smyrniium integerrimum*, L. Spec.

Rocky woods; abundant.

CRYPTOTÆNIA CANADENSIS, (L.) DC. Mem. Umbel. 1829.—*Sison Canadense*, L. Spec.

Low woods; common.

SIUM CUCUTÆFOLIUM, Gmel. Syst. ii. 1791.

Sloughs; frequent.

ZIZIA AUREA, Koch, Umbel. (Nov. Act. Leop. xii. 1824).

Low prairie; abundant.

CICUTA MACULATA, L. Spec.—*C. virosa*, L., var. *maculata*, C. & R. Revis. Umbel. 1888.

Sloughs; abundant.

For remarks on this species see Greene, Pitt. i. p. 271, and ii. p. 1.

CHEROPHYLLUM PROCUMBENS, (L.) Crantz, Umbel. 1767.—*Scandix procumbens*, L. Spec.

Low woods; infrequent.

OSMORRHIZA CLAYTONI, (Michx.) B. S. P. Cat.—*Myrrhis Claytoni*, Michx. Fl.—*O. brevistylis*, DC. Prod. iv.

Rich woods; abundant.

O. LONGISTYLIS, (Torr.) DC. Prod. iv.—*Myrrhis longistylis*, Torr. Fl. U. S.

Rich woods; abundant.

ERYNGIUM YUCCÆFOLIUM, Michx. Fl.

Wet prairie; abundant.

For a note on nomenclature see Greene, Pitt. i. p. 185.

SANICULA CANADENSIS, L. Spec.—*S. Marylandica*, L., var. *Canadensis*, Torr. Fl. U. S.

Lowland woods; frequent.

Var. MARYLANDICA, (L.)—*S. Marylandica*, L. Spec.

Lowland woods; common.

ARALIACEÆ.

ARALIA RACEMOSA, L. Spec.

Rich woods; not uncommon.

A. NUDICAULIS, L. Spec.

Woods along clay bluffs; infrequent.

A. quinquefolia, (L.) Decaisne & Planch. Rev. Hort. 1854.—*Panax quinquefolia*, L. Spec.

One specimen among my plants collected at Ames, but locality not noted.

CORNACEÆ.

CORNUS CIRCINATA, L'Her. Cornus. 1788.

Rich woods; rare.

Clear creek one mile west of College, and elsewhere.

C. SERICEA, L. Mant. p. 199.

Moist woods; abundant.

C. ASPERIFOLIA, Michx. Fl.

Lowland woods; abundant.

C. CANDIDISSIMA, Marsh. Arbust.—*C. paniculata*, L'Her. Cornus, 1788.

Woods; abundant.

C. ALTERNIFOLIA, L. f. suppl. 1781.

Rocky woods; rare.

CAPRIFOLIACEÆ.

SAMBUCUS CANADENSIS, L. Spec.

Lowland woods; abundant.

VIBURNUM PUBESCENS, Pursh, Fl.

Rocky woods; not uncommon.

Fruit ovoid, dark purple, 3 to 4 lines long; ripe in July.

V. LENTAGO, L. Spec.

Rocky woods; not uncommon.

A small tree. Fruit black, 4 to 6 lines long, with very flat stone; ripe in September.

TRIOSTEUM PERFOLIATUM, L. Spec.

Upland woods; abundant.

Symphoricarpus vulgaris, Michx. Fl.

"Ames." One specimen in I. A. C. herbarium.

S. occidentalis, Hook. Fl. i.

Woods; rare.

"Ames," Bessey; Anderson. Both specimens in I. A. C. herbarium. Occurs frequently at Jewell Junction, Des Moines river at Boone, and around Des Moines.

LONICERA GLAUCA, Hill, Hort. Kew, 1768.

Rocky woods; infrequent.

Hoggatt's woods; Skunk river northeast of Ames.

RUBIACEÆ.**CEPHALANTHUS OCCIDENTALIS**, L. Spec.

Sloughs; infrequent.

A low shrub, 3 to 4 feet high. (In eastern Iowa it grows taller—6 to 8 ft. high.)

GALIUM APARINE, L. Spec.

Low woods; abundant.

Annual; stems reclining, often forming dense mats; leaves 6, or mostly 8, linear to oblanceolate; fruit hispidulous.

G. TRIFIDUM, L. Spec.

Wet places; common.

A low diffusely-branched perennial; leaves linear, about $\frac{1}{2}$ inch long, 4 to 6 in a whorl; fruit smooth. A form with mostly 6 narrowly elliptical leaves, grows abundantly in upland woods.**Var. LATIFOLIUM**, Torr. Fl. U. S.

Wet places. common.

Plant usually less branched; leaves broader.

G. CONCINNUM, Torr. & Gray, Fl. ii. p. 23.

Dry hills; abundant.

Resembles *G. trifidum*, but leaves all in sixes and flowers more numerous.**G. TRIFLORUM**, Michx. Fl.

Woods; frequent.

Leaves elliptical-lanceolate, all in sixes, larger and broader than in the other species; fruit hispidulous.

COMPOSITÆ.**VERNONIA FASCICULATA**, Michx. Fl.

Bottom lands; common.

EUPATORIUM PURPUREUM, L. Spec.

Low woods; not uncommon.

Var. MACULATUM, (L.) Darl. Fl. Cest. 1837.—*E. maculatum*, L. Amoen. iv. 1760.—*E. purpureum*, β . L. Spec.

Sloughs and low woods; frequent.

This is more common than the type, and easily distinguished; the inflorescence is denser, the leaves shorter, and veins more reticulated.

E. ALTISSIMUM, L. Spec.

Dry banks; infrequent.

E. PERFOLIATUM, L. Spec.

Low grounds; common.

E. AGERATOIDES, L. f. suppl. 1781.

Woods; common.

KUHNI A EUPATORIODES, L. Spec. 2d ed. appx.

Dry prairie; abundant.

Var. GLUTINOSA, (Ell.)—*K. glutinosa*, Ell. Sk. ii.—*K. eupatorioides*, L., var. *corymbulosa*, Torr. & Gray, Fl. ii.

Dry prairies; abundant.

LIATRIS CYLINDRACEA, Michx. Fl.

Prairie; frequent.

L. SCARIOSA, (L.) Willd. Spec. iii. p. 1635. — *Serratula scariosa*, L. Spec.

Prairie; abundant.

L. PYCNOSTACHYA, Michx. Fl.

Low prairie; abundant.

SOLIDAGO.

* Inflorescence in the axils of feather-veined leaves.

S. LATIFOLIA, L. Spec.

Rich woods; frequent.

Stem smooth, angled, more or less zigzag; leaves ovate, large and thin, or upper smaller and lanceolate, all tapering into margined petioles, sharply and deeply serrate, pubescent beneath.

* * Inflorescence a terminal panicle.

+ Leaves not triple-ribbed.

++ Racemes not secund.

S. SPECIOSA, Nutt., var. **ANGUSTATA**, Torr. & Gray, Fl. ii. p. 205.

Prairie; infrequent.

Stems strict, 2 to 3 feet high; leaves entire or nearly so, lower spatulate, upper narrowly elliptical, becoming small and bract-like in the inflorescence.

True *S. speciosa*, Nutt. is abundant in eastern Iowa, but I have not seen it here. It should be sought along the borders of upland woods.

++ ++ Racemes secund. (*S. nemoralis* might be sought here.)

S. ULMIFOLIA, Muhl. in Willd. Spec. iii.

Woods; common.

Leaves thin, elliptical, pointed at both ends, sharply serrate, or sometimes the upper entire; branches of panicle long, slender and recurving. Quite variable. (For note on *S. lateriflora*, Ait., see Gray, Proc. Amer. Acad. xvii. p. 180.)

+ + Leaves more or less triple-ribbed.

++ Stem smooth, at least up to panicle.

S. MISSOURIENSIS, Nutt. Jour. Acad. Phil. vii. 1834.

Prairie; common.

Low, seldom more than 2 feet high; glabrous throughout; leaves narrow, thick and rather rigid, entire or sparingly denticulate. Flowering earlier than the other species.

S. SEROTINA, Ait. Hort. Kew.

Open ground or along fences and roadsides; common.

Tall, glabrous up to the ample panicle; leaves large and sharply serrate.

Var. GIGANTEA, (Ait.) Gray, Proc. Amer. Acad. xvii. 1882.—

S. gigantea, Ait. Hort. Kew.

Open ground; not uncommon.

Around North Hall and elsewhere. Leaves more or less pubescent beneath.

++ ++ Stem pubescent,

S. CANADENSIS, L. Spec.

Open ground, roadsides, moist woods, etc.; common.

Resembles *S. serotina* in general appearance, but stem, and usually smaller and narrower leaves, pubescent.

Var. PROCERA, (Ait.) Torr. & Gray, Fl. ii. p. 224.—*S. procera*, Ait. Hort. Kew.

Open ground; not uncommon.

Plant paler, leaves less serrate, and panicle much smaller than in *S. Canadensis*.

S. NEMORALIS, Ait. Hort. Kew.

Dry gravelly soil; abundant.

Stem (a few inches to 2 feet high) cinereous-pubescent; leaves spatulate or oblanceolate, entire, or the lower sparingly serrate; panicle recurved, or in the taller specimens sometimes erect.

* * * Heads disposed in corymbiform or cymose clusters.

+ Stem densely pubescent.

S. RIGIDA, L. Spec.

Prairie; common.

Stem 2 to 3 feet high, softly pubescent or scabrous; radical leaves on long petioles; lower cauline, oblanceolate tapering into slender petioles; upper, ovate to oblong, sessile; all entire or nearly so.

+ + Stem nearly or quite glabrous.

S. RIDDELLII, Frank, in Riddell, Synops. 1835.

Sloughs, often growing in the water; infrequent.

Low prairie north of Ames, and elsewhere. Stem smooth, 1 to 2 ft. high; leaves entire, long and narrow, erect from a sheathing base.

S. GRAMINIFOLIA, (L.) Ell. Sk. ii.—*Chrysocoma graminifolia*, L. Spec.—*S. lanceolata*, L. Mant. p. 114.

Wet places; abundant.

Stem much branched, usually smooth, 1 to 3 feet high, with long and slender rootstocks; leaves narrowly lanceolate, 3-nerved, heads glomerate-sessile. Flowering late.

BOLTONIA ASTEROIDES, (L.) L'Her. Sert. Angl. 1788.—*Matricaria asteroides*, L. Mant. p. 116.

Sloughs; frequent.

This has the general appearance of an Aster, but the pappus consists of two (under a lens, setose) awns and a ring of short bristles; the achene is setulose on the upper part of its winged margin.

ASTER OBLONGIFOLIUS, Nutt., var. RIGIDULUS, Gray, Syn. Fl. i. 2.
Rocky bluffs; infrequent.

A. NOVÆ-ANGLIÆ, L. Spec.

Sloughs and moist places; abundant.

Var. ROSEUS, (Desf.) DC. Prod. v.—*A. roseus*, Desf. Cat. H. Par. 3d ed.

With the above; an infrequent form.

A. SERICEUS, Vent. Hort. Cels. 1800.

Dry banks; infrequent.

- A. AZUREUS, Lindl. in Hook. Comp. Bot. Mag. i. 1835.
Prairies and thickets; frequent.
- A. CORDIFOLIUS, L. Spec.
Woods; common.
- A. LÆVIS, L. Spec.
Rocky woods, especially bluffs; not uncommon.
- A. AMETHYSTINUS, Nutt. Trans. Amer. Phil. Soc. vii. 1841.
Moist places; scarce.
- A. MULTIFLORUS, Ait. Hort. Kew.
Prairie; common.
- A. LATERIFLORUS, (L.) Britton, Trans. N. Y. Acad. Sci. ix. 1889.
—*Solidago lateriflora*, L. Spec.—*A. diffusus*, Ait. Hort. Kew.
Low woods; abundant.
- A. PANICULATUS, Lam. Dict. i.
Low ground; common.
- A. PRENANTHOIDES, Muhl. in Willd. Spec. iii.
Low ground; infrequent.
- A. PUNICEUS, L., var. LUCIDULUS, (Wendr.) Gray, Syn. Fl. i. 2.—
A. lucidulus, Wendr. Ind. Sem. Marb.
Moist places; not uncommon.
- A. UMBELLATUS, Mill. Dict.
Low ground; not uncommon.
- Var. PUBENS, Gray, Syn. Fl. i. 2.
Low ground; infrequent.
- ERIGERON CANADENSIS, L. Spec.
Neglected ground; common.
Commonly 4 or 5 feet high, but depauperate specimens sometimes only a few inches.
- E. DIVARICATUS, Michx. Fl.
Prairie or open woods; not uncommon.
- E. ANNUUS, (L.) Pers. Syn. ii.—*Aster annuus*, L. Spec.
Prairie and neglected fields; abundant.
The typical form is pubescent with spreading hairs; leaves broad, thinnish and toothed. Passes into the next.
- E. RAMOSUS, (Walt.) B. S. P. Cat.—*Doronicum ramosum*, Walt.
Fl.—*E. strigosus*, Muhl. in Willd. Spec. iii.
Dry ground; common.
Typical form pubescent with appressed hairs; leaves narrowly spatulate, thickish, usually entire. Apparently crosses freely with *E. annuus*.
- E. PHILADELPHICUS, L. Spec.
Upland woods; abundant.
- ANTENNARIA PLANTAGINIFOLIA, (L.) Hook. Fl. i.—*Gnaphalium plantaginifolium*, L. Spec.
Upland woods; common.

SILPHIUM LACINIATUM, L. Spec.

Prairie; frequent.

Radical leaves varying from narrowly oblanceolate and entire to broad and twice pinnately parted.

S. INTEGRIFOLIUM, Michx. Fl.

Open upland woods; frequent in the woods west of Nevada.

Leaves sometimes narrowed to a sessile base.

S. PERFOLIATUM, L. Spec. 2d ed.

Moist soil; frequent.

AMBROSIA TRIFIDA, L. Spec.

Low ground; common.

Var. **INTEGRIFOLIA**, (Muhl.) Torr. & Gray, Fl. ii. p. 290.—*A. integrifolia*, Muhl. in Willd. Spec. iv.

A form with entire leaves.

A. ARTEMISIAEFOLIA, L. Spec.

Prairies and roadsides; common and quite variable.

A. PSILOSTACHYA, DC. Prod. v.

Prairie; infrequent.

Dry hills north of College, beyond Squaw creek.

XANTHIUM CANADENSE, Mill. Dict. 8th ed.

Cultivated ground and waste places; common.

X. Canadense, Mill., var. *echinatum*, (Murr.) Gray, Syn. Fl. i. 2.—*X. echinatum*, Murr. in Comm. Soc. reg. sci. Goett. vi. 1783-4. If I have the right understanding of this variety, it does not occur in our flora.

HELIOPSIS SCABRA, Dunal, Mem. Mus. Paris, v. 1819.

Prairie and open woods; common.

It has the appearance of *Helianthus*, but the ray-flowers are fertile.

ECHINACEA ANGUSTIFOLIA, DC. Prod. v.

Prairie; abundant.

RUDBECKIA LACINIATA, L. Spec.

Low woods; common.

R. TRILOBA, L. Spec.

Moist woods; common.

R. SUBTOMENTOSA, Pursh, Fl.

Moist prairie or open woods; frequent.

R. HIRTA, L. Spec.

Prairie; common.

LEPACHYS PINNATA, (Vent.) Torr. & Gray, Fl. ii. p. 314.—*Rudbeckia pinnata*, Vent. Hort. Cels. 1800.

Prairie; abundant.

HELIANTHUS ANNUUS, L. Spec.

Waste grounds; infrequent.

Ordinarily tall and stout, but ours is frequently depauperate, sometimes only a few inches high with a single small head.

- H. DIFFUSUS**, Sims, Bot. Mag. 1818.—*H. rigidus*, Desf. Cat. Hort. Paris. 3d ed. 1829.
Prairies; frequent.
- H. LÆTIFLORUS**, Pers. Syn. ii.
Prairie; infrequent.
Along the railroad near the stone arch.
- H. GROSSE-SERRATUS**, Martens, Sel. Sem. Hort. Lovan. 1839.
Low ground; abundant.
- H. STRUMOSUS**, L. Spec.
Borders of woods; abundant.
- Var. MOLLIS**, (Willd.) Torr. & Gray, Fl. ii. p. 327.—*H. mollis*, Willd. Spec. iii.
Woods; infrequent.
Leaves often somewhat cordate at base, softly pubescent beneath.
- H. TRACHELIIFOLIUS**, Willd. Spec. iii.
Borders of woods; scarce.
- H. TUBEROSUS**, L. Spec.
Open places; abundant.
- ACTINOMERIS ALTERNIFOLIA**, (L.) DC. Prod. v.—*Corcopsis alternifolia*, L. Spec.—*A. squarrosa*, Nutt. Gen.
Woods in low ground; frequent.
- COREOPSIS PALMATA**, Nutt. Gen.
Prairie; abundant.
Specimens sometimes occur with narrow, entire leaves.
- C. TRIPTERIS**, L. Spec.
Upland woods; infrequent.¹
Woods west of Nevada; Squaw creek 3 miles northwest of College.
- BIDENS FRONDOSA**, L. Spec.
Moist ground; common.
- B. CONNATA**, Muhl. in Willd. Spec. iii.
Wet places; common.
- B. CERNUA**, L. Spec.
Wet places; common.
- B. CHRYSANTHEMOIDES**, Michx. Fl.
Wet places; common.
- B. Beckii**, Torr. in Spreng. Neu. Entd. ii. 1821.
I observed a few plants in a pond north of Ames in 1883, but have no specimens.
- HELENIUM AUTUMNALE**, L. Spec.
Low ground; common.
- DYSODIA PAPPOSA**, (Vent.)—*Tagetes papposa*, Vent. Hort. Cels. 1800.—*D. chrysanthemoides*, Lag. Nov. Gen. & Spec. 1816.
Sterile soil; frequent.
The pappus consists of "scales dissected into bristles" instead of "capillary bristles," as it may at first appear.
- ANTHEMIS COTULA**, L. Spec.
Roadsides; common.

A. arvensis, L. Spec.

"Ames-Bessey." Specimen in I. A. C. herbarium.

ACHILLEA MILLEFOLIUM, L. Spec.

Prairie; common.

Chrysanthemum Leucanthemum, L. Spec.

Plants occur occasionally on the Campus, along the railroad, and elsewhere, but the species has not, so far as I know, become established.

Tanacetum vulgare, L. Spec.

Escaped along roadsides in a few localities.

ARTEMISIA CAUDATA, Michx. Fl.

Sandy soil; abundant along the sand-hills south of the Northwest School.

A. DRACUNCULOIDES, Pursh, Fl.

Prairie; not uncommon.

A. SERRATA, Nutt. Gen.

Low ground; infrequent.

Bottom-land in "the forks"; quite abundant on Clear creek about one mile west of the College.

A. LUDOVICIANA, Nutt. in Torr. & Gray, Fl. ii. p. 420.

Prairie; common.

Leaves incised, or entire (var. *gnaphalodes*).

A. BIENNIS, Willd. Phytog. 1794.

Dry and sterile ground; frequent.

SENECIO AUREUS, L. Spec.

Marshy places; not uncommon.

Var. OBOVATUS, (Muhl.) Torr. & Gray, Fl. ii. p. 442. - *S. obovatus*, Muhl. in Willd. Spec. iii.

Wet prairie; infrequent.

Var. BALSAMITÆ, (Muhl.) Torr. & Gray, l. c. - *S. balsamitæ*, Muhl. l. c.

Rocky bluffs on Des Moines river at Boone.

CACALIA TUBEROSA, Nutt. Gen.

Wet prairie; frequent.

ERECHTITES HIERACIFOLIA, (L.) Raf. in DC. Prod. vi. - *Senecio hieracifolia*, L. Spec.

Moist places; not common.

ARCTIUM LAPPA, L. Spec.

Neglected ground; common.

CNICUS LANCEOLATUS, (L.) Hoffm. Fl. Germ. iv. 1804. - *Carduus lanceolatus*, L. Spec.

Pastures; infrequent.

Rather abundant in a pasture about one mile northeast of Ames; also west of the College beyond the brick-kiln.

C. ALTISSIMUS, (L.) Willd. Spec. iii.—*Carduus altissimus*, L. Spec.
Open woods and roadsides; abundant.

Var. DISCOLOR, (Muhl.) (Gray, Proc. Amer. Acad. xix. 1883.—*C. discolor*, Muhl. in Willd. Spec. iii.

Borders of fields, along fences, etc.; common.

Seems to pass into *C. altissimus*. The white-flowered form occurs along Skunk river.

C. odoratus, Muhl. Cat. 1st ed.—*Carduus odoratus*, Muhl. Cat. 2d ed.—*C. pumilus*, Torr. Compend. 1826.

Pastures; not uncommon.

[Of this, Mr. Watson writes:—The *Cnicus* sent is not true *C. pumilus*. While the foliage and shape of the involucre scales agree well enough, the latter have a black-glutinous thickening above, which I do not find on eastern specimens. Of more importance are the more acuminate anthers, like those of the other western species of the group. It will not go into *C. Drummondii*, and I suspect that it is a fairly good undescribed species.—T.]

C. arvensis, (L.) Hoffm. Fl. Germ. iv. 1804.—*Serratula arvensis*, L. Spec.

Introduced in a few places but not established.

HIERACIUM SCABRUM, Michx. Fl.

Upland woods; a few specimens collected on Onion creek, northwest of stone arch, in 1886.

H. LONGIPILUM, Torr. in Hook. Fl. i. (note under *H. Scouleri*).

Prairie; infrequent.

Campus south of Prof. Osborn's house; abundant a few rods south of the veterinary barn.

PRENANTHES RACEMOSA, Michx. Fl.

Low prairie; not uncommon.

P. ASPERA, Michx. Fl.

Prairie; infrequent.

P. ALBA, L. Spec.

Upland woods; frequent.

TROXIMON CUSPIDATUM, Pursh, Fl.

Prairie; scarce.

Along railroad 3 miles east of Ames, and elsewhere.

TARAXACUM OFFICINALE, (With.) Weber in Prim. Fl. Holsat. 1780.

—*Leontodon officinale*, With. Bot. Arrang. 1776.

Grass land; common.

LACTUCA SCARIOLA, L. Spec. 2d ed.

Waste places; becoming frequent.

This was first described under *L. Serriola* (Amœn. Acad. iv. p. 328), which is probably a typographical error, for in the Species, 2d edition, the description is the same as in the Amœnitates, to which reference is made without comment.

L. CANADENSIS, L. Spec.

Moist places; common.

L. LUDOVICIANA, (Nutt.) DC. Prod. vii.—*Sonchus Ludovicianus*, Nutt. Gen.

L. FLORIDANA, (L.) Gaertn. Fruct. ii. 1791.—*Sonchus Floridanus*, L. Spec.

Shady places; frequent.

L. SPICATA, (Lam.)—*Sonchus spicatus*, Lam. Dict. iii.—*L. leucophæa*, Gray, Proc. Amer. Acad. xix. 1883.

Moist open woods; not uncommon.

Lactuca leucophæa, Sibth. Fl. Græc. 4. 794, 1833 (ex DC. Prod. vii.) is placed by Boissier (Fl. Orient.) under *L. Cretica*, but it may be revived at any time, in which case *L. leucophæa*, Gray, would be untenable.

SONCHUS OLERACEUS, L. Spec.

I have no specimen of this, but Prof. Pammel assures me that it occurs at Ames.

S. ASPER, Vill. Fl. Delph. 1785.

Waste places; not uncommon.

LOBELIACEÆ.

LOBELIA CARDINALIS, L. Spec.

Wet places in lowland woods; frequent.

L. SYPHILITICA, L. Spec.

Low ground; abundant.

L. SPICATA, Lam., var. HIRTELLA, Gray, Syn. Fl. ii. 1.

Prairie; frequent.

L. INFLATA, L. Spec.

Open woods; a few specimens found in the woods west of cemetery.

CAMPANULACEÆ.

SPECULARIA PERFOLIATA, (L.) A. DC. Mon. Camp. 1830.—*Campanula perfoliata*, L. Spec.

CAMPANULA APARINOIDES, Pursh, Fl.

Low grassy places; not uncommon.

C. AMERICANA, L. Spec.

Moist woods; abundant.

ERICACEÆ (MONOTROPEÆ).

MONOTROPA UNIFLORA, L. Spec.

I have one specimen collected near the stone arch, a few years ago, by Mr. C. L. Spencer.

PRIMULACEÆ.

STEIRONEMA CILIATUM, (L.) Raf. Ann. Gen. Phys. Brux. vii. 1820.

—*Lysimachia ciliata*, L. Spec.

Low ground; abundant.

S. LANCEOLATUM, (Walt.) Gray, var. HYBRIDUM, (Michx.) Gray, Syn. Fl. ii. 1.—*Lysimachia hybrida*, Michx. Fl.

Sloughs; abundant.

S. QUADRIFLORUM, (Sims).—*Lysimachia quadriflora*, Sims, Bot. Mag. 1803.—*S. longifolium*, Gray, Proc. Amer. Acad. xii. 1876.

Low prairie; frequent.

LYSIMACHIA THYRSIFLORA, L. Spec.

Ponds; becoming rare.

OLEACEÆ.

FRAXINUS AMERICANA, L. Spec. 2d ed.

Upland woods.

This species is apparently rare. Although diligently searched for, only one tree was found near the railroad, north of the brick-kiln. It is easily recognized by its cylindrical fruit with the wing not decurrent, and by its rather slender-petioled leaflets being whitened beneath.

F. VIRIDIS, Michx. f. Hist. Arb. Am. iii. 1813.

Woods; abundant.

A small or medium sized tree, growing in both upland and lowland woods; leaflets mostly 5, oval to narrowly lanceolate, sharply serrate, or nearly entire, glabrous or with more or less pubescence along the veins beneath, tapering into a somewhat margined petiole; fruit with slender striate body, tapering to an acute base, and decurrent obovate oblong or lanceolate retuse or acute wing 1 to 3 times the length of the body.

Var. PUBESCENS.

Upland woods; Ames; Hamilton county, Fremont county, Sioux City.

This differs from *F. viridis* in having the twigs of the season densely pubescent.

F. SAMBUCIFOLIA, Lam. Dict. ii.

Along streams; infrequent.

A medium sized tree with oblong spray, dark green foliage, and close bark, becoming mottled with white as in the Black Maple; leaflets sessile, 7 to 11. Occurs along the clay bluffs of Skunk river, mostly near the water but often on the sides or top; also sparingly on Clear creek about one mile west of the College, on Onion creek, and in a few other localities.

APOCYNACEÆ.

APOCYNUM ANDROSÆMIFOLIUM, L. Spec.

Rich open woods; frequent.

A. CANNABINUM, L. Spec.

Moist banks; abundant.

ASCLEPIADACEÆ.

ASCLEPIAS TUBEROSA, L. Spec.

Prairie; abundant.

Var. DECUMBENS, (L.) Pursh, Fl. — *Asclepias decumbens*, L. Spec.

Sterile soil; infrequent.

A. PURPURASCENS, L. Spec.

Prairie and open woods; not uncommon.

A. INCARNATA, L. Spec.

Low ground; common.

A. SYRIACA, L. Spec.—*A. Cornuti*, Decaisne in DC. Prod. viii.

Fields, pastures, and open woods; abundant.

A. SULLIVANTII, Engel. in Gray Man. 1st. ed.

Low prairie; frequent.

A. OVALIFOLIA, Decaisne in DC. Prod. viii.

Prairie; scarce.

The following specimens are in the I. A. C. herbarium: "Ames—R. Burgess, 1878;" "Ames—H. A. Gossard, 1887;" "E. Ames—E. K. Paine, 1887."

A. VERTICILLATA, L. Spec.

Banks and prairie; frequent.

Acerates Floridana, (Lam).—*Asclepias Floridana*, Lam. Dict. i.

—*Acerates longifolia*, Ell. Sk. i.

Prairie; southeastern part of Story county.

A. VIRIDIFLORA, (Raf.) Ell. Sk. i.—*Asclepias viridiflora*, Raf. Med.

Rep. xi. 1807.(?)

Prairie; not uncommon.

Var. LANCEOLATA, (Ives) Gray, Syn. Fl. ii. 1.—*Asclepias lanceolata*, Ives, Amer. Jour. Sci. iv. 1822.(?)

Prairie; infrequent.

GENTIANACEÆ.

GENTIANA CRINITA, Froel. Gent. 1796.

Swamps; rare.

Near pump-house, and reported elsewhere.

G. QUINQUEFOLIA, L., var. OCCIDENTALIS.—*G. quinquefolia*, Lam.,

var. *occidentalis*, Gray, Syn. Fl. ii. 1.

Open woods; not uncommon.

G. PUBERULA, Michx. Fl.

Prairie; infrequent.

G. ANDREWSII, Griseb. Gent. 1839.

Low ground; not uncommon.

G. FLAVIDA, Gray, Amer. Jour. Sci. 2d s. i. 1846.—*G. alba*, Muhl.

Cat. 2d ed.

Low ground; infrequent.

Along the railroad east of Squaw creek bridge, and elsewhere. For note on nomenclature see Porter, Torr. Bull. xvi. 1889.

POLEMONIACEÆ.

PHLOX MACULATA, L. Spec.

Sloughs; scarce.

Near Shearer School.

P. PILOSA, L. Spec.

Low prairie; abundant.

P. DIVARICATA, L. Spec.

Woods; abundant.

POLEMONIUM REPTANS, L. Spec. 2d ed. (Syst. Nat. 10th ed. ex Richter.)

Rich woods; not uncommon.

Frequent along Skunk river north of Ames.

HYDROPHYLLACEÆ.

HYDROPHYLLUM VIRGINIANUM, L. Spec.

Low woods; common.

This is commonly quoted as *H. Virginicum*, L.

H. appendiculatum, Michx. Fl.

Rich woods; Des Moines river west of Boone.

ELLISIA NYCTELEA, L. Spec. 2d ed. — *Polemonium Nyctelea*, L. Spec.

Low sandy ground; abundant.

BORRAGINACEÆ.

ECHINOSPERMUM VIRGINIANUM, (L.) Lehm. Pl. Asper. 1818. — *Myosotis Virginiana*, L. Spec. — *M. Virginica*, L. Spec. 2d ed.

Woods; common.

It is probable that the name as it appears in the 2d edition of the Species, is a typographical error, which was followed by Lehmann; hence I have quoted the latter above, although in Pl. Asper. it appears as *E. Virginicum*.

E. LAPPULA, (L.) Lehm. Pl. Asper. 1818. — *Myosotis Lappula*, L. Spec.

Sterile soil; frequent.

MERTENSIA VIRGINICA, (L.) DC. Prod. x. — *Pulmonaria Virginica*, L. Spec.

Low woods; abundant.

LITHOSPERMUM LATIFOLIUM, Michx. Fl.

Upland woods; scarce.

Skunk river northeast of College, and elsewhere.

L. CANESCENS, (Michx.) Lehm. Pl. Asper. 1818. — *Botschia canescens*, Michx. Fl.

Prairie; frequent.

L. ANGUSTIFOLIUM, Michx. Fl.

Prairie; frequent.

ONOSMODIUM CAROLINIANUM, (Lam.) DC., var. *MOLLIS*, (Michx.) Gray, Syn. Fl. ii. 1. — *O. mollis*, Michx. Fl.

CONVOLVULACEÆ.

Ipomœa purpurea, (L.) Lam. Illustr. i. — *Convolvulus purpurea*, L. Spec. 2d ed.

Escaped from cultivation in the neighborhood of dwellings.

CONVOLVULUS SEPIUM, L. Spec.

Low ground; abundant.

C. arvensis, L. Spec.

In a field a short distance northwest of Mr. Sexton's house.

Cuscuta Cephalanthi, Engel. Amer. Jour. Sci. xliii. 2, 1842. — *C. tenuiflora*, Engel. Gray, Man. 1st ed.

Low ground; frequent.

Growing on *Salix*, *Vernonia*, *Solidago*, etc.

Dr. Engelmann first described this species under the impression that it grew only on *Cephalanthus*. The next year (l. c. xlv. 1, 1843) he says, "I did wrong there. fore, to name them from the genera upon which they grew, and I should much prefer to see the names *C. Cephalanthi* changed into *C. tenuiflora*, *C. Coryli* into *C. incurva*. * * * if they had not yet been published," Nevertheless, in 1843, he makes this change.

C. CORYLI, Engel. Amer. Jour. Sci. xliii. 1842. — *C. inflexa*, Engel. Trans. St. L. Acad. Sci. i. 1859.

Dry thickets; infrequent.

Usually on *Corylus*.

C. GRONOVII, Willd. Reliqu. in Roem. & Sch. Syst. Veg. vi. 1820.

Moist places; frequent.

Growing on *Solidago* and other tall herbs.

C. GLOMERATA, Choisy, Mem. Genev. 1841.

Low ground; not uncommon.

Usually on *Solidago*. According to Dr. Engelmann (*Cusc.* p. 510) Rafinesque's earlier name, *C. paradoxa*, Ann. Nat. 1820, should be discarded because of the obscure description.

SOLANACEÆ.

SOLANUM NIGRUM, L. Spec.

Shady places; common.

S. CAROLINENSE, L. Spec.

Well established in the field west of the greenhouse.

Physalis Philadelphica, Lam. Dict. ii.

Waste ground; rare.

One specimen collected on the streets of Ames.

P. PUBESCENS, L. Spec.

Low ground; not uncommon.

P. VIRGINIANA, Mill. Dict.

Sandy ground; frequent.

P. LANCEOLATA, Michx. Fl.

Fields and prairies; frequent.

DATURA STRAMONTIUM, L. Spec.

Pastures and waste places; infrequent.

D. TATULA, L. Spec. 2d ed.

Waste ground; not uncommon.

SCROPHULARIACEÆ.

VERBASCUM THAPSUS, L. Spec.

Neglected fields; frequent.

V. BLATTARIA, L. Spec.

Quite abundant in an open place in the woods northeast of Ames, near Skunk river.

- LINARIA VULGARIS**, Mill. Diet.—*Antirrhinum Linaria*, L. Spec.
Roadsides, etc.; not uncommon.
- SCROPHULARIA NODOSA**, L., var. **MARILANDICA**, (L.) Gray, Syn.
Fl. ii. 1.—*S. Marilandica*, L. Spec.
Woods; common.
- MIMULUS RINGENS**, L. Spec.
Low woods; abundant.
- ILYSANTHES GRATIOLOIDES**, (L.) Benth. in DC. Prod. x. — *Capra-
ria gratioides*, L. Spec. 2d ed.
Wet places; not uncommon.
- VERONICA VIRGINICA**, L. Spec.
Upland woods; frequent.
- V. ANAGALLIS**, L. Spec.
Borders of ponds and streams; infrequent.
- V. PEREGRINA**, L. Spec.
Damp places; common.
- V. ARVENSIS**, L. Spec.
Upland woods; rare.
Rather abundant in locality mentioned for *Verbascum Blattaria*.
- GERARDIA AURICULATA**, Michx. Fl.
Low prairie; not uncommon.
- G. LONGIFOLIA**, Benth. Comp. Bot. Mag. i. 1835.—*G. aspera*, Benth.
in DC. Prod. x.
Prairie; abundant.
G. longifolia, Nutt. Trans. Amer. Phil. Soc. N. S. v. 1837., is *G. setacea*, Walt.,
var. *longifolia*, Gray, (ex Syn. Fl. ii. 1).
- G. TENUIFOLIA**, Vahl. Symb. iii. 1794.
Low ground; abundant.
- CASTILLEIA SESSILIFLORA**, Pursh, Fl.
Dry hills; rare.
Along railroad 3 miles east of Ames.
- PEDICULARIS CANADENSIS**, L. Mant. p. 86.
Upland woods; abundant.
- P. LANCEOLATA**, Michx. Fl.
Low prairie; not uncommon.

OROBANCHACEÆ.

- Aphyllon uniflorum**, (L.) Gray, Man. 1st ed. (there cited "Torr. &
Gray").—*Orobanche uniflorum*, L. Spec.

I have a single specimen collected northwest of the College by Mr. I. B. Clark.

LENTIBULARIACEÆ.

- UTRICULARIA VULGARIS**, L. Spec.
Ponds; becoming rare.

VERBENACEÆ.

VERBENA URTICÆFOLIA, L. Spec.

Low woods; common.

Originally spelled *V. urticifolia*.

V. HASTATA, L. Spec.

Low ground; common.

V. STRICTA, Vent. Hort. Cels. 1800.

Prairie; common.

Often becomes a troublesome weed in close-fed pastures.

V. BRACTEOSA, Michx. Fl.

Pastures and roadsides; abundant.

V. Aubletia, L. f. suppl. 1781.

Escaped from cultivation. Specimens contributed by Prof. Pammel.

PHRYMA LEPTOSTACHYA, L. Spec.

Woods; common.

LABIATÆ.

TEUCRIUM CANADENSE, L. Spec.

Wet places; abundant.

MENTHA CANADENSIS, L. Spec.

Wet places; abundant.

Var. *BOREALIS*, (Michx.) Wood. Bot. & Fl.—*M. borealis*. Michx.

Fl.—*M. Canadensis*, L., var. *glabrata*, Benth. in DC. Prod. xii.

Wet places; infrequent.

LYCOPUS VIRGINICUS, L. Spec.

Wet places; frequent.

L. RUBELLUS, Moench, Meth. suppl. 1802.

Low places; infrequent.

L. SINUATUS, Ell. Sk. i.

Low ground; common.

PYCNANTHEMUM VIRGINIANUM, (L.) Pers.—*Satureia Virginiana*,

L. Spec. (ex Gray, Syn. Fl. ii. 1.)—*Pycnanthemum lanceolatum*,

Pursh, Fl.—*Thymus Virginicus*. L. Mant. p. 409.

Prairie; common.

According to Bentham, *Satureia Virginiana*, L., is *Pycnanthemum muticum*, Pers. Dr. Britton informs me that in the N. Y. Catalogue the authority was inadvertently omitted, and should be *P. Virginicum*, (L.) Pers. instead of *P. Virginicum*, (L.) B. S. P. as given in Fl. N. Jersey.

HEDEOMA PULEGIOIDES, (L.) Pers. Syn. ii.—*Melissa pulegioides*,

L. Spec.—*Cunila pulegioides*. L. Spec. 2d ed.

Open woods; scarce.

Abundant in locality mentioned for *Verbascum Blattaria*, and elsewhere.

H. HISPIDA, Pursh, Fl.

Dry ground; abundant.

Salvia lanceolata, Willd. Enum.

A few specimens along railroad, northwest of Ames, collected by Mr. Sirrene.

MONARDA FISTULOSA, L. Spec.

Prairie and open woods; common.

Blephilia hirsuta, (Pursh) Benth. Lab. 1832-1836.—*Monarda hirsuta*, Pursh, Fl.

Damp woods on Des Moines river at Boone.

LOPHANTHUS NEPETOIDES, (L.) Benth. Bot. Reg. xv. 1829.—*Hyssopus nepetoides*, L. Spec.

Open woods; infrequent.

L. SCROPHULARIEFOLIUS, (Willd.) Benth. Bot. Reg. xv. 1829.—*Hyssopus scrophulariaefolius*, Willd. Spec. iii.

Open woods; not uncommon.

NEPETA CATARIA, L. Spec.

Waste places; not uncommon.

N. HEDERACEA, (L.) B. S. P. Cat.—*Glechoma hederacea*, L. Spec.
—*N. Glechoma*, Benth. Lab. 1832-1836.

Around dwellings; frequent along streets of Ames.

SCUTELLARIA LATERIFLORA, L. Spec.

Moist places; abundant.

S. PARVULA, Michx. Fl.

Sandy prairie; frequent.

S. GALERICULATA, L. Spec.

Bogs; rare.

Near pump-house.

BRUNELLA VULGARIS, L. Spec.

Open woods; abundant.

In the Linnæan works it is written *Prunella*.

PHYSOSTEGIA VIRGINIANA, (L.) Benth. Lab. 1832-1836.—*Dracocephalum Virginianum*, L. Spec.

Low ground; frequent.

LEONURUS CARDIACA, L. Spec.

Waste places; a few specimens collected on Squaw creek north of College.

STACHYS PALUSTRIS, L. Spec.

Low ground; frequent.

S. ASPERA, Michx. Fl.

Low ground; abundant.

Var. TENUIFLORA, (Willd.)—*S. tenuiflora*, Willd. Spec. iii.—*S. aspera*, Michx. var. *glabra*, Gray, Syn. Fl. ii. 1.

Wet places; infrequent.

PLANTAGINACEÆ.

PLANTAGO MAJOR, L. Spec.

Waste places; not uncommon.

Prefers rather dry places, as streets, yards, and pavements. Leaves thickish, often pubescent; base of petiole green; spike usually 4 or 5 inches long, obtuse and densely flowered; capsules ovate, obtuse, with line of dehiscence in sight, i.e. above the summit of calyx.

P. RUGELII, Decaisne in DC. Prod. xiii.1.

Moist places; common.

Often growing with *P. major*, which it much resembles, though much more common; but preferring moister soil, as lowland woods, where this species alone is found. Leaves dark green, thin and smooth, in damp soil often very large and remotely denticulate; base of petiole purple; spikes a foot or more in height, with the apex attenuated and sometimes branched; capsules acutish, with line of dehiscence hidden by the calyx. This species certainly seems to be indigenous.

P. lanceolata, L. Spec.

Specimens have been occasionally collected by students, but I have none in my herbarium.

*NYCTAGINACEÆ.***OXYBAPHUS NYCTAGINEUS**, (Michx.) Sweet, Hort. Brit. 1827.—

Allionia nyctaginea, Michx. Fl.

Gravelly banks; frequent.

*PARONYCHIACEÆ.***ANYCHIA CANADENSIS**, (L.) B. S. P. Cat.—*Queria Canadensis*, L.

Spec.—*A. capillacea*, DC. Prod. iii.

Open woods; frequent.

See note on this species by Britton, Torr. Bull. xiii. 1885.

*AMARANTACEÆ.***AMARANTUS RETROFLEXUS**, L. Spec.

Cultivated ground; common.

A. ALBUS, L. Spec. 2d ed. (Syst. Nat. 10th ed. ex Richter);

Cultivated ground; frequent.

Most abundant in newly broken sod, when the larger specimens become "tumble weeds."

A. BLITOIDES, Wats. Proc. Amer. Acad. xii. 1876.

Dry open ground; abundant.

ACNIDA TUBERCULATA, Moq. in DC. Prod. xiii. 2.

Low ground; abundant.

*CHENOPODIACEÆ.***CHENOPODIUM BOSCIANUM**, Moq. Chenop. Enum. 1840.

Shady places; common.

C. ALBUM, L. Spec.

Cultivated ground; common.

C. URBICUM, L. Spec.

Waste places; infrequent.

C. HYBRIDUM, L. Spec.

Woods; infrequent.

C. Botrys, L. Spec.

A few specimens collected along the railroad near Ames in 1834.

*POLYGONACEÆ.***RUMEX ALTISSIMUS**, Wood, Cl.-B. 2d ed. 1847.

Low ground; common.

- R. VERTICILLATUS**, L. Spec.
Around ponds and ditches; abundant.
- R. CRISPUS**, L. Spec.
Roadsides and waste places; common.
- R. maritimus**, L. Spec.
Abundant on the borders of Cairo lake.
- R. ACETOSELLA**, L. Spec.
Pastures; infrequent.
- POLYGONUM AVICULARE**, L. Spec.
Yards and roadsides; common.
In dry soil it is prostrate-spreading; in damp places, erect.
- P. ERECTUM**, L. Spec.
Roadsides; common.
- P. RAMOSISSIMUM**, Michx. Fl.
Roadsides; frequent.
- P. LAPATHIFOLIUM**, L., var. **INCARNATUM**, (Ell.) Watson in Gray,
Man. 6th ed.—*P. incarnatum*. Ell. Sk. i.
Damp places; common.
- P. PENNSYLVANICUM**, L. Spec.
Damp places; common.
- P. AMPHIBIUM**, L. Spec.
Ponds; infrequent.
- P. MUHLENBERGII**, Wats. Proc. Amer. Acad. Sci. xiv. 1879.
Low and often sandy soil; abundant.
I have not been able to satisfy myself that *P. terrestre*, (Willd.) B. S. P. Cat.
(*P. amphibium*, L., var. *terrestre*, Willd. Spec. ii.) should be used.
- P. HARTWRIGHTII**, Gray, Proc. Amer. Acad. viii. 1870.
Ponds or even on sandy banks; becoming scarce.
- P. orientale**, L. Spec.
Neglected ground, Ames.
- P. PERSICARIA**, L. Spec.
Damp places; common.
- P. HYDROPIPER**, L. Spec.
Wet places; common.
- P. ACRE**, HBK. Nov. Gen. & Sp. ii. 1817.
Wet places; common.
- P. VIRGINIANUM**, L. Spec.
Woods; frequent.
- P. CONVULVULUS**, L. Spec.
Cultivated grounds, especially stubble; common.
- P. DUMETORUM**, L., var. **SCANDENS**, (L.) Gray, Man. 5th ed.—*P. scandens*, L. Spec.
Thickets; common.
- Fagopyrum esculentum**, Moench, Meth. 1794.
Cultivated ground; frequent.

ARISTOLOCHIACEÆ.

ASARUM CANADENSE, L. Spec.

Low woods; frequent.

SANTALACEÆ.

COMANDRA UMBELLATA, (L.) Nutt. Gen.—*Thesium umbellatum*,
L. Spec.

Prairie; frequent.

EUPHORBACEÆ.

Euphorbia petaloidea, Engel. in Bot. Mex. Bound. ii. 2, 1859.

A single specimen found along the railroad near lower gate; others have been reported.

E. GLYPTOSPERMA, Engel. in Bot. Mex. Bound. ii. 2. 1859.

Sandy prairie and banks; common.

In an open sandy or gravelly soil it is prostrate-spreading; in grassy places it is erect or spreading.

E. MACULATA, L. Spec.

Prairies and banks; common.

E. HYPERICIFOLIA, L. Spec.

Fields, pastures, and woods; common.

Specimens sent to Dr. Millspaugh were pronounced to be this species. *E. Pres-ltii*, Guss. Fl. Sicul. i. 1837, which much resembles it, may also occur.

E. marginata, Pursh, Fl.

Specimens are occasionally found along the railroad.

E. COROLLATA, L. Spec.

Prairie and open woods; abundant.

E. HETEROPHYLLA, L. Spec.

Rocky woods; scarce.

Bluffs, Hoggatt's woods. Leaves of specimens so far collected are all linear and entire.

E. cyparissias, L. Spec.

Escaped around gardens.

ACALYPHA VIRGINICA, L. Spec.

Low places; abundant.

URTICACEÆ.

ULMUS FULVA, Michx. Fl.

Lowland woods; frequent.

U. AMERICANA, L. Spec.

Lowland woods; abundant.

Woodmen have informed me that formerly the "Hickory-Elm" (probably *U. racemosa*, Thomas) was rather common, but, on account of its valuable timber, has been almost entirely cut away.

CELTIS OCCIDENTALIS, L. Spec. 2d ed.

Woods; infrequent.

CANNABIS SATIVA, L. Spec.

Waste places; frequent.

HUMULUS LUPULUS, L. Spec.

Banks of streams; frequent.

MORUS RUBRA, L. Spec.

Lowland woods; scarce.

Bottom-land of Skunk river; Squaw creek, and woods near cemetery (Prof. Pammel).

URTICA GRACILIS, Ait. Hort. Kew.—*U. dioica*, Ait., var. *procera*, Wedd. in DC. Prod. xvi. 1.

Lowland woods and waste places; infrequent.

LAPORTEA CANADENSIS, (L.) Gmel. Bot. Voy. Uran. 1826.—*Urtica Canadensis*, L. Spec.

Low woods; frequent.

PILEA PUMILA, (L.) Gray, Man. 1st ed.—*Urtica pumila*, L. Spec.

Lowland woods in moist places; frequent.

PARIETARIA PENNSYLVANICA, Muhl. in Willd. Spec. iv.

Dry banks in woods; not uncommon.

PLATANACEÆ.

PLATANUS OCCIDENTALIS, L. Spec.

Lowland woods; not uncommon.

JUGLANDACEÆ.

JUGLANS CINEREA, L. Spec. 2d ed.

Lowland woods; not uncommon.

J. NIGRA, L. Spec.

Lowland woods; not uncommon.

HICORIA OVATA, (Mill.) Britt. Torr. Bull. xv. 1888.—*Juglans ovata*, Mill. Dict.—*Carya alba*, Nutt. Gen.

Upland woods; abundant.

H. MINIMA, (Marsh.) Britt. Torr. Bull. xv. 1888.—*Juglans alba minima*, Marsh. Arbust.—*Carya amara*, Nutt. Gen.

Lowland woods; abundant.

CUPULIFERÆ.

CORYLUS AMERICANA, Walt. Fl.

Upland woods and thickets; abundant.

OSTRYA VIRGINIANA, (Mill.) Koch, Dendr. ii. 2.—*Carpinus Virginiana*, Mill. Dict. iv.—*O. Virginica*, Willd. Spec. iv.

Upland woods; frequent.

QUERCUS ALBA, L. Spec.

Upland woods; abundant.

A large tree with light colored bark and smooth twigs; leaves obovate, usually nearly equally lobed all around, the sinuses shallow or extending nearly to the midrib.

Q. MACROCARPA, Michx. Hist. Chênes, 1801.

Woods; abundant.

A large tree with deeply furrowed bark and rough or corky-winged twigs, growing more commonly on the bottom-lands; leaves obovate-rhomboidal, usually with the lower half lobed, and the upper half or terminal lobe merely sinuate.

Q. Muhlenbergii, Engelm. Trans. St. L. Acad. iii. 1877.

Des Moines river at Boone (Prof. Pammel, Prof. Budd).

Q. RUBRA, L. Spec.

Upland woods; abundant.

Q. coccinea, Wang. Beitr. 1787.

In the I. A. C. herbarium is a specimen, with acorns, collected by Dr. Bessey, said to come from a tree northwest of the College near the railroad. I have been unable to find the tree, and have not observed the species in the county. It is abundant in the eastern part of the State, where, to a large extent, it replaces *Q. rubra*, and extends at least as far west as Waterloo. The leaf is not to be distinguished from *Q. rubra*, although it is generally more deeply parted; the acorns of the two species are quite different.

SALICACEÆ.

POPULUS TREMULOIDES, Michx. Fl.

Borders of woods; infrequent.

P. GRANDIDENTATA, Michx. Fl.

A few young trees and sprouts were found along the bluffs of Skunk river north-east of Ames. Prof. Budd informs me that formerly it was quite abundant.

P. MONILIFERA, Ait. Hort. Kew.

Lowland woods; not uncommon.

SALIX NIGRA, Marsh. Arbust.

River banks; common.

S. LONGIFOLIA, Muhl. Neue Schrift. Ges. Nat. Fr. Berlin, iv. 1802?
(ex Anders. Salic.)

Low, especially sandy ground; common.

S. DISCOLOR, Muhl. l. c.

Low ground; common.

S. HUMILIS, Marsh. Arbust.

Dry hills and copses; frequent.

S. CORDATA, Muhl. N. Berl. Schr. l. c.

Low land; common.

CERATOPHYLLACEÆ.

CERATOPHYLLUM DEMERSUM, L. Spec.

Ponds; becoming scarce.

CONIFERÆ.

(This Order more properly follows *Gramineæ*.)

Juniperus Virginiana, L. Spec.

Along the Des Moines river (Prof. Budd).

HYDROCHARIDACEÆ.

ELODEA CANADENSIS, Michx. Fl.

Ponds; becoming infrequent.

For synonymy see Pringsheim's Jahrbücher, i. p. 499.

Vallisneria spiralis, L. Spec.

Cairo lake.

ORCHIDACEÆ.

SPIRANTHES CERNUA, (L.) Rich. Bot. Reg. — *Ophrys cernua*. L. Spec.

Low prairie; infrequent.

ORCHIS SPECTABILIS, L. Spec.

Springy places in rich woods; scarce.

Woods south of College, and reported elsewhere.

HABENARIA BRACTEATA, (Willd.) R. Br. in Ait. f. Hort. Kew.

— *Orchis bracteata*, Willd. Spec. iv.

Rich woods; rare.

This species seems to be well distributed over the county, but is usually solitary and only occasionally found.

H. LEUCOPHÆA, (Nutt.) Gray, Man. 5th ed. — *Orchis leucophæa*, Nutt. Trans. Amer. Phil. Soc. N. S. vii. 1841.

Low prairie; infrequent.

CYPRIPEDIUM CANDIDUM, Muhl. in Willd. Spec. iv.

Low prairie not uncommon.

C. PUBESCENS, Willd. Spec. iv.

Rich woods; infrequent.

Woods west and south of College; on Skunk river, and elsewhere. *C. parviflorum*, Salisb. has been reported, but I doubt if it occurs with us.

C. REGINÆ, Walt. Fl. — *C. spectabile*, Salisb. Trans. Lin. Soc. i. 1791, (read 1788). — *C. album*. Ait. Hort. Kew. — *C. hirsutum*. Mill. Dict. ?

Rich woods; rare.

On the east side of Skunk river north of Ames, a short distance above the ford. This species was formerly much more frequent, but many causes, not the least of which are the ravages of eager students, have almost exterminated this beautiful plant.

IRIDACEÆ.

IRIS VERSICOLOR, L. Spec.

Marshes; common.

Belamcanda Chinensis, (L.) Adans. — *Ixia Chinensis*, L. Spec.

Occasionally escapes from gardens.

In the absence of sufficient literature I have followed the Manual in the authority for the accepted combination. The New York Catalogue gives *B. Chinensis*, (L.) Redouté.

SISYRINCHIUM ANGUSTIFOLIUM, Mill. Dict.

Prairie; abundant.

The white-flowered form is frequent.

AMARYLLIDACEÆ.

HYPOXIS ERECTA, L. Spec. 2d ed. (Syst. Nat. 15th ed. ex Richter.)

Prairie; common.

DIOSCOREACEÆ.

DIOSCOREA VILLOSA, L. Spec.

Thickets; not uncommon.

LILIACEÆ.

SMILAX HERBACEA, L. Spec.

Moist grassy places; not uncommon.

Var. *PULVERULENTA*, (Michx.) Gray, Man. 5th ed.—*S. pulverulenta*, Michx. Fl.

Woods; infrequent.

S. HISPIDA, Muhl. Cat. 2d ed.

Rich woods; frequent.

ALLIUM TRICOCCUM, Ait. Hort. Kew.

Rich woods; infrequent.

A. CANADENSE, Kalm, in L. Spec.

Sloughs; frequent.

POLYGONATUM COMMUTATUM, (Schult.) Dietr. in Allg. Gartenz.

iii. 1835.—*Convallaria commutata*. Schult. in Roem. & Schult. Syst.

vii.—*P. giganteum*, Dietr. l. c.

Asparagus officinalis, L. Spec.

Escapes frequently from cultivation.

SMILACINA RACEMOSA, (L.) Desf. Ann. Mus. Paris, ix. 1807.—*Convallaria racemosa*, L. Spec.

Upland woods; frequent.

S. STELLATA, (L.) Desf. l. c.—*Convallaria stellata*, L. Spec.

Woods; frequent.

Maianthemum Canadense, Desf. l. c.

"Ames, J. C. Noble." Specimen in I. A. C. herbarium.

UVULARIA GRANDIFLORA, Smith, Exot. Bot. p. 99, 1804-1805.

Rich woods; abundant.

ERYTHRONIUM ALBIDUM, Nutt. Gen.

Low woods; abundant.

LILIUM PHILADELPHICUM, L. Spec. 2d ed.

Low prairie; not uncommon.

L. superbum, L. Spec. 2d ed.

A few specimens found at Jewell Junction.

L. CANADENSE, L. Spec.

Low ground; infrequent.

TRILLIUM ERECTUM, L. Spec.

Two specimens (var. *declinatum*) in the I. A. C. herbarium from "Ames". Occasionally reported.

T. cernuum, L. Spec.

A specimen in the I. A. C. herbarium from "Ames."

T. nivale, Riddell, Synops. 1835.

"Boone-Bessey." Specimen in I. A. C. herbarium.

PONTEDERIACEÆ.

PONTEDERIA CORDATA, L. Spec.

Ponds; becoming scarce.

Formerly abundant in the Big Prairie region.

HETERANTHERA GRAMINEA, (Michx.) Vahl. Enum. ii.—*Leptanthus graminea*, Michx. Fl.

Muddy banks of ponds and streams; scarce.

Lake 7 miles southeast of the College; Cairo lake.

COMMELINACEÆ.

TRADESCANTIA VIRGINIANA, L. Spec.

Low ground; frequent.

A white-flowered form was found along the railroad, near the first bridge, going towards Ames.

JUNCACEÆ.

JUNCUS TENUIS, Willd. Spec. ii.

Grassy places; common.

Quite variable in aspect. In dry soil it is low, with few-flowered panicles; in wet places it becomes stouter, often two feet high, with more crowded inflorescence. One form corresponds to "Forma major, floribus subsecundus" of specimens in the Engelmann herbarium. It is not uncommon. Low or, usually, tall; flowers crowded on the inner side of the ascending branches of the panicle, which tends to curve inward at the top.

J. NODOSUS, L., var. MEGACEPHALUS, Torr. Fl. N. Y. ii.

Wet places; abundant.

TYPHACEÆ.

TYPHA LATIFOLIA, L. Spec.

Sloughs and ditches; abundant.

SPARGANIUM EURYCARPUM, Engel. in Gray, Man. 2d ed.

Marshes; frequent.

S. SIMPLEX, Huds. Fl. Angl. 1762.

Marshes; scarce.

Four miles southwest of the College.

ARACEÆ.

ARISEMA TRIPHYLLUM, (L.) Torr. Fl. N. Y. ii.—*Arum triphyllum*, L. Spec.—*A. atrorubens*, Blume, in Rumphia, i. 1835. (Engler, *Araceæ* in DC. Mon. Phan. ii.)

Rich woods; not uncommon.

A. DRACONTIUM, (L.) Schott, Melet. 1832.—*Arum Dracontium*, L. Spec.

Low woods; infrequent.

ACORUS CALAMUS, L. Spec.

Marshes; scarce.

Two miles north of Ames, and elsewhere.

LEMNACEÆ.

SPIRODELA POLYRRHIZA, (L.) Schleid. in Linnaea xiii. 1839.—*Lemna polyrrhiza*, L. Spec.

Bayous and slow-flowing water; not uncommon.

LEMNA TRISULCA, L. Spec.

Ponds; becoming scarce.

This species prefers still water that is filled with vegetation, while *Spirodela* is found also in more open water.

L. MINOR, L. Spec.

Stagnant water; infrequent.

*ALISMACEÆ.***ALISMA PLANTAGO**, L. Spec.

Wet places; abundant.

SAGITTARIA VARIABILIS, Engel. in Gray, Man. 1st ed.—*S. sagittifolia*, L., var. *variabilis*, Micheli in DC. Mon. Phan. iii. 1881.

In shallow water or wet places; abundant.

We have the three forms known as:—var. *obtusa*, (Willd.) Engel. 'l. c. 2d ed. (*S. obtusa*, Willd. Spec. iv.), leaves large and broad, obtuse, usually with an abrupt short point, lobes broad and short, flowers diœcious; var. *latifolia*, (Willd.) Engel. l. c. (*S. latifolia*, Willd. l. c.), leaves rather large and broad, obtuse or usually acute, lobes often longer and narrower than in the preceding, flowers monœcious; var. *hastata*, (Pursh) Engel. l. c. (*S. hastata*, Pursh, Fl.), leaves with terminal and basal lobes quite similar in size, long, narrow and acute, flowers monœcious. For notes on these forms see Britton, Torr. Bull. xvii. p. 5, 1890.

S. HETEROPHYLLA, Pursh, Fl.

Muddy shores of ponds; scarce.

Pond northeast of Ames, beyond Skunk river; abundant at Cairo lake.

S. GRAMINEA, Michx. Fl.

Wet places; infrequent.

I have also found what appears to be *S. cristata*, Engel. in Arthur, Contr. Fl. Iowa (Proc. Davenp. Acad. Sci. iv. p. 29, 1886), but more study is needed.

*NAIADACEÆ.***Triglochin maritimum**, L. Spec.

A single specimen in my herbarium collected by Mr. M. E. Wells in the "forks."

Potamogeton fluitans, Roth. Tent. Fl. Germ. i. 1788.

Streams around Cairo lake.

P. ILLINOENSIS, Morong in Bot. Gaz. v. 1880.

Ponds and lakes; infrequent.

P. HETEROPHYLLUS, Schreb. Spicil. Fl. Lips. 1771.

Ponds; infrequent.

P. lucens, L. Spec.

Sterile specimens, from the pond under the first railroad bridge below the gate, appear to be this species.

P. ZOSTERÆFOLIUS, Schum. Enum. i. 1801.

Lakes and streams; not uncommon.

P. obtusifolius, Mertens & Koch, Deutschl. Fl. i. 1823.

What appears to be this species was found in the pond, under the first railroad bridge, in considerable quantity, but has disappeared.

P. pusillus, L. Spec.

Abundant at Cairo lake.

ZANNICHELLIA PALUSTRIS, L. Spec.

Ponds and slow streams; not uncommon.

NAIAS FLEXILIS, Rostk. & Schum. Fl. Sedin. 1824.

Ponds; becoming scarce.

CYPERACEÆ.

CYPERUS DIANDRUS, Torr. Cat. Pl. N. Y. 1819.

Wet sandy places; scarce.

Var. **CASTANEUS**, (Pursh) Torr. l. c.—*C. flavescens*, var. *castaneus*, Pursh, Fl.

Wet sands; abundant.

C. ARISTATUS, Rottb. Gram.

Wet sand; not uncommon.

C. SCHWEINITZII, Torr. Cyp.

Sandy soil; frequent.

C. FILICULMIS, Vahl, Enum. ii.

Sandy hills; frequent.

C. ERYTHORRHIZOS, Muhl. Gram.

River banks; abundant.

C. ESCULENTUS, L. Spec.

Low ground; abundant.

C. STRIGOSUS, L. Spec.

Low or sandy ground; abundant.

Var. **ROBUSTIOR**, Kunth, Enum. ii.

Low ground; common.

ELEOCHARIS PALUSTRIS, (L.) R. Br. Prod. Fl. Nov. Hol. 1810 (by implication).—*Scirpus palustris*, L. Spec.

Wet places; common.

E. ACICULARIS (L.) R. Br. l. c.—*Scirpus acicularis*, L. Spec.

Muddy banks of ponds and streams; common.

SCIRPUS PUNGENS, Vahl, Enum. ii.

Wet clay; scarce.

S. LACUSTRIS, L. Spec.

Sloughs, common.

S. FLUVIATILIS, (Torr.) Gray, Man. 1st ed.—*S. maritimus*, L., var. ?
fluvialis, Torr. Cyp.

Marshes; infrequent.

S. ATROVIRENS, Muhl. Gram.

Sloughs; common.

ERIOPHORUM LINEATUM, (Michx.) Benth. & Hook. Gen. Pl. iii. 2, 1833.—*Scirpus lineatum*, Michx. Fl.

Wet places; scarce.

Bentham and Hooker by a slip say, "Hic includimus . . . *E. lineatus*, Mich." Michaux is not really the author of this combination.

E. CYPERINUM, L. Spec. 2d ed.

Wet places; rare.

I have seen the specimens of this, but have none in my possession.

E. POLYSTACHYON, L. Spec.

Low prairie; frequent.

HEMICARPHA MICRANTHA, (Vahl) Britt. Torr. Bull. xv. 1888.— *Scirpus micranthus*, Vahl, Enum. ii. — *H. subsquarrosa*, Nees in Mart. Fl. Bras. ii. 1, 1829.

Wet sand; scarce.

CAREX INTUMESCENS, Rudge, Trans. Linn. Soc. vii. 1804 (read 1803).

Low shady places; common.

C. GRAYII, Carey, Amer. Jour. Sci. iv. 1821.

Low woods; common.

C. LUPULINA, Muhl. in Willd. Spec. iv.

Sloughs.

Prof. Bailey notes one specimen as nearly typical; another as approaching var. *pedunculata*.**C. LURIDA, Wahl. Königl. Ac. Handl. xxiv. 1803.**

Sloughs; infrequent.

Prof. Bailey says our specimens are a "depauperate form" of this species.

C. FILIFORMIS, L. Spec.

Swamps; abundant.

Var. *LANUGINOSA*, (Michx.) B.S.P. Cat.—*C. lanuginosa*, Michx.Fl.—*C. filiformis*, L., var. *latifolia*, Boeck. Linnæa, xli. 1876-7.

Swamps; frequent.

C. TRICHOCARPA, Muhl. in Willd. Spec. iv.

Marshes; infrequent.

Var. *IMBERBIS*, Gray, Man. 5th ed.

Swamps; common.

Var. *LÆVICONICA*, (Dewey).—*C. læviconica*, Dewey, Amer. Jour. Sci. xxiv. 1833.—*C. trichocarpa*, Muhl., var. *Deweyi*, Bailey in Bot. Gaz. x. 1883.

Low places; common.

Var. *ARISTATA*, (R. Br.) Bailey in Bot. Gaz. x. 1883.—*C. aristata*, R. Br. in Narr. Frankl. Exped. app.

Swamps; infrequent.

C. RIPARIA, W. Curtis, Fl. Lond. iv. 1821.

Low places; common.

C. FUSCA, All. Fl. Pedem. ii. 1785.

Grass land; infrequent.

C. STRICTA, Lam. Diet. iii.

Sloughs; common.

C. LONGIROSTRIS, Torr. in Schwein. Ann. Tab. Car. (Ann. N. Y. Lyc. i. 1823.)

Shady places; abundant.

- C. DAVISII**, Schwein. & Torr. Mon. Cyp. 1825.
Wet places; abundant.
- C. GRISEA**, Wahl. Königl. Ac. Handl. xxiv. 1803.
Grass land; common.
- C. LAXIFLORA**, Lam., var. **LATIFOLIA**, Boott, Ill. 1858-1867.
Rich woods; infrequent.
- C. TETANICA**, Schkuhr, var. **MEADII**, (Dewey) Bailey, Syn. Car. 1886.—*C. Meadii*, Dewey, Amer. Jour. Sci. xliii. 1842.
Grass land; frequent.
- C. EBURNEA**, Boott, in Hook. Fl. ii.
Woods; infrequent.
- C. PENNSYLVANICA**, Lam. Dict. iii.
Dry woods; common.
- C. PUBESCENS**, Muhl. in Willd. Spec. iv.
Rich woods; not uncommon.
- C. CONJUNCTA**, Boott, Ill. 1858-1867.
Low grass land; common.
- C. GRAVIDA**, Bailey; var. **LAXIFOLIA**, Bailey, Types. Car. 1889.
Low ground; not uncommon.
- C. VULPINOIDEA**, Michx. Fl.
Low grass land; common.
- C. Sartwellii**, Dewey, in Amer. Jour. Sci. xli. 1842.
One imperfect specimen, marked by Prof. Bailey, "probably."
- C. SPARGANOIDES**, Muhl. in Willd. Spec. iv.
Low ground; common.
- C. CEPHALOPHORA**, Muhl. in Willd. Spec. iv.
Low ground; frequent.
- C. MUSKINGUMENSIS**, Schwein. Ann. Tab. 1823.
Sloughs; frequent.
- C. TRIBULOIDES**, Wahl., var. **CRISTATA**, (Schwein.) Bailey, Syn. Car. 1886.—*C. cristata*, Schwein. Ann. Tab. 1823.
Low ground, common.
- C. STRAMINEA**, Willd., var. **FESTUCACEA**, (Willd.)—*C. festucacea*, Willd. Spec. iv.—*C. straminea*, Willd., var. *brevior*, Dewey, Amer. Jour. Sci. xi. 1826.
Low ground; common.
- Var. **ALATA**, (Torr.) Bailey, Cat. Car. 1884.—*C. alata*, Torr. Mon. Cyp.
Grass land.

GRAMINEÆ.

- SPARTINA CYNOSUROIDES**, (L.) Willd. Enum. i.—*Dactylis cynosuroides*, L. Spec.
Sloughs; abundant.

- Beckmannia erucæformis, (L.) Host, var. uniflorus, Scrib. in Vasey, Desc. Cat. 1885.
Escaped around station-house.
- PANICUM GLABRUM, (Schräd.) Gand. Agros. i. 1811.—*Syntherisma glabra*, Schräd. Fl. Germ. 1806.
Roadsides and sandy places; common.
- P. SANGUINALE, L. Spec.
Fields; common.
- P. PROLIFERUM, Lam. Dict. iv.
Roadsides and cultivated soil; common.
- P. CAPILLARE, L. Spec.
Fields; common.
- P. VIRGATUM, L. Spec.
Prairie; common.
- P. LATIFOLIUM, L. Spec.
Upland woods; frequent.
- P. SCOPARIUM, Lam. Dict. iv.
Prairie; common.
One form is nearly smooth except the margins of the leaves; another is stouter, with leaves, sheaths and spikelets hirsute.
- P. DICHOTOMUM, L. Spec.
Prairie; common.
- P. CRUS-GALLI, L. Spec.
Fields and waste places; common.
Var. MUTICUM, Torr.
Damp places; frequent.
- SETARIA GLAUCA, (L.) Beauv. Agrost. 1812.—*Panicum glaucum*, L. Spec.
Fields; common.
- S. VIRIDIS, (L.) Beauv. Agrost. 1812.—*Panicum viride*, L. Spec.
Fields; common.
Some specimens with oblong, purplish spikes, are apparently hybrids with *S. Italica*.
- S. Italica, (L.) Kunth, Gram. (ex Kunth, Enum. i. 1).—*Panicum italicum*, L. Spec.
Abundantly escaped.
- CENCHRUS TRIBULOIDES, L. Spec.
Sandy soil; not uncommon.
- HOMALOCENCHRUS VIRGINICA, (Willd.) Britt. Trans. N. Y. Acad. Sci. ix. 1889.—*Leersia Virginica*, Willd. Spec. i.
Low ground; abundant.
- H. ORYZOIDES, (L.) Poll. Enum. Pl. Palat. 1776.—*Phalaris oryzoides*, L. Spec.—*Leersia oryzoides*, Swartz, Fl. Ind. Occ. i. 1797.
Wet places; common.
- ZIZANIA AQUATICA, L. Spec.
Ponds; scarce.
South of Shearer School; Onion creek.

ANDROPOGON PROVINCIALIS, Lam. Diet. i.—*A. furcatus*, Muhl. in Willd. Spec. iv.

Prairie; common.

See Hackel, Androp. p. 443; Watson, Contr. Am. Bot. xvii. p. 139 (Proc. Amer. Acad. xxv. 1899).

A. SCOPARIUS, Michx. Fl.

Prairie; common.

CHRYSOPOGON NUTANS, (L.) Benth. Jour. Linn. Soc. xix. 1881. — *Andropogon nutans*, L. Spec. (retained in Hackel, Androp.)

Prairie; common.

Phalaris Canariensis, L. Spec.

Streets of Story City.

P. ARUNDINACEA, L. Spec.

Marshes; infrequent.

ARISTIDA GRACILIS, Ell. Sk. i.

Dry hills; infrequent.

STIPA SPARTEA, Trin. Stipæ, 1842.

Prairie; abundant.

ORYZOPSIS MELANOCARPA, Muhl. Gram.

Dry rocky woods; not uncommon.

MUHLENBERGIA SOBOLIFERA, (Muhl.) Trin. Diss. i.—*Agrostis sobolifera*, Muhl. Gram.

Dry hills; infrequent.

M. RACEMOSA, (Michx.) B. S. P. Cat.—*Agrostis racemosa*, Michx. Fl.—*M. glomerata*, Trin. Diss. i.

Dry clay bluffs or wet grassy places; frequent.

M. SYLVATICA, (Torr.) Torr. & Gray, in Gray, Gram. & Cyp. i. 1834. — *Agrostis sylvatica*, Torr. Fl. U. S.

Upland woods; frequent.

M. TENUIFLORA, (Willd.) B. S. P. Cat.—*Agrostis tenuiflora*, Willd. Spec. i.—*M. Willdenovii*, Trin. Diss. i.

Upland woods; not uncommon.

M. DIFFUSA, Schreb. Gram. ii. 1772-1779.

Open lowland woods; abundant.

BRACHYELYTRUM ERECTUM, (Schreb.) Beauv. — *Muhlenbergia erecta*, Schreb. Gram. ii. 1772-1779. — *B. aristatum*, Beauv. Agrost. 1812. — *B. aristosum*, (Michx.) B. S. P. Cat.—*Dilephyrum aristosum*, Michx. Fl.

Rich woods; frequent.

Ours is the form, var. *Engelmanni*, Gray, Man. 5th ed.

PHLEUM PRATENSE, L. Spec.

Meadows and pastures; common.

Sporobolus vaginæflorus, (Torr.) Vasey, Desc. Cat. 1855. — *Vilfa vaginæflora*, Torr. in Gray. Gram. & Cyp. i. 1834.

Sandy and sterile soil.

- S. ASPER, (Michx.) Kunth, Gram. i. (ex Enum. i.)
Sandy soil; common.
- S. HETEROLEPIS, Gray, Man. 1st ed.—*Vilfa heterolepis*, Gray, in Ann. Lyc. N. Y. iii. (read Dec. 1834).
Prairie; abundant.
- S. CRYPTANDRUS, (Torr.) Gray, Man. 1st. ed.—*Agrostis cryptandrus*, Torr. in Ann. Lyc. N. Y. i. 1824.
Sandy hills; infrequent.
- AGROSTIS ALBA, L. Spec.
Meadows; common.
Var. VULGARIS, (With.) Thurb. in Watson, Bot. Calif. ii. 1880.
—*A. vulgaris*, With. Eng. Bot. 1776.
Moist meadows; common.
- A. PERENNANS, (Walt.) Tuckerm. Amer. Jour. Sci. xlv. 1843. —
Cornucopiæ? perennans, Walt. Fl.
- A. HYEMAL, (Walt.) B.S.P. Cat.—*Cornucopiæ hyemalis*, Walt. Fl.
—*Agrostis scabra*, Willd. Spec. i.
Prairie, especially in open or barren spots; common.
- CINNA ARUNDINACEA, L. Spec.
Upland woods; abundant.
- CALAMAGROSTIS CANADENSIS, (Michx.) Beauv.—*Arundo Canadensis*, Michx. Fl.—*Deyeuxia Canadensis*, Hook. Arc. Pl. 1862.
Sloughs; abundant.
- CALAMOVILFA LONGIFOLIA, (Hook.) Scribn. in Hackel, True Grasses, 1890.—*Calamagrostis longifolia*, Hook. Fl. ii.—*Ammophila longifolia*, Benth.
Dry hills; infrequent.
- BOUTELOUA HIRSUTA, Lag. Elench. v.? 1816 (ex Kunth, Enum. i.)
Dry hills; infrequent.
- B. CURTIPENDULA, (Michx.) Gray, Man. 3d ed. (or earlier?)—*Chloris curtispindula*, Michx. Fl. — *B. racemosa*, Lag. Varied. Cienc. 1805 (ex Kunth, Enum. i.)
Prairie; common.
- PHRAGMITES VULGARIS, (Lam.) B.S.P. Cat.—*Arundo vulgaris*, Lam. Fl. Franc. iii. 1778.—*P. communis*, Trin. Fund. 1820.
Ponds; frequent.
- KELERIA CRISTATA, (L.) Pers. Syn. i.—*Aira cristata*, L. Spec.
Prairie; abundant.
- EATONIA OBTUSATA, (Michx.) Gray, Man. 3d ed. 1857 (or earlier).
—*Aira obtusata*, Michx. Fl.
Prairie; abundant.
- E. PENNSYLVANICA, (Spreng.) Gray, Man. ed. of 1857 (or earlier?).
—*Aira Pennsylvanica*, Spreng. Act. Petrop. 1810.
Sloughs; abundant.
It also occurs in upland woods, where it is low and slender.

ERAGROSTIS HYPNOIDES, (Lam.) B. S. P. Cat.—*Poa hypnoides*,
Lam. Ill. i.—*E. reptans*, Nees, in Mart. Fl. Bras. i. 1829.

Banks of streams; common.

E. MAJOR, Host, Gram. iv, 1809.—*Poa Eragrostis*, L. Spec.

Fields and roadsides; common.

E. FRANKII, Meyer, Ind. Sem. Hort. Petrop. —?

River banks; scarce.

E. PURSHII, Schrad. in Linnæa, xii. 1838.

River banks and roadsides; common.

E. pectinacea, (Michx.) Gray, Man. ed. of 1857 (or earlier?).—*Poa pectinacea*, Michx. Fl.

"Ames-Bessey." A young, unnamed specimen; but evidently it belongs here.

DIARRHENA DIANDRA, (Michx.).—*Festuca diandra*, Michx. Fl.

—*D. Americana*, Beauv. Agrost. 1812.

Woods; frequent.

DACTYLIS GLOMERATA, L. Spec.

Pastures; freely escaped from cultivation.

POA COMPRESSA, L. Spec.

Wet or dry soil; common.

P. SEROTINA, Ehr. Gaud. Agrost. i. 1811 (ex Kunth, Enum. i.)

Wet places; frequent.

P. PRATENSIS, L. Spec.

Pastures and meadows; common.

GLYCERIA NERVATA, (Willd.) Trin. Act. Petrop. S. 6, i. 1831?—*Poa nervata*, Willd. Spec. i.

Wet places; abundant.

G. FLUITANS, (L.) R. Br. Prod. i. 1810.—*Festuca fluitans*, L. Spec.

Ponds and sloughs; infrequent.

FESTUCA OCTOFLORA, Walt. Fl.—*F. tenella*, Willd. Enum. i.

Dry hills: frequent.

F. NUTANS, Willd. Enum. i.

Upland woods; abundant.

F. SHORTII, Kunth, (?) Vasey, Deser. Cat. 1885.

Sloughs; rare.

A small quantity found about 3 miles east of Ames. It seems quite distinct from *F. nutans*. The spikelets are more numerous, the panicle more or less drooping, but the branches not reflexed in fruit as in the case of *F. nutans*. This appears in Wood's Class-Book, edition of 1861, p. 794, as *F. Shortii*, Kunth, and is placed under *F. nutans*.

BROMUS KALMII, Gray, Man. 1st ed.

Dry ground; infrequent.

B. secalinus, L. Spec.

Waste places; scarce.

B. CILIATUS, L. Spec.

Woods; abundant.

Var. **PURGANS**, (L.) Gray, Man. 1st ed.—*B. purgans*, L. Spec.

Upland woods; abundant.

Apparently a distinct species, flowering a month earlier than *B. ciliatus*.**Lolium perenne, L. Spec.**

Waste places; rare.

Var. **ITALICUM**, Vasey, Desc. Cat. 1885.

Escaped around the station-house.

AGROPYRUM REPENS, (L.) Beauv. Agrost. 1812.—*Triticum repens*, L. Spec.

Fields and waste places; frequent.

The form which has passed for *A. glaucum*, Roem. & Schult., is occasionally found.**HORDEUM JUBATUM, L. Spec.**

Waste places: common.

ELYMUS VIRGINICUS, L. Spec.

River banks; abundant.

Specimens frequently occur which appear to be hybrids with *E. Canadensis*.**E. CANADENSIS, L. Spec.**

River banks; abundant.

Var. **GLAUCIFOLIUS**, (Muhl.) Gray, Man. 5th ed.—*E. glaucifolius*, Muhl. in Willd. Enum.

Gravelly places; frequent.

Var. **GLABRIFOLIUS**, Vasey, Contr. Nat. Herb. (No description.)

Rocky places; frequent.

E. STRIATUS, Willd. Spec. i.

Upland woods; frequent.

ASPRELLA HYSTRIX, (L.) Willd. Enum.—*Elymus Hystrix*, L. Spec.

Woods; abundant.

*EQUISETACEÆ.***EQUISETUM ARVENSE, L.**

Sandy soil; common.

*FILICES.***ADIANTUM PEDATUM, L. Spec.**

Rich woods; abundant.

PTERIS AQUILINA, L. Spec.

Rich woods; scarce.

ASPLENIUM FILIX-FÆMINA, (L.) Bernh. N. Jour. f. d. Bot. ii. 1806.—*Polypodium Filix-femina*, L. Spec. 2d ed.

Shady ravines; abundant.

CYSTOPTERIS FRAGILIS, (L.) Bernh. l. c. i. 1805.—*Polypodium fragile*, L. Spec. 2d ed.

Woods; common.

ONOCLEA SENSIBILIS, L. Spec.

Wet places; not uncommon.

OSMUNDA CLAYTONIANA, L. Spec.

Woody ravines; scarce.

Botrichium Virginianum, (L.) Swartz, Jour. f. d. Bot. ii. 1800.—

Osmunda Virginiana, L. Spec.—*B. Virginicum*, Willd. Spec. v.

Rich woods; scarce.

LIST OF THE MORE IMPORTANT WORKS REFERRED TO IN THE CATALOGUE, PRECEDED BY THE ABBREVIATIONS USED.

Ait. Hort. Kew.: Aiton, W.—Hortus Kewensis, 3 vols. 1789; 2d ed. Aiton, W. T. (Ait. f.), 5 vols. 1810.

Bigel. Fl. Bost.: Bigelow, J.—Florula Bostonensis, 1814; 2d ed., 1824; 3d ed., 1840.

B. S. P. Cat.: Britton, N. L., Sterns, E. E., and Poggenburg, J. F.—Preliminary Catalogue of Anthophyta and Pteridophyta, *** within 100 miles of New York City, 1888.

Darl. Fl. Cest.: Darlington, W.—Florula Cestrica, 1826; 2d ed., Flora Cestrica, 1837; 3d ed., 1853.

DC. Prod.: DeCandolle, A. P. and A.—Prodromus Systematis Naturalis Regni Vegetabilis. i, 1824; ii, 1825; iii, 1828; iv, 1830; v. 1836; vi. 1837; vii, 1, 1839; vii. 2, 1838; viii, 1844; ix, 1845; x, 1846; xi, 1847; xii, 1848; xiii, 1, 1852; xiii, 2, 1849; xiv, 1856; xv, 1, 1864; xv, 2, 1866; xvi, 1, 1869; xvi. 2, (p. 1-160) 1864; xvi, 2 (p. 161-end), 1868; xvii, 1873.

DC. Syst.: DeCandolle, A. P.—Regni Vegetabilis Systema Naturale. i, 1818; ii, 1821.

Ell. Sk.: Elliott, S.—A Sketch of the Botany of South Carolina and Georgia. i, 1821; ii, 1824.

Gray, Man.: Gray, Asa—Manual of the Botany of the Northern United States, 1848; 3d ed. (?) 1857; 5th ed., 1867; 6th ed., 1890.

Gray, Syn. Fl.: Gray, Asa—Synoptical Flora of North America; i. 2. 1884; ii, 1, 188; Suppl., 1886.

Hook. Fl.: Hooker, W. J.—Flora Boreali-Americana. i. Pt. 1, 1829; i. Pt. 2 & 3, 1832; ii, 1840. (Ex notes in Dr. Engelmann's copy.)

Kunth, Enum.: Kunth, K. S.—Enumeratio Plantarum omnium hucusque cognitarum. i, 1833; Suppl., 1835; ii, 1837; iii, 1841; iv, 1843.

Lam. Dict.: De la Marck, J. B.—Encyclopédie Méthodique. i. 1783; ii. 1786; iii, 1789; iv, 1797; v, (vols. v to xiii by J. L. Poiret.) 1804; vi, 1804; vii, 1806; viii & ix, 1810; x, 1811; xi, 1813; xii, 1816; xiii, 1817.

Lam. Ill. : De la Marck, J. B.—Tableau Encyclopédique et Méthodique des trois règnes de la Nature. Botanique. Illustration des Genres. i, 1791; ii, 1793; iii & Suppl. (Poiret), 1823.

L. Mant. : Linnæus, C.—Mantissa Plantarum, p. 1 to 142, 1767; Mantissa Plantarum altera, p. 143 to 588, 1771.

L. Spec. : Linnæus, C.—Species Plantarum, 1753; 2d ed. i, 1762; ii, 1763; 3d ed., 1764 (said to be the same as the 2d edition).

Marsh. Arbust. : Marshall, H.—Arbustrum Americanum, 1785.

Michx. Fl. : Michaux, F. A.—Flora Boreali-Americana, 2 vols. 1803.

Mill. Dict. : Miller, P.—The Gardener's Dictionary, 8th ed., 2 vols., 1768. (The first edition in which binomials are used.)

Muhl. Cat. : Mühlenberg, H.—Catalogus Plantarum Americæ Septentrionalis hucusque cognitarum, 1813; 2d ed., 1818. (The one usually quoted.)

Muhl. Gram. : Mühlenberg, H.—Descriptio uberior Graminum et Plantarum Calamarium Americæ Septentrionalis, 1817.

Nutt. Gen. : Nuttall, T.—The Genera of North American Plants, 2 vols. 1818.

Pers. Syn. :—Persoon, C. H.—Synopsis Plantarum, i, 1805; ii, 1807.

Poir. : Poiret, J. L.—See Lam. Dict. & Ill.

Pursh, Fl. : Pursh, F.—Flora Americæ Septentrionalis, 1814 (another issue in 1816).

Torr. Cyp. : Torrey, J.—Monograph of North American Cyperaceæ (Annals Lyc. Nat. Hist. N. Y. iii. 1836).

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Torr. Fl. U. S. :—A Flora of the Northern and Middle Sections of the United States, 1824.

Torr. & Gray, Fl. :—A Flora of North America. i, p. 1 to 184, July 1838; i, p. 185 to 360, Oct. 1838; i, p. 360 to end, June 1840; ii, p. 1 to 184, 1841; ii, p. 185 to 392, spring, 1842; ii, p. 393 to end, Feb. 1843 (ex notes in Dr. Engelmann's copy).

Trin. Diss. : Trinius, K. B.—De Graminibus unifloris et sesquifloris. Dissertatio botanica, 1824.

Vahl, Enum. : Vahl, M.—Enumeratio Plantarum. i, 1804; ii, 1806.

Walt. Fl. : Walter, T.—Flora Caroliniana, 1788.

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Willd. Spec. :—Linnæus, Species Plantarum. i, Pt. 1, 1797; i, Pt. 2, 1798; ii, 1799; iii, Pt. 1 (p. 1-848), 1800; iii, Pt. 2, (p. 849-1474), 1801; iii, Pt. 3, 1803 (subsequent to Michaux's Flora); iv, Pt. 1, 1805; iv, Pt. 2, 1807; v, 1810.

ginal beauty of wild-flowered meadow and stream-washed grove, now so rich in all that comes from tillage and toil, will put on yet an added splendor, in that all her toil and tilth shall yield to wisdom's guidance; forest and meadow receive each in turn intelligent and appropriate recognition; beauty becomes an object of universal popular concern, and once again across the prairie state the clarified waters of a hundred streams will move in perennial freshness toward the great river and the sea.

THE MYXOMYCETES OF THE BLACK HILLS.

A PRELIMINARY NOTICE.

BY THOMAS H. MACBRIDE.

The species listed here were collected during the month of August, 1897,* and represent the rather hasty gathering of a traveler who could not remain long enough at one place to do thorough work. The number of species ought to be extended to three times that here offered, and probably will be ere many seasons pass.

The Black Hills exhibit a very considerable range of summer climate, remarkable when we consider the very restricted limits within which such variation is displayed, a region about equal to a dozen Iowa counties. The foot-hills and southern plateaus are in summer excessively dry, drouth-stricken. The occasional showers that pass seem to make no special impression, the water falling at such times being almost immediately evaporated. On the other hand the central mountain peaks are covered with varied, flourishing, and abundant vegetation all summer long, seem to enjoy sufficient rainfall and are often enveloped by mists for days together, and are undisturbed by any hot, dry winds, from the southern and eastern plains such as constantly sweep and vex the lower levels. The temperature varies much also in different localities. At the lower levels, 1,000-2,000 feet, the heat by day is great, reaching 95-98° Fahrenheit; on the higher levels, probably owing in part to more abundant moisture, the temperature of the air by day seldom rises above 70°, and is often much below. It is so cold in the central hills that corn does not mature, and even oats and barley during the short season fail betimes for the same reason.

Such conditions would not seem specially favorable for organisms so sensitive and quickly responsive as are the slime-moulds. One region is during the warm season too dry; another where moisture is adequate would seem too cold. Nevertheless, I found Myxomycetes, in one stage or another, in every region visited. The only one characteristic which seemed to indicate unfavorable conditions was the scanty size of the fructifications, although there were exceptions even to this. However, on the whole, my specimens are poor and show nothing like the beauty and perfection of the same species as collected in the woods of eastern Iowa. Further annotation is more conveniently made in connection with the names of each particular species.

There is no attempt to revise the nomenclature which here in general follows the usage of American authors.

1. *Bartramia utricularis* Berkeley.

Only one gathering of old and weathered material near Hot Springs.

2. *Physarum cinereum* Pers.

Abundant on the buffalo grass (*Bouteloua*) in several places near Minnekahta. Found also on dried, weathered droppings of cattle and horses near Long Pine, Neb. This appears to be a ubiquitous species. Although not especially common, yet it appears in all sorts of places and is usually profuse in fructification.

3. *Physarum nefroideum* Rost.

Represented in this collection by a single gathering of small scattered stipitate sporangia. Collected at Custer.

4. *Cratereum aureum* (Schum.) Rost.

Once collected along Fall River near Hot Springs. The sporangia are immaturity dried up, but I believe correctly identified.

5. *Tilmadoche nutans* (Pers.) Rost.

A small colony of weathered sporangia from the neighborhood of Hot Springs.

6. *Spumaria alba* (Bull.) D. C.

The specimen is immature and small. It was collected as a milk-white plasmodium and passed into the fruiting phase in the collecting case.

7. *Didymium crustaceum* (Fr.) Rost.

One gathering, in fairly good condition. The species is quoted by Lister as from Poland and England and appears to

be here for the first time reported from this country. I have, however, good specimens from a single collection in Iowa made many years ago. The form is so peculiar that I do not believe it likely to be mistaken for anything else. It must simply be put down as rare.

8. *Diderma laciniatum* Phillips.

Fairly good specimens of what is believed to be this species were found near Custer on Buckhorn Mountain. Phillips gathered his material in the Sierra Nevada nearly thirty years ago. (Grev. V, p. 113, t. 87, fig. 2,) but so far as I know the species has not been reported since. In August last Mr. T. B. Ellis, of New Jersey, sent to our laboratory a specimen from Colorado which proves to be the same thing. The species is thus very interesting, not only on account of its own inherent beauty, but because of its rarity and range. As is well known the Black Hills constitute a sort of meeting ground for the flora of almost all parts of the country. *Betula occidentalis* Hook here meets *Betula papyracea* Marsh. *Pinus ponderosa* Dougl. stands side by side with *Picea canadensis* Mill, and *Populus tremuloides* Mx. overshadows *Amelanchier alnifolia* Nutt, and *Aconitum fisheri* Reich.; so that we are perhaps less surprised to find a delicate slime-mould on this side of the vast reaches of desert that lie between the Black Hills and the California Sierras.

9. *Comatricha typhina* Pers.

Typical, though small, specimens are in the collection from near Sylvan lake.

10. *Comatricha nigra* Pers.

Very beautiful, but unusually small, specimens of this species were collected on fallen logs of Cottonwood along the south fork of the Cheyenne river. As in other cases the colony was small.

11. *Stemonitis smithii* Macb.

Well defined specimens of this minute species occur on fallen pine logs near Hot Springs and Cascade. Lister applies this name to all our North American forms having ferruginous spores. But these forms certainly show a diversity too great to admit of their being thus associated. As here employed the specific name is restricted to small forms of scattered habit and very minute .002-.004 mm smooth spores. This is rare in the western Mississippi valley.

12. *Stemonitis microspora* Lister.

This name is applied provisionally to the form heretofore commonly distributed and recognized throughout the United States as *S. ferruginea* Ehr. The European type, if one may judge from the reports of authorities and from scant material in herbaria of this country, is plainly different from ours and the specific name suggested by Lister may be for the present adopted.

13. *Stemonitis fusca* Roth.

Not common. One colony especially noteworthy has the sporangia short, and the spores, while of the usual size and color yet marked by unusual episporic characters, unlike any observed in specimens from the eastern United States. *S. fusca* is here adopted to supplant both *S. fusca* and *S. maxima*, as the separation seems impracticable.

14. *Stemonitis webberi* Rex.

Typical and not rare. On Arnold's peak, near Hot Springs, but not in the central hills. The species seems to belong to the plains proper, and is probably an adaptation to a climate drier than that of Harney or Sylvan lake.

15. *Licea variabilis* Schrad.

Fine specimens were collected near Harney's peak.

16. *Tubulina cespitosa* Peck.

Common in the central hills. One fructification 4-6 inches wide stretched along the surface of a log for the distance of many feet.

17. *Eutoridium rozeanum* (Rost.) Wing.

One specimen only discovered. The plasmodium is at first milk-white, then pink; later the fruit becomes umber-brown as the spores mature.

18. *Cribraria aurantiaca* Schrad.

Specimens poor, but plainly referable to this species.

19. *Cribraria pyriformis* Schrad.

Material poor. Reference provisional, though probably correct.

20. *Cribraria minutissima* Schweinitz.

In the crevices of a weathered pine log near Custer were found beautiful specimens of this species. Schweinitz reported it common in Pennsylvania and Carolina in his day. Specimens from Iowa and from Missouri are in the university (Iowa) herbarium. Its minuteness withdraws it from general recognition so that it escapes collection, though probably widely distributed.

21. *Dictydium cancellatum* (Batsch).

This is rare in the hills, though so common everywhere else. The specimens taken are unusually small. The stipe is short and unmarked above, although exhibiting the characteristic twist. This is *D. cernuum* (Pers.) Noes, as usually written, but Batsch surely recognized and figured the species, Elenchus II, 137, Pl. xlii, Fig. 232, and there seems no reason why the specific name he used should not pass current.

22. *Perichæna corticalis* (Batsch) Rost.

Rare, but in typical condition, and on the usual habitat, bark of fallen stems of *Ulmus americana*.

23. *Trichia fallax* Pers.

Typical in form and capillitium. Very dark colored, both within and without.

24. *Trichia inconspicua* Rost.

Typical. Occurring as in Iowa on bark of fallen stems of *Populus tremuloides*.

25. *Hemiarcyria varneyi* Rex.

Typical. Much resembles *Hemiarcyria clavata* (Pers.) Rost., but has more slender threads, smoother and with abundant free tips.

26. *Hemiarcyria clavata* (Pers.) Rost.

Rare. Probably sought too early. Doubtless as common in the fall in the central hills as in other parts of the western states.

27. *Arcyria incarnata* Pers.

Rare. Collected only once, in a very light, delicate form, near Hot Springs.

28. *Arcyria nutans* (Bull.) Grev.

Found in small colonies on fallen willow stems, near Custer. Typical.

29. *Arcyria pomiformis* Rost.

This is an exceedingly delicate form. The peridium is wholly evanescent, the stipe very short, the threads regularly marked by the transverse plates or ridges characteristic of the genus. The spores are entirely smooth, about .008 mm.

30. *Lachnobolus incarnatus* (A. & S.) Schroeter.

Typical specimens were collected on the bark of fallen *P. tremuloids*, near Harney's peak.

31. *Lycogaha epidendrum* (Buxb) Fr.

Rare. Only a single specimen observed near Custer.

THE FLORA OF THE SIOUX QUARTZITE IN IOWA.

BY B. SHIMEK.

II.*

A further study of the flora of this restricted exposure during the third and fourth weeks of last June offered certain suggestions upon geographical distribution which are here briefly presented.

In addition to the area described in the first paper on this flora (l. c. p. 72) a second exposure was examined. This lies near the Big Sioux river, nearly two miles west of the first exposure, and extends quite to the state line. It resembles the first exposure, but its surface is more broken, and also much greater in area. Near the central part there is a deep depression, occupied in part by a large pond. This exposure is likewise chiefly horizontal, but around the central depression, and also on the sides nearest the Big Sioux river, vertical sections are prominent, those at the latter point being fifteen to twenty feet high. Near their base there is an accumulation of soil which gradually runs out into the narrow alluvial valley of the Big Sioux river.

At the base of the lower ledges in the first exposure similar richer soil is found bordering small pools, which are connected only during flood periods.

Upon this soil at both points, but chiefly at the former, was found a flora similar (in so far as it is developed) to the flora of the more easterly portions of the state, and to the floras of our river courses. The species, which are enumerated in Table I, are all common and well known eastward.

Within a few feet, upon the exposed or scantily covered rock, were abundant specimens of the plants, which in that region at least, are peculiar to the rock exposures. In addition

*The first paper on this flora appeared in the Proc. Ia. Acad. Sci., Vol. II, pp. 72-77.

to those already listed as characteristic of the rock exposures (*l. c.* p. 73) there were added the following species:

Schedonnardus texanus Steud. Common.

Potentilla pennsylvanica var. *strigosa* Lehm. Not common.

Gilia linearis Gray. Common.

Euphorbia obtusata Pursh. Rather common.

The lichens enumerated on pp. 74-5 (*l. c.*) should also be transferred to this list, as all of the species were collected in much greater numbers upon the most exposed portions of the outcrops, and as comparatively few specimens are found upon the straggling boulders over the surrounding prairie, they are rather characteristic of the rock exposures. Upon the more pronounced soil which runs in and out among the exposures of rock from the adjacent prairie, is a still different flora made up of species which are peculiar to dry prairies, or which from their ready adaptability to circumstances are often found upon them. The species which have not already been listed (*l. c.* pp. 74-5) are enumerated in Table II.

Surrounding the pond and pools, or growing in them, were representatives of still another flora consisting of aquatic and marsh species, most of which are common eastward. The additional species of this group are reported in Table III. The first and fourth groups represent an eastern flora, and the second and third groups a flora more nearly western in its relationship (*l. c.* p. 76).

We have here, then, four distinct floras meeting upon a very restricted area. The lines between them are sharply drawn (excepting perhaps that between the second and third groups), and the collector need but take two or three steps to pass from the aquatic and alluvial flora of the east to that of the dry plains of the west.

A general comparison of the plants and of the conditions existing in June and August* brought out the fact that the prevailing plants of the region which belong to the eastern flora flowered and matured earlier in the season while the influence of the spring rains was still abundantly felt, while those which are more characteristic of dry grounds reached their development (*i. e.*, flowered and fruited) later in the season after the drier summer period had fairly set in.

All this, of course, emphasizes the well-known fact that most plants are more or less restricted in their choice of hab-

*The plants discussed in the first paper were collected in August.

itat, and that while their seed may be scattered broadcast, only that will grow and blossom and bring forth fruit which falls within those conditions which render its existence possible. It is not probable that widely separated regions owe the similarity of their floras wholly to the accidental dropping of a few seeds. The floras of the Sioux Quartzite and of a portion of Muscatine county are in many respects similar, and quite unlike the intervening flora, yet it is not improbable that the broad area lying between them was once covered by their own kind.

Where distinct floras, requiring conditions for the best development, are brought as close together as is the case in the region under consideration, it is evident that with any considerable change in amount of rainfall one of the floras would suffer. With a comparative abundance of rains the alluvial and aquatic floras would have the advantage and would crowd upon their drouth-loving neighbors; while with a scarcity of rain these conditions would be reversed. A number of very wet or very dry consecutive seasons might therefore materially change the character of the flora of such a region. If, however, a general average was preserved, the dry soil and rock species would be at a disadvantage in the end, for they would gradually prepare a soil for their greedier neighbors who would slowly creep out upon their territory and finally take complete possession of it.

The study of such regions as that which includes the Sioux Quartzite exposures in Iowa, if conducted systematically and for a long period, ought certainly to throw light on the question of the succession of floras in the northwest.

TABLE I.

Species from the alluvial and richer soil

The species marked * were collected only at the first or eastern exposure. With two exceptions they are herbs, which do not appear in the list of the preceding year, having probably disappeared by the month of August.

* <i>Allium canadense</i> Kalm.	<i>Parietaria pennsylvanica</i> Muhl.
* <i>Amorpha fruticosa</i> L.	<i>Phlox pilosa</i> L.
<i>Ampelopsis quinquefolia</i> Mx.	<i>Prunus virginiana</i> L.
* <i>Anemone pennsylvanica</i> L.	<i>Ranunculus abortivus</i> L.
<i>Anemone virginiana</i> L.	<i>Rhus glabra</i> L.
<i>Aquilegia canadensis</i> L.	<i>Rhus toxicodendron</i> L.
<i>Celastrus scandens</i> L.	<i>Ribes floridum</i> L'Her.
<i>Celtis occidentalis</i> L.	<i>Ribes gracile</i> Mx.
* <i>Ellisia nycitelea</i> L.	<i>Rubus strigosus</i> Mx.

NOTES ON THE FLORA OF NORTHEASTERN IOWA.

BY T. J. FITZPATRICK.

The following notes are the result of a series of studies made during the summer of 1895 when the writer passed down the Upper Iowa river from Decorah to its mouth and thence down the Mississippi river to Muscatine, examining enroute the floras of Winneshiek, Allamakee, Clayton, Dubuque, Jackson, Clinton and Scott counties. Much field work was done by collecting specimens and taking notes. The writer received aid subsequently in the examination of a collection from Winneshiek county made by Herbert Goddard of Decorah, Iowa. All the rare or infrequent species mentioned in the following list are represented in my herbarium. Those common as *Quercus alba*, *Ulmus americana*, *Populus monilifera*, *Xanthium canadense*, etc., are not represented by specimens from all the localities given.

The difficult species have been carefully compared with specimens in the herbarium of the State University of Iowa, or submitted to competent botanists. The sedges were determined by R. I. Cratty, the grasses by F. Lamson-Scribner, and miscellaneous species by the officers of the Missouri Botanical Garden at St. Louis. The writer hopes the following notes may be beneficial to students who study the flora of that portion of the state, a flora unique in many respects.

RANUNCULACEÆ.

Clematis virginiana L. Winneshiek, Allamakee, and Scott Cos. Woods, infrequent.

Anemone patens L., var. *nuttalliana* Gray. Winneshiek and Allamakee Cos. High prairies, common.

A. cylindrica Gray. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Frequent in open woods.

A. virginiana L. Winneshiek and Allamakee Cos. Rich woods, frequent.

A. pennsylvanica L. Winneshiek, Allamakee, and Scott Cos. Frequent in open woods.

A. nemorosa L. Winneshiek Co. Common in woods.

Hepatica acutiloba DC. Winneshiek, Allamakee, Clayton, and Scott Cos. Rocky woods, common.

Anemonella thalictroides Spach. Winneshiek and Allamakee Cos. Woods, frequent.

Thalictrum dioicum L. Winneshiek, Allamakee, Clayton, and Scott Cos. Rocky woods, frequent.

T. purpurascens L. Winneshiek, Allamakee, and Clayton Cos. In woods and open places, frequent.

Ranunculus aquatilis L., var. *trichophyllus* Gray. Winneshiek Co. Common in pools near springs. This may be *R. circinatus* Sifh.

R. rhomboideus Goldie. Winneshiek Co. One specimen found.

R. abortivus L. Winneshiek and Allamakee Cos. Wet and waste ground, common.

R. fascicularis Muhl. Winneshiek and Scott Cos. Upland woods, frequent.

R. septentrionalis Poir. Winneshiek Co. Moist places, common.

R. pennsylvanicus L. Winneshiek and Allamakee Cos. In Allamakee Co., in sandy soil along the Mississippi river.

Isopyrum biternatum T. & G. Winneshiek and Scott Cos. Woods.

Caltha palustris L. Winneshiek Co. Wet places, not common.

Aquilegia canadensis L. Winneshiek, Allamakee, Clayton, Dubuque, and Scott Cos. Woods, common.

Actæa spicata L. var. *rubra* Ait. Winneshiek Co. Woods, less frequent than the following.

A. alba Bigel. Winneshiek Co. Wooded hillsides, common.

Hydrastis canadensis L. One specimen noted. Winneshiek Co.

MENISPERMACEÆ.

Menispermum canadense L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Woods, frequent.

. BERBERIDACEÆ.

Caulophyllum thalictroides Mx. Winneshiek, Allamakee, and Dubuque Cos. Upland woods, frequent.

Podophyllum peltatum L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rich upland woods, common.

NYMPHÆACEÆ.

Nelumbo lutea Pers. Allamakee, and Clayton Cos. Very common in the sloughs of the Mississippi river.

Nymphæa odorata. Ait. Winneshiek and Allamakee Cos. Ponds and sloughs, frequent.

Nuphar advena Ait. Winneshiek and Allamakee Cos. Ponds, frequent.

PAPAVERACEÆ.

Sanguinaria canadensis L. Winneshiek, Allamakee, Clayton, and Scott Cos. Rich woods, frequent.

Dicentra cucullaria DC. Winneshiek, Allamakee, and Scott Cos. Rich woods, common.

CRUCIFERÆ.

Dentaria laciniata Muhl. Winneshiek and Scott Cos. Rich woods, frequent.

Cardamine rhomboidea DC. Winneshiek Co. Damp soil, frequent.

C. hirsuta L. Winneshiek and Allamakee Cos. Damp soil, frequent.

Arabis canadensis L. Winneshiek, Allamakee, and Clayton Cos. Woods, frequent.

A. confinis Watson. Winneshiek and Allamakee Cos. Woods, frequent.

A. lyrata L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rolling woods, common.

A. dentata T. & G. Winneshiek Co. Woods, infrequent.

Draba caroliniana Walt. Winneshiek Co. Rocky woods, infrequent.

Camalina sativa Crantz. Winneshiek Co. Frequent in flax fields.

Nasturtium officinale R. Br. Winneshiek Co. Wet soil, frequent.

N. palustre DC. Winneshiek, Allamakee, Clayton, Dubuque, and Clinton Cos. Wet soil, margins of ponds and waterways, common.

N. armoracia Fries. Winneshiek, Allamakee, and Dubuque Cos. A frequent escape.

Erysimum cheiranthoides L. Winneshiek, Allamakee, and Dubuque Cos.

Sisymbrium canescens Nutt. Winneshiek Co.

S. officinale Scop. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Waste places, common.

S. altissimum L. Allamakee, Clayton, and Dubuque Cos. Frequent in waste places along or near railways.

Brassica sinapistrum Boiss. Winneshiek Co. Waste places, frequent.

B. nigra Koch. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Fields and waste places, common.

Capsella bursa-pastoris Moench. Winneshiek Co. Waste places, common.

L. epidium intermedium Gray. Winneshiek, Allamakee, Clayton, Dubuque, Jackson, Clinton and Scott Cos. Waste places, common.

CAPPARIDACEÆ.

Polanisia trachysperma T. & G. Winneshiek, Allamakee, Clayton, Dubuque and Jackson Cos. Sandy soil along waterways, common.

CISTACEÆ.

Helianthemum canadense Mx. Winneshiek and Allamakee Cos. Prairies, frequent.

VIOLACEÆ.

Viola pedata L. Winneshiek Co. Open places, frequent.

V. palmata L., var. *cucullata* Gray. Winneshiek, Allamakee, Dubuque, Clinton and Scott Cos. Fields and woods, common.

V. pubescens Ait. Winneshiek, Allamakee and Scott Cos. Woods, common.

V. canina L., var. *muhlenbergii* Gray. Winneshiek and Allamakee Cos. Damp woods, infrequent.

CARYOPHYLLACEÆ.

Saponaria officinalis L. Winneshiek and Allamakee Cos. Waste places. A frequent escape.

S. vaccaria L. Winneshiek Co. Waste places, infrequent.

Silene stellata Ait. Winneshiek and Allamakee Cos. Woods, frequent.

S. nivea Otth. Winneshiek and Allamakee Cos. Along river, infrequent.

S. antirrhina L. Winneshiek Co. Fields, frequent.

Lychnis githago Lam. Winneshiek Co. Waste places, infrequent.

Arenaria lateriflora L. Winneshiek Co.

Stellaria media Smith. Winneshiek Co.

S. lonigfolia Muhl. Winneshiek Co.

Cerastium arvense L. Winneshiek Co.

C. nutans Raf. Winneshiek and Allamakee Cos.

PORTULACACEÆ.

Portulaca oleracea L. Winneshiek, Allamakee, Clayton and Scott Cos. Fields and waste places, common.

Claytonia virginica L. Winneshiek Co. Woods, frequent.

HYPERICACEÆ.

Hypericum ascyron L. Winneshiek, Allamakee and Clayton Cos. Prairie and upland woods, infrequent.

H. cistifolium Lam. Dubuque Co. Along the railway, frequent.

H. maculatum Walt. Winneshiek Co. Woods and open places, frequent.

MALVACEÆ.

Malva crispa L. Winneshiek Co. One specimen noted.

M. rotundifolia L. Winneshiek, Allamakee, Clayton, Dubuque and Jackson Cos. Waste places near dwellings, common.

Napæa dioica L. Winneshiek and Allamakee Cos. Frequent in the valley of the Upper Iowa river.

Abutilon avicennæ Gaertn. Winneshiek and Allamakee Cos. Fields and waste places, frequent.

TILIACEÆ.

Tilia americana L. Winneshiek, Allamakee, Clayton, Dubuque and Scott Cos. Rich woods, common.

LINACEÆ.

Linum sulcatum Riddell. Allamakee Co. Prairies, frequent.

L. usitatissimum L. Clayton and Dubuque Cos. Waste places along railway, infrequent.

GERANIACEÆ.

Geranium maculatum L. Winneshiek, Allamakee and Clayton Cos. Rich woods, frequent.

Oxalis violacea L. Winneshiek Co. Fields, common.

O. corniculata L., var. *stricta* Sav. Winneshiek, Allamakee, Clayton, Dubuque, and Clinton Cos. Fields and woods, common.

Impatiens pallida Nutt. Winneshiek and Clayton Cos. Rich soil along streams, common.

I. fulva Nutt. Winneshiek and Allamakee Cos. With the preceding.

RUTACEÆ.

Xanthoxylum americana Mill. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Woods, frequent.

Ptelea trifoliata L. Rock Island Arsenal grounds.

CELASTRACEÆ.

Euonymus atropurpureus Jacq. Winneshiek and Allamakee Cos. Upland woods, frequent.

RHAMNACEÆ.

Ceanothus americanus L. Winneshiek, Allamakee, Clayton, Dubuque, and Jackson Cos. Woods, frequent.

VITACEÆ.

Vitis riparia Mx. Winneshiek, Allamakee, Clayton, Dubuque, and Jackson Cos. Woods, common.

Ampelopsis quinquefolia Mx. Winneshiek, Clayton, and Dubuque Cos. Woods, common.

SAPINDACEÆ.

Acer spicatum Lam. Clayton Co. Bluffs, infrequent. Specimen sent by Prof. B. Fink.

A. saccharinum Wang. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Frequent along rivers in rolling woods.

A. dasycarpum Ehrh. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Low grounds, common.

Negundo aceroides Moench. Winneshiek, Allamakee, Clayton, Dubuque, and Clinton Cos. Low grounds, common

Staphylea trifolia L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rocky woods, frequent.

ANACARDIACEÆ.

Rhus typhina L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rolling woods, frequent.

R. glabra L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Uplands, common.

POLYGALACEÆ.

Polygala senaga L. Winneshiek Co. Woods, frequent.

LEGUMINOSÆ.

Baptisia leucophæa Nutt. Winneshiek and Allamakee Cos. Open woods and pastures, frequent.

B. leucantha T. & G. Winneshiek and Allamakee Cos. Fields and woods, common.

Lupinus perennis L. Winneshiek Co.

Trifolium arvense L. Winneshiek Co. Fields, infrequent.

T. pratense L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Fields and waste places, common.

T. repens L. Winneshiek and Allamakee Cos. Pastures and waste places, common.

T. hybridum L. Winneshiek Co. Fields and waste places, infrequent.

Melilotus officinalis Willd. Winneshiek Co. Waste places, frequent.

M. alba Lam. Winneshiek, Allamakee, Clayton, Dubuque, and Scott Cos. Waste places, common.

Amorpha canescens Nutt. Winneshiek, Allamakee, Clayton, Dubuque, and Jackson Cos. Dry soil, common.

A. fruticosa L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Along waterways, frequent.

Petalostemon violaceus Mx. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Prairies, common.

P. candidus Mx. Winneshiek, Allamakee, and Dubuque Cos. With the preceding.

Tephrosia virginiana Pers. Winneshiek, Allamakee, and Jackson Cos. Sandy soil, frequent.

Robinia pseudacacia L. Winneshiek, Allamakee, and Jackson Cos. Introduced, waste places.

Astragalus canadensis L. Winneshiek and Clayton Cos. Frequent.

Desmodium acuminatum DC. Winneshiek, Allamakee, and Clayton Cos. Woods, frequent.

D. canadense DC. Winneshiek, Clayton, and Dubuque Cos.

Lespedeza capitata Mx. Winneshiek Co.

Vicia cracca K. Winneshiek Co. One specimen in my collection.

V. americana Mull. Winneshiek and Allamakee Cos. Woods, frequent.

Lathyrus venosus Muhl. Winneshiek Co. Woods, frequent.

Apios tuberosa Moench. Allamakee Co. Woods, frequent.

Strophostyles angulosa Ell. Clayton, Dubuque, Jackson, and Scott Cos. Sandy soil, common.

Cassia marylandica L. Dubuque Co. Woods, infrequent.

C. chamæcrista L. Winneshiek, Allamakee, Dubuque, and Jackson Cos. Fields and waste places, common.

Cercis canadensis L. Scott Co. Rolling woods, frequent.

Gymnocladus canadensis Lam. Dubuque Co. Woods along the river, infrequent.

Gleditschia triacanthos L. Allamakee, Clayton, Dubuque, Clinton, and Jackson Cos. Rich woods, frequent.

ROSACEÆ.

Prunus americana Mars. Winneshiek, Allamakee, and Clayton Cos. Thickets, frequent.

P. serotina Ehrh. Winneshiek, Allamakee, and Dubuque Cos. Rich woods, frequent.

P. virginiana L. Winneshiek, Allamakee, and Dubuque Cos. Thickets, frequent.

Spiraea aruncus L. Dubuque and Muscatine Cos. Along river, frequent.

Physocarpus opulifolius Maxim. Winneshiek, Allamakee, and Clayton Cos. Rich woods, frequent.

Rubus occidentalis L. Winneshiek, Allamakee, Clayton, Dubuque, and Jackson Cos. Borders of fields and in woods, frequent.

R. villosus Ait. Winneshiek and Jackson Cos. Woods, frequent.

Geum album Gmelin. Winneshiek, Allamakee, and Clayton Cos. Borders of fields and woods, common.

G. macrophyllum Wild. Winneshiek. A few collected.

G. triflorum Pursh. Winneshiek and Allamakee Cos. Rocky woods, infrequent.

Fragaria virginiana Mill. Winneshiek, Allamakee, and Clayton Cos. Fields and woods, common.

F. vesca L. Winneshiek and Allamakee Cos. Woods, common.

Potentilla arguta Pursh. Winneshiek and Allamakee Cos. Roadsides and prairies, frequent.

P. norvegica L. Winneshiek, Allamakee, Clayton and Dubuque Cos. Fields, frequent.

P. fruticosa L. Allamakee Co. Common on top of a bluff facing the Upper Iowa river. Also in Winneshiek Co.

P. canadensis L. Winneshiek and Allamakee Cos. Fields, common.

Agrimonia eupatoria L. Winneshiek Co. Woods, common.

Rosa humilis Marsh. Winneshiek, Dubuque, Allamakee, and Jackson Cos. Prairie and fields, common.

R. blanda Ait. Winneshiek and Allamakee Cos. Fields and woods, frequent.

Pyrus coronaria L. Allamakee Co. Thickets, common.

Crataegus coccinea L. Allamakee Co. Thickets, common.

C. tomentosa L. Winneshiek, Allamakee, and Clayton Cos. Thickets, common.

C. crus-galli L. Winneshiek, Allamakee, Clayton and Scott Cos. Thickets, common.

Amelanchier canadensis T. & G. Winneshiek and Allamakee Cos. Rocky woods, frequent.

SAXIFRAGACEÆ.

Saxifraga pennsylvanica L. Winneshiek and Allamakee Cos. Rich soil, meadows and open woods, frequent.

Mitella diphylla L. Winneshiek Co. Rich woods, frequent.

Heuchera hispida Pursh. Winneshiek, Allamakee, Clayton and Scott Cos. Meadows, frequent.

Ribes cynosbati L. Winneshiek, Clayton and Dubuque Cos. Woods, frequent.

R. gracile Mx. Winneshiek, Allamakee and Dubuque Cos. Woods, common.

R. floridum L'Her. Winneshiek, Allamakee and Clayton Cos. Woods, frequent.

CRASSULACEÆ

Penthorum sedoides L. Winneshiek Co. Wet ground, frequent.

HAMAMELIDEÆ.

Hamamelis virginiana L. Clayton Co. In a ravine below the pictured rocks south of McGregor.

ONAGRACEÆ.

Epilobium angustifolium L. Dubuque Co. Common in open woods.

E. coloratum Muhl. Winneshiek Co. Wet soil, frequent.

Gaura coccinea Nutt. Dubuque Co. Common.

Oenothera biennis L. Winneshiek, Clayton, Dubuque and Jackson Cos. Fields, common.

Æ. serrulata Nutt. Winneshiek and Allamakee Cos. Prairies and woods, frequent.

Circeä lutetiana L. Winneshiek and Allamakee Cos. Woods, common.

C. alpina L. Clayton Co. Woods along river, infrequent.

CUCURBITACEÆ.

Echinocystis lobata T. & G. Winneshiek, Allamakee, Clayton and Clinton Cos. Woods, common.

FICOIDEÆ.

Mollugo verticillata L. Allamakee and Clayton Cos. Sandy shores, common.

UMBELLIFERÆ.

Daucus carota L. Dubuque Co. Common along railway.

Heracleum lanatum Mx. Winneshiek and Allamakee Cos. Upland woods, frequent.

Cicuta maculata L. Winneshiek, Allamakee, Clayton and Dubuque Cos. Wet places, common.

Pastinaca sativa L. Dubuque Co. Waste ground.

Pimpinella integerrima Benth. & Hook. Winneshiek Co. Woods, frequent.

Cryptotenia canadensis DC. Winneshiek Co.

Sium cicutæfolium Gmelin. Winneshiek, Allamakee, Clayton and Dubuque Cos. In water or wet ground, frequent.

Conium maculatum L. Winneshiek Co. Along a ravine, introduced, infrequent.

Zizia aurea Koch. Winneshiek and Allamakee Cos. Rich soil, common.

Osmorrhiza longistylis DC. Allamakee Co. Woods, frequent.

O. brevistylis DC. Winneshiek and Clayton Cos. Woods, frequent.

Eryngium yuccæfolium Mx. Winneshiek Co. Prairies, common.

Saniculama rylandica L. Winneshiek, Clayton and Dubuque Cos. Woods, common.

ARALIACEÆ.

Aralia racemosa L. Winneshiek, Clayton and Dubuque Cos. Rocky woods, frequent.

A. nudicaulis L. Winneshiek and Allamakee Cos. Rocky woods, frequent.

A. quinquefolia Decs. & Planch. Winneshiek Co. Woods, infrequent.

CORNACEÆ.

Cornus paniculata L'Her. Winneshiek, Allamakee, and Clayton Cos. Woods and borders, frequent.

CAPRIFOLIACEÆ.

Sambucus canadensis L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Fields and woods, common.

S. racemosa L. Winneshiek and Clayton Cos. Rocky woods, frequent.

Viburnum lentago L. Winneshiek, Allamakee, and Dubuque Cos. Woods, frequent.

Triosteum perfoliatum L. Winneshiek, Allamakee, and Clayton Cos. Open woods, frequent.

Linnæa borealis Gronov. Winneshiek Co.

Symphoricarpos occidentalis Hook. Winneshiek Co.

Lonicera glauca Hill. Winneshiek and Allamakee Cos. Woods, infrequent.

L. sullivantii Gray. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Woods, frequent.

Diervilla trifida Moench. Winneshiek Co. Woods near the base of cliffs, frequent.

RUBIACEÆ.

Cephalanthus occidentalis L. Allamakee, Clayton, Clinton, and Jackson Cos. Low woods, frequent.

Galium aparine L. Winneshiek and Allamakee Cos. Damp woods, frequent.

G. boreale L. Winneshiek and Allamakee Cos. Woods, frequent.

G. concinnum T. & G. Winneshiek and Allamakee Cos. Woods, common.

VALERIANACEÆ.

Valeriana edulis Nutt. Winneshiek Co. Damp places, frequent.

COMPOSITÆ.

Vernonia fasciculata Mx. Winneshiek, Allamakee, Dubuque, and Jackson Cos. Low grounds, frequent.

Eupatorium purpureum L. Winneshiek, Clayton, and Dubuque Cos. Woods, frequent.

E. ageratoides L. Winneshiek Co. Woods, common.

E. perfoliatum L. Winneshiek Co.

E. altissimum L. Winneshiek Co.

Kuhnia eupatorioides L. Winneshiek Co. Dry soil, common.

Liatris scariosa Willd. Winneshiek Co. Prairies.

Solidago bicolor L. Winneshiek Co. One specimen collected.

S. rigida L. Winneshiek Co. Prairies, common.

S. ulmifolia Muhl. Winneshiek Co. Woods, common.

S. latifolia L. Allamakee Co. Woods, frequent.

S. serotina Ait. Winneshiek, Clayton, and Dubuque Cos.

S. canadensis L. Winneshiek, Clayton, and Dubuque Cos.

S. nemoralis Ait. Winneshiek and Dubuque Cos.

Aster sericeus Vent. Winneshiek Co.

A. shortii Hook. Winneshiek Co. One specimen noted.

A. multiflorus Ait. Winneshiek Co. Waysides, common.

A. tradescanti L. Winneshiek Co.

- A. novæ-angliæ* L. Winneshiek Co.
A. azureus Lindl. Winneshiek Co.
A. sagittifolius Willd. Winneshiek, Allamakee, Clayton, and Dubuque Cos,
Erigeron bellidifolius Muhl. Winneshiek Co.
E. strigosus Muhl. Winneshiek Co.
E. philadelphicus L. Winneshiek Co.
E. canadensis L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Fields and waste places, common.
E. annuus Pers. Winneshiek, Allamakee, Clayton, and Dubuque Cos.
Antennaria plantaginifolia Hook. Winneshiek, Allamakee, and Clayton Cos. Fields and open woods, common.
Polymnia canadensis L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Along the base of wooded cliffs, common.
Silphium perfoliatum L. Winneshiek, Allamakee, and Dubuque Cos.
S. laciniatum L. Winneshiek, Allamakee, and Dubuque Cos. Prairies and borders of woods, common.
S. integrifolium Mx. Dubuque Co.
Parthenium integrifolium L. Winneshiek, Allamakee, and Dubuque Cos. Fields, frequent.
Iva xanthiifolia Nutt. Winneshiek Co. Waste places, infrequent.
Ambrosia artemisiæfolia L. Winneshiek, Allamakee, Clayton, Dubuque, and Jackson Cos. Fields and waste places, common.
A. trifida L. Winneshiek, Allamakee, and Jackson Cos. Damp soil, waste places, common. The var. *integrifolia* T. G., frequently found.
Xanthium canadense Mill. Winneshiek, Allamakee, Clayton, Dubuque, Jackson, and Clinton Cos. Fields and waste places, common.
Heliopsis scabra Dunal. Winneshiek, Allamakee, and Clayton Cos. Frequent.
Rudbeckia triloba L. Winneshiek and Dubuque Cos. Open woods, frequent.
R. hirta L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Woods, frequent.
R. laciniata L. Winneshiek Co.
Lepachys pinnata T. & G. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Prairies, common.

Helianthus annuus L. Winneshiek, Allamakee, Clayton, and Jackson Cos. Waste places, frequent.

H. petiolaris Nutt. Dubuque Co. Along the railroad, one specimen.

H. occidentalis Ridd. Winneshiek Co.

H. grosse-serratus Mart. Winneshiek Co. Rich soil, common.

H. maximiliani Schrad. Dubuque Co. A few along railroad.

H. tuberosus L. Winneshiek Co. Woods, frequent.

Coreopsis palmata Nutt. Winneshiek, Allamakee, and Clayton Cos. Prairies, common.

Bidens frondosis L. Winneshiek, Clayton, Dubuque, and Clinton Cos. Wet grounds, common.

B. connata Muhl. Winneshiek Co. Wet grounds, common.

B. cernua L. Winneshiek Co. Wet grounds, common.

Helenium autumnale L. Winneshiek, Allamakee, Clinton, and Scott Cos. Alluvial soil, frequent.

Anthemis cotula DC. Winneshiek, Allamakee, Clayton, Dubuque, Jackson, Clinton, and Scott Cos. Waste places, common.

Achillea millefolium L. Winneshiek and Dubuque Cos. Meadows and open woods, common.

Chrysanthemum leucanthemum L. Allamakee and Dubuque Cos. Along railroad and in open woods, infrequent.

Tanacetum vulgare L. Winneshiek and Allamakee Cos. Waysides and waste places, frequent.

Artemisia blennis Willd. Winneshiek, Dubuque, and Jackson Cos. Waste places, frequent.

A. ludoviciana Nutt. Winneshiek, Allamakee, and Dubuque Cos.

A. caudata Mx. Winneshiek Co.

Senecio aureus L., var. *balsamitæ* T. & G. Winneshiek, Allamakee, and Scott Cos. Woods, frequent.

Cacalia suaveoleus L. Winneshiek Co. Woods, infrequent.

C. reniformis Muhl. Winneshiek and Allamakee Cos. Woods, frequent.

C. tuberosa Nutt. Allamakee Co. Wet prairies, frequent.

Erechtites hieracifolia Raf. Winneshiek Co. Open places, frequent.

Arctium lappa L. Winneshiek, Clayton and Dubuque Cos. Fields and waste places, frequent.

Cnicus lanceolatus Hoffm. Winneshiek, Allamakee, Clayton, Dubuque and Clinton Cos. Fields and open woods, frequent.

C. altissimus Willd. Winneshiek and Scott Cos.

Krigia amplexicaulis Nutt. Winneshiek and Allamakee Cos.
Rich upland woods, common.

Hieracium canadense Mx. Winneshiek Co.

Prenanthes alba L. Winneshiek Co.

Taraxacum officinale Weber. Winneshiek, Allamakee, Clayton, Dubuque, and Clinton Cos. Roadsides and fields, common.

Lactuca scariola L. Winneshiek and Dubuque Cos. Waste places, infrequent.

L. canadensis L. Winneshiek Co.

L. acuminata Gray. Clayton and Dubuque Cos.

Sonchus asper Vill. Winneshiek and Dubuque Cos.

LOBELIACEÆ.

Lobelia syphilitica L. Winneshiek Co. Dampsoil, common.

L. spicata Lan. Winneshiek and Allamakee Cos. Fields, frequent.

CAMPANULACEÆ.

Specularia perfolia A. DC. Winneshiek and Allamakee Cos.

Campanula rotundifolia L. Winneshiek, Allamakee, Clayton, Dubuque, and Jackson Cos. Woods at the base of cliffs, frequent.

C. aparinoides Pursh. Winneshiek Co. A few specimens collected.

C. americana L. Winneshiek, Clayton, and Dubuque Cos. Rich soil, woods, frequent.

ERICACEÆ.

P. secunda L. Winneshiek Co. One specimen received in exchange. The only locality known in the state. Reported by Holway and Shimek.

PRIMULACEÆ.

Eodecatheon media L. Winneshiek and Scott Cos. Woods frequent.

Scirionoma ciliatum Raf. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Open woods, frequent.

S. lanceolatum Gray. Allamakee Co. Alluvial soil along the Mississippi river.

OLEACEÆ.

Fraxinus americana L. Winneshiek, Allamakee, Clayton, and Clinton Cos. Rich woods, frequent.

Syringa vulgaris L. Dubuque Co. Many specimens were found along the railroad.

APOCYNACEÆ.

Apocynum androsaemifolium L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Fields and waste places, frequent.

ASCLEPIADACEÆ.

Asclepias tuberosa L. Winneshiek, Allamakee, and Clayton Cos. Fields, frequent.

A. incarnata L. Winneshiek, Allamakee, and Clayton Cos. Wet ground, frequent.

A. cornuti Dec. Winneshiek, Allamakee, Clayton, Dubuque, and Jackson Cos. Fields, common.

A. phytolacchoidea Pursh. Winneshiek Co.

A. verticillata L. Winneshiek, Clayton and Dubuque Cos. Open woods, frequent.

Acerates viridiflora Ell. Allamakee Co.

GENTIANACEÆ.

Gentiana quinquefolia Lam., var. *occidentalis* Gray. Winneshiek Co.

G. puberula Mx. Winneshiek Co.

G. alba Muhl. Winneshiek Co. One specimen.

POLEMONIACEÆ.

Phlox pilosa L. Winneshiek and Scott Cos. Prairies, frequent.

P. divaricata L. Winneshiek, Allamakee and Clayton Cos. Woods, frequent.

Polemonium reptans L. Winneshiek, Allamakee and Scott Cos. Rich woods, frequent.

HYDROPHYLLACEÆ.

Hydrophyllum virginicum L. Winneshiek and Allamakee Cos.

H. appendiculatum Mx. Winneshiek Co. Rocky woods, frequent.

Ellisia nyctelea L. Winneshiek Co. Low ground, common.

BORRAGINACEÆ.

Cynoglossum officinale L. Allamakee and Scott Cos. Open woods, infrequent.

Echinosperrum virginicum Lehm. Winneshiek Co.

E. redowskii occidentale Wats. Winneshiek Co. Frequent.

Mertensia virginica DC. Winneshiek and Scott Cos. Damp woods, frequent.

M. paniculata Don. Winneshiek Co. Received in exchange, collected by Holway.

Lithospermum latifolium Mx. Winneshiek Co.

L. hirtum Lehm. Winneshiek and Allamakee Cos. Sandy woods, frequent.

L. canescens Lehm. Winneshiek, Allamakee and Scott Cos.

L. angustifolium Mx. Winneshiek Co.

Onosmodium carolinianum DC. Winneshiek and Allamakee Cos. Pastures and open woods, frequent.

CONVOLVULACEÆ.

Ipomœa pandurata Meyer. Winneshiek Co.

Convolvulus sepium L. Allamakee, Clayton, Dubuque and Clinton Cos. Fields and thickets, frequent.

Cuscuta glomerata Choisy. Winneshiek, Allamakee and Jackson Cos. Fields and upland thickets, frequent.

C. tenuiflora Eng. Winneshiek Co. Woods, frequent.

SOLANACEÆ.

Solanum nigrum L. Allamakee, Clayton, Dubuque, Clinton and Scott Cos. Fields and woods, common.

Physalis virginiana Mill. Winneshiek, Allamakee and Clayton Cos.

P. lanceolata Mx. Winneshiek Co. Prairies, frequent.

P. lanceolata Mx, var. *lævigata* Gray. Allamakee Co.

Datura tatula L. Allamakee and Dubuque Cos. Waste places, common.

SCROPHULARIACEÆ.

Verbascum thapsus L. Winneshiek, Allamakee, Clayton, Dubuque, Jackson and Scott Cos. Fields and woods, common.

Linaria vulgaris Mill. Winneshiek and Clayton Cos. Waste places, frequent.

Scrophularia nodosa L., var. *marilcanda* Gray. Winneshiek, Allamakee, Clayton and Dubuque Cos. Open woods, frequent.

Chelone glabra L. Winneshiek Co.

Mimulus ringens L. Winneshiek, Allamakee, Clayton and Dubuque Cos. Wet ground, river banks, frequent.

M. jamesii Torr. Winneshiek Co. Calcareous springs, frequent.

Gratiola virginiana L. Winneshiek Co. Upland woods, frequent.

Veronica virginica L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Woods, common.

V. anagallis L. Winneshiek and Allamakee Cos. Wet grounds near springs, common.

V. peregrina L. Winneshiek Co. Wet soil, common.

Gerardia tenuifolia Vahl. Winneshiek Co. Fields and woods, common.

Castilleja coccinea Spreng. Winneshiek Co. Woods, frequent.

Pedicularis canadensis L. Winneshiek, Allamakee, and Clayton Cos. Prairies, common.

P. lanceolata Mx. Wet ground, infrequent.

VERBENACEÆ.

Verbena urticifolia L. Winneshiek, Allamakee, and Dubuque Cos. Fields and open woods, frequent.

V. angustifolia Mx. Allamakee Co. Sandy soil, frequent.

V. hastata L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Waste grounds, common.

V. stricta Vent. Winneshiek, Allamakee, and Clayton Cos. Sandy soil, frequent.

V. bracteosa Mx. Winneshiek, Allamakee, and Clayton Cos. Pastures and waste places, frequent.

Lippia lanceolata Mx. Clayton, Dubuque, and Clinton Cos. Wet soil along river, common.

Phryma leptostachya L. Winneshiek, Allamakee, and Clayton Cos. Rich open woods, common.

LABIATEÆ.

Isanthus cæruleus Mx. Winneshiek and Scott Cos. Open woods, frequent.

- Mentha canadensis* L. Winneshiek and Allamakee Cos.
Lycopus sinuatus Ell. Winneshiek Co.
Pycnanthemum lanceolatum Pursh. Winneshiek Co.
P. linifolium Pursh. Jackson Co.
Hedeoma pulegioides Pers. Allamakee Co. Open woods, common.
H. hispida Pursh. Winneshiek Co. Dry soil, common.
Monarda fistulosa L. Winneshiek, Allamakee, Clayton and Dubuque Cos. Waste places, common.
M. punctata L. Dubuque Co. Frequent along railroad.
Lophanthus scrophulariæfolius Benth. Winneshiek Co. Open woods.
Nepeta cataria L. Winneshiek, Allamakee, Clayton, Dubuque, and Scott Cos. Roadsides and waste places, common.
N. glechoma Benth. Winneshiek Co. Waste places, infrequent.
Blephilia hirsuta Benth. Winneshiek Co. Woods, frequent.
Scutellaria lateriflora L. Winneshiek Co.
S. versicolor Nutt. Winneshiek and Allamakee Cos. Woods, infrequent.
S. parvula Mx. Winneshiek, Allamakee, and Scott Cos.
Brunella vulgaris L. Winneshiek, Allamakee, and Dubuque Cos.
Phystostegia virginiana Benth. Winneshiek Co.
Leonurus cardiaca L. Winneshiek Co. Waste places, frequent.
Stachys palustris L. Winneshiek Co.
S. aspera Mx. Dubuque Co.
Galeopsis tetrahit L. Winneshiek Co. One specimen collected.

AMARANTACEÆ.

- Amarantus albus* L. Winneshiek, Allamakee, Clayton, Clinton, and Scott Cos. Wayside and waste places, frequent.
A. blitoides Watson. Allamakee Co.

CHENOPODIACEÆ.

- Chenopodium album* L. Winneshiek, Allamakee, and Clinton Cos.
C. botrys L. Dubuque Co. Waste places, frequent.
Salsola kali L. var. *targus* DC. Dubuque Co. A few found in waste places.

POLYGONACEÆ.

Rumex britannica L. Winneshiek and Allamakee Cos. Rich soil, common.

R. altissimus Wood. Winneshiek, Allamakee, and Clayton Cos. Rich soil, common.

R. verticillatus L. Winneshiek and Allamakee Cos. Wet ground, frequent.

R. obtusifolius L. Winneshiek Co.

R. crispus L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rich soil, wayside and waste places, common.

R. acetosella L. Winneshiek and Allamakee Cos. Cultivated fields, frequent.

Polygonum pennsylvanicum L. Winneshiek and Clayton Cos. Damp soil, common.

P. amphibium L. Allamakee Co. Along river.

P. aviculare L. Winneshiek Co. Waste places, common.

P. sagittatum L. Winneshiek Co. Margins of ponds and streams, frequent.

P. convolvulus L. Dubuque Co.

P. dumetorum L., var. *scandens* Gray. Winneshiek, Allamakee, and Clayton Cos. Fields and woods, common.

P. tenue Mx. Winneshiek Co.

ARISTOLOCHIACEÆ.

Asarum canadense L. Winneshiek, Allamakee, and Clayton Cos. Wooded bluffs, frequent.

THYMELÆACEÆ.

Dirca palustris L. Winneshiek Co.

EUPHORBIACEÆ.

Euphorbia maculata L. Winneshiek, Allamakee, Clayton, Dubuque, Jackson, and Clinton Cos. Waysides, common.

E. preslii Guss. Winneshiek, Allamakee, and Dubuque Cos. Waysides, common.

E. cyparissias L. Allamakee and Scott Cos. Near old cemetery.

URTICACEÆ.

Ulmus fulva Mx. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rich woods, frequent.

U. americana L. Winneshiek, Allamakee, Clayton, Dubuque, Jackson, Clinton, and Scott Cos. Woods, common.

Celtis occidentalis L. Winneshiek, Allamakee, and Clayton Cos. Rich woods, frequent.

Morus rubra L. Clayton Co. Near river, infrequent.

Urtica gracilis Ait. Winneshiek and Allamakee Cos. Alluvial soil, frequent.

Pilea pumila Gray. Winneshiek and Clayton Cos. Rich woods or waste places, frequent.

Laportea canadensis Gaud. Alluvial soil, frequent.

Parietaria pennsylvanica Muhl. Winneshiek, Allamakee, and Dubuque Cos. Woods, frequent.

PLANTANACEÆ.

Plantanus occidentalis L. Jackson Co. Along Mississippi river.

JUGLANDACEÆ.

Juglans cinerea L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rich soil, frequent.

J. nigra L. Winneshiek, Allamakee, Clayton, Dubuque, Jackson, and Scott Cos. Rich soil, frequent.

Carya alba Nutt. Winneshiek, Allamakee, Clinton, and Scott Cos. Uplands, frequent

C. amara Nutt. Winneshiek Co. Low grounds, frequent.

CUPULIFERÆ.

Betula nigra L. Allamakee, Clayton, Dubuque, Jackson, and Clinton Cos. River banks, common.

B. papyrifera Mars. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rich woods, common.

Corylus americana Walt. Winneshiek, Allamakee, and Dubuque Cos. Uplands, common.

Ostrya virginica Willd. Winneshiek, Allamakee, and Clayton Cos. River bluffs, frequent.

Carpinus caroliniana Walt. Allamakee, Clayton, and Dubuque Cos. Rolling woods, frequent.

Quercus alba L. Winneshiek, Allamakee, and Clayton Cos. Uplands, frequent.

Q. macrocarpa Mx. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Upland woods, common.

Q. rubra L. Winneshiek, Allamakee, and Clayton Cos. Uplands and lowlands, frequent.

Q. coccinea Wang. Allamakee, Dubuque, Jackson, and Scott Cos. Uplands, common.

SALICACEÆ.

Salix humilis Marsh. Winneshiek Co. Prairies, frequent.

Populus tremuloides Mx. Winneshiek, Allamakee, and Dubuque Cos.

P. monilifera Ait. Winneshiek, Allamakee, Clayton, Dubuque, Jackson, and Clinton Cos. Along streams, common.

CONIFERÆ.

Pinus strobus L. Winneshiek, Allamakee, and Clayton Cos. Summit of bluffs along rivers, frequent.

Juniperus communis L. Winneshiek, Allamakee, and Dubuque Cos. Dry soil, frequent.

J. virginiana L. Winneshiek, Allamakee, and Clayton Cos. With the preceding.

Taxus canadensis Willd. Winneshiek, and Dubuque Cos. A decumbent bush under the pines.

HYDROCHARIDACEÆ.

Elodea canadensis Mx. Winneshiek and Allamakee Cos. Ponds, frequent.

Vallisneria spiralis L. Scott Co. In Mississippi river.

ORCHIDACEÆ.

Liparis liliifolia Richard. Winneshiek Co.

Goodyera pubescens R. Br. Winneshiek Co. One specimen noted.

Habenaria bracteata R. Br. Winneshiek Co. Two specimens found in deep woods.

Cypripedium pubescens Willd. Winneshiek and Allamakee Cos. Rich woods, frequent.

IRIDACEÆ.

Iris versicolor L. Winneshiek and Allamakee Cos. Wet places, frequent.

Belamcanda chinensis Adams. Dubuque Co. Frequent along railway.

Sisyrinchium angustifolium Mill. Winneshiek Co. Fields and waysides, frequent.

AMARYLLIDACEÆ.

Hypoxis erecta L. Winneshiek Co. Rich meadows, frequent.

DIOSCORIACEÆ.

Dioscorea villosa L. Winneshiek and Dubuque Cos. Thickets, frequent.

LILIACEÆ.

Smilax herbacea L. Winneshiek, Allamakee, and Dubuque Cos. Alluvial soil, frequent.

S. hispida Muhl. Allamakee, Clayton, and Dubuque Cos. Thickets, frequent.

S. ecirrhata Wats. Winneshiek Co. Woods, frequent.

Allium stellatum Fras. Winneshiek Co. Fields, frequent.

A. tricoccum Ait. Winneshiek and Allamakee Cos. Low woods, infrequent.

A. canadense Kalm. Winneshiek, Allamakee, and Dubuque Cos. Fields, frequent.

Zygadenus elegans Pursh. Allamakee Co. Base of cliffs, frequent.

Polygonatum giganteum Diet. Winneshiek, Clayton, and Dubuque Cos. Alluvial soil, frequent.

Asparagus officinalis L. Winneshiek Co. Waysides and waste places, infrequent.

Smilacina racemosa Desf. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Copses, common.

S. stellata Desf. Winneshiek Co. Frequent.

Maianthemum canadense Desf. Winneshiek Co. Rich woods, frequent.

Uvularia grandiflora Smith. Winneshiek, Allamakee, and Clayton Cos. Rich woods, frequent.

Oakesia sessilifolia Watson. Winneshiek Co. Rich woods, infrequent.

Erythronium albidum Nutt. Winneshiek Co. Rich soil, common.

Lilium philadelphicum L. Winneshiek Co. Prairies and upland woods, infrequent.

L. canadense L. Winneshiek Co.

Trillium erectum L. Winneshiek Co. Rich woods, frequent.

T. nivale Riddell. Winneshiek Co. Rocky woods, frequent.

PONTEDERIACEÆ.

Heteranthera graminea Vahl. Allamakee Co. Frequent in Upper Iowa river.

COMMELINACEÆ.

Tradescantia virginica L. Winneshiek, Allamakee, and Clayton Cos. Rich soil, frequent.

JUNCACEÆ.

Juncus tenuis Willd. Winneshiek, Allamakee, Dubuque, and Jackson Cos. Fields and waysides, common.

TYPHACEÆ.

Typha latifolia L. Winneshiek and Allamakee Cos. Ponds and river margins, frequent.

Sparganium eurycarpum Englm. Winneshiek Co. Wet places, frequent.

ARACEÆ.

Arisæma triphyllum Torr. Winneshiek, Allamakee, Clayton, Dubuque, and Scott Cos. Rich woods, frequent.

A. dracontium Schott. Winneshiek and Dubuque Cos. Rich woods, infrequent.

Symplocarpus fœtidus Salisb. Winneshiek and Allamakee Cos. Wet ground, infrequent.

LEMNACEÆ.

Spirodela polyrrhiza Schleid. Winneshiek and Dubuque Cos. Ponds and river sloughs, common.

ALISMACEÆ.

Alisma plantago L. Winneshiek and Dubuque Cos. Shallow ponds and ditches, frequent.

Sagittaria variabilis Engl. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Mud flats, ditches, and shallow water, common.

S. heterophylla Pursh. Winneshiek Co. In shallow water, frequent.

NAIADACEÆ.

Potamogeton fluitans Roth. Winneshiek, Allamakee, and Clayton Cos. Common in the Upper Iowa river.

P. pauciflorus Pursh. Winneshiek Co. Frequent.

CYPERACEÆ.

Cyperus esculentus L. Clayton Co. Wet ground, frequent.

Eleocharis palustris R. Br. Winneshiek Co. Wet ground, frequent.

Scirpus lacustris L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Wet ground and in water, common.

S. fluviatilis Gray. Allamakee Co. Very common in the sloughs of the Mississippi river.

S. atrovirens Muhl. Winneshiek, Allamakee, and Dubuque Cos. Wet ground, frequent.

Carex intumescens Rudge. Dubuque Co. Wet woods, frequent.

C. squarrosa L. Clayton and Dubuque Cos. Wet woods, frequent.

C. hystricina Muhl. Winneshiek Co. Wet ground, frequent.

C. pennsylvanica Lam. Winneshiek Co. Dry soil, common.

C. stipata Muhl. Winneshiek Co.

C. vulpinoidea Mx. Winneshiek Co.

C. rosea Schkuhr. Winneshiek Co.

C. cephalophora Muhl. Winneshiek Co.

C. straminea Willd., var. *aptera* Booth. Winneshiek Co. The same as *C. tenera* Dew.

GRAMINEÆ.

Panicum sanguinale L. Winneshiek Co.

P. capillare L. Winneshiek Co.

P. dichotomum L. Winneshiek Co.

P. dichotomum L., var. *villosa* Vasey. Winneshiek Co.

P. latifolium L. Winneshiek, Allamakee, and Clayton Cos. Woods, frequent.

Setaria glauca Beauv. Winneshiek, Clayton, and Dubuque Cos. Waste places, common.

S. viridis Beauv. Winneshiek and Clayton Cos. Waste places, common.

Cenchrus tribuloides L. Dubuque Co. Sandy soil, frequent.

Andropogon furcatus Muhl. Allamakee Co.

Stipa spartea Trin. Winneshiek Co. Prairies, frequent.

Phleum pratense L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Cultivated and frequent in waste places.

Bouteloua racemosa Lag. Allamakee Co. Waysides, frequent.

Kæleria cristata Pers. Winneshiek and Allamakee Cos. Waysides, frequent.

Eragrostis major Host. Winneshiek and Dubuque Cos. Sandy soil, frequent.

E. frankii Meyer. Winneshiek Co. Sandy soil.

Melica mutica Walt. Winneshiek Co.

Poa pratensis L. Winneshiek, Allamakee, and Dubuque Cos. Dry soil, pastures, waysides, common.

Glyceria arundinacea Kunth. Winneshiek Co. Margins of ponds, wet ground, frequent.

Bromus kalmii Gray. Winneshiek Co. Fields, infrequent.

B. secalinus L. Winneshiek Co. Fields and waste places, frequent.

B. ciliatus L., var. *purgans* Gray. Winneshiek, Allamakee, and Jackson Cos. Rich upland woods, frequent.

Agropyrum repens (L.) Beauv. Winneshiek Co. Dry soil, frequent.

Hordeum jubatum L. Winneshiek, Clayton, and Scott Cos. Dry fields, common.

Elymus canadensis L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Prairies and low grounds, common.

E. striatus Willd. Allamakee Co.

Asprella hystrix Willd. Winneshiek, Clayton, and Dubuque Cos. Upland woods, frequent.

EQUISETACEÆ.

Equisetum arvense L. Winneshiek and Allamakee Cos. Wet soil, frequent.

E. hyemale L. Allamakee Co. Wet places, frequent.

E. laevigatum Braun. Waysides and fields, frequent.

FILICES.

Polypodium vulgare L. Clayton Co. Frequent at pictured rocks below McGregor.

Adiantum pedatum L. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rich, upland woods, frequent.

Pieris aquilina L. Winneshiek, Allamakee and Clayton Cos. Upland woods, frequent

Cheilanthes lanuginosa Nutt. Allamakee and Dubuque Cos. On the face of cliffs, common locally

Pellaea atropurpurea Link. Winneshiek, Allamakee, and Dubuque Cos. Cliff crevices, frequent

Asplenium filix-femina Bernh. Winneshiek and Clayton Cos. Woods, frequent.

Camptosorus rhizophyllus Link. Winneshiek, and Clayton Cos. Rocky glens, infrequent.

Cystopteris bulbifera Bernh. Winneshiek, Allamakee, Clayton, and Dubuque Cos. Rich soil near base of cliffs, frequent.

C. fragilis Bernh. Winneshiek and Allamakee Cos. Woods, frequent.

Onoclea sensibilis L. Clayton Co. Moist ravines, frequent.

Osmunda claytoniana L. Winneshiek, Allamakee, and Clayton Cos. Low woods, frequent.

OPHIOGLOSSACEÆ.

Botrychium virginianum Swartz. Winneshiek and Allamakee Cos. Rich woods, frequent.

MARCHANTIACEÆ.

Marchanta polymorpha L. Winneshiek, Allamakee, and Dubuque Cos. Wet rocks, frequent.

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FLORA OF SOUTHERN IOWA.

T. J. AND M. F. L. FITZPATRICK.

The following notes are based upon collections in our private herbarium. In point of time the period reaches from 1882 to 1897. The counties represented being Decatur, Appanoose, Wapello, Van Buren, Shelby, and Johnson, extended by occasional collections from neighboring counties.

The sedges were determined by R. I. Cratty, the grasses by F. Lamson Scribner, and miscellaneous species by the officers of the Missouri Botanical garden.

To those who wish to obtain a more thorough knowledge of the flora of southern Iowa we submit our results, hoping they are worthy of consideration.

RANUNCULACEÆ,

Clematis virginiana L. Decatur, Appanoose, Des Moines, and Johnson Cos. Fence rows, along streams, frequent.

C. pitcheri T. & G. Decatur, Shelby, and Johnson Cos. Rich woods, frequent.

Anemone patens nuttalliana Gray. Crawford and Shelby Cos. High prairies, common.

A. cylindrica Gray. Decatur and Johnson Cos. Prairies and open woods, frequent.

A. virginiana L. Decatur, Appanoose, Des Moines, and Johnson Cos. Woods, frequent.

A. pennsylvanica L. Des Moines and Johnson Cos.

A. nemorosa L. Johnson Co. Upland woods, common.

Hepatica acutiloba DC. Johnson and Decatur Cos. Upland woods, common.

Anemonella thalictroides Spach. Decatur and Johnson Cos. Upland woods, frequent.

Thalictrum purpurascens L. Decatur, Appanoose, Des Moines, Shelby, and Johnson Cos. Rich woods, frequent.

Ranunculus circinatus Sibth. Johnson Co. Ponds frequent.

R. abortivus L. Decatur, Page, Shelby, and Johnson Cos.

Low grounds, common.

R. recurvatus Poir. Johnson Co. Woods, frequent.

R. fascicularis Muhl. Johnson Co. Wooded hillsides, common.

R. septentrionalis Poir. Decatur, Shelby, and Johnson Cos.

Low grounds, common

R. repens L. Johnson Co. Upland woods, frequent.

R. acris L. Page Co.

Isopyrum biternatum T. & G. Decatur and Johnson Cos. Woods, frequent.

Caltha palustris L. Johnson Co. Wet places, infrequent.

Aquilegia canadensis L. Page, Decatur, Shelby, and Johnson Cos. Woods, common.

Delphinium tricornes Mx. Decatur and Shelby Cos. Rich soil, fields and woods, common.

D. azureum Mx. Page, Decatur, and Shelby Cos. Prairies, common.

D. ajacis L. Johnson Co. Occasionally an escape.

Actæa spicata rubra Ait. Shelby and Johnson Cos. Woods, infrequent.

A. alba Bigel. Decatur and Johnson Cos. Woods, common.

MENISPERMACEÆ.

Menispermum canadense L. Decatur, Shelby, and Johnson Cos. Woods, frequent.

BERBERIDACEÆ.

Caulophyllum thalictroides Mx. Decatur, Shelby, and Johnson Cos. Woods, frequent.

Podophyllum peltatum L. Page, Decatur, Appanoose, and Johnson Cos. Rich upland woods, common.

NYMPHÆACEÆ.

Nymphæa odorata Ait. Johnson Co. Ponds, frequent.

Nuphar advena Ait. Johnson Co. Margins of ponds, frequent.

PAPAVERACEÆ.

Sanguinaria canadensis L. Decatur, Appanoose, Shelby, and Johnson Cos. Rich woods, common.

Argemone mexicana L. Johnson Co. Rarely an escape.

FUMARIACEÆ.

Dicentra cucullaria DC. Decatur, Appanoose, Shelby, Page, and Johnson Cos. Rich woods, common.

Corydalis curvisiliqua Englm. Page and Henry Cos. Probably not frequent. Has been labeled *C. aurea* Willd, and also the variety *occidentalis* Englm.

CRUCIFERÆ.

Dentaria laciniata Muhl. Decatur, Shelby, and Johnson Cos. Rich woods, frequent.

Cardamine rhomboidea DC. Decatur, Shelby, and Johnson Cos. Wet grounds, common.

C. rhomboidea purpurea. Johnson Co.

C. hirsuta L. Decatur and Johnson Cos. Wet soil, frequent.

Arabis dentata T. & G. Henry Co.

A. canadensis L. Decatur Co. Woods, infrequent.

A. confinis Watson. Johnson Co. Woods, common.

Draba caroliniana Walt. Johnson Co. Rocky banks, frequent.

Nasturtium palustre DC. Decatur, Van Buren, Shelby, and Johnson Cos. Wet places, common,

N. obtusum Nutt. Decatur Co. In fields, infrequent.

N. armoracia Fries. Page, Decatur, Shelby, and Johnson Cos. Near dwellings, frequent.

N. sessiliflorum Nutt. Van Buren Co. Frequent along Des Moines river.

Barbarea vulgaris R. Br. Shelby Co. Cultivated fields, infrequent.

Erysimum cheiranthoides L. Johnson Co. Banks, common.

Sisymbrium canescens Nutt. Decatur, Page, and Johnson Cos. Woods, frequent.

S. officinale Scop. Decatur, Shelby, and Johnson Cos. Waste places, common.

Brassica sinapistrum Boiss. Decatur and Johnson Cos. Waste places, infrequent.

B. nigra Koch. Decatur, Appanoose, Johnson, Shelby, and Van Buren Cos. Fields and waste places, common.

B. alba Boiss. Decatur Co. Forms were found with bristly pods. This character, however, varies and the specimens may be the preceding species.

Capsella bursa-pastoris Moench. Page, Decatur, Van Buren, Shelby, and Johnson Cos. Waste grounds, common.

Lepidium virginicum L. Johnson Co. Waste ground, frequent.

L. intermedium Gray. Decatur, Appanoose, and Shelby Cos. Waste places, common.

Raphanus sativus L. Decatur Co. Occasionally an escape.

CAPPARIDACEÆ.

Polanisia trachysperma T. & G. Des Moines and Johnson Cos. Sandy shores, frequent. Usually mistaken for *P. graveolens* Raf.

CISTACEÆ.

Helianthemum canadense Mx. Decatur, Appanoose, Shelby, and Johnson Cos. Prairies, frequent.

Lechea major Mx. Decatur, Appanoose, and Johnson Cos. Borders of woods, frequent.

L. minor L. Johnson Co. Dry soil, frequent.

L. tenuifolia Mx. Van Buren Co. Dry soil, frequent.

VIOLACEÆ.

Viola pedata L. Decatur and Johnson Cos. Open woods, frequent.

V. pedatifida G. Don. Decatur, Shelby, Page, and Johnson Cos. Woods and fields, common, especially southward.

V. palmata L. Decatur and Appanoose Cos. Damp soil, fields and woods, common.

V. palmata cucullata Gray. Decatur, Wapello, Van Buren, Des Moines, Shelby, Page, and Johnson Cos. Fields and woods, common.

V. sagittata Ait. Johnson Co. Woods, frequent locally.

V. pubescens Ait. Decatur, Shelby, and Johnson Cos. Rich woods, frequent.

CARYOPHYLLACEÆ.

- Dianthus armeria* L. Johnson Co. Upland woods, frequent.
Saponaria officinalis L. Decatur, Des Moines, and Johnson Cos. Waste places, frequent.
S. vaccaria L. Johnson Co. Waste places, infrequent.
Silene stellata Ait. Decatur, Appanoose, Van Buren, Des Moines, and Johnson Cos. Rich woods, frequent.
S. nivea Otth. Johnson Co. Along streams, infrequent.
S. antirrhina L. Decatur, Henry, and Johnson Cos. Fields and waste places, frequent.
Lychnis githago Lam. Johnson Co. Waste places, infrequent.
Arenaria lateriflora L. Johnson Co. Low places, frequent.
Stellaria media Smith. Henry Co.
S. longifolia Muhl. Johnson Co. Wet woods, infrequent.
Cerastium nutans Raf. Decatur and Johnson Cos. Wet places, frequent.

PORTULACACEÆ.

- Portulaca oleracea* L. Decatur, Appanoose, Wapello, Van Buren, Des Moines, and Johnson Cos. Fields and waste places, common.
Claytonia virginica L. Decatur, Van Buren, Des Moines, and Johnson Cos. Rich woods, common.

HYPERICACEÆ.

- Hypericum ascyron* L. Johnson Co. Prairie, rare.
H. prolificum L. Appanoose, Des Moines, and Jefferson Cos. Waysides, infrequent.
H. mutilum L. Decatur Co. Open woods, common.
H. cistifolium Lam. Appanoose and Johnson Cos. Waste places, infrequent.
H. maculatum Walt. Decatur, Appanoose, Van Buren, and Johnson Cos. Open woods, frequent.
H. canadense L. Decatur and Johnson Cos.

MALVACEÆ.

- Malva rotundifolia* L. Decatur, Van Buren, and Johnson Cos. Waste places, frequent.

M. sylvestris L. Shelby and Johnson Cos. Waste places, infrequent.

Callirrhoe involucrata Gray. Shelby Co. Open woods, common locality.

Sida spinosa L. Decatur, Van Buren, Henry, and Des Moines Cos. Waste places, frequent.

Abutilon avicennae Gaertn. Decatur, Appanoose, Wapello, Van Buren, and Johnson Cos. Fields and waste places, common.

Hibiscus militaris Cav. Johnson Co. Borders of ponds, frequent.

H. trionum L. Decatur, Appanoose, Van Buren, and Wapello Cos. Waste ground, frequent.

TILIACEÆ.

Tilia americana L. Decatur, Appanoose, Van Buren, Des Moines, Shelby, and Johnson Cos. Rich soil, frequent.

LINACEÆ.

Linum sulcatum Riddell. Decatur, Appanoose, and Van Buren Cos. Prairies, frequent.

L. usitatissimum L. Decatur, Wayne, Des Moines, and Johnson Cos. Waste places, frequent.

GERANIACEÆ.

Geranium maculatum L. Decatur and Johnson Cos. Rich woods, common.

G. carolinianum L. Johnson Co. Frequent locally.

Oxalis violacea L. Page, Decatur, Des Moines, Shelby, and Johnson Cos. Fields, common.

O. corniculata stricta Sav. Page, Decatur, Appanoose, Wapello, Van Buren, Des Moines, and Johnson Cos. Woods and waste places, common.

Impatiens pallida Nutt. Decatur, Appanoose, Des Moines, and Johnson Cos. Wet woods, frequent.

I. fulva Nutt. Decatur, Appanoose, Van Buren, Des Moines, and Johnson Cos. With the preceeding, less frequent.

RUTACEÆ.

Xanthoxylum americanum Mill. Decatur, Shelby, and Johnson Cos. Woods, common.

CELASTRACEÆ.

Celastrus scandens L. Decatur and Johnson Cos. Rich woods, frequent.

Euonymus atropurpureus Jacq. Decatur, Van Buren, and Johnson Cos. Woods, frequent.

RHAMNACEÆ.

Rhamnus lanceolata Pursh. Decatur, Des Moines, and Johnson Cos. Borders of fields and woods, frequent.

Ceanothus americanus L. Decatur, Appanoose, Van Buren, Des Moines, Shelby, and Johnson Cos. Open woods and prairies, common in Johnson Co., but infrequent southward.

C. ovatus Desf. Decatur and Shelby Cos. Prairies, common.

VITACEÆ.

Vitis riparia Mx. Decatur, Shelby, and Johnson Cos. Low woods, common.

V. cinerea Englm. Decatur Co. Infrequent.

Ampelopsis quinquefolia Mx. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Woods, frequent.

SAPINDACEÆ.

Æsculus glabra Willd. Decatur, Appanoose, and Van Buren Cos. Rich woods, common.

Acer saccharinum Wang. Decatur, Van Buren, Des Moines, and Johnson Cos. Along rivers, frequent.

A. dasycarpum Ehrh. Decatur, Appanoose, Wapello, Shelby, and Johnson Cos. Along rivers, common.

Negundo aceroides Moench. Page, Decatur, Appanoose, Wapello, Shelby, and Johnson Cos. Low woods, common.

Staphylea trifolia L. Johnson and Decatur Cos. Bluffs, frequent. In Missouri opposite Decatur Co., Iowa.

ANACARDIACEÆ.

Rhus glabra L. Decatur, Wapello, Van Buren, Des Moines, and Johnson Cos. Woods and uplands, common.

R. toxicodendron L. Decatur, Wapello, Van Buren, Des Moines, Shelby, and Johnson Cos. Waysides and woods, frequent.

R. canadensis Marsh. Wapello, Henry, Van Buren, and Jefferson Cos. Rocky woods, frequent. Also found near Decatur Co. line, in Missouri.

POLYGALACEÆ.

Polygala senega L. Johnson Co. Woods, common.

P. sanguinea L. Decatur, Appanoose, and Johnson Cos. Fields, common.

P. verticillata ambigua Gray. Decatur, Appanoose, Wapello, Van Buren, and Johnson Cos. Fields and open woods, frequent.

LEGUMINOSÆ.

Baptisia leucantha T. & G. Decatur, Appanoose, Wapello, Des Moines, Shelby, and Johnson Cos. Fields and open woods, common.

B. leucophæa Nutt. Page, Decatur, Appanoose, Shelby, and Johnson Cos. Open woods, common.

Crotalaria sagittalis L. Johnson Co. Sandy soil, open woods, frequent.

Trifolium pratense L. Page, Decatur, Appanoose, Van Buren, Wapello, Shelby, and Johnson Cos. Cultivated and in waste places, common.

T. reflexum L. Johnson Co. Sandy banks, infrequent.

T. repens L. Page, Decatur, Appanoose, Wapello, Van Buren, Shelby, and Johnson Cos. Pastures and waysides, common.

T. hybridum L. Decatur, Shelby, and Johnson Cos. Fields and waste places, frequent.

Melilotus officinalis Willd. Decatur and Johnson Cos. Waste places, infrequent.

M. alba Lam. Decatur, Wapello, Des Moines, and Johnson Cos. Waste places, common.

Medicago sativa L. Decatur Co. Vacant lots, frequent.

Psoralea tenuiflora Pursh. Prairie, common. Decatur Co.

P. argophylla Pursh. Prairies, infrequent. Shelby Co.

P. esculenta Pursh. Prairies, frequent. Shelby Co.

Amorpha canescens Nutt. Decatur, Appanoose, Wapello, Van Buren, Shelby, and Johnson Cos. Dry soil, open woods and waysides, common.

A. fruticosa L. Decatur, Appanoose, Wapello, Shelby, and Johnson Cos. Along water courses, common.

Dalea alopecuroides Willd. Decatur and Johnson Cos. Waysides and waste places, frequent.

Petalostemon violaceus Mx. Decatur, Appanoose and Johnson Cos. Prairies, frequent.

P. candidus Mx. Decatur, Appanoose, Wapello, Shelby and Johnson Cos. Prairies, frequent.

Tephrosia virginiana Pers. Johnson Co. Sandy woods, infrequent.

Robinia pseudacacia L. Decatur, Wapello, Des Moines, Shelby, and Johnson Cos. Waste places, frequent.

Astragalus caryocarpus Ker. Decatur and Shelby Cos. Prairies, frequent.

A. canadensis L. Decatur, Appanoose, Van Buren, Des Moines, and Johnson Cos. Rich soil, common.

Glycyrrhiza lepidota Nutt. Decatur Co. Waysides, rare.

Desmodium acuminatum DC. Decatur, Appanoose, and Johnson Cos. Rich woods, common.

D. illinoense Gray. Decatur Co. Prairies, frequent.

D. paniculatum DC. Van Buren and Johnson Cos. Woods, infrequent.

D. canadense DC. Decatur, Appanoose, Van Buren, and Johnson Cos. Open woods, frequent.

D. dillenii Darlington. Johnson Co. Woods, infrequent.

Lespedeza violacea Pers. Decatur, Appanoose, Van Buren and Johnson Cos. Open woods, frequent.

L. capitata Mx. Decatur, Appanoose, and Johnson Cos. Prairies and rocky banks, frequent.

Vicia americana Muhl. Shelby Co. Low prairies, frequent.

Lathyrus palustris L. Page and Johnson Cos. Dry woods, infrequent.

Apios tuberosa Moench. Decatur and Johnson Cos. Rich woods and banks, frequent.

Strophostyles angulosa Ell. Decatur, Appanoose, Van Buren, and Johnson Cos. Sandy soil, frequent.

S. pauciflorus Watson. Wapello Co. Sandy ground, frequent.

Amphicarpaea monoica Nutt. Decatur and Johnson Cos. Dry soil, frequent.

A. pitheri T. & G. Decatur, Van Buren, and Johnson Cos. Woods, common.

Cercis canadensis L. Decatur, Appanoose, Van Buren, Des Moines, Jefferson, and Henry Cos. Wooded bluffs, frequent.

Cassia marylandica L. Ringgold and Appanoose Cos. Rich woods, infrequent. Found in Missouri, opposite Decatur Co.

C. chamecrista L. Decatur, Appanoose, Wapello, and Johnson Cos. Fields and waysides, common.

Gymnocladus canadensis Lam. Decatur and Johnson Cos. Rich woods, infrequent.

Gleditsia triacanthos L. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Rich woods, common.

ROSACEÆ.

Prunus americana Marsh. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Thickets, common.

P. serotina Ehrh. Decatur, Appanoose, Shelby, and Johnson Cos. Woods, frequent.

P. virginiana L. Decatur, Shelby, Page, and Johnson Cos. Low woods, frequent.

Spiraea salicifolia L. Henry and Johnson Cos. Rocky woods, frequent.

Physocarpus opulifolius Maxim. Decatur and Johnson Cos. Rocky woods, frequent.

Rubus occidentalis L. Page, Decatur, Appanoose, Van Buren, Shelby and Johnson Cos. Woods and fence rows, frequent.

R. villosus Ait. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Woods, common.

P. canadensis L. Decatur and Appanoose Cos. Poor soil, fields, common.

Geum album Gmelin. Decatur, Appanoose, and Johnson Cos. Open woods, frequent.

G. virginianum L. Decatur Co. Low grounds, infrequent.

Fragaria virginiana Mill. Decatur, Shelby, and Johnson Cos. Fields and woods, common.

F. vesca L. Shelby, Page, and Johnson Cos. Woods, infrequent.

Potentilla arguta Pursh. Decatur, Appanoose, Shelby, and Johnson Cos. Prairies, common.

P. norvegica L. Decatur, Shelby, and Johnson Cos. Fields, common.

P. canadensis L. Decatur and Johnson Cos. Waysides and open woods, common.

Agrimonia eupatoria L. Decatur, Appanoose, Van Buren, and Johnson Cos. Woods, common.

A. parviflora Ait. Decatur Co. Low grounds, prairies and woods.

Rosa arkansana Porter. Decatur, Appanoose, Shelby, and Johnson Cos. Prairies and woods, common.

R. humilis Marsh. Johnson Co.

R. blanda Ait. Johnson Co. Woods, frequent.

Pyrus coronaria L. Decatur, Appanoose, Shelby, and Johnson Cos. Thickets, common.

P. malus L. Decatur and Appanoose Cos. Fields and waste places, not infrequent.

Cratægus coccinea L. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Woods, common.

C. tomentosa L. Page, Decatur, Appanoose, Shelby, and Johnson Cos. Woods, frequent.

C. crus-galli L. Decatur, Wapello, and Johnson Cos. Woods, frequent.

Amelanchier canadensis T. & G. Decatur and Johnson Cos. Bluffs, common.

SAXIFRAGACEÆ.

Saxifraga pennsylvanica L. Johnson Co. Low prairies, common.

Mitella diphylla L. Johnson Co. Woods, common.

Heuchera hispida Pursh. Decatur, Appanoose, and Johnson Cos. Prairies, common.

Ribes cynosbati L. Johnson Co. Woods, common.

R. gracile Mx. Page, Decatur, Appanoose, Shelby, and Johnson Cos. Low grounds, common.

S. floridum L'Her. Johnson Co. Woods, infrequent.

CRASSULACEÆ.

Penthorum sedoides L. Decatur, Appanoose, Van Buren, and Johnson Cos. Wet ground, common.

Sedum telephium L. Decatur and Johnson Cos. Occasionally an escape.

HALORAGACEÆ.

Myriophyllum scabratum Mx. Appanoose Co. In shallow water, common.

LYTHRACEÆ.

Lythrum alatum Pursh. Decatur, Appanoose, and Johnson Cos. Fields and low places, common.

Rotala ramosior Koehne. Henry Co.

Ammannia coccinea Rottb. Johnson Co. Sandy shores, infrequent.

ONAGRACEÆ.

Ludwigia alternifolia L. Decatur and Johnson Cos. Wet ground, infrequent.

L. polycarpa Short & Peter. Decatur and Appanoose Cos. Margins of ponds, common.

L. palustris Ell. Johnson Co. In water or wet places, infrequent.

Epilobium angustifolium L. Shelby Co. Woods, infrequent.

E. coloratum Muhl. Decatur, Van Buren, and Johnson Cos. Wet ground along rivers, frequent.

Gaura coccinea Nutt. Decatur, Appanoose, and Johnson Cos. Fields and waste places, common.

Oenothera biennis L. Van Buren and Johnson Cos. Waste ground, frequent.

Oe. rhombipetala Nutt. Decatur, Van Buren, Des Moines, and Johnson Cos. Fields and waste places, common.

Oe. serrulata Nutt. Shelby Co. Prairies, frequent.

Circea lutetiana L. Decatur, Appanoose, Henry, and Johnson Cos. Woods, common.

CUCURBITACEÆ.

Sicyos angulata L. Des Moines Co. Waste places, frequent.

Echinocystis lobata T. & G. Decatur, Des Moines, Shelby, and Johnson Cos. Low woods, common.

FICOIDEÆ.

Mollugo verticillata L. Decatur and Johnson Cos. Sandy shores, frequent.

UMBELLIFERÆ.

Daucus carota L. Decatur and Appanoose Cos. Fields infrequent.

Tiedemannia rigida Coult. & Rose. Decatur Co. Wet sloughs, frequent; often on high prairies.

Heracleum lanatum Mx. Decatur and Shelby Cos. Rich woods, common.

Cicuta maculata L. Decatur, Appanoose, Van Buren, and Johnson Cos. Wet places, common.

Thaspium barbinode Nutt. Des Moines and Johnson Cos. Woods, frequent.

Pimpiella integerrima Benth & Hook. Decatur, Appanoose, and Johnson Cos. Woods, frequent.

Polytenia nuttallii DC. Decatur and Appanoose Cos. Dry woods, infrequent.

Cryptotenia canadensis DC. Decatur, Appanoose, Shelby, and Johnson Cos. Rich woods, common.

Sium cicutaefolium Gmelin. Decatur and Des Moines Cos. Shallow ponds, frequent.

Foeniculum officinale All. Johnson Co. Occasionally an escape.

Zizia aurea Koch. Decatur and Shelby Cos. Low grounds, common.

Cherophyllum procumbens Crantz. Decatur, Henry, and Johnson Cos. Low woods, frequent.

Osmorrhiza longistylis DC. Decatur, Shelby, and Johnson Cos. Rich woods, frequent.

O. brevistylis DC. Decatur, Appanoose, Shelby, and Johnson Cos. Rich woods, frequent.

Eryngium yuccaefolium Mx. Decatur, Appanoose, Shelby, and Johnson Cos. Prairies, common.

Sanicula marylandica L. Decatur, Shelby, and Johnson Cos. Woods, common.

S. marylandica canadensis Torr. Appanoose and Johnson Cos. Woods, frequent.

ARALIACEÆ.

Aralia racemosa L. Van Buren, Des Moines, and Johnson Cos. Woods, frequent.

A. nudicaulis L. Johnson Co. Woods, frequent.

A. quinquefolia Dees. & Planch. Johnson Co. Woods, frequent. Seems to prefer the north hill sides.

CORNACEÆ.

Cornus paniculata L'Her. Decatur, Appanoose, Wapello, Van Buren, Des Moines, Shelby, and Johnson Cos. Low grounds, common.

C. sericea L. Decatur, Appanoose, Shelby, and Johnson Cos. Low woods, frequent.

CAPRIFOLIACEÆ.

Sambucus canadensis L. Decatur, Appanoose, Van Buren, Des Moines, Shelby, and Johnson Cos. Rich woods and fields, common.

Viburnum lentago L. Shelby, Appanoose, and Johnson Cos. Woods, frequent.

Triosteum perfoliatum L. Decatur, Appanoose, Shelby and Johnson Cos. Open woods, common.

Symphoricarpus vulgaris Mx. Decatur, Appanoose, Wapello, Van Buren, and Shelby Cos. Prairies and woods, common.

S. occidentalis Hook. Shelby Co. Open woods, frequent.

Lonicera sullivanii Gray. Johnson Co. Woods, frequent.

RUBIACEÆ.

Houstonia minima Beck. Johnson Co

H. angustifolia Mx. Shelby Co. Sandy prairie soil, frequent.

Cephalanthus occidentalis L. Decatur, Appanoose, and Johnson Cos. Wet low woods, frequent.

Galium aparine L. Decatur, Shelby, and Johnson Cos. Woods, common.

G. trifidum Decatur Co. Woods, frequent.

G. trifidum latifolium Torr. Johnson Co.

G. concinnum T. & G. Decatur, Appanoose, and Johnson Cos. Woods, common.

G. triflorum Mx. Decatur and Johnson Cos. Rich woods, common.

G. circeazans Mx. Decatur and Van Buren Cos. Woods, frequent.

COMPOSITÆ.

Vernonia fasciculata Mx. Decatur, Wapello, Van Buren, and Johnson Cos. Low grounds, common.

V. noveboracensis latifolia Gray. Decatur, Appanoose, and Van Buren Cos. Borders and open woods, common.

Eupatorium purpureum L. Decatur, Appanoose, and Johnson Cos. Woods and low pastures, common.

E. ageratoides L. Decatur, Appanoose, Van Buren, and Johnson Cos. Woods, common.

E. perfoliatum L. Decatur, Wapello, Van Buren, and Johnson Cos. Open woods, common.

E. altissimum L. Decatur and Johnson Cos. Upland woods, or prairies, infrequent.

Kuhnia eupatorioides L. Decatur and Johnson Cos. Dry soil,

Liatris scariosa Willd. Decatur and Johnson Cos. Prairies, common.

L. pycnostachya Mx. Decatur, Appanoose, and Johnson Cos. Prairies, common.

L. squarrosa Willd. Decatur and Wapello Cos. Prairies, common.

Grindelia squarrosa Dunal. Henry Co. Waste places, infrequent.

Solidago rigida L. Decatur and Johnson Cos. Prairies, common.

S. ulmifolia Muhl. Decatur and Johnson Cos. Woods, frequent.

S. latifolia L. Decatur and Johnson Cos. Woods, frequent.

S. speciosa Nutt. Decatur and Johnson Cos. Prairies, common.

S. serotina Ait. Decatur, Henry, and Johnson Cos. Borders of woods, frequent.

S. canadensis L. Decatur, Henry, and Johnson Cos. Open woods and borders of fields, common.

S. nemoralis Ait. Decatur and Johnson Cos. Prairies, common.

S. lanceolata L. Decatur, Henry, and Johnson Cos. Sandy soil, common.

Boltonia asteroides L'Her. Decatur and Johnson Cos. Wet ground, frequent.

Aster sericeus Vent. Decatur and Johnson Cos. Prairies, common.

A. shortii Hook. Johnson Co. Woods, infrequent.

A. oblongifolius Nutt. Johnson Co. Dry soil, infrequent.

A. multiflorus Ait. Decatur, Henry, and Johnson Cos. Prairies and waysides, common.

A. novæ-angliæ L. Decatur and Johnson Cos. Woods, frequent.

A. prenanthoides Muhl. Johnson Co. Woods, frequent.

A. salicifolius Ait. Decatur, Henry, and Johnson Cos. Coppes, open places, frequent.

A. azureus Lindl. Decatur, Appanoose, and Johnson Cos. Woods and prairies, common.

A. cordifolius L. Decatur and Johnson Cos. Woods, infrequent.

A. sagittifolius Willd. Johnson and Decatur Cos. Woods frequent.

A. lævis L. Decatur Co. Woods, open places, common.

A. diffusus Ait. Decatur Co. Low woods, common.

Erigeron bellidifolius Muhl. Johnson Co. Woods, infrequent.

E. strigosus Muhl. Shelby and Johnson Cos. Fields and waste places, common.

E. philadelphicus L. Decatur, Shelby, and Johnson Cos. Rich woods, frequent.

E. divaricatus Mx. Decatur, Appanoose, and Johnson Cos. Dry soil, pastures, common.

E. canadense L. Decatur and Appanoose Cos. Waste places, common.

E. annuus Pers. Appanoose, Shelby, and Johnson Cos. Waste places, common.

Antennaria plantaginifolia Hook. Decatur, Appanoose, Shelby, Page, and Johnson Cos. Meadows and upland woods, common.

Anaphalis margaritacea Benth. & Hook. Decatur and Johnson Cos. Dry woods, frequent.

Inula helenium L. Johnson Co. Open woods, frequent locally.

Polymnia canadensis L. Des Moines Co. Along cliffs, frequent.

Silphium perfoliatum L. Decatur, Van Buren, Des Moines, Shelby, and Johnson Cos. Low grounds, frequent.

S. integrifolium Mx. Decatur, Appanoose, Van Buren, and Johnson Cos. Prairies and open woods, frequent.

S. laciniatum L. Decatur, Appanoose, and Johnson Cos. Prairies, common.

Parthenium integrifolium L. Decatur, Appanoose, and Johnson Cos. Prairies, common.

Ambrosia artemisiæfolia L. Decatur, Appanoose, Wapello, Van Buren, and Johnson Cos. Waste places, very common.

A. trifida L. Decatur, Appanoose, Wapello, Van Buren, and Johnson Cos. Waste ground, common.

A. trifida integrifolia T. & G. Decatur and Johnson Cos. Waste places, frequent.

A. psilostachya DC. Decatur and Johnson Cos. Waste places, frequent.

Xanthium canadense Mill. Decatur, Appanoose, Wapello, and Johnson Cos. Fields and waste places, common.

Eclipta alba Hassk. Johnson Co. Along river banks, infrequent.

Heliopsis scabra Dunal. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Prairies, common.

Echinacea purpurea Moench. Decatur and Appanoose Cos. Woods, infrequent.

E. angustifolia DC. Decatur, Shelby, and Johnson Cos. Prairies, frequent.

Rudbeckia triloba L. Decatur, Wapello, Van Buren, and Johnson Cos. Open woods, common.

R. hirta L. Decatur, Appanoose, Van Buren, and Johnson Cos. Open woods and prairies, frequent.

R. laciniata L. Decatur and Johnson Cos. Low woods, common.

R. subtomentosa Pursh. Decatur Co. Prairies, infrequent.

Lepachys pinnata T. & G. Decatur, Appanoose, and Johnson Cos. Prairies, common.

Helianthus annuus L. Decatur, Appanoose, Van Buren, Des Moines, and Johnson Cos. Waste places, frequent.

H. rigidus Desf. Decatur and Johnson Cos. Prairies, frequent.

H. occidentalis Rid. Johnson Co. Prairies, frequent.

H. grosse-serratus Mart. Decatur, Appanoose, and Johnson Cos. Low grounds, common.

H. hirsutus Raf. Decatur and Van Buren Cos. Prairies, frequent.

H. strumosus L. Johnson Co. Borders and low woods, frequent.

H. tuberosus L. Decatur, Van Buren, and Henry Cos. Low woods and prairies, frequent.

Actinomeris squarrosa Nutt. Decatur, Appanoose, and Johnson Cos. Low woods, frequent.

Coreopsis palmata Nutt. Decatur, Shelby, and Johnson Cos. Prairies, common.

C. tripteris L. Decatur and Johnson Cos. Prairies and open woods, frequent.

C. involuerata Nutt. Decatur and Johnson Cos. Wet grounds, common.

Bidens frondosa L. Decatur, Appanoose, and Johnson Cos. Low grounds, common.

B. connata Muhl. Decatur and Johnson Cos. Low grounds, frequent.

B. cernua L. Decatur and Johnson Cos. Wet grounds, low woods, frequent.

B. chrysanthemoides Mx. Decatur and Johnson Cos. Low waste places, frequent.

Helenium autumnale L. Decatur, Appanoose, Des Moines, and Johnson Cos. River banks, moist places, frequent.

Dysodia chrysanthemoides Lag. Decatur, Appanoose, Wapello, Van Buren, Shelby, and Johnson Cos. Waste places, common.

Anthemis cotula DC. Decatur, Appanoose, Wapello, Van Buren, Des Moines, Shelby, and Johnson Cos. Waste places, common.

Achillea millefolium L. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Fields and waste places, common.

Chrysanthemum leucanthemum L. Decatur and Johnson Cos. Waste places, infrequent.

Tanacetum vulgare L. Decatur and Johnson Cos. Waste places near dwellings, infrequent.

Artemisia biennis Willd. Decatur, Appanoose, Wapello, and Johnson Cos. Waste places, frequent.

A. ludoviciana Nutt. Decatur and Johnson Cos. Waysides and fields, common.

Senecio aureus L. Johnson Co. Rich woods, infrequent.

S. aureus balsamitæ T. & G. Page, Decatur, Shelby, and Johnson Cos. Rich woods, common.

Cacalia reniformis Muhl. Johnson Co. Woods, infrequent.

C. atriplicifolia L. Decatur, Van Buren, and Johnson Cos. Rich woods and prairies, frequent.

C. tuberosa Nutt. Decatur, Appanoose, and Shelby Cos. Moist prairies, frequent.

Erechtites hieracifolia Raf. Decatur and Johnson Cos. Open woods, frequent.

Arctium lappa L. Decatur, Appanoose, Van Buren, Des Moines, and Johnson Cos. Waste places, frequent.

Cnicus lanceolatus Hoffm. Decatur, Appanoose, Van Buren, and Johnson Cos. Fields and waste places, common.

C. altissimus Willd. Decatur and Johnson Cos. Waste places, frequent.

C. altissimus discolor Gray. Johnson Co. Waste places, frequent.

C. arvensis Hoffm. Decatur and Johnson Cos. Fields and waste places, infrequent.

Krigia amplexicaulis Nutt. Johnson Co. Woods, frequent.

Hieracium canadense Mx. Johnson Co. Open woods, infrequent.

H. scabrum Mx. Decatur and Johnson Cos. Dry woods, frequent.

H. longipilum Torr. Decatur Co. Sandy prairie, infrequent.

Prenanthes aspera Mx. Decatur Co. Open woods, frequent.

P. crepidinea Mx. Johnson Co. We have one specimen.

P. alba Johnson Co. Woods, frequent.

Lygodesmia juncea Don. Shelby Co. Fields and waste places, common.

Troximon cuspidatum Pursh. Shelby and Johnson Cos. High prairies, infrequent.

Taraxacum officinale Weber. Shelby, Page, Decatur, Appanoose, Wapello, Van Buren, and Johnson Cos. Pastures and waysides, common.

Lactuca scariola L. Van Buren, Henry, and Johnson Cos. Waste places, frequent.

L. canadensis L. Decatur and Johnson Cos. Waste ground, frequent.

L. acuminata Gray. Decatur, Van Buren, Des Moines, and Johnson Cos.

Sonchus asper Vill. Decatur and Johnson Cos. Waste grounds, frequent.

S. oleraceus Johnson Co. Waste grounds, frequent.

LOBELIACEÆ.

Lobelia cardinalis L. Appanoose and Johnson Cos. Wet low woods, frequent.

L. syphilitica L. Decatur and Johnson Cos. Moist soil, common.

L. spicata Lam. Decatur, Van Buren, and Johnson Cos. Fields, common.

L. inflata L. Decatur, Appanoose, Wapello, Van Buren, and Johnson Cos. Open woods, frequent.

CAMPANULACEÆ.

Specularia perfoliata A. DC. Decatur and Johnson Cos. Fields and woods, frequent.

Campanula americana L. Decatur, Appanoose, Van Buren, Des Moines, and Johnson Cos. Waste places, fields, and woods, frequent.

ERICACEÆ.

Pyrola elliptica Nutt. Johnson Co. Upland woods, frequent.

Monotropa uniflora L. Johnson Co. Upland woods, common.

PRIMULACEÆ.

Dodecatheon media L. Johnson Co. Open woods, frequent.

Androscae occidentalis Pursh. Johnson Co. Rocky shores, frequent.

Steironema ciliatum Raf. Decatur, Des Moines, and Johnson Cos. Rich open woods, common.

S. lanceolatum Gray. Johnson Co. Rich soil, infrequent.

OLEACEÆ.

Fraxinus viridis Mx. Decatur, Shelby, and Johnson Cos. Woods, frequent.

F. americana L. Johnson Co. Woods, infrequent.

APOCYNACEÆ.

Apocynum androsaemifolium L. Decatur, Appanoose, Des Moines, and Johnson Cos. Fields and borders of woods, frequent.

A. cannabinum L. Decatur, Appanoose, Des Moines, Shelby, and Johnson Cos. Fields and waste places, frequent.

ASCLEPIADACEÆ.

Asclepias tuberosa L. Decatur, Appanoose, Des Moines, Shelby, and Johnson Cos. Prairies and fields, common.

A. incarnata L. Decatur and Johnson Cos. Wet grounds, common.

A. purpurascens L. Decatur and Johnson Cos. Infrequent.

A. cornuti DC. Decatur, Appanoose, Wapello, and Johnson Cos. Fields, common.

A. sullivantii Englm. Shelby Co. Infrequent.

A. obtusifolia Mx. Shelby and Johnson Cos. Infrequent.

A. meadii Torr. Decatur Co. Waysides, infrequent.

A. phytolaccoides Pursh Johnson Cos. Open woods, infrequent.

A. verticillata L. Decatur, Des Moines, and Johnson Cos. Open woods and fields, common.

Acerates longifolia Ell. Decatur, Appanoose, and Johnson Cos. Prairies, common

A. viridiflora Ell. Decatur Co. Prairies, common.

GENTIANACEÆ.

Gentiana crinita Froel. Johnson Co. Springy places, frequent locally.

G. quinqueflora occidentalis Gray. Johnson Co. Open woods, infrequent.

G. puberula Mx. Decatur, Jefferson, and Johnson Cos. Prairies, infrequent.

G. andrewsii Griseb Johnson Co. Low grounds, infrequent.

G. alba Muhl. Decatur Co. Open woods, infrequent.

POLEMONIACEÆ.

Phlox paniculata L. Johnson Co. Occasionally an escape near dwellings.

P. pilosa L. Decatur, Shelby, and Johnson Cos. Open woods and prairies, frequent.

P. divaricata L. Decatur, Des Moines, Shelby, and Johnson Cos. Rich woods, common.

P. subulata L. Page Co. Infrequent.

Gilia linerais Gray. Decatur Co. Prairie, frequent.

Polemonium reptans L. Decatur and Johnson Cos. Rich woods, common.

HYDROPHYLLACEÆ.

Hydrophyllum virginicum L. Decatur, Shelby, and Johnson Cos. Low woods, common.

H. appendiculatum Mx. Des Moines Co. Wooded ravines, frequent.

Ellisia nyctelea L. Decatur, Shelby, and Johnson Cos. Low grounds, common.

BORRAGINACEÆ.

Cynoglossum officinale L. Des Moines Co. Waste places, infrequent.

Echinosperrum virginicum Lehm. Decatur and Johnson Cos.

E. lappula Lehm. Wapello and Johnson Cos. Roadsides and rocky woods, frequent.

Mertensia virginicum DC. Page, Van Buren, Des Moines, and Johnson Cos. Damp woods, frequent.

Myosotis verna Nutt. Johnson Co.

Lithospermum latifolium Mx. Shelby Co. Woods, infrequent.

L. hirtum Lehm. Johnson Co. Sandy soil, frequent.

L. canescens Lehm. Page, Decatur, Shelby, and Johnson Cos. Prairies, common.

L. angustifolium Mx. Shelby Co. Prairies, common.

Onosmodium carolinianum DC. Shelby Co. Upland pastures, common. Johnson Co. Sandy soil along the Cedar river, frequent.

CONVOLVULACEÆ.

Ipomœa pandurata Meyer. Decatur, Van Buren, Henry, and Des Moines Cos.

I. purpurea Lam. Decatur Co. Cultivated fields and waste places, infrequent.

I. hederacea Jacq. Johnson Co. Waste places, infrequent.

Convolvulus sepium L. Decatur, Des Moines, Shelby, and Johnson Cos. Borders and upland woods, frequent.

C. spithameus L. Johnson Co. One specimen collected.

C. arvensis L. Henry and Johnson Cos. Waste places, infrequent.

Cuscuta glomerata Choisy. Decatur and Johnson Cos. Low grounds, frequent.

C. tenuiflora Englm. Decatur and Johnson Cos. Along streams, frequent.

C. inflexa Englm. Decatur Co. Open woods, infrequent.

SOLANACEÆ.

Solanum nigrum L. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Low grounds, frequent.

S. carolinense L. Decatur, Des Moines, Henry, and Johnson Cos. Waste places, frequent locally.

S. rostratum Dunal. Decatur, Henry, and Johnson Cos. Waste places, infrequent.

S. tuberosum L. Decatur Co. Occasionally an escape, but not persistent.

Physalis pubescens L. Decatur Co. Fields and woods, frequent.

P. virginiana Mill. Decatur, Van Buren, and Johnson Cos.

P. lanceolata Mx. Decatur and Shelby Cos. Fields and waysides, frequent.

Lycium vulgare Dunal. Appanoose Co. A few places known where this species has been observed for a generation. Decatur Co. Along the streets, rare.

Datura stramonium L. Decatur, Appanoose, Wapello, and Johnson Cos. Waste places, common.

D. tatula L. Decatur, Appanoose, Wapello, Van Buren, Des Moines, and Johnson Cos. Waste places, common.

SCROPHULARIACEÆ.

Verbascum thapsus L. Decatur, Appanoose, Wapello, Van Buren, Des Moines, and Johnson Cos. Old pastures and waste places, common.

V. blattaria L. Van Buren and Johnson Cos. Waste places, frequent.

Linaria vulgaris Mill. Decatur, Appanoose, Wapello, Van Buren, Des Moines, and Johnson Cos. Waste places, frequent.

Scrophularia nudosa marylandica Gray. Decatur, Van Buren, Des Moines, and Johnson Cos. Woods, frequent.

Collinsia verna Nutt. Jefferson Co. Frequent, locally.

Chelone glabra L. Johnson Co. Wet places, infrequent.

C. obliqua L. Jefferson Co. Infrequent.

Pentstemon pubescens Sol. Appanoose Co. Open woods, frequent.

P. lævigatus digitalis Gray. Appanoose and Johnson Cos. Open woods, frequent.

Mimulus ringens L. Decatur and Johnson Cos. Wet grounds, frequent.

M. jamesii Torr. Des Moines Co. Calcareous springs, frequent.

M. alatus Ait. Appanoose Co. Infrequent.

Gratiola virginiana L. Decatur and Appanoose Cos. Open woods, frequent.

Ilysanthes riparia Raf. Decatur, Van Buren, and Johnson Cos. Along waterways, common.

Veronica virginica L. Decatur, Appanoose, Van Buren, and Johnson Cos. Woods and prairies, common.

V. anagallis L. Appanoose Co. Wet places, frequent.

V. peregrina L. Decatur, Shelby, and Johnson Cos. Wet soil, common.

V. arvensis L. Henry Co.

Seymeria macrophylla Nutt. Van Buren, Des Moines, and Johnson Cos. Open woods, frequent.

Gerardia grandiflora Benth. Appanoose, Van Buren, and Jefferson Cos. Open woods, frequent.

G. auriculata Mx. Decatur and Johnson Cos. Low prairies and open woods, frequent.

G. aspera Dougl. Decatur Co. Low prairies, infrequent.

G. tenuifolia Vahl. Decatur, Washington, and Johnson Cos. Prairies and woods, common.

Castilleja coccinea Spreng. Appanoose and Johnson Cos. Open woods, frequent.

C. sessiliflora Pursh. Shelby Co. Prairies, frequent.

Pedicularis lanceolata Mx. Johnson Co. Springy ground, frequent, locally.

P. canadensis L. Decatur, Shelby, and Johnson Cos. Open woods and prairies, common.

OROBANCHACEÆ.

Aphyllon uniflorum Gray. Decatur, Jefferson, and Johnson Cos. Woods and prairies, infrequent.

BIGNONIACEÆ.

Catalpa speciosa Wardner. Decatur, Des Moines, Shelby, and Johnson Cos. Frequently cultivated, rarely spontaneous.

ACANTHACEÆ.

Ruellia ciliosa Pursh. Decatur, Appanoose, Wapello, Van Buren and Johnson Cos. Open woods, borders, waysides, common.

R. strepens L. Decatur Co. Shaded ravines, frequent locally.

VERBENACEÆ.

Verbena urticæfolia L. Decatur, Appanoose, Wapello, Des Moines, and Johnson Cos. Fields and waste places, common.

V. angustifolia Mx. Henry and Johnson Cos. Sandy soil, frequent.

V. hastata L. Decatur, Appanoose, Wapello, Des Moines, Shelby, and Johnson Cos. Fields and waste places, common.

V. stricta Vent. Decatur, Appanoose, Van Buren, Des Moines, Shelby, and Johnson Cos. Fields and upland woods, common.

V. bracteosa Mx. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Waste places, frequent.

Lippia lanceolata Mx. Wapello, Van Buren, and Johnson Cos. Wet grounds, frequent.

Phryma leptostachya L. Decatur, Appanoose, and Johnson Cos. Rich woods, frequent.

LABIATÆ.

Isanthus cæruleus Mx. Johnson Co. Open woods, frequent.

Teucrium canadense L. Decatur, Appanoose, Van Buren, and Johnson Cos. Low grounds, frequent.

Mentha canadensis L. Decatur and Johnson Cos. Low grounds, common.

Lycopus virginicus L. Decatur Co. Low grounds, frequent.

L. rubellus Moench. Decatur Co. Low grounds, infrequent.

L. sinuatus Ell. Decatur, Van Buren, and Johnson Cos. Low grounds, common.

Pycnanthemum lanceolatum Pursh. Decatur, Appanoose, Wapello, and Johnson Cos. Open woods and prairies, frequent.

P. lineifolium Pursh. Decatur, Appanoose, and Johnson Cos. Open woods and prairies, frequent.

Hedeoma pulegioides Pers. Decatur, Van Buren, and Johnson Cos. Open woods, common.

H. hipsida Pursh. Johnson Co. Dry soil, common.

Monarda fistulosa L. Decatur, Appanoose, Wapello, Jefferson, and Johnson Cos. Prairies and open woods, common.

M. punctata L. Johnson Co. Sandy soil, infrequent.

Blephilia hirsuta Benth. Johnson Co. Rich woods, frequent.

Lophanthus scrophulariæfolius Benth. Decatur, Appanoose, and Johnson Cos. Open woods, frequent.

L. nepetoides Benth. Decatur, Van Buren, Des Moines, and Johnson Cos. Open woods, frequent.

Salvia lanceolata Willd. Shelby Co. Dry soil, frequent.

Nepeta cataria L. Decatur, Appanoose, Des Moines, and Johnson Cos. Waste places, common.

N. glechoma Benth. Page, Decatur, Des Moines, and Johnson Cos. Waste grounds near dwellings, frequent.

Scutellaria lateriflora L. Decatur, Appanoose, and Johnson Cos. Woods, frequent.

S. versicolor Nutt. Van Buren, Des Moines, and Johnson Cos. Woods, frequent.

S. parvula Mx. Decatur, Appanoose, Wapello, Shelby, and Johnson Cos. Prairies, frequent.

Brunella vulgaris L. Decatur, Appanoose, Van Buren, Des Moines, and Johnson Cos. Open woods and waste places, common.

Physostegia virginia Benth. Johnson Co. Low woods, frequent.

Leonurus cardiaca L. Appanoose, Des Moines, and Johnson Cos. Waste places, frequent.

Stachys palustris L. Shelby and Johnson Cos. Low places, frequent.

S. aspera Mx. Decatur, Appanoose, and Johnson Cos. Low places, frequent.

PLANTAGINACEÆ.

Plantago rugellii Dec. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Waste places and low woods, common.

P. lanceolata L. Decatur Co. Waste places, becoming frequent.

P. patagonica aristata Gray. Decatur, Appanoose, and Van Buren Cos. Waste places, common.

NYCTAGINACEÆ.

- Oxybaphus nyctagineus* Sweet. Decatur, Wapello, Van Buren, Shelby, and Johnson Cos. Along waterways, frequent.
O. hirsutus Sweet. Shelby Co. Prairie roadsides, frequent.
O. angustifolius Sweet. Decatur Co. Prairies, infrequent.

ILLECEBRACEÆ.

- Anychia dichotoma* Mx. Johnson Co. Woods, frequent.
A. capillacea DC. Decatur and Johnson Cos. Woods, frequent.

AMARANTACEÆ.

- Amarantus retroflexus* L. Decatur, Van Buren, and Johnson Cos.
A. albus L. Decatur Co.
A. blitoides Watson. Decatur and Johnson Cos. Waste places, frequent.
A. chlorostachys Willd. Johnson Co.
A. paniculatus L. Johnson Co.
Acnida tuberculata Moq. Decatur and Johnson Cos. Waste places, frequent.
Chenopodium album L. Decatur, Van Buren, and Johnson Cos. Waste places, common.
C. hybridum L. Decatur Co. Fields, infrequent.

POLYGONACEÆ.

- Rumex britannica* L. Decatur Co.
R. altissimus Wood. Decatur and Johnson Cos. Rich soil, frequent.
R. verticillata L. Appanoose and Johnson Cos. Rich soil, frequent.
R. obtusifolius L. Page and Shelby Cos. Rich soil, frequent.
R. crispus L. Shelby and Johnson Cos. Waste places, common.
R. acetosella L. Decatur, Shelby, and Johnson Cos. Waste places, common.
Polygonum orientale L. Johnson Co. Waste places, infrequent.
P. pennsylvanicum L. Decatur and Johnson Cos. Wet soil, common.

P. lapathifolium incarnatum Watson. Appanoose Co. Wet soil, frequent.

P. hydropiper L. Decatur and Johnson Cos. Wet soil, frequent.

P. hydropiperoides Mx. Johnson Co. Wet soil, frequent.

P. hartwrightii Gray. Henry Co.

P. virginianum L. Decatur and Johnson Cos. Low woods, frequent.

P. aviculare L. Decatur, Appanoose, and Johnson Cos. Waste places, common.

P. erectum L. Decatur Co. Waste places, common.

P. ramosissimum Mx. Decatur, Des Moines, and Johnson Cos. Sandy soil, common,

P. sagittatum L. Johnson Co. Wet soil, common.

P. convolvulus L. Shelby and Johnson Cos. Fields and waste places, common.

P. dumetorium scandens Gray. Decatur Co.

P. cuspidatum Sieb & Jucc. Johnson Co. Rarely an escape into waste places.

Fagopyrum esculentum Moench. Decatur, Appanoose, Des Moines, Shelby, and Johnson Cos. Fields and waste places, infrequent.

ARISTOLOCHIACEÆ.

Asarum canadense D. Decatur, Appanoose, Des Moines, and Johnson Cos. Wooded river bluffs, frequent.

THYMELÆACEÆ.

Dirca palustris L. Johnson Co. Open woods, frequent locally.

SANTALIACEÆ.

Commandra umbellata Nutt. Decatur, Des Moines, and Johnson Cos. Sandy soil in woods, frequent.

EUPHORBIACEÆ.

Euphorbia maculata L. Decatur, Wapello, and Johnson Cos. Waste places, common.

E. preslii Guss. Decatur, Van Buren, and Johnson Cos. Waste places, frequent.

D. marginata Pursh. Decatur, Van Buren, and Johnson Cos. Waste places, infrequent.

E. corollata L. Decatur, Appanoose, Wapello, Van Buren, Des Moines, Shelby, and Johnson Cos. Fields, prairies, and open woods, common.

E. heterophylla L. Wapello, Van Buren, and Johnson Cos. Rocky wooded banks, frequent.

E. dentata Mx. Des Moines Co. Waste places near railroad, frequent.

E. obtusata Pursh. Johnson Co. Sandy soil in woods, infrequent.

E. cyparissias L. Shelby, Henry, and Johnson Cos. Waste places, infrequent.

Croton glandulosus L. Des Moines Co. Waste places near railroad, frequent.

Acalypha virginica L. Decatur, Van Buren, and Johnson Cos. Fields and waste places, common.

URTICACEÆ.

Ulmus fulva Mx. Decatur, Appanoose, and Johnson Cos. Rich woods, frequent.

U. americana L. Page, Decatur, Appanoose, Wapello, Van Buren, Des Moines, Shelby, and Johnson Cos. Low woods, common.

Celtis occidentalis L. Decatur, Appanoose, and Johnson Cos. Low woods, frequent.

Cannabis sativa L. Decatur, Van Buren, Des Moines, Shelby, and Johnson Cos. Waste places, frequent.

Humulus lupulus L. Decatur, Appanoose, and Johnson Cos. Waysides and thickets, common.

Machura aurantiaca Nutt. Decatur, Appanoose, Shelby, and Johnson Cos. Formerly much used for hedge fences, sometimes spontaneous.

Morus rubra L. Decatur, Appanoose, Des Moines, and Johnson Cos. Rich woods, frequent.

Urtica gracilis Ait. Decatur Co. Alluvial soil, infrequent.

Pilea pumila Gray. Decatur, Des Moines, and Johnson Cos. Rich woods, common.

Laportea canadensis Gaud. Decatur, Appanoose, and Johnson Cos. Moist woods, common.

Bahmeria cylindrica Willd. Johnson Co. Moist woods, frequent.

Parietaria pennsylvanica Muhl. Shelby and Johnson Cos.
Low woods, frequent.

PLANTANACEÆ.

Plantanus occidentalis L. Decatur, Van Buren, Lee, Des Moines, and Johnson Cos. A frequent tree along the larger rivers.

JUGLANDACEÆ.

Juglans cinerea L. Johnson Co. Rich woods, frequent.

J. nigra L. Decatur, Appanoose, Van Buren, and Johnson Cos. Rich woods, frequent.

Carya alba Nutt. Decatur, Appanoose, Wapello, Van Buren, Shelby, and Johnson Cos. Upland woods, common once but disappearing.

C. sulcata Nutt. Decatur, Appanoose, and Van Buren Cos. Along rivers, once common, yet frequent.

C. amara Nutt. Decatur, Appanoose, Shelby, and Johnson Cos. Rich woods, common.

CUPULIPERÆ.

Betula nigra L. Appanoose and Johnson Cos. Woods, frequent.

Corylus americana Walt. Decatur, Appanoose, Wapello, Van Buren, Shelby, and Johnson Cos. Thickets, common.

Ostrya virginica Willd. Decatur, Henry, and Johnson Cos. Woods, frequent.

Carpinus caroliniana Walter. Decatur, Appanoose, Wapello, Van Buren, Des Moines, and Johnson Cos. Woods, frequent.

Quercus alba L. Decatur, Appanoose, Wapello, Van Buren, and Johnson Cos. Upland woods, common.

Q. stellata Wang. Appanoose Co. One small grove known.

Q. macrocarpa Mx. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Woods, common. This is a large tree along the rivers, but a shrub on the prairies.

Q. bicolor Willd. Decatur and Appanoose Cos. Along rivers, frequent.

Q. muhlenbergii Englm. Decatur, Appanoose, Van Buren, Henry and Johnson Cos. Woods along streams, frequent.

Q. prinoides Willd. Decatur and Appanoose Cos. Prairies and upland woods, common. Similar to preceding, but of diminutive size, usually one or two feet high.

Q. rubra L. Decatur, Appanoose, Wapello, Van Buren, and Johnson Cos. Woods, frequent.

Q. coccinea Wang. Decatur, Appanoose, and Johnson Cos. Upland woods, common.

Q. palustris Du Roi. Decatur and Appanoose Cos. Low woods, frequent.

Q. imbricaria Mx. Decatur, Appanoose, Wapello, and Washington Cos. Woods, common.

Q. nigra L. Decatur Co. Dry upland woods, frequent.

SALICACEÆ.

Salix longifolia Muhl. Shelby and Page Cos. Frequent.

S. discolor Muhl. Shelby and Johnson Cos. Low grounds, common.

S. humilis Marsh. Decatur, Shelby, and Johnson Cos. Prairies, frequent.

Populus tremuloides Mx. Decatur, Appanoose, Shelby, and Johnson Cos. Upland woods, common.

P. grandidentata Mx. Johnson Co. Woods, common.

P. monilifera Ait. Decatur, Appanoose, Shelby, and Johnson Cos. Rich woods, common.

P. alba L., var. *nivea*. Decatur Co. A frequent escape.

CONIFERÆ.

Juniperus virginiana L. Van Buren and Johnson Cos. River bluffs, frequent.

HYDROCHARDIACEÆ.

Elodea canadensis Mx. Johnson Co. Ponds, frequent.

Vallisneria spiralis L. Johnson Co. Infrequent.

ORCHIDACEÆ.

Microstylis ophioglossoides Nutt. Johnson Co. We have one specimen collected in low woods.

Liparis liliifolia Richard. Upland woods, frequent.

Aplectum hiemale Nutt. Johnson Co. Rich woods, infrequent.

Corallorhiza odontorrhiza Nutt. Johnson Co. Rich upland woods, common at least locally.

Spiranthes gracilis Bigelow. Johnson Co. Open upland woods, infrequent.

Goodyera pubescens R. Br. Johnson Co. Infrequent.

Calopogon pulchellus R. Br. Johnson Co. One specimen with three flowers on season's stem and two capsules on preceding year's stem was collected on top of a bluff in open woods.

Pogonia pendula Lindl. Johnson Co. Woods, infrequent.

Orchis spectabilis L. Johnson Co. Frequent locally.

Habenaria bracteata R. Br. Decatur and Johnson Cos. Woods, infrequent.

H. leucophæa Gray. Decatur Co. Low prairie, infrequent.

Cypripedium parviflorum Salisb. Crawford and Johnson Cos. Rich woods, frequent.

C. pubescens Willd. Decatur, Appanoose, and Johnson Cos. Rich woods, frequent.

C. spectabile Swartz. Johnson Co. Rich upland woods, infrequent.

C. candidum Muhl. Page Co. Infrequent.

IRIDACEÆ.

Iris versicolor L. Decatur and Johnson Cos. Along ponds, marshes, infrequent.

Sisyrinchium angustifolium Mill. Page, Decatur, Des Moines, Shelby, and Johnson Cos. Fields and open woods, common. White and blue flowered forms.

S. anceps Cav. Decatur and Johnson Cos. Open woods infrequent.

AMARYLLIDACEÆ,

Hypoxie erecta L. Decatur, Shelby, and Johnson Cos. Meadows and prairies, common.

DIOSCORIACEÆ.

Dioscorea villosa L. Decatur, Appanoose, Van Buren, and Johnson Cos. Woods, frequent.

LILIACEÆ.

Smilax herbacea L. Decatur, Appanoose, Shelby, and Johnson Cos. Woods, frequent.

S. hispida Muhl. Decatur and Shelby Cos. Woods, frequent.

S. ecirrhata Wats. Johnson Co. Woods, infrequent.

Allium tricoccum Ait. Decatur and Johnson Cos. Rich woods, frequent.

A. canadense Kalm. Decatur, Shelby, and Johnson Cos. Prairies and open woods, frequent.

Polygonum giganteum Dietrich. Decatur, Appanoose, and Shelby Cos. Low woods, frequent.

Asparagus officinalis L. Decatur, Van Buren, Shelby, and Johnson Cos. Waste places, infrequent.

Smilacina racemosa Desf. Decatur, Appanoose, Des Moines, Shelby, and Johnson Cos. Rich woods, common.

S. stellata Desf. Des Moines and Johnson Cos. Low places, infrequent.

Mianthemum canadense Desf. Johnson Co. Upland woods, infrequent.

Uvularia grandiflora Smith. Decatur, Appanoose, and Johnson Cos. Rich woods, frequent.

Oakesia sessilifolia Wats. Des Moines and Johnson Cos. Woods, infrequent.

Erythronium albidum Nutt. Page, Decatur, Van Buren, Shelby, and Johnson Cos. Low woods and fields, common.

Lilium philadelphicum L. Decatur, Shelby, and Johnson Cos. Prairies, infrequent, except Decatur Co., where the species is common.

L. canadense L. Decatur and Johnson Cos.

Trillium recurvatum Beck. Van Buren, Des Moines, Jefferson and Johnson Cos. Low woods, frequent locally.

T. erectum L. Shelby, Crawford, and Johnson Cos. Rich woods, infrequent.

T. nivale Riddell. Johnson Co. Upland woods, common.

Melanthium virginicum L. Decatur Co. Wet sloughs, common locally.

PONTEDERIACEÆ.

Pontedera cordata L. Appanoose and Johnson Cos. Borders of ponds, common locally.

Heteranthera graminea Vahl. Johnson Co. Borders of ponds, common locally.

COMMELINACEÆ.

Tradescantia virginica L. Page, Decatur, Appanoose, Des Moines, Shelby, and Johnson Cos. Prairies and fields, common.

JUNCACEÆ.

Juncus tenuis Willd. Decatur and Johnson Cos. Prairies and waysides, common.

J. nodosus megacephalus Torr. Decatur Co. Wet places, frequent locally

TYPHACEÆ.

Typha latifolia L. Decatur, Wayne, Appanoose, and Johnson Cos. Borders of ponds, common.

Sparganium eurycarpum Englm. Appanoose Co. In shallow water of Goose lake, common.

ARACEÆ.

Arisæma triphyllum Torr. Page, Decatur, Appanoose, Shelby, and Johnson Cos. Woods, common.

A. dracontium Schott. Decatur, Appanoose, Shelby, and Johnson Cos. Damp woods, frequent.

Acorus calamus L. Appanoose and Johnson Cos. Sloughs, frequent.

LEMNACEÆ.

Spirodela polyrrhiza Schleid. Decatur, Appanoose and Johnson Cos. Ponds, common.

Lemna trisulca L. Johnson Co. Ponds, common locally.

ALISMACEÆ.

Alisma plantago L. Decatur, Appanoose, and Johnson Cos. Ponds and flats, common.

Sagittaria variabilis Englm. Decatur, Appanoose, Shelby, and Johnson Cos. Wet sloughs or shallow water, common.

S. heterophylla Pursh. Appanoose and Johnson Cos. Shallow water, common.

S. graminea Mx. Johnson Co. Margins of ponds and shallow water, frequent.

NAIDACEÆ.

Potamogeton spirillus Tuck. Decatur Co. In a railroad pond, common. Cratty: "This seems to be intermediate between this and *P. diversifolius* Raf. The submerged fruits are mostly peduncled in your specimens, while they are sessile, or very nearly so in true *P. spirillus* Tuck. Hitchcock collected the same at Hamburg."

P. fluitans Roth. Johnson Co. In ponds, common locally.

P. pauciflorus Pursh. Henry Co.

CYPERACEÆ.

Cyperus diandrus Torr. Johnson Co. Sandy soil along river, frequent.

- C. speciosus* Vahl. Decatur Co. Wet soil, frequent.
C. aristatus Rottb. Johnson Co. Sandy soil, frequent.
C. schweinitzii Torr. Johnson Co. Sandy soil, common.
C. filiculmis Vahl. Johnson Co. Sandy soil, frequent.
C. strigosus L. Decatur, Van Buren, and Johnson Cos.
 Low, sandy soil, common.
Eleocharis palustris R. Br. Decatur, Shelby, and Johnson
 Cos. Wet soil, common.
E. tenuis Schultes. Decatur Co.
E. acicularis R Br Johnson Co. Wet soil, common.
E. ovata R. Br. Decatur and Appanoose Cos. Wet soil, or
 in shallow water, common locally.
Scirpus lacustris L. Decatur, Appanoose, Shelby, and John-
 son Cos. Ponds or wet soil, common
S. atrovirens Muhl. Decatur, Shelby, and Johnson Cos.
 Wet soil, common.
Eriophorum polystachyon L. Johnson Co. Specimens col-
 lected by Prof. Shimek.
E. lineatum Benth & Hook. Decatur Co. Low prairies,
 frequent
Hemicarpha subsquarrosa Nees. Johnson Co. Sandy soil
 along river, infrequent
Scleria triglomerata Mx. Decatur Co. Prairies, frequent.
Carex intumescens Rudge. Appanoose Co. Wet woods, fre-
 quent.
C. grayii Carey. Appanoose Co.
C. squarrosa L. Appanoose Co. Swamps, frequent.
C. hystericina Muhl. Decatur, Shelby, and Johnson Cos. Low
 grounds, common.
C. filiformis latifolia Boeckl. Shelby and Johnson Cos.
C. trichocarpa Muhl. Shelby Co.
C. tricocarpa aristata Bailey. Johnson Co.
C. stricta Lam. Shelby and Johnson Cos.
C. davisii Schwein. & Torr. Johnson Co.
C. longirostris Torr. Johnson Co.
C. crawii Dewey. Shelby Co.
C. laxiflora Lam. Decatur and Shelby Cos.
C. laxiflora striatula Carey. Shelby and Johnson Cos.
C. granularis Muhl. Shelby Co.
C. tetanica Bailey. Johnson Co.
C. pennsylvanica Lam. Decatur, Shelby, and Johnson Cos.
 Prairies and woods, common.

- C. stipata* Muhl. Shelby and Johnson Cos.
C. grvida Bailey. Johnson Co.
C. vulpinoidea Mx. Decatur, Appanoose, and Johnson Cos.
C. rosea Schkuhr. Decatur, Shelby, and Johnson Cos.
 Woods, common.
C. sparganoides Muhl. Decatur Co.
C. cephalophora Muhl. Johnson Co.
C. tribuloides cristata Bailey. Decatur Co.
C. scoparia Schkuhr. Johnson Co.
C. straminea Willd. Decatur Co.
C. straminea brevior Dewey. Decatur, Shelby and Johnson Cos.
C. straminea aptera Boott Johnson Co.

GRAMINEÆ.

- Spartina cynosuroides* Willd. Decatur and Appanoose Cos.
 Sloughs, common.
Panicum leibergii Schribn. Decatur Co. Meadows, frequent.
P. sanguinale L. Decatur, Wapello, Van Buren, and Johnson Cos. Fields and waste places, common.
P. capillare L. Decatur, Wapello, and Johnson Cos.
P. virgatum L. Decatur Co. Low prairies, frequent.
P. lanuginosum Ell. Decatur and Appanoose Cos. Meadows, frequent.
P. depauperatum Muhl. Johnson Co.
P. crus-galli L. Decatur, Wapello, and Johnson Cos. Wet grounds, common.
P. macrocarpon Le Conte. Decatur and Johnson Cos. Woods, frequent.
Setaria glauca Beauv. Decatur, Appanoose, Wapello, and Johnson Cos. Fields and waste places, common.
S. viridis Beauv. Decatur and Johnson Cos. With the preceding.
S. italica Kunth. Decatur, Van Buren, and Shelby Cos. Waste places, frequent.
S. verticillata Beauv. Johnson Co. Near dwellings, frequent.
Cenchrus tribuloides L. Decatur, Wapello, Van Buren, and Johnson Cos. Sandy soil, common.
Leersia oryzoides Swartz. Decatur Co.
Zizania aquatica L. Johnson Co. Ponds, frequent.

Tripsacum dactyloides L. Decatur and Appanoose Cos. Sloughs, frequent locally.

Andropogon furcatus Muhl. Decatur, Appanoose, and Johnson Cos. Prairies, common.

Chrysopogon nutans Benth. Decatur Co. Prairies, frequent.

Phalaris canariensis L. Johnson Co. An occasional escape.

P. arundinacea L. Johnson Co. Wet soil, infrequent.

Aristida oligantha Mx. Decatur Co. Dry soil, common.

Stipa spartea Trin. Decatur, Shelby, and Johnson Cos. Prairies, frequent.

Muhlenbergia mexicana Trin. Johnson Co. Low places, frequent.

Phleum pratense L. Decatur, Appanoose, Shelby, and Johnson Cos. Cultivated, a frequent escape.

Alopecurus geniculatus L. Johnson Co. Borders of ponds, infrequent.

Sporobolus cryptandrus Gray. Johnson Co.

Agrostis alba L. Decatur Co. Meadows, common.

A. perennans Tuck. Decatur Co. Frequent.

Cinna arundinacea L. Johnson Co.

Calamagrostis canadensis Beauv. Decatur Co.

Bouteloua racemosa Lag. Decatur, Appanoose, and Johnson Cos. Prairies, frequent.

Triodia cuprea Jacq. Decatur and Van Buren Cos. Sandy soil near water courses, common.

Koeleria cristata Pers. Decatur, Shelby, and Johnson Cos. Prairies, frequent.

Eatonia pennsylvanica Gray. Shelby and Johnson Cos.

Eragrostis reptans Nees. Decatur, Van Buren, and Johnson Cos. River banks, common.

E. major Host. Decatur and Johnson Cos. Waste places, common.

E. purshii Schrader. Decatur and Johnson Cos. Waste places, frequent.

Melica mulica Walt. Johnson Co. Open woods, frequent.

Diarrhena americana Beauv. Decatur Co. Frequent.

Dactylis glomerata L. Decatur, Shelby, and Johnson Cos. Orchards and waste places, frequent.

Poa trivialis L. Shelby and Johnson Cos. Meadows and borders, common. This is frequently mistaken for *P. pratensis* L.

Glyceria nervata Trin. Decatur, Shelby, and Johnson Cos.
Low prairies, common.

Festuca tenella Willd. Johnson Co.

F. shortii Kunth. Decatur Co. Low prairies, common.

Bromus secalinus L. Decatur and Johnson Cos. Fields and waste places, frequent.

B. ciliatus L. Decatur Co.

B. ciliatus purgans Gray. Decatur, Appanoose, and Johnson Cos. Rich woods, frequent.

Agropyrum repens Beauv. Decatur Co. Waste places, frequent.

A. spicatum (Pursh.) Scribn. & Smith. Shelby Co.

Hordeum jubatum L. Decatur, Shelby, and Johnson Cos.
Waste places, common.

H. pusillum Nutt. Decatur and Johnson Cos. Waste places, becoming frequent. Johnson Co. specimens collected by Professor Shimek.

Elymus canadensis L. Decatur, Appanoose, Wapello, Des Moines, and Johnson Cos. Prairies and river banks, common.

E. striatus Willd. Johnson Co. Woods, frequent.

E. virginicus L. Decatur, Appanoose, and Johnson Cos. Prairies and woods, common.

Asprella hystrix Willd. Appanoose and Johnson Cos. Woods, frequent.

EQUISETACEÆ.

Equisetum arvense L. Decatur, Des Moines, Shelby, and Johnson Cos. Moist soil, frequent.

E. hyemale L. Decatur, Appanoose, Des Moines, and Johnson Cos. Wet places, frequent.

E. laevigatum Braun. Shelby Co. Fields and waysides, common.

FILICES.

Adiantum pedatum L. Decatur, Appanoose, Van Buren, Shelby, and Johnson Cos. Rich woods, common.

Pteris aquilina L. Upland woods, frequent.

Pellaea atropurpurea Link. Johnson Co. Cliffs, frequent.

Asplenium filix-femina Bernh. Decatur, Appanoose, Shelby, and Johnson Cos. Woods, common.

Camptosorus rhizophyllus Link. Johnson Co. Moist ravines, frequent.

Phegopteris hexagonoptera Fee. Johnson Co. Woods, frequent.

Aspidium thelypteris Swartz. Johnson Co. Boggy places, locally frequent.

A. aerostichoides Swartz. Johnson Co. Rare.

Cystopteris bulbifera Bernh. Johnson Co. Base of cliffs, common.

C. fragilis Bernh. Decatur, Appanoose, Van Buren, Des Moines, Shelby, and Johnson Cos. Woods, common.

Onoclea sensibilis L. Decatur, Appanoose, and Johnson Cos. Moist woods, frequent.

O. struthiopteris Hoff. Shelby and Johnson Cos. Woods, common.

Woodsia obtusia Torr. Decatur, Van Buren, and Johnson Cos. Cliffs, frequent.

Osmundia claytoniana L. Decatur and Appanoose Cos. Moist woods, frequent.

OPHIOGLOSSACEÆ.

Botrychium virginianum Swartz. Decatur, Appanoose, Shelby, and Johnson Cos. Rich woods, frequent.

LYCOPODIACEÆ.

Lycopodium clavatum L. Johnson Co. Local, rare.

L. complanatum L. Johnson Co. Local, rare.

JUNGERMANNIACEÆ.

Lejunia serphyllifolia americana Lindl. Johnson Co. Base of trees, common.

Porella platyphylla Lindb. Johnson Co. On lime rocks and moist banks, common.

Cephalozia multiflora Spruce. Johnson Co. In moist situations, on ground among lichens, infrequent.

Lophocolea minor Nees. Johnson Co. On moist banks, infrequent.

Plagiochila asplenoides Dumort. Johnson Co. Moist banks, infrequent.

ANTHOCEROTACEÆ.

Anthoceros levis L. Johnson Co. Moist low grounds, frequent.

MARCHANTIACEÆ.

Marchantia polymorpha L. Johnson Co. Low grounds and over rocks, common.

Conocephalus conicus Dumort. Johnson Co. Rocks along shallow streams, common.

Asterella hemispherica Beauv. Johnson Co. On shady moist banks, common.

RICCIACEÆ.

Riccia crystallina L. Decatur and Johnson Cos. Fields and mud flats, common.

R. fluitans L. Johnson Co. Cratty sends us the same from Emmet Co. Floating on water, perhaps not common.

NOTES CONCERNING IOWA LICHENS.

BRUCE FINK.

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It has been my good fortune, through connection with the Minnesota Botanical Survey, to be able to study the lichen-flora of a region extending from northeastern Iowa to the British possessions; and it is my purpose first of all to give a somewhat revised abridgment of a previous paper* dealing with the lichen-floras of certain localities within this region. The localities are Fayette, Iowa; Pictured Rocks, Clayton county, Iowa; and Minneapolis. I had originally intended to present merely an abstract of the original paper, but have finally decided that the only way to do justice to the subject is to give a more extended account from an Iowan point of view.

Also, in the interval of three years since my paper on Iowa lichens† appeared, I have been able to add a number of species new to the state, and a list of them is given at the close of the paper. The further study of areas within and without the limits of Iowa has given additional knowledge of the distribution of a few species previously reported, and I shall give some notes concerning these, stating why they are of special interest and in some instances where they are likely to occur in our state.

The only noteworthy differences between the vicinities of Fayette and Minneapolis as regards substrata suited to lichen-development are the presence of the Saint Peter sandstone at the latter place, which does not occur at the former, and the fact that the paleozoic limestones outcrop at the surface much more frequently at the former. The first difference is in favor of the lichen-flora about Minneapolis, and the second favors

* Contributions to a Knowledge of the Lichens of Minnesota, II Lichens of Minneapolis and Vicinity, Minn. Bot. Stud., Bull. No. 9, parts X and XI, pp. 703-726.

† Lichens of Iowa, Bull. Lab. of Nat. Hist., State Univ. of Iowa, vol. III, No. 3, pp. 70-88.

that about Fayette, as each of these substrata bears its characteristic lichens. As will be especially noted toward the close of these notes, these two differences about offset each other. The tamarack swamps about Minneapolis have no parallel about Fayette, and furnish lichens not found, or rare, in other parts of the former region. Yet all of these lichens occur about Fayette on one substratum or another, so that, in the comparison, the former region will gain nothing. Minneapolis has the larger river and the lakes, but not a single lichen has occurred near these bodies of water that is especially characteristic of such localities.

The following table, giving the genera and the number of species in each for the Fayette and Minneapolis vicinities, will be instructive and will form the basis for some further comparisons of the two regions:

GENERA.	No. of species Fayette.	No. of species Minn.	GENERA.	No. of species Fayette.	No. of species Minn.
Aco'ium	1	1	Opegrapha	2-2	1
Arthonia	5-1	3	Pannaria	2-1	2
Alectoria	1	1	Parmelia	9-1	8
Biatoria	13-3	6	Peltigera	6	6
Buellia	5-1	3	Pertusaria	4-2	3
Cetraria	1	1	Physcia	10-1	10
Cladonia	16	9	Placodium	10-1	10
Collema	7-1	2	Pyrenula	7-1	4
Conio ybe	1	0	Pyxine	1	0
Endocarpon	6	5	Ramalina	3	3
Evernia	1	1	Rinodina	4	3
Gyalacta	0-1	0	Staurothele	1	0
Graphis	2-1	1	Theloschistes	5	4
Heppla	1	0	Urceolaria	1-1	1
Lecanora	16-2	15	Usnea	4	4
Lecidea	2-1	1	Verrucaria	4-1	3
Leptogium	5	1			
Omphalaria	1-1	1	Totals	157-2	113

The collecting at Fayette extended over three years, and that at Minneapolis only over two months. Yet the collecting at the former place was my first extended work on lichens, and the best part of the work was confined to a single summer. The Fayette column I have divided into two parts, the first containing 157 species, which, with present experience, I should expect to find in a region as favorable for lichen-development as Fayette and in the time spent in collecting at Minneapolis. The second part of the Fayette column contains 23 species, so rare that one would not be so likely to find them in the short time, or which are not found within five miles of Fayette. The

113 species found at Minneapolis are about 72 per cent of the 157 species of Fayette lichens, and it will be an approximately correct estimate to say that lichens are one-fourth more numerous at the latter place than at the former.

The cause of the difference in number of lichens in the two places is evidently to be sought mainly in climatic differences. Several considerations have conspired to cause me to arrive at this conclusion.

First.—Most species of lichens are more disposed to confine themselves to moist situations at Minneapolis, as about the bodies of water mentioned above, in heavy woods, or when in dry places near the ground. The last tendency is noticeable in *Graphis scripta* (L) Ach., which in dry places most frequently grows low down on the trunks of the trees. In passing up from the Mississippi river banks fifty to one hundred feet to the level ground just above the bluffs the decrease in number of species and individuals, whether on rocks, earth or trees, is very striking. In one place, within or near the city limits, the granitic boulders just above the bluffs are well covered with lichens, while twenty rods back from the river in open ground the rocks of the same kind are nearly bare of them. The decrease is not so marked in lichens growing on trees as in those growing on rocks, but is noticeable. I am not referring now to change in species in passing to the drier locality, which also occurs here as elsewhere, and is due to stress caused by environment. Further, it may be said that a decrease would occur in numbers in other regions, but observation shows it to be more marked in dry climates. In parts of northern Iowa no such noticeable decrease occurs. Here fifteen or more species of lichens may easily be found on a single tree in moderately dry situations, and nearly all the species commonly occurring on the boulders in the vicinity of Fayette may be found on a single one in an open, dry field far removed from any stream.

Second.—The gelatinous lichens, which thrive in moist places, are much more common at Fayette. The first table will show that the genera *Collema* and *Leptogium* show twelve species at Fayette and only two at Minneapolis. I took special pains to investigate this peculiarity of distribution at the latter place, searching deep wooded ravines where these species should abound. It may be added that two of the three species given for the one locality are much rarer than any one of the twelve

given for the other. This adds to the evidence in a way not shown in the table.

Third.—The genus *Peltigera*, the species of which grow on the ground where they can get an abundance of moisture, is represented, by an equal number of species in the two localities compared, as will appear upon examining the first table. The individual *Peltigeras* are also about equally numerous in the two regions, the genus *Peltigera* being probably the best developed one of the flora about Minneapolis, though several other genera are represented by more species.

A thorough exploration of three or four selected areas along the Mississippi river, between the two localities compared above would, if made by one well acquainted with lichens and their habits of growth, bring out some very interesting and instructive information regarding lichen distribution. The first and second questions considered just above could thus be traced. As to where the gelatinous lichens decrease in number most rapidly in passing northward; and where the change from comparative uniformity of distribution, so far as influenced by the moisture or dryness of small adjacent areas, to greater lack of uniformity in this regard takes place most rapidly, are questions of interest.

The difference in number of species of lichens for the two localities compared is a greater per cent of the larger total than is the difference in number of genera. Fayette has thirty-four genera and Minneapolis twenty-nine. The difference in favor of the former place for genera is only 15 per cent, while for species it is about 28 per cent, or nearly twice as great. Reference to the table will show that the five Fayette genera (*Coniocybe*, *Gyalecta*, *Heppia*, *Pyxine*, and *Staurothele*), not thus far found at Minneapolis, are each represented at the former place by a single species. Hence, the 15 per cent has not the significance that it would have if it stood for genera well represented at one place and wanting at the other. On the whole, the less favorable conditions for lichen development at Minneapolis have affected the number of species vastly more than the number of genera.

Further knowledge of the distribution of the lichens about the two places can be gained by the consideration of the table below, in which I have given numbers of lichens for various substrata for Fayette and Minneapolis with the per cents which

these numbers represent of the whole number of lichens found in each locality on the substrata considered:

SUBSTRATA.	No. and per cent, Fayette.	No. and per cent, Minneapolis.
Wood	90 or 57 per cent.	58 or 58.5 per cent.
Calcareous rocks	31 or 19.33 per cent.	17 or 17+ "
Granitic rocks	17 or 10.66 "	12 or 12+ "
St. Peter sandstone.	0	5
Earth	22 or 13.75 per cent.	12 or 12+ per cent.
Wood and rocks	15.	5
Wood and earth	2.	1
Rocks and earth.	3	3
Total numbers.	180.	113

The table shows very little difference in the per cents of species on different substrata for the two localities, and this would seem to indicate that, though the drier climate of the Minnesota region has caused a poorer development of lichens than is found at the Iowa locality, it has not caused these plants to seek substrata especially favorable for their development. Other factors enter in to compensate differences which would otherwise occur to such an extent that the table shows in this respect just what it would not show were it not for these factors,—similarity as to number of lichens on different substrata for the two regions.

These other factors have prevented the development of a larger per cent of earth and rock lichens at Minneapolis. As climate becomes drier the relative per cent of these lichens should increase because nearer the earth there is more moisture. First as to the lichens on calcareous rocks, the per cent for Fayette is a little higher than that for Minneapolis, while the opposite condition should follow the difference in climatic conditions between the two places. This apparent difficulty is easily explained since the calcareous rocks outcrop at the surface much more frequently at the former locality. The lichen-species on calcareous rocks at Minneapolis are those confined in both places to perpendicular exposures, while one-third of the species found at Fayette are characteristic of surface outcrops. Deducting one-third of the 19.33 per cent given in the table for Fayette leaves less than 12.7 per cent and gives Minneapolis an advantage of more than 3 per cent for conditions as to substrata existing at both places. This is given as the true relation so far as influenced by the difference in hygrometric conditions.

Next as to the lichens on granitic rocks, the difference of 1.3 per cent in favor of Minneapolis is not so great as might be expected. This is due to the fact that so many of the granitic boulders are in dry open places. The few in moist or shaded places are reasonably well covered with lichens, but those not thus protected are not, as has been stated elsewhere. The limestone exposures are usually shaded along the wooded river banks, hence the advantage for these rocks would be greater than for the granitic rocks were it not for the lack of surface outcrops of the limestone rocks.

As to the earth lichens, the region including Minneapolis lacks the calcareous-earth lichens of the Iowa region, because the calcareous rocks are more deeply covered by drift and have not been so frequently exposed to help in soil formation. Of the twenty-two earth lichens found at Fayette seven occur on calcareous earth, while of the twelve found at Minneapolis only two occur on calcareous earth. Reducing the first number to fifteen and the third to ten gives Minneapolis an advantage of 3 per cent. This 3 per cent does not show the effect of atmospheric differences between the two places compared, because of the Minneapolis *Cladonias* only one-third occur on the earth, while of those at Fayette about two-thirds grow on the ground. Since I have been able to present no very satisfactory explanation of this difference in distribution of the *Cladonias* out of the calculation; and, if this were done, the advantage in favor of Minneapolis in the per cents would be about 2.5.

As to the wood lichens it will be seen that if the per cents of rock and earth lichens about Minneapolis were what we should expect from hygrometric conditions alone, the per cent of these would rise and that of the wood lichens would fall in comparative proportion. In other words, conditions other than atmospheric have tended to decrease the rock and the earth lichens, but not the wood lichens. Scarcity of lichens on trees removed from the large bodies of water and not in heavy forests has been noted elsewhere in this paper. As to lichens on dead wood, especially old boards, the Iowa region furnishes 14 and the Minneapolis region eight. The per cent of the whole lichen-floras in favor of the former region is about one. In the Minneapolis region the lichens on old boards are common enough in damp places, but in dry ones old boards are fre-

quently quite bare of them. In the Iowa region the old boards are abundantly supplied with lichens, even in dry places.

The reconstructed table below (which leaves the numbers of lichens for the substrata considered unchanged in the Minneapolis column except that for the earth lichens all calcareous earth lichens plus all earth *Cladonias* are omitted, treats the Fayette earth lichens in the same way and also deducts from the latter column all the calcareous rock lichens found on surface exposures) gives the relative per cents for all the substrata considered as influenced by atmospheric conditions alone:

SUBSTRATA.	NO. AND PER CENT, FAYETTE		NO. AND PER CENT, MINNEAPOLIS.	
Wood	90 or 68+	per cent	58 or 62 3 +	per cent.
Calcareous rocks	20 or 15+	" "	17 or 18 25-	" "
Granite rocks	17 or 12 8-	" "	12 or 12 8+	" "
Earth	5 or 4-	" "	6 or 6 5-	" "

This table simply places the per cents that would result from atmospheric conditions where they may be easily compared. However, by the reduction of the numbers representing earth and calcareous-rock lichens to eliminate other causes, it reduces the advantage for the Minneapolis vicinity in granitic rock species to a very small fraction. A somewhat larger number of such rocks were examined about Fayette, and possibly the larger number increases the number of species of lichens on them, which once established may now all be found on a few of the rocks. However, if the smaller number about Minneapolis is due to removal of the rocks, this argument loses much of its value. This table shows the relation between the wood lichens, as influenced by climate alone by per cents, which has not been done before.

The Saint Peter sandstone along the Mississippi river near Minneapolis, and that along the same river in northeastern Iowa, near McGregor, may be compared as to lichen-floras by use of the following table, which gives the species characteristic of these rocks in both places, and also those found on them in each place and not in the other:

SPECIES FOUND IN BOTH PLACES.	IN NORTHEASTERN IOWA ONLY.	ABOUT MINNEAPOLIS ONLY.
<i>Ramalina calicaris</i> (L.) Fr.	<i>Pannaria microphylla</i> (Sw.) Delos.	<i>Cladonia cespiticia</i> (Pers.) Fl.
var <i>Farinacea</i> Schær.	<i>Cladonia rangiferina</i> (L.) Hoffm. var <i>Sylvatica</i> L.	
<i>Urceolaria scruposa</i> (L.) Nyl.	<i>Cladonia uncialis</i> (L.) Fr	
<i>Cladonia cornucoplioides</i> (L.) Fr.	<i>Biatora granulosa</i> (Ehrh.) Poetsch.	
<i>Usnea barbata</i> (L.) Fr. var. <i>rubiginea</i> Michx.		

This table affects comparisons thus far made in no way since the Iowa locality, now under consideration, is a different one than that previously used. In all the comparisons thus far made, the lichens on the Saint Peter sandstone have been eliminated with those of other substrata occurring in only one of the localities. Now, in the above table it will be noticed that the Iowa region has the advantage in the number of species not common to both. Knowing what occurs in Iowa, I examined the Minnesota locality very carefully, and the advantage is apparently due to the more favorable conditions for lichen growth in northern Iowa. The four species common to both regions are doubtless distributed along the river between the two localities wherever these rocks are exposed. How far north the four species found only in the Iowa locality extend, and how far south that found only in the Minnesota locality extends, are questions of interest. Knowledge on this point might lead to a modification of views just stated.

Usnea barbata (L.) Fr. var. *Hirta* Fr., is also confined to the Saint Peter sandstone at the Minnesota locality, but not at the Iowa one, though occurring on this formation there also. This rock is apparently its most natural habitat in the regions considered, to which habitat it is confined in the one less favorable to lichen development. Though, as in this instance, I have omitted from the last table the species found on these rocks and also on other substrata near by in one or both regions, abruptness in floral change due to stress caused by change in substrata is seldom better illustrated than in comparing the lichens of the Saint Peter sandstone with those of other substrata that happen to lie adjacent. The distribution of lichens on this rock formation in Minnesota, Wisconsin, Iowa and Illinois is worthy of careful study. Other questions of distribution would be brought to light, illustrated by the species here considered, and doubtless by several others not yet collected on these rocks.

From scattered statements in this paper, the inference might be drawn that I should have given more prominence to difference of substrata in accounting for the difference in number of lichens in the localities compared. Minneaplis gains six species on the Saint Peter sandstone, which is not found at Fayette, and lacks six species, occurring at Fayette, because the calcareous rocks seldom outcrop at the surface, and five species because of scarcity of calcareous earth. Possibly some allow-

ance should be made for a probable slight advantage for Fayette in number of granitic rocks, though Minneapolis has the advantage in the per cent of species on these rocks. Of the five species gain for Fayette in the figures given above, three or four, about 75 per cent, could be expected to occur at Minneapolis if the substrata were present. We could add as many more species for the possible advantage of Fayette in granitic rocks as substrata and still only have a total difference of seven species resulting from difference in substrata. This would reduce the advantage of Fayette to be accounted for by difference in atmospheric conditions to thirty-seven species or 24 per cent. Subtracting this from the total difference of 28 per cent, leaves a doubtful 4 per cent to be accounted for by lack of substrata at Minneapolis.

It may also be thought that I have not taken into account the usual decrease in number of species in passing from warmer to colder regions. The distance of about 150 miles from south to north between the two localities compared is so small that little difference in number of species could result, the difference in mean annual temperature being between 2° F. and 3° F. The smaller number of individuals at Minneapolis also tends to prove that the difference in latitude has not helped to produce the difference in number of species, as the decrease in number of species, caused by colder climate, usually gives place to an increase in number of individuals. If the difference in lichen-floras were due to the above cause, northern species should come in, to some extent, at Minneapolis, to take the place of those found at Fayette, and not at the former place. *Parmelia olivacea* (L) Ach., *Evernia prunastri* (L) Ach., *Cetraria ciliaris* (Ach.) Tuck., and possibly *Alectoria jubata* (L) Tuck var. *Chalybeiformis* Ach. are more numerous, and occur on more substrata at Minneapolis as a result of more northern location, but not a species has come in.

A comparison of the amount of precipitation of moisture at St. Paul and Fayette for the eight years since the record has been kept for the latter place, shows a difference in annual precipitation of 6.77 inches in favor of Fayette. Comparison of St. Paul and Dubuque for twenty-three years shows a difference of 9.31 inches per annum in favor of Dubuque. Now, comparison of Fayette and Dubuque for the eight years shows a difference of .50 inches per annum in favor of Fayette. Thus these last two places, only about fifty-five miles apart, show so

little difference in amount of precipitation that the Dubuque figures may be substituted for Fayette without great error. Also, St. Paul suffered less from the drouth of recent years than Dubuque, and hence than Fayette, so that the figures for the smaller number of years cannot be relied on, and 9.31 inches per annum doubtless is nearer the average difference between Minneapolis and Fayette in precipitation than is 6.77 inches. The use of St. Paul figures for Minneapolis can, of course, give rise to no appreciable error, and this difference of about 9.31 inches, with the accompanying difference of humidity of the atmosphere, seems to account very largely for the difference of 28 per cent in number of species of lichens. No reliable figures as to relative or absolute humidity could be obtained.

The following conclusions may be drawn relative to lichen-distribution in northeastern Iowa:

1. The lichen-flora of the region is richer than that of the Minnesota region about 150 miles north, and doubtless there is a gradual decrease in number of lichen species in passing north from the Iowa region.
2. The cause of the difference in favor of the Iowa region is neither its more southern location nor advantage in substrata, but mainly at least its moister climate. The proofs given in the paper may be briefly summarized as follows:
 - (a) Lichens in the Iowa region are not so much inclined to confine themselves to moist situations.
 - (b) Gelatinous lichens, which thrive best in moist places, are four times as numerous in the Iowa region.
 - (c) Were it not for other than atmospheric conditions, the number of tree lichens would be larger in comparison with earth and rock lichens in northeastern Iowa.
 - (d) Even the Saint Peter sandstone, occurring in moist places, has more lichens in the Iowa region.
 - (e) The greater number of habitats of certain lichen species in northeastern Iowa must be included. This has been noted for *Usnea barbata* (L) Fr., var *hirta* Fr., and a comparison of the number of species found on both wood and rocks at Fayette and Minneapolis, as shown in the second table, is further evidence. Other instances could be drawn from a comparison of the lists of species for the two places.

After giving this brief summary it may be stated that the decrease in richness of lichen-flora changes to an increase somewhere between Minneapolis and Duluth, as will be brought out in a future paper on the lichens of Minnesota.

As regards other Iowa problems, the most interesting region in connection with the study here presented is that extending along the Mississippi river from the northeastern region already studied to the southern extremity of the state. The study of this area, besides the information it would furnish concerning the lichen-flora of our own state, is especially necessary to an understanding of lichen-distribution along the upper Mississippi river. The study of more western portions of Iowa will bring new problems and also throw some light on those here considered.

Below is added the lists of new and rare Iowa lichens mentioned in the first part of this paper. These with two given for locality bring the total number of species and varieties which I have collected and determined at Fayette up to 208. These additions make a total of 226 species for the state, and this number could be increased largely by thorough work in several widely separated regions within Iowa.

LIST OF SPECIES NEW TO IOWA.

Usnea barbata L. Fr., var. *ceratina* Schær. On trees, rare. Fayette.

Alectoria jubata L., var. *chalybeiformis* Ach. On an old board fence, rare. Fayette. Also on Saint Peter sandstone in Clay ton county.

Theloschistes concolor Dicks, var. *effusa* Tuck. On trees, rare. Fayette. Since publishing the first paper on Iowa lichens I have also found at Fayette a form of the species with fibrils unusually developed about the apothecia. They are frequently as long as the diameter of the apothecia!

Parmelia saxatilis L. Fr., var. *sulcata* Nyl. On trees, rare. Fayette.

Parmelia olivacea L. Ach., var. *aspidota* Ach. On trees, infrequent. Fayette.

Pannaria nigra Nyl., var. *cæsia* Nyl. On calcareous rocks, rare. Fayette.

Collema nigrescens Huds., Ach. On old logs, rare. Fayette. Frequently with pruinose apothecia.

Placodium ferrugineum Huds., Hepp. On trees, rare. Bremer and Fayette counties.

Placodium murorum Hoffm., DC. On rocks. Northwestern Iowa. Coll., Prof. B. Shimek, who sent it to me last year. It should have appeared with the lichens listed in his paper* last year, but I could not be sure that it was distinct from *P. elegans* Link, DC., without further study.

Lecanora pallida Schreb., Schær, var. *cancriformis* Tuck. On trees, rare. Fayette.

Lecanora varia Ehrh., Nyl., var. *symmicta* Ach. On old fences, infrequent. Fayette.

Lecanora cinerea L. Sommerf. On sandstone, probably common. Clayton county.

Lecanora fuscata Schrad., Th. Fr., var. *rufescens* Th. Fr. On granitic rocks, frequent. Fayette.

Lecanora priqigna Ach., Nyl., var. *clavus* Koerb. On calcareous rocks, rare. Clayton county.

Lecanora xanthophana Nyl. On granitic rocks, rare. Fayette and Bremer counties.

Rinodina sophodes Ach., Nyl., var. *telhraspis* Tuck. On sandstone, rare. Clayton county.

Conotrema urceolatum Ach., Tuck. On trees, rare, Fayette.

Biotora decipiens Ehrh., Fr. var. *dealbata* Auct. On calcareous earth, rare. Fayette.

Biotora russellii Tuck., var. *dealbata* Tuck. On calcareous rocks, rare. Fayette.

Biotora fossarum Duf., Mont. On calcareous earth, rare. Fayette.

Biotora carnulenta Tuck. On decorticated wood, rare. Fayette, and also from Black Hawk county, collected by Mr. Morton E. Peck.

Buellia myriocarpa DC., Mudd., var. *polyspora* Willey. On tree, rare. Fayette. This rare lichen was also sent to me from Decatur county by Prof. T. J. Fitzpatrick and from La Crosse, Wis., by Prof. L. H. Pammel. A larger form collected by Mr. Morton E. Peck in Black Hawk county must also be referred here for the present.

Buellia alboatra Hoffm., Th. Fr. On an elm tree, rare. Fayette.

Opegrapha quaternella Nyl. On thallus of a *Parmela*, rare. Fayette. I have not been able to compare this, but it agrees

* The Flora of the Sioux Quartzite in Iowa. Proc. Iowa Acad. Sci., vol. III, pp. 72-77.

perfectly with the description, having spores 4 in asci, 4 celled, brownish and 16-19 x 5-6 mic.

Calicium parietinum Ach. On decorticated wood, especially red cedar, probably frequent. Fayette.

Calicium quercinum Pers. On oaks, rare. Fayette.

Sphinctrina tigillaris B. and Br. On *Polyporus versicolor* L Fr., rare. Fayette. Placed here because of close relationship to the last two, though the algal cells probably are wanting in this. Perhaps better to place it in the above genus under the synonym, *Calicium polyporæum* Nyl.

Verrucaria epigæa Pers., Ach. On clay, rare. Fayette.

Pyrenula cinerella Flt., Willey. On prickly ash, frequent. Fayette.

Thelocarpon prasinellum Nyl. Old boards, frequent. Fayette and Bremer counties.

NOTES CONCERNING SOME SPECIES PREVIOUSLY REPORTED FOR IOWA.

Evernia prunastri L., Ach. I have recently found this species on old board fences at Fayette. Thus far it has not occurred elsewhere in the state, though it is very common in northern Minnesota and frequent as far south as Minneapolis. Its southern limit is doubtless reached somewhere in Iowa.

Pycine sorediata Fr. This lichen was only listed in the paper on "Lichens of Iowa" from rocks. It has since been found in fruit on trees at Fayette. It becomes more common in passing north to the British possessions, and its distribution in other parts of Iowa is especially worthy of study.

Sticta pulmonaria L., Ach. Only known thus far in Iowa along the Mississippi river in Clayton county. How far this northern lichen extends south along the river, or possibly in other parts of Iowa, is of special interest. Like the last two, I find it increasing in abundance as I go north.

Pannaris languinosa (Ach.,) Koerb. I have recently collected the sulphur colored form, common in Europe, on the Saint Peter sandstone in Clayton county and in several localities in Minnesota.

Lecanora punicea Ach. Any further occurrence of this in Iowa should be noted, because it is a southern lichen, and it finds its most northern known limit in Iowa.

Lecanora varia Ehrh., Nyl., var. *sæpincola* Fr. This rare Iowa variety was sent from Black Hawk county Coll., Morton E. Peck.

Lecanora privigna Ach., Nyl. var. *pruinosa* Auct. On calcareous rocks, frequent at Fayette. Previously reported from Johnson county.

Cladonia cariosa Ach., Spreng. This species only reported from Johnson county, is common in northern Minnesota. In Iowa it seems to be largely replaced by the more southern *C. mitrula* Tuck. Especially interesting because the southern limit of the one and the northern limit of the other may be looked for in Iowa or Minnesota.

Cladonia cornucopioides L., Fr. Collected only along the Mississippi river in Clayton county. Another species apparently following the river down from more northern regions where I find it common. Should be diligently sought further south in Iowa, especially along the river.

Biatora granulosa Ehrh., Poetsch. Found with the last, which is as far south as it is known, except in mountains. Should be sought further south, as the last.

Biatora inundata Fr. I have recently collected this lichen on trees. Previously reported from several places, but only on rocks.

Arthonia dispersa Schrad., Nyl. On trees. Black Hawk county. Coll., Morton E. Peck.

Endocarpon pusillum Hedw. var. *garoqaglii* Kph. On calcareous rocks, infrequent, Fayette. I have also collected it in Kane county, Ill., from which state it has not been previously reported.

Verrucaria fuscella Fr. On calcareous rocks. Black Hawk county. Coll., Morton E. Peck.

Verrucaria muralis Ach. On calcareous rocks. Black Hawk county. Coll., Morton E. Peck.

It is worth noting that the last two rather rare species have been collected at La Crosse, Wis., by Prof. L. H. Pammel. Also, the last was sent me by Mr. E. Bartholomew, from Rooks county, Kan.

DO THE LOWER ANIMALS REASON?

C. O. NUTTING.

For the average layman to enter into a discussion involving psychological matters is surely a rather hazardous proceeding and indicates a temerity that needs some apology.

Your speaker, although not a psychologist, has become greatly interested in the evidences of mind that have impressed themselves upon him in his study of animals, and has had his interest greatly stimulated by the perusal of the works of two writers, one of whom discusses animal psychology from the side of the naturalist, and the other from the side of the psychologist. With the latter writer I have been led into the most delightful correspondence involving a discussion of the question "Do the lower animals reason?" a question upon which I have been forced to differ from the gentleman in question.

I referred a moment ago to the difficulty involved in a psychological discussion. This difficulty is two-fold, arising first from the necessity of exact and very careful definitions of terms, and second, from the great tendency to be drawn off into a discussion of side issues, which, however alluring are not strictly pertinent to the matter in hand.

It is my purpose to discuss briefly the attitude of the two authors above mentioned, Romanes and Lloyd Morgan; to point out my objections both to the premises and conclusions of the latter, to state with all diffidence my own position in the question, and finally to cite a sufficient number of facts to justify that conclusion.

George J. Romanes, an English zoologist, whose untimely death has been a severe loss to science, has written two works on "The Intelligence of Animals," and "Mental Evolution in Animals." He has sought to establish a thoroughly consistent scheme of development of mind along evolutionary lines. The following propositions will indicate the keynote to his position.

FROM

THIRTEENTH BIENNIAL REPORT

—OF THE—

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duties of engineer, contractor, etc. Retaining walls include the methods of obtaining the resistances of various forms of walls, forces acting upon them, classes of masonry, composition and manufacture of cements, mortars, artificial stone, and kindred subjects. The course throughout is shaped to the needs of the engineer *after he leaves college*, so that he can—as most of them must do—make a living from the close of his college life, and by the aid of the knowledge obtained in his engineering course, rise rapidly in his profession. No study is put in the course because it is in some other civil engineering course, or because it would look well when printed in the course of study. But each and every study is put there and taught for the sole benefit of those most interested, viz.: the students.

As to methods of teaching, these must vary with the subject and *size of classes*. The same methods cannot be employed in a class of fifty as can with fifteen, nor with fifteen as can with five. Nor the same with students just commencing the course as with those who have nearly completed it. The equipments of the department are not excelled anywhere in the West, and we consider the course of study, *as tested by results*, to be one of the best to be found anywhere in the country. The question asked the young engineer seeking employment is, what can you do? hence the object of the instruction given is to teach the student *to do* and to depend on *his own resources* in doing. Nothing is more valuable to a student than to work out in his own way the various problems, and to find his own mistakes by comparison with his fellow student. And this is especially valuable in engineering, where one never knows in what shape a problem may present itself.

REPORT OF THE DEPARTMENT OF BOTANY.

BY L. A. PAMMEL, PROFESSOR.

I have the honor to present my first annual report as professor of botany. That you may understand how this study is taught in the college, I will briefly outline the work of this department. The freshmen begin the study of botany in the second term. In this course they are expected to become familiar with roots, stems, leaves, and such terms as are used in descriptive botany, thus leading up to the determination of our native plants.

In an agricultural college it is proper that the subject of vegetable physiology, and the diseases our crops are subject to, should receive considerable attention. With this end in view the sophomore student familiarizes himself with some of the native plants of Iowa, making a collection of seventy different species. In the laboratory the student takes up the minute anatomy of plants and vegetable physiology. He learns something about the function of roots, stems and leaves, how the plant prepares its food, and how these materials are conducted through the stem, leaf and root, where and why these materials are stored away. In the second term special attention is given to the lower forms of plant life, such as "rusts," "smuts," "molds," "mildews," and the diseases of cultivated plants that are most troublesome to the farmer and horticulturist.

In the veterinary course three terms of botany are required. In the second term of the freshman year the students become familiar with the principles upon which the subject of botany is founded. After having acquired this elementary knowledge, they are ready to take up medicinal plants. In this course it is intended to show the relationship, origin, and history of some of the medicinal plants. Some of these are also studied in the laboratory. No veterinarian can call himself up with the times, unless he has some knowledge of the various minute organisms that cause so many of our contagious diseases in man and the lower animals. It is of the utmost importance to the community that the contagious diseases of our domestic animals should be recognized by the veterinarian, to prevent the loss of human life; as such diseases as anthrax, glanders, and tuberculosis, produce fatal diseases in man as well as in our domestic animals. It is, therefore, important that veterinary students should study these low vegetable organisms. To accommodate these and other students who are interested in this subject, the Botanical department has purchased some of the apparatus for doing bacteriological work.

WEEDS.

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In a previous report, Dr. Halsted, now of New Brunswick, New Jersey, has called your attention to several troublesome weeds, and as this is a subject of considerable importance to the farmer, I shall mention a few which have come under my notice during the year. It will certainly be of great interest to the farmers of Iowa to know that the troublesome European parasite, "Clover Dodder," has made its appearance in Missouri.

A short time ago, I received from Mr. Henry Wallace, of the *Homestead*, a specimen of what he thought might be Clover Dodder. The material was carefully compared with specimens in the herbarium of the Agricultural College, and the conclusion I reached was that it could be nothing else but Clover Dodder (*Cuscuta epithymum*, L.) I republish a part of the *Homestead* article, and some more additional facts concerning this pest, that farmers may be on their guard.

Mr. Downing's letter to the *Homestead* is as follows:

"I send sample of a vine that is killing clover, not on my farm alone, but it has quite a start in this section, and all from seed shipped here last spring. I send you some that has dried up, and some green. As soon as it kills the clover (or anything else that it gets hold of) it dies and leaves the ground bare; but the ends of the vine keep on spreading among anything green. There are spots now already dead that are two or three rods across. I hope you will give information as to what it is, also how to get rid of it."

Mr. Downing's plant is without doubt Clover Dodder (*Cuscuta Trifolii* Bab, or, as it is now called, *C. epithymum*, L). The dodders belong to the Morning-glory family (*Convolvulaceae*), to which the common wild Morning-glory, or Bindweed Sweet potato belong. This order contains a good many plants which are troublesome weeds in many parts of the world.

The genus *Cuscuta* or Dodder contains a good many species, upwards of a hundred having been described by botanists. Of these, forty-four are found in America, twenty-nine of which are indigenous to the United States. Among these American dodders one is frequently found on the high bush blackberry (*rubus villosus*). The others are found on various native plants, such as smart weeds, willows, hazels, on various composites, like golden-rod, sunflowers, etc.

The dodders are leafless (excepting the small scales on the stem) herbs of reddish or yellowish color, with thread-like stems twining around the plants upon which they live. They pierce the bark with their small and short rootlets, which are called suckers, or haustoria. The seeds are small; yet there is stored sufficient nourishment in them to give the growing plants a good start. Germination takes place in the soil, the young plantlet grows sufficient in length to allow it to come in contact with the plant upon which it lives, when it immediately sends in its suckers and thus becomes established upon the plant as though it were a part of it. It is usually stated that dodders contain no chlorophyll, but recent investigations show that they contain at least a small amount, but probably not enough to enable them to make very much starch out of crude material. Ordinary green leaves contain a great deal of this chlorophyll, or green coloring matter, and, hence, are able to prepare their own food. Plants like dodders, which derive their nourishment from the host upon which they live, are said to be parasitic.

As a troublesome parasite, Clover Dodder seems to have been observed in Germany about the beginning of this century. Flax Dodder seems to have been known for a much longer period, as it is mentioned by writers as early as 1760. Flax Dodder occurs in this country, but is not troublesome. In Europe it does much damage. The South American *Cuscuta racemosa*—*Martius var. Chiliana engelmannii*—has occasioned some trouble in European alfalfa. It has also been introduced with the seed of this plant into California, where it now injures the crop to some extent.

Professor Macoun reports Clover Dodder in his catalogue of Canadian plants, published in 1884, as occurring in Ontario, and introduced with clover seed. It may possibly occur in other parts of the United States and that I have failed to see the reference.

Fortunately all these pests are not so common in this country as to materially affect our crops. Whole clover fields are destroyed by the Clover Dodder in England and on the continent. It should, therefore, not be allowed to spread in this country. The existing patch should be exterminated immediately.

• HOW TO EXTERMINATE THE WEED.

Several means suggest themselves. Cover the patch with straw and burn it with the clover. A more radical way would be to use oil of vitriol and water in the proportion of one of the oil of vitriol to three thousand of water; but this must render the soil quite unfit for use at least for a year or two. If it covers large areas clover ought to be followed by plants upon which dodder will not grow. It has been found to grow with preference on leguminous plants, showing its best development on clover vetch. The common bean is seldom affected. At times it occurs on other leguminous plants, on various weeds growing near clover patches, on some members of the carrot family (*Umbelliferae*) and on common nettle (*Urticaceae*): it produces both flowers and seeds. Haberlandt found that it would not even start on flax, sunflowers, and hemp, but can be made to grow for a short time on mangolds, common bean, and Indian corn.

It will be well, therefore, to follow clover with oats, wheat, and barley, or such other plants upon which it will not grow. Above all, we should prevent its appearance. It must be remembered that dodder seed maintains its vitality for several years in the soil, and that the seeds are distributed in several ways, first, by animals; second, by sowing clover and the like containing dodder seed. Animals eating clover containing dodder seed carry it for some distance. It has been shown that after it has passed the alimentary canal the seeds are still capable of germinating. In Europe sieves are used to separate dodder from the clover seed, as the latter is very much smaller. It seems proper in this connection to say that suspected seed should be sent to some of the experiment stations, as many seeds have a characteristic structure, and can easily be recognized by aid of the microscope.*

*A most excellent account of this parasite may be found in Sorauer, Diseases of Plants (*Pflanzenkrankheiten*) Vol. II. page 32. Also N. G. Smith, Diseases of Field and Garden Crops.

HORSE-NETTLE.

In the last biennial report Dr. Halsted reported the appearance of Horse-Nettle (*Solanum Carolinense*, L.) on the College farm. This species has certainly come to stay. The past summer it was found in several places on the farm. In Missouri and Southern Illinois it is a very troublesome pest in grain fields. The leaves and stem are prickly. The flowers resemble those of a potato; pale blue or whitish in color, while the "seeds" (berries) are yellow. The plant is a perennial, that is, living from year to year, and therefore somewhat difficult to destroy. The only effective measure of dealing with this pest is to stamp out its first appearance. This may be done by digging it up roots and all, and allowing none of the leaves to grow, as these are the organs in which the food of the plant is made.

SPINY-NIGHTSHADE.

Another very troublesome pest, and closely related to the Horse-Nettle, is the Spiny-Nightshade (*Solanum rostratum* Dunal) or thistle as it is called in some places. This weed occurs in parts of Iowa. It is to be hoped that this pest will not get a strong foothold in our loose, fertile prairie soil. The Spiny-Nightshade is a native of the Rocky Mountains, and the plains from Nebraska to Texas. It has spread eastward and southward to a considerable degree. Prof. Henry has well said, it is following up the "Potato Bug." Anyone who has traveled in Texas or parts of Kansas and Missouri knows how troublesome it is to the farmer. In these States it is well established; occurring in streets, door-yards, and fields. In pastures, cattle avoid it, thus leaving it to go to seed. Texas parties inform me that this plant scatters its seeds like our tumble weeds (*Amarantus*, *Cycloloma*, etc.). How long will it be before it becomes a serious pest in the grain and corn fields of the Mississippi valley? It has already been reported from Wisconsin, New York, and Massachusetts. The Wisconsin plants which I collected were only strays, accidentally introduced by seed.

PRICKLY LETTUCE AND FIELD SOW-THISTLE.

From time to time I have made observations on several other introduced plants. I was therefore much interested in a little patch of Prickly Lettuce (*Lactuca Scariola*, L.) occurring on the College grounds. Dr. Halsted informs me that he first observed it several years ago near some rubbish on the College farm. I also noticed some in the streets of Ames and Des Moines. The spreading of this weed is rather interesting. In Dr. Gray's Synoptical Flora of North America it is recorded as "spreading near towns and habitations in the Atlantic States." It seems that Mr. Eggert collected it as early as 1877 near St. Louis. Mr. David F. Day found it at Mukwanago, forty miles west of Milwaukee, in 1880 (Bot. Gazette, page 159. See also page 139 for other localities). In the fall of 1883 it was quite common at Madison, Wisconsin, and in 1885 it was plentiful in a good many of the vacant lots in North Chicago. In the summer of 1887, I found it near LaCrosse, Wisconsin, in Vernon county, growing on a manure heap only a few yards from a nursery. There can be little question that it was introduced in some way by the nursery man, as much of his stock was purchased

in the East. Recently I also noticed it in Northern Texas. In Missouri it is common in the streets of cities, along railroads, and even growing in woods.

The field Sow-Thistle (*Sonchus* ^a*Arvensis*, L.), which in one of our adjoining States, Wisconsin, has been recognized in the weed law, is found in considerable quantity along one of the great trunk lines entering Chicago. This is a pest somewhat to be dreaded if it should appear in Iowa, as it is a perennial and is much harder to stamp out than the common Sow-Thistle (*Sonchus oleraceus*, L.) In Chicago and near St. Louis I have seen one of the Pig-weeds (*Atriplex patula*, L. var. *hastata*) in large numbers. Mr. Hitchcock has recently reported it from Iowa City.

A great many more troublesome weeds could be added to this list, especially such as are found in the streets, and along public highways; but those may be considered at some other time. It would be a great aid to the Botanical Department if the farmers of the State would send in weeds of various kinds, giving their common names, and stating how troublesome they are.

PLANT DISEASES.

During the past summer some of the cherry and pear trees in the orchard were seriously affected with fungous parasites. These diseases were especially troublesome in the new orchard set out by Captain Speer, of the experiment station, and some of the seedlings in the nursery of the horticultural department.

These diseases were chosen as thesis work by some of the special students in the laboratory, and as some of the facts may be of interest I give abstracts of their papers below.* The first paper was prepared by J. A. Kelsey.

LEAF BLIGHT AND CRACKING OF THE PEAR. (*Entomosporium maculatum*, L.)

That pear trees were attacked by some destructive agent other than the common fire-blight has been a well known fact to botanists of Europe and America for almost a century. The loss from this disease must amount to a great many thousand dollars annually. Every year large numbers of seedlings are completely destroyed by this fungus, while older trees are frequently defoliated by the 4th of July. This not only prevents the development of the fruit during the same year, but often destroys the prospect of a crop the succeeding year, since it not unfrequently happens that a second set of leaves and blossoms is put forth the same autumn. The value of the fruit is greatly deteriorated if not completely destroyed by the unsightly appearance or cracking which the malady produces. The bark is also attacked, so that all parts of the tree except the roots are subject to more or less injury. The disease makes itself manifest in early spring. Many of the leaves instead of retaining a uniformly green appearance are dotted with small carmine-red spots, first appearing on the upper and later on the lower surface of the leaf. The carmine-red color soon changes to a dull brown. During the early stages the fungus remains hidden beneath the cuticle of the leaf, but later it is ruptured and exposes to the surface a countless number

*In these abstracts it is not intended to give references to the valuable papers which have been published on the subjects treated, but rather to some facts about a few common and troublesome diseases.

of spores. On the leaves of a few of the Russian pears on the College grounds, particularly on those of the Bessmanka pear, I found this eruption had taken place without producing the brown spot. I believe that most of the Russian varieties, on account of having thicker leaves than those originating in southwestern Europe, will prove to be much less affected by this disease.

Other species of the genus *Pyrus* are also infested by a fungus, that to all appearances is the same thing. Many of the quinces brought into our market this fall from the East were almost completely covered with this destructive parasite. This fungus seems to be identical with that on the pear. Some apple seedlings on the ground, growing ^{direct} pear seedlings, were found to be quite seriously attacked by it. ^Λ

The fungus is carried over winter not only by the winter spores which are produced late in the fall and winter, but also by summer spores, if they succeed in finding lodgement in the buds of next year's growth. Concerning its prevention and destruction nothing very definite can as yet be said, since practical experiments have only been begun.

A number of the leading nurserymen of this country claim that seedlings are much less liable to be attacked if planted in a new soil, or at least soil which has not been occupied by trees.

Barry recommends that the ground be prepared by sub-soil plowing to a depth of two feet the preceding autumn, and also by a liberal application of a compost of lime and leaf mold to be well plowed the following spring, the object being to secure a vigorous growth as early as possible in the season, in order that the young trees may be better able to stand attack. All diseased leaves should be raked up as soon as they fall, and burned.

Prof. Galloway has been highly successful during the past season in preventing the disease, by the application of a mixture of copper, lime and water, in the following proportions: Copper sulphate, six pounds; lime, six pounds; water, twenty-two gallons. A block of five thousand pear trees, treated at intervals of ten days, beginning June 5th, were reported August 11th as being nearly free from the fungus. At the same time another block of young pear trees adjoining these were very severely injured by the fungus.

THE SEED COATS OF CROTALARIA SAGITTALIS AND ASTRAGALUS MOLLISSIMUS.

The subject of Crotalism and Loco-poisoning has attracted considerable attention in late years. It is sufficiently important to demand a short place in this report. One of the veterinary students, Mr. Ashworth, has studied the seed coats of *Crotalaria sagittalis* and *Astragalus mollissimus* for the purpose of obtaining some characters to aid in the diagnosis of these diseases, especially after parts of the seed have passed through the alimentary canal.

Crotalaria sagittalis, L., or Rattle-box, is an annual common in the western part of the State, along the Missouri river. It has a rather wide distribution in the United States, occurring in sandy soil from Massachusetts to Illinois, Missouri, Iowa, Nebraska, and south to Texas. *Astragalus mollissimus*, one of the Loco plants, is a perennial and occurs on high sandy soil, distributed throughout the plains and table-lands of Colorado, New Mexico, Utah, Wyoming, Texas, Indian Territory and Arkansas. In *Astragalus*

mollissimus, the outer or palisade layer, is thick and dark, the cells are elongated, like the palisade cells in leaves. They are marked in the upper one third by a light line. The cell cavity is larger at the base, and gradually tapers upwards until it is quite narrow. The palisade cells show four rather distinct folds, the middle one refracting light strongly; the second layer is composed of thick walled cells; the cavity resembles a dumb-bell in outline. The third layer is composed of several rows of thin walled—really differentiated—cells, in two parts; the cells of the lower part of the third layer are more irregular than the first. The fourth layer is made up of four rows of cells, which are elliptical in outline, with a small cell-cavity. The fifth layer is composed of elongated cells similar to those of the fourth. The cells of the sixth layer are very small; some of these occasionally contain an oil globule. The testa of *Crotalaria sagittalis* is made up of four differentiated layers. The outer is fully one third larger than in *Astragalus mollissimus*. The light line runs horizontally one fourth the way down from the cuticle. The remaining layers are much like those of *Astragalus*, excepting the third, which contains three rows of thin walled cells. The aleurone layer and the starch cells of the embryo join the inner layer of seed coats.

✓ P6
BOTANICAL GARDEN
BY N. L. BRITTON
CONTRIBUTIONS

FROM THE

Botanical Department

Iowa College of Agriculture and Mechanic Arts.

No. 1.

1. NOTES ON THE FLORA OF WESTERN IOWA.
2. SOME NOTES ON CHROMOGENIC BACTERIA.
3. FUNGUS DISEASES OF PLANTS AT AMES, IOWA, 1895.
4. SOME ANATOMICAL STUDIES OF THE LEAVES OF SPOROBOLUS AND *
PANICUM.

(From Proceedings Iowa Academy of Sciences. Vol. III.)

DES MOINES:
F. R. CONAWAY, STATE PRINTER.
1896.

NOTES ON THE FLORA OF WESTERN IOWA.

BY L. H. PAMMEL.

The flora of the loess in western Iowa is unique, in many respects. While it may be said that many parts of the state have a typical prairie flora, certain species being common from Texas to British America, east to Wisconsin, Illinois and Indiana, only occasionally do we find plants of the great plains in our own state. Western species are somewhat unequally distributed in our state; they occupy a larger area in north-western Iowa than in southern and western. In northern Iowa a few prominent types appear, as in Emmet county. Of these I may mention *Bouteloua oligostachya*, *Agropyrum caninum*, *A. caesium*, *Grindelia squarrosa*, *Helianthus Maximiliani*. The latter is not, however, a typical western plant, though introduced in central Iowa. It crosses our western border on the loess and extends south to Texas.

The loess of western Iowa is peculiar so far as the flora is concerned, nothing like it in Iowa. A number of American writers have written upon the peculiarities of its plant life. B. F. Bush¹ has given us a complete catalogue of the flora of northwestern Missouri.

A. S. Hitchcock² has reported a few of the plants occurring near Sioux City, and in general touches on the flora of western Iowa.

J. W. McGee considers the loess flora of northeastern Iowa. The two regions are however not similar from a botanical standpoint. It may be well to speak of the formation in this

¹Notes on the mound flora of Atchison county, Missouri. Reprint, Sixth Ann. Rep. Missouri Botanical Garden, 1895, pp. 121-134.

²Notes on the flora of Iowa, Bot. Gazette Vol. XIV, p. 127

connection. McGee³ says: "The macroscopic characters of the deposit are moderately constant:

"(1) It is commonly fine, homogeneous, free from pebbles or other adventitious matter, and either massive or so obscurely stratified that the bedding plains are inconspicuous; (2) it commonly contains unoxidized carbonate of lime in such quantity as to effervesce freely under acids; (3) it frequently contains nodules and minute ramifying tubules of carbonate of lime; (4) in many regions it contains abundant shells of land and fresh water mollusca; (5) is commonly so friable that it may be removed with a spade or impressed with the fingers, yet it resists weathering and erosion in a remarkable manner, standing for years in vertical faces and developing steeper erosion slopes than any other formation except the more obdurate elastic or crystalline rocks." McGee also states that it is a fallacy to regard the loess as identical in composition or that it is identical in genesis or even in age. As to its origin, Chamberlin and Salisbury find that in western Wisconsin and contiguous parts of Illinois and Iowa its composition varies in different localities with that of the associated drift and that both composition and distribution point to glacial silt as the parent formation of the loess in the upper Mississippi valley. Prof. McGee in speaking of the plants of the loess in northeastern Iowa lays stress on the prevalence of hard wood forests in the area. That the timber belt is confined to this area. The chief trees of this region from my observations are, oaks a half dozen species (*Quercus macrocarpa*, *Q. coccinea*, *Q. tinctoria*, *Q. rubra*, *Q. alba*, *Q. Muhlenbergii*, *Q. bicolor*). The *Q. bicolor* is however, a swamp species. The latter and *Q. Muhlenbergii* are southern species that have extended northward along the Mississippi. The butternut (*Juglans cinerea*) of the uplands and walnut (*Juglans nigra*) of the bottoms, the former is northern and the latter southern. The genus *Prunus* is represented by three species (*Prunus Americana*, *P. serotina*, and *P. Virginiana*). The crab-apple (*Pyrus coronaria*) is found everywhere in thickets. The white birch (*Betula papyracea*) is a rare tree, the river birch (*Betula nigra*) is abundant along the streams; other trees along streams are honey locust (*Gleditschia triacanthos*); sycamore (*Platanus occidentalis*), Kentucky coffee tree (*Gymnocladus Canadensis*), all southern representatives. The elms are represented

³The Pleistocene history of northeastern Iowa, Eleventh Ann. Rep. U. S. Geological Survey, p. 291.

by three species (*Ulmus Americana*, *U. racemosa* and *U. fulva*). Only one, the slippery elm, is abundant on the loess formation, though *Ulmus Americana* is less restricted to low bottoms than *U. racemosa*. Of the maples the sugar maple (*Acer saccharinum*) is common on the loess, while the soft maple (*Acer dasycarpum*) is exclusively a lowland species, so is box elder (*Negundo-aceroides*). The mountain maple (*Acer spicatum*) occurs on the loess. *Tilia Americana* is common on the loess formation. Three cone bearing trees occur in northeastern Iowa (*Abies balsamea*, *Pinus Strobus* and *Juniperus Virginiana*), but they occur on other than loess soil. Of the ashes there are several species the *Fraxinus viridis* delights in low bottoms. The *F. Americana* occurs on higher soil.

I cannot, in this connection, enumerate the shrubs that occur, but they are numerous and may occur in thickets in both loess and bottoms. Comparing the plants found in northeastern Iowa with those about La Crosse, Wis., where my early botanical work was done, I may say that most of the species occur and that the woody plants are more numerous. Some of the southern species, however, fail to appear, but in places northern forms occur. The density of the timber increases from the Mississippi east. In the drainage basin of the Kickapoo Valley the finest timber in western Wisconsin occurs. Nowhere have I seen such beautiful specimens of *Acer saccharinum*, *Tilia Americana* and *Quercus macrocarpa*. This, too, is outside of the loess region. In southwestern Minnesota, the statement of McGee that there is a significant relation between the loess sheeting and forest covering is very apparent.

The most significant fact appearing to one who has made a study of the loess flora of western Iowa is the absence of trees, except an occasional cottonwood, on the peculiar mounds that occur in parallel ridges along the Missouri river. These peculiar hills rise abruptly from the rich, fertile Missouri bottom and somewhat resemble the low foot hills of the Rocky mountains. They are from 100 to 200 feet high. From a distance they look bare, but a day spent in this region will show that the hills are full of botanical interest. I have made four botanical trips at different times along the Missouri. On the whole there is very little variation in the flora of Iowa. If we leave out of consideration a number of most interesting plants found in Winneshiek county by Mr. Holway and a few peculiar southern plants found by Mr. Ferd Reppert, near the city of

Muscatine, the only radical difference shown in our flora is that occurring along the Missouri. About twenty-five western and northwestern species occur and, according to the list of Mr. Bush, nearly the same species occur from Sioux City, Iowa, to St. Joseph, Mo. The region is not entirely devoid of trees, in its northern portion, between the steep mounds a variety of bur oak (*Quercus macrocarpa* var. *olivaeformis*), Slippery elm (*Ulmus fulva*), Cottonwood (*Populus monilifera*), Plum (*Prunus Americana*), Basswood (*Tilia Americana*), box elder (*Negundo aceroides*), occur. Several shrubs also occur; Grape (*Vitis riparia*), climbing bittersweet (*Celastrus scandens*), wahoo (*Euonymus atropurpureus*). South, the timber area is more extensive, as at Council Bluffs and Missouri Valley. At Glenwood and Logan there are fine specimens of *Quercus rubra*, *Tilia Americana* and *Ulmus fulva*. They are abundant from one-half to two miles from the hills. The trees on the loess about Turin and Sioux City are broad and spreading.

Of the peculiar herbaceous plants, I shall content myself by giving a list. The beautiful Spanish bayonet (*Yucca angustifolia*) so abundant everywhere in the west. The *Aplopappus spinulosus* forms dense mats on the tops of the mounds. *Grindelia squarrosa*, now naturalized in other parts of Iowa. *Liatris punctata*, *Euphorbia marginata*, *E. heterophylla*, a beautiful blue-flowered lettuce (*Lactuca pulchella*), *Gaura coccinea*, so abundant everywhere in Nebraska and in the Rocky mountain region. *Oxybaphus angustifolia*, *Helianthus Maximiliani*, *Lygodesmia juncea*, an abundant plant of the plains now exerting itself with great force in the cornfields of northwestern Iowa. The beautiful *Mentzelia ornata* is confined to Cedar Bluffs along the Big Sioux a few miles north of Sioux City. *Cleome integrifolia*, the celebrated Rocky Mountain bee plant. Two species of *Dalea* (*D. alopecuroides* and *D. laxiflora*) the Loco weed (*Oxytropis Lamberti*) and *Astragalus lotiflorus*, var. *brachypus*. Professor Hitchcock records *Stipa comata*, which belongs chiefly to the Rocky Mountain region and rarely found in eastern Nebraska. *Shepherdia argentea* occurs along the Missouri near Sioux City undoubtedly a waif from the northwest.

I may also add a gamma grass peculiar to the west, most common species of Nebraska (*Bouteloua oligostachya*) Buffalo grass (*Buchloe dactyloides*) from Lyon county. The most abundant grasses on the hills are *Andropogon scoparius*, *Bouteloua racemosa*, quite common in many parts of Iowa. *Muhlenbergia*

soboliferia, *Ammophila longifolia* and *Sporobolus Hookeri*, *S. brevifolius* and an unnamed western species which has heretofore been referred to *S. cuspidatus*. I may also remark that a peculiar thistle occurs, the *Cnicus altissimus*, var. *fililpendulus*.

Why is it that these peculiar hills, not more than a few hundred feet wide, should have such a local western flora? The soil is retentive of moisture, it dries out quickly and the roots easily penetrate the soil to draw on the contained moisture below. This certainly cannot be the reason, since the loess extends along the river courses in the interior. Some of these plants, since the cultivation of the soil, have shown some tendency to spread, as in *Euphorbia marginata*, *Lygodesmia juncea*, *Grindelia squarrosa*, which are tramping eastward to menace the farmer.

Were the seeds of some of these plants brought to Iowa with the buffalo, as has been suggested for buffalo grass? Some of the plants are disseminated by the wind, and in others the water can by a purely mechanical means bring them to the base of the mound. With the more woody country of southeastern Iowa there seems to have been but little chance for these plants to spread beyond the bluffs. In northwestern Iowa some of these plants, like *Helianthus Maximiliani*, are not uncommon, which shows that the woody area of southwestern Iowa is in part a barrier against a further eastern extension. But why did the plants not extend beyond the very narrow limits, as the forest area does not encroach directly on the loess mounds? I am at a loss to explain this most peculiar distribution.

In the list appended I enumerate the most striking plants. The writer is under obligations to Mrs. Rose Schuster Taylor and Miss Bandusia Wakefield, of Sioux City, for favors rendered; also Mr. E. D. Ball, of Little Rock; Mr. W. Newell and J. Jensen, of Hull, and E. G. Preston, of Battle Creek, for specimens, to Dr. Millspaugh for naming the Euphorbias.

My own collections were made at various times near Sioux City, Hawarden, Onawa, Turin, Missouri Valley, Council Bluffs and Logan. The list could have been extended and localities added, but college material is not readily accessible at this time of the year. Miss Wakefield's list is based on colored sketches in her possession. I have abbreviated all specimens credited to her as (B. W.), and those collected by myself as (L. H. P.). I have followed Gray's Manual in arrangement of

orders, genera and species. It will not be necessary to comment on the value of this, since it is the standard work in the schools and colleges of Iowa.

RANUNCULACEÆ.

Clematis Virginiana L.

Sioux City, in woody ravines (B. W.).

Anemone patens L. var. *Nuttalliana* Gray.

Sioux City, prairies, abundant (B. W.).

Anemone cylindrica A. Gray.

Hull (W. Newell); Little Rock, dry grounds (Herb. C. R. Ball).

A. Virginiana L.

Sioux City (B. W.).

A. Canadensis L.

Sioux City, low grounds, bottoms (B. W.); Little Rock (Herb. C. R. Ball).

Thalictrum purpurascens L.

Sioux City, low grounds and prairies (B. W.); Hull (W. Newell); Little Rock (C. R. Ball).

Ranunculus Cymbalaria Pursh.

Hull (W. Newell); Little Rock (Herb. C. R. Ball).

R. multifidus Parsh.

Little Rock, in water (Herb. C. R. Ball).

R. abortivus L.

Sioux City (B. W.).

R. septentrionalis Poir.

Cherokee (B. W.).

Caltha palustris L.

Sioux City, not common, low marshes (B. W.).

Aquilegia Canadensis L.

Sioux City, abundant in wooded ravines (B. W.).

Delphinium azureum Michx.

Sioux City prairies (B. W.); Little Rock (C. R. Ball); flowers of Iowa specimens are greenish white.

Actaea spicata L. var. *rubra*, Ait.

Sioux City woods, frequent (B. W.).

MENISPERMACEÆ.

Menispermum Canadense L.

Sioux City, common, in wooded ravines (B. W. L. H. P.).

BERBERIDACEÆ.

Caulophyllum thalictroides, Michx.

Sioux City woods, frequent (B. W.).

NYMPHAEACEÆ.

Nelumbo lutea Pers.

Onawa (B. W.).

Nymphaea reniformis D. C.

Lyon Co. (B. W.).

Nuphar advena Ait.

Sioux township Lyon Co., northwest corner of state (B. W.).

PAPAVERACEÆ.

Sanguinaria Canadensis L.

Sioux City. Wooded ravines (B. W.).

FUMARIACEÆ.

Dicentra cucullaria D. C.

Sioux City, abundant in wooded ravines in vegetable mould.

Corydalis aurea Willd.

Sioux City, borders of woods, common (B. W.).

CRUCIFERÆ

Lepidium Virginicum L.

Sioux City, waste places abundant (B. W.)

L. apetalum Willd.

Not represented by specimens though abundant on mounds, fields and pastures in western Iowa (L. H. P.).

Capsella Bursa-pastoris Medic.

Sioux City (B. W.).

Brassica nigra Koch.

Sioux City (B. W.).

B. Sinapis Boiss.

Sioux City (B. W.).

Sisymbrium officinale Scop.

Sioux City (B. W.); Battle Creek (E. G. Preston); Little Rock (C. R. Ball); roadside weed.

S. canescens, Nutt.

Sioux City (B. W.).

Erysimum cheiranthoides L.

Sioux City, rich soil, river bottoms (B. W.).

Nasturtium terrestre R. Br.

Sioux City (B. W.) low grounds; borders of ponds and streams.

Cardamine hirsuta L.

Little Rock (C. R. Ball).

Arabis, hirsuta Scop.

Sioux City (B. W.).

CAPPARIDACEÆ.

Polanisia graveolens, Raf.

Sioux City (B. W.);

Cleome integrifolia Torr. & Gray.

Onawa, Missouri Valley streets and loess mounds (L. H. P.) common (B. W.); common in the city (L. H. Pam-
mel); from observation.

VIOLACEÆ.

Viola pedatifida Don.

Sioux City, prairies frequent (B. W.).

A. palmata L. var. *cucullata* Gray.

Sioux City, common in woods (B. W.).

Viola Canadensis L.

Sioux City, wooded ravines between loess mounds east of
Sioux City (B. W.). Apparently out of its range.

CARYOPHYLLACEÆ.

Saponaria officinalis L.

Sioux City, escaped from cultivation (B. W.).

Silene stellata Ait.

Sioux City, woods common (B. W.); Hawarden, Council
Bluffs, common borders of woods (L. H. P.).

Lychnis Githago Lam.

Sioux City, an introduced weed (B. W.); Rock Valley
(Jensen & Newell); Little Rock (Herb. C. R. Ball).

Stellaria longifolia Muhl.

Sioux City (B. W.); Little Rock (C. R. Ball).

PORTULACACEÆ.

Portulaca oleracea L.

Sioux City (B. W.); an abundant weed everywhere in west-
ern Iowa.

Talinum teretifolium Pursh.

Sioux City (B. W.).

Claytonia Virginica L.

Smithland, in woods (B. W.).

MALVACEÆ.

Malva rotundifolia L.

Turin, Onawa, weed in streets and along roadsides (L. H.
P.); Sioux City (B. W.); Little Rock (C. R. Ball).

Abutilon Avicennæ Gaertn.

Onawa, streets and waste places, abundant (L. H. P.); Sioux
City (B. W.).

TILIACEÆ.

Tilia Americana L.

Sioux City, Turin, Missouri Valley, Council Bluffs, ravines between loess mounds (L. H. P.); back of mounds an abundant tree.

LINACEÆ.

Linum sulcatum Riddell.

Sioux City, top and sides of loess mounds, prairies (L. H. P.), (B. W.); Little Rock (C. R. Ball).

L. rigidum Pursh.

Sioux City, loess mounds, capsules and old stems only found by myself (L. H. P.); Hamburg (Hitchcock, Bot. Gazette, XIV, 128).

GERANIACEÆ.

Oxalis violaceæ L.

Sioux City, in woods frequent (B. W.); Little Rock (Herb. C. R. Ball).

O. corniculata L. var. *stricta* Sav.

Turin, Onawa, in woods and fields abundant (L. H. P.); Sioux City (B. W.).

Impatiens pallida Nutt.

Sioux City, in woods along streams (B. W.).

I. Fulva Nutt.

Sioux City, in woods along streams (B. W.).

RUTACEÆ.

Xanthoxylum Americanum Nutt.

Sioux City, common in woods (B. W.); South Dakota, opposite Hawarden, in valleys between hills (L. H. P.).

CELASTRACEÆ.

Celastrus scandens L.

Sioux City, common in woods between loess mounds (B. W. and L. H. P.).

Euonymus atropurpureus Jacq.

Sioux City, in woods between loess mounds (B. W., L. H. P.); South Dakota, opposite Hawarden (L. H. P.).

RHAMNACEÆ.

Rhamnus lanceolata Pursh.

Logan, low hills in woods (L. H. P.), Sioux City, level woodland near the Big Sioux river (B. W.).

Ceanothus Americanus L.

Turin, Missouri Valley, loess hills in open, grassy places
(L. H. P.); Sioux City (B. W.).

C. ovatus Desf.

Council Bluffs, sides and tops of loess mounds (L. H. P.).

VITACEÆ.

Vitis riparia Michx.

Sioux City, valleys between loess mounds in woods (L. H. P.);
South Dakota, opposite Hawarden (L. H. P.).

Ampelopsis quinquefolia Michx.

Sioux City, in woods; common (B. W.).

SAPINDACEÆ.

Acer dasycarpum Ehrh.

Sioux City, Hawarden; abundant in alluvial bottoms, along
Big Sioux and Missouri rivers (L. H. P.).

Negundo aceroides Moench.

Sioux City, frequent along streams (B. W.).

Staphylea trifolia L.

Sioux City, in valleys between loess hills (B. W.).

ANACARDIACEÆ.

Rhus glabra L.

Sioux City, common border of loess mounds (B. W.) South
Dakota, opposite Hawarden (L. H. P.).

R. Toxicodendron L.

Sioux City, common in valleys between loess mounds
(B. W.).

POLYGALACEÆ.

Polygala verticillata L.

Sioux City, loess mounds (L. H. P. and B. W.).

LEGUMINOSÆ.

Baptisia leucantha Torr. and Gray.

Battle Creek, low places, prairie (E. G. Preston), Cherokee
(B. W.).

Crotalaria sagittalis L.

Sioux City, bank of Big Sioux river, Cedar Bluffs (B. W.).

Trifolium pratense L.

Sioux City (B. W.).

T. stoloniferum Muhl.

Sioux City (B. W.).

T. repens L.

Sioux City (B. W.).

Melilotus officinalis Willd.

Sioux City (B. W.), Council Bluffs (L. H. P.).

M. alba Lam.

Sioux City, along railroads, in streets, fields and roadsides, abundant (L. H. P. and B. W.), Onawa, Turin (L. H. P.).

Medicago sativa L.

Sioux City, in streets; not common, Council Bluffs (L. H. P.).

Hosackia Purshiana Benth.

Sioux City, loess mounds (B. W.).

Psoralea argophylla Pursh.

Sioux City, abundant on loess mounds (B. W.), high prairies and low, rich soil; Little Rock (Herb. C. R. Ball), Hull (W. Newell). A typical prairie plant, common throughout Iowa on dry hills.

Amorpha canescens L.

Sioux City, bottoms (B. W.), Missouri Valley (L. H. P.).

Dalea alopecuroides Nutt.

Near Lake Okoboji (B. W.), Missouri Valley, Sioux City, loess mounds; abundant; Hawarden, in open grounds (L. H. P.), Hamburg (Hitchcock Bot. Gazette, XIV, 128).

D. laxiflora Pursh.

Sioux City (B. W.). The species is abundant on the loess mounds about Sioux City, Missouri Valley and Turin, producing a long and thick root. Hamburg (Hitchcock, Bot. Gazette, XIV, 128).

Petalostemon violaceus Michx.

Sioux City abundant on loess hills (B. W., L. H. P.); Hull (W. Newell); South Dakota opposite Hawarden dry hills (L. H. P.); Logan (L. H. P.); Battle Creek (E. G. Preston); Little Rock (C. R. Ball); Council Bluffs dry hills (L. H. P.); Missouri Valley, Turin, loess hills (L. H. P.). On loess mounds, usually with shorter heads than commonly found on prairies.

P. candidus Michx.

Sioux City, hills loess abundant; L. H. P. South Dakota opposite Hawarden (L. H. P.); Hull (W. Newell); Battle Creek (E. G. Preston); Little Rock (Herb. C. R. Ball); Council Bluffs, Turin, Missouri Valley, on loess mounds, shorter heads and smaller plants than commonly found on prairies.

Robinia Pseudacacia L.

Sioux City, an escape from cultivation (B. W.).

Astragalus caryocarpus Ker.

Sioux City (B. W.).

A. Canadensis L.

Sioux City (B. W.).

A. lotifloris Hook var. *brachypus* Gray.

Hamburg, Hitchcock, Bot. Gazette XIV, 128.

Oxytropis Lamberti Pursh.

Sioux City (B. W.). Specimens in fruit were found near Turin and Missouri Valley on loess mounds (L. H. P.). Produces a perennial root several feet in length, frequently exposed where soil has washed away. Miss Wakefield finds the form with violet colored flowers more common than the white. Hamburg (Hitchcock, Bot. Gazette, XIV, 128).

Glycyrrhiza lepidota Nutt.

Sioux City (B. W.); Turin, Missouri Valley, along railroads, and border of hills common, Logan, Council Bluffs (L. H. P.). Hull (W. Newell); Little Rock (C. R. Ball).

Desmodium Canadense D. C.

Hull (W. Newell).

D. canescens D. C.

Sioux City, bottom (L. H. P.).

Apios tuberosa Moench.

Smithland, low grounds (B. W.).

Strophostyles angulosa Ell.

South Dakota, opposite Hawarden, flood plain of Big Sioux river (L. H. P.); Sioux City (B. W.).

Amphicarpaea monoica Nutt.

Sioux City (B. W.).

Cassia Chamæcrista L.

Missouri Valley, loess hills abundant (L. H. P.); Sioux City (B. W. and L. H. P.); South Dakota, opposite Hawarden (L. H. P.); Battle Creek (E. G. Preston).

Gymnocladus Canadensis Lam.

Sioux City (B. W.), abundant at the mouth of the Big Sioux river, in alluvial soil, base of hills (L. H. P.).

Gleditschia triacanthos L.

Sioux City, abundant along the river (B. W.).

Desmanthus brachylobus Benth.

Spirit Lake (B. W.).

ROSACEÆ.

Prunus Americana Marshall.

Council Bluffs, loess in valleys between mounds. South Dakota, opposite Hawarden forming thickets at the base of hills (L. H. P.), Sioux City (B. W.) the species forms dense thickets in western Iowa, fruit small.

P. Virginiana L.

Logan, in valleys between hills. Sioux City (B. W.); the species occurs in thickets mostly small shrubs.

Rubus strigosus Michx.

Sioux City, rare (B. W.).

R. occidentalis L.

Sioux City, not common (B. W.).

Geum album Gmelin.

Logan, in woods (L. H. P.); Sioux City (B. W.).

Fragaria Virginiana Mill. var. *Illinoensis* Gray.

Sioux City (B. W.).

Potentilla arguta Pursh.

Hull (W. Newell); Battle Creek, (E. G. Preston); Little Rock, (Herb. C. R. Ball); Sioux City (B. W.). The species is frequent in dry places in western Iowa, loess mounds.

P. Norvegica L.

Hull (W. Newell); Little Rock (C. R. Ball); Rock Valley, (J. F. Jensen and W. Newell); Sioux City (B. W.).

Var. *millelegrana* Watson.

Sioux City (B. W.).

Rosa Arkansana Porter.

Hull (M. Newell).

SAXIFRAGACEÆ.

Heuchera hispida Pursh.

Sioux City (B. W.).

Ribes gracile Michx.

Sioux City, in woods (B. W.) Council Bluffs, loess in woods (L. H. P.).

R. floridum L'Her.

Sioux City, in woods (L. H. P.); South Dakota, opposite Hawarden in woods, valleys and between hills.

CRASSULACEÆ.

Penthorum sedoides L.

Hull (W. Newell); Sioux City (B. W.).

ONAGRACEÆ.

Oenothera biennis L.

Hull (W. Newell); Battle Creek (E. G. Preston); Little Rock (C. R. Ball); Council Bluffs (L. H. P.). A weed in streets and waste places, and fields abundant throughout western Iowa.

O. serrulata Nutt.

Sioux City (B. W.); Battle Creek (E. G. Preston); Little Rock (C. R. Ball); Hull (W. Newell). Praries and loess mounds abundant.

Gaura parviflora Dougl.

Sioux City, base of mounds (B. W.); Missouri Valley (L. H. P.). It is spreading eastward, occurring in meadows and fields.

G. coccinea Nutt.

Sioux City (B. W.) Missouri Valley, Turin top of loess mounds, common (L. H. P.); Hamburg (Hitchcock, Bot. Gazette XIV, 128).

LOASACEÆ.

Mentzelia ornata Torr. & Gray.

Sioux City on sandy and rocky bluffs along the Big Sioux river, Cedar Bluffs, abundant in that locality (B. W.).

CUCURBITACEÆ.

Echinocystis lobata Torr & Gray.

Turin, low ground along streams (L. H. P.).

CATACEÆ.

Opuntia Rafinesquii Englem.

Lyon county (B. W.).

UMBELLIFERÆ.

Heracleum lanatum Michx.

Sioux City (B. W.).

Pastinaca sativa L.

A roadside weed. Council Bluffs, Sioux City (L. H. P.).

Cryptotaenia Canadensis D. C.

Sioux City (B. W.).

Zizia aurea Koch.

Sioux City (B. W.).

Cicuta maculata L.

South Dakota opposite Hawarden (L. H. P.); Sioux City (B. W.)

Osmorrhiza brevistylis D. C.

Sioux City (B. W.).

Eryngium yuccaefolium Michx.

Cherokee (B. W.).

CAPRIFOLIACEÆ.

Triosteum perfoliatum L.

Cherokee Co., Sioux City (B. W.)

Sambucus Canadensis L.

Sioux City (B. W.).

Symphoricarpos occidentalis Hook.

Sioux City, base of mounds; abundant (L. H. P. and B. W.); South Dakota, opposite Hawarden (L. H. P.); Battle Creek (E. G. Preston); Rock Valley (W. Newell and J. F. Jensen); Little Rock (C. R. Ball); Council Bluffs, Missouri Valley, Turin, base of loess mounds; abundant (L. H. P.).

RUBIACEÆ.

Houstonia angustifolia Michx.

Logan, hills; Council Bluffs, Missouri Valley, loess mounds (L. H. P.); Smithland (B. W.), common everywhere on the hills.

Galium Aparine L.

Sioux City (B. W.).

COMPOSITÆ.

Vernonia fasciculata Michx.

Hawarden, Missouri Valley, Turin, low grounds (L. H. P.); Sioux City (B. W.).

V. noveboracensis Willd.

Missouri Valley, Council Bluffs, loess mounds near base (L. H. P.).

Eupatorium purpureum L.

Sioux City (B. W.).

E. serotinum Michx.

Sioux City, Big Sioux bottom; not common (L. H. P.).

E. perfoliatum L.

Missouri Valley, low grounds (L. H. P.), Sioux City (B. W.).

E. ageratoides L.

Sioux City (B. W.); Onawa, in woods and low grounds (L. H. P.).

Kuhnia eupatorioides L.

Missouri Valley, Turin, loess mounds; Sioux City, loess mounds (B. W. and L. H. P.); Alton, prairies; South Dakota, opposite Hawarden (L. H. P.).

Liatris punctata Hook.

Missouri Valley, loess mounds (L. H. P.); Sioux City (B. W., L. H. P.); Hitchcock, South Dakota, opposite Hawarden, hills (L. H. P.).

L. scariosa Willd.

Alton, prairies, South Dakota, opposite Hawarden (L. H. P.).

Grindelia squarrosa Dunal.

Smithland (J. M. Wrapp), Sioux City, Hawarden, alluvial plain, Big Sioux river, abundant (L. H. P.); Battle Creek (E. G. Preston); Little Rock (Herb. C. R. Ball). Sioux City (Hitchcock, Bot. Gazette, XIV, 128).

Aplopappus spinulosus D. C.

Missouri Valley, Turin, Sioux City, tops of loess mounds, found in dense patches (L. H. P., B. W., Hitchcock, Bot. Gazette, XIV, 128).

Solidago speciosa Nutt.

Turin low grounds, border of woods (L. H. P.); Sioux City, base of hills (B. W.).

S. Missouriensis Nutt.

Turin, Missouri Valley, loess mounds common (L. H. P.).

S. serotina Ait.

Sioux City (B. W.).

S. rupestris Raf.

Sioux City, loess mounds (L. H. P.).

S. Canadensis L.

Sioux City, border of woods, thickets, roadsides, fences, pastures, abundant (L. H. P. B. W.); Onawa, Turin (L. H. P.).

S. rigida L.

Turin, loess hills (L. H. P.); Sioux City (B. W.).

Boltonia asteroides L'Her.

Missouri Valley, Turin, low bottoms, common (L. H. P.); Sioux City (B. W.).

Aster oblongifolius Nutt.

Turin, very abundant over loess mounds; South Dakota, opposite Hawarden, abundant all over low hills (L. H. P.); Sioux City, low mounds, common (B. W., L. H. P.).

A. Noce-Anglicæ L.

Turin, borders of woods, common; South Dakota, opposite Hawarden, few specimens near spring (L. H. P.); Sioux City (B. W.).

A. sericeus Vent.

Sioux Rapids, prairies, Turin, Missouri Valley, abundant over loess mounds (L. H. P.); Sioux City (B. W.).

A. sagittifolius Willd.

Turin, low grounds (L. H. P.).

A. ericoides L.

Turin, low grounds (L. H. P.).

A. multiflorus Ait.

Missouri Valley, open places, woods (L. H. P.); Sioux City (B. W.).

A. paniculatus Lam.

Sioux City, bottoms (L. H. P.); *A. ptarmicoides*, Torr. & Gray. Little Rock, prairies (Herb. C. R. Ball).

Erigeron Canadensis L.

Sioux City (B. W.); a weed in fields and pastures throughout western Iowa (L. H. P. observations).

E. strigosus Muhl.

Rock Valley (W. Newell, J. F. Jensen); Little Rock, prairies (Herb. C. R. Ball).

E. Philadelphicus L.

Hull (W. Newell); Sioux City (B. W.).

Antennaria plantaginifolia Hook.

Sioux City (B. W.).

Silphium laciniatum L.

Council Bluffs, common around loess mounds (L. H. P.); Sioux City (B. W.).

S. perfoliatum L.

Sioux City (B. W.).

Iva xanthiifolia Nutt.

Sioux City (B. W., L. H. P.); Onawa (L. H. P.); Smithland (J. M. Wrapp). An extremely abundant weed everywhere in western Iowa, growing luxuriantly ten to twelve feet high in streets, vacant lots, dooryards, and around neglected buildings, etc.

Ambrosia trifida L.

Smithland (J. M. Wrapp); Sioux City (B. W.). A common weed along creeks and river courses in western Iowa (L. H. P.).

A. artemisiaefolia L.

Alton, Turin (L. H. P.); Sioux City (B. W.). A common weed in cultivated fields, pastures, meadows, along roadsides, vacant lots, and railroads.

A. psilostachya DC.

Council Bluffs, common weed along creeks and river courses in western Iowa (L. H. P.).

Xanthium Canadense Mill.

Sioux City, Turin (L. H. P.). In alluvial soil very abundant and weedy. South Dakota, opposite Hawarden, bottoms of Big Sioux river (L. H. P.).

Heliopsis scabra Dunal.

Sioux City (B. W.); Hull (W. Newell); Battle Creek, in woods (E. G. Preston); Little Rock (Herb. C. R. Ball).

Echinacea angustifolia DC.

Sioux City (B. W.); Hull (W. Newell); Battle Creek, abundant prairies (E. G. Preston); Council Bluffs, Logan (L. H. P.); Little Rock (Herb. C. R. Ball).

Rudbeckia laciniata L.

South Dakota, opposite Hawarden in woods abundant (L. H. P.); Sioux City (B. W.).

R. triloba L.

Onawa, low grounds, common (L. H. P.)

R. hirta L.

Sioux City (B. W.) Little Rock (Herb. C. R. Ball).

Lepachys pinnata Torr. & Gray.

Sioux City (B. W.) Council Bluffs (L. H. P.).

Helianthus annuus L.

Sioux City (B. W.); Hawarden (L. H. P.); Onawa, Missouri Valley, (L. H. P.). A common weed everywhere in western Iowa, flood plains, Missouri and Big Sioux rivers, streets and dooryards. (L. H. P.).

H. rigidus Desf.

Hawarden (L. H. P.); Sioux City (B. W.).

H. grosse-serratus Martens.

Sioux City, abundant in alluvial bottoms of Missouri river, and along river courses, creeks (L. H. P., B. W.); Onawa, Turin. One of the most conspicuous plants in September.

H. Maximiliani Schrad.

Sioux City, Loess hills along the Missouri and Big Sioux rivers. Alton, Sioux Rapids, Hawarden, occasionally in alluvial bottoms at Whiting; also observed near Bradgate further east (L. H. P.).

H. tuberosus L.

Sioux City, between loess mounds, common, Hawarden,
Big Sioux bottom, common (L. H. P.).

Coreopsis palmata Nutt.

Sioux City (B. W.); Hull (W. Newell); Battle Creek (E. G.
Preston); Little Rock (Herb. C. R. Ball).

Bidens frondosa L.

Sioux City (B. W.).

B. chrysanthemoides Michx.

Sioux City (B. W.).

Helenium autumnale L.

Missouri Valley, low grounds, common (L. H. P.) Sioux
City (B. W.).

Dysodia chrysanthemoides Lag.

Sioux City, hills, waste places, streets, along roadsides
abundant (L. H. P., B. W.); Turin (L. H. P.).

Anthemis Cotula D. C.

Sioux City (B. W.); Little Rock (C. R. Ball).

Achillea millefolium L.

Sioux City (B. W.); Battle Creek, pastures (E. G. Preston);
Little Rock (C. R. Ball.).

Crysanthemum Leucanthemum L.

Sioux City; escaped from cultivation (B. W.).

Artemisia Canadensis Michx.

Sioux City (B. W., L. H. P.); South Dakota, opposite Har-
warden (L. H. P.).

A. Ludoviciana Nutt.

Sioux City (L. H. P.).

A. biennis Willd.

Sioux City (B. W.).

Senecio aureus L.

Sioux City (B. W.).

Cacalia tuberosa Nutt.

Council Bluffs (L. H. P.); Smithland (B. W.).

Arctium Lappa L.

Sioux City (B. W.).

Cnicus undulatus Gray.

Sioux City, lower parts of loess mounds; abundant in places
(L. H. P.).

C. altissimus Willd. var. *filipendulus* Gray.

Has been sent to me from western Iowa—Ruthven (D. Cha-
pin); Sioux City (L. H. P.; Hitchcock Bot. Gazette, XIV,

129). This approaches *C. undulatus*, Miss Wakefield's *C. undulatus*, from Sioux City, is referable to this variety.

Var. discolor Gray.

Sioux City (B. W.).

C. arvensis Hoffm.

Maple River Junction (Bernholtz).

Krigia Dandelion Nutt.

Sioux City (B. W.).

Lygodesmia juncea Don.

Sioux City, loess mounds very abundant (L. H. P.); Logan, Missouri Valley, Turin (L. H. P.); Hull, weedy (James C. Watson); Little Rock, weedy (C. R. Ball); Battle Creek, roadsides, weedy (E. G. Preston). Very abundant tops and sides of mounds. In August and September most of the plants are affected with galls.

Taraxacum officinale Weber.

Sioux City (B. W.).

Lactuca Scariola L.

Missouri Valley (L. H. P.). Common in streets of Council Bluffs, Onawa, Turin (L. H. P. observations).

L. Canadensis L.

Sioux City (B. W.).

L. integrifolia Bigel.

Lake Okoboji (B. W.).

L. pulchella Bigel.

Sioux City, base of loess mounds and in streets (B. W., L. H. P.).

LOBELIACEÆ.

Lobelia syphilitica L.

Sioux City (B. W.).

L. spicata Lam.

Rock Valley (C. R. Ball), Sioux City (B. W.).

CAMPANULACEÆ.

Campanula Americana L.

Sioux City (B. W.), Hull (W. Newell).

ERICACEÆ.

Monotropa uniflora L.

Smithland, in rich woods (B. W.).

PRIMULACEÆ.

Steironema ciliatum Raf.

Rock Valley (J. Jensen and W. Newell), Sioux City (B. W.).

S. lanceolatum Gray.

Little Rock (C. R. Ball).

APOCYNACEÆ.

Apocynum cannabinum L.

Little Rock (C. R. Ball), Sioux City (B. W.).

ASCLEPIADACEÆ.

Asclepias tuberosa L.

Hull (W. Newell), Sioux City (B. W.).

A. incarnata L.

Hull (W. Newell), Sioux City (B. W.).

A. Cornuti Decaisne.

Sioux City (B. W.), Little Rock (C. R. Ball).

A. ovalifolia Decaisne.

Sioux City (B. W.).

A. verticillata L.

Sioux City, loess mounds, common in open places (B. W., L. H. P.); South Dakota, opposite Hawarden, hills; Turin, Missouri Valley (L. H. P.); Rock Valley (J. F. Jensen and W. Newell).

Acerates viridiflora Ell.

Little Rock (C. R. Ball).

GENTIANACEÆ.

Gentiana puberula Michx.

Sioux City, grassy low lands and hills; not common (B. W.).

G. Andrewsii Griseb.

Sioux City, meadows of Missouri river bottom (B. W.).

POLEMONIACEÆ.

Phlox pilosa L.

Sioux City (B. W.); Little Rock (C. R. Ball).

P. divaricata L.

Sioux City, in rich woods (B. W.).

Polemonium reptans L.

Cherokee, in rich woods (B. W.).

BORRAGINACEÆ.

Echinosperrum Virginicum Lehm.

Sioux City, woods, along streets and roadsides (B. W.).

Lithospermum canescens Lehm.

Sioux City, prairies, and loess mounds (B. W.).

L. angustifolium Michx.

Sioux City, prairie and loess mounds (B. W.).

Onosmodium Carolinianum D. C. var. *molle*, Gray.

Sioux City, prairies and common on loess mounds (B. W.);
 Little Rock (C. R. Ball); Council Bluffs, loess woods,
 South Dakota opposite Hawarden, border of woods,
 hills (L. H. P.).

CONVOLVULACEÆ.

Convolvulus sepium L.

Sioux City (B. B.); a common weed in fields, and pastures,
 gardens and meadows (L. H. P. observations).

Cuscuta glomerata Choisy.

Sioux City on *Heilanthus*, *Solidago*, common (B. W.).

SOLANACEÆ.

Solanum nigrum L.

Sioux City (B. W.).

S. Carolinense L.

Introduced; Mapleton (Abjah Lamb); Logan, along road-
 sides, Council Bluffs in streets (L. H. P.).

S. rostratum Dunal.

Woodbine; South Dakota, opposite Hawarden (L. H. P.).

Physalis pubescens L.

Sioux City (B. W.); A very common weed in neglected yards
 Missouri Valley, Council Bluffs, Onawa (L. H. P. observations).

SCROPHULARIACEÆ.

Scrophularia nodosa L. var. *Marilandica* Gray.

Sioux City (B. W.); Little Rock (C. R. Ball).

Pentstemon grandiflorus Nutt.

Sioux City, common on the sides of the loess mounds (L.
 H. P., B. W.).

Mimulus ringens L.

Sioux City in low grounds (B. W.).

Ilysanthes riparia Raf.

Sioux City, low grounds and muddy places (B. W.);
 Hawarden (L. H. P.); Hull (W. Newell).

Veronica Virginica L.

Sioux City (B. W.); Hull (W. Newell); Little Rock (C. R.
 Ball).

Gerardia aspera Dougl.

Sioux City, common on sides and tops of loess mounds (L.
 H. P.).

G. tenuifolia Vahl.

Missouri Valley, loess mounds (L. H. P.).

Castilleja sessiliflora Pursh.

Sioux City, abundant on loess mounds (B. W.).

LENTIBULARIACEÆ.

Utricularia vulgaris L.

Hull (W. Newell).

PEDALIACEÆ.

Martynia proboscidea Glox.

Missouri Valley, in fields, base of hills (L. H. P.).

VERBENACEÆ.

Verbena urticifolia L.

Sioux City (B. W.); Hull (W. Newell); Turin, Missouri Valley, low grounds (L. H. P.).

V. hastata L.

Sioux City, fields and low ground (B. W.); Hull (W. Newell).

V. stricta Vent.

Sioux City, base of loess mounds, prairies and fields, abundant (B. W.); Battle Creek (E. G. Preston); Little Rock (C. R. Ball); Turin, Missouri Valley (L. H. P.).

Phryma leptostachya L.

Sioux City (B. W.).

LABIATÆ.

Teucrium Canadense L.

Sioux City, low grounds, abundant (B. W.); Council Bluffs, abundant (L. H. P.).

Mentha Canadensis L.

Sioux City (B. W.); Hull (W. Newell); Little Rock, low grounds (C. R. Ball).

Lycopus sinutus Ell.

Sioux City (B. W.); Hull, low grounds (W. Newell).

L. Virginicus L.

Sioux City (B. W.).

Hedeoma hispida, Pursh.

Sioux City (B. W.).

Pycnanthemum lanceolatum Pursh.

Spirit Lake (B. W.).

Salvia lanceolata Willd.

Council Bluffs (L. H. P. observations).

Monarda fistulosa L.

Logan, prairies and borders of woods (L. H. P.).

Lophanthus scrophulariaefolius Benth.

Sioux City (B. W.).

Nepeta Cataria L.

Sioux City (B. W.). A common weed in western Iowa (L. H. P.).

Scutellaria lateriflora L.

Turin, rich, low woods near stream (L. H. P.); Sioux City (B. W.).

S. parvula Michx.

Little Rock (C. R. Ball); Sioux City (B. W.).

Physostegia Virginiana Benth.

Sioux City, low grounds (B. W.).

Stachys palustris L.

Sioux City, low grounds (B. W.); Rock Valley (J. Jensen, W. Newell).

PLANTAGINACEÆ.

Plantago major L.

Sioux City (B. W.).

P. Patagonica Jacq., var. *gnaphalioides* Gray.

Rock Valley (J. Jensen, W. Newell).

NYCTAGINACEÆ.

Oxybaphus hirsutus Sweet.

Hull (W. Newell); Sioux City, common along roadsides and fields (B. W.); Little Rock (C. R. Ball).

O. angustifolius Sweet.

Sioux City, loess hills near top (L. H. P.).

AMARANTACEÆ.

A. retroflexus L.

A common weed everywhere in western Iowa (L. H. P.); Sioux City (B. W.).

A. albus L.

Sioux City (B. W.); Onawa, Turin, a common weed (L. H. P.).

A. blitoides Watson.

Sioux City, loess mounds in open places (L. H. P.).

Acnida tuberculata Moq.

Onawa, common weed in cultivated ground (L. H. P.).

CHENOPODIACEÆ.

~~Onawa, Turin, Des Moines (L. H. P.); Smithland (J. M. Wrapp); Sioux City (B. W.).~~

C. urticum L.

Onawa, Missouri Valley, Turin near stables and houses (L. H. P.).

C. hybridum L.

Missouri Valley, Turin, Onawa (L. H. P.); Sioux City (B. W.), a common weed in waste places.

Salsola Kali L., var. *tragus* Moq.

Onawa, Sioux City, Missouri Valley, Hawarden, Council Bluffs (L. H. P.), spreading rapidly.

POLYGONACEAE.

Rumex verticillatus L.

Missouri Valley, in swamps, common (L. H. P.).

R. crispus L.

Council Bluffs, weed in streets (L. H. P. observations).

R. maritimum L.

Sioux City (B. W.); Little Rock (C. R. Ball), in low grounds.

R. Acetosella L.

Missouri Valley, Turin, weedy in yards and fields (L. H. P.).

Polygonum aviculare L.

Sioux City (B. W.); Hawarden, weed in yards (L. H. P.); Missouri Valley.

P. erectum L.

Missouri Valley, common weed in streets (L. H. P.).

P. ramosissimum Michx.

Missouri Valley, Sioux City, L. H. P., B. W.) Hawarden (L. H. P.).

P. lapathifolium L., var. *incarnatum* Watson.

Sioux City, (B. W.); Turin, low grounds (L. H. P.).

P. Pennsylvanicum L.

Logan, Turin, Onawa, Missouri Valley, low grounds, (L. H. P.); Hull (N. Newell).

P. Muhlenbergii Watson.

Sioux City (B. W.), common along the Missouri river (L. H. P.).

P. Persicaria L.

Hull (W. Newell); Sioux City (B. W.).

P. orientale L.

Missouri Valley, an escape from cultivation (L. H. P.).

P. acre HBK.

Hull (W. Newell).

P. Virginianum L.

Sioux City (B. W.).

P. Convolvulus L.

Sioux City (B. W.), Hull (W. Newell).

P. dumetorum L., var. *scandens* Gray.

Sioux City (B. W.).

ARISTOLOCHIACEÆ.

Asarum Canadense L.

Cherokee (B. W.).

ELÆAGNACEÆ.

Shepherdia argentea Nutt.

Sioux City, sandy banks of Missouri river (B. W., L. H.

P., Hitchcock, Bot. Gazette, XIV, 128).

EUPHORBIACEÆ.

Euphorbia maculata L.

Missouri Valley, Des Moines, Turin and Onawa; waste places and along railroad (L. H. P.).

E. hypericifolia.

Onawa (L. H. P.), Sioux City (B. W.).

E. marginata Pursh.

South Dakota, opposite Hawarden, hills, Missouri Valley, Turin and in waste places (L. H. P.), Hull (W. Newell), Council Bluffs (L. H. P.), Sioux City (B. W., L. H. P.).

E. corollata L.

Missouri Valley (L. H. P.), Sioux City (B. W.).

E. serpens H. B. K.

Missouri Valley, low grounds (L. H. P.).

E. serpyllifolia Pers.

Turin (L. H. P.), Sioux City (B. W.).

Var. *consanguinea*.

Onawa, Turin (L. H. P.).

E. glyptosperma Engelm.

Missouri Valley (L. H. P.).

Var. *pubescens*.

Turin (L. H. P.).

E. hexagona Nutt.

Missouri Valley (L. H. P.), Sioux City (B. W.).

E. Geyeri Engelm.

Missouri Valley (L. H. P.)

E. heterophylla L.

Sioux City, in woods, Council Bluffs (L. H. P.); Sioux City (B. W.).

E. obtusata Push.

Sioux City (B. W.).

Acalypha Virginica L.

Sioux City (B. W.)

URTICACEÆ.

Ulmus fulva Michx.

Sioux City, in valleys between loess mounds (B. W., L. H. P.); South Dakota opposite Hawarden.

U. Americana L.

Sioux City, along the Big Sioux river and Missouri river (B. W., L. H. P.).

Celtis occidentalis L.

Sioux City, along Missouri and Big Sioux rivers (L. H. P.).

Cannabis sativa L.

Missouri Valley (L. H. P. observations); Sioux City (B. W.).

Humulus Lupulus L.

Sioux City (B. W.).

Urtica gracilis Ait.

Sioux City (B. W.); Little Rock (Herb. C. R. Ball.).

Laportea Canadensis Gaudichaud.

Sioux City (B. W.).

Pilea pumila Gray.

Logan (L. H. P.)

Parietaria Pennsylvanica Muhl.

Turin (L. H. P.).

JUGLANDACEÆ.

Juglans nigra L.

Sioux City (B. W.).

Carya olivæformis Nutt.

Sioux City (Hitchcock); this is further north than it occurs elsewhere in this state.

C. amara Nutt.

Smithland (B. W.).

CUPULIFERÆ.

Corylus Americana Walt.

Sioux City (B. W.).

Ostrya Virginica Willd.

Council Bluffs, in woods, back of steep mounds (L. H. P.); Logan (L. H. P.); Sioux City (B. W.).

Quercus macrocarpa Michx.

Council Bluffs (L. H. P.).

Var. olivæformis Gray.

Sioux City, sides of bluffs (L. H. P., B. W.)

Q. rubra L.

Sioux City (B. W.).

SALICACEÆ.

Salix humilis Marsh.

Sioux City, common on prairies and at base of loess mounds (L. H. P.).

S. longifolia Muhl.

Sioux City (B. W.).

Populus monilifera Ait.

Missouri Valley, in bottoms near streams, in swales between loess mounds; occasionally near top of mound. Common (L. H. P.), South Dakota, opposite Hawarden (L. H. P.); Sioux City (B. W.).

CERATOPHYLLACEÆ.

Ceratophyllum demersum L.

Sioux City (B. W.).

CONIFERÆ.

Juniperus Virginiana L.

Sioux City (B. W.).

ORCHIDACEÆ.

Orchis spectabilis L.

Sioux City (B. W.).

Habenaria leucophæa Gray.

Cherokee (B. W.).

Spiranthes cernua Richard.

Smithland (B. W.).

Cypripedium pubescens Willd.

Cherokee, Smithland (B. W.).

IRIDIACEÆ.

Iris versicolor L.

Sioux City (B. W.).

LILIACEÆ.

Smilax herbacea D.

Sioux City (B. W.).

Allium stellatum Fras.

Alton, common on prairies (L. H. P.).

A. Canadense Kalm.

Sioux City (B. W.).

Yucca angustifolia Pursh.

Council Bluffs, Missouri Valley, Sioux City, Turin (L. H. P.); near top of loess, mounds common. South, north and west sides. Many seeds produced. Not all the plants which flower produce seeds—many empty stalks were found. It is a significant fact that this species does

not occur on the east slopes of the mounds, perhaps because they are more or less wooded about Council Bluffs and Missouri Valley. Sioux City (B. W.), Hitchcock Bot. Gazette, XIV, p. 128.

Polygonatum giganteum Dietr.

Sioux City (B. W., L. H. P. observations). Deep rich woods.

Smilacina stellata Desf.

Sioux City (B. W.).

Uvularia grandiflora Smith.

Sioux City (B. W.).

Erythronium albidum Nutt.

Sioux City (B. W.).

Lilium Philadelphicum L.

Little Rock (Herb., C. R. Ball).

L. Canadense L.

Sioux City (B. W.).

Trillium nivale Riddell.

Cherokee (B. W.).

Zygadenus elegans Pursh.

Little Rock (Herb., C. R. Ball).

COMMELINACEÆ.

Tradescantia Virginica L.

Sioux City (B. W.).

JUNCACEÆ.

Juncus tenuis Willd.

Sioux City (B. W., L. H. P. observations).

J. nodosus.

Sioux City (B. W.).

TYPHACEÆ.

Typha latifolia L.

Sioux City (B. W.).

Sparganium eurycarpum Engelm.

ARACEÆ.

Dickinson Co. (Hitchcock); Hall (W. Newell).

Arisaema triphyllum Torr.

Sioux City (B. W.).

ALISMACEÆ.

Alisma plantago L.

Sioux City (B. W.).

Echinodorus rostratus Nutt.

Sioux City, Big Sioux river (L. H. P.).

NAIADACEÆ.

Potamogeton natans L.

Lake Okoboji (Hitchcock).

P. lonchites Tuck.

Spirit Lake (Hitchcock).

P. praelongus Wulf.

Clear Lake (Hitchcock).

P. perfoliatus L. var. *Richardsonii*, Bennett.

Lake Okoboji and Spirit Lake (Hitchcock).

P. zosterifolius Schum.

Lake Okoboji (Hitchcock).

P. mucronatus Schrad.

Spirit Lake (Hitchcock).

P. pectinatus L.

Woodbine (Burgess); Lake Okoboji (Hitchcock)

CYPERACEÆ.

Cyperus diandrus Torr.

Near Lake Okoboji (B. W.).

C. Schweinitzii Torr.

Lake Okoboji (B. W.).

Eleocharis acicularis R. Br.

Sioux City (B. W.; L. H. P.).

Scirpus lacustris L.

Council Bluffs (L. H. P. observations); Sioux City (B. W.).

S. atrovirens Muhl.

Sioux City (B. W.).

Species of *Carex* numerous, but omitted because they have not been studied critically. There are also a large number of grasses, localities and species will appear in another connection

SOME NOTES ON CHROMOGENIC BACTERIA.

L. H. PAMMEL AND ROBERT COMBS.

Quite a large list of chromogenic bacteria are known to bacteriologists. Many of these are familiar objects in bacteriological laboratories. Of the early works describing these in this country we may mention Sternberg and Trelease. For later works on North American chromogenic bacteria we must refer to Sternberg, Jordan and the numerous text books dealing with pathogenic species.

Very few attempts have been made to study our local bacteriological floras. It is indeed a very difficult matter.

The following works describe Chromogenes:

Saccardo: Sylloge Fungorum VIII.

Sternberg: Manual of Bacteriology. 1892.

Trelease: Observations on several Zoogloea (Studies Biol. Lab. of the Johns Hopkins University). 1885.

P. & G. C. Frankland: Micro-organisms in Water. 1894.

Adametz: Die Bakterien der Trink-und Nutzwasser. Mitth. der Oester Versuchstation fur Brauerei-und Malzerei in Wien, 1888. Heft 1.

Jordan: A report on certain species of bacteria observed in sewage. Rep. Mass. State Board of Health, 1888-1890, plate II.

Eisenberg: Bakteriologische Diagnostik. 1888.

Welz: Bakteriologische Untersuchungen der Freiburger Luft, Zeitschrift fur Hygiene XI, p. 121.

No attempt will be made to give description of common species found here at Ames, simply a record of their occurrence including some laboratory observations.

Micrococcus cyanogenus. N. SP.

Source.—During the latter part of May, 1894, a foreign blue color was observed on an old milk culture of an organism obtained from cheese; later the same was found in an old milk culture of *Bacillus aromaticus*. A transfer from the first milk tube was made to another tube of sterilized milk, the typical color appearing in three or four days. The organism was separated by pouring plates of agar.

Morphology.—A small micrococcus occurring singly or in groups; motility not determined. An aerobic liquefying micrococcus.

Agar.—Nearly colorless, with a slight tinge of blue, producing an irregular film on surface, growing at temperature of room.

Gelatin.—A creamy white layer not spreading on surface, soon liquefying, forming a funnel-shaped area, later the medium was liquefied with a creamy white sediment in the bottom of the tube.

Milk.—Sterilized milk inoculated produces in three days a slight blue layer on surface, which increases in intensity, becoming quite blue for one-third of an inch on the seventh day. On the eighth day it appeared rather muddy; on the ninth day only a faint blue color remained; it coagulated milk with a

blue liquid on top. The curd was dissolved slowly. In twenty-five days the process was completed, excepting a small portion in the bottom of the flask.

Dunham's peptone solution.—No color produced; the medium became cloudy, which was in no way characteristic. It failed to grow in Dunham's rosalic acid solution.

Several blue organisms have been described.

Bacillus cyanogenus is a well known inhabitant of milk. This is a non-liquefying, actively motile bacillus. Has not been found here at Ames. Gessard has shown that in presence of an acid it produces an intense blue color, and in milk not sterilized containing lactic acid germs, a sky blue color is produced.

Jordan has also described a *Bacillus cyanogenus*, which is less motile forming a deep brown color on potato, but he says undoubtedly *Bacillus cyanogenus*. Beyerinck² has also described a blue organism obtained from cheese, the *Bacillus cyaneo-fuscus*. The original paper has not been seen but according to the description given by Sternberg this is a small bacillus 0.2-0.6 u. long and one half as thick. It is an aerobic liquefying motile bacillus, and when cultivated in a solution containing one-half per cent of peptone the culture media acquires at first a green color, which later changes to blue, brown and black. Subsequently the color is entirely lost. More recently Wm. Zangemeister³ has described a bacillus cyaneo-fluorescens.

This species is in many respects similar to *Bacillus cyanogenus*.

It is however somewhat shorter and very actively motile.

Gelatin is not liquefied and the bright greenish fluorescent pigment diffuses through it.

Our species also came from cheese and the blue color disappears, but the organism in question never produces a black color. The species so far as we have been able to determine is new, and we have therefore given it the name of *Micrococcus cyanogenus*.

Staphylococcus pyogenes, Ogston var. *aureus* Rosenbach.—This, the most common of the pyogenic micrococci has been found quite frequently here at Ames. It has at different times been isolated from ordinary carbuncle, fistula, dirt under the finger nails, etc. It has been found more commonly in suppurative abscesses than any other organism. It is pathogenic to mice

²Sternberg: Manual of Bacteriology p. 727.

³Kurze Mitteilungen über Bakterien der-blauen Milch. Centralblatt f. Bakt. u. Parasitenkunde. Erste Abt., XVIII, p. 321.

and rats. Old cultures, however, soon loose their virulence. A culture nine months old failed to cause any lesions in mice, not even the local formation of pus.

St. pyogenes, Ogston var. *citreus* Passet.—This species has not been found spontaneously in any of the cases of pus studied, though it has been cultivated in the laboratory. It has been included with the pyogenic cocci because of its occurrence in pus. Passet found the organism in the pus of an acute abscess and Sternberg⁴ says: "As to its pathogenic properties, we have no definite information. It is included among the pyogenic bacteria because of occasional presence in the pus of acute abscesses, although it has heretofore only been found in association with other micro-organisms." Mice have been inoculated here at Ames but in no case did fatal septicæmia follow. We have, however, had no trouble in obtaining pus at the point of inoculation under the root of the tail. From this pus, pure cultures of the organisms were obtained.

St. pyogenes Ogston var., *flavescens* Trev.—Obtained from the fistula of a horse by Dr. S. Whitbeck in bacteriological laboratory, Iowa Agricultural college. This organism does not differ from the foregoing in size; in color, however, it is much paler, being an ochre yellow. It produces fatal septicæmia in mice when fresh cultures were used, but in this case pure cultures were not obtained.

Streptococcus cinnabareus, Flügge.—Obtained at first from butter, but probably came either from the air or water. Color in different media is quite constant, except in blood serum, where its color is much paler. It grows quite characteristic on the surface of bouillon, forming spherical masses paler than in agar or potato. A nearly related species was isolated by Dr. W. B. Niles from the heart of a diseased steer affected with corn-stalk disease. It differs from the *cinnabareus* in the change of color. It is dark lemon-yellow at first, and then changes to a brick-red. This species will be described in another connection.

Sarcina lutea Schröter.—This well known organism occurs chiefly in the air. Gelatin and agar plates exposed to the air invariably show this organism. It comes up somewhat more tardily than the non-chromogenic species. They appear as small, yellow, spherical colonies. The canary-yellow growth liquefies gelatin quite slowly. The same organism has been

⁴Manual of Bacteriology p. 273.

obtained frequently from butter and milk, but the organism undoubtedly came from the air.

S. aurantiaca Flügge.—This organism is also quite commonly met, and appears on gelatin and agar plates exposed to the air.

Bacillus fluorescens liquefaciens Flügge.—This common inhabitant of water also occurs on potato, milk and butter. Scarcely a sample of water can be plated without obtaining this organism.

B. pyocyaneus Gessard.—This has been obtained several times from wounds and Dr. S. Whitbeck obtained a pure culture in open synovial bursa. Inoculation into the peritoneal cavity was followed by death in forty-eight hours. In old cultures there is a gradual tendency for the organism to lose its power of forming coloring matter. Gessard⁵ has isolated two pigments a fluorescent green and a blue, the latter called pycocyanin.

Bacillus prodigiosus Ehrenberg.—This species is well known to most bacteriologists. It has long attracted attention because of the red stains produced on potatoes, boiled bread, and the red color it imparts to milk. According to several investigators this organism is not a native to this country.

The species is however, recorded at Ames by Bessey. He commonly obtained a red organism on sliced potatoes exposed to the air.

There are of course several red organisms and as the organism was reported before the era of modern bacteriological methods I must therefore express some doubt as to the correct determination of the *Bacillus prodigiosus* found by Bessey. The senior writer has at various times had cultures of this organism in the laboratory. Thus we had good growing cultures in 1889, 1892, but all attempts to make old cultures failed. In 1894 a blood-red colony came up in culture plate. Cultures of this organism had never been in this laboratory so far as we know. In the spring we had received from Dr. Irving W. Smith, cultures of several species obtained from the laboratory of Johns Hopkins University. The cultures appeared pure but they may have been contaminated. The senior writer observed this organism on one other occasion in the botanical laboratory of the Shaw School of Botany, St. Louis. Cultures of *B. prodigiosus* were obtained from rotting sweet potatoes, but European cultures were common at the time in the labora-

⁵Gessard. De la pyocyanine et de son Microbe. These de Paris, 1882. Nouvelles recherches sur la Microbe pyocyanique. Ann. d l'Institut Pasteur. Vol. IV, 1890, p. 89

⁶Bull. Dept. of Botany, Nov. 1884.

tory. Professor Trelease thought it probable that the species came from the European cultures. We are therefore inclined to believe with Jordan, Russell, and others that the species is not native in this country.

FUNGUS DISEASES OF PLANTS AT AMES, IOWA, 1895.

BY L. H. PAMMEL AND GEO. W. CARVER.

In previous papers record has been made of the abundance of parasitic fungi for the years of 1891, 1892, 1893 and 1894.¹ We hope to continue these observations for the purpose of making comparison.

Observations from year to year with climatic conditions should make it possible to say how much climate modifies the appearance of disease. Observations in a climate like ours are valuable because of the changeable conditions as to humidity and rainfall. From the nature of the diseases of plants it is difficult to make exact statements. We must speak in relative terms. In 1893 *Puccinia graminis*, *P. rubigo-vera* and *P. coronata* were very destructive. In 1894 these rusts were not absent, but they were not destructive; in fact, scarce as compared with 1893.

In the study of diseases of plants the condition of the atmosphere with reference to moisture is an important factor. The universally low humidity of the atmosphere in 1894, no doubt, largely determined the amount of rust that year. So low was the humidity that during the growing season dew was an unusual condition.

We append table, giving rainfall, relative humidity, 7 A. M. temperature (maximum and minimum), for the months of May, June, July, August and September, taken from the records made at Ames by Dr. J. B. Weems, Mr. W. H. Heileman.

¹ L. H. Pammel, Jour. Mycology, VII, p. 95.

Agricultural Science, VII, p. 20.

Proc. Iowa Academy of Science, II, p. 201-203

MAY.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Rainfall.....		.03	.36	.38		.02	1.18				.11				.17																
Rel. hum. 7:00 a. m.																															
Temperature—max.		76	75	85	80	73	79	80	89	93	64	63	53	53	60	59	69	64	63	62	67	72	77	80	69	74	86	93	88	88	86
Temperature—min.		60	59	56	61	59	56	53	52	61	44	37	29	38	31	43	39	42	47	35	38	31	32	40	40	57	40	69	72	70	66

JUNE.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Rainfall.....		1.06	.08				.12		.36	.44		.40	.99			.47							.43	.24	.44	.03					
Rel. hum. 7:00 a. m.		95	78	76	71	78	70	71	63	95	99	93	81	91	71	74	90	78	70	85	75	85	90	86	69	79	89	77	93	75	
Temperature—max.		90	85	83	68	77	84	84	85	86	69	77	81	81	85	84	80	76	80	85	80	80	84	60	88	74	72	69	74	81	
Temperature—min.		67	64	50	48	49	60	57	66	64	63	55	51	55	60	62	57	50	56	57	54	63	64	65	57	49	49	50	56	54	

JULY.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Rainfall.....														.18	.22		.82			.89					.29		.38	.09			
Rel. hum. 7:00 a. m.		85	90	99	86	86	66	77	71	81	65	71	95	95	95	95	72	95	95	99	99	89	90	90	95	95	94	85	90	95	99
Temperature—max.		86	85	85	85	86	93	85	65	72	80	84	88	81	89	88	93	89	92	86	82	74	70	79	85	80	89	81	85	81	74
Temperature—min.		60	56	63	67	64	58	54	41	46	56	54	53	52	58	52	65	66	66	62	60	57	55	56	57	62	62	68	58	49	52

AUGUST.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Rainfall.....		.06	.07	T					.64						T							1.92	.74		.05		1.35	T		1	
Rel. hum. 7:00 a. m.		84	81	74	69	90	80	87	81	71	99	78	84	80	85	69	90	85	60	88	72	84	85	95	95	81	95	99	99	84	76
Temperature—max.		85	87	85	85	80	82	80	94	93	85	88	91	94	84	83	94	81	71	77	84	85	93	73	84	87	94	74	78	83	68
Temperature—min.		61	56	63	57	60	55	65	71	67	60	55	58	63	57	62	64	51	52	48	50	59	66	63	59	67	67	65	57	50	52

SEPTEMBER.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Rainfall.....															.52					1.32		.66									
Rel. hum. 7:00 a. m.		68	89	82	85	85	67	61	95	82	82	81	94	78	87	95	93	76	74	66	74	82	85	79	94	65	77	66	70	60	
Temperature—max.		77	78	89	89	90	78	67	86	92	93	87	78	81	98	87	92	90	88	88	88	88	65	72	78	66	65	66	55	60	
Temperature—min.		51	58	57	57	57	45	49	61	66	72	62	60	58	62	64	67	68	73	64	63	26	42	48	46	38	41	37	30	31	

We have followed Saccardo (Sylloge Fungorum) in the arrangement of orders, genera and species, and in most cases have used the synonymy given by him.

USTILAGINEAE.

Ustilago hypodytes (Schlecht.) Fr.

Very abundant. On *Stipa spartea*.

U. tritici (Pers.) Jensen.

Not uncommon and was frequent in 1894 on *Triticum vulgare*.

U. hordei (Pers.) Kellerman and Swingle.

Common on *Hordeum vulgare*.

U. nuda (Jensen) Kellerman and Swingle.

Scarce on *Hordeum vulgare*.

U. avenae (Pers.) Jensen.

Not uncommon on *Avena sativa*.

U. segetum (Bull) Dittm.

Common on *Arrhenatherum avenaceum*.

U. neglecta Niessl.

Abundant on *Setaria glauca*.

U. Rabenhorstiana Kuhn.

On *Panicum sanguinale* abundant.

U. maydis (D. C.) Corda.

Abundant on *Zea mays*.

U. pustulata Tracy & Earle.

Locally abundant in one place, first time observed on *Panicum proliferum*.

Tilletia-striaeformis (Westend.) Magnus.

Not abundant on *Phleum pratense*.

T. foetens (B. & C.) Trelease.

Not observed in 1895.

Schizonella melanogramma (D. C.) Schroet.

Abundant in May, Moingona.

Sorosporium syntherismae (Schw.) Farlow.

Abundant on *Panicum capillare*.

Urocystis Agropyri (Preuss) Schroet.

Abundant in June and early July on *Elymus Canadensis*.

UREDINEÆ.

Uromyces Polygoni (Pers.) Fuckel.

Abundant August and September on *Polygonum aviculare* and *P. erectum*.

U. Trifolii (Hedw.) Lev.

Abundant in September on *Trifolium pratense*. This fungus has been increasing in severity, large patches of second crop of clover being affected.

U. appendiculatus (Pers.) Link.

Abundant on *Strophostyles angulosa*, but not observed here on *Phaseolus vulgaris*. At Indianola it was, however, destructive to the cultivated bean.

U. Euphorbiæ Cooke & Peck.

Abundant in August and July on *Euphorbia maculata* and *E. Preslii*.

Melampsora farinosa (Pers.) Schroet.

Abundant on *Salix*, August and September.

M. Populina (Jacq.) Lev.

Abundant on *Populus monilifera*, August and September.

Puccinia Helianthi Schw.

Abundant on *Helianthus tuberosus* and *H. grosse-serratus* July, August and September. In August especially destructive to cultivated *Helianthus annuus*.

P. Convolvuli (Pers.) Cast.

Abundant on *Convolvulus sepium* July, August and September.

Gymnosporangium macropus Link.

Teleuto stage on *Juniperus Virginiana* not as abundant as in 1894; nor was the æcidium (*Roestelia pyrata*) so abundant on *Pyrus Iowensis*. Locally, however, in Madison county it seriously affected the leaves, stems and fruit of the wild crab. May was unfavorable for the germination and development of the teleutospores.

Phragmidium subcorticium (Schränk.) Winter.

Abundant on the leaves of the cultivated rose, as Madam Charles, Frederick Worth, August and September.

Æcidium Grossulariæ Schum.

Not so common as in 1894 on *Ribes Grossulariæ*, *R. gracile*.

Uredo Caeoma-nitens Schw.

(*C. interstitiale*, Schlecht and is supposed to be connected with *Puccinia Peckiana*.) Abundant on *Rubus villosus*; large patches of native blackberry destroyed; seriously affecting cultivated blackberry locally. It was also observed in Story, Polk, Louisa and Henry counties.

P. Graminis Pers.

Not common on *Triticum vulgare*, *Avena sativa* and *Hordeum jubatum*. June and July. *Aecidium* abundant on *Berberis vulgaris* May-June. Very destructive on fall sown oats and wheat. August and September; also *Hordeum jubatum*.

P. coronata Corda.

Not common on *Avena sativa*, June and July. Abundant August and September. Klebahn has recently separated another species out of what has passed as this, until further work in this country, the species is used here as it is by American authors generally.

P. rubigo-vera (D. C.) Wint.

Not common, on wheat June and July. Abundant on fall sown wheat, *Hordeum jubatum*, August and September. Squirrel-tail grass is held in check by this fungus.

P. Sorghi Schw.

Abundant August and September on *Zea Mays*.

P. emaculata Schw.

Abundant on *Panicum capillare* August and September.

P. Andropogonis Schw.

Not abundant on *Andropogon furcatus*. *A. scoparius*, August and September.

P. Xanthii Schw.

Abundant on *Xanthium Canadense*, July, August and September. In low grounds destroyed a large number of plants.

PERONOSPORACEÆ.

Cystopus candidus (Pers.). Lev.

Abundant early in the season on *Lepidium intermedium*, *L. Virginicum*, *Capsella bursa-pastoris*. Later, oospores abundant in inflorescence of *Rhaphanus sativa*.

C. Tragopogonis (Pers.) Schroet.

Locally abundant in June and early July.

C. Portulacæ (D. C.) Lev.

Abundant on *Portulaca oleracea* from the middle of June to the first of September. Oospores abundant.

C. Bliti (Biv.) De By.

Abundant July, August and September on *Amarantus albus*, *A. retroflexus*. More severe on the latter species.

Sclerospora graminicola (Sacc.) Schroet.

Abundant during the latter part of May till middle of June,

destroying large numbers of young plants of *Setaria viridis*. In whole patches it prevented the maturing of seeds.

Plasmopara Viticola (B. and C.) B. and DeT.

Abundant. Destructive to cultivated grape (*Vitis Labrusca*), affecting leaf, stem and fruit. Also affecting the growing of young shoots of *Vitis riparia*, in some cases killing the young shoots.

P. Halstedii (Farlow) B. and DeT.

Not common, on *Helianthus annuus*, *H. tuberosus*, *Silphium laciniatum*, *Xanthium Canadense*, *Centaurea*.

Bremia Lactucae Regel.

Not observed although abundant in 1893.

Peronospora Viciae (Berk.) DeBy.

Abundant in latter part of May and early June on *Vicia Americana*.

P. Arthuri Farlow.

Abundant on *Oenothera biennis*.

P. parasitica (Pers.) DeBy.

Abundant on leaves and stems of *Lepidium intermedia*, *L. Virginicum*, killing the affected plants. On leaves of *Capsella bursa pastoris* not destructive. *Brassica nigra*, *B. campestris*, *Raphanus sativa*, *Draba Caroliniana*. *Sisymbrium officinale* seriously affected.

P. Potentillae DeBy.

Not found in 1895. Local in 1894.

P. effusa (Grev) Rabenh.

Abundant on *Chenopodium album* in May and June.

P. Euphorbiae Fuck.

Locally abundant on *Euphorbia Preslii* and *E. maculata*.

P. alta Fuckel.

Abundant on *Plantago major*.

PERISPORIACEAE.

Podosphaera Oxyacanthae (D. C.) De By.

Abundant on cultivated (*Prunus Cerasus*) and *P. pumila*. Not common on *P. Americana*; also observed on young shoots of *Crataegos punctata*, and *C. mollis*; July, August and September.

Spærotheca Mali (Duby) Burrill.

Common on suckers of *Pyrus Malus* and young shoots of *P. toringo* in nursery, June, July and early August.

S. Mors-uvae (Schw.) Berk & Curt.

Abundant on *Ribes Grossulariae*, *R. floridum*, June, July; leaves, stem and fruit.

Phyllactinia suffulta (Reb.), Sacc.

Abundant on *Fraxinus Americana*, August and September.

Uncinula necator (Schw.) Burrill.

Common on *Vitis Labrusca*, Concord, Worden and especially Roger hybrids (*Agawam*).

Microsphaera Alni (D. C.) Wint.

Abundant on *Syringa vulgaris*, *S. Persica*, *Lonicera*, August and September. Abundant latter part of August and September.

Erysiphe Cichoracearum D. C.

Very abundant on *Helianthus annuus*, *H. tuberosus*. Not so common on *H. grosseserratus*. Abundant on *Ambrosia artemisiaefolia*, *A. trifida*, *Artemisia*, *Ludoviciana*; generally attacked by *Cicinnobulus Cesatii*. Abundant on *Verbena stricta*; less common on *V. hastata*.

E. communis (Wallr.) Schl.

Abundant on *Ranunculus abortivus* and *Amphicarpæa monoica*.

SPHÆRIACEÆ.

Physalospora Bidwellii (Ell.) Sacc.

None observed in 1895.

DOTHIDEACEÆ.

Phyllachora Graminis (Pers.) Fuck.

Common on *Muhlenbergia Mexicana*, *Elymus Canadensis*, *Panicum scoparium* *Asprella hystrix*.

P. Trifolii (Pers.) Fuck.

Abundant, conditinal stage on *Trifolium pratense*, September.

Plowrightia morbosa (Schw.) Sacc.

Abundant on *Prunus domestica*, *P. Padus*, and wild *P. Americana*, *P. Virginiana* and Japan plum.

GYMNOASACEÆ.

Exoascus communis Sadebeck.

Rare on *Prunus Americana* in 1895; abundant on *Prunus Cerasus* and *P. domestica*. Nursery stock defoliated in August. Not as severe on *P. Americana*. Also occurred on *P. Mahaleb* and *P. avium*.

HYPHOMYCETÆ-MUCEDINÆ.

Monilia fructigena Pers.

Abundant late in season on fruit of *Prunus Americana*.

DEMATIACEÆ.

Cladosporium carpophilum Thum.

Rare on *Prunus Americana*, but abundant on *Cratægus mollis* late in August and September.

Helminthosporium Graminum Rabh.

Not common on *Hordeum vulgare* in July.

Cercospora Resedæ Fuck.

Abundant on *Reseda odorata* in August and September.

C. Beticola Sacc.

Abundant on *Beta vulgaris*. (Sugar and mangel beets).
September. In some cases leaves completely covered with cinereous spots.

C. angulata Winter.

Abundant on *Ribes rubrum*, shrubs nearly defoliated latter part of July and early August. Fungus appeared early in May.

SPHÆROPSIDÆ SPHÆROIDACEÆ.

Septoria Rubi West.

Abundant on *Rubus odoratus*, *R. canadensis* August and September.

Septoria Ribis Desm.

Abundant on *Ribes nigrum*, June and September.
Melanconiaceæ.

Cylindrosporium Padi Karst.

Abundant on Cherry.

Marsonia Juglandis Sacc.

Trees of *Juglans cinerea* nearly defoliated by middle of August. Not so severe on *Juglans nigra*.

M. Martini Sacc.

Abundant on *Quercus robur*; majority of leaves affected; also occurred on *Q. macrocarpa*.

BACTERIACÆ.

Bacillus amylovorus (Burrill) Trev.

Blight more severe than in 1894. *Pyrus Malus*, *P. prunifolia*, *P. Sinensis*, *P. communis* and *P. Iowensis* especially severe on the following varieties of *P. Malus*: Yellow Transparent apple, Red Queen-Lead, Arabskoe Antonovka, Thaler, Oldenburg. It seems, also, to have been severe in other parts of the state. Fruiting orchards less affected than nursery stock. It would seem that the condition of the soil may influence the

severity of the disease. We should also observe that flowers are occasionally affected, but not so severe as in 1894. The disease gradually subsided by the middle of July and early August.

B. Sorghi W. A. Kellerman.

Not severe. It occurred on *Andropogon Sorghum* var *Halepense* and *A. Sorghum* (*Sorghum*).

B. cloaceæ (Jordan).

On *Zea mays*; not abundant.

B. campestris Pammel.

Not observed in 1895.

SOME ANATOMICAL STUDIES OF THE LEAVES OF SPOROBULUS AND PANICUM.

EMMA SIRRINE AND EMMA PAMMEL.

Numerous writers have called attention to the value of anatomical studies for diagnostic purposes in the recognition of Phaenogams. We may note in this connection the paper by Pfister¹, who has made a comparative study of the leaves of some palms.

The author considers anatomical characters of value because so many palms are collected without flower or fruit. Bertrand² in a general paper considers the characters and important points to be observed in making anatomical studies of this kind. He notes that we must not lose sight of: 1. Inequalities in the grouping of subdivisions with the association of higher groups. 2. The paucity of material of certain forms, many intermediate species having disappeared in the lapse of time. These objections hold with equal truth to the characters now used in the classification of Phaenogams. He states that there are good differential characters in fibro-vascular bundle found in Gymnosperms, vascular cryptogams and Phaenogams, but the arrangement of the fibro-vascular bundle is of less value. For the families such characters as the veins of leaf; development of stomata; secretion reservoirs; arrangement of inner phloem; for species the cuticle and trichomes are of value in diagnosis.

¹Beitraege zur vergleichenden Anatomie der Sabaleen Blartter. Inaugural Diss. 2 plates, Hofer and Burger (1892) Abst. Bot. Centralblatt, LI, p. 300.

²Des caracteres que l'anatomie peut fournir a classification des vegetaux, pp. 54-
Antun (Dejussieu) 1891, Abst. Bot. Centralblatt Vol. L. p. 375.

Priemer³ states that peculiar hairs, epidermal cells, crystals cystoliths are of value for diagnostic purposes in the order Ulmaceae.

Bordet⁴ has made some anatomical studies of the genus *Carex*. He concludes that in this genus anatomical characters do not offer any material aid in the separation of species. Although some good characters are found in fibro-vascular bundles.

Mez, who has made an exhaustive study of cystoliths and anatomical characters found in the sub-family Cordieae of the order Borraginaceae, finds that hairs are very characteristic and are certainly valuable from a systematic standpoint. Nor should we omit in this connection the valuable paper by Solereder⁵ on the value of the wood structure in dicotyledonous plants, Holle⁶ who has made an exhaustive study of the order Saxifragaceae calls especial attention to the structure of pith cells of *Cunoniaceae*, the characteristic wood cells in certain genera, and crystals in the tribe *Hydrangeae*.

K. Leist⁷ who has likewise made a study of Saxifragaceae concludes that the species of this order offer characters which makes it easy to separate them into groups, but this grouping does not always conform to the present systematic position of its members. Nevertheless general harmony prevails between morphological and anatomical characters as to species.

Several other authors Christ⁷, Thouvenin⁸, Waldner⁹ and Engler¹⁰ have likewise studied this order with reference to different organs and parts.

³Über seine unter Leitung von Prof. Prantl ausgeführten untersuch ungen über die Anatomie Ulmaceen. Bot. Centralblatt, Vol. L, p. 105.

⁴Recherches anatomiques sur le genre *Carex* (Revue generale de Botanique, Vol. III, 1891, p. 57-64. Abst. Bot. Centralblatt, Vol. LI, p. 116.

⁵Über den systematischen Werth den Holzstructur bei den Dicotyledonen. R. Oldenbourg, Muenchen. 1885.

⁶Beitraege zur Anatomie der Saxifragaceen und deren Systematische Verwerthung. Bot. Centralblatt Vol. LIII. p. 33, 65, 97, 129, 161, 209.

⁷Beitraege der vergleichenden Anatomie der Saxifragaceen. Bot. Centralblatt Vol. XLIII. p. 100, 136, 161, 233, 281, 313, 345, 377.

⁷Beitraege zur vergleichenden Anatomie des Stengels der Caryophyllen und Saxifrageen. Diss. Marburg, 1887.

⁸Sur l'appareil de soutien dans les tiges des Saxifrages.

⁹Die Kaldruesen der Saxifrageen. Graz 1887.

¹⁰Monographie der Gattung *Saxifraga*. Breslau 1872.

Synopsis of North American Pines, based on leaf-anatomy. Bot. Gazette, XI, p. 256, 302; plate VIII.

Die Anatomie der Euphorbiaceen in ihrer Beziehung zum system derselben. Separate Engler's Botanische Jahrbucher, Vol. V, p. 384-421; plates VI and VII.

Mention should be made of the splendid work of Coulter and Rose on the anatomical characters found in the leaves of conifers and their value in the recognition of species. A subject referred to long ago by Dr. George Engelmann. The work of Pax on the anatomy of Euphorbiaceæ, Trecul and others on the stems of many plants.

It will not be necessary to give other references; the literature is quite extensive. More work should be done along this line. We should study the biological relations and the consequent peculiar anatomical structures of plants. It is a field full of interest. Theo. Holm has called attention to the value of this kind of work in studying our flora.

Ganong, in a recent paper with reference to biology and morphology (Present Problems in Anatomy, Morphology and Biology of Cactaceæ, Bot. Gazette, Vol. XX, p. 130), says: "As to the tissues, it is enough here to say that the characteristic *xerophilous* appearances are strong cuticle, thick epidermis, perfect cork, sunken stomata, collenchymatous hypoderma, deep palisade layers; great development of pith and cortex, which consists of large, round, splendidly pitted water-storing cells, often containing mucilage * * * ." The whole system conforms closely to the external form and follows its morphological changes. We notice this especially because the same thing holds true in other plants outside *Cactaceæ*, especially grasses. Great difference occurs between such plants as are habituated to humid climates and those occurring in a dry climate. This offers, indeed, a great field for investigation.

ANATOMICAL STUDY OF GRASSES.

Theo. Holm has done well in calling attention to some anatomical characters of North American Gramineæ. In speaking of the studies which had been made he says: "The importance of studies of that kind was very clear; they not only furnished additional and often even more reliable systematic characters, but the extended study of anatomy into wider fields than ever before, until anatomy has become one of the most important modern lines of botanical science." He emphasizes the importance of internal structure, as it will give a striking illustration of the physiological life of the plant. It will not be necessary here to refer to earlier writers on the subject; suffice

it to say here that Duval, Jouve¹¹, Hackel¹², Güntz¹³, Samsøe, Lünd¹⁴ and Beal¹⁵ have made valuable contributions.

Theo. Holm¹⁶ has studied *Uniola latifolia*, *U. gracilis*, *U. nitida*, *U. paniculata* and *U. Palmeri*, *Distichlis*, *Pleurogogon* and *Leersia*.

From a study of some of the species of *Uniola* growing under widely different conditions, he concludes, that of the five species, the genus show anatomical structures by which they may be easily distinguished.

He says of the genus *Distichlis*, that, "Considered altogether, the anatomical structure of the leaf in the genus *Distichlis* is very uniform, and it does not seem possible to give any special characters by which either of the varieties or the supposed species *thalassica* and *prostata* may be distinguished from the species *maritima*; because we have seen that male and female specimens of this last show variations among themselves nearly equivalent with the differences in the two varieties and subspecies." Of *Pleuropogon*, he says: "Considering now these three species of *Pleuropogon* together, it is evident that they are, in spite of their great similarity, easily distinguished from each other" by certain anatomical characters taken from leaf blade.

THE GENUS SPOROBOLUS.

The species of the genus *Sporobolus* are nearly all western or southern. Those occurring in Iowa are characteristic western plants and well adapted to dry climate conditions. The following species of *Sporobolus* were studied: *Sporobolus heterolepis* Gray; *S. cryptandrus* Gray; *S. Hookeri*, *S. vaginæflorus*.

SPOROBOLUS HETEROLEPIS.

The epidermal cells (e) are rectangular in shape, with a strongly developed cuticle (c); they vary but little in size. The bulliform cells (b) occur between each mestome bundle (m), except between the last few at the tip of the leaf, where it is occupied by the streome (st.). The bulliform cells occur in four or five rows, a large central cell and three or four smaller cells

¹¹ Histotaxie des feuilles de Graminees.

¹² Monographia Festucarum Europaeorum, 1882.

¹³ Untersuchungen ueber die anatomische Structur der Gramineenblaetter, etc. Inaug. Dissert. Leipzig, 1886.

¹⁴ Vejledning til at kjende Graesser i blomterlos Tilstand, Kjobenhavn, 1882.

¹⁵ Grasses of North America for farmers and students.

¹⁶ A study of some anatomical characters of N. America Gramineae. Bot. Gazette, Vol. xvi. p. 166, 217, 275.

on each side. The strongly involute character of the leaf is due to the bulliform cells.

The carene (c') is occupied with one mestome bundle; this bundle is somewhat different than the others, as it is surrounded on the upper side by chlorophyll bearing parenchyma while the lower side contains stereome.

The mestome bundles on right and left of carene are entirely closed (i. e., entirely surrounded by chlorophyll bearing parenchyma). This species is provided with three different types of mestome bundles; the first occurs in carene; this has stereome on lower side in contact with leptome; the second, those which have stereome both on lower and upper side, in contact with leptome and hadrome; and third, those that are entirely closed. Those that are entirely closed occur alternate with those having stereome on upper and lower surface. As to the mestome bundles, there are, in this species, five on left side of the carene and seven on the right side. On the left, the leaf terminates with one closed mestome bundle. The right side of the leaf terminates with three mestome bundles. The mestome bundles, except those at the tip of the leaf, are separated from each other by the bulliform cells and three or four layers of colorless parenchyma. The uncolored parenchyma is more conspicuous near the median nerve, where it is quite strongly developed. In this species the mesophyll does not occur between the bundles but is found only in immediate contact with chlorophyll bearing parenchyma (c b p).

The uncolored parenchyma cells are in immediate contact with stereome. The mestome bundles are entirely closed and do not have leptome (l) and hadrome (h) so well developed as in the other bundles. The leptome in the open bundles (i. e., having stereome in contact with both leptome and hadrome) seem to be in two parts, there being a depression on upper side of leptome.

The stereome occurs on the upper side of all bundles, and also on the lower side of all bundles except those which are entirely closed.

Below the uncolored parenchyma connecting the mestome bundles we find the stereome. The stereome occupies a prominent place on the sides of the leaf, forming on the left two triangular groups of cells separated by two layers of uncolored parenchyma. On the right side three such groups occur between the last four mestome bundles.

The chlorophyll bearing parenchyma can be divided into two parts. First, large parenchyma cells surrounding the bundles; these consist of rather large cells somewhat roundish in shape; second, elongated cells in one or more rows around the first.

SPOROBULUS CRYPTANDRUS.

The epidermal cells in this species do not differ from those described for *S. heterolepis*. The bulliform cells (b) are somewhat larger than those in the first species, usually two or three quite large cells and two smaller on each side. One or two groups of bulliform cells occur between a large mestome bundle, and, as in *S. heterolepis*, these do not occur between the last two bundles.

The carene (c¹) has one mestome bundle (m) which is open on both sides. It is somewhat larger than other mestome bundles. The leptome (l) and hadrome (h) are separated from each other by thick-walled parenchyma (p¹); two rows of thick parenchyma occur around the leptome.

The mestome bundles are of three types: First, those open above and below; second, those open above only, and third, such as are entirely closed. Those of the third type are more numerous than others. One mestome bundle is entirely closed and at the side of the leaf, those of the third type alternate with those of the second and first types. The second type is more numerous than the first. Ten bundles occur on each side of the carene. The mestome bundles of the third type are usually found between two groups of bulliform cells. The chlorophyll bearing parenchyma (c. b. p.) is about as in *S. heterolepis*. The leptome in this species differs from leptome in *S. heterolepis* in not being depressed on the upper side.

The stereome (st) is found on the lower side of all bundles, and also upon the upper side of all bundles except those of the third type. The cells of the stereome are not so thick walled as in *S. heterolepis*.

The mesophyll consists of elongated cells in one or two rows around each mestome bundle. There seems to be mesophyll connecting the bundles beneath the unclosed parenchyma. The unclosed parenchyma is found in one or two rows around the bulliform cells in contact with the mesophyll.

SPOROBOLUS HOOKERI.

The epidermal cells (e) of this species are small, thick walled and uniform in size, they are more roundish than in

other species. The cuticle (c) and cell wall, are well developed in this species. The leaf is strongly involute on the upper surface and here we also find papillae.

The bulliform cells (b) are also much larger than in the other species, there being four to six in a row, sometimes one large central cell and sometimes two large central cells with two smaller bulliform cells on either side of the large ones.

The carene (c), in this species consists of five mestome bundles (m), three very small, a large central, and one medium in size. The leptome (l) and hadrome (h) are fully developed in the two large bundles. The hadrome is separated from the leptome by two layers of thick walled parenchyma. One small mestome bundle occurs on each side of the medium bundle.

The mestome bundles are all connected with each other by the mesophyll (m).

The mestome bundles number thirty-eight, eighteen on left and twenty on right side of carene (c). In this species three types of bundles occur: First, those open on both sides; second, those open above only; and third, those entirely closed. Those of the third type are of two sizes one very small, the other somewhat larger. The mestome bundles of the third type predominate. The sides of the leaf terminate with a closed bundle. In the mestome bundle of the second type the leptome and hadrome seem to be in immediate contact with each other, but in those of the first type they are separated by thick-walled parenchyma. The chlorophyll bearing parenchyma does not differ materially from that found in other species.

The stereome (st) is on the lower side of all the bundles and on the upper side of those of the first and second type. The leaf also terminates with irregular groups of stereome. The stereome is quite well developed in the carene where it occurs in large groups.

The mesophyll (mes) in this species connects the different mestome bundles and consists of both round and elongated cells.

The uncolored parenchyma is more strongly developed in this than in any of the other species of *Sporobolus* studied. It is prominent in the midrib, where it occupies the space above the five mestome bundles. It also occurs immediately below the bulliform cells and on the upper side of the mestome bundles

(m) of the second type connecting these bundles with the stereome.

SPOROBOLUS VAGINAEFLORUS.

In this species the epidermis (e) resembles that of other species except the cuticle (c) which is much more fully developed.

The bulliform cells (b) in this species differ much from those of other species, they are very irregular in outline, the cells ranging in number from eight to ten, and occur almost the entire length of the leaf except near the sides where we find the uncolored parenchyma (p).

The carene (c') consists of one mestome bundle which has stereome in contact with leptome (l). This is the only bundle which is open. On either side of this median bundle there are three or four small closed bundles. The leptome and hadrome (h) are separated by thick walled parenchyma. The mestome bundles number twelve, five to the left and six to the right of the carene. The bundles are of two types: first the median one which is open below and the second, closed; the bundles of this latter type are of two sizes, one very much smaller and the other nearly as large as that of the median nerve. The well developed leptome and hadrome in the median nerve and the larger bundles of the second type are characteristic. The smaller mestome bundles predominate, numbering nine in a leaf. The sterome occurs on upper and lower surface of the mestome bundles of the carene, and large sized mestome bundles of second type, but none are found in contact with smaller sized bundles.

The cells of the chlorophyll bearing parenchyma (c. b. p.) in this species are much smaller than the cells of the other species.

The uncolored parenchyma (p) is found only at the edges of the leaf above the last two mestome bundles.

PANICUM.

The large genus *Panicum* is widely distributed in tropical and warmer countries with a goodly number in temperate climates. The representatives studied by us are common species in the Mississippi valley and southward. The three species, *P. capillare* L., *P. proliferum* L., and *P. crus-galli* L., grow in moist places or where there is considerable rainfall. The weedy *P. capillare* is perhaps an exception, as it is adapted to a wider range of climatic conditions, the structure of the leaf

plainly shows that it can adapt itself to different conditions of soil and moisture.

PANICUM CAPILLARE.

This species has a hairy appearance and is harsh to the touch. The epidermal cells (e) are large, the cuticle (c) and epidermal cell walls are thicker than in *P. crus-galli* and *P. proliferum*, but not so well developed as in the genus *Sporobolus*. The walls of the epidermal cells of the upper and lower surface of the leaf have small conical projections (cp). The end of the leaf terminates in a small thickened point; on the edges of leaf occurs a bundle of stereome (st).

The bulliform cells do not vary much from the epidermal cells, they are somewhat larger, however, and vary in number from three to five, the middle cell being the largest. The carene (c') has one mestome bundle (m) differing from those of secondary veins only in that it is larger, and being open on both upper and lower side. The mestome bundles are of three types: first, those which are open both above and below, second, those which are open below, and third, those which are closed. The leptome (l) is separated from hadrome (h) by thick walled parenchyma (p). In this species the arrangement of mestome bundles is irregular, the number varies from forty to forty-three bundles in one leaf. There are from twenty to twenty-two bundles on each side of the carene, and of these, three on each side are of the first type, three of the second type and the remaining of the third type. In the closed mestome bundles the leptome and hadrome are not so well developed as in those which are open. The stereome occurs on the upper and lower surface of all open mestome bundles, while in those which are closed it is found sometimes on the upper surface and sometimes on the lower surface, and sometimes it is entirely wanting. It consists of from two to four rows, bordering immediately on the chlorophyll bearing parenchyma (c b p). At the sides of the leaf well developed stereome occurs for the purpose of protection.

The mesophyll (mes) consists of elongated cells joining the chlorophyll bearing parenchyma. Between the mestome bundles surrounded by the mesophyll, we have colorless parenchyma.

PANICUM PROLIFERUM.

In this species the epidermal cells are much smaller than in *P. capillare*, and the conical projections (c p) are found more

strongly developed only on the upper surface of the leaf; they are much more numerous than in *P. capillare*, but not nearly so sharply defined. The cuticle (c) is not so strongly developed as in *P. capillare*.

The bulliform cells vary from two to five, usually consisting of one large or two large central cells. The leaf is not so strongly involute in this species, but the bulliform cells (b) extend farther down into the mesophyll (mes) than in *P. capillare*.

The carene (c¹) has one mestome bundle (m), which is open at the lower side. There are from forty to forty-five mestome bundles in the leaf, the median being the largest. On either side of the carene are five small mestome bundles entirely closed, then occurs a secondary bundle on each side resembling the carene, only much smaller. The leptome is separated from the hadrome in the carene by thick-walled parenchyma cells (p).

The mestome bundles are of two types; first, such as are open below, and second, those that are entirely closed. The closed are much more numerous than the open; only six or seven open in the whole leaf. The leptome (l) and hadrome (h) are not well developed in the small bundles.

The mesophyll consists of elongated and somewhat loosely arranged cells of variable size. One larger surrounds the chorophyll bearing (c b p) parenchyma cells and comes in contact with the stereome (st); the space between the mestome bundles and beneath the bulliform cells is also filled with them.

The stereome is found on the lower side of all bundles, in contact with the parenchyma and epidermis, and also on the upper surface of all the larger mestome bundles.

PANICUM CRUS GALLI.

The most obvious difference between *P. crus-galli* and *P. capillare* is that in this species the leaf is not involute; the epidermal cells (e) are large; the cell wall and cuticle (c) is not so strongly developed but conical projections are found on both surfaces of the leaf.

The carene has one mestome bundle (m). It differs from the other species studied in that the stereome is not in direct contact with the leptome (l) and hadrome (h) but is separated from them by two rows of thick walled parenchyma (p), while the leptome and hadrome are in direct contact with each other.

The mestome bundles are of two types; first, those that resemble the open bundles of other species, only that in this case they are surrounded by thick walled parenchyma outside of which, on two sides occur the chlorophyll bearing parenchyma cells (c b p); second, those that are entirely closed.

The mestome bundles are differently arranged in this species, a small mestome bundle occurs beneath the bulliform cells, this bundle is smaller than the one occurring between the bulliform cells, but is of the same type. Surrounding the bundles of the first type are small chlorophyll bearing cells and more numerous than in the other species studied. The chlorophyll bearing parenchyma cells surrounding those of the second type are larger than those of the first type, but not as large as those of the other type. In this species the leptome and hadrome are in immediate contact while thick walled parenchyma cells surround both.

The stereome is found on the upper and lower surface of all mestome bundles of the first type and separated from leptome and hadrome by thick walled parenchyma. Stereome does not occur around the mestome bundles beneath the bulliform cells. The mestome bundles between the bulliform cells are always closed below and sometimes entirely so.

The mesophyll consists of both elongated and round cells bordering on the chlorophyll bearing parenchyma.

COMPARISON.

A comparison of the two genera shows that in the genus *Sporobolus* the cuticle and cell walls are much more strongly developed than in the genus *Panicum*.

The mestome bundles in *Panicum* are more numerous than in *Sporobolus*. The epidermal cells in *Sporobolus* are uniform in size, in *Panicum* variations occur in different species, while in *P. crus-galli*, the epidermal cells on both sides of the median nerve are smaller than elsewhere on the leaf.

The bulliform cells are larger and more numerous in *Sporobolus* than in *Panicum*.

CONCLUSIONS.

We feel safe in concluding from our study of these genera that the anatomical characters are marked and constant enough to readily enable one to distinguish the species, and along with the work of others it shows that anatomical characters may be used as a basis for the separation of genera and some species.

EXPLANATION OF PLATE VI.

In all figures the same letter is used for the same character — c, cuticle; e, epidermis; st, stereome; m, mestome; c b p, chlorophyll bearing parenchyma; b, bulliform cells; mes, mesophyll; h, hadrome; l, leptome; c p, conical projections. All figures drawn with camera to the same scale. General drawings $\frac{1}{2}$ inch objective; detailed drawings $\frac{1}{4}$ inch objective.

Figures	I, II,	III,	<i>Sporobolus heterolepis.</i>
"	IV,	V,	" <i>vaginæflorus.</i>
"		VI,	" <i>Hookeri.</i>
"	VII, VIII,		" <i>cryptandrus.</i>
"	IX, X,		<i>Panicum proliferum.</i>
"	XI, XII,		" <i>capillare.</i>
"	XIII, XIV,		" <i>Crus-galli.</i>

A COMPARATIVE STUDY OF THE SPORES OF NORTH AMERICAN FERNS.

BY C. B. WEAVER.

Ferns have been objects of interest to botanists and cultivators; they have therefore been studied more than many of the flowering plants. Their simple structure and the apparently well defined limitation of species has rendered them easier for purposes of study than many of the groups of Phaenogams.

The purpose of this paper is to make a small contribution toward our knowledge concerning the spore characters of the different genera and species of North American ferns.

The measurements of a few spores are here given:

NAME.	Locality.	Length and breadth of largest spore.	Length and breadth of small-est spore.	Length and breadth of medium sized spore.	DESCRIPTION OF THE SPORES.
<i>Polypodium vulgare</i>	Mo.....	72.6-49.5	56.1-39.0	69.3-46.2	Spores large, smooth.
<i>Polypodium tectum</i>	Mo.....	49.5-33	39.6-29.7	46.2-26.4	Spores smooth on surface.
<i>Notholaena ferruginea</i>	Mass.....	56.8-75.2	66-66	69.3-66	Spores large.
<i>Adiantum capillus-Veneris</i>	Ark.....	52.8-49.5	36.6-36.3	42.9-39.6	Medium size, somewhat irregular, slightly smooth.
<i>Adiantum pedatum</i>	Ark.....	49.5-46.2	42.9-36.3	46.2-42.9	Same as A. capillus-Veneris.
<i>Pteris aquilina</i>	Del.....	36.3-33	29.7-23.1	36.3-33	Spores small, spiny, rough, uniform in size.
<i>Cheilanthes Alabamensis</i>	Tenn.....	51.1-46.2	33-33	49.5-46.2	Spores medium size, slightly roughened.
<i>Cheilanthes lanuginosa</i>	Iowa.....	62.7-42.9	52.8-42.8	59.4-49.5	Spores large, spiny and slightly roughened.
<i>Cheilanthes tomentosa</i>	Tenn.....	45-51	33-42	33-45	Similar to W. radicans.
<i>Pellaea atropurpurea</i>	Iowa.....	82.5-75.9	66-62.7	66-69.3	Spores small; membranous structure not so prominent as in some other species.
<i>Woodwardia radicans</i>	Cal.....	69.6-52.8	49.5-39.6	62.7-52.8	Spores oblong, large, not particularly characteristic.
<i>Woodwardia angustifolia</i>	N. Y., L. I.....	39-51	33-39	36-42	Spores small; membranous structure not so prominent as in some other species.
<i>Asplenium trichomanes</i>	Wis.....	33-26.4	26.4-23.1	33-23.1	Spores vary in size, not very rough, reticulated.
<i>Asplenium angustifolium</i>	Mo.....	23-48	24-36	30-42	Spores average size, elliptical with rough surface.
<i>Asplenium Filix-foemina</i>	Iowa.....	42.9-29.7	33-23.1	33-25.4	Spores medium size, somewhat roughened.
<i>Camptoson rhizophyllum</i>	Mo.....	36.3-29.7	33-29.7	46.2-23.7	Spores rough.
<i>Phegopteris Dryopteris</i>	Wis.....	42-27	36-18	33-24	Spores similar to P. Dryopteris quite rough.
<i>Phegopteris hexagonoptera</i>	N. Y.....	57-42	27-21	54-30	Spores not characteristic, rough.
<i>Aspidium Novelboracense</i>	Conn.....	49.5-33	42.9-36.3	49.5-29.7	Spores medium size, quite rough.
<i>Aspidium Thelypteris</i>		56.1-39.6	49.5-36.3	56.1-31	Spores not large, usually elliptical, some round.
<i>Aspidium marginale</i>		46.2-39.7	39.7-29.7	39.6-29.7	Spores medium size, very spiny.
<i>Aspidium Lonchitis</i>	Utah.....	36.6-29.7	33-23.1	33-33	Spores not as spiny as C. bulbifera.
<i>Cystopteris bulbifera</i>	Minn.....	39.6-29.7	33-26.4	33-26.4	Spores large, very smooth, nearly round.
<i>Cystopteris fragilis</i>	Mex.....	48-36	39.5-46.2	42-33	Spores similar to O. sensibills, not so large.
<i>Onoclea sensibilis</i>	Iowa.....	72.6-53.4	49.5-46.2		Spores very large, smooth surface, remarkable for size.
<i>Onoclea Struthiopteris</i>	Wis.....	57-39	39-39	54-45	Spores rough, resemble S. pusilla in structure, but much smaller.
<i>Woodia Livenis</i>	Wis.....	59.4-46.2	42.9-33	49.5-46.2	Spores similar to O. regulis, not so large.
<i>Schizaea pusilla</i>	N. J.....	105.6-69.3	63.3-62.7	89.1-62.8	
<i>Osmunda regalis</i>	Mo.....	66-66	46.2-46.2	62.7-59.4	
<i>Osmunda Claytoniana</i>	Iowa.....	48-30	36-36	45-27

EXPLANATION OF PLATE.

No.		No.	
1.	<i>Acrostichum aureum</i> .	31.	<i>Asplenium Thelypteroides</i> .
2.	<i>Polypodium vulgare</i> .	32.	<i>Asplenium Filix-foemina</i> .
3.	<i>Polypodium falcatum</i> .	33.	<i>Scolopendrium vulgare</i> .
4.	<i>Polypodium Californicum</i> .	34.	<i>Camptosorus rhizophyllus</i> .
5.	<i>Polypodium pectinatum</i> .	35.	<i>Phegopteris calcarea</i> .
6.	<i>Polypodium aureum</i> .	36.	<i>Phegopteris Dryopteris</i> .
7.	<i>Gymnogramme triangularis</i> .	37.	<i>Phegopteris Polypodioides</i> .
8.	<i>Notholæna ferruginea</i> .	38.	<i>Phegopteris alpestris</i> .
9.	<i>Notholæna nivea</i> .	39.	<i>Aspidium spinulosum</i> .
10.	<i>Vittaria lineata</i>	40.	<i>Aspidium Oreopteris</i> .
11.	<i>Adiantum capillus-Veneris</i> .	41.	<i>Aspidium Noveboracense</i>
12.	<i>Pteris longifolia</i> .	42.	<i>Aspidium Thelypteris</i> .
13.	<i>Pteris cretica</i> .	43.	<i>Aspidium acrostichoides</i> .
14.	<i>Pteris longifolia</i> .	44.	<i>Aspidium unitum</i> .
15.	<i>Cheilanthes microphylla</i> .	45.	<i>Aspidium Lonchitis</i> .
16.	<i>Cheilanthes Alabamensis</i> .	46.	<i>Nephrolepis exaltata</i> .
17.	<i>Cheilanthes viscida</i> .	47.	<i>Cystopteris bulbifera</i> .
18.	<i>Cheilanthes lanuginosa</i> .	48.	<i>Onoclea sensibilis</i> .
19.	<i>Cryptogramme acrostichoides</i> .	49.	<i>Woodsia obtusa</i> .
20.	<i>Pellaea gracilis</i> .	50.	<i>Woodsia Ilvensis</i> .
21.	<i>Pellaea atropurpurea</i> .	51.	<i>Woodsia glabella</i> .
22.	<i>Pellaea andromedæfolia</i> .	52.	<i>Dicksonia punctilobula</i> .
23.	<i>Pellaea ternifolia</i> .	53.	<i>Trichomanes Petersii</i> .
24.	<i>Ceratopteris thalictroides</i> .	54.	<i>Lygodium palmatum</i> .
25.	<i>Lomaria spicant</i> .	55.	<i>Aneimia adiantifolia</i> .
26.	<i>Blechnum serrulatum</i> .	56.	<i>Aneimia Mexicana</i> .
27.	<i>Woodwardia radicans</i> .	57.	<i>Osmunda cinnamomea</i> .
28.	<i>Asplenium pinnatifidum</i> .	58.	<i>Osmunda regalis</i> .
29.	<i>Asplenium trichomanes</i> .	59.	<i>Schizæa pusilla</i> .
30.	<i>Asplenium firmum</i> .		

These tables show that there are differences with respect to size and character of species; in some genera species show marked differences in size of spores. *Schizæa pusilla*, the smallest of our ferns, has the largest spores of any species examined. *Onoclea Struthiopteris* has relatively small spores.

Fig. 56. Spores of ferns,
Aneimia Mexicana.

Fig. 58. *Osmunda*
regalis.

Fig. 59. *Schizæa*
pusilla.

THURSDAY, OCTOBER 14, 1847.

[For the Davenport Gazette.]

Review of some Botanical observations, made during the last season;— principally in the vicinity of Davenport, and Rock-Island.

(BY C. C. PARRY.)

The general interest which attaches to the natural productions of a new country, induces me to present to your readers a brief review of some *botanical observations* furnished by the last season, embracing a flowering interval of about six months.

During this period, including an absence of two months into the interior of Iowa, about 500 species have come under my notice, containing specimens, of 100, out of the 170, *Natural Families* of North-American plants. Of this number, about two-thirds, are common to the states east of the Alleghanies; many are found in the Southern States; the remainder may be considered characteristic.

Comprised in my list, upwards of 50, or about one in ten, are recognized as medicinal in the United States Dispensary. The poisonous plants are few, and not of that kind that would be apt to tempt the inexperienced.

Several of the plants, possess *esculent* roots, which were in use among the Indians as articles of food.

The striking difference, that marks plants of the same species, common to the east, is a greater rankness of growth and productiveness; the *pigmies* of the light fern soils, becoming complete *giants* here. According to my observation, the number of *species* over an equal extent of country, is *less* than at the east, corresponding with a less variable condition of

soil; on the other hand the number of *individuals* is much greater.

The varieties of forest trees are comparatively small; and there is a characteristic absence of plants invariably connected with the Pine growth materially diminishing our Flora.

The number of ferns is likewise small.

With regard to the probable extent of our State Flora; embracing as it does an extensive prairie country including on the north west, a portion of the high table land known as "*the hill of the meadows*," on east and west the valleys of the Mississippi and Missouri with their characteristic vegetation; gathering on the south most of the plants peculiar to the broken country of the State of Missouri; and on the north encroaching on the lake region towards the sources of the Mississippi. From these geographical data confirmed by observation, we may safely infer, that when thoroughly examined our Flora will present a variety and richness second to no State in the Union.

The published list of plants collected by Mr. Geyer, contained in Nicolle's report of the exploration of country, between the Mississippi and Missouri rivers, contains 446 species, about one-half of those there enumerated I have observed this season, with an additional 250 not there contained.

Besides this I have derived assistance from the complete and extensive list of Dr. S. B. Mead, of Hancock co., Ill., containing over 900 species; my own observations thus far have coincided very nearly with his and I have seldom met with plants not there contained.

I select from my list a few plants that would seem to possess special, or general interest, merely noting that where the locality is not mentioned they may be found in the vicinity of Davenport.

LIST.

Anemone Caroliniana, May, banks of the Mississippi. Davenport and Rock Island. This interesting little plant, first known as a native of the Carolinas, is also found on the Platte and at Council Bluffs. It has never to my knowledge been found so far to the north and east. It here grows always associated with *Draba Caroliniana* and *Androsace occidentalis*.
Anemone cylindrica, June, dry praries, abundant.
Delphinium azureum, June, azure Larkspur, interior counties.
Nasturtium tanacetifolium, May, pastures and river banks.
Polygala (new species)? Polk county.
Hypericum pyramidatum, July.
Ptelia trifoliata, June, a shrub, the inner bark I am informed constituting an important ingredient in the kinnikinnick smoked by the Indians. It possesses pungent properties.
Negundo aceroides, April, Box Elder.
Fesculus glabra, Buckeye, interior counties.
Euonymus atropurpureus, June, Spindle tree, medicinal.
Rhamnus lanceolatus, May.
Ceanothus ovalis, June, interior counties.
Psoralea argophylla, July, Polk county.
Amorpha fruticosa, May, a shrub lining our river banks.
Amorpha canescens, July, Lead plant, abundant.
Astragalus caryocarpus, July in fruit, Ground plum, Polk county.
Baptisia leucophea and *leucantha*, Indigo plant.
Cassia eschschrista, Aug., sensitive pea.
Gymnocladus canadensis, June, coffee tree.
Potentilla arguta, July.
Fragaria vesca, rock strawberry.
Cratægus tomentosa, June, an elegant species of thorn.
Oenothera serrulata, July, Polk county.
Myriophyllum ambiguum, July, brooks in the Upper Des Moines.
Ribes Missouriense, May, Missouri gooseberry, common.

Heuchera richardsonii, alum root, June.
Eryngium aquaticum, July, Rattle-snake weed, a prairie plant.
Archemora rigida, Aug.
Liatris, [several species,] Aug., Blazing star, showy prairie plant.
Aster sericeus, Sept., *Aster oblongifolius*, characteristic *Asters*.
Solidago rigida, Aug., a coarse and characteristic prairie plant.
Solidago speciosa, Aug., Golden rod.
Silphium laciniatum, July. The well known rosin weed.
Silphium perfoliatum, cup plant.
Rudbeckia subtomentosa, Aug., cone flower.
Lepachys pinnata, Aug.
Echinacea angustifolia, June, a common prairie plant.
Helianthus occidentalis, August.
Actinomeris squarrosa, August.
Coreopsis palmata, July.
Dysodia chrysanthemoides, Sept., resembling the cultivated marigold.
Artemisia ludoviciana, wooly *artemesia*.
Cacalia tuberosa, July, Indian plantain.
Nabalus racemosus, Sept., prairies.
Troximon cuspidatum, May.
Apocynum pubescens, Polk county.
Acerates longifolia, July.

Asclepias [periplocæfolia?] Nutt, June.
Phlox bifida, April.
Batschia longiflora, May, Davenport and Rock Island.
Batschia gmelini, June.
Onosmodium hispidum, June, gromwell.
Hydrophyllum appendiculatum, June.
Ellisia ambigua, May, a characteristic weed.
Scutellaria parvula, small skull cap.
Dracocephalum virginianum, August, Drag mouth.
Chelone purpurea, August, Snake head.
Pentstemon grandiflorum, Red Cedar river, found by A. Sanders.
Euchroma grandiflora, in fruit, July, Polk co.
Verbena angustifolia, stricta, and bracteosa, characteristic vervains.
Dodecatheon media, May, "Pride of the prairie."
Allionia nictaginea, May, allied to the cultivated "Four-o'clock."

uphorbia corollata, Spurge, common on dry
prairies.
roton ellipticum, streets of Davenport, aromatic.
ypripedium candidum, 'white moccasin flower.'
rythronium albidum, April, adder tongue lily.
ioscorea villosa, a representative of the Yam
family of tropical countries.
halangium esculentum, May, an edible root
used by the Indians.

DAILY GAZETTE

SATURDAY, MARCH 13, 1869.

Academy of Sciences.

Dr. C. C. Parry's Farewell Address.

AN ABLE SPEECH.

Changes in Local Flora and Fauna.

INTERESTING REMINISCENCES.

Donations Received---New Members---
The Good Bye.

The regular monthly meeting of the Davenport Academy of Natural Sciences was held last evening. The occasion was one of much interest, it being expected that Dr. C. C. Parry, President of the Association, would deliver a farewell address, he having been appointed Superintendent of the National Botanical Gardens at Washington, to which city he is about to remove. There was a large attendance of members and citizens, together with several ladies. Dr. Parry presided.

After the usual order of business had been attended to, several

DONATIONS

to the Library and Cabinet of the Association were reported, the most prominent of which were: Owen's Geological Survey of the Northwest, Nicholas Fejervary donor; a box of Geological Specimens from Ottawa, Illinois, Dr. Paul, donor; Report of Exploration for Kansas Pacific Railroad, Dr. Parry, donor; Marine Plants and Shells from Portland Natural History Society, Me.

NEW MEMBERS

were then elected. Dr. M. B. Cochran, W. F. Roes and S. J. Sanger were admitted as regular members, and W. N. Byer, of Denver, O. T., H. N. Bolander, of San Fran-

Wislizenus, of St. Louis, and Dr. John Torrey, of New York, were elected corresponding members.

Dr. Hazen read a very interesting paper on Optics.

PRESIDENT PARRY'S ADDRESS

was then delivered. The Doctor spoke as follows:

Gentlemen of the Davenport Academy of Natural Sciences:

It had been my intention in watching the practical workings of this Academy, to suggest certain modifications, and courses of action, such as in my judgment might conduce to its present efficiency and prospective usefulness; but I did not expect thus early and prematurely to be called on to dissolve my pleasant connection with its active membership. While, under these circumstances, I feel that any extended considerations would be unwarranted, I cannot, in justice to my own feelings, and the friendly courtesy which has placed me in the position of your presiding officer, neglect this opportunity to make a few suggestions in reference to the Academy's future management and prospects.

The objects of such an Academy of Natural Sciences, as indicated in its constitution, are the cultivation of a taste for Natural History pursuits, and the stimulation of research in the different branches of science, by those whose cultivated tastes and educated abilities qualify them for such work.

The first object specified exhibits the relations which such an institution sustains to the community in which it is located. The second has particular regard to its active membership. How can these most desirable objects be best accomplished? is the practical question for our consideration.

And in order to awaken a general interest in the observation and study of natural objects and local phenomena, we need, first and foremost, collections in all the separate departments of Natural History, classified and properly displayed before the eye, so as to suggest at once ideas of order, system and plan--in brief, we must have museums, and their contents must be accessible and attractive to the observing public, and thus serve to convince those who may be otherwise absorbed in business pursuits, that there are objects of study at least deserving the attention and regard of a progressive, utilitarian age. When such collections are once fairly commenced, even on the most limited scale, the peculiar individual tastes and appetites, or even the accidental biases of different minds, will be attracted to the various branches of science so exhibited, and we shall see gradually growing up under its influence workers prepared to follow out particular lines of research and investigation. In this way the objects and aims of

speedily attained in diffusing and increasing a knowledge of Natural Science in the community where it is located.

In the comprehensive view of the case, we see the particular need of such an institution, particularly in its early stages of growth, viz.: A *permanent location*, where its objects can be properly displayed, and affording room for necessary enlargement. This want will become more pressing as collections enlarge, and is even now beginning to be seriously felt in the necessities of this Academy. We have a name, and a good one—we now want a "local habitation," and where shall we find it? In older communities where the ordinary course of business is more settled, and where there is less strain upon the mental faculties in the pursuit of wealth, or where wealth has been accumulated to such an extent that it becomes a point of earnest inquiry to know how it may be best used, we not unfrequently meet with those who assume a wise patronage of science, and aim to place institutions designed for its promotion in the possession of necessary funds. To such wise promptings we owe the rich endowments of eastern colleges, or the munificent gifts of Peabody. But here in the west where every one is intent on securing wealth by the most rapid process, or having thus attained it, continue to cherish the excitement of gain to the exclusion of higher motives, we cannot expect to meet with patrons of science who will take such institutions under their fostering care. Perhaps our Davenport *Peabody* is being lulled to sleep in its purses' arm, or has not yet appeared upon the stage of existence. Therefore, in the long intervening period, the Davenport Academy of Natural Science must reasonably look to other sources for its successful continuance. The plan of life membership affords the most feasible plan of securing the necessary means for procuring a permanent location, and could sufficient interest be awakened on this subject among our active, prosperous business men, something might be done to secure the desirable consummation. How this may be most speedily accomplished does not yet appear, but I trust that gentlemen here who have been active in the organization of this Academy will keep this object in view till something definite is brought about in the shape of a permanent location. Till this is done we shall be at the mercy of the elements of fire and water—if not earthquakes—and if subject to frequent removals, might as well have a few strokes of the latter to assist in the *moving process*.

Again, as I have had frequent occasion to remark, the educational claims of Natural Science are but very dimly appreciated, even in this utilitarian age and country, whose astonishing progress is largely due to the applied results of scientific investigation. We are profuse in our expenditure of funds raised by general taxation to impart a knowledge of dead and living languages, or the dull abstractions of technical grammar,

almost entirely the things and living objects that enter so largely into the observations and wants of every day life. As long as the community at large is satisfied with this kind of education, and is willing to pay well for it, so long will educators neglect Natural Science, and teachers as a class will keep aloof from the meetings of such an Academy as this. But let the claims of Natural Science be once fairly admitted, and we shall have scores of teachers crowding within these halls, consulting our museums and libraries, taking an active part in our exercises, while at present we can barely number two worthy representatives of this important class. No small honor will in after times attach to those who uphold the cause of science, as an educational power, during the period in which it is little esteemed, or regarded as visionary and Utopian in its aims and purposes.

Another tendency which in such a young undeveloped institution, it is necessary to guard against, is a disposition to run into loose theorizing and a presentation of subjects in their purely theoretical aspects, vague, shadowy and undefined. While it is eminently proper that our discussions of suitable subjects should be allowed to take the widest possible range, and nothing professing to be true should be excluded from a free and fair exhibition of its claims to attention, however much it may clash with our preconceived opinions, yet our chief and paramount duty is to collect substantial facts, arrange them properly, let them accumulate even in their roughest aspects, and leave them to be shaped afterwards, and construed into theories in which each ascertained fact shall represent a polished and well fitting block in the great temple of truth. Mud built, or adobe theories, may answer well enough for a temporary structure, but cannot be relied on to withstand the vicissitudes of an age that tries with its frost, and fire, and flood everything that aims to rise above the common level, reducing all that is unsubstantial to its kindred dust.

I need only further remark that as a local scientific institution our chief efforts should be primarily directed to develop and bring to light the scientific raw material, and objects of interest, or the peculiar local phenomena by which we are surrounded. I think in this connection it is not sufficiently appreciated, as to the importance of early observations and collections in new localities. The natural Flora and Fauna of a country undergoes great changes in the progress of civilized settlement, and the important law which regulates these changes, can only be properly understood in the light of comparison. I have been lately forcibly reminded of this fact by observing the remarkable changes which the natural vegetation in this vicinity has undergone within my recollection. Plants that twenty years ago I could find within range of a short walk from where we are now assembled, have now almost entirely disappeared from view,

ident to alter the whole aspect of vegetation. In many respects the changes are disagreeable in the substitution of introduced weeds of coarse and homely aspect, for the native denizens of the soil. The prairies that surround us to-day, are no longer the prairies of twenty-two years ago. Even a spot which I have religiously cherished as a botanizing ground, comparatively free from intrusion as the last resting place of the dead, has been taken possession of by the *blue grass* and *white clover*, and I can no longer find the *prairie primrose*, the *moocassin flower*, or the *gentian*, which formerly flourished there. I have noted the same kind of changes in process on the Rocky Mountain slopes. So that I feel the urgency and importance of early collections of Natural History to inform those who may come after us of the aboriginal aspects of our surrounding country.

The same is, no doubt, also true in regard to animals and insects. Introduced species supplant the native, till the organized aspects of a country become entirely changed. This fact is probably not as applicable to minerals and geological formations, which Nature most carefully protects in her covered museums. Yet, still our coal beds and quarries, in being worked out, will cause a dearth of fossils and minerals that if early collected would serve to give a more complete view of the various formations they bring to light.

I mention these facts, gentlemen, as a motive for industry and perseverance in the important work of making local collections. It would no doubt be a matter of interest and curiosity to know some about the Flora of Japan, or the mineral and animals of Independent Tartary, or Central Africa; but our nearest duty lies at Home. History is here making every day, and it is one important part of our duty to give it a record and permanence in our collections and transactions.

It will also be very desirable to commence the issuing of publications and transactions as early as possible. By this means alone shall we be brought into intimate relations with kindred associations elsewhere, and be entitled to receive that class of publications that we need to keep us well posted as the movements and progress of scientific research all over the world. Such publications need not be very extensive or elaborate, but should be continuous. If neglected so long, our name as an Academy of Science will pass out of view, and our corresponding members will forget their membership. This single suggestion is all that I feel authorized to offer at the present time.

In regard to membership I would recommend a rigid adherence to rules of admission and prompt payment of dues. No name, however desirable otherwise, should be allowed to remain our list, if needlessly delinquent in this respect. We shall need greenbacks much more than mere names, and unless the latter come with this associated recommendation they had better be left out.

might profitably, on a different occasion, call your attention, but at present the subject may be safely left to your reflection and an enlarged experience of your progressive wants.

In now assuming the less responsible duties of a corresponding member, I trust I shall find no occasion to forget my pleasant associations with this pioneer society, or to feel any diminished interest in its growth and success. Twenty-five years of the most active period of my life have been passed in connection with this home locality. I have seen the village of one thousand inhabitants increase twenty fold. In a certain sense I have not been an idle spectator, though I have occupied no coveted field, or sought for personal emoluments that might have been within my reach, I have been at least a zealous student in Natural History, and have no higher ambition than to be so regarded. I have endeavored to see and understand as much as I could of the country and districts in which my lot has been cast. I have not hesitated, on all suitable occasions, to use my pen and my voice in behalf of the educational claims of natural science. And in now assuming similar duties in a distant locality, I have only to regret that I have not worked harder and accomplished more.

With most sincere thanks for the courtesy that has marked our past relations, I now present my resignation of the Presidency of the Academy, and asked to be enrolled on the list of its corresponding members.

As the Doctor concluded his address, a deep feeling of regret was manifest on the countenances of the members of the Association. All felt the loss of his services as an active member of the Association to be a serious episode in its history.

On motion, Rev. James Challen, James Thompson and A. S. Tiffany were appointed a committee to draft resolutions expressive of the feelings of the Association in reference to Dr. Parry's removal, and the esteem cherished for him as a Scientist and as a citizen.

The Association then adjourned, and the members thronged about the Doctor and extended their farewells and God-speed.

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The Report of Prof. Sanford, Corresponding Secretary of the Society, (verbal,) was received and accepted.

Dr. Siveter offered an amendment to the Constitution, which,

On motion,

Was laid on the table.

On motion of Dr. Cole,

The Chair appointed a committee to report candidates for the various offices for the ensuing year. Drs. Cole, McGugin, Ransom, Shriener, and Ramage were appointed said committee.

On motion,

The Society adjourned until two o'clock, P. M.

AFTERNOON SESSION, 2 o'clock, P. M.

Society called to order.

The Report of the Board of Censors recommending Drs. La Force, J. Robinson, Wm. L. Orr and J. T. Huey, was read and accepted.

The following officers were then elected for the ensuing year, to-wit:

President—DR. D. L. MCGUGIN.

1st Vice President—DR. J. F. HENRY.

2d Vice President—DR. J. WITHERWAX.

Recording Secretary—DR. E. D. RANSOM.

Corresponding Secretary—PROF. J. F. SANFORD.

Treasurer—DR. RAMAGE.

Librarian—DR. RAUCH.

Censors—DRS. SIVETER, LOWE, SANFORD, FLINT, GRUBB, FORD, and MATTHEWS.

On motion,

Drs. Sanford, Matthews and Ramage were appointed a committee on publication.

A paper on Paronychia was read by Dr. E. Lowe.

Dr. Ramage, introduced the following resolution:

Resolved, That it shall be the duty of each member of this Society, upon removing beyond the State, to make the fact known to the Society, and such persons shall thereafter be considered members; and each gentlemen holding such membership shall be entitled to a certificate signed by the President and Secretary, and have affixed to it the seal of the Society.

Dr. Sanford, from the committee appointed to report upon the causes which contribute to depress the science and dignity of the medical

profession in Iowa, introduced the following report and resolutions, which were unanimously adopted :

R E P O R T :

Your committee deem it incumbent upon them, before they proceed to discuss the subject more particularly connected with this report, to allude briefly to the state of the profession in Iowa at the present time, by saying, that the defects which it is our duty to point out, are by no means peculiar to this portion of the west, but exist to an equal extent in almost every State in the American Union ; from an intercourse with the profession of different portions of the Union during the past few years, your committee can see no disparagement to the profession of Iowa; but as medical men should every where zealously labor to augment the moral power, and increase the usefulness of the profession, it is right that the obstacles to scientific progress should be clearly presented. If this is done, the influence of Medical Associations may contribute to their removal.

The want of a proper preliminary education in those who have entered the profession, is, perhaps, the most influential cause of the depressed state of medical science amongst us. This evil has been brought upon the profession of this State, by the course of physicians and Colleges in the Eastern and Middle States. A very small proportion of the medical population of the State have been admitted as students since their emigration to the West; they have been admitted destitute of the necessary qualifications into the offices of our Eastern brethren, and have received, with the same facility, the honors of the doctorate from the Eastern Schools. This being the case, and much of the evil being beyond the control of this Society, the committee do not deem it necessary to enter into an extended argument upon the importance of this subject, but will content themselves with a few suggestions as to the policy which this Society should earnestly recommend to its members, premising two reasons, cogent in their character, why the recommendation should be faithfully carried out.

The first is, that every community must form its estimate of medical men, from their proficiency in a knowledge of things adapted to popular comprehension, or their acquaintance with departments of learning which may be made familiar to the popular mind.

The adoption of this criterion by the public is not only right, but it is a tribute of respect to the true character of our science; besides acknowledging its legitimate connection with other branches of science and human accomplishments, assigning to these latter their true importance in the curriculum of study pertaining to a learned profession,

it practically asserts the truth, that an individual who will not render himself proficient in knowledge so easily accessible to all, will scarcely acquire a profound acquaintance with the principles of a difficult and abstruse science.

The second is more important, and refers to the influence of this delinquency upon the physician himself. The extensive relation that medicine must ever maintain with other branches of knowledge, deprives a physician who is ignorant of the general principles of natural science, of all those instrumentalities which are necessary to develop the resources of his profession; and it not only disqualifies *him* from adding to the existing stock of valuable facts, but excludes him also from participation in the benefits of many of those brilliant truths, whose development has so greatly distinguished the modern cultivators of our art.

Being thus deprived of the only means of attaining distinction in his profession, and uninspired by the lights that physical science throws around his path, he becomes indifferent to the progress, and often to the honor of the profession.

Regarding this as the basis of most that is wrong in the profession, the committee have appended to this report a resolution relative thereto, the adoption of which they respectfully urge upon the Society.

Another cause of the depression of medical science in this State, is the commencement, by young men, of the practice of the profession before they are thoroughly qualified. This evil had its beginning at a remote period, when the facilities for completing a medical education were beyond the means of a large number who annually entered the profession. But the praiseworthy multiplication of Medical Colleges has left no good reason for delinquency in this respect, and the habit of young gentlemen commencing practice when partially qualified, with a view of completing at some future time their medical education, should, in the opinion of your committee, be discouraged. Experience proves that they often fail to carry out their intentions—that the extraneous duties which may become incident to a life in the West, as well as the frequent addition of some other business to the practice of medicine, involve them in numerous responsibilities, from which they cannot, without a sacrifice few are inclined to make, disengage themselves. This contributes to lower the standard of acquirement in the ranks of the profession, and alienates the minds of many who engage in its pursuit with zeal and enthusiasm, from its subsequent cultivation.

If young men who engage in the study of medicine with respectable preparatory acquirements, would make everything secondary to their

final success in the study as well as the practice of the profession, it would rapidly bring about a new era in the condition of medical science in this State, and place it upon a more dignified and elevated basis.

A want of harmony in carrying out the great ethical and reciprocal obligations of our profession, is a serious obstacle to its progress amongst us. This proverbial strife among medical men, often leads them to abjure the influence and authority of medical associations, which have projected and set in operation important measures of reform. Personal influence and dignity are likewise lessened, and growing out of this dissociation are some of the worst evils that can curse a learned profession; jealousy, which would rob a brother of his hard earned fame, and instigate an opposition as incongenial to the true principles of science as are the demands of God and mammon; a competition which deprives the honest and capable physician of his daily and nightly earnings, or reduces them to a pittance barely adequate for his support, and totally insufficient to procure the means of successful study. This kind of competition, depriving the physician of adequate remuneration for his services, has been a principal means of driving into collateral pursuits many of the best physicians in our country, and especially young men of talents just entering the profession. Your committee know an old physician, in a beautiful city in this State, who is in the habit of purchasing an attendance upon some families, and of doing the practice of many others at a mere nominal sum, whenever a competitor of talents comes in his way. Such practices are highly reprehensible and degrading. No class of men are called upon to make the same sacrifices, to pass through the same exposures, and to incur the same responsibilities as physicians, and they should be rewarded according to their services. The general influence of this central association, pervading every part of the State, maintaining proper ethics and rules of amicable intercourse, will, it is hoped, diminish these evils.

The habit of some regular physicians of entering into consultation with quacks of various kinds, is another cause of professional depreciation, not sufficiently looked to. Although your committee are happy to say, that but few examples of this kind have fallen under their notice, still there are cases of this kind, and they always exercise an evil influence. Besides the absolute incompatibility of medical science with any form of empiricism, there is an obvious inconsistency in the amalgamation, which the community will not fail to perceive; since the general mass of our profession, impelled by a sense of duty, have constantly exposed and denounced these systems to the world.

The practice, pursued by some members of our profession, of vending and retailing nostrums, and lending their influence to the sale of nostrums, deserves the most decided reprehension. Scarcely less injurious is the practice of very many, in giving a tacit consent to the use of these iniquitous drugs. Some of the more popular, and seemingly harmless preparations, derive much of their importance in the public mind from the fact, that respectable regular physicians give their consent to their occasional use. A patient in a convalescent state, or afflicted with a chronic malady, will ask his physician if a bottle of Cherry Balsam, or Bull's Sarsaparilla, will not do him good, and, heedless of what he does, or from a desire to please the patient, he sanctions a resort to the miserable stream of filth and trash which is now inundating the country, with an influence scarcely less destructive than the curse of pestilence. Your committee cannot withhold the expression of a strong hope, that the Society will fulfil one of its most benevolent objects, by strongly impressing upon its members the importance of entering an earnest and decided protest against the use of all secret medicines upon any pretext whatever. This is the more important now, because organized quackery has but few representatives in Iowa; the great majority of the people at the present time favoring the regular profession, whose enlightened influence would, therefore, discourage, to a great extent, a resort to this species of quackery.

The practice of attending families by the year, as your committee believe, is calculated to forfeit, to the medical man, the permanent respect of the community. The medical services of an enlightened and benevolent physician are not to be made an article of traffic and bargain. His commerce is with health, the lives and happiness of the human race, and should be as free from purely mercenary influence, as his honor and reputation. But there is a principle of justice as well as propriety, outraged by this practice. If an intelligent man's estimate of a physician is not reduced by the mere fact of the bargain itself, it certainly is affected at the end of the year, when he comes to pay the physician \$15 or \$20 for nothing done, or for four times that amount of service. Again, physicians are often retained in a family by virtue of a contract of this kind, long after they have ceased to be preferred,—a circumstance which almost invariably causes them to lose the respect, as well as confidence of those who are thus bound. A physician who is not the first choice of a family, must always exercise his profession at a great disadvantage. Your committee would, therefore, urge the adoption of a resolution by this Society, calculated to discourage this practice, which, they are convinced, does much to degrade the profession.

Before bringing this report to a close, your committee would remark, that the evils they have felt it their duty to point out, are by no means incident to the profession generally. Their observations relate to individual instances, yet sufficiently numerous to justify what they have briefly said. Every member of the Society will appreciate the importance of individual rectitude, to the reputation of the whole profession, where lines of distinction are not fairly established. Our profession, as a whole, stands preeminent for public virtue, probity and usefulness, yet the individual short comings of its members have often excited a popular and erroneous prejudice against it. Instead of looking to physicians as the guardians of the greatest public and private blessings—as men whose profession qualifies them to sympathise with the misfortunes of those around them, independent of social caste or position—they look only at those who disgrace themselves and their profession, and thence imbibe the opinion that physicians are a burthen upon the body social, and opposed to the true interests of community.

1st. For the purpose, therefore, of true improvement in the profession.

2nd. That the influence of this State Society may be exercised against dishonest practices; and

3d. That a line of distinction may be drawn between regular and honorable physicians and those who are otherwise. Your committee recommend the adoption of the following resolutions:

Resolved, That the practice of admitting young men to the study of medicine without a respectable preliminary education, greatly contributes to depress the science, dignity and usefulness of our profession; and that this Society urge upon its members the propriety of examining all young gentlemen who apply for the benefits of private pupilage upon their preparatory education, with a view to discourage such as are deficient in this respect, from entering upon the study of a profession, in the ranks of which they can never attain preeminence, and the usefulness and dignity of which they are not competent to promote.

Resolved, That discussions upon scientific questions, connected more or less intimately with medical science, would promote a more accurate knowledge of the brilliant modern discoveries in Animal Chemistry and Human Physiology, and that to secure this object, it shall be the duty of the President at this, and each annual meeting hereafter, to appoint one member to read a paper at the next succeeding meeting, upon the various improvements and discoveries in medicine which have been made during the year, and one to read a paper upon the relations which the natural sciences bear to recent improvements and

discoveries, and their agency in developing the resources of the healing art, and that these papers shall be made the theme of an evening's discussion, during the sitting of the Society.

Resolved, That we will exert our influence both by precept and example, in sustaining our code of medical ethics, and that all evasions or infractions of the great moral law of the profession, will forfeit the claim of any physician to the fellowship or privileges of our Society.

Resolved, That the practice of attending families by the year, is deemed improper and mercenary by this Society, and that it strongly recommends to its members the discontinuance of a practice which is calculated to lower the moral standing of the profession, and lessen the respect of community for its members.

On motion of Dr. Sanford,

Resolved, That any local Medical Society in this State may become auxiliary to the Iowa Medical and Chirurgical Society, by pledging itself, by resolution, to conform to the Constitution, By-Laws and Code of Ethics, and to carry out the various recommendations which it may annually enunciate.

Dr. Rauch from the committee on the Medical and economical botany of Iowa, presented the following Report, which was read, adopted, and ordered to be printed with the proceedings of the Society.

REPORT.

In compliance with a resolution passed at the first annual meeting of the Society, "that a committee of three be appointed to report on the medical and economical botany of Iowa" at its next annual meeting, the following report is hereby presented:

In the absence of the chairman of the committee, the duty of preparing the report has devolved upon me. The difficulties I have labored under were many, as the botany of this State has been but little explored, and when first placed upon the committee, my own observation was limited, as I had been a resident of the State but a short time. Immediately after the organization of the Society last June, I endeavored to gain as much information as I possibly could by personal observation, at the same time collecting all the indigenous medicinal plants, so that by the end of the season I had quite a fine collection. It was my purpose to have presented duplicates of each plant to the Society at this meeting, but unfortunately my specimens were all destroyed. I shall, however, at some future period, endeavor to carry out my original intention, and would suggest to the members of the Society the propriety of preparing specimens of each plant found in their respective vicinities, and at every annual meeting present them to the Society. In this manner a fine herbarium of the

plants of this State could be collected, and individual members would also have an opportunity to exchange specimens, at the same time causing an interest to be excited throughout the State, in a study so pleasant and useful, and lamentable as it is, so neglected.

I do not, in any manner, pretend that this report embraces all the medicinal plants found within the precincts of this State, but submit it with the hope that it may form the nucleus around which the Medical Flora of our young and thriving State may be gathered.

In its preparation I have consulted the various reports of the Geological and other explorations made of this State by the Government, the botanical works of Torrey and Gray, Bigelow, Rafinesque, Riddell, Eaton, Nuttall, James, Wood, Griffith's Medicinal Botany, and the U. S. Dispensatory of Wood and Bache. I have arranged the plants according to the natural method, or that of Jussieu, and I have adopted the nomenclature of the "North American Flora" of Torrey and Gray. I would also express my indebtedness for much valuable information to Dr. James of Des Moines Co., who, as the companion of Long in his expedition to the Rocky Mountains, so fully described and explored the Flora of the Missouri and Platte rivers, also to Alfred Sanders, Esq. of Davenport, who has done much as an amateur botanist toward exploring and collecting the Flora of this State, Mr. Sanders, of Davenport, D. S. Sheldon, A. M., and myself at Burlington, will at any time be happy to exchange specimens with persons of this or any other State.

It must be remarked, more especially by those who have paid some attention to the botany of the Eastern States, and who have recently come to this State, that there is a vast difference in the size of plants found here, and those they have been accustomed to seeing, the same plants being nearly as large again, thus furnishing proof positive of the comparative depth and fertility of the soil. Another distinguishing feature is in the *color*, the petals of plants assuming brighter hues here than those produced on the lighter soils of the older States. The idea so prevalent that the prairies of the West are a Paradise for the botanist from the multiplicity of plants produced, as shown by the rich and brilliant corols that meet the admiring gaze upon every side, is entirely erroneous. *As a country becomes settled the botany increases.* Quite a large number of plants that have been introduced from foreign countries, follow the march of civilization, and soon become naturalized, while few if any of the indigenous species become extinct, but are merely diminished in number. The varieties of our Forest trees are but few, also of *Ferns* and those plants accompanying the Pine growth. Thus our Flora seems to be dimin-

ished, but when we take into consideration the scope and diversity of country embraced by the State of Iowa, the valleys of the Mississippi and Missouri rivers on the east and west, with their peculiar vegetation, the high table land on the northwest, the lake region upon which it encroaches on the north, and the Mexican Flora running into the south-western part of the State, confirmed even by the casual observation to which they have been subjected, we may safely infer that when thoroughly examined, Iowa will present a Flora inferior to that of no State in the Union.

With such an extensive field, that has as yet, comparatively speaking, been unexplored, I cannot help but call the attention of the members of the Society to the study of our indigenous medical botany. A subject pregnant with so much importance to the profession at large, to the community we live in, and to ourselves, cannot receive too much attention. The idea so prevalent, that our country does not produce as many *medicinal* plants, as the older countries of the eastern hemisphere, is entirely erroneous; apparently it is so, but the difference is simply this, the virtues of their plants are better known; and who, I would ask, is to bring forth from obscurity these hidden treasures? The answer every one will give is, the profession, the members of this Society; for this purpose you meet here, they would expect it from you, science expects it from you, humanity expects it from you, and duty expects it from you. You must not rest contented to think that you possess sufficient remedial means to combat disease, but rather think to the contrary; let your aim and object be, not to thrive and live upon what others have done before you, but let each one feel that it is his duty, yes, that he is morally bound to contribute his portion to the already great stores.

The science of medicine, as everything else, is progressing, let us, therefore endeavor to keep pace with it, let each of us do our duty, so that Iowa may take her proper position in the constellation of our Union, among her sister States, in *this* as well as in every other respect. The united efforts of the members of this Society, will accomplish great good, independent of the advantages that would be derived from the administration of the hidden virtues of many plants, and it would prove more conclusively to the minds of the public, that we *really, truly* and *emphatically* are *eclectics*, and would do more toward the dissemination of correct principles, with regard to the science of medicine, and the uprooting of that species of charlatanry, humbuggery and presumption, which seems to thrive upon the apparent remissness of the profession *in this respect*, and the credulity and prejudices of the public.

I would again urge upon the members of this Society, the necessity, yes, the duty of their paying more attention to the Medical Botany of our State; let all feel as if there was a specific for every ill to which the flesh is heir, and that possibly he may discover it, thus conferring a lasting benefit upon society, and immortality upon himself. Examine, experiment with every plant you meet with, be observant; most important medicines have been discovered by accident, and no doubt there are many plants in our new State that possess medicinal properties, totally unknown, and as it were

“Waste their virtues, on the prairie air.”

ORDER—RANUNCULACEÆ. Crowfoots.

This order possesses several plants that are highly esteemed in medicine, but they nearly all contain a very acrid and caustic principle of a volatile nature, which is dissipated by heat, or in the process of drying.

1. CLEMATIS.

Clematis Verticillaris, D. C. (*Atragene Americana*, Sims.) Whore leaved Virgin's Bower. Flower purple. Woods. Prop. diuretic and vesicant.

Clematis Virginiana. Virgin's Bower. Flowers W. Aug. Fences, &c. Prop. diuretic and vesicant.

Clematis Viorna. Leather flower. Flowers purple. June, July. Woods. Employed externally in the cure of itch, rheumatism, cutaneous eruptions.

2. ANEMONE.

Anemone nemorosa. Wood anemone. Low anemone. Flower white. April, May. Woods, hedges and open fields. Prop. causes bloody urine and convulsions in cattle. Tinea capitis.

Anemone cylindrica. Gray. Flowers white. April, May. Prop. similar to the other.

Anemone Virginiana. Virginian anemone. F. green. Woods. July. Rubefacient when recent.

Anemone Pennsylvanica aconstifolia. Mchx. F. white. June, July. Rocky place. Similar to the other.

Anemone patens. (*A. Ludoviciana*, Nutt.) F. purple. April. Dry hills. Prop. similar to the other.

3. HEPATICA.

Hepatica triloba. Chaix. (*Anemone Hepatica*, Lim.) Liverwort, Liverweed. Flowers blue, white and purple. Woods. April. Prop. astringent.

Hepatica obtusa. Blunt lobed liver-leaf. F. white. April. Hills. South side. Prop. astringent, diuretic.

Hepatica acuta. Liver leaf. Flowers white and purple. Hills, south side. Prop. similar to the other.

5. RANUNCULUS.

Ranunculus flammula. Small Spearwort. Official. July and Sept. Y. Wet places and swamps. Prop. acrid, rubefacient and vesicating. Distilled water, emetic.

Ranunculus acris. Buttercup. Crowfoot. Yellow Weed. Blister weed. Official. Y. June and Sept. Meadows and wet prairies. Properties similar to the other.

Ranunculus bulbosus. Bulbous Crowfoot. Official Y. May and June. Fields. Properties similar to the other. The remaining plants of this order possess properties similar to the foregoing, and are never used internally. Care must be taken when employed as a vesicant, lest troublesome ulcers are produced, which is sometimes the case.

Ranunculus reptans. Creeping crowfoot

“ *abortivus.* Round-leaved Crowfoot.

“ *sceleratus.* Ph. Celery Crowfoot.

“ *fascicularis.* Muhl. Early Crowfoot.

“ *Pennsylvanicus.* (*R. hispidus.* Ph.) Bristly Crowfoot.

“ *Purshii.* Richardson. Floating Crowfoot.

“ *aquatalis.* River Crowfoot.

6. CALTHA.

Caltha palustris. Marsh Marigold, Cowslips. Acrid when fresh. Y, May. Wet meadows. Young leaves boiled for greens.

9. COPTIS SALISBURY.

Coptis trifolia. Golethead. Mouth-root. Official secondary. Y. May. Swamps north part of State. Prop. simple bitter, similar to quassia.

11. AQUILEGIA.

Aquilegia Canadensis. Wild Columbine. Rocks. May. Properties diuretic, diaphoretic, bitter and astringent.

12. DELPHINIUM.

Delphinium exaltatum. American Larkspur. F. purple. August, July. Flowers diuretic, emmenagogue and anthelmintic. Seeds emetic and purgative, employed as a substitute for the *D. Consolida* of Europe.

Delphinium azureum. Azure Larkspur. } F. azure-colored. Inter-
“ *tricomé.* Mchx. Three-fruited } or State. July. Prop. sim-
Larkspur. } lar to last.

14. ACTÆA.

Actæa alba Bigelow. (*A. Americana,* Ph. *alba.*) White Baneberry, Indian white cohosh. Woods. Flowers purple. May. Proper-

ties bitter and astringent, as well as cathartic and emetic, and in over doses, poisonous.

Actæa rubra. Red Bane-berry. Red cohosh. Indians. Flowers white. May. Properties similar to the other, both used as a substitute for the *A. specata* of Europe.

15. CIMICIFUGA.

Cimicifuga racemosa, Ell. (Actæ. Lin. Macroty's. Raf.) Black Snake root. Black cohosh. Official. Woods. June, July. White. Properties, mild tonic, stim. the secretions, of skin, kidneys, bronchial mucous membrane; emmen. and nervous sedative. Thought by Indians, antidote for bite of rattlesnake.

19. ZANTHORHIZA.

Zanthorhiza apiifolia. L'Her. (*Z. simplicissima*. Mchx.) Yellow Root. Official. Found south part of State, banks of rivers., April. Properties, simple bitter, and a yellow coloring matter.

20. HYDRASTIS.

Hydrastis Canadensis. Turmeric root. Orange root. Yellow puccoon root. Meadows and wet prairies. Flowers white. May and June. Prop. Topical application in ophthalmia, old ulcers by Indians; also to stain their clothing yellow. Slightly stimulant and tonic.

ORD.—AMNACEÆ. Amnads.

Uvaria Triloba. Fw. gray. (Asimina Adans.) Pawpaw, Custard Apple. Banks of Streams, near Keokuk. Apr. Y. Fruit eatable in October.

ORD.—MENISPERMACEÆ.

Menispermum Canadense. Worm Seed. Woods. Flowers Yellow. Prop. tonic, gently stimulating, and the root employed as a substitute for sarsaparilla.

ORD.—BERBERIDACEÆ.

Berberis Vulgaris. Berberry bush. Gardens. Flowers Yellow. Berries acid. Refrigerant, astringent and antiscorbutic. Inner bark and root employed in jaundice and for coloring.

2. PODOPHYLLUM.

Podophyllum peltatum. May Apple. Wild Mandrake. Official. Woods. F. White. May. Fruit edible. Cathartic, similar to Jalap.

3. JEFFERSONIA. BART.

Jeffersonia depphylla. Barton. Rheumatism root. Woods. April. W. Stimulant, diaphoretic, antispasmodic.

ORD.—NELUMBIACEÆ. NELUMBIVM.

Nelumbium luteum. Nelumbo. Sacred Bean. Water Chinquepin. Bottoms, N. and E. of Burlington and S. W. of Keokuk. F. White. June. Fruit eaten by the Osage, and other Indians.

ORD.—NYMPHÆACACEÆ. Water Lilies.

1. NYMPHÆA.

Nymphæa odorata. Water Lily. Lotus. Pond's. F. White, tinged with Yellow. July. Slightly astringent. Stalks are mucilaginous, seeds and root stocks edible.

2. NUPHAR.

Nuphar advena. Ait. (Nymphæa Adv. Mx.) Yellow Pond Lily. F. Yellow. June. July. Property similar to last.

ORD.—PAPAVERACEÆ.

1. SANGUINARIA.

Sanguinaria Canadensis. Blood-root. Puccoon. Off. Woods. April. May. W. Prop. emetic and purgative. Small doses sedative, diaphoretic, large, acro-narcotic poison, escharotic &c.

Chelidonium majus Celandine. Introduced. Fences, roadsides. F. Y. May to October. Acrid, stimulant and diuretic. Externally to cure itch.

MECANOPSIS.

Mecanopsis diphylla D. C. (*Chelidonium* Mx. *Stylophorum* Nutt) Celandine poppy. Woods. F. Y. May and Sept. Prop. similar to last and may be substituted for it

ARGEMONE.

Argemone Mexicana. Prickly Poppy. Banks of streams. S. W. of state. F. Y. July. Prop. Acrid, juice employed by Indians in ophthalmia, jaundice, and cutaneous eruptions. Emetic and purgative

ORD.—FUMARIACEÆ. DIELYTRA.

Delytra Cucullaria. D. C. (*Corydalis Cucullaria* Pers.) Dutchmans Breeches. Woods. F. White. April. May. Prop. Bitter and astringent.

Delytra Canadensis. D. C. (*D. eximia* Beck. *Corydalis Canadensis*) Squirrel Coon. Dutchman's Breeches. Woods. Rocky. May. June. Prop. similar to last.

CORYDALIS.

Corydalis aurea. Wild. (*Fumaria aurea*. Muhl.) Golden Corydalis. Woods. F. Y. May to August. Prop. similar to the first.

FUMARIA.

Fumaria officinalis Fumitory. Introduced. Fields, gardens. July. August. Prop. Tonic and alterative.

ORD.—CRUCIFERÆ.

Draba Caroliniana. Walt. (*D. hespidula* Michx.) Whitlow Grass. Fields. F. W. Apr. June. Rubefacient and antiscorbutic.

Draba nemoralis. Ehrh. F. Yellowish white. May. Prop. similar to the last.

COCHLEARIA.

Cochlearia armoracia. Horse Radish. Introduced. Official. Garden. June. Prop. stimulant, Antiscorbutic and rubefacient. Condiment.

NASTURTIIUM.

Nasturtium officinale. Water Cress. Brooks and Ponds. F. June. Prop. similar to scurvy grass. Antiscorbutic. Cultivated as a salad.

Nasturtium palustre. D. C. March. Water Cress. Prop. similar to last.

DENTARIA.

Dentaria Dephylla. Pepper Root. Woods. F. W. May. Root aromatic, pungent. Antiscorbutic.

Dentaria laciniata. Muhl. (*D. concatenata.* Michx.) Woods. P. Apr. May. Prop. similar to last.

SISYMBRIUM.

Sisymbrium officinale. Scap. (*Crysimum.* Lin.) Hedge Mustard. Fields &c. F. Y. June to Sept. Diuretic and expectorant.

ERYSIMUM.

Erysimum Arkanzanum. Nuttall. Yellow. Phlox. False wall Flower. F. Y. June. July. Prop. stimulant, antiscorbutic.

SINAPIS.

Sinapis nigra. Black Mustard. Official. Introduced. F. Y. June. July. Prop. Seeds stimulant, laxative, rubefacient, and antiscorbutic. Condiment.

ORD.—POLYGALACEÆ.

Polygala Senega.—Seneca Snake root. Official. Woods. F. White. July. Prairies. Prop. stimulating expectorant, diuretic, emetic and cathartic.

Polygala polygama. Walt. (*P. rubella.* Willd.) Bitter Polygala. Official. Fields, pastures. F. purple. June. July. Prop. Tonic, laxative and diaphoretic.

Polygala paucifolia. Fringed Polygala. Woods and Swamps. F. Purple. May. Prop. Tonic. Thought to contain an oil similar to *Gaultheia procumbens.*

ORD.—VIOLACEÆ.

The roots of nearly all the plants of this order possess emetic and purgative properties. The most conspicuous found in this state are the

Viola cucullata. Ait. Hood-leaved violet.

“ *sagittata.* Ait. Arrow-leaved violet.

“ *palmata.* Palmated violet.

Viola pedate. Pedate violet.

“ *delphinifolia*. Nutt. Larkspur-leaved violet.

“ *lanceolata*. Lance-leaved violet.

“ *rotundifolia*. Mchx. Round-leaved violet.

“ *Canadensis*. Canadian violet.

“ *Rubescens*. Ait. Common Yellow violet.

“ *Muhlenbergii*. Torr. Muhlenberg's violet.

“ *Prostrata*. Beaked violet.

“ *Striata*. Ait. (v. *ocholenca*. Schw.) Striped violet.

“ *aroensis*. Ell. (v. *lettriella*. Muhl.) v. *vecolor*. Ph.

“ *tri color*. Tricolored violet. Pansy. Hearts-ease.

SOLEA.

Solea concolor. Ging. (*Viola concolor*. Ph.) Green violet.
Woods. F. Greenish white. Apr. May. Prop. emetic.

ORD.—DROSERACEÆ. Sundews.

Drosera rotundifolia. Round-leaved Sundew. Swamps. F.
White. Aug. Acid, and acrid.

PARNASSIA.

Parnassia palustris. Bogs, and shores of lakes N. part of state.
F. White. Prop. astringent and tonic.

ORD.—CISTACEÆ. Rock Roses.

HELIANTHEMUM.

Helianthemum Canadense. (*Cistus*. Canad. Willd.) Frost plant.
Fields. Woods. F. Y. June. Sept. Astringent and tonic.

HUDSONIA.

Hudsonia tomentosa. Nutt. Downy. Hudsonia. Shores of lakes
N. part of State. F. Y. May. Prop. Astringent.

ORD.—HYPERICACEÆ. HYPERICUM.

Hypericum pyramidatum. Ait. (*H. ascyroides*. Willd.) Giant
Hypericum. Hills. Banks of streams. F. July and Aug. The juice
of many species of this class is considered purgative and febrifugal.
They contain an essential oil, and a bitter extractive matter.

Hypericum perforatum. Common St. John's-wort. Introduced.

Hypericum corymbosum. Muhl. (*H. punctatum*. Beck.) Spotted
St. John's.

Hypericum prolificum.

Hypericum adpressum Barton.

Hypericum Canadense.

ORD.—CARYOPHYLLACEÆ. SILENE.

Silene Virginica. Virginian Catch Fly. Campion. Fields. F.
R. June. Prop. Anthelmentic.

SAPONARIA.

Saponaria officinalis. Common Soap-wort. Bouncing Bet. Off. Introduced. Contain an active prin. called saponine, which is thought to posses properties similar to Sarsaparilla.

ORD.—PORTULACACEÆ. PORTULACA.

Portulaca oleracea. Purslane, Introduced. Indigenous on the Missouri. Gardens. F. Y. June to Aug. Used as a potherb. Diuretic and antiscorbutic.

ORD.—LINACEÆ. LINUM.

Linum usitatissimum. Common Flax. Official. Introduced. Flowers blue. June and July. Prop. The herbage is bitter and purgative. Seeds demulcent and emollient, by expression a fixed oil, which is largely used in the arts. The inner fibre of the bark furnishes flax. The cultivation of this plant deserves the attention of our farmers, as there is no doubt it would well repay their trouble.

Linum Virginiana. Virginia Flax. Woods. F. Y. July. Prop. similar to last.

ORD.—GERANIACEÆ. GERANIUM.

Geranium maculatum. Spotted Geranium. Cranesbill. Official. Woods. Flowers purple or reddish white. Apr. June. Root purely astringent, contain more gallic and tannic acid than Kino.

Geranium Carolinianum. Carolinian Cranes-bill. Fields. F. R. July. Prop. similar to last.

ORD.—OXALIDACEÆ. OXALIS.

Oxalis Acetocella. Common Wood Sorrel. Official. Woods and shady places. F. Y. June. Prop. acidulous and refrigerant, and as a drink in fevers. The acidity depends upon Oxalic acid which is in the herbage.

Oxalis violacea. Violet Wood Sorrel. Rocky woods. F. violet. May. Prop. similar to last.

Oxalis striata. Yellow Wood Sorrel. Fields. F. Y. all summer. Prop. similar to the other.

ORD.—ZANTHOXYLACEÆ. ZANTHOXYLUM.

Zanthoxylum Americanum. Miller. (*Z. fraxineum*. Willd.)—Prickly Ash. Off. Toothache tree. Woods. Flowers Greenish. May, Apr. Prop. Pungent aromatic qualities with bitterness. Due to an ethereal oil and its resin, in the leaves and fruit, and to a bitter acrid crystallizable substance, with a yellow coloring matter, which is contained in the bark. Stimulant and tonic, chronic rheumatism and toothache.

Ptelea. Inner bark an ingradient in the Kinni Kinnick of the Indians.

Ptelea trifoliata. Shrubby Trefoil. Stinking prairie bush. Stinking Ash. F. white. May. Prop. Antiperiodic, young shoots antihelmintic, and the fruit used as a substitute for hops.

ORD.—ANACARDIACEÆ. RHUS.

Rhus glabra, Smooth Sumach. Upland Sumach. Off. Second Fields, woods &c. F. gr. red. June, July. Bark and leaves are aromatic and astringent, and contains tannin used in tanning morocco leather. The fruit is acid, which resides in the hairs of the surface, and is owing to the bi-malate of lime. Refrigerant. Leaves dye red.

Rhus typhena. Stag-horn Sumach. Rocky places. F. G. W. June. Prop. similar to last with the exception that its wood is yellow and used in dyeing.

Rhus venenata. D. C. (R. vernix Linn.) Poison Sumac. Dogwood. Official. Swamps. F. green. June. Prop. Poisonous, taints the air around it, juice employed as an indelible ink. Leaves stimulant and narcotic.

Rhus Toxicodendron. Poison Oak. Poison Ivy. Official. Flowers small. Woods. Prop. Leaves stimulant, narcotic, diaphoretic and diuretic. Poisonous.

Rhus aromatica. Ait. Sweet Sumac. On Rêd Cedar river. Hedges. F. Y. May. Prop. similar to *Rhus glabra*.

Rhus radicans, Torr. Poison Ivy. Poisonous.

ORD.—MALVACEÆ. MALVA.

Malva rotundifolia. Low Mallow. Official. Naturalized. Common. F. Pink. June to Oct. Prop. Emollient and demulcent.

Malva sylvestris High Mallow. Official. Naturalized. Fields, gardens. F. red. Prop. same as first.

Malva Houghtoni. Houghton's Malva. Prairies. F. July and Aug. Prop. similar to last.

CALLIRRHŒ. Nutt.

Callirrhoe triangulata. Prairies. F. Red. Root farinaceous and eaten by Indians.

NAPÆA.

Napæa dioica. Lin. (*Sida dioica* Cav.) Glade Mallow. Rich calcareous soil. F. white. Aug. Prop. Demulcent.

ORD.—TILIACEÆ. TILIA.

Tilia Americana. Linden or Lime Tree. Bass wood. Pumpkin wood. Woods. Flower Yellowish. June. Prop. Mucilaginous, a tough inner bark, the outer of which is astringent. Inner bark manufactured into ropes. Wood employed for Cabinet work, also paneling.

Tilia peterophylla. Vent. Various-leaved Linden. Banks of Miss. Prop. similar to the last.

Tilia alba. Michx. White lime or Linden. Prop. similar to others.

ORD.—VITACEÆ. VITIS

Vitis Labrusca. Fox Grape. Woods. F. Green. June, July. The Isabella, and Catawba Grapes have been produced in cultivation from this. These thrive well especially on bluffs and hills with southern exposures. Cultivation of them demand the attention of our horticulturists.

Vitis cordifolia. Mx. (v. *vulpina* Linn.) Frost Grape. Winter Grape.

Vitis Æstivalis. Summer Grape.

Vitis Riparia. Winter Grape.

Vitis Vinifera. Common Wine Grape. Naturalized. Thrives well

AMPELOPSIS.

Ampelopsis quinquefolia. American Ivy. Woodbine. F. Green. July. Prop. Expectorant. Substitute for Ivy.

ORD.—ACERACEÆ. ACER.

Acer rubrum. Red Maple. Swamp Maple. Soft Maple. Low Woods. Swamps. Crimson. F. April, May. Prop. Bark astringent, and also a dye black. For cabinet work called Curled maple.

Acer dasycarpum. Ehrh. (A. *eriocarpum*. Mx.) White Maple. Silver Maple. Banks of rivers. F. yellow, green. April, May. Sap yields sugar.

Acer Pennsylvanicum. (A. *Striatum*..) Striped Maple.

Acer nigrum. Black Maple Sugar-tree. Sap yield sugar.

Acer saccharinum. Sugar Maple. Rock Maple. Forests. April. Greenish. Prop. The limpid sap of this tree yields sugar in great abundance, by boiling. Bark astringent.

NEGUNDO.

Negundo acervides. Ash-leaved Maple, Box Elder. Woods. April. G. Prop. Yields sugar, bark astringent.

ORD.—SAPINDACEÆ. HIPPOCASTANEÆ. ÆSCULUS.

Æsculus glabra. Willd. (Pavia *pallida*. Spald) P. *Ohiensis*. Michx. Ohio Buckeyes. Bottoms. Universal. F. yellow and white. Bark astringent and tonic. Employed in tanning. Button mucilaginous, saponifying; Matter similar to soap; seeds and branches narcotic and emetic. Starch prepared from fruit is superior to that from wheat.

CARDIOSPERMUM.

Cardiospermum Haliacabum. Heart-seed, Balloon-vine. F. white. Banks Missouri. Prop. Roots mucilaginous, aperient and diaphoretic.

ORD.—CELASTRACEÆ. CELASTRUS.

Celastrus scandens. Staff-tree, Shrubby Bittersweet, Waxwork. Climbing shrub in woods and thickets, on trees. F. g. white. June. Prop. Seeds narcotic and stimulant, astringent and bitter. Employed by Thompsonians to remove hepatic affections. Often planted as an ornamental shrub.

EUONYMUS.

Euonymus atropurpureus. Jacq. Spindle-tree, Strawberry-tree, Burning-bush, Indian-arrow, Wahoo. F. d. p. June. Prop. tonic, hydragogue, cathartic, diuretic, and antiperiodic. Thought to be similar in its effects to rhubarb. Seeds purgative and emetic.

Euonymus Americanus. Bur. (*E. obovatus*. Nutt.) Burning-bush. Woods. F. yellow and pink. June. Prop. similar to *Celastrus scandens*.

ORD.—RHAMNACEÆ. RHAMNUS.

Rhamnus Alnifolius. L'Her. (*R. paniculoides*. Mich.) Alder-Leaved Buckthorn. On the Missouri river. Berries purgative and emetic. A bitter extractive principle abounds in the bark, also a coloring matter.

CEANOTHUS.

Ceanothus Americanus. New Jersey Tea, Red-root. Shrub. Woods. F. white. June. Prop. astringent. Indian remedy for syphilis. Leaves were used during the American Revolution as a substitute for tea. Root yields a cinnamon-red color.

ORD.—LEGUMINOSÆ. APIOS.

Apios tuberosa. Ph. (Glycine *Apios*. Lin.) Ground-nut. Woods. F. purple. July, August. Prop. Root, tuberous and nutritious. Would supply place of potato. Indians.

ROBINIA.

Robinia Pseudacacia. Locust tree. Bark of root cathartic and emetic. F. white May. Valuable for its timber.

PSORALEA.

Psoralea Esculenta. Ph. Nutt. Bread-root. Wabsepinecon river. F. blue. June, July. Eaten by the Indians either raw or boiled.

AMIOPHA.

Amiophya Canescens. Mott. Lead Plant. Thought to prefer localities where lead exists.

TRIFOLIUM.

Trifolium repens. White Clover. Trefoil. Shamrock. Pasturage,

Trifolium reflexum. Buffalo Clover.

Trifolium Stoloniferum. Muhl. Running Buffalo Clover.

Trifolium pratense. Cinnamon Red Clover. Intro.

BAPTISIA.

Baptisia Tinctoria. Raf. Br. Wild Indigo. Flowers, yellow.

July, Sept. Prop. astringent, antiseptic, cathartic and emetic.

Baptisia leucantha. Torrey & Gray. (*B. alba*. Hook.) White flowered Bapt. Prairies. Flowers white. June, July. Properties similar to last.

CERCIS.

Cercis Canadensis. Judas Tree. Red-bud. Flowers red. May, April. Wood made use of for various purposes. Young twigs dye wool a nankeen color.

CASSIA.

Cassia marilandica. American senna. Off. Flowers yellow. Aug. Cathartic, similar to imported senna.

Cassia chamæcrista. Sensitive Pea. Dwarf Cassia. Dry prairies. Flowers yellow. August. Similar to last.

GYMNOCLADUS.

Gymnocladus Canadensis. Coffee-bean. Coffee-tree. Rare. Flowers white. May, July. Wood employed in architecture and cabinet work.

GLYCYRRHIZA.

Glycyrrhiza lepidota American liquorice. Banks of Miss. F. white. June. Demulcent and expectorant. Substitute for the Official.

ORD.—ROSA CÆ. CERASUS.

Cerasus serotina. D. C. (*C. Virginiana*. Michx. *Prunus*. Ehrh.) Wild Cherry. Official. Forests. F. white. May. Prop. Tonic and sedative. Wood employed by Cabinet makers.

Cerasus Virginiana. D. C. (*C. Sentina* Hook. *Prunus* Lin.) Choke Cherry. F. white. May. Fruit astringent though pleasant to the taste.

Cerasus Pennsylvanica. Ait. (*Prunus vorealis*. Ph.) Wild Red Cherry. Woods. F. white. May. Fruit acid.

Cerasus pumila. Michx. (*Prunus depressa*. Ph.) Sand Cherry. Shrub sandy soil. F. white. May. Fruit acid and agreeable.

PRUNUS

Prunus Americana. Marsh. (*Cerasus nigra*. Sorsel.) Red plum. Yellow plum. Woods. F. white. May. Fruit agreeable and pleasant to the taste.

PERSICA.

Persica vulgaris. Nutt. (*Amygdalus Persica* Willd.) Common Beach. Introduced. Official Tonic and sedative. The bark, leaves, fruit and kernels of the *Amygdalæ* contain hydrocyanic acid which is indicated by their peculiar odor.

CRATÆGUS.

Cratægus coccinea. (C. Crus-galli. Bw. C. glandulosa. Willd.) Crimson fruited Thorn, White Thorn. Thickets, banks of streams. F. white. April, May. Fruit eatable.

Cratægus Punctata. Jacq. (C. latifolia. D. C. Mespilus. Spach.) Thorn. Woods. F. white. May, June. Fruit red, eatable.

PYRUS,

Pyrus coronaria. (Malus. Mill.) Crab apple. Sweet-scented Crab tree. Woods. Fl. May. White. Fruit esteemed for preserves.

Pyrus arbutifolia. Lin. f. (Mespilus. Lin.) Aronia. Pers. Choke Berry. F. white. May, June. Fruit astringent.

AMELANCHIER.

Amelanchier Canadensis. Torr. and Gray. (Mespilus. Lin. Mespilus arborea. Michx.) Shad Berry. June Berry. Wild Service Berry. Woods. F. white. April, May. Fruit pleasant to the taste.

RUBUS.

Rubus villosus. Ait. High Blackberry. Off. Fl. white. May Root and fruit astringent and tonic.

Rubus hispidus. (R. sempervirens. Bw.) Bristly Blackberry. Damp woods Fl. w. May Prop. similar to last.

Rubus Canadensis. (R. trivialis. Ph.) Low Blackberry. Dew-berry. Off. Fields. Fl. May. White. Astringent and tonic.

Rubus odoratus. Rose-flowering Raspberry. Mulberry. Woods. F. purple. June. Fruit bright red, and sweet when ripe.

Rubus strigosus. Michx. (R. Idæus. Nutt.) Wild Red Raspberry. Fields. Flowers white. May. Fruit delicious. Leaves slightly astringent.

Rubus occidentalis. Black Raspberry. Thimble-berry. Fields. Fl. white. May. Fruit of a lively agreeable taste.

POTENTILLA.

Potentilla Canadensis. (P. sarmentosa. Willd.) Common Cinquefoil. Fields. May. F. Y. Prop. Astringent. Thompsonians employ it.

COMARUM.

Comarum palustre. Marsh Cinquefoil. In spaginous swamps, N. part of State. F. June. Prop. Astringent.

FRAGARIA.

Fragaria Virginiana. Ehrh. (F. Canadensis. Michx.) Scarlet or Wild Strawberry. Fields, woods. Fl. white. April and May. Fruit highly fragrant and delicious when ripened in the Sun. Astringent.

GEUM.

Geum Virginianum. (G. Album. Gmel.) White Avens. Thickets. F. white. July. Prop. Astringent.

Geum vernum. T. and G. (Stylipus vernus. Raf.) Thickets. Fl. yellow. April, June. Prop. Astringent.

Geum rivale. Water Avens. Purple Avens. Off. N. part of State. F. purple. June. Prop. Root aromatic, astringent and tonic.

AGRIMONIA.

Agrimonia Eupatoria. Agrimony. Fields. F. yellow. July. Prop. Astringent, corroborant. Said to be a vermifuge. Indians employed it in fever.

Agrimonia parviflora. Ait. (A. suaveolens. Ph.) Small flowered Agrimony. Woods. Fl. yellow. Aug. Prop. similar to last, has an agreeable balsamic odor.

SPIRÆA.

Spiræa tomentosa. Hardhack. White-leaf. Officinal. Wet prairies. F. purple. July, Aug. Tonic and Astringent, also a trace of Hydrocyanic acid, as in the Amygdalæa.

Spiræa salicifolia. (S. alba. Bw.) Queen of the meadow. Willow-leaved Spiræa. Meadows. Fl. white. July, Aug. Prop. nearly similar to last.

Spiræa opulifolia. Nine bark. Banks of streams. Fl. white. June. Prop. Astringent, rather unpleasant, seeds tonic. In other respect similar to S. tomentosa.

Spiræa lobata. Siberian Red Spiræa. Prairies. June, July.—Prop. An oil has been distilled from its stems and leaves, similar to that derived from the Gaultheria procumbens. Pleasant beverage made from flowers.

Spiræa Aruncus. Goat's Beard. F. white. June, July. Prop. similar to S. tomentosa.

GILLENIA.

Gillenia stipulacea. Nutt. (Spiræa. Ph.) Bowman's Root. Am. Ipecac. Woods. F. rose color. June. Prop. Root emetic, cathartic, diaphoretic and tonic according to dose.

ORD.—MELASTOMACEÆ.

RHEZIA.

Rhezia Virginica. Meadow Beauty. Deer Grass. Wet grounds. F. P. July. Prop. Astringent.

ORD.—LYTHRACEÆ.

AMMANNIA.

Ammannia humilis. Michx. (A. ramosior. Lin.) Low Ammannia. Wet places. F. blue. Aug. Astringent.

LYTHRUM.

Lythrum alatum. Ph. Wing-stem Lythrum. Damp grounds. F. purple. June, July. Astringent.

CUPHEA.

Cuphea viscosissima. Jacq. (*Lythrum petiolatum*. Lin.) Wet grounds. F. purple. Aug. Astringent.

ORD.—ONAGRACEÆ.

EPILOBIUM.

Epilobium angustifolium. (E. *Spicatum*. Lam.) Willow Herb. Rose-bay. Meadows. Fl. P. July. Root emollient, slightly astringent.

Epilobium coloratum. Muhl. Colored Epilobium. Prop. similar to last.

Epilobium palustre. Marsh Epilobium. Similar to the others.

ÆNOTHERA.

Ænothera biennis. Common Evening Primrose. Scabish Tree Primrose. F. y. June, Sept. Bark and leaves mucilaginous in a recent state, slightly acrid. Decoction employed in eruptive affections. Emollient in ulcers.

Ænothera fruticosa. Perennial Evening Primrose.

Ænothera Missouriensis. Sims.

Ænothera sinuata. Prop. like first.

GAURA.

Gaura biennis. Biennial Gaura. Virginian hosertrife. F. red. July, Aug. Slightly astringent.

ORD.—CUCURBITACEÆ.

CUCURBITA.

Cucurbita verrucosa. Warty Squash. Club Squash. Cultivated by Indians west of Miss. Nutt.

ORD.—GROSSULACEÆ.

Ribes Floridum. L'Her. Wild Black Currant. Woods. Fl. greenish-yellow. May, June. Fruit rather insipid.

Ribes rubrum. Common Red Currant. N. part of State. Fruit pleasant.

Ribes aureum. Ph. Missouri or Golden Currant. Fl. yellow. April, May.

Ribes Cynosbati. Prickly Gooseberry. Thickets. April, June. Fl. white-greenish. Fruit eatable.

Ribes rotundifolium. (Michx. *R. triflorum*. Willd.) Wild Gooseberry. Fl. white. May. Fruit delicious.

Ribes hirtellum. Michx. (*R. triflorum*. Bw. *R. Saxosum*. Hook.) Woods. F. greenish. May. Fruit purple.

ORD.—CACTACEÆ.

OPUNTIA

Opuntia vulgaris. Mill. (Cactus opuntia. Lin.) Prickly Peas. Sandy places. F. yellow. Fruit eatable.

ORD.—SAXIFRAGACEÆ.

HEUCHERA.

Heuchera Americana. Alum-root. Fl. purplish. May, June. Root powerfully astringent, hence common name.

Hydrangea arborescens. (H. vulgaris. Michx.) Common Hydrangea. Banks of streams. F. white. Astringent.

ORD.—HAMAMELACEÆ.

HAMAMELIS.

Hamamelis Virginiana. Witch Hazel. F. yellow. Astringent and sedative.

ORD.—UMBELLIFERÆ.

Nearly all the Umbelliferæ possess aromatic, stimulant and carminative properties, depending upon a volatile oil, chiefly accumulated in the roots and reservoirs (vittæ) of the fruit, sometimes it is small in quantity, so as merely to flavor the saccharine roots, which are used for food. In many the herbage is pervaded by an acrid narcotic principle, rendering them very poisonous.

SANICULA.

Sanicula Marilandica. Sanicle. Woods. Thickets. Fl. white. June. Prop. Diaphoretic, stimulant and stomachic.

ERYNGIUM.

Eryngium aquaticum. Button Snake-root. Wet prairies. Fl. white.. July, Aug. Prop. Diaphoretic and expectorant.

CICUTA.

Cicuta maculata. Water Hemlock. Spotted Cowbane. Off. Wet prairies. F. white. July, Aug. Prop. Powerful narcotic. Employed as a substitute for Conium, but in smaller doses.

SIUM.

Sium latifolium. Water Parsnep. Swamps &c. Fl. white. July, Aug. Prop. Poisonous. Employed in cutaneous diseases.

Sium lineare. Michx. (S. latifolium. Bw.) Swamps. F. white. July, Aug. Prop. similar to last.

ARCHANGELICA.

Archangelica atropurpurea. Hoffm. (Angelica triquinata. Mx.) Angelica. Fields. Meadows. Fl. greenish-white. June. Aromatic and tonic.

ARCHEMORA.

Archemora rigida. D. C. Water Drop-wort. Cow-bane. Swamps. F. white. Sept. Prop. Poisonous.

PASTINACA.

Pastinaca sativa. Common Parsnep. Wild Parsnep. Introduced. Fields, along fences &c.. F. yellow. July. Root nutritious and wholesome.

HERACLEUM.

Heracleum lanatum. Cow Parsnep. Water-wort. Off. Low places. F. white. June. Prop. Stimulant and carminative.

POLYTÆNIA.

Polytænia Nuttallii. D. C. Prairies. F. white. May. Flowers odor of turpentine.

DAUCUS.

Daucus Carrota. Carrot. Introduced. Fields, roadsides F. white. July, Sept. Expectorant and diuretic.

OSMORHIZA.

Osmorhiza longistylis. D. C. (*Uraspermum Claytoni*. Nutt.) Sweet Cicely. Woods. F. white. May, June. Root of an agreeable spicy flavor,

Osmorhiza brevistylis. D. C. (*O. hirsutum*. Bw). Short-styled Cicely. Woods. F. white. June. Root not as pleasant and more disagreeable than the last.

CONIUM.

Conium maculatum. Poison Hemlock. Official. Introduced. Way-sides, &c. Flowers, white. July, Aug. Properties, narcotic.

ERIGENIA.

Erigenia bulbosa. Nutt. (*Sison*. Mchx. *Hydrocotyle composita*. Ph.) Banks of streams. Flowers, white. March, April. Root nutritious.

ORD.—ARALIACEÆ.

Aralia nudicaulis. Wild Sarsaparilla. Woods. Flowers, greenish. June, July. Properties stimulant, diaphoretic and alterative. Substitute for the Sarsaparilla of the shops.

Aralia racemosa. Pettymorrel Spikenard. Woods. Flowers green. July. Properties stimulant and diaphoretic. Ingredient in small beer.

Aralia spinosa. Angelica Tree, Shot-bush. Woods. Flowers white. August. Properties stimulant, diaphoretic, emetic and cathartic, if recent.

PANAX.

Panax trifolium. Ground-nut, Dwarf Ginseng. Low woods. F. white. May. Root nutritious.

Panax quinquefolium. Ginseng. Woods. Flowers yellow. June, July. Properties stomachic. Exported to China.

ORD.—CORNACEÆ.

CORNUS.

Cornus stolonifera. Michx. (C. Alba. Wang.) White-berried cornel, or dogwood. Woods. Flowers white. May, June. Properties tonic.

Cornus sericea. Red Osier. Flowers white. June. Properties astringent and tonic.

Cornus circinata. Round-leaved Cornel, or Dogwood. Flowers white. June. Astringent and tonic.

Cornus paniculata. White, or panicled Cornel, Prairie Cornel. F. white. July. Tonic.

Cornus Canadensis. Low Cornel or Dogwood. Flowers red and white. May, June. Tonic.

ORD.—CAPRIFOLIACEÆ.

LONICERA.

Lonicera flava. Sims. (C. Fraseri. Ph.) Yellow Honeysuckle. Cultivated for its beauty and fragrance.

TRIOSTEUM.

Triosteum perfoliatum. Fever-wort, Horse Gentian. Woods. F. purple. June. Mild cathartic. Large dose, emetic, similar to Ipecac. Dried berries substitute for coffee.

SAMBUCUS.

Sambucus Canadensis. Common Elder. Officinal. Thickets. F. white. May, July. Prop. Flowers, sudorific and diaphoretic. Leaves and bark, cathartic and emetic. Berries, laxative.

Sambucus pubens. Michx. Panicled Elder. F. white. June. Prop. similar to last.

VIBURNUM.

Viburnum opulus. Americana. Ait. T. & G. (V. Oxycoccus. Ph.) High Cranberry. Banks of streams. N. part of State. Fruit red and acid.

Viburnum acerifolium. Maple-leaved viburnum. Dockmackie. Woods. F. white. June. The leaves were applied by Indians to inflamed tumors. Astringent.

Viburnum prunifolium. Black Haw. Sloe. Woods. F. white. June. Fruit sweet and eatable. Bark tonic and astringent.

Viburnum lentago. Sweet viburnum. Banks of streams. F. white and very fragrant.

ORD.—RUBIACEÆ.

GALIUM.

Galium tinctorium. Torr. Dyers' Cleavers. Goose grass. Wild Needles. Wet woods. F. white. June to Aug. Roots dye red.

Galium aparine. Common Cleavers. Wet Thickets. F. white. June. Diuretic. Dye red root.

Galium circæans. Michx. Circæa-like Galium. Wild Liquorice. Woods. F. purple. July. Prop. Demulcent, expectorant and diuretic. Root and leaves have a sweet taste like liquorice.

MITCHELLA.

Mitchella repens. Patridge Berry. Creeping plant. N. part of State. F. white. June. Very fragrant, expectorant and emmenagogue. Indians use it as a prep. parturient. Oil distilled from it.

CEPHALANTHUS.

Cephalanthus occidentalis. Button Bush. F. white. July, Aug. Tonic and expectorant.

SPIGELIA.

Spigelia Marilandica. Pink-root. Worm grass. Off Woods. F. scarlet. June. Prop. Roots and leaves anthelmintic in large dose, cathartic and narcotic.

ORD.—VALERIANACEÆ.

VALERIANA.

Valeriana Sylvatica. Wild Valerian. Swamps. N. part of State. F. rose. July. Prop. Tonic and antispasmodic.

Valeriana ciliata. T. & G. Low grounds. F. white. June. Prop. similar to last and found in the same localities.

ORD.—COMPOSITÆ.

A bitter principle pervades the whole order, which, when combined with resin and astringent mucilage, becomes tonic and febrifugal. Some are anthelmintic from the prevalence of the resinous principle. Some are aromatic and extremely bitter and acrid, others are useful for food.

VERNONIA.

Vernonia noveboracensis. Willd. New York Vernonia. Iron-weed. Wet prairies. F. purple. Sept. Prop. Purgative.

Vernonia fasciculata. Iron-weed. Woods and prairies. F. purple. July, Aug. Purgative.

EUPATORIUM.

Eupatorium fistulosum. Barratt. (E. purpureum. Willd.) Trumpet-weed. (E. Maculatum. Lin.) Thickets. F. purple. July. Prop. Bitter, aromatic and astringent.

Eupatorium Maculatum. (E. purpureum. Darl.) Spotted Eupatorium. Low grounds. F. purple. July, Sept. Prop. similar to last but more acrid.

Eupatorium purpureum. Lin. Purple thorough-wort. Prairies, woods. F. white. August, Sept. Prop. same.

Eupatorium altissimum. (*Kuhnia glutinosa.* D. C.) Golden-rod Eupatorium Woods. Fl. white. Sept, Oct. Prop. Tonic.

Eupatorium perfoliatum. Thorough-wort. Boneset. Off. Prairies. F. white. Prop. Tonic, emetic, antiperiodic, diaphoretic, and aperient. My friend Dr. James informed me that several years ago, he prepared an extract from this plant, and while in a surveying expedition on the bottoms of the Miss., he and several of his men made use of it, while those who did not, were taken with Ague. I have often prescribed an infusion of it after I had broken the chill with Quinia to prevent its return.

Eupatorium ageratoides, Nettle-leaved Eupatorium. White Snake root. Woods. F. white. Sept. Prop. Antispasmodic, diuretic and diaphoretic.

LIATRIS.

Liatris squarrosa. Willd. Blazing Star. Button Snake-root. F. purple. Aug. Prop. Stimulant, carminative and diaphoretic.

Liatris spicata. Willd. Slender spiked Liatris. Prairies. F. purple. Aug. Prop. Stimulant, carminative and diaphoretic.

NARDOSMIA.

Nardosmia palmata. Hook. (Tussilago. Ait.) Swamps. F. May. Prop. Demulcent and expectorant.

ERIGERON.

Erigeron Philadelphicum. (*E. purpureum.* Ait.) Narrow-leaved Robin's plantain. Woods. F. purple. June, Aug. Prop. Diuretic.

Erigeron heterophyllum. Muhl. (*E. annuum.* Pers.) Common Fleabane. Woods, Fields. F. white. June. Prop. Diuretic.

Erigeron Canadense. Canadian or Common Fleabane. Fields. F. white. July, Sept. Prop. Diuretic, tonic and astringent.

SOLIDAGO.

Solidago odora. Ait. Sweet-scented Goldenrod. Official.— Woods, hills. F. yellow. August, Oct. Prop. Leaves yield by distillation a fragrant vol. oil. Aromatic, stimulant and carminative. Substituted for tea.

Solidago rigida Hard-leaved Golden-rod. Bone's styptic. Prairies. F. yellow. Aug. Prop. Leaves styptic

INULA.

Inula Helenium. Elecampane. Introduced. Off. Roadsides. F. yellow. July, Aug. Prop. Tonic, stimulant, diaphoretic, diuretic and emmenagogue.

SILPHIUM.

Silphium laciniatum Rosin-weed. Polar Plant. Prairies. F. yellow. July, Sept. Causes the smoke in burning prairies, on account of the resin. Thought to possess Medical properties.

Silphium terebinthinaceum. Prairie Burdock. Similar to last.

Silphium perfoliatum. Cup-plant. Prairies. F. yellow. Aug. Sept. An Indian remedy. This species is worthy the attention of the Med. Society.

PARTHENIUM.

Parthenium integrifolium. Nephritic plant. Prairies. F. white. July, Sept. Prop. Diuretic in ischuria.

ECHINACEA.

Echinacea purpurea. Mönch (Rudbeckia. Lin.) Purple Cone-flower. Thickets. F. purple. July, Sept. Root aromatic and carminative.

Helianthus, Quite a number of varieties.

HELENIUM.

Helenium autumnale. American Sneeze-root. Wet prairies. F. Y. Sept. Prop. Tonic and errhine.

ANTHEMIS.

Anthemis arvensis. Corn Chamomile. Introduced. Fields. F. Y. July. Prop. Tonic and diaphoretic.

MARUTA.

Maruta cotula. D. C. (Anthemis. Lin) May-weed. Introduced. Roadsides. June, Sept. Prop. Emetic, diaphoretic and antispasmodic.

ACHILLEA.

Achillea millefolium. Millfoil. Yarrow. Fields. F. white or rose colored, June, Sept. Prop. Aromatic bitter and astringent.

DYSODIA.

Dysodia chrysanthemoides Lagasca. F. Y. Streets. Sept. Disagreeable plant.

SENECIO.

Senecio vulgaris. Common Groundsel. Introduced. Waste grounds F. yellow all summer. Prop. refrigerant antiscorbutic.

Senecio aureus. Golden Senecio. Rag-wort. False valerian. Woods, Meadows. F. yellow. May to Aug. Prop. Emmenagogue.

ARTEMISIA.

Many plants of this species are tonic and anthelmintic. Those found in this State are the

Artemisia dracunculoides. Ph. (A. cernua. Nutt.)

Artemisia Canadensis. Wild worm-wood. Lakes N. W. part of State.

Artemisia Santonica. Tartarian Southernwood. Banks of Mo.

Artemisia biennis.

TANACETUM.

Tanacetum vulgare. Tansy. Introduced. Fields, roadsides. F. yellow. Aug. Prop. aromatic, bitter and anthelmintic.

LAPPA.

Lappa major. Gaert. (*Arctium Lappa*. Lin.) Burdock. Introduced. Waste grounds. F. purple. July, Aug. Prop. aperient, diaphoretic and alterative.

LACTUCA.

Lactuca elongata. Wild Lettuce. Trumpet Milkweed. Fireweed. Hedges, Thickets. F. yellow. Aug. Prop. sedative, laxative, diuretic and diaphoretic.

HIERACIUM.

Hieracium venosum. veiny-leaved Hawkweed. Woods. F. yellow. July, Aug. Prop. Bitter, astringent and narcotic.

NABALUS.

Nabalus albus. Hook. (*Prenanthes*. Lin.) Lionsfoot. White Lettuce. Woods. F. white. Aug. Reputed cure for the bite of a rattlesnake.

TARAXACUM.

Taraxacum Dens-leones. Less. (*Leontodon Taraxacum*. Lin.) Dandelion. Fields, &c. Introduced. Tonic, diuretic, aperient.—Employed principally in hepatic affections.

ORD.—LOBELIACEÆ.

Lobelia cardinalis. Cardinal Flower. Meadows. F. scarlet. July, Aug. Acro-narcotic and anthelmintic.

Lobelia inflata. Indian Tobacco. Official. Woods. F. pale blue. July, Sept. Prop. powerful emetic and sudorific. In small doses expectorant. Thompsonian's great remedy.

Lobelia sylphilitica. Blue Cardinal Flower. Along streams, F. blue. July. Prop. similar to last, also antisymphilitic.

ORD.—ERICACEÆ.

VACCINIUM.

Vaccinium resinosum. Ait. Black Whortleberry. Woods. F. greenish. Prop. Bark diuretic and tonic. Fruit eatable.

Vaccinium corymbosum. Blue Bilberry. High Whortleberry.—Swamps. F. purplish white. June. Prop. similar to last. Fruit sub-acid.

Vaccinium virgatum. Muhl. (*V. Pennsylvanicum*. Darl. Beck.) Blue Whortleberry. Woods. F. yellow. May, June. Prop. similar to the foregoing.

Vaccinium stamineum. Deerberry. Dry Woods. F. white. May June. Prop. Diuretic, tonic and slightly astringent. Substitute for *Uva Ursi*.

OXYCOCUS.

Oxycoccus palustris. Pers. (*O. vulgaris*. Ph.) Common Cranberry. Swamps. N. part of State. F. pink. June. Fruit ripe in October. Eatable

Oxycoccus macrocarpus. Pers. Large Cranberry. Shrubby plant. Sphagnous swamps. Flowers in June. Fruit ripe in October. Eatable.

CHIOGENES.

Chiogenes hispidula. Gray. (*Vaccinium hispidulum*. Lin) Box-berry. Shady woods, F. white. May, June. Leaves and berries flavor similar to *Gaultheria procumbens*.

ARCTOSTAPHYLOS.

Arctostaphylos Uva Ursi. Spreng. (*Arbutus Ura Ursi*. Lin.) Bear-berry. Shrub sandy places; N. part of State. F. pale red. April, May. Prop. Tonic, astringent, used principally in nephritic affections. Off.

GAULTHERIA.

Gaultheria procumbens. Box-berry. Winter green. Woods. F. white. June, Sept. Prop. stimulant, aromatic and astringent. also Emmenagogue.

CHIMAPHILA.

Chimaphila umbellata. Nutt. (*Pyrola*. Lin.) Pipsissiwa. Off. Woods. N. part of State. F. purple. July. Prop. Tonic and diuretic.

Chimaphila maculata. Pursh. Spotted Wintergreen. Sandy woods F. purple. June, July. Prop similar to last.

ORD.—AQUIFOLIACEÆ.

PRINOS.

Prinos verticillatus. (P. Gronovii. Michx.) Wintergreen. Black Alder. Shrub swamps. F. white. July. Prop. Bark and berries astringent, tonic and antiseptic.

ORD.—PLANTAGINACEÆ.

PLANTAGO.

Plantago major. Common Plantain. Introduced. F. white. Fields, &c. Prop. Refrigerant and antiseptic.

ORD.—OROBANCHACEÆ.

OROBANCHE.

Orobanche uniflora. (*O. biflora*. Nutt.) One-flowered Broomrape. Woods. F. purplish white. June, July. Astringent.

Orobanche Americana. Lin. Cancer-root. American Broomrape. Woods. F. yellow. July. Prop. Astringent. Represented remedy for Cancer.

EPIPHEGUS.

Epiphegus virginianus. Eaton. Beech-drops. Parasite. F. white. Astringent.

ORD.—BIGNONIACEÆ.

CATALPA.

Catalpa bignonioides. Walt. (*C. cordifolia*. Jaum.) Catalpa. May. F. white. Seeds have been employed in Asthma.

ORD.—ACANTHACEÆ.

RUELLIA.

Ruellia strepens. Herb ruel. Prairies. F. bluish purple. July. Prop. Astringent.

ORD.—SCROPHULARIACEÆ.

VERBASCUM.

Verbascum thapsus. Common Mullein. Fields, roadsides. F. y. June, Aug. Prop. Demulcent and emollient. Diuretic in Gonorrhea.

LINARIA.

Linaria vulgaris. Mill. (*Antirrhinum Linaria*. Lin.) Toad flax. Snap-dragon. Roadsides. F. yellow. July, Aug. Prop. Diuretic and cathartic.

SCROPHULARIA.

Scrophularia nodosa. (*S. Marilandica*. Lin.) Figwort. Woods. F. greenish brown. July, Aug. Applied to tumors, Hæmorrhoids.

CHELONE.

Chelone glabra. Snake-head. Salt-rheum Weed. Wet places. F. white. August, Sept. Prop Tonic. Used by Thompsonians.

GRATIOLA.

Gratiola Virginica. (*G. aurea*. Ph. *G. Missouriana*. Beck.) F. yellow. July. Prop. Cathartic, emetic and diuretic, and can be substituted for the *G. officinalis* of E.

VERONICA.

Veronica Virginica. (*Leptandra Virginica*. Nutt.) Culver's Physic. Woods. F. white. July. Cathartic, emetic. Alterative.

Veronica Americana. Schwenitz. (*V. Beccabunga*. Am. authors.) Brooklime. Brooks. F. blue. June, July. Prop. Diaphoretic, diuretic, astringent and tonic. Antiscorbutic.

Veronica officinalis. Speedwell. Dry woods. Flowers blue. May, July. Properties similar to last.

ORD.—VERBENACEÆ.

VERBENA

Verbena hastata. Vervain. Simpler's Joy. Low grounds. Flowers blue. July, Sept. Properties emetic, cathartic, sudorific and tonic. Thompsonians use it.

Verbena urticifolia. Nettle-leaved Vervain. Roadside. Flowers white. July and August. Properties similar to last.

ORD.—LABIATÆ.

This well known family is universally pervaded by an aromatic, volatile oil, and a bitter principle, the former rendering them eminently tonic, cordial, stomachic; the latter where it prevails, febrifugal.

MENTHA.

Mentha Canadensis. (M. Borealis. Michx.) Horsemint. Low places. Flowers purple. June, July. Properties aromatic.

Mentha Viridis. Spearmint. Wet soils. Flowers pale purple. July, August. Properties aromatic and stimulant.

Mentha piperita. Peppermint. Officinal. Gardens, &c. Flowers purple. Properties carminative and stimulant.

LYCOPUS.

Lycopus simulatus. (L. Europæus. Michx. L. Americanus. Muhl.) Water Hoarhound. Wet places. Flowers white. August. Properties astringent. Dyes a permanent black.

Lycopus Virginicus. Virginian Hoarhound. Bugle-weed. Wet soil. Flowers white. June, August. Properties mild, cathartic and astringent.

MONARDA.

Monarda fistulosa. Horsemint. Wild Burgamot. Thickets, &c. Flowers pale yellow. July, August. Properties nervine, stomachic, and deobstruent.

Monarda punctata. (M. Lutea. Mchx.) Horsemint. Flowers yellow. Sept. Properties stimulant, carminative and rubefacient. Contains kind of camphor and an essential oil.

BLEPHILIA.

Blephilia hirsuta. (Monarda hirsuta. Ph.) Hairy Blephilia. Woods. Flowers pale purple. June, July. Properties stimulant and carminative.

PYCNANTHEMUM.

Pycnanthemum Incanum. Michx. Mountain Mint. Wild Basil. Rocky Woods. Flowers pale red. July, Sept. Properties aromatic.

Pycnanthemum pylosum. Nutt. Hairy Pycnanthemum. Low grounds. Flowers white. June. Properties aromatic.

ORIGANUM.

Origanum Vulgare. Linn. Wild Marjorum. Officinal. Thickets. Flowers white and purple. July, Sept. Properties tonic, excitant, diaphoretic and emmenagogue.

CUNILA.

Cunila Mariana. DuRoi. Dry woods. Flowers pale red. August. Properties aromatic.

HEDEOMA.

Hedeoma pulegioides. Pers. (Cunila. Linn.) Pennyroyal. Prairies, fields. Flowers white, pink. July, August. Properties stimulant, aromatic and emmenagogue.

MELISSA.

Melissa officinalis. Balm. Introduced. Woods and gardens. F. white. June. Properties stomachic, diuretic.

SCUTELLARIA.

The plants of this genus are nearly all diaphoretic and tonic.

Scutellaria nervosa. Pursh. (S. gracilis. Nutt.) Banks of streams.

“ *parvula*. Michx. (S. ambigua. Nutt.) Prairies.

“ *lateriflora*. Mad-dog Scull-sap. Low Prairies.

“ *integrifolia*. S. *hyssopifolia*. Pers. S. Caroliniana. Ph. Dry places. Tonic.

“ *canescens*. Nutt. (S. serrata. S. incana. Spr.)

“ *cordifolia*. Muhl.

PRUNELLA.

Prunella vulgaris. Self-heal. Blue-curls. Prairies. Flowers blue all summer. Properties astringent.

NEPETA.

Nepeta cataria. Catnep. Catmint. Introduced. Old buildings, &c. Flowers purple. July. Properties dyspepsia, flatulence and in urinary diseases.

Nepeta Glechoma. (Glechoma hederacea. Linn.) Gill-over-the ground. Hedges, &c. Flowers blue. Properties tonic, aromatic. Employed to make ale.

LEONURIS.

Leonuris cardiaca. Motherwort. Introduced. Waste places. Flowers purple. July. Properties diaphoretic and emmenagogue.

MARRUBIUM.

Marrubium vulgare. Hoarhound. Introduced. Official. Roads, fields. Flowers white. Properties tonic and diuretic.

ORD.—BORRAGINACEÆ.

Mucilaginous, emollient and slightly astringent plants, never poisonous.

SYMPHYTUM.

Symphytum officinale. Comfrey. Introduced. Gardens, low grounds. Flowers white all summer. Properties, Root demulcent, emollient and astringent.

LITHOSPERMUM.

Lithospermum arvense. Corn Gromweil. Wheat-thief. Fields. Flowers white. May, June. Properties diuretic.

Lithospermum canescens. Leh. (*Batschia canescens*. Michx.) Puccoon. Prairies. Flowers bright yellow. June, July. Properties, narcotic. Also to dye red by the Indians.

MERTENSIA.

Mertensia Virginica. D. C. (*Pulmonaria*. Linn.) Virginian Lungwort. Bottoms. Flowers blue. May, April. Properties astringent, demulcent and expectorant.

CYNOGLOSSUM.

Cynoglossum officinale. Hound's-tongue. Roadsides. Flowers red. July. Properties anodyne, demulcent and astringent.

Cynoglossum Virginicum. (*C. amplexicaule*. Michx.) Wood. F. purple. June. Prop. May be substituted for comfrey.

ORD.—POLEMONIACEÆ.

POLEMONIUM.

Polemonium reptans. American Greek Valerian. Banks of streams, near Burlington. Flowers blue. April, May. Properties sudorific.

ORD.—CONVOLVULACEÆ.

CONVOLVULUS.

Convolvulus panduratus. (*Ipomœa*. Meyer.) Wild Potato. Man-of-the-earth. Sandy places. Flowers purple and white, July, August. Properties, Extract purgative and diuretic.

Convolvulus lacunosus. (*C. micranthus*. Riddell.) Small-flowered Bindweed. Hills. Flowers white. August, Sept. Properties cathartic.

Convolvulus Jalapa. (*C. macrorrhizus*. Ell. Batatas Jalapa. Choisy.) Sandy places. Flowers purple. July, August. Properties slightly purgative. Mistaken at one time for the officinal Jalap.

Convolvulus Batatas. (*Batatas edulis*. Choisy.) Sweet Potato. Introduced.

ORD.—SOLANACEÆ.

Stimulant narcotic properties pervade this order; the herbage and fruit of some, dangerously poisonous, while others are nutritious and wholesome, not that they are free from the narcotic properties; but, because it is expelled in the process of cooking or ripening in the sun.

NICOTIANA.

Nicotiana rustica. Common Tobacco, Introduced. Flowers gr.-yellow. Aug. Cultivated by the Indians. Thought to be inferior to the Virginian.

Nicotiana Tabacum. Virginian Tobacco. Intro. Off. Flowers rose color. July. Cultivated to a small extent in this State, and thrives well, especially in south part. Should demand the attention of our farmers. Properties narcotic, emetic and diuretic.

DATURA.

Datura Stramonium. Thorn Apple. Jamestown-weed. Official. Waste places. Flowers white. August. Properties poisonous, narcotic.

Datura Tatula. Stem purple. Similar to last.

SOLANUM.

Solanum Dulcamara. Bitter-sweet. Woody Nightshade. Off. Rare. Thickets, &c. Flowers purple. July. Prop. Berries poisonous. Leaves and twigs narcotic and alterative.

Solanum nigrum. Black Nightshade. Off. Way sides, &c. F. white. July, August. Properties narcotic, emetic and diaphoretic. Plenty.

Solanum tuberosum. Common Potato. Introduced.

Solanum Lycopersicum. Tomato. Introduced. S. Triflower.

ORD.—GENTIANACEÆ.

A pure bitter principle called Gentiana, pervades the whole order, hence their herbage, especially the roots, are employed as tonics, stomachics and frubrifugals.

SABBATTIA.

Sabbattia angularis. Ph. (*Chironia*. Linn.) American Centaury. Off. Wet prairies. Flowers rose color. July, August. Properties pure bitter, tonic and stomachic. Substitute for cinchona. Emmenagogue and vermifuge.

GENTIANA.

Gentiana Pneumonanthe. (*G. saponaria*. Griseb.) Soapwort Gentian. Flowers blue. August, Sept. Properties tonic. Fresh state, cathartic. Substitute for the *G. lutea* of Europe.

Gentiana Saponaria. Soapwort Gentian. Properties similar to last.

Gentiana Quinquiflora. Five-flowered Gentian. Woods. Flowers pale blue. Sept., Oct. Prop. tonic; herb, *G. lutea*.

Gentiana acuta. Michx. Nutt. Plains of the Missouri. Flowers gr.-purple. August, Sept. Properties tonic.

FRASERA.

Frasera Carolinensis. Walt. (*F. Walteri*. Mx.) American Columbo. Moist woods. Flowers greenish. May, July. Properties tonic. Substitute for officinal columbo. Off. Fresh root emetic, cathartic.

MENYANTHES.

Menyanthes trifoliata. Buck Bean. Water Shamrock. Official. Swamps, &c. Flowers red. April, May. Properties bitter and astringent, large dose emetic and cathartic. Substitute for hops.

ORD.—APOCYNACEÆ. Dogbanes.

The white juice which these plants contain is poisonous; they are principally emetic.

APOCYNUM.

Apocynum androsæmifolium. Dog's-bane Milweed. Off. Hedges and fields. Flowers white. June, July. Prop. Emetic, tonic. Lues venerea, Indians.

Apocynum cannabinum. Indian Hemp. Off. Waste lands. F. white. July, Aug. Properties emetic, cathartic, diuretic, diaphoretic and expectorant. The fibres of the bark are strong and pliable, said to be used by the Indians in various ways as hemp.

ORD.—ASCLEPIADACEÆ.

The juice is acrid and stimulating, less so, however than the last class.

ASCLEPIAS.

Asclepius cornuti. Decaisne. (A. Syriaca Linn.) Common Silkweed. Low shady grounds. Flowers red. June. Properties similar to last.

Asclepias incarnata. (A. amœna. Michx.) Rose-colored Silkweed. Off. Wet places. Flowers purple. July. Properties similar to the others.

Asclepias tuberosa. Tuber-root Asclepias. Butterfly Weed. Off. Sandy places. Flowers orange color. Aug. Properties diaphoretic, expectorant, tonic, antispasmodic, sudorific and emetic.

Asclepias quadrifolia. Pursh.

Asclepias obtusifolia. Michx. (A. cordata. Walt.) Blunt-leaved Silkweed.

ORD.—OLEACEÆ.

FRAXINUS.

Fraxinus Americana. (F. acuminata. Lam.) White Ash. Fine tree. North part of State. Prop. Timber valuable, bark reported cure for bite of rattlesnake.

Fraxinus sambucifolia. Lam. Black Ash. Water Ash. Swamps. North part of State. Prop. Young saplings for hoops, trunks for baskets, brooms. Indians.

Fraxinus quadrangulata. Michx. Blue ash. Woods. Timber valuable.

ORD.—ARISTOLOCHIACEÆ.

Tonics and stimulants.

ASARUM.

Asarum Canadense. Wild Ginger. Asarabacca. Rich soil. F.

purple. May, July. Properties aromatic, stimulant, diaphoretic. Substitute for serpentaria, also for ginger.

ARISTOLOCHIA.

Aristolochia serpentaria. Virginian Snake-root. Off. Thickets. Flowers purple. June. Properties stimulant, tonic, diaphoretic and diuretic. Antidote to the bite of poisonous snakes.

Aristolochia sipho. L'Her. Dutchman's pipe. Woods. Flowers brown. June. Prop. similar to *A. serpentaria*.

ORD.—CHENOPODIACEÆ.

Some of these plants contain an essential oil, which renders them tonic, antispasmodic and anthelmintic.

CHENOPODIUM.

Chenopodium ambrosioides. Ambrosia. Goose-foot. Off. Prairies. Flowers green. August, Sept. Prop. tonic and anthelmintic. Employed in chorea.

Chenopodium Botrys. Oak-of-Jerusalem. Off. Sandy fields. F. green. June. Prop. tonic, anthelmintic and expectorant.

Chenopodium anthelminticum. Wormseed. Off. F. green. Aug. Prop. anthelmintic and tonic,

ORD.—POLYGONACEÆ.

The roots of some of these plants are nauseous and purgative, while the leaves and stalks of others contain oxalic acid, and others are farinaceous.

POLYGONUM.

Polygonum aviculare. Bird Polygonum or Knot-grass. Fields. F. reddish. May, Sept. Prop. Astringent and styptic, seeds emetic and cathartic.

Polygonum erectum. (*P. aviculare*. Michx.) Erect Knot-grass. Fields. Flowers yellowish. June, September. Properties similar to last.

Polygonum punctatum. Ell. (*P. Hydropiper*. Michx.) Water Pepper. Low grounds. Flowers green, August, Sept. Properties; leaves acrid, pungent and vesicant, emmenagogue, diuretic.

Polygonum persicaria. Ladies' Thumb. Spotted Knot-weed. Wet grounds. Flowers rose colored. June, August. Prop. similar to last, astringent.

Polygonum lapathifolium. (*P. Incarnatum*. Ell.) Ditches, F. white. Aug. Properties similar to the last. Used to dye yellow.

Polygonum amphybium. (*P. coccinium*. Muhl.) Amphibious Knot-weed. Marshes. F. red. Aug. Properties alterative, substitute for sarsaparilla.

Polygonum Virginianum. Shades. Flowers white. Aug. Properties astringent.

Polygonum sagittatum. Scratchgrass. P. Convolvulus. Knot Bindweed. P. Scandens, Climbing Knotgrass.

Polygonum fagopyrum. Buckwheat. The fruit of the two former might be substituted for this.

RUMEX.

R. crispus. Yellow Dock. Carled Dock. Off. Introduced. Cultivated grounds. June. Properties astringent, tonic, alterative and antiscorbutic. Cutaneous diseases. Itch.

R. sanguineus. Bloody-veined Dock. Fields. Flowers red. July. Properties astringent. Applied to cancerous ulcers.

R. britannicus. British Water Dock. Muddy places. July. Prop. similar to *R. Crispus*.

R. aquaticus. Great Water Dock Ponds. July. Prop Root very astringent, similar to *R. Crispus*.

R. altissimus. Wood. (*R. verticillata*. Mead) Peach-leaved Dock. Wet prairies. June. Properties astringent, tonic.

R. ob'usifolius. Broad-leaved Dock. Fields, waste places. July. Properties astringent, cutaneous diseases.

R. acetosella. Field Sorrell. Sheep Sorrell. Pastures, waste grounds. Flowers red. Properties refrigerant, diuretic and antiscorbutic.

ORD.—PHYTOLACCACEÆ.

PHYTOLACCA.

P. decandria. Polk. Garget. Jalap. Roadsides, fields. Flowers greenish white. July. Properties, Leaves are purgative, also to dress ulcers. Emetic, cathartic, narcotic.

ORD.—LAURACEÆ.

BENZOIN.

B. odoriferum. Nees. (*Laurus Benzoïn*. Linn.) Fever-bush, Spice-wood. Moist woods. Flowers greenish. May. Prop. Berries aromatic, substitute during the Revolution for allspice. Bark aromatic, tonic, stimulant, intermittent fever. Flowers local applied to itch, &c.

SASSAFRAS.

S. officinale. (*Laurus Sassafras*. Linn.) Sassafras. Off. Forests, bluffs near Keokuk. Properties aromatic, stimulant, diaphoretic and demulcent.

ORD.—SANTALACEÆ.

NYSSA.

N. multiflora. Walt. (*N. villosa*. Michx.) Pepperidge. Tulepo.

Gum-tree. Woods. Flowers small, green. June. Wood soft, fine grain, interwoven, rendering it difficult to split, useful for beetles, naves of wheels, hatter's blocks, &c.

ORD. THYMELACEÆ.

DIRCA.

D. palustris. Leather-wood. Moose-wood. Banks of streams. Flowers yellow. April, May. Prop. Berries emetic and poisonous. Bark cause redness and vesication, emetic, cathartic, sudorific and expectorant. Substitute for senega, also for mezereum.

ORD.—ULMACEÆ.

ULMUS.

U. Americana. American Elm. White Elm. Forests. Flowers small purplish. Bark astringent and demulcent. Timber valuable.

U. fulva. Slippery Elm. Red Elm. Off. Woods, low grounds. Inner bark demulcent and mucilaginous. Timber valuable.

CELTIS.

C. occidentalis. American Nettle-tree. Hoop Ash. Beaver Wood. Woods. Flowers white. Wood tough and used for making hoops.

ORD.—EUPHORBIACEÆ.

An acrid, stimulant and poisonous principle residing chiefly in the milky juice. This principle varies in activity from mild stimulants, to the most active poisons, but it is volatile and easily expelled by heat.

EUPHORBIA.

E. corollata. Flowering Spurge. Milk-weed. Bowman's Root. Dry sandy soil. Flowers white. July, August. Properties diaphoretic, emetic and expectorant.

E. Ipecacuanhæ. Ipecac Spurge. Wild Ipecac. Sandy places. Properties emetic, diaphoretic and expectorant, in large doses cathartic.

E. marginata. Pursh. Gardens. Properties similar to last.

E. Lathyris. Mole-tree. Caper Spurge. Gardens. Properties emetic and cathartic. Seeds employed to procure abortion.

ACALYPHA.

A. Virginica. Three-seeded Mercury. In dry soils. F. August. Properties expectorant and diuretic.

RICINUS.

R. communis. Castor-oil Bean. Palma Christi. Cultivated. F. green. Seeds, oil expressed. This plant thrives well here with a little care, and I have no doubt that it would well pay the farmer for his trouble.

ORD.—JUGLANDACEÆ.

The butter-nut, walnut, peccan-nut, are sweet and wholesome, abounding in a rich drying oil. The epicarp and kernel are astringent. The timber is highly valuable.

JUGLANS.

Juglans cinerea. (J. cathartica. Michx.) Butternut. White Walnut. Official. Bluffs and woods. From the inner bark is extracted an excellent cathartic. Similar in effects to rhubarb in the property of evacuating, without debilitating the alimentary canal.—Wood also employed for the manufacture of furniture.

Juglans nigra. Black Walnut. Forests. The hull of the fruit has been employed as a vermifuge. Timber employed for many useful purposes.

CARYA.

Carya alba. Nutt. (J. squamosa. Michx.) Shag-bark. Walnut or Hickory. Wood is strong and elastic, compound and heavy.

Carya porzina. Nutt. (Juglans glabra. Willd.) Hog Walnut. Tough wood, excellent fuel.

Carya amara. Nutt. (J. amara. Michx.) Bitternut Hickory. Good for fuel.

Carya sulcata. Nutt. Thick Shell-bark. Along rivers. Excellent for fuel.

ORD.—CUPULIFERÆ.

QUERCUS.

Quercus alba. White Oak. Official. Bark astringent, antiseptic and tonic. Ship building, &c., tanning.

Quercus macrocarpa. Overcup White Oak. Timber very valuable.

Quercus stellata. (Q. obtusiloba. Michx.) Iron Oak. Timber excellent, and is more durable than any of the oaks, excepting the Q. birens or live oak made use of in ship building, &c.

Quercus prinus. Willd. Q. Prinus palustris. Michx.) Swamp Chestnut Oak. Timber valuable, fuel excellent.

Quercus bicolor. Willd. (Q. Prinus discolor. Michx.) Swamp White Oak. Fuel and timber excellent.

Quercus montana. Willd. (Q. Prinus monticola Mx.) Mountain Oak. Good fuel. Ship building. Tanning bark.

Quercus rubra. Red Oak. Excellent for fuel.

Quercus tinctoria. Bartram. Black Oak. Yellow-bark Oak. Off Bark astringent and tonic. Used in tanning, also in dyeing yellow, from a yellow principle called *quercitron*. Valuable for fuel.

Quercus palustris. Michx. Pin Oak. Water Oak. Wood good for fuel.

Quercus ilicifolia. Willd. (Q. Bannisteri. Michx.) Shrub or Scrub Oak. Good for fuel.

Quercus nigra. Willd. (Q. ferruginea. Michx.) Barren Oak. Black-Jack. Iron Oak. Wood valuable for fuel.

Quercus imbricaria. Laurel Oak. Shingle Oak. Shingles made of wood.

FAGUS.

Fagus sylvatica. Linn. Americana. Nutt. (*F. sylvestris*. Michx.) Beech. Large tree. Forests. May, June.

CORYLUS.

Corylus Americana. Hazel. Wild filbert. Flowers in April. Root astringent.

OSTRYA.

Ostrya Virginica. Hop Hornbeam. Iron-wood. Lever-wood. Small tree. April, May. Wood hard and strong, used for levers.

CARPINUS.

Carpinus Americana. Hornbeam. Small tree. April, May. Bluffs around Burlington.

ORD.—BETULACEÆ.

BETULA.

B. nigra. Ait. (*B. rubra*. Michx.) Red Birch. Banks of streams. May.

B. papyracea. Ait. Paper Birch. Canoe Birch. Woods N. part of State. Bark, Indians construct canoes. Wood used in turnery and furniture work.

B. excelsa. Lofty or Yellow Birch. Wood valuable for fuel.

B. glandulosa. Michx. Glandular Dwarf Birch. Astringent bark.

ALNUS.

A. rubra. Marsh. (*A. serrulata*. Willd.) Common Alder. Swamps. Flowers dark brown. March, April.

ORD.—MYRICACEÆ.

COMPTONIA.

C. asplenifolia. Ait. (Liquidambar. Linn.) Sweet Fern. Woods and hills. May. Prop. Tonic and astringent.

ORD.—SALICACEÆ.

Bark astringent and tonic, possessing properties similar to quiniæ.

SALIX.

S. tristis. Ait. (*S. Longirostris*. Michx.) Sage Willow. Border of Woods. Prop. Bark astringent and tonic.

S. Muhlenbergiana. Barratt. (*S. conifera*. Muhl.) Muhlenberg's Willow. Dry soils. Prop. similar to last.

S. nigra. Marshall. Black Willow. Banks of streams. Prop. Tonic, astringent and antiseptic.

S. Purshiana. Spreng. (*S. falcata*. Hook.) Pursh's Willow. Swamps. Prop. similar to last.

- S. longifolia.* Muhl. Long-leaved Willow. Banks of streams.
S. angustata. Ph. Narrow-leaved Heart Willow. Banks of streams. Prop. similar to others.
S. myricoides. Muhl. Gale-leaved Willow. Woods.

POPULUS.

- P. tremuloides.* American Aspen. White Poplar.
P. grandidentata. Michx. Large Poplar.
P. balsamifera. Balsam Poplar. Woods. Buds of this species are covered with an aromatic resin, which may be separated in boiling water. Same in all poplars.
P. angulata. Water Poplar. Western Cotton Tree. Banks of rivers.

ORD.—PLATANACEÆ.

PLATANUS

- P. occidentalis.* Plane Tree. Button-wood. Sycamore. Banks of rivers. 50 to 100 feet high.

ORD.—URTICACEÆ.

MORUS.

- M. rubra.* Red Mulberry. Berries pleasant to the taste.

MACLURA.

- M. aurantiaca.* Nutt. Osage Orange. Bow-wood. Yellow-wood. Cultivated for hedges. Thrives well.

URTICA.

- U. dioica.* Stinging Nettle. Waste places. Flowers green. July, August. Properties diuretic and astringent.

CANNABIS.

- C. sativa.* Hemp. Introduced. Flowers small, green. June. Cultivated for the sake of its fibre, which is stronger than that of flax, and is the best of all materials for cordage and sail cloth. The cultivation of hemp should engage the attention of our farmers as it thrives well, and the cultivator is amply remunerated for his trouble, such is the experience of Mr. Williams of Burlington.

HUMULUS.

- H. lupulus.* Common Hop. Hedges. Aug. Prop. Tonic and narcotic. Cultivated for the sake of its fertile aments, which are used as a preservative in beer. This is also well worthy the attention of our farmers.

ORD.—CONIFERÆ.

PINUS.

- P. resinosa.* Ait. (*P. rubra.* Michx.) Norway Pine. Red Pine. North part of the State. Valuable for its timber.

P. variabilis. Lamb. Yellow Pine. Spruce Pine. North part of State. Timber valuable.

P. palustris. (*P. australis*.) Long-leaved or Brown Pine. Timber valuable.

E. strobus. White Pine. Weymouth Pine. Masts of ships and various purposes.

ABIES.

A. Canadensis. (*Pinus*. Linn.) Hemlock. Bark used in tanning.

A. nigra. Michx. (*Pinus*. Linn.) Black Spruce. Timber used in architecture, young branches used in making spruce beer.

A. balsamea. Willd. (*Pinus*. Linn.) Fir Balsam. Balsam Spruce. North part of State.

CUPRESSUS.

C. distycha. Cypress. Wet soils. Wood fine grained and durable.

THUJA.

T. occidentalis. Arbor Vitæ. Border of streams, lakes, &c. Wood light and durable.

JUNIPERUS.

J. Virginiana. (*J. Sabina*. Hook.) Red Cedar. Off. Found on Red Cedar River. Properties similar to sabina, stimulant, emmenagogue, diuretic and diaphoretic. Excrecences on the branches, called *Cedar Apples*, employed as anthelmintics. Wood used for fences, tubs, pails and drawing pencils.

TAXUS.

T. Canadensis. Dwarf Yew. Ground Hemlock. Shady places. Fruit red. May.

ORD—ARACEÆ.

An acrid, volatile principle pervades the order, which is in some instances so concentrated as to become poisonous. The corms and rhizomas abound also in starch, which in some cases, when the volatile acidity is expelled in drying or cooking, is edible and nutritious.

ARUM.

A. triphyllum. Dragon-Root. Jack-in-the-Pulpit. Indian Turnip. Off. Wet woodlands. May, June. g. y. and p. Properties acrid, irritant, secernant, stimulant, pectoral. When dried valuable as a carminative.

A. dracontium. Green Dragon. Banks of streams. June, July. Properties similar to last.

CALLA.

C. palustris. Northern Calla. Wet places. North part of State. July. Root acrid. Bread made from it after the acidity is destroyed.

ACORUS.

A. calamus. Sweet Flag. Off. Swamps. Flowers green. June, July. Properties stimulant, tonic, stomachic.

ORD.—TYPHACEÆ.

TYPHA.

T. latifolia. Cat-tail. Reed Mace. Muddy pools and ditches. Leaves made useful for weaving the seats of chairs.

ORD.—ALISMACEÆ.

ALISMA.

A. Plantago. (*A. Parviflora*. Ph.) Water Plantain. Ponds, ditches. Reputed remedy for hydrophobia. Leaves rubefacient.

ORD.—ORCHIDACEÆ.

ORCHIS.

O. orbiculata. Pursh. (*Platanthera*. Lindl.) Woods. Flowers greenish white. July. Fresh leaves used to dress blisters.

GOODYERA.

G. pubescens. Br. Rattlesnake Plantain. Woods. Flowers white. July, Aug. Remedy for scrofula.

CYPRIPEDIUM.

C. candidum. Willd. White-flowered Ladies'-slipper. Moccasin-flower. Prairies. Flowers white. May. Properties sedative, antispasmodic, nervine, similar to valerian.

C. parviflorum. Salisb. Yellow Ladies'-slipper. Prairies. Flowers purple. May, June. Properties like first.

ORD.—HÆMODORACEÆ. Bloodroots;

ALETRIS.

A. farinosa. (*A. alba*. Mx.) Star-grass. Colic Root. Low grounds. Flowers white. July. Properties tonic, stomachic, and emetic in large doses.

ORD.—IRIDACEÆ.

IRIS.

I. versicolor. Blue Flag. Wet grounds. Flowers blue. June. Properties cathartic, emetic, diuretic and alterative.

SISYRINCHIUM.

S. anceps. (*S. gramineum*. Lam.) Blue-eyed Grass. Low grounds. Flowers blue. June, July. Properties cathartic. Employed by Thompsonians under the name of *Physic grass*.

ORD.—DIOSCOREACEÆ. Yam Roots.

DIOSCOREA,

D. villosa. (*D. quaternata*. Ph.) Yam Root. Thickets. F yellow and white. June, July. Prop. A decoction of root good in bilious colic. Emetic, diaphoretic and expectorant.

ORD.—SMILACEÆ.

SMILAX.

S. rotundifolia. Linn. Green-briar. Thickets. Flowers greenish. June. Similar to the officinal sarsaparilla.

S. herbacea. (*S. pedunculata*. Muhl.) Low grounds. Flowers yellowish green. June. Substitute for the Off. Sarsaparilla.

ORD.—TRILLIACEÆ.

TRILLIUM.

The roots of some of these plants are emetic, others astringent, tonic, pectoral, antiseptic. Given prior to parturition.

T. sessile. Sessile-flowered Trillium. Woods. Flowers purple. April, May.

T. recurvatum. Beck. Shady woods. Flowers purple. May.

T. Nivale. Riddell. Snowy Trillium. Dr. James' farm, Des Moines county. Flowers white. April.

T. pendulum. Muhl. (*T. cernuum*. Bart. Ph.) Drooping Trillium. Small white flower. May, June.

T. grandiflorum. Salisb. Large-flowering Trillium. Woods. F. white. May.

MEDEOLA.

M. Virginica. (*Gyromia*. Nutt.) Cucumber Root. Beautiful plant. Flowers greenish. July. Properties diuretic and hydragogue cathartic.

ORD.—LILIACEÆ.

LILIUM.

L. Canadense. Yellow Lily.

L. superbum. Superb Lily. Turk's Cap.

L. Philadelphicum. (*L. Catesbæi*. Walt.)

ERYTHRONIUM.

E. Americanum. Smith. (*E. Dens-canis*. Michx.) Yellow Erythronium. Dog-tooth violet. Woods. Flowers yellow. May. Prop. Recent root emetic. External application to scrofulous sores.

E. albidum. Nutt. Erythronium. Wet prairies. Flowers white. April, May. Prop. similar to last.

ALLIUM.

A. tricoccum. Ait. Lance-leaved Garlic. Damp woods. Flowers white. June, July. Prop. stimulant, diuretic, diaphoretic and expectorant.

A. Canadense. Canadian Garlic. Wild Meadow Garlic. Woods, prairies. Flowers white. June. Prop. similar to last and may be substituted for *A. Sativum*.

A. vineale. Crow Garlic. Meadows. Flowers purple. June, July.

A. cernuum. Roth. Nodding Garlic. Hill sides. Flowers rose col. July.

A. Cepa. Common Onion. Introduced.

ORNITHOGALUM.

O. umbellatum. Star of Bethlehem. Introduced. Abundant.
Flowers white. May. Prop. stimulant and nutritive.

PHALANGIUM.

P. esculentum. Nutt. Esculent Phalangium. Quamash. Wet prairies. Flowers yellow. May. Eaten by the Indians.

CONVALLARIA.

C. bifolia. (Smilacina. Desf. Styrandra. Raf.) Two-leaved Solomon's Seal. Woods. Flowers white. May.

C. trifoliata. (Smilacina. Desf.) Three-leaved Solomon's Seal. Wet prairies. Flowers white. May.

C. stellata. (Smilacina. Desf.) Star-flowered Solomon's Seal. Banks of streams. Flowers white. May, June.

C. racemosa. (Smilacina. Desf.) Clustered Solomon's Seal. Fl. white. May, June. Prop. Root. Found it to produce nausea, cathartic effect on the bowels and either diaphoresis or diuresis. Used it internally in piles, and derived much benefit from its external application in the form of a decoction, in the affection of the skin arising from the poisonous exhalations of plants.

C. borealis. (*C. umbellulata.* Michx. *Clintonia* Raf.) Wild Lily of the Valley. Woods. Flowers yellowish green. June. Prop. similar to last.

POLYGONATUM.

P. multiflorum. Desf. (*P. pubescens.* *P. latifolium*, of Ph.) Solomon's Seal. Woods. Flowers greenish, axillary. June. Berries Blue. Properties similar to *C. Racemosa*, also *C. Polygonatum* of Europe.

UVULARIA.

U. perfoliata. (*U. flava.* Smith.) Mealy Bellwort. Woods, bluffs, near Burlington. Flowers yellow. April. May. Reputed remedy for the bite of rattlesnake.

U. grandiflora. Large-flowered Bellwort. Woods. Flowers yellow. May. Properties similar to last.

ASPARAGUS.

A. officinalis. Asparagus. Cultivated. Diuretic.

ORD.—MELANTHACEÆ.

This order is equally pervaded by drastic, narcotic and poisonous qualities.

ZIGADENUS.

Z. glaucus. (*Z. cloranthus.* Rich. *Melanthium.* Nutt.) Sandy places. Flowers greenish white. July, Aug. Prop. Poisonous.

MELANTHIUM.

M. hybridum. Walt. Woods. Flowers yellowish green. June, July. Prop. Poisonous.

VERATRUM.

V. viride. (*V. album*. Michx.) Poke. White Hellebore. Swamps. Flowers green. July. Prop. Root emetic, stimulant and poisonous.

HELONIAS.

H. dioica. Ph. (*Veratrum luteum*. Lin.) Unicorn Root. Low grounds. Flowers greenish white. June. Properties anthelmintic and tonic.

ORD.—GRAMINEÆ.

ZIZANIA.

Z. aquatica. Lamb. (*Z. clavulosa*. Michx.) Indian Rice. Swamps, ponds, &c. N. part of State. Flowers blackish. Aug. The fruit affords sustenance to wild geese, ducks and other water fowls. Also an important diet among the Indians.

ZEA.

Z. Mays. Maize. Indian Corn.

ORD.—EQUISETACEÆ.

EQUISETUM.

E. hyemale. Scouring Rush. Wet places. June, July. Infusion said to be good in strangury.

ORD.—FILICES.

ASPIDIUM.

A. acrostichoides. Willd. (*Nephrodium*. Michx.) Bluffs and rocky woods. June, Aug. Prop. Vermifuge.

ADIANTUM.

A. pedatum. Maidenhair. Rocky woods. July. Pectoral and demulcent.

On motion of Dr. Barton, it was

Resolved, That the Treasurer be authorised to call upon members of this Society who are not present at this meeting, for the sum of one dollar each, for the purpose of defraying the expenses of this Society.

On motion of Dr. Sanford,

A committee was then appointed to revise the Constitution and By-Laws.

Drs. Siveter, Sanford and Orr were appointed said committee.

Dr. Rauch then offered the following resolution :

Resolved, That a committee of three be appointed whose duty it shall be to memorialize the Legislature of our State at its next session, relative to obtaining material for dissection.

Drs. Rauch, Norris and McGugin were appointed said committee.

EVENING SESSION, 7½ o'clock, P. M.

Society met and was called to order by the chair.

The following report by Dr. J. F. Henry, on the Topography, Climate and Diseases of Iowa, presented through the President of the Society, was read and adopted.

REPORT.

On the Medical Topography, Climate and Diseases of Iowa

MR. PRESIDENT:

As Chairman of the Committee of our State Medical Society, to whom the above subjects were assigned, I beg leave respectfully to make the following report:

The State of Iowa, extending from the mouth of the Des Moines river in latitude $40^{\circ} 22'$ on the south, to latitude $43^{\circ} 30'$ in the north, occupies a happy position on the map. It constitutes a belt of about 3° in width, just a little south of the middle belt of the North Temperate Zone; and so far as climatical influence depends on latitude, it may challenge a comparison with any other portion of the United States. The same parallel extended eastward would embrace Middle and Northern Illinois, and Southern Wisconsin; Northern Indiana and Southern Michigan; Northern Ohio and Pennsylvania; Southern New York; the Southern New England States, and the Southern portion of Vermont and New Hampshire. These regions are now considered the most salubrious in our country, though many portions of them, in their early settlement, were desolated by the various forms of malarious disease. Viewed in another aspect, it also challenges a comparison with the countries enumerated.

At the mouth of the Des Moines, the Mississippi, at low water mark, is only 444 feet above tide water; at Burlington, 486; at Rock Island, 528; at Prairie Du Chien, 652, and the Upper Iowa river, near the northern boundary of the State, about 660. The elevation of the contiguous bluffs ranges from 150 to 250 feet above these levels. Progressing westward, the country gradually rises, until we come to the Gotean des Prairies, between the Des Moines river and the Spirit Lake, where we reach an elevation of 1414 feet. This is unquestionably the highest land in Iowa. The Spirit Lake, one of the principal heads of the Little Sioux of the Missouri, is 1310 feet above tide water. From this the country declines to the southwest until it reaches the Missouri, which, on the average, has a water level at corresponding parallels, of almost double that of the Mississippi. So far then, as elevation influences climate, our State has a warmer climate than is found in the States east of Illinois. Another view of this matter seems to possess great interest. Our whole State may be consid-

ered an inclined plane, fronting to the southeast, south and southwest; no one of its water courses running to the north, as is the case with all the States east of Illinois until you reach New York. Thus our springs are earlier, and our autumns more prolonged, than under other circumstances they could be.

But there are other elements which must be estimated in solving the great problem we are upon. Our State is a prairie State, some parts having only one-tenth timber, and others one-half. The average would be about one-sixth. Our prairies in the eastern portion of the State, run from southeast to northwest, and may be considered extended belts of prairie land, varying somewhat in figure, but still continuing their course until they are merged into the Coteau des Prairies already referred to, passing which, they run on indefinitely until they abut on the Rocky Mountains. From this statement, it is apparent that the cold atmosphere of the snowy mountains passes over a gently inclined plane, unobstructed by a single tree or a single hill, for the Coteau des Prairies is no obstruction. This, at a glance, shows us why the northwest is one of the most common as well as the coldest of our winds. In this respect it exceeds our directly north winds, which, coming from Hudson's Bay and the Northern Ocean, traverses a country of low elevation. A single puff of this northwest wind is sufficient to reduce the temperature greatly. But it is not so evanescent in its nature; on the contrary, it often continues several days in succession. When it reaches the Mississippi, a portion of it passes on in the neighboring State of Illinois, while another portion, blending with the north winds already referred to, takes the channel, or valley of the Mississippi river, and thus passes onward to the Gulf of Mexico, constituting the terrible Northers of that distracted water. But according to the old maxim, Nature abhors a vacuum, and after prevailing for several days, the equilibrium must be restored, and then we have this same wind sent back to us loaded with moisture, and being from that circumstance more reluctant of animal heat, and actually less bearable than when it came from the northwest; but a few hours continuance produces a rise in the thermometer, and then we have a decided mitigation of the feeling of cold. Those from the south are warm and sometimes accompanied with rains; but I have known them to prevail for weeks at a time, in summer and autumn, without the accompaniment. Our northeast winds are generally accompanied, or followed by storms. Blowing over the Lakes to the northeast as they do, they come loaded with cold vapor, and often produce snow storms; after prevailing for a few hours, they change to the northwest or southeast, according to the season of the year.

Thus it would appear, that while our low elevation and southern declension gives us a warmer and more genial climate, than if we faced to the north, or were convulsed into mountain ranges, still these very circumstances render us liable to the sudden changes which result from alternations of winds so excitable as ours. These sudden changes are known and felt by all, and as they are, in great measure, beyond the control of man, the force of this element must not be forgotten when we are summing up the good and bad qualities of our climate.

But these things, vastly important as they are, would not of themselves enable us to develop the causes of our diseases. There are other elements which must not be forgotten. Among them are the nature of the surface and the character of our soils. Our whole State may be considered under three heads, which are sufficiently comprehensive to embrace every part. For the sake of order, let us first consider the bottom lands. It is needless to specify these minutely. They have one invariable character from the Balize to the Falls of St. Anthony, and to the base of the Rocky Mountains, on the Missouri; nor is the character different on our smaller streams, except in degree. They are exceedingly fertile; they are very damp from river influences, even when not subject to overflow; but most of them are annually submerged, and then there are pond's, sloughs, &c. which, as reservoirs, add to the prevalent moisture. As a consequence, they are exceedingly destructive to health and human life. The inhabitants, no matter from what region they come, soon become subjects of some form of what, for want of a more comprehensive and precise term, is called bilious disease, and unless they fly from their homes, they are again and again attacked, until the constitution is broken down, and some organic disease supervening, they sooner or later sink into the grave the victims of malaria. But this may be protracted for many years, the patient becoming listless, sluggish, good-for-nothing, and carrying with him visceral enlargements of great size. In one case, that of a thin tall female, I found an enlarged spleen reaching from beneath the ribs to the pubes—a distance in her case of more than twelve inches. These dwellers on the bottoms must be a short-lived race, nor are they a prosperous one; owing to repeated sicknesses they tend their crops badly, and thus from year to year they fall behind their neighbors on the uplands. They live in cabins daubed with mud, with wooden chimneys, and no glass in their windows. They lack energy to burn lime-kilns, although the rock and fuel may be quite accessible in some neighboring bluff. It makes but little difference whether the bottom is prairie or timberland.

The essential elements and the results are similar in either case. Let no immigrant settle on bottom land. It is an interesting question how far the influence of the bottom lands extends. I am sorry I have no means of definitively determining a question of this sort. The general impression is, that the Mississippi is no barrier to their pestilential influence, and that a prevalent wind may waft the miasma to the inhabitants on the opposite bank. It would be hard to convince the old inhabitants of Burlington, that the bottom opposite to us, was not the focus of many of our diseases. How far on the hills the same influence may extend must depend on contiguous timber, or prevalent winds. The estimate of Dr. Horr, is, I think, 600 feet; but this must be modified by the circumstances above mentioned.

2d. The timberlands are generally intermediate between the bottom lands, or water courses, and the prairie lands; they are generally broken, rough lands, with deep clay foundations; in point of productiveness, they are commonly inferior to the prairie lands. They are almost uniformly well drained. So far as health is concerned, the concurrent testimony of my correspondents is, that they are more salubrious than either prairie or bottom lands. The diseases may be the same, but there are fewer cases, and they are more manageable; such is my own observation,

3d. The prairie lands are the highest lands in their respective neighborhoods. They are indeed the table lands of our country. In them originate all the water courses, and they are generally dry, or susceptible of drainage. Indeed, Dr. Sales thinks there is not, in Jones county, wet land enough for meadows. The same would seem to be true of Cedar and Dubuque counties. They are by universal consent admitted to be as healthful as any new country ever was. An extensive and simultaneous breaking up of prairie, rarely fails to generate bilious disease; but in a year or two all decaying roots, &c. having commingled with the earth, all is right again.

A prairie farm is a delightful one. The pure, enlarged atmosphere braces the form, and makes us luxuriate in the enjoyments of health. And the farmer is prosperous; he builds good houses, good barns, plants orchards, and if any winds, for instance a northwester, is particularly troublesome, he plants a grove of young forest trees, and they lift the wind from the earth, and it passes harmless over his head. The influence of artificial groves in thus protecting houses and stock and farms from destructive winds, deserves a more extensive consideration than I have space to bestow on it. Its bearing on health is very direct, and so far as I know, it is the only means by which man can control the angry element in which he lives. There seems to be

a large scope of country north of the Iowa river, commencing with the counties bordering on the Cedar river, and extending to above Dubuque, and probably to the north boundary of the State, in which there are fine mill streams, with rocky bottoms and banks, with but little bottom lands and no swamps. The mill dams flood no lands and create no disease. I am indebted to Drs. Sales and Witter for interesting descriptions and statements in reference to this section of country.

The county of Van Buren may be considered a type of the Des Moines Valley, and with the exception of the river itself, it would seem to be free from any permanent causes of disease. I am compelled to rely on the statement of Nicollet as to the river itself, to-wit: that it flows constantly in a deep valley, until near its mouth, where it spreads over low grounds, that it has a uniform rocky bottom, and that its current is almost as rapid as that of the Missouri. This would indicate a health producing stream. But Dr. Flint informs me that there is a long moss, which at low water becomes very abundant, and getting dislodged by floods, or other accidents, is drifted to the head of Islands, or on to mill dams, and there undergoing decomposition. is considered a very abundant source of autumnal fevers. What effect the State Improvements may have on the health of this country must depend on the amount of submerged lands, and the accumulation of this long moss already referred to.

The whole eastern and southern portion of the State, with few exceptions, abounds with limestone suitable for building purposes. The prevalence of lime is generally considered conducive to health.

The valley of the Des Moines, that of Skunk, and many other streams, abound in stone coal. The influence of beds of bituminous coal are not known to me to be prejudicial to health anywhere.

The county of Dubuque abounds in lead mines; but the working of them as at present conducted, cannot be very injurious. Since Dr. Horr in his communication does not even allude to the subject. Doubtless, however, cases of colica pictonum occasionally occur.

Our principal river towns may form a distinct class, and deserve a separate consideration. Their first settlement was followed by seasons of sickness, often to all the inhabitants, sometimes none escaping. This was owing to the usual prevalence of malaria from stagnant water, and drainage aggravated by badly built houses and by poor living. So far as I am informed, our river towns are uniformly and rapidly improving in their healthful condition. The better drainage resulting from the grading of our streets and the more thorough attention to cleanliness, as well as the improved condition of our dwell-

lings, and consequently of our mode of living, fully accounts for this improvement. The remark of Dr. Horr, that the sanitary line is approaching the river at Dubuque at the rate of about fifty feet per annum, applies with greater or less force to all our towns.

Dr. Drake's interesting and philosophical work on the diseases of the Mississippi valley, shows, by a very extensive array of statistics, that most of the elements of disease may abound, and localities remain comparatively healthful, because of the absence of a single one. Thus our bottom lands, if transported to the latitude of New Orleans, would unquestionably generate yellow fever, and other malignant forms of disease, whilst, for want of a tropical sun, they with us produce mild intermitting or remitting fevers.

The only remaining element of disease deserving consideration at this time, is the hygrometric condition of the atmosphere, and the consequent amount of rain which falls. On this subject I have no records to consult, and therefore I must be very brief. The value of rain as a health producing or disease engendering agent, must depend on its amount, or on the time of the year at which it falls. When the country is deluged at the commencement of the warm season, it must be more injurious than if it fell in mid-winter. As a general rule, that season is the most healthful in which the ordinary quantity falls, rather than that in which there is either an excess or deficiency. As trees are considered valuable in condensing or in affording those vapors, which, rising into the higher regions of the atmosphere, are condensed and fall down in showers, I should suppose the neighborhood of our water courses, abounding in forests, would be more regularly supplied by rains than our prairies; but I am not prepared to say that this is so.

The *diseases* of Iowa embrace a very extensive list. Wherever man is found, the maladies to which he is liable will also exhibit themselves. But a more limited range is undoubtedly contemplated by the resolution under which this report is made. No one, for instance, would rank apoplexy or gout among the diseases of Iowa, because cases of each might occur within the limits of the State. The object is to ascertain what diseases our topography and climate produce.

For the sake of order I will enumerate our diseases as they occur in the successive seasons of the year, commencing with the spring. This is the season of sudden changes of temperature, and we have consequently catarrhal affections, some of the milder, and occasionally some of the severer forms of pulmonary disease, such as bronchitis, pneumonia and pleuritis; we have, also, inflammatory rheumatism

of an exceedingly aggravated character. This too is the season at which we have the greater amount of exanthematous diseases, such as scarlatina, rubeola, erysipelas, &c., though from these diseases being supposed to depend more on a specific contagion or an epidemic constitution of the air, than on any local causes, I have hesitated to embrace them among our diseases. They are evidently, however, under climatical influences, and therefore modified by situation. This is also the season of mild intermittents, though these most generally show themselves as relapses. We have also many irregular forms of periodical disease, consisting principally of painful nervous affections of the head and face. As a matter of course, many of our uncured winter diseases run into this season, and are greatly aggravated by the sudden changes of temperature.

In the month of June we have more or less of cholera infantum, often the accompaniment of remittent fever. Attacks of diarrhoea in adults, with the same accompaniment are not uncommon; and as summer advances, especially if the season be dry, the various forms of bilious disease are displayed in greater abundance. At this season also our principal manifestations of cholera have been made. As this disease wears somewhat the appearance of an exotic, not yet having been acclimated, I hesitated to include it among the diseases of Iowa. But I could not with propriety omit all notice of it, and as it may often re-appear, the sooner our Physicians become familiar with its progress the better. In my judgment it depends on a mixed origin, a something from abroad which may be a *sine qua non*, and a local cause sufficient to develope it. The circumstances which constitute this local cause are very well known; they are heat, moisture and filth, within and without the crowded habitations in which, as a general rule, the disease is most prevalent and most destructive. When really epidemic, the whole population of a city is immersed in this local cause.

As autumn advances, the peculiar diseases of this season manifest themselves. These consist of intermitting fevers of every grade, from the mildest to the most malignant form, constituting the congestive chill, so much dreaded by doctor and patient. Intermitting fever is especially the disease of new settlements, as well as of our bottom lands; as a general thing it is mild and manageable, though liable to return unless the patient is removed from the malarious district in which it originates. This is essentially an autumnal disease, although an occasional vernal attack may be looked for among recent settlers. It has been observed repeatedly that those new comers who are badly provided with the necessities and comforts of life are almost sure

of an attack, while those in greater comfort in the same neighborhood escape. Conjointly with these intermitting forms of fever we often find, in the same families, some who are laboring under remitting forms of fever, a more severe malady, though if thoroughly cured, more easily and speedily removed. These forms of fever are generally destitute of danger, though occasionally they assume the pernicious or congestive form, and are thus full of peril. The intensity of our febrile attacks, compared with similar attacks elsewhere, was made the subject of special inquiry of all the physicians to whom I wrote. The testimony from the northern portion of the State has been uniform, that they are milder and more manageable; and in this opinion I entirely concur, whilst Drs. Ford of Keokuk, and Flint of Van Buren, represent them as more severe. As I rely on the judgment of both sets of Doctors, I presume the Des Moines Valley is afflicted with severer forms of autumnal fevers than those observed north of Iowa river.

Among our autumnal diseases, although they occur a month or two earlier, must not be omitted dysentery and diarrhoea; nor should it be overlooked that ill-cured intermittents and occasionally remittents, greatly neglected, are merged into visceral enlargements, which occasionally terminate in hydropic effusions in both sexes, and also in amenorrhoea in the female. Gastritis and enteritis are sporadic forms of disease which may occur at any season, but are thought to be more common at this season than at any other. Hepatitis is thought to be very rare. I may mention one peculiarity of erysipelas as it lately prevailed to some extent in this city, viz: the exemption of women in childbed from puerperal peritonitis, which in the epidemics seen by Gordon and Hay, and in a former one seen by myself, was so exceedingly fatal.

As cold weather advances, in addition to these maladies, and sometimes conjoined with them, we have catarrhal affections, pleuritis, pneumonia, bronchitis, &c.; many of these forms are manifestly complicated with bilious symptoms, showing that the malarious influence had not ceased to act. This is also the opinion of Dr. Flint, whilst Dr. Horr thinks that those who have actually suffered an attack of autumnal fever, are, to some extent, exempt from the winter disease. Except in those whose health has been greatly impaired, these pulmonary attacks are inflammatory in their character; a neglected case, or one supervening on a broken down constitution may assume the character of pneumonia typhoides. As might be expected from our climate, tuberculous formations are not uncommon, though from the habits of our people living much in the open air, taking a large amount

of exercise, the developments are more rare than in denser populations. I ascribe to these causes, and not to the prevalence of miasmatic diseases, our greater exemption from this desolating form of disease. Conjunctivitis, as well granular as mild, is very common. This is the result of strong winds impinging on the conjunctiva, freighted with dust and sand, and other impurities. This disease is, I think, most common in summer and autumn.

Before I conclude, I feel called upon to allude to a remarkable series of local affections. In Dr. Horr's interesting communication he alludes to the greater prevalence of felons or whitloes, than in Ohio, where he formerly practiced. How this, a local disease, can be more prevalent in one country than another, I am at a loss to conjecture, but certainly in the practice of my own office, I have never seen as many cases as in the last six or eight months, and I would mention as occurring at the same time, an unusual amount of phlegmonous tumors and carbuncles. I have seen a gentleman from Indiana or Ohio, who tells me that the same thing has been observed there during the past winter. Can this be a local affection marking the advance of some epidemic influence? The subject is worthy of notice and remark.

I have thus, Mr. President, discharged my duty in a very imperfect manner, as none can feel more sensibly than myself. I have been confined for almost six weeks with inflammatory rheumatism, from which my hands are yet great swollen, so much so, that I have been compelled to avail myself of the kind aid of my friend Dr. Matthews, to copy this communication, my own hand being almost illegible. I was not well enough to commence preparing my report until nearly dark on Saturday evening, and every word I have written has been with pain. Some subjects, as for instance, the hygrometric condition of the atmosphere, I entirely forgot in my great suffering, until it was too late to do more than allude to it. I may mention also, that I sent circulars to some fifteen or twenty of the most distinguished physicians in the State, but have received only five communications, which have already been honorably noticed. The paucity of communications which I have received, while it shows less interest than I expected among our medical men, will account for large sections of our State being entirely unnoticed.

I hope our Society will accept this report as the best evidence under all the circumstances, that I could possibly give of my devotion to the great objects of medical improvement.

Dr. McGugin then offered the following preamble and resolution :

WHEREAS, The highest and first object of patriotism is to provide for the suffering and to protect those who are without protection ; *and whereas*, the insane are not only unable to provide for and protect themselves, but often inflict serious injury upon their own persons, therefore

Resolved, That deeply impressed with the necessity of an Asylum in this State, this Convention would invoke the Legislature at the earliest possible moment, to provide by law for the erection of an Asylum at some point most accessible to the citizens, that this large suffering class of fellow-citizens may receive that aid and protection which are alike demanded by patriotism and humanity.

Drs. Rauch and Cousins were appointed a standing committee on Medical Botany.

Dr. McGugin was appointed in accordance with a resolution of the Society, to read a paper upon various discoveries and improvements in medicine.

Dr. Henry, Sr., upon the relation which the natural sciences bear to recent improvements and discoveries in medicine, and their agency in the development and resources of the healing art.

Dr. Sanford was appointed to deliver the Annual Address.

Dr. Barton then offered the following :

WHEREAS, The General Assembly of this State, by a late act, established and endowed the College of Physicians and Surgeons of the Iowa University, located in the city of Keokuk, thus securing the perpetuity of that Institution, and whereas such Institutions exert a great influence upon the character and dignity of the medical profession of the State, it is therefore

Resolved, That a committee of five be appointed by the chair to visit said College during its next session, with a view to ascertain and report to this Society at its next annual meeting, how far the College of Physicians and Surgeons above mentioned, is entitled to the confidence and patronage of the Society.

Drs. J. F. Henry of Burlington, T. Siveter of Salem, Ramage of Fairfield, Barton of Farmington, and Flint of Keosauqua, were appointed said committee.

Delegates were then appointed to attend the American Medical Association.

Drs. Lowe and Sanford were appointed for that purpose.

On motion of Dr. Barton,

A committee of three was appointed to draw up articles of association according to the statute, and to present them to the next meeting for its consideration.

Drs. Barton, Lowe and Huey were appointed said committee.

On motion of Dr. Rauch,

The code of Medical ethics of the American Medical Association was adopted by the Society, and the old code expunged.

Dr. McGugin then introduced the following resolution.

Resolved, That the thanks of this Society are due and hereby tendered to the Medical Faculty of Fairfield for the courtesy shown the various members who have met here, and for the kind provision made for their comfort and convenience.

The President then made the following closing remarks :

You assigned me the honorable position of President of your Society for the first year of its existence ; that period is now at an end, and my worthy and respected successor, Dr. D. L. McGugin, is about to take my place.

May your organization strengthen and improve with each succeeding year, until no well educated and respectable physician can be found within the borders of our State who is not a member of it.

Let us adhere to our Society as worthy of affection, acting up to its objects and ethics, and by so doing we shall make it an instrument of good to our fellow men, and a means of advancing the dignity and honor of the profession.

In parting with you, it is with the cherished hope that a year hence we may all meet again, with increased interest in each other, and in promotion of the objects of our Society.

On motion,

The Society adjourned to meet again at Fairfield, on the first Wednesday in June, 1852.*

ENOS LOWE, *President*.

E. D. RANSOM, *Secretary*.

* It will be perceived, that the time of the next meeting of the Society is postponed. I have been induced to make this change after consultation with several members who have all concurred in the propriety of avoiding a conflict in the time of meeting, with the American Medical Association, which meets the first *Tuesday* in May.

D. L. MCGUGIN, *President*.

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NOTES ON THE FLORA OF IOWA.

BY B. SHIMEK.

THE following paper contains a number of additions to the published lists of the flora of Iowa, together with notes on the occurrence in new localities of species already listed.

The notes are based wholly on material in the Herbarium of the State University of Iowa which was contributed by the following named persons: Professors T. H. Macbride, A. S. Hitchcock, and T. J. Fitzpatrick; Messrs. J. H. Mills, R. I. Cratty, Fred. Reppert, E. W. D. Holway, John E. Cameron, Charles Atwood, Henry L. Berry, C. W. Weidner, and Paul Bartsch; Hon. B. F. Osborn; Misses Mary F. Linder, Mabel Berry, Minnie Howe, and Lucy M. Cavanagh; the pupils of the Oskaloosa High School through Professor Stover; and the writer. Where the collector's name is not mentioned in connection with the locality the specimens were collected by the writer.

A list of species, long known to the collectors of the State, is here included for the purpose of adding more exact information concerning geographical distribution within the State.

The object of this list is to add, if possible, to the knowledge of the plants of the State, not to the volume of the nomenclature literature. Therefore, without regard to the present controversy, the nomenclature of the latest edition of Gray's Manual is followed, as the plants will readily be recognized by the names therein given.

I. SPECIES NEW TO THE STATE.

SPERMATOPHYTES.

NYMPHÆA ODORATA Ait.

Allamakee Co. (*Fitzpatrick*); Winnebago, Linn and John-

son Cos. This species, though not uncommon, does not seem to appear in the published lists.

Dianthus armeria L.

Johnson Co. Introduced, but seemingly well established.

CALLIRRHÖE INVOLUCRATA Gray.

Shelby Co. (*Fitzpatrick*); Scott Co. Not rare near Davenport.

Ailanthus glandulosus Desf.

Lee Co. Well established in and near Keokuk.

POLYGALA CRUCIATA L.

Muscatine Co. (*Reppert.*)

POLYGALA VERTICILLATA L. *var. AMBIGUA* Gray.

Johnson Co. Not always clearly distinct from the type.

BAPTISIA TINCTORIA R. Br.

Johnson Co. Rather common.

BAPTISIA ALBA R. Br.

Shelby and Winneshiek Cos. (*Fitzpatrick*); Fremont Co.

LUPINUS PERENNIS L.

Winneshiek Co. (*Holway.*)

HOSACKIA PURSHIANA Benth.

Henry Co. (*Mills.*)

DESMODIUM NUDIFLORUM DC.

Muscatine Co. (*Reppert.*)

DESMODIUM RIGIDUM DC.

Des Moines Co. (*Bartsch.*)

ROSA HUMILIS Marsh.

Henry Co. (*Mills.*); Johnson Co. Common.

Rosa rubiginosa L.

Henry Co. (*Mills.*) Introduced.

CRATÆGUS CRUS-GALLI L.

Louisa and Muscatine Cos. (*Reppert*); Allamakee Co. (*Fitzpatrick*); Johnson and Lee Cos. Frequent.

POTENTILLA SUPINA L.

Woodbury Co. (*Hitchcock.*)

CORNUS STOLONIFERA *Mx.*

Emmet Co. (*Cratty*); Johnson Co. Other specimens marked *C. stolonifera* are found in the collection, but as their identity is somewhat uncertain the localities are here omitted. The species is very common near Iowa City.

TRIOSTEUM ANGUSTIFOLIUM *L.*

Johnson Co. (*Macbride*); Lee Co.

LINNÆA BOREALIS *L.*

Winneshiek Co. (*Holway*.)

DIERVILLA TRIFIDA *Moench.*

Winneshiek Co. (*Fitzpatrick*.)

ASTER CORYMBOSUS *Ait.*

Muscatine Co. (*Reppert*.) "Scarce."

ASTER PATENS *var. PHLOGIFOLIUS* *Nees.*

Winnebago Co. Rather common near Forest City.

LEPACHYS COLUMNARIS *Torr. and Gray.*

Henry Co. (*Mills*); Page Co.

COREOPSIS INVOLUCRATA *Nutt.*

Henry Co. (*Mills*); Johnson Co. (*Miss Linder*.)

CAMPANULA ROTUNDIFOLIA *L.*

Jones Co. (*Macbride*; *Cameron*); Jackson Co. The type form. The variety *arctica* has already been reported.

PYROLA SECUNDA *L.*

Winneshiek Co. (*Holway*.)

PHLOX PANICULATA *L.*

Johnson Co. (*Hitchcock*.)

HYDROPHYLLUM MACROPHYLLUM *Nutt.*

Johnson Co. (*Miss Berry*.) This species was formerly quite common near Iowa City.

Ipomœa hederacea *Jacq.*

Henry Co. (*Mills*); Lee Co. Introduced.

IPOMœA PANDURATA *Meyer.*

Muscatine Co. (*Reppert*); Johnson Co. Not rare. Mr. Reppert also reports it from Louisa county.

CUSCUTA ARVENSIS *Beyr.*

Emmett Co. Growing on *Artemisia*, etc. Rare.

CUSCUTA CHLOROCARPA *Engelm.*

Henry Co. (*Mills*); Johnson Co. (*Hitchcock*); Emmet Co.
Abundant in September, 1895, in Emmet Co., along the
shores of Iowa Lake where it was associated with *C.*
tenuiflora *Eng.*

CHELONE OBLIQUA *L.*

Des Moines Co. (*Bartsch.*) Some of the specimens in the
Herbarium marked *C. glabra* probably also belong to
this species, but they are mostly poor and difficult to
determine satisfactorily. True *C. glabra*, however, is
in the collection from several localities in Iowa.

DIANTHERA AMERICANA *L.*

Henry Co. (*Mills.*)

BLEPHILIA CILIATA *Raf.*

Henry Co. (*Mills.*)

Amarantus chlorostachys *Willd.*

Henry Co. (*Mills.*)

Amarantus chlorostachys *var. hybridus* *Wats.*

Johnson Co.

SHEPHERDIA ARGENTEA *Nutt.*

Woodbury Co. (*Hitchcock.*)

ACALYPHA VIRGINICA *var. GRACILENS* *Muell.*

Lee Co. Not common.

Urtica dioica *L.*

Emmet Co., near Iowa Lake.

Salix fragilis *L.*

Johnson Co. Escaped from cultivation.

Salix alba *var. vitellina* *Koch.*

Johnson Co. Escaped from cultivation.

Populus alba *L.*

Johnson Co. Escaped from cultivation.

LIPARIS LÆSELII *Richard.*

Emmet Co. (*Cratty.*)

GOODYERA PUBESCENS *R. Br.*

Jones Co. (*Cameron*); Johnson Co. Formerly not rare
near Iowa City, but becoming very scarce.

SMILAX ECIRRHATA *Wats.*

Henry Co. (*Mills*); Johnson and Winnebago Cos.

PTERIDOPHYTA.

OSMUNDA REGALIS *L.*

Muscatine Co. (*Reppert.*)

ALGÆ.⁽¹⁾

STIGEOCLONIUM LONGIPILUS *Kg.*

Johnson Co. (*Miss Cavanagh.*)

CLADOPHORA CANALICULARIS *Kg.*

Johnson Co. (*Miss Cavanagh.*)

CLADOPHORA OLIGOCLONA *Kg.*

Johnson Co. (*Miss Cavanagh.*)

MOUGEOTIA SPHÆROCARPA *Wolle.*

Linn Co.

EUGLENA VIRIDIS *Ehrb.*

This enigmatic form is very common at Iowa City, Cedar Rapids, and other points, but seems not to have been reported in the published lists.

II. NEW LOCALITIES.

SPERMATOPHYTA.

CLEMATIS PITCHERI *T. and G.*

Lee and Johnson Counties.

ANEMONE CAROLINIANA *Walt.*

Hardin County.

RANUNCULUS MULTIFIDUS *Pursh.*

Emmet Co. (*Cratty*); Johnson and Hardin Cos.

¹ The *Algæ* were identified by Miss Lucy M. Cavanagh.

RANUNCULUS RECURVATUS *Poir.*

Johnson Co. (*Miss Linder.*)

RANUNCULUS SEPTENTRIONALIS *Poir.*

Henry Co. (*Mills*); Mahaska Co. (*Oskaloosa H. S.*);
Shelby Co. (*Fitzpatrick*); Emmett Co. (*Cratty*); Lee
Co. (*Bartsch*); Johnson Co.

RANUNCULUS REPENS *L.*

Johnson Co.

DELPHINIUM AZUREUM *Mx.*

Emmet Co. (*Cratty*); Shelby Co. (*Fitzpatrick*); Cerro
Gordo, Fremont and Page Cos.

DELPHINIUM TRICORNE *Mx.*

Shelby Co. (*Fitzpatrick.*)

ISOPYRUM BITERNATUM *T. and G.*

Henry Co. (*Mills*); Emmet Co. (*Cratty*); Johnson Co.

NYMPHÆA RENIFORMIS *DC.*

Emmet Co. (*Cratty*); Hancock Co.

CORYDALIS AUREA *Willd.*

Hardin Co.

DENTARIA DIPHYLLA *L.*

Hancock Co. Collected in 1882.

CARDAMINE RHOMBOIDEA *var. PURPUREA T. and G.*

Johnson Co. Very common.

NASTURTIIUM PALUSTRE *DC.*

Emmet Co. (*Cratty*); Winneshiek Co. (*Fitzpatrick*);
Henry Co. (*Mills*); Lee Co. (*Bartsch*); Johnson, Win-
nebago, and Ringgold Cos.

NASTURTIIUM SINUATUM *Nutt.*

Henry Co. (*Mills*); Fremont, Page and Pottawattamie Cos.

DRABA CAROLINIANA *Walt.*

Hardin and Johnson Cos.

CLEOME INTEGRIFOLIA *T. and G.*

Linn Co.

CERASTIUM NUTANS *Raf.*

Henry Co. (*Mills*); Johnson Co.

HYPERICUM ASCYRON *L.*

Henry Co. (*Mills*); Allamakee Co. (*Fitzpatrick*); Johnson and Winnebago Cos.

HYPERICUM MUTILUM *L.*

Johnson Co.

HYPERICUM PROLIFICUM *L.*

Henry Co. (*Mills*); Fremont Co.

ELODES CAMPANULATA *Pursh.*

Emmet Co. (*Cratty*.)

HIBISCUS MILITARIS *Cav.*

Des Moines Co. (*Bartsch*); Johnson Co.

Sida spinosa L.

Fremont Co. (*Hitchcock*); Henry Co. (*Mills*.)

LINUM SULCATUM *Rid.*

Henry Co. (*Mills*); Allamakee Co. (*Fitzpatrick*); Woodbury Co. (*Hitchcock*); Johnson, Floyd, and Emmet Cos.

GERANIUM CAROLINIANUM *L.*

Muscatine Co. (*Reppert*); Johnson and Lee Cos. Quite common near Iowa City.

XANTHOXYLUM AMERICANUM *Mill.*

Des Moines Co. (*Bartsch*); Winneshiek Co. (*Fitzpatrick*); Emmet Co. (*Cratty*); Winnebago, Linn, Johnson, Jackson, and Lee Cos. Very common near Iowa City.

PTELEA TRIFOLIATA *L.*

Scott Co. (*Macbride*); Henry Co. (*Mills*); Johnson Co. (*Miss Linder*.)

RHAMNUS LANCEOLATA *Pursh.*

Henry Co. (*Mills*); Boone Co. (*Hitchcock*); Shelby Co. (*Fitzpatrick*); Lee and Johnson Cos.

VITIS CINEREA *Eng.*

Lee Co. Not rare.

ÆSCULUS GLABRA *Willd.*

Henry Co. (*Mills*.)

ÆSCULUS OCTANDRA *Marsh.*

Jasper Co. Collected in 1882.

RHUS TYPHINA *L.*

Jones Co. (*Macbride*); Emmet Co. (*Cratty*); Jackson Co.

RHUS CANADENSIS *Marsh.*

Henry Co. (*Mills*); Lee Co.

TEPHROSIA VIRGINIANA *Pers.*

Winneshiek Co. (*Fitzpatrick*); Johnson Co. Not common.

GLYCYRRHIZA LEPIDOTA *Nutt.*

Emmet Co. (*Cratty*); Pottawattamie Co.

DESMODIUM CANESCENS *DC.*

Clayton Co. (*Fitzpatrick*); Lee Co.

DESMODIUM DILLENII *Darl.*

Lee Co. (*Bartsch*); Muscatine Co. (*Fitzpatrick.*)

LESPEDeza VIOLACEA *Pers.*

Henry Co. (*Mills*); Johnson Co.

PSORALEA ARGOPHYLLA *Pursh.*

Emmet Co. (*Cratty*); Winnebago, Cerro Gordo and Fremont Cos.

PSORALEA ESCULENTA *Pursh.*

Emmet Co. (*Cratty*); Shelby Co. (*Fitzpatrick.*)

LATHYRUS VENOSUS *Muhl.*

Emmet Co. (*Cratty*); Floyd and Winnebago Cos.

LATHYRUS OCHROLEUCUS *Hook.*

Emmet Co. (*Cratty.*)

AMPHICARPÆA MONOICA *Nutt.*

Johnson and Winnebago Cos.

AMPHICARPÆA PITCHERI *T. and G.*

Johnson Co. Not rare.

CASSIA MARILANDICA *L.*

Muscatine Co. (*Reppert*); Dubuque Co. (*Fitzpatrick*); Linn Co.

SPIRÆA ARUNCUS *L.*

Lee Co.

PHYSOCARPUS OPULIFOLIUS *Maxim.*

Henry Co. (*Mills*); Jones Co. (*Cameron*); Winneshiek Co. (*Fitzpatrick*); Jackson and Johnson Cos.

POTENTILLA PALUSTRIS *Scop.*

Hancock Co., near Lake Edwards.

AMELANCHIER CANADENSIS *var. ? OBLONGIFOLIA* *T. and G.*

Johnson Co. Here a small shrub less than two feet in height. Not common.

SULLIVANTIA OHIONIS *T. and G.*

Jones and Delaware Cos. (*Macbride*); Jackson Co.

HAMAMELIS VIRGINIANA *L.*

Clayton Co. (*Miss E. R. McGee.*)

EPILOBIUM ADENOCaulON *Hausk.*

Floyd and Hancock Cos.

EPILOBIUM COLORATUM *Muhl.*

Winnebago, Jackson, and Johnson Cos.

SICYOS ANGULATUS *L.*

Des Moines Co. (*Bartsch*); Scott Co.

VIBURNUM OPULUS *L.*

Allamakee Co. (*Macbride.*)

SYMPHORICARPOS VULGARIS *Mx.*

Henry Co. (*Mills, Atwood*); Lee Co. (*Bartsch*); Shelby Co. (*Fitzpatrick.*)

SYMPHORICARPOS OCCIDENTALIS *Hook.*

Fremont and Dickinson Cos. (*Hitchcock*); Shelby Co. (*Fitzpatrick*); Winnebago, Emmet and Page Cos.

HOUSTONIA MINIMA *Beck.*

Johnson Co. Common.

HOUSTONIA ANGUSTIFOLIA *Mx.*

Fremont Co.

GALIUM APARINE *L.*

Henry Co. (*Mills*); Johnson Co.

GALIUM CIRCÆZANS *Mx.*

Henry Co. (*Mills*); Lee and Johnson Cos.

GALIUM BOREALE *L.*

Jones Co. (*Macbride*); Dickinson Co. (*Hitchcock*); Jackson, Floyd and Cerro Gordo Cos.

GALIUM TRIFIDUM *L.*

Linn Co. (*Macbride*); Henry Co. (*Mills*); Emmet Co. (*Cratty*); Lee Co.

GALIUM TRIFIDUM *var. PUSILLUM Gray.*

Emmet Co. (*Cratty*); Johnson Co. (*Miss Linder*); Winnebago Co.

GALIUM TRIFIDUM *var. LATIFOLIUM Torr.*

Linn Co.

GALIUM CONCINNUM *T. and G.*

Henry Co. (*Mills*); Johnson and Ringgold Cos.

GALIUM ASPRELLUM *Mx.*

Jones Co. (*Cameron*); Lee Co.

GALIUM TRIFLORUM *Mx.*

Emmet Co. (*Cratty*); Jones Co. (*Macbride*); Johnson Co. (*Miss Linder*); Winnebago and Jackson Cos.

VERNONIA NOVEBORACENSIS *Willd.*

Cass Co. (*Weidner*); Des Moines Co. (*Bartsch*); Lee Co.

EUPATORIUM ALTISSIMUM *L.*

Henry Co. (*Mills*); Des Moines Co. (*Bartsch*); Johnson Co. Very common.

LIATRIS SQUARROSA *Willd.*

Cass Co. (*Weidner.*)

LIATRIS PUNCTATA *Hook.*

Emmet Co. (*Cratty.*)

LIATRIS SCARIOSA *Willd.*

Emmet Co. (*Cratty*); Johnson, Floyd and Winnebago Cos.

LIATRIS PYCNOSTACHYA *Mx.*

Henry Co. (*Mills*); Cass Co. (*Weidner*); Lee Co.

GRINDELIA SQUARROSA *Dunal.*

Henry Co. (*Mills.*)

SOLIDAGO RIDDELLII *Frank.*

Hancock and Floyd Cos. Common.

SOLIDAGO LANCEOLATA *L.*

Henry Co. (*Atwood*); Johnson Co. Common.

ASTER PANICULATUS *Lam.*

Lee Co. (*Bartsch.*)

ASTER OBLONGIFOLIUS *Nutt.*

Des Moines Co. (*Bartsch.*); Johnson Co. (*Hitchcock.*)

ASTER PRENANTHOIDES *Muhl.*

Henry Co. (*Mills.*); Johnson and Jackson Cos.

ASTER VIMINEUS *Lam.*

Des Moines Co. (*Bartsch.*)

ANAPHALIS MARGARITACEA *B. and H.*

Delaware Co. (*Macbride.*); Johnson Co. (*Miss Linder.*)

SILPHIUM TRIFOLIATUM *L.*

Winnebago Co.

IVA XANTHIIFOLIA *Nutt.*

Emmet Co. (*Cratty.*); Winnebago Co.

ECLIPTA ALBA *Hassk.*

Johnson, Linn and Muscatine Cos.

HELIANTHUS OCCIDENTALIS *Rid.*

Henry Co. (*Mills.*); Lee Co. (*Bartsch.*); Johnson Co.

HELIANTHUS LÆTIFLORUS *Pers.*

Johnson and Jackson Cos.

HELIANTHUS RIGIDUS *Desf.*

Emmet Co. (*Cratty.*); Winnebago, Hancock and Floyd Cos.

HELIANTHUS MAXIMILIANI *Schrad.*

Floyd Co.

HELIANTHUS TUBEROSUS *L.*

Henry Co. (*Mills.*); Cass Co. (*Weidner.*); Winnebago, Floyd and Lee Cos.

Chrysanthemum leucanthemum L.

Johnson and Page Cos. Introduced.

ARTEMISIA DRACUNCULOIDES *Pursh.*

Emmet Co. (*Cratty.*); Floyd and Hancock Cos.

ARTEMISIA CAUDATA *Mx.*

Muscatine, Emmet, Winnebago and Johnson Cos.

ARTEMISIA SERRATA *Nutt.*

Jackson and Winnebago Cos.

CACALIA SUAVEOLENS *L.*

Jackson Co.

CACALIA RENIFORMIS *Muhl.*

Cass Co. (*Weidner.*)

CACALIA ATRIPPLICIFOLIA *L.*

Henry Co. (*Mills*); Muscatine Co. (*Macbride*); Des Moines Co. (*Bartsch*); Johnson Co.

CACALIA TUBEROSA *Nutt.*

Emmet Co. (*Cratty*); Johnson Co. (*Miss Linder*); Page and Ringgold Cos.

Cnicus arvensis *Hoffm.*

Johnson, Lee and Linn Cos.

HIERACIUM LONGIPILUM *Torr.*

Muscatine Co. (*Macbride.*)

PRENANTHES RACEMOSA *Mx.*

Emmet Co. (*Cratty*); Hancock and Floyd Cos.

LYGODESMIA JUNCEA *Don.*

Emmet Co. (*Cratty*); Fremont Co.

TROXIMON CUSPIDATUM *Pursh.*

Emmet Co. (*Cratty*); Marshall Co.

Lactuca scariola *L.*

Jackson, Winnebago and Johnson Cos.

LOBELIA SPICATA *var. HIRTELLA* *Gray.*

Emmet Co.

CAMPANULA APARINOIDES *Pursh.*

Emmet Co. (*Cratty*); Johnson Co. (*Miss Berry.*)

PYROLA ELLIPTICA *Nutt.*

Winneshiek Co. (*Fitzpatrick*); Johnson Co.

MONOTROPA UNIFLORA *L.*

Jones Co. (*Cameron*); Johnson Co. (*Macbride.*) Very common near Iowa City.

STEIRONEMA LANCEOLATUM *Gray.*

Linn Co.

STEIRONEMA LONGIFOLIUM *Gray.*

Emmet Co. (*Cratty.*)

GENTIANA CRINITA *Froel.*

Muscatine Co. (*Reppert*); Chickasaw Co. (*Miss Howe*);
Johnson and Linn Cos.

GENTIANA PUBERULA *Mx.*

Emmet Co. (*Cratty*); Johnson Co. (*Berry*); Winnebago
and Floyd Cos.

HYDROPHYLLUM APPENDICULATUM *Mx.*

Henry Co. (*Mills*); Johnson Co. (*Miss Linder*); Winne-
shiek Co. (*Fitzpatrick*); Jackson Co.

ELLISIA NYCTELEA *L.*

Henry Co. (*Mills*); Delaware Co. (*Macbride*); Shelby
Co. (*Fitzpatrick*); Calhoun Co. (*Rigg*); Linn and John-
son Cos.

ECHINOSPERMUM REDOWSKII *Lehm. var occidentale Wats.*

Woodbury Co. (*Hitchcock*); Johnson Co.

MYOSOTIS Verna *Nutt.*

Johnson Co. Not rare.

ONOSMODIUM CAROLINIANUM *DC.*

Shelby Co. (*Fitzpatrick*); Pottawattamie and Page Cos.

SOLANUM ROSTRATUM *Dunal.*

Johnson¹ Co. (*Macbride*); Emmet Co. (*Cratty*); Greene
Co. (*Hon. B. F. Osborn.*)

Verbascum blattaria L.

Johnson Co.

PENTSTEMON GRANDIFLORUS *Nutt.*

Pottawattamie Co. (*Miss Flickinger.*)

VERONICA ANAGALLIS *L.*

Emmet Co. (*Cratty*); Winneshiek Co. (*Fitzpatrick*); John-
son Co.

GERARDIA ASPERA *Dougl.*

Emmet Co. (*Cratty*); Delaware Co. (*Macbride.*)

¹ Already reported by Prof. Macbride in *Bull. from the Lab. of Nat. Hist.*
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GERARDIA PURPUREA *L.*

Emmet Co. (*Cratty*.)

GERARDIA TENUIFOLIA *Vahl.*

Delaware Co. (*Macbride*); Emmet Co. (*Cratty*); Henry Co. (*Mills*); Des Moines Co. (*Bartsch*); Winnebago and Johnson Cos.

GERARDIA TENUIFOLIA *var. MACROPHYLLA Benth.*

Fremont Co.

CASTILLEIA SESSILIFLORA *Pursh.*

Delaware Co. (*Macbride*); Emmet Co. (*Cratty*); Shelby Co. (*Fitzpatrick*); Hardin and Hamilton Cos.

PEDICULARIS CANADENSIS *L.*

Emmet Co. (*Cratty*); Shelby Co. (*Fitzpatrick*); Calhoun Co. (*Rigg*); Johnson Co. Very common.

PEDICULARIS LANCEOLATA *Mx.*

Emmet Co. (*Cratty*); Hancock, Winnebago and Johnson Cos.

APHYLLON UNIFLORUM *Gray.*

Johnson Co. Not common.

TECOMA RADICANS *Fuss.*

Lee Co. Very common in the vicinity of Keokuk, and certainly native.

VERBENA ANGUSTIFOLIA *Mx.*

Allamakee Co. (*Fitzpatrick*); Johnson Co. Common near Iowa City.

MONARDA PUNCTATA *L.*

Des Moines Co. (*Bartsch*); Dubuque Co. (*Fitzpatrick*); Muscatine and Cedar Cos.

SALVIA LANCEOLATA *Willd.*

Page Co.

SCUTELLARIA LATERIFLORA *L.*

Emmet Co. (*Cratty*); Lee Co. (*Bartsch*); Jackson and Johnson Cos.

SCUTELLARIA VERSICOLOR *Nutt.*

Henry Co. (*Mills*); Johnson and Lee Cos.

SCUTELLARIA PARVULA *Mx.*

Emmet Co. (*Cratty*); Chickasaw Co. (*Miss Howe*); Henry Co. (*Mills*); Shelby Co. (*Fitzpatrick*); Johnson Co.

SCUTELLARIA GALERICULATA *L.*

Emmet Co. (*Cratty*.)

OXYBAPHUS HIRSUTUS *Sweet.*

Adair Co. (*James E. Gow*); Shelby Co. (*Fitzpatrick*.)

CYCLOLOMA PLATYPHYLLUM *Moq.*

Fremont Co. (*Hitchcock*); Henry Co. (*Mills*); Lee Co.

Chenopodium botrys *L.*

Johnson Co. (*Hitchcock*); Dubuque Co. (*Fitzpatrick*); Lee Co.

Salsola kali var. *tragus* *DC.*

Emmet Co. (*Cratty*); Calhoun Co. (*Rigg*); Floyd Co.

RUMEX MARITIMUS *L.*

Emmet Co. (*Cratty*); Calhoun Co. (*Rigg*); Hancock Co.

DIRCA PALUSTRIS *L.*

Henry Co. (*Mills*); Jackson and Johnson Cos.

EUPHORBIA HETEROPHYLLA *L.*

Johnson and Linn Cos. Common.

CROTON GLANDULOSUS *L.*

Lee Co. Not rare.

CROTON CAPITATUS *Mx.*

Lee Co. Not rare.

ULMUS RACEMOSA *Thomas.*

Henry Co. (*Mills*); Lee Co.

MORUS RUBRA *L.*

Polk Co. (*E. Des Moines H. School*); Johnson Co.

BÆHMERIA CYLINDRICA *Willd.*

Des Moines Co. (*Bartsch*); Johnson Co. (*Miss Linder*.)

PARIETARIA PENNSYLVANICA *Muhl.*

Henry Co. (*Mills*); Shelby Co. (*Fitzpatrick*.)

CARYA SULCATA *Willd.*

Scott, Clinton and Wayne Cos. (*Macbride*); Van Buren Co. (*Spraker*.)

CARYA SULCATA + OLIVÆFORMIS.

Muscatine Co. (*Reppert.*) The fruit, though seemingly well developed and showing characters of both species, contains no seed. It seems undoubtedly a sterile cross between the two species.

CARYA AMARA *Nutt.*

Shelby Co. (*Fitzpatrick*); Lee and Johnson Cos.

BETULA NIGRA *L.*

Des Moines Co. (*Bartsch*); Polk Co. (*E. Des Moines H. School*); Johnson Co. Common.

ALNUS INCANA *Willd.*

Jones Co. (*Macbride.*)

OSTRYA VIRGINICA *Willd.*

Emmet Co. (*Cratty*); Winneshiek Co. (*Fitzpatrick*); Calhoun Co. (*Rigg*); Lee and Johnson Cos. Very common near Iowa City.

CARPINUS CAROLINIANA *Walt.*

Emmet Co. (*Cratty*); Henry Co. (*Mills*); Lee Co. (*Bartsch*); Johnson Co.

QUERCUS MUHLENBERGII *Engelm.*

Lee, Jackson and Johnson Cos.

QUERCUS PALUSTRIS *Du Roi.*

Lee Co.

QUERCUS IMBRICARIA *Mx.*

Henry Co. (*Mills*); Des Moines Co. (*Bartsch*); Ringgold, Washington and Johnson Cos. Found only in the southern part of Johnson Co.

SALIX AMYGDALOIDES *Anders.*

Johnson Co. Quite common.

SALIX LONGIFOLIA *Muhl.*

Henry Co. (*Mills*); Winnebago, Lee and Johnson Cos.

SALIX DISCOLOR *Muhl.*

Johnson Co. Common.

SALIX HUMILIS *Marsh.*

Henry Co. (*Mills*); Johnson Co.

SALIX TRISTIS *Ait.*

Johnson Co.

SALIX SERICEA *Marsh.*

Johnson Co.

SALIX PETIOLARIS *Smith.*

Johnson Co. Rare.

SALIX CANDIDA *Willd.*

Hancock Co.

SALIX CORDATA *Muhl.*

Henry Co. (*Mills*); Calhoun Co. (*Rigg*); Johnson Co.
Common.

SALIX CORDATA *var. ANGUSTATA* *Anders.*

Henry Co. (*Mills*); Johnson Co. Common.

POPULUS TREMULOIDES *Mx.*

Emmet Co. (*Cratty*); Winnebago and Johnson Cos. Com-
mon.

POPULUS GRANDIDENTATA *Mx.*

Johnson Co. Very common.

JUNIPERUS COMMUNIS *L.*

Des Moines Co. (*Bartsch*); Allamakee Co. (*Fitzpatrick*);
Lee and Johnson Cos.

JUNIPERUS VIRGINIANA *L.*

Emmet Co. (*Cratty*); Dickinson Co. (*Hitchcock*); John-
son Co.

TAXUS CANADENSIS *Willd.*

Jones Co. (*Macbride*); Winneshiek and Dubuque Cos.
(*Fitzpatrick*); Jackson Co.

MICROSTYLIS OPHIOGLOSSOIDES *Nutt.*

Johnson Co. (*Berry*.) Rare.

LIPARIS LILIIFOLIA *Rich.*

Johnson Co. Not rare.

APLECTRUM HIEMALE *Nutt.*

Johnson Co. Not rare.

SPIRANTHES GRACILIS *Bigel.*

Johnson Co. (*Macbride*.) Not rare.

CALOPOGON PULCHELLUS *R. Br.*

Howard Co. (*Macbride*.)

POGONIA PENDULA *Lindl.*

Johnson Co. (*Miss Linder*.) Formerly not rare.

ORCHIS SPECTABILIS *L.*

Johnson Co. Still quite common.

HABENARIA BRACTEATA *R. Br.*

Delaware Co. (*Macbride*); Johnson Co. Formerly quite common.

HABENARIA LEUCOPHÆA *Gray.*

Emmet Co. (*Cratty*); Johnson Co. Formerly common but now almost extinct.

CYPRIPEDIUM CANDIDUM *Muhl.*

Emmet Co. (*Cratty*); Benton and Johnson Cos. Once quite common in Johnson County, but now very rare.

CYPRIPEDIUM PARVIFLORUM *Salisb.*

Johnson Co. Common.

CYPRIPEDIUM PUBESCENS *Willd.*

Johnson Co. Less common than the preceding.

CYPRIPEDIUM SPECTABILE *Salisb.*

Winnebago and Johnson Cos. Formerly very common in Johnson Co., but becoming rare.

POLYGONATUM BIFLORUM *Ell.*

Henry Co. (*Mills*); Lee, Winnebago and Johnson Cos.

POLYGONATUM GIGANTEUM *Dietr.*

Johnson Co.

OAKESIA SESSILIFOLIA *Wats.*

Johnson Co.

TRILLIUM RECURVATUM *Beck.*

Henry Co. (*Mills*); Louisa Co. (*Helmick*); Johnson Co. Quite common in the southern part of Johnson Co.

TRILLIUM ERECTUM *L.*

Shelby Co. (*Fitzpatrick*); Delaware Co. (*Macbride*); Jones Co. (*Cameron*); Calhoun Co. (*Rigg*); Johnson Co. Common.

TRILLIUM NIVALE *Rid.*

Henry Co. (*Mills*); Chickasaw Co. (*Miss Howe*); Linn and Johnson Cos. Common. A form with pink-veined petals is common near Iowa City.

MELANTHIUM VIRGINICUM *L.*

Lee and Johnson Cos. Formerly rather common in Johnson Co., but now very rare.

PTERIDOPHYTA.

EQUISETUM ARVENSE *L.*

Emmet Co. (*Cratty*); Henry Co. (*Mills*); Lee, Johnson, Linn and Winnebago Cos.

EQUISETUM LIMOSUM *L.*

Emmet Co. (*Cratty*); Delaware Co. (*Macbride*); Hamilton Co.

EQUISETUM HYEMALE *L.*

Lee, Johnson, Linn and Winnebago Cos.

EQUISETUM LÆVIGATUM *Braun.*

Emmet Co. (*Cratty*); Shelby Co. (*Fitzpatrick*); Page Co.

POLYPODIUM VULGARE *L.*

Allamakee, Muscatine and Clayton Cos. (*Macbride*)

PTERIS AQUILINA *L.*

Johnson Co.

ADIANTUM PEDATUM *L.*

Jones and Allamakee Cos. (*Macbride*); Emmet Co. (*Cratty*); Shelby Co. (*Fitzpatrick*); Calhoun Co. (*Rigg*); Polk Co. (*E. Des Moines H. S.*); Lee and Johnson Cos.

PELLÆA GRACILIS *Hook.*

Cedar and Delaware Cos. (*Macbride*); Dubuque Co. (*F. M. Irish*); Johnson Co. (*Dr. C. M. Hobby*); Johnson and Jackson Cos. This species was collected in Scott Co. by Dr. Parry in 1860, but has not been found there since.

PELLÆA ATROPURPUREA *Link.*

Jones Co. (*Macbride*); Johnson Co. Common.

ASPLENium ANGUSTIFOLIUM *Mx.*

Delaware Co. (*Macbride*); Jackson Co. Specimens from Jackson Co. were successfully transplanted to Johnson Co. two years ago.

ASPLENium FILIX-FÆMINA *Bernh.*

Jackson Co. (*Macbride*); Jones Co. (*Cameron*); Calhoun Co. (*Rigg*); Polk Co. (*E. Des Moines H. S.*); Ringgold Co. Common everywhere eastwardly.

ASPLENium THELYPTEROIDES *Mx.*

Jones and Jackson Cos. (*Macbride*.)

CAMPTOSORUS RHIZOPHYLLUS *Link.*

Des Moines Co. (*Bartsch*.) Not uncommon eastward.

ASPIDIUM SPINULOSUM *Swtz.*

Johnson Co. Some years ago this species was quite common near Iowa City, but the locality in which it was most common is now under cultivation.

ASPIDIUM GOLDIANUM *Hook.*

Jackson Co. (*Macbride*.)

CYSTOPTERIS BULBIFERA *Bernh.*

Allamakee and Jones Cos. (*Macbride*.) Very common in Johnson Co.

CYSTOPTERIS FRAGILIS *Bernh.*

Emmet Co. (*Cratty*); Calhoun Co. (*Rigg*); Ringgold and Johnson Cos. Very common in Johnson Co.

ONOCLEA SENSIBILIS *L.*

Ringgold and Johnson Cos. Very common in Johnson Co., and almost always growing in wet meadows.

ONOCLEA STRUTHIOPTERIS *Hoffm.*

Muscatine Co. (*Reppert*); Shelby Co. (*Fitzpatrick*.) Quite common in Johnson Co.

OSMUNDA CLAYTONIANA *L.*

Jones Co. (*Cameron*.) The most common of the larger Ferns in Johnson Co.

BOTRYCHIUM VIRGINIANUM *Swtz.*

Jones Co. (*Macbride*; *Cameron*); Chickasaw Co. (*Miss*

Howe); Henry Co. (*Mills*); Shelby Co. (*Fitzpatrick*);
Johnson Co. Quite common.

SELAGINELLA RUPESTRIS *Spring*.
Winneshiek Co. (*Bartsch*.)

ALGÆ.

DRAPARNALDIA PLUMOSA *Ag*.
Johnson Co. (*Miss Cavanagh*.)

OSCILLARIA IMPERATOR *Wood*.
Linn Co.

CLADOPHORA CRISPATA *Kg*.
Linn Co.

To the species new to the State the following should be added:

CORALLORHIZA ODONTORHIZA *Nutt*.
Johnson Co. (*Miss Linder*.) Rare.

The foregoing is a preliminary report chiefly on flowering plants. A complete catalogue, so far as it can be made with the information at hand, which will include the cryptogams, is in course of preparation.

After the first part of this list had gone to press collections of plants were received from Mr. G. B. Rigg from Calhoun Co., and from the East Des Moines High School through Miss Julia E. Rogers from Polk Co.

Notes on some of these are added in the latter part of the list, but the greater number will be reported upon in the subsequent catalogue.

AN INTERESTING NICARAGUAN PUFF-BALL.

BY T. H. MACBRIDE.

AMONG the fungi brought from Nicaragua by Mr. C. L. Smith are half a dozen puff-balls unlike anything seen in this part of North America. They are brick-red in color, cespitose, and probably represent the species established by Berkeley from the study of a specimen sent him undetermined by Montagne. In the London *Journal of Botany*, May, 1888, the species is thus noticed by Masee:

“BOVISTA LATERITIA *Berk.* In Herb. No. 4593. Subglobose; cortex evanescent; peridium pale, thin; mass of spores and exceedingly dense capillitium bright rust-color; threads thick-walled, brown, branched, acute spores spherical, coarsely warted, pale brown, 8 μ . in diam. (Type in Herb. Berk. 4593. Sent as a queried specimen by Montagne). About 1 $\frac{1}{2}$ in. in diam. Locality not known.”

Our specimens may be thus described:

Peridium sessile, rootless, mycelium-attached, becoming free, cespitose, globose or more or less compressed by mutual interference, two to four centimeters in diameter, smooth, tough, persistent, opening irregularly, dull red; capillitium, in mass cottony or felt-like, elastic, dull brown with a purplish tinge, crowded with spores; columella none; capillitial threads under the lens, pale brown, delicate, long, slender, branching freely, hardly larger than the diameter of the spores; spores in mass reddish, under the lens opaque, globose, spinulose, 5-6.25 μ .

It will be seen that the descriptions agree generally except in the spore-measurements. It is probable therefore that we

have rediscovered Berkeley's species which has been represented, apparently, so far by but a single specimen of unknown origin.

It should be remarked, however, that the outer peridium, as such, was probably not noticed by Berkeley. It is extremely delicate and very persistent as a red covering of the peridium proper. In older and weathered specimens the outer peridium resembles simply a tinge or stain, and its true character would not be apparent from such a specimen; but in younger, fresher specimens the two peridia are sufficiently distinct. The capillitium is very delicate and shows a tendency to become discrete from the peridium suggesting so far Fries' genus *Lanopila*.

Saccardo for some reason does not have *B. lateritia*. I am indebted to Mr. A. P. Morgan for calling my attention to Berkeley's description.

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