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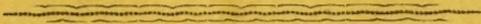
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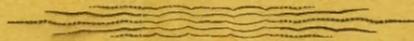
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A KEY
TO THE
SPRING FLORA
OF
MANHATTAN.



BY
A. S. HITCHCOCK,
Professor of Botany in the Kansas State Agricultural College,
MANHATTAN, KANSAS.



No. 3

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PREFACE.

The list includes those Angiosperms in the vicinity of Manhattan which may be found in flower before the first of June. The only Gymnosperm occurring here is *JUNIPERUS VIRGINIANA*, L.

Through the kindness of Dr. N. L. Britton, I am enabled to present the nomenclature and arrangement as they will probably appear in the new Check List now being prepared by a committee of the A. A. S.

Experience has shown that Gray's Manual, though a most excellent work for advanced students, is too extended for the use of the majority of the beginners who can devote but ten weeks to the study of elementary botany and with whom the preparation of a herbarium is subsidiary to a training of the powers of observation.

In giving the characters of orders and genera exceptions are neglected. *RANUNCULACEÆ* are described as being herbs, that is, they usually are herbs. As the title implies, it is intended to differentiate the plants included in the list only, hence the characters are usually abbreviated and will not serve to definitely distinguish the groups from all others.

ARTIFICIAL KEY TO ORDERS.

CLASS I. Monocotyledoneæ Fibrovascular bundles of stem distributed irregularly through the pith. Venation usually nerved. Parts of the flower often in three's.

Flowers without a perianth, in the axils of small bracts.

A scale above each flower, leaves 2-ranked, sheaths split *Gramineæ* 1

No scale above the flower, leaves 3-ranked, sheaths entire, *Cyperaceæ* 2

Flowers naked, monœcious, gathered in a fleshy spike surrounded by a spathe..... *Araceæ* 3

Flowers provided with a proper perianth, divisions 6.

Perianth scale-like..... *Juncaceæ* 5

Perianth not scale-like.

Three outer divisions green, 3 inner petal-like. *Commelinaceæ* 4

Divisions similar.

Ovary superior.

Leaves provided with tendrils..... *Smilaceæ* 7

No tendrils..... *Liliaceæ* 6

Ovary inferior..... *Iridaceæ* 8

CLASS II. Dicotyledoneæ. Fibrovascular bundles of stem arranged in a ring. Venation reticulate. Parts of flower usually in four's or five's

SUBCLASS I. Archichlamydeæ. Corolla, if present, of separate petals.

I. Calyx and Corolla present.

1. Stamens more than ten (cf. *Schrankia*, which sometimes has more than ten stamens).

Separate.

Inserted on the receptacle.

Herbs..... *Ranunculaceæ* 23

Small tree..... *Anonaceæ* 22

Woody vine..... *Menispermaceæ* 24

Inserted on calyx..... *Rosaceæ* 30

United in a column (monadelphous)..... *Malvaceæ* 43

2. Stamens not more than 10.

As many as petals and opposite them.

Woody vines provided with tendrils..... *Vitaceæ* 42

Shrubs, not climbing..... *Rhamnaceæ* 41

When as many as petals alternate with them.

A Ovary superior.

Simple; stamens 10; flowers usually papilionaceous. *Leguminosæ* 31

Compound	
Stamens as many as petals and alternate.	
Herbs, flowers irregular.....	<i>Violaceae</i> 44
Woody plants.	
Leaves simple.....	<i>Celastraceae</i> 37
Leaves compound.	
Ovary 1-celled.....	<i>Anacardiaceae</i> 36
Ovary 3-celled.....	<i>Staphyleaceae</i> 38
Stamens more numerous than petals, or only 2.	
Flowers irregular.	
Sepals 2; petals 4; stamens 6.....	<i>Papaveraceae</i> 25
Petals 4; stamens usually 7.....	<i>Hippocastanaceae</i> 40
Flowers regular.	
Stamens 10; petals 5.	
Ovary 5-celled.	
Leaves simple.....	<i>Geraniaceae</i> 32
Leaves 3-foliolate.....	<i>Oxalidaceae</i> 33
Ovary 1-celled.....	<i>Caryophyllaceae</i> 21
Stamens 6 (or 2); petals 4.	
Ovary 1-celled.....	<i>Cupparidaceae</i> 27
Ovary 2-celled.....	<i>Cruciferae</i> 26
B. Ovary inferior.	
Shrubs.	
Leaves opposite; petals 4.....	<i>Corniceae</i> 47
Leaves alternate; petals 5.....	<i>Saxifrugaceae</i> 28
Herbs.	
Petals 4.....	<i>Oenotheraceae</i> 45
Petals 5; flowers in umbels.....	<i>Umbelliferae</i> 46
II. Corolla and sometimes calyx absent.	
Flowers unisexual; one or both sorts in catkins or heads; trees or shrubs.	
Staminate flowers in catkins; pistillate single.	
Leaves simple.....	<i>Fagaceae</i> 12
Leaves pinnate.....	<i>Juglandaceae</i> 9
Both kinds in catkins or heads.	
Ovary 2-ovuled; anthers 1-celled.....	<i>Betulaceae</i> 11
Ovary 1-ovuled; flowers in heads.....	<i>Platanaceae</i> 29
Ovary 1-2-ovuled; flowers in short catkins; anthers 2 celled,	<i>Moraceae</i> 14
Ovary, many ovuled.....	<i>Salicaceae</i> 10
Flowers not in catkins.	
Trees or shrubs.	
Ovary not lobed.	
Leaves simple.....	<i>Ulmaceae</i> 13
Leaves pinnate.....	<i>Oleaceae</i> 49
Ovary 2-lobed.....	<i>Aceraceae</i> 39
Ovary 3-5-lobed; leaves pinnate.....	<i>Rutaceae</i> 34
Herbs.	
Ovaries several.....	<i>Ranunculaceae</i> 23

Ovary 1.

Inferior.....*Santaluceae* 16
 Superior but enclosed in calyx tube, calyx colored,
Nyctaginaceae 20

Superior, not enclosed in calyx tube.

Ovary 3-celled.....*Euphorbiaceae* 35

Ovary 1-celled.

Stipules sheathing*Polygonaceae* 17

Stipules none.

Flowers closely imbricated with scarious bracts,
Amarantaceae 19

No scarious bracts.

Flowers perfect; stigmas 2. *Chenopodiaceae* 18

Flowers monœcious or polygamous; stigma 1,
Urticaceae 15

SUBCLASS II. Sympetalæ. Calyx and corolla both present; petals more or less united.

Ovary inferior.

Flowers in heads surrounded by an involuere

Corollas all strap-shaped*Cichoriaceae* 64

Corollas all or partly tubular.....*Compositae* 65

Flowers not in heads.

Leaves alternate.....*Campanulaceae* 63

Leaves opposite; corolla 5-lobed.....*Cuprifoliaceae* 62

Leaves whorled; corolla 4-lobed.....*Rubiaceae* 61

Ovary superior.

Stamens as many as lobes of corolla and opposite them.

Primulaceae 48

Stamens if as many alternate with the lobes of corolla.

Corolla regular.

Ovaries 2; herbs with milky juice.

Stamens distinct.....*Apocynaceae* 50

Stamens united with each other and the stigma,
Asclepiadaceae 51

Ovary 1.

Deeply 4-lobed around the style *Asperifoliae* 55

Not lobed.

Leaves opposite, entire; ovary 3-celled. *Polemoniaceae* 53

Leaves opposite, entire or toothed; ovary 2-celled,
Scrophulariaceae 59

Leaves all radical; flowers in a close spike,
Plantaginaceae 60

Leaves alternate, or if opposite, deeply parted, not all radical

Stamens 10 or more*Leguminosae* 31

Stamens 5.

Ovules not more than 4.

Ovary 2-celled; leaves not lobed,

Convolvulaceae 52

- Ovary 1-celled; leaves deeply parted,
Hydrophyllaceae 54
 Ovules numerous; ovary 2-celled. *Solanaceae* 58
- Corolla irregular.
 Ovary deeply 4-lobed around the style... *Labiatae* 57
 Ovary not lobed.
 2-celled; ovules numerous... *Scrophulariaceae* 59
 2-4-celled; ovules 4... *Verbenaceae* 56



DESCRIPTIVE LIST.

MONOCOTYLEDONEAE.

1 GRAMINEÆ.

Perianth none. Stamens usually 3. Ovary one, superior, 1-celled, 1-ovuled. Styles and stigmas 2. Fruit a caryopsis, the seed grown fast to the pericarp. Flower in the axil of a bract (flowering glume) with a 2-keeled bract (palet) between the flower and the axis. The flowers are arranged in 2-ranked clusters (spikelets), the two glumes at the base of the spikelet being empty. The spikelets may be from one to many flowered. Herbaceous plants with 2-ranked, alternate, nerved leaves and sheaths split on the side opposite the blade

1. Spikelets with usually 4 glumes and one perfect flower, jointed up to the pedicel below the glumes
 - Spikelets in loose panicles. *Panicum*
 - Spikelets in spike-like panicles. *Chamaeraphis*
2. Spikelets not jointed below the glumes, 1-many flowered; glumes 3 when 1-flowered.
 - a Spikelets 1-flowered, not on a zig-zag rhachis.
 - Inflorescence loosely paniced, ... *Agrostis*
 - Inflorescence spike-like. *Alopecurus*
 - b. Spikelets diœcious; staminate in two rows, forming a 1-sided spike. *Bulbilis*
 - c Spikelets more than 1-flowered, pedicelled.
 - *Flowering glume 3-nerved.
 - Empty glumes similar, acute. *Kœleria*
 - Empty glumes very dissimilar, upper very obtuse *Eatonia*
 - * *Flowering glume 5-nerved
 - Glumes compressed and keeled.
 - Awn-pointed; spikelets in 1-sided clusters. *Dactylis*
 - Not awn-pointed; spikelets in panicles. *Poa*
 - Glumes convex on back.
 - Awn, if present, from tip of glume. *Festuca*

- Glumes awned below the 2-cleft apex.....*Bromus*
 d. Spikelets sessile on opposite sides of a zig-zag rachis.
 1-flowered.....*Hordeum*
 3-5-flowered.....*Elymus*

PANICUM, L.

Lower glume usually small; third glume empty or staminate; fourth glume coriaceous, enclosing a perfect flower.

P. laxiflorum, Lam. Resembling the next but spikelets scarcely 2 mm. long. Prairie land

P. scoparium, Lam. Stems usually several, 2-4 dm. high. Sheaths hairy. Panicle about $\frac{1}{2}$ dm. long. Spikelets obovate, obtuse, 3 mm. long; lower glume roundish, about one-third the length of the spikelet. Prairie land, common.

CHAMAERAPHIS, R. Br.*

Spikelets as in *Panicum* but the peduncles bearing a few long bristles below the joint.

C. viridis, (L.) Porter. Annual, upright; leaves straight (not twisted as in *C. glauca*). Spike 3-10 cm. long, usually somewhat tapering upward. A common weed in cultivated ground.

ALOPECURUS, L.

Spikelets 1-flowered; lower glumes boat shaped, about as long as the flowering glume which is awned on the back below the middle. Inflorescence spike-like.

A. geniculatus, L. Tufted, 2-4 dm. high, leaves short, the soft spike 2-5 cm. long, often partly enclosed in the upper sheath. Moist meadows, frequent.

AGROSTIS, L.

Spikelets 1-flowered. Empty glumes usually longer than the flowering one, all without terminal awns.

A. hiemalis, (Walt.) B. S. P. Slender stems tufted, with a few short leaves at base, 3-4 dm. high. Panicle large, the branches capillary and in fruit very long and spreading. Lower glume acute, about $1\frac{1}{2}$ mm. long. Dry land, common.

BULBILIS, Raf.

Diœcious; staminate spikelets 2-ranked in 1-sided short spikes, 2-3 flowered; spikes 1-3 at the summit of the short stem. Pistillate spikelets 1-flowered in a cluster near the ground, each in the axil of a leaf-like bract.

B. dactyloides, (Nutt.) Raf. A low tufted grass, spreading extensively by stolons. Prairie, frequent.

EATONIA, Raf

Spikelets 2 flowered; empty glumes nearly equal in length but very unequal in shape, lower narrow, upper broad and obovate.

*It would seem best to retain *Setaria* as a genus distinct from the Australian *Chamaeraphis*, but as the name was used earlier for a genus of lichens, a new name should be given.

F. obtusata, (Michx.) Gray. An upright smooth grass $\frac{1}{2}$ to $\frac{3}{4}$ m. high, with contracted panicle, Prairie, common.

KELERIA, Pers.

Spikelets 2-4-flowered; empty glumes somewhat unequal, about the length of the spikelet, acutish.

K. cristata, (L.) Pers. Resembling the previous species but stem pubescent above and panicle rather more contracted. Prairie, common.

DACTYLIS, L.

Spikelets 3-4-flowered, crowded in 1-sided clusters; empty glumes short awned, flowering glume 5 nerved.

D. glomerata, L. An upright, tufted grass $\frac{1}{2}$ m. high or more, with rather broad leaves. Escaped from cultivation.

POA, L.

Spikelets ovate, compressed, 2-several flowered, in open panicles. Empty glumes shorter than flowers. Flowering glume keeled, 5 nerved, with a scarious margin. Awns none.

P. compressa, L. Panicle short and narrow. Stem flattened, wiry, 2-4 dm. high. Leaves short and erect. Perennial by running rootstocks. Sterile ground.

P. pratensis, L. Panicle pyramidal, short. Stem cylindrical, upright, 2-6 dm. high. Escaped from cultivation, common.

P. sylvestris, Gray. Panicle loose and open, pedicels slender. Stem (2-6 dm.) and leaves soft and weak. Upland woods.

FESTUCA, L.

Spikelets 3-several flowered. Panicle open or contracted. Flowering glume coriaceous, convex on back, 3-5 nerved, acute or awned from tip.

F. octoflora, Walt. Panicle often contracted into a simple raceme. Flowering glume short awned. Leaves few and short, convolute. Stem erect, 1-4 dm. high. Sterile soil, common.

F. elatior, var. *pratensis*, (Huds.) Hack. Panicle simple. Glumes awnless. Leaves flat. Stem tall; $\frac{1}{2}$ m. or more. Escaped from cultivation.

BROMUS, L.

Spikelets several flowered, paniced. Empty glumes unequal, nerved. Flowering glume convex on back, or keeled above, nerved, awned below the 2-cleft apex.

B. secalinus, L. Panicle often simple, pedicels rough, slender. Lower empty glume acute, narrow, 3-nerved; upper broader and longer, 7-nerved. Flowering glume about 7-nerved; awn shorter than glume. A weed in fields.

HORDEUM, L.

Spikelets 1-flowered, sessile on a zig zag rachis, 3 at each joint, the 2 lateral more or less imperfect, the 6 empty glumes bristle form, standing side by side in front of the spikelets. Flowering glume long awned from the apex.

H. jubatum, L. Awn capillary, spreading, 2-5 cm. long. Stems about $\frac{1}{2}$ m. high. Waste places, infrequent.

H. nodosum, L. Awn about as long as glume ($\frac{1}{2}$ cm.) erect. Stem low, 1-5 dm. Spike sometimes enclosed in upper sheath, breaking up at maturity into joints. Sterile soil, common.

ELYMUS, L.

Much as in *Hordeum* but spikelets all perfect and usually more than 1-flowered.

E. Canadensis var. *glaucofolius*, (Willd.) Torr. Spike large and thick. Empty glumes strongly nerved, awned. Flowering glumes with long spreading, capillary awns. Large grass with rough leaves. Low land, common.

2. CYPERACEAE.

Proper perianth none, sometimes represented by bristles or scales. Stamens usually 3. Ovary one, superior, 1-celled, 1-ovuled. Style 2-3-cleft. Fruit an achene. Flowers in the axils of bracts; no bract between the flower and the axis. Grass-like plants with 3-ranked leaves and closed sheaths.

ELEOCHARIS, R. Br.

Flowers perfect, in a single spike terminating the naked stem. Ovary surrounded by several bristles. Style thickened at the base forming a tubercle on the achene.

E. palustris, (L.) R. & S. Stems cylindrical, striate, 1-5 dm. high. In mud or shallow water, common.

SCIRPUS, L.

Resembling *Eleocharis* but style not thickened. In our species the 1-several spikelets are at the apex of the stem, with an involucre leaf which may appear as a continuation of the stem.

S. Americanus, Pers. Spikelets 1-several, sessile, involucre leaf much longer than the cluster. Stems triangular. Wet places.

S. lacustris, L. Spikelets panicle, the involucre leaf shorter than the cluster. Stems cylindrical, tall. Wet places.

CAREX, L.

Flowers monoëcious, the two kinds in the same or different spikes. Achene enclosed in a sac (perigynium). Stems usually triangular.

$\frac{1}{2}$ 1. Staminate flowers in one or more terminal spikes; the pistillate spikes below, usually peduncled. Achene triangular.

C. hystericina, Muhl. Pistillate spikes 1-3, drooping on slender stalks, oblong and densely flowered. Perigynium smooth, strongly nerved, somewhat inflated, narrowed into a slender beak as long as the body. Swampy ground.

C. filiformis var. *lanuginosa*, (Michx.) B. S. P. Pistillate spikes 1-3, erect and nearly sessile. Perigynium short beaked, deeply 2-toothed, densely pubescent. Low prairie.

C. trichocarpa, Muhl. Staminate spikes several. Pistillate spikes usually 2-3, upper erect, lowermost long stalked and spreading. Perigynium smooth, nerved, the short beak extending into 2 long, bristle-like teeth. Coarse plants growing in marshes.

C. stricta, Lam. Spikes several; pistillate slender and compactly

flowered, mostly several and erect. Perigynium short, smooth, scarcely nerved, beak short and entire. Swampy land.

C. tetanica, Schk. Staminate spike one; pistillate spikes 1-3, short, more or less stalked. Perigynium nerved, smooth, the very short beak bent to one side. Prairie, common. Leaf below lowermost spike several cm. long.

C. Pennsylvanica, Lam. The habit of the preceding but perigynium pubescent, beak longer and toothed, and lower leaf only a little longer than spike. Prairie, common.

§ 2. The two kinds of flowers in the same spike. Spikes short, sessile and collected at the summit of stem. Perigynium plano-convex and achene lenticular.

C. Muhlenbergii, Schk. Staminate flowers borne at top of spike, hence lower scales fruitful. Perigynia strongly spreading at maturity. Spikes close together, so as to form an aggregate spike-like head. Prairie, common.

C. straminea, var. *festucacea*, (Willd.) Tuckerm. Staminate flowers at base of spike, hence several of the lower scales empty causing the spike to taper below. Perigynia ascending. Spikes usually 4-6, shortly separated from each other. Common on prairie.

3. ARACEAE.

Flowers sessile, crowded on a fleshy axis (spadix). Fruit a berry.

ARISÆMA, Mart.

Flowers naked, covering only the lower portion of the spadix, the latter surrounded by a rolled up leaf or spathe. Perennial from a corm. Leaves compound. Fruit scarlet, 1-few seeded.

A. Dracontium, (L.) Schott. Usually one leaf with several leaflets. Spadix tapering into a long slender point which is exerted from the rolled up tip of the spathe. Low woods, frequent.

A. triphyllum, (L.) Torr. Leaves 2, each with 3 elliptical leaflets. Spadices dioecious, club-shaped and obtuse above, shorter than the hooded spathe. Rich woods, rare.

4. COMMELINACEAE.

Calyx of 3 green sepals. Corolla of 3 colored petals which soon wither. Stamens 6. Ovary 2-3-celled, free. Fruit a capsule.

TRADESCANTIA, L.

Petals pink or violet. Filaments covered with long violet hairs. Flowers umbelled in terminal and axillary clusters.

T. Virginiana, L. Common in low prairie. Flowers opening on sunny mornings and soon withering.

5. JUNCACEAE.

Perianth of 6 similar, persistent, bract-like divisions. Stamens 6. Ovary one, superior, 3-carpelled. Style 1, stigmas 3. Fruit a 3 valved capsule. Grass-like herbs.

JUNCUS, L.

J. tenuis, Willd. Stem wiry, 2-4 dm. high. Flowers small, green.

$\frac{1}{2}$ cm. long, in terminal panicles. Sepals narrow, acute. Common in grass land.

6. LILIACEAE.

Perianth of 6 similar divisions, not bract-like. Stamens 6 Ovary free, 3-celled, several ovuled. Fruit a capsule or berry.

Flowers borne on a leafless stem.

Solitary and nodding; from a corm.....*Erythronium*.

Umbelled; from a bulb

The bruised plant exhaling the odor of onions.....*Allium*

No odor of onions*Nothoscordum*

Racemose or panicled; from a thick woody rootstock*Yucca*

Stems leafy.

Leaves scale-like with thread-like branches in their axils. *Asparagus*

Leaves broad.

Flower clusters axillary.....*Polygonatum*

Flower clusters terminal

Leaves grass like; from bulbs.*Zygadenus*

Leaves elliptical; from rootstocks....*Vagnera*

ZYGADENUS, Michx.

Z. Nuttallii, (Gray) Wats. Flowers yellowish, in racemes. Stem 4-8 dm. high. Rocky hills, frequent.

ALLIUM, L.

A. nutabile, Michx 2-4 dm. high from a densely fibrous coated bulb. Leaves about half the length of scape Low prairie.

NOTHOSCORDUM, Kunth.

N. ornithogalooides, (Walt.) Kunth. Leaves about the length of the scape. Low prairie.

ERYTHRONIUM, L.

Scape about the length of the two smooth, elliptical leaves

E. albidum, Nutt. Divisions of perianth white or pinkish, 2-3 cm. long, recurved. Low woods, infrequent

YUCCA, L.

Leaves long and rigid, linear, sharp pointed Flowers white, large and showy.

Y. glauca, Nutt. Flowers 4-6 cm. broad, in an elongated raceme Sand hills, not common.

ASPARAGUS, L.

Stems much branched, the filiform branches performing the function of leaves. Fruit a scarlet berry.

A. officinalis, L. Escaped from gardens.

VAGNERA, Adans.

Flowers small, white. Stems simple.

V. racemosa, (L.) Morong. Perianth divisions 2 mm. long. Flowers in panicles. Stem pubescent. Rich woods, rare.

V. stellata, (L.) Morong. Perianth divisions about 4 mm. long. Flowers in racemes. Stem smooth. Rich woods, rare.

POLYGONATUM, Adans.

Perianth greenish, cylindrical, united, 6-lobed at summit. Stamens inserted on perianth. Fruit a globose berry. Stem from a creeping fleshy rootstock.

P. biflorum, var. *commutatum*, (R. & S.) Morong. Stem $\frac{1}{2}$ -1 m. high, naked below. Peduncles axillary, few flowered. Rich woods.

7. SMILACEAE.

SMILAX, L.

Flowers diœcious, small and greenish, in peduncled axillary umbels. Fruit a black few seeded berry. Leaves netted veined, their petiole bearing two tendrils.

S. hispida, Muhl. A woody climbing vine; the stem, at least below, armed with numerous black prickles. Low woods, common.

8. IRIDACEAE.

Divisions of perianth 6, colored. Stamens 3. Ovary inferior, 3-celled. Leaves equitant.

SISYRINCHIUM, L.

Stamens monadelphous. Leaves grass-like. Roots fibrous.

S. Bermudianum, L. Flower stem flat, 1-2 dm. high, bearing a few slender pedicelled white or blue flowers. Prairie, common.

DICOTYLEDONEAE.

9. JUGLANDACEAE.

Flowers monœcious, the staminate in lateral catkins, the pistillate single or in clusters terminating the growth of the season. Trees with pinnate leaves.

JUGLANS, L.

Fruit with an indehiscent spongy covering. Pith diaphragmed.

J. nigra, L. Leaflets 7-11 pairs. Twigs downy. Low woods, frequent.

HICORIA, Raf.

Covering of fruit splitting from apex into four parts. Pith without diaphragms.

H. ovata, (Mill.) Britton. Leaflets mostly 5, lower pair much smaller. Bud scales several. Bluffs along river below Manhattan.

H. minima, (Marsh) Britton. Leaflets mostly 7-9. Bud scales 2, yellow. Low woods, common.

10. SALICACEAE.

Flowers diœcious, both kinds in catkins. Trees or shrubs with alternate, simple leaves.

POPULUS, L.

Scales of catkins cut-lobed. Flowers from a cup-shaped disk. Trees with broad leaves.

P. monilifera, Ait. Leaves broadly ovate with a slender point, on a flattened, slender petiole, serrate. Low ground, common.

SALIX, L.

Scales of catkins entire. No disks. Leaves long and pointed, ours with serrate leaves.

S amygdaloides, Anders. Leaves pale beneath, closely and sharply serrate. Catkins terminating small leafy branches of the season. Stamens 3 or more. Wet places, becoming a large tree, common.

S longifolia, Muhl. Leaves narrow, remotely denticulate. Stamens 2. A shrub or tree, common in low places especially along streams.

S cordata, Muhl. Leaves glaucous beneath, closely serrate. Flowers appearing before the leaves. Stamens 2. A tall shrub. Rocky ravines, not common.

11. BETULACEAE.

Flowers monœcious, the staminate in catkins. Ovary 2-celled, 2-ovuled. Fruit a 1-seeded nut. Woody plants with alternate, simple leaves.

OSTRYA, Scop.

Staminate flowers in close, cylindrical, bracted catkins, from the previous season's wood. The pistillate in short catkins terminating the growth of the season. Fruit an achene, enclosed in an inflated, flattened sac. Leaves 2-ranked.

O Virginiana, (Mill) B. S. P. Leaves oblong, doubly serrate, pinnately veined. Bark twisted. Bluffs, frequent.

12. FAGACEAE.

Differs from *Betulaceæ* in having the ovary 3-celled and 3 or 6 ovuled.

QUERCUS, L.

Staminate catkins very slender, interrupted, bractless, from the old wood. Pistillate flowers in little clusters along the new growth. Fruit an acorn. Leaves 5-ranked.

Q macrocarpa, Michx. Bark light colored; twigs corky ridged. Leaves sinuate-pinnatifid and lobed. Acorns nearly covered by the large mossy fringed cup. Common.

Q prinoides, Willd. Bark light, twigs smooth. Leaves irregularly sinuate-toothed and pinnately veined. Acorns small. Upland woods, common.

Q nigra, L. Bark dark, twigs brown. Leaves thickish, 3-lobed at apex, or often lobed along the sides; lobes bristle pointed. Acorn small, about half enclosed in the hemispherical, coarsely scaly cup. Dry hills, from Manhattan eastward.

Q Rubra, L. Bark dark and smooth, twigs smooth. Leaves lobed, the lobes bristle pointed. Acorn large with a very flat, shallow cup. Hills east of Manhattan, frequent.

Q tinctoria, Bartr. Resembles *Q. rubra* but acorn with a top-shaped or hemispherical cup covering the lower half of the acorn. Hills east of Manhattan.

13. ULMACEAE.

Flowers more or less polygamous, in umbels or racemes, not in catkins. Trees with alternate, 2-ranked, pinnately veined leaves. Calyx free from the 1-2-celled ovary.

ULMUS, L.

Flowers often perfect. Fruit a 1-2-celled samara, winged all around,

which ripens in early spring. Flowers appearing before the leaves, in clusters on the old wood.

U. Americana, L. Flowers slender pedicelled. Fruit hairy margined. Leaves smooth above. Twigs brown, smooth or nearly so. Woods, common.

U. pubescens, Walt. Flowers nearly sessile. Fruit smooth. Leaves rough above. Twigs gray, scabrous. Woods, common.

CELTIS, L.

Flowers racemose from the growth of the season. Fruit a drupe.

C. occidentalis, L. Leaves taper-pointed, nearly smooth, veiny. Bark gray and rough-warty. Low woods, frequent.

14. MORACEAE.

Flowers unisexual. Calyx becoming fleshy in fruit, enclosing the achene. Woody plants with milky juice.

MORUS, L.

Flowers in catkin-like spikes; the fertile spike resembling in fruit a blackberry.

M. rubra, L. Leaves cordate, serrate, often deeply lobed. Twigs smooth, light gray. Low woods, frequent.

15. URTICACEAE.

Flowers unisexual. Ovary 1-celled. Fruit an achene. Herbs.

PARIETARIA, L.

Flowers in bracted cymose clusters in the axils of the alternate, entire, 3-ribbed leaves.

P. Pennsylvanica, Muhl. A low, simple stemmed, inconspicuous annual, with thin, roughish leaves. Moist, shady places, common.

16. SANTALACEAE.

Flowers apetalous. Calyx 4-5-cleft, adherent to the 1-celled ovary. Stamens as many, inserted opposite the lobes. Fruit 1 seeded. Style one. Leaves entire.

COMANDRA, Nutt.

Low perennials with alternate, sessile leaves and whitish flowers in terminal clusters.

C. umbellata, (L.) Nutt. Stem erect (1-2 dm). Leaves oblong. Prairie, common.

17. POLYOGONACEAE.

Flowers apetalous. Calyx mostly 5-6-cleft, persistent. Stamens several. Ovary 1-celled, 1-ovuled, forming in fruit an achene. Styles 2-3. Herbs with alternate, entire leaves and sheathing stipules.

RUMEX, L.

Sepals 6, the 3 outer reflexed in fruit, the inner enlarging and enclosing the achene, then called *valves*. Stamens 6. Achene 3-angled. Flowers small, green, in close whorls, forming a terminal panicle.

R. Acetosella, L. Low and slender, dioecious. Leaves halberd-shaped or the upper linear. Valves small. Meadows, infrequent.

R. altissimus, Wood. Taller (3-1 m). Leaves oblong-lanceolate, not

wavy. Valves veiny (4 mm. broad), one with a conspicuous thickening. Low ground, common.

R. crispus, L. Resembles the foregoing but the leaves with a conspicuously wavy margin. Low ground, common.

R. venosus, Pursh. Low (2-3 dm.) Leaves oblong, with conspicuous stipules. Valves very large (2-3 cm.), orbicular, pink. Low ground, infrequent.

POLYGONUM, L.

Calyx mostly 5 parted, all the lobes erect in fruit. Styles 2 or 3 and the achene lenticular or triangular.

P. aviculare, L. Low and slender annual, prostrate or in wet places upright. Leaves small. Flowers axillary. Stamens 8. Achene triangular. Along roadsides, etc., common.

P. Convolvulus, L. Twining annual. Leaves halberd-shaped. Flowers in racemes. Achene triangular. Fields, common.

P. Pennsylvanicum, L. Erect annual. Leaves lanceolate. Peduncles glandular. Flowers pink or white in terminal spikes. Achene lenticular. Moist soil, common.

P. Persicaria, L. Differs from the above in having the leaves often marked with a dark spot, the sheaths with ciliate margin, peduncles smooth and achene sometimes triangular. Wet places, common.

18. CHENOPODIACEAE.

Flowers apetalous, small and green; no bracts. Stamens as many as sepals, inserted opposite them. Ovary 1-celled, 1-ovuled. Fruit an utricle. Herbs with mostly alternate leaves and no stipules.

CHENOPODIUM, L.

Sepals 5. Flowers sessile in small clusters. Plants usually mealy. Ours annual.

C. album, L. Leaves ovate, more or less angulate-toothed. A common weed

C. leptophyllum, Nutt. Leaves linear, entire. Dry places, common.

19. AMARANTACEAE.

Flowers imbricated with dry bracts, about 3 to each flower. Ovary 1-celled, 1-ovuled. Herbs without stipules.

AMARANTUS, L.

Sepals mostly 5. Stamens 5. Fruit an utricle. Leaves alternate, entire. Flowers green, very small.

A. blitoides, Wats. Prostrate. Leaves obovate. Roadsides, etc. Common in summer and autumn.

20. NYCTAGINACEAE.

Calyx gamosepalous, colored like a corolla, the base closely surrounding the 1-celled, 1-ovuled ovary. Corolla none. Herbs with opposite, entire leaves.

ALLIONIA, L.

Flowers 3-5 in an open involucre. Calyx pink.

A. nyctaginea, Michx. Leaves ovate, petioled. Stem $\frac{1}{2}$ -1 m. high. Dry places, frequent.

21. CARYOPHYLLACEAE.

Herbs with opposite, entire leaves. Stamens not more than twice the sepals. Ovary 1-celled with central placenta.

SILENE, L.

Calyx 5-toothed. Stamens 10. Styles 3.

S. antirrhina, L. A slender annual with linear leaves and small flowers on long peduncles, each of which is provided with a glutinous ring. Dry ground, common.

S. vulgaris, (Moench), Garke. Leaves ovate-lanceolate. Calyx inflated, veiny. Large petals 2-cleft. Escaped occasionally.

22. ANONACEAE.

Sepals 3. Petals 6. Stamens numerous. Pistils several. All hypogynous. Woody plants.

ASIMINA, Adans.

Pistils ripening into 1 or 2 oblong, yellow, pulpy fruits.

A. triloba, (L.) Dunal. A small tree with oblanceolate leaves and dark brownish-red flowers. Fruit edible.

23. RANUNCULACEAE.

Parts of flower all free and distinct. Sepals often corolla-like. Petals often absent. Stamens numerous. Pistils few to several, 1-celled. Fruit an achene, follicle or berry. Herbs.

Flowers dioecious, small, paniced. *Thalictrum*
Flowers perfect.

Not spurred. Fruit an achene.

Petals absent. *Anemone*

Petals present.

Achenes in a long spike. *Myosurus*

Achenes in a head. *Ranunculus*

Conspicuously spurred. Fruit a follicle.

Spur one. *Delphinium*

Spurs 5. *Aquilegia*

THALICTRUM, L.

Petals none. Fruit an achene.

T. purpurascens, L. Stem 1 m. high. Leaves decomposed. Achenes ribbed. Low ground, infrequent

ANEMONE, L.

Leaves radical; the stem leaves forming a 2-3 leaved involucre on each peduncle.

A. Caroliniana, Walt. Stem 1-2 dm. high. Leaves cleft into rather narrow divisions. Sepals several (10-15), white or purple. Prairie, infrequent.

A. Canadensis, L. Stem taller. Leaves larger, cleft into wedge-shaped divisions. Sepals 5, white. Low places, infrequent.

MYOSURUS, L.

Sepals and petals 5. Pistils on a conical receptacle which greatly elongates in fruit.

M. minimus, L. Annual, with narrow, entire, radical leaves. Dry places, frequent.

RANUNCULUS, L.

Sepals and petals 5. Pistils in a head, receptacle not elongating in fruit.

R. abortivus, L. Glabrous, branching, 2-5 dm. high. Lower leaves roundish, crenate; upper parted. Petals small, yellow. Low woods, common.

AQUILEGIA, L.

Sepals 5, colored. Petals 5, strongly spurred below. Pistils 5, many ovuled.

A. Canadensis, L. A perennial with ternately compound leaves and showy, scarlet and yellow flowers. Rocky woods, not common.

DELPHINIUM, L.

Sepals 5, irregular, one of them spurred. Petals 4, two extending back into the spur of the calyx. Flowers in racemes. Leaves palmately parted. Ours with 3 pistils.

D. Carolinianum, Walt. Racemes wand-like. Flowers light blue or whitish. Lobes of leaves narrowly linear. Prairie, frequent.

D. tricornis, Michx. Raceme rather short. Stem low. Flowers deeper blue. Lobes of leaves broader and wedge-shaped. Rocky woods, infrequent.

24. MENISPERMACEAE.

Woody vines with hypogynous, dioecious flowers.

MENISPERMUM, L.

M. Canadense, L. Leaves roundish, angled, peltate near the edge. Fruit a black drupe with a flat stone. Low woods, common.

25. PAPAVERACEAE.

Sepals 2, small. Petals 4 (or more). Stamens 6 (or more). Pistil one, 1-celled. Herbs

BICUCULLA, Adans.

Corolla 2-spurred. Stamens united in 2 sets of 3 each. Leaves dissected, all radical.

B. Cucullaria, (L.) Millsp. Pinkish flowers in racemes from a granulated bulb. Woods, rare.

CAPNOIDES, Adans.

Corolla 1-spurred. Fruit a many-seeded capsule. Stems leafy. Otherwise like *Bicuculla*.

C. aureum, var. *occidentale*, (Engelm.) Flowers small, yellow, racemed. Woods, common.

26. CRUCIFERAE.

Sepals 4. Petals 4 (or none). Stamens 6, two being shorter, (or only 2). Pistil one, 2-celled by a false partition between the two parietal placentæ. Fruit a 2-valved capsule. Herbs with alternate leaves and white or yellow flowers.

1. Capsule compressed parallel to partition.

Linear, elongated.

Leaves dissected, grouped near middle of stem.....*Dentaria*Leaves undivided; stem leafy.....*Arabis*Oblong; low plants.....*Draba*

2. Capsule terete or 4-angled.

Short, valves convex, nerveless.....*Roripa*Valves convex or keeled, nerved; flowers very small, yellowish,
*Sisymbrium*Flowers larger; capsule beaked beyond the valves.....*Brassica*

3. Capsule short, flattened contrary to partition.

Obcordate.....*Bursa*Orbicular; stamens only 2; often apetalous.....*Lepidium*

RORIPA, Scop.

R. Armoracia, (L.) The common horse-radish with white flowers and large leaves. Sometimes spontaneous near gardens.*R. Nasturtium*, (L.) Rusby. Flowers white. Capsules linear. Leaves pinnate. Wet places, rare.*R. sessiliflora*, (Nutt.) Flowers yellowish, very small. Capsules about 1 cm. long, nearly sessile. Leaves lyrate. Wet places, common.*R. sinuata*, (Nutt.) Flowers yellow, $\frac{1}{2}$ cm. long. Capsules about 1 cm. long, on slender pedicels. Common.

ARABIS, L.

A. Canadensis, L. Stem $\frac{1}{2}$ -1 m. high, leafy. Leaves oblong-lanceolate, not clasping, somewhat toothed. Flowers whitish. Capsules curved, elongated, very flat, pendulous. Woods, frequent.*A. hirsuta*, (L.) Scop. Leaves clasping by a sagittate base. Flowers greenish. Capsules upright, straight. Rocky woods, common.

DENTARIA, L.

D. laciniata, Muhl. Flowers white or pink; leaves 3-parted. Woods, rare.

DRABA, L.

D. Caroliniana, Walt. Plants a few cm. high. Flowers white. Leaves obovate, entire, hirsute. Capsules smooth, or in var. *micrantha*, (Nutt.) Gray, minutely hairy. Waste places, common.

SISYMBRIUM, L.

S. officinale, (L.) Scop. Leaves 1-pinnatifid. Capsules nearly sessile, closely appressed to stem. A common weed.*S. pinnatum*, (Walt.) Greene. Leaves 2-pinnatifid. Capsules spreading on horizontal pedicels. Open ground, common.

BRASSICA, L.

B. nigra, (L.) Koch. Flowers bright yellow, rather large. Leaves with a large terminal lobe and a few small lateral ones. Stem somewhat hairy. Capsules 4-angled. Waste places, frequent.*B. Sinapistrum*, Boiss. As in *B. nigra*, but stem smooth and glaucous and leaves more or less sagittate-clasping. Capsules terete and knotty. Waste places, frequent.

BURSA, Weber.

B. pastoris, (L.) Wigg. Root leaves clustered, pinnatifid. Stem leaves clasping by a sagittate base. Flowers white, small. A common weed.

LEPIDIDIUM, L.

L. intermedium, Gray. Low, bushy branched. Leaves narrow, entire. Cotyledons incumbent. Dry places, very common.

L. Virginicum, L. Less branched. Leaves toothed. Cotyledons accumbent. Woods, frequent.

L. Draba, L. Pods heart shaped. Leaves sagittate. Escaped from gardens occasionally.

27. CAPPARIDACEAE.

Sepals 4. Petals 4. Stamens 6 or more, equal. Pistil one, 1-celled, with 2 parietal placentæ

CLEOME, L.

Stamens 6. Capsule linear, many seeded, stipitate

C. serrulata, Pursh. Stem smooth, 1 m. high. Leaves 3-foliolate. Flowers pink. Waste places, not common.

28. SAXIFRAGACEAE.

TRIBE RIBESIOIDEÆ.

Shrubs with alternate, simple leaves. Fruit a berry.

RIBES, L.

Calyx 5-lobed. Petals 5. Pistil one, adherent to calyx-tube; ovary 1-celled; ovules numerous.

R. gracile, Michx. Stems provided with scattered prickles and stronger triple spines below the leaves. Flowers narrow, whitish. Stamens exerted. Woods, frequent.

29. PLATANACEAE.

Flowers monœcious, in heads, naked. Trees with alternate, palmately lobed leaves and sheathing stipules.

PLATANUS, L.

P. occidentalis, L. Leaves sinuate-toothed. A large tree with white bark peeling off in patches. Near streams, frequent.

30. ROSACEAE.

Sepals 5, united into a cup (often with 5 alternating bractlets). Petals 5, and stamens numerous, inserted on the calyx tube. Leaves alternate, with stipules.

1. Trees or shrubs.

Leaves simple.

Ovary one, 1-celled, free; fruit a drupe.

Flowers in umbels. *Prunus*

Flowers in racemes. *Cerasus*

Ovaries 3-5, enclosed in the calyx tube; fruit a pome.

Flowers pink, fragrant *Pyrus*

Flowers white, ill-scented. *Crataegus*

Leaves compound.

Palmate; flowers white.....	<i>Rubus</i>
Pinnate; flowers pink.....	<i>Rosa</i>

2. Herbs.

Flowers white.....	<i>Fragaria</i>
Flowers yellow.....	<i>Potentilla</i>

PRUNUS, L.

P. Americana, Marsh. Flowers appearing before the leaves. Fruit ovoid; stone flat. Leaves ovate, doubly serrate, veiny. Many of the branches thorn-like at apex. A small tree. Thickets, common.

P. anquistifolia, Marsh. Resembles the foregoing, but leaves narrower and tending to be partially folded together, finely and evenly glandular-serrate. Fruit globular; stone more turgid. Sand hills along the river. A shrub.

CERASUS, L.

C. Virginiana, (L.) Loisel. Flowers appearing just after the leaves. Fruit and stone globular. Leaves obovate, thin. A tall shrub, not thorny. Woods, not common.

RUBUS, L.

Pistils numerous, becoming small drupelets in fruit. Somewhat woody plants with prickly bark.

R. occidentalis, L. Stems upright or declining, red, glaucous. Leaflets 3, white-downy beneath. Petals shorter than sepals. Thickets and fence corners, frequent.

R. villosus, Ait. Stems upright or declining, brown, furrowed. Leaflets 3-5, the terminal 1-3 stalked, glandular pubescent. Petals longer than sepals. Roadsides, rather uncommon.

R. Canadensis, L. Stems trailing. Leaflets usually 3, thin and nearly smooth. Otherwise resembles the preceding. Woods about St. George.

FRAGARIA, L.

Calyx with 5 bractlets alternating with the lobes. Pistils numerous becoming achenes. The receptacle becoming in fruit enlarged and pulpy. Leaves radical, trifoliolate. Flowers cymose on scapes. Spreading by runners.

F. Virginiana, Mill. Low prairie, common.

POTENTILLA, L.

As in *Fragaria* but receptacle not becoming pulpy in fruit. Ours with leafy stem.

P. Monepeliensis, L. Stem erect, 2-5 dm. Leaflets 3. Sandy soil, infrequent.

P. pentandra, Engelm. More slender, flowers smaller and the lower leaves with the lateral leaflets parted nearly to the base, thus appearing 5-foliolate. Sandy soil, rare.

ROSA, L.

Calyx tube ovoid, contracted at summit where are borne the petals and stamens, becoming fleshy in fruit. The several pistils at the bottom of the tube becoming bony, hairy achenes.

R. Arkansana, Porter. Stem prickly or nearly unarmed. Prairie, common.

PYRUS, L.

P. Coronaria, L. Twigs and simple leaves glabrous or nearly so. Flowers umbellate. Bluffs along Kansas river, not common. Often thorny with stunted branchlets.

P. Iowensis, (Wood) Bailey. Thicker leaves and the twigs woolly. Woods about St. George.

CRATÆGUS, L.

Twigs bearing smooth, simple thorns.

C. coccinea, L. Leaves ovate-cordate, thin, glabrous, incised. Fruit globose, scarlet. Bluffs, rare.

C. mollis, Scheele. Leaves thicker and larger, downy beneath. Bluffs, rare.

31. LEGUMINOSAE.

Sepals 5, usually more or less united. Petals 5 (one in *Amorpha*), usually irregular. Stamens usually 10, distinct or united. Pistil one, simple. Fruit a legume. Leaves alternate, with stipules, mostly compound.

SUBORDER PAPILIONATÆ.

Corolla papilionaceous, the upper petal, or standard, enclosing the others in the bud.

Leaves palmately compound.

Stamens distinct.....*Baptisia*

Stamens diadelphous.

Flowers in heads.....*Trifolium*

Flowers in spikes or racemes.....*Psoralea*

Leaves pinnately compound (if trifoliolate, the terminal leaflet stalked.)

Leaflets 3.

Flowers yellow or white.....*Melilotus*

Flowers purple.....*Medicago*

Leaflets more than 3.

Shrub.....*Amorpha*

Herbs.

Leaves odd-pinnate.....*Astragalus*

Leaf stalk terminating in a tendril.....*Vicia*

Leaf-stalk terminating in a bristle.....*Lathyrus*

BAPTISIA, Vent.

Stamens distinct. Legume oblong, inflated, stalked in the persistent calyx. Leaves palmately 3-foliolate.

B. australis, (L.) R. Br. Smooth. Flowers blue in an erect raceme. Prairie, frequent.

B. leucophæa, Nutt. Hairy. Flowers yellow, in a reclining raceme. Prairie, common. (Hybrids with the foregoing occur.)

MEDICAGO, L.

Stamens diadelphous. Leaves pinnately 3-foliolate. Legume more or less coiled.

M. sativa, L. Escaped from cultivation, frequent.

MELILOTUS, Juss.

As in *Medicago* but legume not coiled. Flowers in spikes. Tall herbs.

M. alba, Lam. Flowers white. Roadsides, etc., frequent.

M. officinalis, (L.) Lam. Flowers yellow. Waste places, rare.

TRIFOLIUM, L.

Leaves palmately 3-foliolate. Flowers in head-like clusters. Low herbs.

T. medium, L. Flowers purple, sessile in the head. Leaflets without a dark spot. Fields, common. (*T. pratense*, L., is distinguished by having a dark spot on the leaves.)

T. repens, L. Flowers white (turning pink with age), pedicelled in the head. Leaflets notched at apex. Meadows, common.

PSORALEA, L.

Perennial herbs with glandular dotted, 3-5-foliolate leaves and purplish flowers.

P. esculenta, Pursh. Stem 1-3 dm high, rough, hairy. Leaves 5-foliolate. Raceme dense. Prairie, not common.

P. tenuiflora, Pursh. Stem taller and much branched, nearly smooth. Raceme loose. Leaves 3-5 foliolate. Prairie, common

AMORPHA, L.

Stamens monadelphous only at base. Leaves odd-pinnate. Flowers violet, in spikes. Corolla of one petal.

A. fruticosa, L. Nearly smooth. Leaflets 8-12 pairs. Wet places, frequent.

ASTRAGALUS, L.

Stamens diadelphous. Low perennial herbs with racemed flowers. Legume sometimes 2-celled by a false partition.

A. caryocarpus, Ker. Stems leafy and spreading. Leaflets narrowly elliptical (1-1½ cm. long). Flowers about 2 cm. long, purplish, in a short loose raceme. Legume turgid, 2-celled, thick and fleshy, becoming papery at maturity. Prairie, common.

A. lotiflorus, Hook. Stems short and tufted. Leaflets oblong, broader and more distant than in the foregoing. Flowers about 1 cm. long, yellowish, in a head-like raceme. Legume dry, not completely 2-celled. Prairie, frequent.

A. Missouriensis, Nutt. Resembling the foregoing but leaflets smaller and flowers blue or purple. Rocky bluffs, frequent.

VICIA, L.

V. sparsifolia, Nutt. Leaflets 2-5 pairs, linear or oblong. Raceme 2-4 flowered, flowers narrow, about 2 cm. long, narrow. Low ground, not common.

LATHYRUS, L.

L. ornatus, Nutt. Flowers about 3 cm. long, the standard broad and conspicuous, purple. Prairie, frequent.

SUBORDER CÆSALPINIOIDÆ.

Flowers not papilionaceous, or if somewhat so, the upper petal enclosed by the others in the bud. Stamens usually distinct.

GYMNOCLADUS, Lam.

Flowers regular, whitish, in terminal racemes. Leaves 2-pinnate. Legume oblong, woody.

G. dioica, (L.) Koch. A large tree with nearly dioecious flowers. Low woods, frequent.

GLEDITSCHIA, L.

Flowers small, regular, greenish, in spikes. Legume woody. Thorny trees.

G. triacanthos, L. Leaves 1-2-pinnate. Thorns often much branched, above the axils. Legume elongated. Low woods, frequent.

CERCIS, L.

Corolla imperfectly papilionaceous, pink. Legumes thin and flat. Trees with simple cordate leaves. Flowers appearing before the leaves.

C. Canadensis, L. Woods, frequent.

SUBORDER MIMOSOIDEÆ.

Flowers regular, corolla valvate. Stamens distinct, exerted. Leaves 2-pinnate.

SCHRANKIA, Willd.

Corolla gamopetalous, funnel form. Stamens about 10. Legume narrow and prickly.

S. uncinata, Willd. A perennial herb with prickly stems, sensitive leaves and axillary, peduncled heads of pink flowers. Prairies, frequent.

32. GERANIACEÆ.

Sepals and petals 5. Stamens usually 10. Ovary 5-celled. Herbs with simple but usually deeply lobed leaves.

GERANIUM, L.

G. Carolinianum, L. A low much branched herb with 5-parted and much cleft leaves, and small pinkish flowers. Sterile soil, frequent.

33. OXALIDACEÆ.

Differs from the preceding order in having compound leaves, in ours 3-foliolate, with obcordate leaflets.

OXALIS, L.

O. corniculata, L. Stem leafy, from a creeping rootstock. Flowers yellow. Fruit erect on a reflexed pedicel. Open ground, common.

O. stricta, L. Differs from the above in having the fruiting pedicels ascending. Common.

O. violacea, L. Leaves radical, from a scaly bulb. Flowers pink or purple. Rocky soil, common.

34. RUTACEÆ.

ZANTHOXYLUM, L.

Flowers dioecious. Petals and stamens 4-5, the latter alternate with petals. Pistils 2-6. Fruit a fleshy, 2-valved, 1-2-seeded capsule. Prickly shrubs with pinnate, glandular dotted leaves and small greenish flowers.

Z. Americanum, Mill. Calyx none. Plant aromatic. Prickles in position of stipules and sometimes also scattered. Leaflets 3-5. Woods, common.

35. EUPHORBIACEAE.

Flowers monœcious or diœcious, mostly apetalous. Ovary free, 3-celled, 3-ovuled. Fruit a capsule.

EUPHORBIA, L.

Flowers monœcious, naked, enclosed in a cup-shaped involucre, the whole likely to be mistaken for a single flower. Staminate flowers, several in each involucre, consisting of a single stamen jointed on its pedicel. Pistillate flower one, pedicelled. Involucre often provided with 4-5 thick glands with colored appendages, making the resemblance to a flower still more striking. Herbs with milky juice.

E. Cyparissias, L. Erect perennial with linear, entire leaves scattered along the stem, the upper rounded. Inflorescence umbellate. Escaped from gardens.

E. nutans, Lag. Annual. Stem ascending or erect, slender, nearly smooth. Leaves oblong, serrate, opposite. Open places, common.

E. maculata, L. Prostrate, hairy annual. Leaves oblong, often with a brown spot. Open places, common.

TRAGIA, L.

Flowers apetalous, monœcious, racemose. Calyx present.

T. stylaris, Muell. An erect perennial, hispid, with stinging hairs. Leaves ovate to oblong, coarsely toothed. Dry hills, rare.

36. ANACARDIACEAE.

Sepals, petals and stamens 5 Ovary 1-celled, 1-ovuled. Styles and stigmas 3.

RHUS, L.

Shrubs with compound leaves and small greenish or yellowish flowers.

R. aromatica, Ait. Flowers in compact clusters which develop before the leaves. A low, upright shrub. Leaves 3-foliolate. Rocky bluffs, frequent.

R. radicans, L. Flowers in loose axillary panicles, developing after the leaves. An upright shrub or high climbing vine. Leaves 3-foliolate. Woods and thickets, common.

37. CELASTRACEAE.

Sepals, petals and stamens 4-5, the latter alternate with petals and inserted on a disk surrounding the ovary. Shrubs with simple leaves.

CELASTRUS, L.

Flowers greenish yellow, in terminal racemes. Leaves alternate. Fruit globose.

C. scandens, L. A twining vine, with ovate or oval, finely serrate leaves. Upland woods, frequent.

EUONYMUS, L.

Flowers dark red in axillary clusters. Leaves opposite. Fruit lobed.

E. atropurpureus, Jacq. An upright shrub with 4-sided branches. Parts of flower usually in fours. Woods, frequent.

38. STAPHYLEACEAE.

Flowers perfect, regular. Stamens as many as petals. Shrubs with opposite, compound leaves. Ovary 3-celled.

STAPHYLEA, L.

Petals 5. Ovules several. Fruit much inflated.

S. trifolia, L. Leaves pinnately 3-foliolate. White flowers in drooping racemes. Woods, not common.

39. ACERACEAE.

Flowers polygamous or diœcious, regular. Ours apetalous. Ovary 2-celled and 2-lobed, 4-ovuled. Fruit a samara (double), unsymmetrically winged at apex. Leaves opposite. Woody plants.

ACER, L.

Leaves simple, palmately lobed.

A. saccharinum, L. Flowers in umbel-like clusters much preceding the leaves. Common along Blue river.

RULAC, Adans.

Leaves pinnately 3-5-foliolate. Flowers diœcious, the staminate on capillary drooping pedicels.

R. Negundo, (L.) Hitchc. Low woods, frequent.

40. HIPPOCASTANACEAE.

Flowers usually irregular. Stamens more numerous than petals. Ovary 3-celled. Woody plants with compound leaves.

ÆSCULUS, L.

Calyx tubular. Petals unequal. Stamens 7. Leaves palmate.

Æ. arguta, Buckl. A small tree with polygamous, yellow flowers in terminal panicles appearing with the leaves. Petals 4. Leaflets 7. Woods, frequent.

41. RHAMNACEAE.

Sepals, petals and stamens 4-5, the latter opposite the petals. Shrubs with alternate, simple leaves.

RHAMNUS, L.

Disk lining the calyx free from ovary. Fruit a drupe.

R. lanceolata, Pursh. Flowers more or less clustered, axillary, greenish, the parts in four's. Upland woods, rare.

CEANOTHUS, L.

Disk lining the calyx cohering with the ovary. Fruit dry, separating into 3 parts at maturity.

C. ovatus, Desf. A low shrub with glandular-serrate leaves and white flowers in dense, terminal, umbel-like clusters. Prairie and open woods, common.

42. VITACEAE.

Sepals (when present), petals and stamens 4-5, the latter opposite the petals. Ovary 2-celled, 4-ovuled. Woody vines provided with tendrils opposite the leaves. Fruit a berry.

VITIS, L.

Calyx lobes scarcely developed. Petals separating below and falling from the expanding flower without opening. Leaves simple. Flowers in a compound panicle, small and very fragrant.

V. vulpina, L. Leaves cordate, 3-lobed, incised-serrate, smooth. Woods, common.

PARTHENOCESSUS, Planch.

Calyx shortly 5-toothed. Petals expanding. Leaves palmately compound.

P. quinquefolia, (L.) Planch. Leaflets 5, clinging to rough supports by disk-like terminations. Woods, common. The older parts provided with aerial rootlets.

P. vitacea, (Knerr) Hitchc. Differs from the above in having no aerial rootlets; the canes smooth, and lighter colored; the tendrils dichotomous like the grape, and usually without disks; the inflorescence dichotomous rather than pinnate as in the former; flowering about two weeks earlier; the fruit maturing earlier and considerably larger. Woods, infrequent.

43. MALVACEAE.

Sepals 5, more or less united, often provided with a whorl of bractlets outside. Petals 5. Stamens numerous, united in a column. Pistils several, united in a ring. Leaves alternate, with stipules. Ours herbs.

MALVA, L.

Involucel of 3 bractlets. Carpels rounded, beakless.

M. rotundifolia, L. Stems spreading. Leaves on long petioles, round-cordate, crenate. Petals whitish. Waste places, infrequent.

CALLIRHOE, Nutt.

Involucel 3-leaved or none. Carpels beaked.

C. alceaoides, (Michx.) Gray. Stem erect. Involucel none. Flowers pink or white. Prairie, not common.

C. involucrata, (Nutt.) Gray. Stem spreading. Involucel 3-leaved. Flowers deep red. Prairies, common.

44. VIOLACEAE.

Sepals 5. Petals 5, irregular. Stamens 5. Pistil one, 1-celled, with 3 parietal placentæ. Herbs.

VIOLA, L.

Sepals eared at base. The lower petal spurred and two of the stamens sending appendages into the spur. Ours with blue flowers.

V. obliqua, Hill. Stemless. Leaves cordate, crenate. Woods, common.

V. pedatifida, Don. Stemless. Leaves palmately cleft into narrow lobes. Prairie, frequent.

V. tenella, Muhl. Stem low, with oval leaves and large pinnatifid stipules. Flowers small, light blue. Grassy places, frequent.

CALCEOLARIA, Lœfl.

Sepals not eared. Leafy perennials with small axillary flowers.

C. verticillata, (Ort.) Kuntze. Leaves linear. Flowers white. Prairie, infrequent.

45. OENOTHERACEAE.

Parts of flower usually in four's. Pistil one, adherent to calyx tube, 4-celled. Herbs.

OENOTHERA, L.

Calyx tube prolonged beyond the ovary, lobes 4. Petals 4. Stamens 8.

E. Missouriensis, Sims. Calyx tube about 1 dm. long. Flowers axillary, $\frac{1}{2}$ -1 dm. broad, yellow. Low decumbent perennials with silky pubescence and broadly 4-winged capsules. Rocky hills, not uncommon.

E. scrulata, Nutt. Stems slender, from a woody base. Leaves linear, denticulate. Flowers axillary, yellow, $1\frac{1}{2}$ -2 cm. wide. Capsule narrow, cylindrical, not winged. Prairie, frequent.

E. sinuata, L. Stems hairy, decumbent. Leaves lanceolate, sinuately toothed or pinnatifid. Flowers yellow. Capsule cylindrical, hairy. Prairie, frequent.

E. speciosa, Nutt. Stem erect. Leaves more or less pinnatifid. Flowers white or pinkish. Capsule spindle shaped, strongly ribbed. Prairie, frequent.

GAURA, L.

Flowers much as in *Enothera*, but in our species small and in loose spikes. Fruit indehiscent and nut-like, 4-angled.

G. coccinea, Pursh. A caescent leafy perennial with linear leaves and pink or scarlet flowers. Prairie, common.

46. UMBELLIFERAE.

Calyx adhering to the ovary. lobes minute or wanting. Petals and stamens 5, inserted on a disk that crowns the 2-celled, 2-ovuled ovary. Styles 2. Fruit separating into 2 seed-like carpels. Herbs with alternate, usually compound leaves, the base of the petiole expanding and clasping around the stem. Flowers small in simple or compound umbels.

Stemless; perennial from a thick root. *Peucedanum*
 Leafy stemmed.

Annual; leaves finely dissected. *Apium*
 Perennial; leaflets ovate or oblong.

Flowers capitate in umbellet. *Sanicula*
 Flowers long pedicelled in umbellet.

White. *Osmorrhiza*
 Yellow. *Polytaenia*

SANICULA, L.

Fruit globose, not flattened, densely prickly with hooked bristles. Stems about 1 m. high, glabrous. Leaves palmately parted. Flowers perfect with staminate ones intermixed.

S. Canadensis, L. Staminate flowers few and short pedicelled. Flowers whitish. Low woods, common.

S. Mavilandica, L. Staminate flowers more numerous and long pedicelled. Flowers yellow. Low woods, common.

APIUM, L.

Fruit ovate or roundish, not flattened. Flowers white.

A. patens, (Nutt.) Wats. A slender, divaricately branched annual (3-6 dm.), with leaves finely dissected into filiform lobes, and tuberculate fruit. Prairie, frequent.

OSMORRHIZA, Raf.

Fruit narrow, not flattened, attenuate at base, bristly. Flowers white.

O. longistylis, (Torr.) DC. Leaves ternately compound, leaflets ovate, incised. Stem $\frac{1}{2}$ -1 m. Woods, not common.

PEUCEDANUM, L.

Fruit ovate, flattened parallel to partition, ribbed on back, winged on margin.

P. fœniculaceum, Nutt. Leaves much dissected. Flowers yellow. Plant with a strong odor resembling celery. Rocky bluffs, frequent.

POLYTÆNIA, DC.

Fruit oval, flattened parallel to partition, with corky margins. Flowers yellow. Leaves 2-pinnate, leaflets incised.

P. Nuttallii, DC. $\frac{1}{2}$ -1 m. high. Rocky soil, frequent.

47. CORNACEÆ.

Calyx adherent to ovary. Petals and stamens inserted on disk which crowns the ovary. Style one. Fruit a drupe. Woody plants.

CORNUS, L.

Petals and stamens 4. Ovary 2-celled, 2-ovuled. Leaves opposite. Flowers (in ours) white in flat topped cymes.

C. asperifolia, Michx. Branches brown or gray. Leaves rough, pubescent above, downy beneath. Fruit white. An upright shrub or small tree. Thickets, common.

C. sericea, L. Branchlets bright red-brown, woolly pubescent. Leaves elliptical, whitened and nearly glabrous beneath. Branches often elongated, declining and stoloniferous at summit. Fruit drab or bluish. Wet places, not common.

48. PRIMULACEÆ.

Calyx free. Corolla 4-5-lobed. Stamens as many as corolla lobes and inserted opposite them. Ovary 1-celled, many ovuled, with central placenta. Herbs with simple leaves.

ANDROSACE, L.

Low plants with radical leaves and mostly umbelled flowers. Capsule 5-valved.

A. occidentalis, Pursh. Annual. Scapes several. Corolla white, small. Sterile hills, common.

49. OLEACEÆ.

Calyx and corolla 4-cleft, one or both sometimes absent. Stamens 2. Ovary 2-celled. Woody plants, with opposite leaves.

FRAXINUS, L.

Flowers diœcious. Calyx very small. Corolla absent. Fruit a samara, winged at apex. Trees with pinnate leaves. Flowers in panicles on the old wood.

F. viridis, Michx. f. A small tree with glabrous twigs, or in var. *pubescens*, Hitchc., the twigs pubescent. Woods, common.

50. APOCYNACEÆ.

Calyx and corolla 5-lobed. Stamens 5, inserted on corolla tube, alternate. Ovaries 2, free from calyx. Plants with milky juice and entire, opposite leaves.

APOCYNUM, L.

Fruit 2 long and slender follicles. Flowers white, cymose.

A. cannabinum, L. About 1 m. high. Leaves oval. Flowers small, in close, terminal cymes. Low ground, frequent.

51. ASCLEPIADACEAE. †

Characters about as in the last order but anthers connected with stigma. Leaves opposite or alternate.

ASCLEPIODORA, Gray.

Corolla lobes 5, ascending. Inside there is a crown consisting of 5 spreading, hooded bodies. Flowers in umbels.

A. viridis, (Walt.) Gray. Stem low. Leaves alternate. Flowers 2-3 cm. broad, green with purple crown. Prairie, not common.

ACERATES, Ell.

Corolla lobes 5, reflexed. Crown present. Flowers small, greenish, in compact umbels.

A. lanuginosa, (Nutt.) Dec. A low, hairy perennial with opposite or scattered leaves and a single umbel terminating the stem. Prairies, rare.

52. CONVULVULACEAE.

Sepals 5. Corolla 5-lobed, convolute. Stames 5, inserted on the corolla tube alternating with its lobes. Ovary 2-celled, 4-ovuled. Herbs with alternate leaves and erect or usually twining stem. Fruit a capsule.

CONVOLVULUS, L.

Corolla funnel form, showy. Style one.

C. Sepium, L. Stem usually twining, glabrous. Leaves halberd-shaped. Corolla white, 4-5 cm long. Moist soil, common.

C. repens, L. Stem usually trailing, pubescent. Corolla pinkish or white. Low ground, frequent.

EVOLVULUS, L.

Corolla small, nearly rotate. Styles 2.

E. pilosus, Nutt. A low, erect, silky hairy herb with crowded, narrow leaves and small, blue flowers ($\frac{1}{2}$ cm. broad). Prairie, frequent.

53. POLEMONIACEAE.

As in the preceding order but ovary 3-celled. Herbs, not twining.

PHLOX, L.

Corolla salver-form. Perennials with opposite, entire, sessile leaves and cymose inflorescence.

P. divaricata, L. Stems ascending from a decumbent base. Leaves oblong to ovate. Corolla pale blue. Woods, frequent.

P. pilosa, L. Stem erect. Leaves linear. Corolla pink. Prairie, frequent.

54. HYDROPHYLLACEAE.

As in the foregoing orders but ovary 1-celled with 2 parietal placentæ. Styles 2, more or less united. Herbs.

MACROCALYX, Trew.

Corolla small, bell shaped. Placentæ meeting in the axis so as to make the ovary appear 2-celled.

M. Nyctelea, (L.) Kuntze. A low branched annual with pinnately parted leaves and nearly white flowers solitary in the forks or opposite the leaves. Low woods, common.

55. ASPERIFOLIAE.

As in the foregoing orders but ovary 4-lobed around the base of the single style, separating at maturity into 4 seed-like nutlets. Hairy herb^s with alternate, entire leaves and flowers in one sided racemes coiled at the tip.

CYNOGLOSSUM, L.

Throat of corolla closed by 5 obtuse scales. Nutlets armed all over with short barbed prickles

C. officinale, L. Corolla dull red Lower leaves petioled, upper sessile. Waste places, frequent.

LAPPULA, Moench.

Much as in *Cynoglossum* but nutlets armed only on the back or edges.

L. pilosa, (Nutt) An erect, diffusely branched, hispid annual, with narrow leaves and small, pale blue flowers. Nutlets armed with a single row of prickles on margin. Dry hills, common.

LITHOSPERMUM, L.

Throat of corolla more or less closed. Nutlets whitish, bony, smooth or roughish. Ours with deep perennial roots.

L. angustifolium, Michx. A few dm. high, rough hairy. Leaves linear. Flowers lemon yellow, with tube 2-4 times as long as calyx. Prairie, frequent

L. canescens, (Michx.) Lehm. Soft hairy, low. Leaves oblong. Corolla orange, tube only a little longer than calyx. Prairies, frequent.

L. Gmelini, (Michx.) Stem taller ($\frac{3}{8}$ - $\frac{1}{2}$ m.), rough hairy. Leaves oblong to linear. Corolla orange, tube short. Dry hills, frequent.

ONOSMODIUM, Michx.

Corolla tubular, throat open, lobes triangular, scarcely opening. Nutlets bony.

O. molle, Michx. About 1 m. high, coarsely hairy. Leaves elliptical, strongly ribbed. Flowers whitish, with much exerted style. Prairie, common.

56. VERBENACEAE.

Flowers irregular. Stamens 4. Ovary 2-4-celled, splitting at maturity into as many nutlets. Leaves opposite. Ours all herbs.

VERBENA, L.

Calyx tubular. Corolla 5-lobed, salver-form. Flowers in spikes.

V. Aubletia, L. Stem low. Leaves ovate, incisely lobed. Corolla pinkish, 1-1½ cm. broad. Spikes depressed, elongating in fruit Bracts narrow. Prairie, frequent.

V. bracteosa, Michx. Procumbent. Bracts large, pinnatifid Flowers blue, small, shorter than the bracts. Prairie, common.

57. LABIATAE.

Corolla 2-lipped (sometimes nearly regular). Stamens 4 or 2. Ovary 4-lobed and separating into nutlets as in *Asperifoliae*. Herbs with square stems, opposite leaves and an aromatic odor.

Stamens 2.

Calyx tubular, lobes awl-shaped.... *Hedeoma*

Calyx strongly 2-lipped, lobes broad *Salvia*

Stamens 4.

Calyx lobes spiny toothed.

Teeth 10 *Marrubium*

Teeth 5..... *Leonurus*

Calyx lobes not spiny.

Tubular, 5-toothed..... *Glechoma*

Strongly 2-lipped.... *Scutellaria*

HEDEOMA, Pers.

Calyx gibbous, nerved. Low annuals, with small leaves.

H hispida, Pursh. Leaves narrow, entire. Corolla very small, blue. Prairie, common.

SALVIA, L.

S lanceolata, Willd 2-3 dm. high. Leaves narrow, entire or nearly so. Inflorescence apparently interrupted-spicate. Corolla blue, 1 cm. long. Prairie, common.

GLECHOMA, L.

G. hederacea, L Creeping. Leaves rounded, crenate. Corolla blue. Yards and roadsides, rare.

SCUTELLARIA, L.

Upper lip of calyx helmet-shaped.

S parvula, Michx. Low, 1-2 dm. Leaves ovate. Flowers in the axils of the upper leaves. Corolla blue, about 1 cm. long. Prairie, common.

MARRUBIUM, L.

M. vulgare, L. Leaves rounded, crenate, petioled. Flowers in heads. Corolla white, small. Waste places, infrequent.

LEONURUS, L.

L. Carduaca, L Tall. Leaves cut lobed Flowers pink. Waste places, infrequent.

58. SOLANACEAE.

Corolla 5-lobed. Stamens 5, inserted on corolla tube, alternate. Ovary 2 celled, many ovuled. Herbs with alternate leaves.

SOLANUM, L.

Corolla rotate. Stamens exerted. Fruit a berry. Ours prickly stemmed

S. Carolinense, L. Stellate hairy. Leaves sinuate lobed Flowers pale blue or nearly white. Perennial, sandy ground, frequent.

S. rostratum, Dunal. Leaves deeply 1-2-pinnatifid. Flowers yellow. Berry enclosed in the prickly calyx. Annual. Common in summer and autumn.

PHYSALIS, L.

Corolla funnel form with a dark "eye," fruit a berry, enclosed in the enlarged and papery calyx. Ours perennials with yellow flowers.

P. lanceolata, Michx. 3-4 dm. high, hirsute. Leaves lanceolate, nearly entire. Dry ground, common.

P. longifolia, Nutt. Taller, glabrous. Leaves larger and often sinuate toothed. Prairie, frequent.

P. cinerascens, (Dunal). Low, villous. Leaves usually entire. Sandy soil, frequent.

P. Virginiana, Mill. Diffusely branched; viscid with glandular hairs. Leaves ovate, cordate, sinuate toothed. Sandy soil, common.

59. SCROPHULARIACEAE.

Flowers 2-lipped or oblique (nearly regular in *Veronica*). Stamens 4 or 2. Ovary 2-celled, many ovuled. Fruit a capsule. Herbs, ours with opposite leaves.

Flowers small, nearly regular, in spikes. Stamens 2. *Veronica*
Flowers 2-lipped. Stamens 4.

Yellow. *Mimulus*

Not yellow

Large, white to pink or blue. *Pentstemon*

Small, lurid within, green without. *Scrophularia*

SCROPHULARIA, L.

Corolla tube globular, lobes short, 4 upper erect, lower spreading. A scale at summit of tube represents a fifth stamen. Flowers in a terminal panicle.

S. Marilandica, L. 1 m. high or more, erect, smooth. Leaves ovate, serrate. Low woods, common.

PENTSTEMON, Soland.

Corolla tubular below, inflated above. Sterile stamen nearly as long as the others. Flowers showy in an elongated panicle. Erect perennials.

P. Cobæa, Nutt. Clammy-hairy. Leaves ovate or oblong, serrate. Corolla white or pinkish, 4-5 cm. long. Rocky hills, not uncommon.

P. grandiflorus, Nutt. Glabrous and glaucous. Upper leaves rounded and clasping, radical obovate, all entire. Flowers bluish, 4-5 cm. long. Sandy soil, not common.

MIMULUS, L.

Calyx 5-angled. Corolla tubular. Flowers axillary.

M. Jamesii, Torr. & Gray. Creeping at base. Leaves rounded, dentate. Flowers 2-3 cm. long. Ditches and springs, not common.

VERONICA, L.

Calyx 4-parted. Corolla rotate or salver-form. Capsule flat, notched at apex.

V. peregrina, L. Low annual with small, narrow leaves and white flowers in an elongated, terminal spike. Low ground, common.

60. PLANTAGINACEAE.

Sepals 4. Corolla 4-lobed, dry and papery. Stamens mostly 4, inserted on corolla tube. Leaves radical. Flowers in spikes.

PLANTAGO, L.

Ovary 2-celled, ovules few. Leaves ribbed.

P. gnaphalioides, Nutt. Leaves narrow, white with silky hairs. Spike narrow, 1-10 cm. Peduncle about 1 dm. Sterile soil, common.

P. lanceolata, L. Leaves lanceolate. Spike globose or oblong, raised on a long ($\frac{1}{2}$ m. or less) peduncle. Meadows, not common.

61. RUBIACEAE.

Calyx adherent to the ovary. Stamens as many as lobes of corolla and inserted on its tube. Leaves opposite, with stipules, or whorled.

GALIUM, L.

Corolla 4-parted. Ovary 2-celled, 2-ovuled, separating at maturity into 2 seed-like carpels. Herbs, with whorled leaves, square stems and small flowers.

G. Aparine, L. A weak, slender annual, with stems retrorsely bristly on the angles. Leaves 8 in a whorl, linear. Flowers greenish. Fruit bristly with hooked prickles.

62. CAPRIFOLIACEAE.

Differs from the preceding order in having the leaves opposite without stipules. Mostly shrubs but ours an herb.

TRIOSTEUM, L.

Calyx lobes 5, linear, persistent, corolla tubular, somewhat irregular, lobes 5. Ovary 3-celled. Fruit 3-seeded, somewhat fleshy. Leaves connate around the stem, the flowers sessile in the axils.

T. perfoliatum, T. Flowers clustered, dark red. Fruit orange. Woods, frequent.

63. CAMPANULACEAE.

Calyx adherent to ovary. Corolla 5-lobed. Stamens 5, free from corolla, and distinct. Flowers blue. Herbs with milky juice and alternate leaves.

CAMPANULA, L.

Capsule opening by 3-5 holes in the sides.

C. perfoliata, L. Leaves rounded, clasping, toothed. A low, simple-stemmed annual with axillary flowers. Open ground, common.

64. CICHORIACEAE.

Flowers in heads surrounded by one or more rows of bracts forming an involucre. Calyx adherent to ovary, lobes absent or represented by scales, bristles or teeth (the pappus) which crown the ovary. Corolla strap-shaped. Stamens 5, inserted on tube of corolla. Ovary 1-celled, 1-ovuled. Fruit an achene. Herbs with milky juice and alternate leaves.

NOTHOCALAIS, Greene.

Bracts of involucre erect in 2-3 rows. Leaves radical, linear. Scape bearing a single large head of yellow flowers. Pappus of capillary bristles.

N. cuspidata. (Pursh) Greene. Achenes beakless. Prairie, frequent.

TARAXACUM, Hall.

Differs from *Nothocalais* in having two distinct series of involucrel bracts, the outer of short scales. Leaves pinnatifid. Achenes beaked

T. Taraxacum, Karst. Outer involucre reflexed. Waste places, not common.

65. COMPOSITAE.

Differs from the previous order in having all or all except the outer row of corollas tubular and 5-lobed. The outer row of flowers are often provided with strap-shaped corollas and are then called ray flowers, the central portion of the head being called the disk. Ours all herbs. Leaves opposite or alternate.

Ray flowers none.

Leaves entire; heads dicæious.....*Antennaria*

Leaves dissected; flowers perfect.*Hymenopappus*

Rays present, but sometimes quite small.

Yellow.

Leaves alternate*Senecio*

Leaves opposite.*Dysodia*

White or nearly so.

Rays only 4-5; heads numerous in a corymb.*Achillea*

Rays numerous; heads few or single.

Perennial; head solitary; leaves pinnatifid.*Chrysanthemum*

Annual; heads few; leaves mostly entire*Erigeron*

ERIGERON, L.

Bracts narrow, equal, and in about one row. Pappus of capillary bristles.

E. ramosus, (Walt.) B. S. P. Leaves narrow, sessile, entire or the lower toothed. Heads few in a loose corymb. Stem erect, about $\frac{1}{2}$ m. Fields and prairie, common.

ANTENNARIA, Gært. n.

Bracts dry and papery, imbricated. Pappus of capillary bristles. Woolly perennials.

A. plantaginifolia, (L.) Richards. Low and spreading. Radical leaves obovate; those of the scape-like flower stems small and scale-like. Prairie, common in early spring.

HYMENOPAPPUS, L'Her.

Bracts broad and thin, the upper part somewhat colored. Pappus a row of thin scales. Leaves alternate. Heads several in a loose corymb.

H. corymbosus, Torr. and Gray Erect, about $\frac{1}{2}$ m. high, woolly but becoming glabrous. Upper part of stem leafless. Rocky bluffs, not common.

DYSODIA, Cav.

Bracts in one row, united into a cup, some loose ones at base. Pappus a row of chaffy scales, dissected into bristles. Conspicuously dotted with yellow glands giving off a strong odor.

D. papposa, (Vent.) Hitchc. A low annual with pinnately parted leaves and small heads with few, short and inconspicuous rays. Sterile ground, common late in the season.

ACHILLEA, L.

Bracts imbricated, margins scarious. Pappus none.

A. millefolium, L. Leaves alternate, 2-pinnately parted into narrow divisions. Perennial. Prairie, common.

CHRYSANTHEMUM, L.

Bracts imbricated. Receptacle broad and flat. Pappus none.

C. Leucanthemum, L. Stem erect, naked above. Fields, not common.

SENECIO, L.

Bracts equal, in one row. Pappus of capillary bristles.

S. Balsamitæ, Muhl. Erect, woolly. Leaves pinnatifid. Heads several, corymbose. Open ground, common.

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No. 1

THE
WOODY PLANTS
OF MANHATTAN
IN THEIR WINTER CONDITION

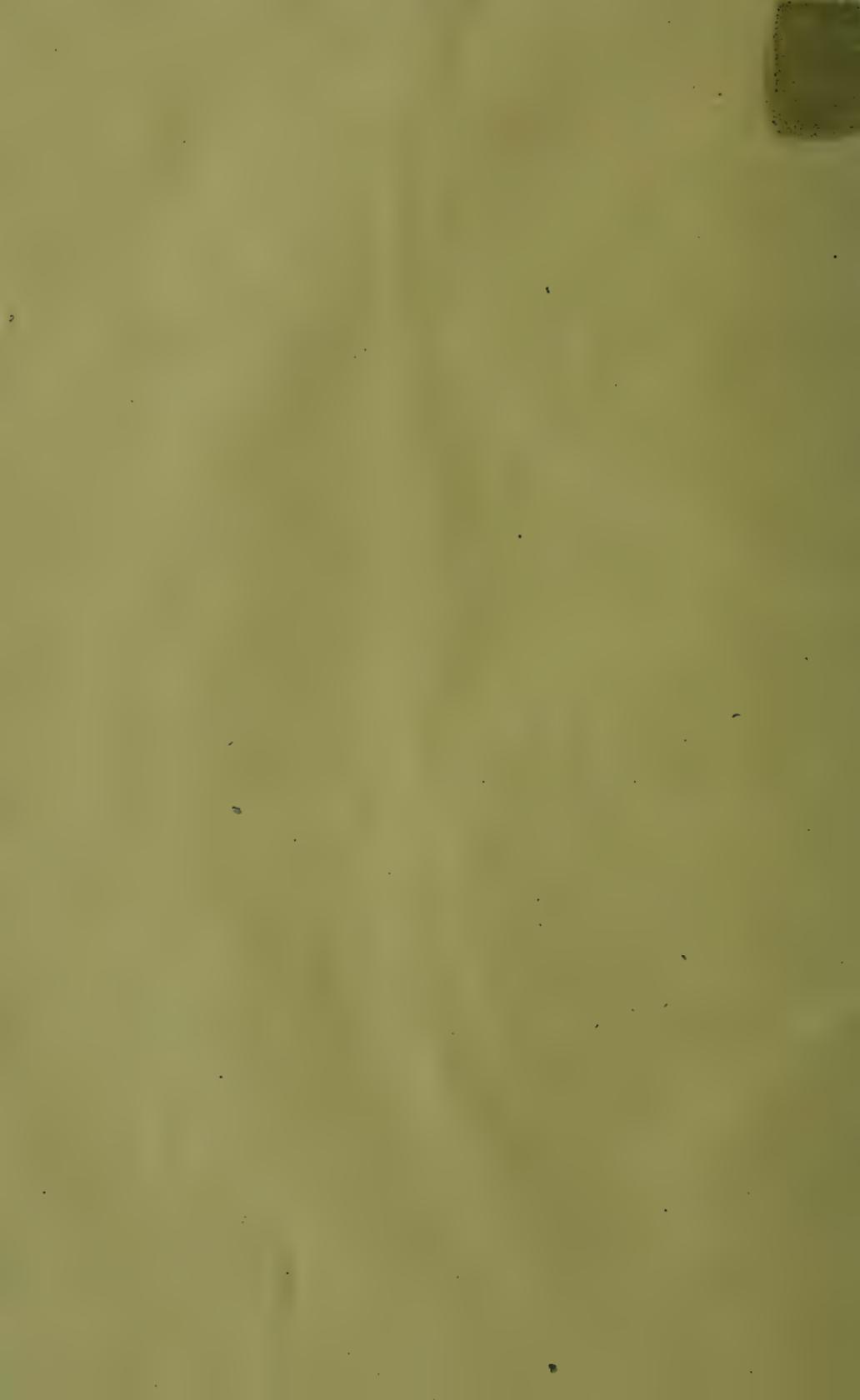


BY
A. S. HITCHCOCK

Professor of Botany, Kansas State
Agricultural College.



MANHATTAN, KANSAS,
Mercury Publishing House, Printers.
1893.



No. 4

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INTRODUCTION.

The following descriptions were written for the use of the students of the Kansas State Agricultural College, there being no work available for the determination of woody plants in their winter condition.

The nomenclature is that adopted recently by the Botanical Club of the A. A. A. S., and the sequence of species is that of Gray's Manual, sixth edition.

The characters given under a genus are not necessarily generic but are those which are common to the species under consideration. The specific descriptions apply to the species as observed in this locality and may not always hold good over a wider range. A few definitions will be necessary for a correct understanding of the descriptions. The pith though usually circular, may be rhomboidal as in wahoo, or five angled as in the oaks. It is understood to be cylindrical unless otherwise stated. Homogeneous pith is the same density throughout the twig and is the usual condition, but occasionally it consists of a series of thin transverse diaphragms a short distance apart as in the walnut, or is continuous except at the nodes where there is a woody cross-partition as in the grapes. By twig is meant the growth of the previous season, all older being called branchlets or branches. The color of the twigs of most species is subject to considerable variation and some allowance must be made in applying the description. The lenticels or small corky eruptions which roughen the epidermis are only occasionally of sufficient diagnostic value to be included in the descriptions. The shape of the leaf-scar may vary considerably in the same twig especially toward the base or apex. In procuring a twig for identification it is best to select one which has made the ordinary healthy growth, avoiding those which are stunted and also the abnormally vigorous sprouts. The description of the leaf-scar applies to those of normal shape which occur over the middle portion of the twig. Most of the terms applied to the shape are self-explanatory. Arcuate is the same width throughout, but slightly curved. The exposed ends of the fibrovascular bundles are aggregated in more or less definite groups known as bundle-scars. At the angles of the leaf-scars will be found the stipule-scars, in plants provided with stipules. When the leaf-scars are oblique, the stipule-scars, if present, are unequal, the longer being on the side toward which the bud is placed.

The arrangement (phyllotaxy) of alternate leaves on the twig is usually two-ranked, five-ranked, or eight-ranked. In the first or one-half

phyllotaxy, the third leaf-scar, starting at any point, is directly over the first; in the second, or two-fifths phyllotaxy, the sixth leaf-scar is over the first; while in three-eighths phyllotaxy, the ninth is directly over the first, that is, there are eight leaves in a cycle, which consists of a spiral passing three times around the stem. The phyllotaxy may vary from two-fifths to three-eighths in the same species or even in different twigs on the same plant.

The lateral buds are usually single but there may be two or more in the same axil, one above another, when they are superposed. The terminal bud in many cases is not present, the upper lateral bud taking its place and pushing aside a terminal scar, which may be caused by the falling off of an inflorescence, but usually (according to Foerste, Bot. Gaz. xvii. No. 6,) is due to the casting off of the green terminal portion of the twig earlier in the season.

Since it has not been necessary, except in a few cases, to discriminate between closely allied species, the descriptions do not include the finer details but are confined to what seemed sufficient to identify the species.

The list includes sixty-three native species and four that are in common cultivation and have escaped in places. The four not native are Tree of Heaven, Black Locust, Catalpa and Osage Orange.

The fruit or leaves are often obtainable and will aid in the identification, in which case the student should refer to Gray's Manual.

Thanks are due to Dr. William Trelease, Director of the Missouri Botanical Garden, and Prof. S.C. Mason, of this College, for various favors.

KEY TO GENERA.

- A. Leaf-scars more than one at each node.
- a. Buds pubescent.
- Twigs glaucous.....Acer. 15
 - Twigs gray, buds brown-felty.....Fraxinus. 33
 - Twigs very small, yellow, scales 2-3 pairs...Symphoricarpos. 31
 - Twigs red, scales one pair.....Cornus. 29
- b. Buds glabrous.
1. EvergreenJuniperus. 48
 2. Deciduous.
 - Leaf-scars circular or oval.....Catalpa. 34
 - Leaf-scars U-shaped... ..Acer. 15
 - Leaf-scars more or less semicircular.
 - Pith rhomboidal, twigs 4-angled.....Evonymus. 7
 - Pith cylindrical, twigs not angled.
 - Stipule-scars present.
 - Joining the leaf-scars.....Cephalanthus. 32
 - Not meeting.....Staphylea. 16
 - Stipule-scars absent.
 - Leaf-scars meeting.....Sambucus. 30
 - Leaf-scars not meeting... ..Æsculus. 13
- B. Leaf-scars one at each node.
- a. Plants armed with prickles or thorns.
1. Thorns representing branches.
 - Bearing leaf-scars below, thorn-like at apex.
 - Leaf-scars V-shaped.....Pyrus. 26
 - Leaf-scars oval.....Prunus. 23
 - Typical thorns, bearing no leaf-scars.
 - Simple; buds globose, single.
 - Color ashy.....Toxylon. 37
 - Color red or brown.....Cratægus. 27
 - Branched; buds superposed.....Gleditsia. 22

2. Prickles not representing branches.
 In position of stipules.
 Buds hidden by leaf-scar.....Robinia. 19
 Buds exposed, red pubescentZanthoxylum. 4
 Scattered.
 Plant provided with tendrils.....Smilax. 47
 No tendrils.
 A triple spine below leaf-scar.....Ribes. 28
 Twigs strongly glaucous or else 5-ridged. .Rubus. 24
 Twigs cylindrical and at most only slightly
 glaucous.....Rosa. 25
- b. Plants unarmed.
1. Buds naked.
 Dark brown, silky.....Asimina. 1
 Pubescence buff or gray.
 Bundle-scar one.....Ceanothus. 9
 Bundle-scars several.....Rhus. 17
2. Buds scaly.
- *Vines.
 Provided with tendrils.
 Woody partitions at nodes.....Vitis. 10
 No partitions at nodes.
 Aerial rootlets on old parts; tendrils irregu-
 larly branching.....Ampelopsis. 12
 No aerial rootlets; tendrils forkedCissus. 11
 No tendrils.
 Leaf-scars semicircular.....Celastrus. 6
 Leaf-scars circular.....Menispermum. 2
- **Not vines.
 †Leaf-scars two-ranked.
 Buds glabrous.
 Superposed.....Cercis. 20
 Single.
 Scales two or three.....Tilia. 3
 Scales several.
 Twigs brown.....Ulmus. 35
 Twigs light colored.....Morus. 38
 Buds pubescent.
 Pith diaphragmed.....Celtis. 36
 Pith homogeneous.
 Buds dark brown, silky.....Ulmus. 35
 Buds light brown, sparingly pubescent.
 Conical, pointed.....Ostrya. 43
 Flattened, rounded.....Corylus. 42
- ††Leaf-scars more than two-ranked.
 Pith 5-angled.
 Upper buds clustered at apex of twig....Quercus. 44

Buds not clustered.	
Scales gummy; stipule-scars present.	
.....	Populus. 46
Scales not gummy; no stipule-scars.	
.....	Hicoria. 41
Pith cylindrical.	
§Twigs pubescent, at least at apex.	
Pith diaphragmed.....	Juglans. 40
Pith homogeneous.	
Brown.....	Ailanthus. 5
White.	
Leaf-scars V-shaped.....	Pyrus. 26
Leaf-scars heart-shaped....	Sapindus. 14
Leaf-scars small, semi-oval.	
Scales obscure, cottony-villous.	
.....	Ceanothus. 9
Scales apparent, glabrescent.	
.....	Amorpha. 18
§§Twigs glabrous.	
¶Stipule-scars present.	
Extending around twig.....	Platanus. 39
Not extending around twig.	
Buds superposed.	
Leaf-scars semi-oval.....	Amorpha. 18
Leaf-scars U-shaped.....	Gleditsia. 22
Buds single.	
Scale one.....	Salix. 45
Scales several.	
Bundle-scar 1; twigs gray..	Rhamnus. 8
Bundle-scars 3; twigs dark.	
Leaf-scars V-shaped.....	Pyrus. 26
Leaf-scars oval.....	Prunus. 23
¶¶Stipule-scars absent.	
Terminal bud absent.....	Gymnocladus. 21
Terminal bud present.....	Hicoria. 41

DESCRIPTIVE LIST.

1 ASIMINA, Adans. Fam. 1763.

A. TRILOBA, (L.) Dunal, Mon. Anon. 1817. *Anona triloba*, L. Spec. 1753. Papaw.

A small tree with white pith, brown twigs, glabrous, or pubescent at apex, two-ranked, rather broadly U-shaped leaf-scars and five bundle scars. The dark brown, silky buds are naked, the compressed terminal one being about 1 cm. long with conduplicate leaves, while the lateral leaf-buds are appressed and only about 4 mm. long, and the flower-buds globose and diverging. Usually occurs in groves in rich lowland soil.

2 MENISPERMUM, Tourn. Act. Acad. Paris, 1705; L. Spec. 1753.

M. CANADENSE, L. Spec. 1753. Moonseed.

A greenish brown, glabrous, twining vine with white pith, circular, concave leaf-scars, and about five bundle-scars. The uppermost of the two to four low, rounded, villous, superposed buds is largest and placed above the leaf-scar, the others being hidden. The bud scales are not easily distinguished. Twines opposite to the hands of a watch. Common.

3 TILIA, Tourn. Inst. 1700; L. Spec. 1753.

T. AMERICANA, L. Spec. 1753. Basswood.

A medium sized tree with smooth gray bark, white pith, drab, red or light brown, glabrous twigs, two-ranked, semi-oval, oblique leaf-scars with three to several bundle-scars, unequal stipule-scars, and no terminal buds. The ovoid lateral buds have two or rarely three scales which are glabrous or sometimes slightly pubescent at apex. Along moist bluffs. Not common.

4 ZANTHOXYLUM, L. Gen. 1737; Spec. 1753.

Z. AMERICANUM, Mill. Diet. 1768. Prickly Ash.

A shrub, four to eight feet high, with white pith, pubescent, dark brown or dark gray twigs, armed with prickles, or rarely unarmed. The short, stout, flattened prickles are in the position of stipules or occasionally scattered. The five-ranked leaf-scars are triangular heart-shaped, containing three separate or more or less coalescing bundle-scars. The buds are low and densely reddish, felty-pubescent, with obscure scales. Not common.

5 AILANTHUS, Desf. Act. Acad. Paris, 1786.

A. GLANDULOSA, Desf. l. c.

Tree of Heaven.

A tree cultivated for shade and escaped in places. Pith large, chocolate-brown, twigs very large, light brown, pubescent and glaucous; large leaf-scars five-ranked, from V-shaped to triangular heart-shaped; bundle-scars numerous, frequently aggregated in about five areas; buds single, low, scarcely raised above the epidermis; scales about two, rounded and pubescent; terminal buds none. Native of China.

6 CELASTRUS, L. Gen. 1737; Spec. 1753.

C. SCANDENS, L. Spec. 1753.

Bitter-sweet.

A twining vine with white pith, smooth light gray twigs, eight-ranked, semicircular leaf-scars, with bundle-scars aggregated in a central mass. The almost horizontally diverging buds are 1 to 2 mm. long, with the two outer, keeled, brownish scales enclosing several smaller ones. Scarlet fruit persistent. Common.

7 EVONYMUS, Tourn. Inst. 1700; L. Spec. 1753.

E. ATROPURPUREUS, Jacq. Hort. Vind. 1772.

Wahoo.

A rather tall shrub with whitish, rhomboidal pith, smooth, green, four-angled twigs and white, semicircular, opposite leaf-scars with one bundle-scar. Terminal bud with two or three pairs of glabrous scales; lateral very small and appressed with one pair of scales. Fruit persistent. Not common.

8 RHAMNUS, Tourn. Inst. 1700; L. Spec. 1753.

R. LANŒOLATA, Pursh, Fl. 1814.

Buckthorn.

A shrub with white pith, glabrous, gray twigs, small oval or arcuate, four-ranked leaf-scars, with one bundle-scar, and stipule-scars just above the angles of the leaf-scar. Buds pointed, appressed, about 3 mm. long, with several brown, glabrous scales. The phyllotaxy can be compared to that of decussate leaves in which one leaf of each pair is some distance above the other. Rare.

9 CEANOTHUS, L. Act. Soc. Ups. 1741; Spec. 1753.

C. OVATUS, Desf. Arb. ii, 1809.

Red-root.

A low shrub with pubescent, gray or red-brown twigs, small, eight-ranked, semi-oval leaf-scars, one horizontal bundle-scar, and frequently persistent awl-shaped stipules. The scales of the globose, densely cottony-villous buds can not be easily distinguished. Common in upland woods and rocky hills.

10 VITIS, Tourn. Inst. 1700; L. Spec. 1753.

Woody vines climbing by forked tendrils placed opposite the leaf scars. Twigs brown and striate, the bark on the older portions becoming shreddy. Leaf scars semicircular to crescent-shaped, the surface irregular, and the bundle-scars obscure. Buds obtuse, the two or three smooth brown scales frequently exposing the densely pubescent young leaves.

The pith is homogeneous, except at the nodes, where there is a woody cross partition.

Twigs cylindrical, glabrous.

Partition $\frac{1}{2}$ to 1 mm. wide..... *V. riparia*.

Partition about $1\frac{1}{2}$ mm. wide *V. cordifolia*.

Twigs angled, cottony..... *V. cinerea*.

V. CINEREA, (Engelm.) Engelm. Bushberg Cat. 1883, *V. aestivalis*, var. *cinerea*, Engelm. in Gray, Man. Ed. 5, 1868. Downy Grape. Common along the Blue and lowlands of the Kansas rivers.

V. CORDIFOLIA, Michx. Fl. 1803. Frost Grape. Rare along Kansas river from Manhattan to St. George.

V. RIPARIA, Michx. Fl. 1803. Summer Grape. Common.

11 *CISSUS*, L. Fl. Zeyl. 1747; Spec. 1753.

C. AMPELOPSIS, Pers. Syn. i, 1805. Cissus.

A vine climbing by once or twice forked tendrils, placed opposite the leaf-scars, with white pith becoming diaphragmed in the older canes, no partitions at the nodes, light gray-brown, glabrous, somewhat angled twigs, irregularly circular, two-ranked, raised leaf-scars and low buds, surrounded by the ruptured epidermis, with one scale almost enclosing the bud. Frequent.

12 *AMPELOPSIS*, Michx. Fl. 1803.

A. QUINQUEFOLIA, Michx. l. c. Virginia Creeper.

A vine climbing by irregularly branching tendrils opposite the leaf-scars and also aerial rootlets on the older parts. Twigs brownish gray to light buff, rather sparsely hirsute or glabrescent, leaf-scars cylindrical, concave, two-ranked, with several bundle-scars in an irregular circle; stipule-scars conspicuous, curved downward; buds low and rounded, with few glabrous or slightly rusty scales. Common.

13 *ÆSCULUS*, L. Syst. 1740; Spec. 1753.

Æ. ARGUTA, Buckley, Proc. Am. Acad. 1860. Buckeye.

A shrub or low tree with white pith, which quickly cracks leaving radiating cavities; large buff or reddish brown, glabrous or minutely pubescent twigs; large heart-shaped, opposite leaf-scars, with three areas of bundle-scars; and large lanceolate, acute terminal buds, with numerous, acute, striate, often glaucous scales. The terminal bud is sometimes absent, when the upper pair of lateral buds are much larger than usual. Frequent.

14 *SAPINDUS*, Tourn. Inst. 1700; L. Spec. 1753.

S. MARGINATUS, Willd. Enum 1809 Soap-berry.

A small tree with white pith, light gray twigs, glabrescent below, pubescent above, and frequently ridged; five-ranked, heart-shaped leaf-

scars, the raised borders of which form at the lower angles small protuberances; bundle-scars in three areas; terminal buds none; lateral buds two or three superposed, contiguous (or single). low, densely pubescent. Rare, on dry hills.

15 ACER, Tourn. Inst. 1700; L. Spec. 1753.

A. SACCHARINUM, L. Spec. 1753. Soft Maple.

A large tree, with reddish or yellowish-brown, glabrous twigs, V-shaped, opposite leaf-scars not quite meeting, but joined by a line, and three bundle-scars. Terminal buds with two or three pairs, the appressed lateral with one or two pairs of smooth, ovate, obtuse scales. Common along the Blue, and the Kansas river below the mouth of the Blue.

A. NEGUNDO, L. Spec. 1753. Box Elder.

A small or medium tree with yellow-green or dark red-brown, glabrous and glaucous twigs, above the nodes of which is an impression, marking the position of the bases of the petiole during the previous season. The leaf-scars are narrow, V-shaped, opposite, the lateral angles meeting and extending upwards into a free appendage. Bundle-scars are three, or the lateral double. Buds pubescent, gray, the scales about two pairs, ovate, obtuse. Frequent in lowland woods.

16 STAPHYLEA, L. Gen. 1737; Spec. 1753.

S. TRIFOLIA, L. Spec. 1753. Bladder-nut.

A shrub with brownish gray or mottled yellow, glabrous twigs, white-streaked branches and trunks, semicircular or crescent, opposite leaf-scars, with about three bundle-scars, and stipule-scars at the angles but not meeting. Terminal bud absent; lateral buds with two pairs of glabrous scales. Infrequent along bluffs.

17 RHUS, L. Gen. 1737; Spec. 1753.

Twigs glabrous. *R. glabra.*

Twigs pubescent.

Buds hidden by leaf-scar. *R. Canadensis.*

Buds not hidden. *R. radicans.*

R. GLABRA, L. Spec. 1753. Smooth Sumac.

A shrub with large yellow-brown pith, large, reddish, glabrous and glaucous twigs, compressed toward the apex by ridges decurrent from the leaf-scars, which are five-ranked, narrow, horse-shoe shaped and nearly surrounding the bud. Bundle-scars numerous. Terminal buds none; lateral low, naked and densely brown-woolly. Common on dry hills, thickets, etc.

R. RADICANS, L. Spec. 1753. Poison Ivy. Poison Oak.

An erect shrub or a vine climbing by aerial rootlets. Pith white; twigs light brown, striate, minutely pubescent; leaf-scars two-ranked, heart, crescent or V-shaped, with raised border; bundle-scars five or six;

buds naked, rusty pubescent. Very common in woods, along fences, and stone walls.

R. CANADENSIS, Marsh Arb. 1785.

Canada Sumac.

A small shrub with white pith, brown twigs finely pubescent above, glabrescent below, five or eight-ranked, circular leaf-scars raised on a broad base, with several scattered bundle-scars. Pubescent buds naked, entirely hidden by the over-arching leaf-scar. The next year's catkins conspicuous. Infrequent on rocky hills.

18 AMORPHIA, L. Gen. 1737; Spec. 1753.

Twigs pubescent.....*A. canescens*.

Twigs glabrous.....*A. fruticosa*.

A. CANESCENS, Nutt. in Fraser's Cat. 1813.

Lead plant.

A low shrub one or two feet high or occasionally as much as four feet. Twigs light brown or ashy, glabrescent below, pubescent above. The small leaf-scars eight-ranked, with three bundle-scars usually coalescent, and minute or obsolete stipule-scars. Buds single, flattened and closely appressed. Just above the bud there is a protuberance of the bark. Scales about four, brown, glabrescent. Common on prairie and in upland woods.

A. FRUTICOSA, L. Spec. 1753.

False Indigo.

A shrub with gray, glabrous, sulcate twigs which die back at the summit, semi-oval, five-ranked leaf-scars, three closely aggregated bundle-scars, small stipules, usually persistent at the angles of the leaf-scars. Buds two superposed, the upper closely appressed; scales four or five, dark-brown, glabrous. Common in moist places.

19 ROBINIA, L. Gen. 1737; Spec. 1753.

R. PSEUDO-ACACIA, L. Spec. 1753.

Black Locust.

Twigs light brown, glabrous, somewhat ridged. Leaf-scars triangular three-lobed, raised in the centre; bundle-scars three; stipular spines present or obsolete. Buds entirely hidden by leaf-scars, the cavity beneath lined with dense ferruginous pubescence. Introduced as a shade tree and escaped in places.

20 CERCIS, L. Gen. 1737; Spec. 1753.

C. CANADENSIS, L. Spec. 1753.

Red bud.

A small tree with twisted and scaly bark: dark red-brown, glabrous, shining, slightly ridged twigs, two-ranked, triangular three-lobed leaf-scars, three bundle-scars and stipule-scars or persistent stipules adjacent above the leaf-scar. Terminal buds non-; lateral small, flattened, appressed, two or three superposed. Flower buds larger, oval, spreading. Scales two or three. Common.

21 GYMNOCLADUS, Lam. Dict. i, 1783.

G. DIOICA, (L.) Koch, Dend. 1869-73. *Guilandina dioica*, L. Spec. 1753. *Gymnocladus Canadensis*, Lam. l. c.

Kentucky Coffee Tree.

A medium tree with reticulately roughened bark, chocolate pith, large, light drab twigs, glabrous, but roughened by numerous prominent lenticels. The large, V-shaped leaf-scars, five-ranked, with three or five bundle-scars, and obsolete stipule-scars. Terminal bud none; lateral two or three superposed, the upper a short distance above the others, all dark pubescent, low and circular, surrounded by an incurved rim of the bark. Infrequent in lowland woods.

22 GLEDITSIA, L. Gen. Ed. 2, 1742; Spec. 1753. *Gleditsia*, Scop. 1777.

G. TRIACANTHOS, L. Spec. 1753. Honey-Locust.

A large tree with close dark bark, green or light gray, glabrous, sulcate twigs flattened at the nodes, five-ranked, horse-shoe shaped, usually somewhat three-lobed, prominent leaf-scars, three bundle-scars and minute or obsolete stipule-scars. Terminal buds none; lateral several superposed, the lower minute and seen only in longitudinal sections through node, the uppermost low and rounded. A short distance above the buds there is a smooth red or brown more or less branched thorn, the branches in the axils of minute scales. Much branched thorns usually occur in fascicles on the trunk or not infrequently the tree is entirely unarmed. The branchlets are often nodulose from the development of very short rounded twigs which bore fascicled leaves. Common in lowland woods.

23 PRUNUS, Tourn. Inst. 1700; L. Spec. 1753.

Shrubs or small trees with glabrous twigs, five-ranked leaf-scars, three bundle-scars and small stipule scars

Twigs and buds dark steel-gray, dull.....*P. Virginiana*.

Twigs and buds red brown, shining.

These medium.....*P. Americana*.

Small.....*P. angustifolia*.

P. AMERICANA, Marsh. Arb. 1785. Wild Plum.

The branches usually bear stunted thorn-like twigs or branchlets which are provided with leaf-scars. These semi-oval or arcuate. Terminal buds none; lateral appressed, acute, single or with two additional, collateral, diverging flower buds. Scales several, ovate, obtuse. Infrequent in thickets, along fences, etc.

P. ANGUSTIFOLIA, Marsh. Arb. 1785. *P. Chicasa*, Michx. Fl. 1803.

Chicasaw Plum.

Differs from *P. Americana* in having more slender twigs, smaller triangular-pointed buds with scales glabrous or somewhat pubescent. A shrub common on sand hills south of Manhattan.

P. VIRGINIANA, L. Spec. 1753.

Choke-Cherry.

Twigs rather large; leaf-scars more or less triangular, comparatively small, sometimes with only one bundle-scar. Buds pointed; scales five or six, glabrous, obtuse. A shrub or small tree rare in thickets.

24 *RUBUS*, Tourn. Inst. 1700; L. Spec. 1753.

Declining suffruticose plants, with biennial or short lived perennial canes, armed with recurved prickles, five-ranked leaf-scars and three bundle-scars.

Twigs glaucous, cylindrical.....*R. occidentalis*.

Twigs not glaucous, five-ridged.....*R. villosus*.

R. OCCIDENTALIS, L. Spec. 1753.

Black Raspberry.

Pith yellow, cylindrical; twigs red-brown; leaf-scars crescent or semicircular, considerably raised, the leaf frequently breaking away irregularly, leaving a long stump without a distinct scar. Buds oblong with several acutish scales, more or less pubescent at apex. Common in upland woods, along fences, etc.

R. VILLOSUS, Ait. Hort. Kew. 1789.

Blackberry.

Pith greenish, five-rayed; twigs purple, glabrous; prickles from a flattened base, sometimes straight; leaf-scars V-shaped, base of petiole often persistent; buds conical, strongly divergent, single or two or three superposed, scales few, somewhat pubescent. Infrequent.

25 *ROSA*, Tourn. Inst. 1700; L. Spec. 1753.

Prickly shrubs with white pith, V-shaped leaf-scars and three bundle scars.

Twigs green; climbing.....*R. setigera*.

Twigs red; a low shrub.....*R. Arkansana*.

R. SETIGERA, Michx. Fl. 1803.

Climbing Rose.

Twigs green; prickles flattened, recurved above an oval, white, well defined base; buds strongly divergent, oblong, obtuse, pink, scales two or three. Rare.

R. ARKANSANA, Porter, Fl. Colorado, 1874.

Wild Rose.

A low shrub, usually not more than two feet high, with slightly glaucous twigs, armed with straight prickles from an elliptical base; leaf-scars very narrow, nearly half encircling the stem. Bud about 2 mm. above the leaf-scar, with three or four red or black scales, pubescent at tip. Common on prairie and open woods.

26 *PYRUS*, Tourn. Inst. 1700; Spec. 1753.

P. CORONARIA, L. Spec. 1753.

Wild Crab-apple.

A small tree with red, glabrous twigs or in vigorous sprouts pubescent at apex, five-ranked, very narrow, open V-shaped leaf-scars, three bundle-scars and obsolete stipule-scars. Buds flattened, appressed, acutish;

scales several, glabrous but disclosing some pubescence at summit of bud. Along bluffs of Kansas river below Manhattan. *P. Ioensis*, Bailey, of eastern Kansas, is easily distinguished by its densely pubescent twigs.

27 CRATÆGUS, Tourn. Inst. 1700; L. Spec. 1753.

C. COCCINEA, L. Spec. 1753.

Scarlet Haw.

A small tree with smooth and shining, dark red twigs, armed with slender, sharp pointed, slightly curved axillary thorns, one to two inches long and same color as twig. The base of the thorn is enlarged and bears a leaf-scar with bud on one side and a few fainter leaf-scars above. The arcuate or semi-oval leaf-scars are five-ranked with three bundle scars. Buds globose; scales several, rounded, glabrous. Rare in upland woods.

Var. MOLLIS, Torr & Gray, Fl. i, 1840.

Distinguished by the twigs being a duller brown and twigs and buds being usually sparsely villous, and by the buds being larger and the scales more open and spreading. Rare.

28 RIBES, L. Gen. 1737; Spec. 1753.

R. GRACILE, Michx. Fl. 1803.

Wild Gooseberry.

A declining shrub with light-brown, glabrous, sulcate twigs, armed with brown triple spines below the leaf-scars, and on at least part of the old wood with scattered prickles. Leaf-scars five-ranked, narrow, U-shaped, almost hidden by the spines. Bundle-scars three. Buds conical, brownish, with numerous ovate scales, keeled at apex. Scales persistent at base of twig. Frequent in lowland woods.

29 CORNUS, Tourn. Inst. 1700; L. Spec. 1753.

Shrubs with hexagonal pith, red, pubescent twigs, crescent-shaped, opposite leaf-scars, with three bundle-scars. Terminal buds compressed, pointed; lateral, smaller, closely appressed. Scales two.

Branchlets bright red; pubescence soft.....*C. sericea*.

Branchlets gray; pubescence appressed....*C. asperifolia*.

C. SERICEA, L. Mant. ii, 1771.

Downy Dogwood.

Twigs and branchlets dark red, the former softly cinereous-pubescent, which hides the color. A small shrub three or four feet high, often with elongated stoloniferous branches. Infrequent in moist, rocky places.

C. ASPERIFOLIA, Michx. Fl. 1803.

Gray Dogwood.

Twigs pale, dull red, the pubescence appressed and not hiding color of twig, the branchlets becoming gray-brown and finally gray. A shrub or sometimes almost a tree, very common in woods, thickets and along fences. This species is best distinguished from the previous by the color of the second and third year wood.

30 SAMBUCUS, Tourn. Inst. 1700; L. Spec. 1753.

S. CANADENSIS, L. Spec. 1753.

Elderberry.

A shrub with large pith, light gray, glabrous, slightly angled twigs, large, triangular heart-shaped, opposite leaf-scars meeting around the stem and five bundle-scars. Terminal portion of twig dies back; lateral buds usually two, superposed, or if more, clustered; scales two or three pairs, glabrous, abruptly pointed. Not common.

31 SYMPHORICARPOS, Dill. Hort. Elth. 1732; Adans. Fam. 1763.

Symphoricarpus, HBK. Nov. Gen. iii, 1818.

S. VULGARIS, Michx. Fl. 1803.

Buck-bush.

A low shrub with extensive stolons, very slender, light brown, pubescent twigs, very small, triangular or shield-shaped, opposite leaf-scars connected by a ridge, and one bundle-scar. Frequently the base of the petiole persists as a withered stump without leaving a distinct scar. Buds very small, usually three collateral; scales two or three pairs, pubescent. Berries persistent. Common on prairie and upland woods.

32 CEPHALANTHUS, L. Gen. 1737; Spec. 1753.

C. OCCIDENTALIS, L. Spec. 1753.

Button-bush.

A shrub with green or brown twigs, semicircular, opposite or whorled leaf-scars, central semicircular bundle-scars, stipule-scars or persistent stipules encircling the stem and very small, low buds, single or two superposed. Frequent in wet places.

33 FRAXINUS, Tourn. Inst. 1700; L. Spec. 1753.

F. VIRIDIS, Michx. f. Hist. Arb. Am. iii, 1813.

Green Ash.

A small or medium tree with smooth, gray twigs, flattened at the nodes, semicircular or shield-shaped, opposite leaf-scars and central semicircular bundle-scars. Terminal buds obtuse, with two pairs of dark brown, felty pubescent scales; lateral single or two superposed. Frequent in lowland woods.

Var. PUBESCENS, Hitchcock, Cat. Ames, 1891.

Distinguished by its pubescent twigs. Rocky bluffs and thickets.

34 CATALPA, Scop. Introd. 1777.

C. SPECIOSA, Warder in Engelm. in Bot. Gaz. v. 1880.

Catalpa.

A small tree, with smooth, gray twigs, opposite or whorled, circular or oval leaf scars with a concentric row of bundle-scars, and low buds with several, short, loose scales. Cultivated and escaped in places.

35 ULMUS, Tourn. Inst. 1700; L. Spec. 1753.

Large trees with two ranked, oval, oblique leaf-scars, and unequal stipule-scars.

Twigs gray; buds densely pubescent. *U. fulva*.Twigs brown; buds glabrous *U. Americana*.

U. FULVA, Michx. Fl. 1803.

Red Elm.

Twigs scabrous or hirsutely pubescent, buds ovate, 5 to 6 mm. long, dark brown, divergent, scales two-ranked, four to six pairs; flower buds swelling considerably. Common in lowland woods.

U. AMERICANA, L. Spec. 1753.

White Elm.

Twigs slender, glabrous, softly pubescent or even somewhat scabrous but not hispid; buds 3 to 4 mm. long, the lateral appressed, pointed; scales three or four pairs. Common.

36 CELTIS, Tourn. Inst. 1700; L. Spec. 1753.

C. OCCIDENTALIS, L. Spec. 1753.

Hackberry.

A small or medium tree with light, corky-ridged bark, white pith diaphragmed in the region of the nodes, dark gray-brown, glabrous or sparsely villous twigs, two-ranked, semi-oval or obtusely triangular, oblique leaf-scars, three bundle-scars and rather obscure stipule-scars. Terminal buds none; lateral flattened, appressed, pointed; scales about one pair, somewhat villous. Frequent in lowland woods.

37 IOXYLON, Raf. Am. Monthly Mag. 1817. *Machura*, Nutt. Gen. 1818.

I. POMIFERUM, Rafin. l. c. *Machura aurantiaca*, Nutt, l. c.

Osage Orange.

Twigs light yellowish-drab, glabrous, at least some of them armed with axillary thorns of the same color. Thorns simple bearing a bud at base. Leaf-scars five or eight-ranked, obtusely triangular, with a central bundle-scar. Buds low, depressed-globose. Scales few, brownish, ciliate-fringed. Introduced for hedges and escaped in places.

38 MORUS, Tourn. Inst. 1700; L. Spec. 1753.

M. RUBRA, L. Spec. 1753.

Mulberry.

A small tree with light brown or greenish-drab, glabrous twigs, two-ranked, oval, oblique, concave leaf-scars, and unequal stipule-scars. Terminal buds none; lateral appressed, pointed; scales several, two-ranked, rounded, glabrous. Infrequent in lowland woods.

39 PLATANUS, Tourn. Inst. 1700; L. Spec. 1753.

P. OCCIDENTALIS, L. Spec. 1753.

Sycamore.

A large tree with smooth or slightly pubescent, light-brown, sulcate twigs, narrow, five-ranked leaf-scars, about half encircling the twig, five prominent bundle-scars, and encircling stipule-scars. Buds conical, smooth and shining as if sticky, scale one, entirely enclosing the bud. Frequent along streams. Bark white and smooth, scaling off in patches.

40 JUGLANS, L. Gen. 1737; Spec. 1753.

J. NIGRA, L. Spec. 1753.

Black Walnut.

A large tree with diaphragmed pith, dark brown, clammy pubescent twigs; and three-lobed, five-ranked leaf-scars with three U-shaped bundle-scars. Terminal bud 10 mm. long or shorter; lateral two, superposed,

upper globose, 2 or 3 mm. long; scales downy. Common in lowland woods.

41 HICORIA, Rafin. Fl. Ludov. 1817. *Carya*, Nutt. Gen. 1818.

Bud scales two, valvate, yellow..... *H. minima*.

Bud scales several, brown..... *H. ovata*.

II. OVATA, (Mill.) Britt. Bull. Torr. Club, xv, 1888. *Juglans ovata*, Mill. Dict 1768. *Carya alba*, Nutt. l. c. 1818. Shellbark Hickory.

A large tree with rather large, dark chocolate, glabrous twigs, large, eight-ranked, circular to heart-shaped leaf-scars, three areas of bundle-scars and large terminal buds. Lateral buds single, small, obtuse, strongly divergent; terminal elliptical or lanceolate; scales acuminate, the inner pubescent above. Along the bluffs below Manhattan, on the south side of the Kansas river.

II. MINIMA, (Marsh.) Britt l. c. *Juglans alba minima*, Marsh. Arb. 1785.

Carya amara, Nutt. Gen. 1818.

Pignut Hickory.

A small tree with yellowish-gray, smooth twigs, sprinkled with waxy atoms, especially above, as are the bud scales; five-ranked, heart-shaped leaf-scars, bundle-scars aggregated in about three areas and narrow, acute, curved terminal buds with waxy-yellow scales. Lateral buds two or three superposed, the upper frequently long stalked. Common.

42 CORYLUS, Tourn. Inst. 1700; L. Spec. 1753.

C. AMERICANA, Walt. Fl. 1788.

Hazel-nut.

A shrub with light brown or yellowish-drab, pubescent or glabrescent twigs, two-ranked, crescent or oval leaf-scars, scattered bundle-scars and conspicuous stipule-scars. Buds flattened, rounded, scales several, rounded, upper pubescent. Next year's catkins conspicuous. Said to occur ten miles northeast of Manhattan (S. C. Mason.)

43 OSTRYA, Mich. Nov. Gen. 1722; Scop. Carn. ii. 1772.

O. VIRGINIANA, (Mill.) Koch, Dendr. ii. 2. 1869 73. *Carpinus Virginiana*, Mill. Dict. 1768.

Iron-wood.

A small tree with twisted bark, brown or gray, softly pubescent or glabrescent twigs, small semi-oval or arcuate, slightly oblique, two-ranked leaf-scars, three bundle-scars and unequal stipule-scars. Buds conical, pointed, divergent, 5 or 6 mm. long; scales several, pubescent. Next year's catkins usually present. Frequent in upland woods.

44 QUERCUS, Tourn. Inst. 1700; L. Spec. 1753.

Pith five-angled; twigs five-ridged from the angles of the semicircular, five-ranked leaf-scars; bundle-scars several, scattered; stipule scars small, often inconspicuous; upper lateral buds clustered at apex of twig.

Buds rounded, about as high as wide.

Glabrous..... *Q. prinoides*.

Pubescent..... *Q. macrocarpa*.

Buds pointed, about twice as high as wide.

Twigs glabrous and buds nearly so.....*Q. rubra.*

Buds pubescent.

Twigs pubescent.....*Q. nigra.*

Twigs glabrous.....*Q. tinctoria.*

Q. MACROCARPA, Michx. Hist. Chenes. 1801. Bur Oak.

A large tree with rough, light colored bark, branchlets, and often the light brown, glabrous or minutely pubescent twigs corky ridged, and frequently persistent stipules. Leaf-scars sometimes triangular-heart-shaped. Common.

Q. PRINOIDES, Willd. N. Schr. Ges. Berlin, iii, 1803; Spec. iv. 1805. *Q. Muhlenbergii*, Engelm. Trans. St. L. Acad. iii, 1877. Chinquapin Oak.

A shrub or tree with light, scaly bark, red or light brown glabrous twigs and terminal buds not more than 4 mm. long. Very common in upland woods.

Q. RUBRA, L. Spec. 1753. Red Oak.

A large tree with dark, close and quite smooth bark, red-brown or gray-brown twigs and terminal buds 5 or 6 mm. long with close scales. Frequent in upland woods.

Q. TINCTORIA, Bartram, Trav. Ed. 2, 1794. Black Oak.

A large tree with close, rough, dark bark, brown, glabrous twigs and distinctly five-sided buds about 8 mm. long. Frequent in upland wood.

Q. NIGRA, L. Spec. 1753. Black Jack.

A medium tree with close, rough, dark bark, red-brown or gray-brown, pubescent twigs and buds much as in *Q. tinctoria*. The twigs on vigorous shoots are frequently glabrescent. Common in upland woods.

45 *SALIX*, Tourn. Inst. 1700; L. Spec. 1753.

Leaf-scars five-ranked; bundle-scars three; stipule-scars present; buds appressed, pointed; scale one.

Twigs and buds soft-pubescent; leaf-scars U-shaped.

.....*S. cordata.*

Twigs and buds glabrous or appressed-pubescent; leaf scars crescent or arcuate.....*S. longifolia.*

Twigs and buds glabrous; leaf-scars U-shaped...*S. amygdaloides.*

S. AMYGDALOIDES, (Anders.) Anders Ofv. Vet. Akad. Forh. 1858. *S. nigra*, var. *amygdaloides*, Anders. Koenig. sven. Akad. Handl. vi.

Twigs light yellowish-brown; A low or tall tree common in moist places.

S. LONGIFOLIA, Muhl. in N. Schr. Ges. Nat. Fr. Berlin, iv. 1802.

Sandbar Willow.

A shrub with slender, red-brown twigs and obtuse buds not more than 4 mm. in length. Common in moist places

S. CORDATA, Muhl. l. c.

Downy Willow.

A large straggling shrub with comparatively large cinereous pubescent or glabrescent twigs and rectangular, U-shaped leaf-scars, the latter sometimes eight-ranked. Stipule-scars conspicuous, oval with one to three bundle-scars. Flower buds as much as 10 mm. long. Along rocky streamlets, not common.

46 *POPULUS*, Tourn. Inst. 1700; L. Spec. 1753.

P. MONILIFERA, Ait. Hort. Kew. 1789.

Cottonwood.

A large tree with five-angled pith, light yellowish-drab, smooth and glossy, cylindrical or on vigorous shoots, angled twigs, five-ranked, elliptical, arcuate or shield-shaped leaf-scars with three bundle-scars and narrow stipule-scars. Terminal bud large, conical, curved, with a few brownish, ovate, smooth and shining, gummy scales. The lateral flower buds are very large, as much as 2 cm long. Frequent in lowland woods.

47 *SMILAX*, Tourn. Inst. 1700; L. Spec. 1753.

S. HISPIDA, Muhl. Cat. Ed. 2, 1818.

Greenbrier.

An endogenous vine climbing by stipular tendrils. Twigs dark green, glabrous, at least the lower part armed with straight, polished, dark brown prickles. The base of the petiole with the two tendrils attached, persists after the leaf has fallen, leaving no distinct scar. Buds single, horizontally divergent, conical, two-ranked, showing but one scale. Common in low woods.

48 *JUNIPERUS*, Tourn. Inst. 1700; L. Spec. 1753.

J. VIRGINIANA, L. Spec. 1753.

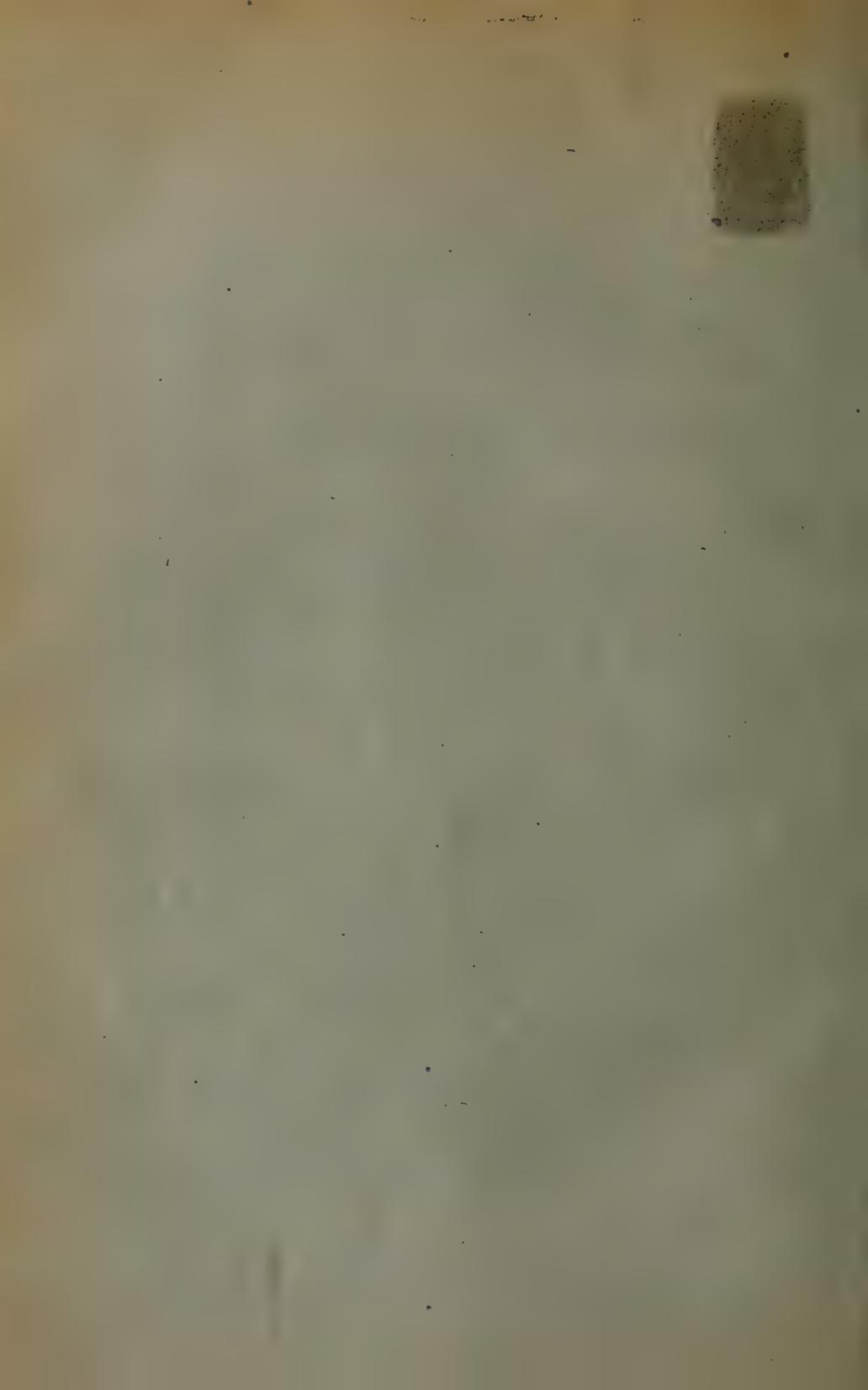
Red Cedar.

Evergreen trees with two kinds of leaves, awl-shaped and divergent in whorls of three, and opposite, appressed, scale-like, with a gland on the back. Rocky bluffs.

A KEY
TO THE
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OF
Manhattan Plants,
BASED ON FRUIT CHARACTERS.

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*Professor of Botany in the Kansas State Agricultural College,
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No 5

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PREFACE.

The original intention was to publish a key to the species of flowering plants growing in the vicinity of Manhattan. With this in view full descriptions of the fruits and seeds of each species were prepared, but it was found that the cost of publication of so much matter was placed beyond what was anticipated. The work was therefore restricted to genera. In the descriptions I have endeavored to give such characters as hold true for the orders and genera as represented in the United States, exceptions being neglected. Characters which apply to our species but not necessarily to the group in general, are placed in parentheses.

The nomenclature is that used in the check list of plants of the northeastern United States.

No attempt at classification has been made here. A good working classification is that given by Caruel in Bull. Soc. Bot. France, XXXIII, 120. I find that authors differ considerably in the terminology, especially in the definition of the capsule and its modifications.

In the descriptions I have included under the term capsule, fruits such as *Cuscuta* and *Ammannia* which burst irregularly at maturity; and have grouped under the term drupaceous the true drupe with one carpel, and those forms which have more than one carpel, yet possess the essential characters of a drupe, such as *Cornus* and *Sambucus*. There are some fruits which are with difficulty placed in any classification e. g. dry, indehiscent fruits with more than one cell or seed.

The Key is prepared for the use of beginners in botany and will be used in connection with a text book.

A. S. H.

ARTIFICIAL KEY TO ORDERS OR GENERA.*

1. Fruit fleshy	2
1. Fruit dry.....	25
2. Drupaceous, 1 to few seeded.....	3
2. Not drupaceous	12
3. An aggregation of drupelets on an oblong receptacle.....	<i>Rubus</i> 91
3. Pome-like, with 1 to 5, 1-seeded stones.....	<i>Crataegus</i> 90
(Compare <i>Rosa</i> .)	
3. Not as above	4
4. Stone 1	5
4. Stones 2 or 3.....	9
5. Stone 2-celled.....	<i>Cornus</i> 182
5. Stone 1-celled.....	6
6. Pulp waxy, scant.	7
6. Pulp juicy.....	8
7. Drupe black, trees	<i>Celtis</i> 36
7. Drupe white or red, shrubs or woody vines	<i>Rhus</i> 133
7. Drupe flattened, dark, submersed aquatic herbs.....	<i>Potamogeton</i> 3
8. Stone disc-shaped, with thickened margin.....	<i>Menispermum</i> 68
8. Stone oval or globose, somewhat 2 edged.....	<i>Prunus</i> 97
9. Stones 2	10
9. Stones 3	11
10. Fruit black, 7 mm, calyx inferior	<i>Rhamnus</i> 141
10. Fruit red, 3 to 5 mm, calyx superior.....	<i>Symphoricarpos</i> 239
11. Pulp thin and waxy, fruit orange, herbs	<i>Triosteum</i> 240
11. Pulp juicy, fruit dark purple, shrubs	<i>Sambucus</i> 238
12. Dehiscent, a fleshy capsule	13
12. Indehiscent.....	14
13. Capsules stalked, 3 to 5 on a receptacle, 2-valved... ..	<i>Xanthoxylum</i> 125
13. Capsule single, orange, 3-valved, aril scarlet.....	<i>Celastrus</i> 135
13. Capsule single, purple, 4-lobed, 4-valved, aril scarlet..	<i>Euonymus</i> 134
14. A pome.....	<i>Pyrus</i> 89
14. A fleshy receptacle enclosing bony akenes.....	<i>Rosa</i> 96
14. A fleshy receptacle bearing small akenes on the surface..	<i>Fragaria</i> 92
14. Fruit multiple, each akene enclosed in fleshy calyx	<i>Morus</i> 37
14. A 1 to many seeded berry	15
15. Many seeded, enclosed in an inflated calyx	<i>Physalis</i> 220
15. Not enclosed in inflated calyx	16

*The numbers refers to the genera or the order according as the names are in italics or small capitals.

16. Large, oblong, with several flat seeds 2 cm or more long . . . *Asimina* 60
16. Fruit and seeds smaller 17
17. Not more than 10 seeded 18
17. Seeds numerous, more than 10 23
18. Seeds 10, flat, berry dark purple surmounted by 10
styles *Phytolacca* 54
18. Seeds 1 to 6 19
19. Fruits scarlet, closely aggregated on a spadix *Arasaema* 14
19. Not as above 20
20. Berries in axillary peduncled umbels, perianth de-
ciduous *Smilax* 26
20. Berries not in umbels 21
21. Woody vines, berries in a cyme or thyrus opposite
the leaves VITACEAE 56
21. Herbs, berries in axils of leaves or terminal clusters 22
22. Berries dark purple, 1 to several in axillary clusters. *Polygonatum* 25
22. In terminal clusters, variegated red and black *Vagnera* 24
23. Plant fleshy, spiny, seeds campylotropous, flattened. CACTACEAE 63
23. Plant not fleshy 24
24. Shrubs, remains of calyx at apex of berry *Ribes*. 87
24. Herbs, calyx persistent at base of berry *Solanum* 219
25. Fruit from a compound pistil, separating at matur-
ity into its carpels, these indehiscent or more or
less 2-valved 26
25. Not as above 36
26. In dense terminal heads, calyx superior, a shrub. *Cephalanthus* 235
26. Not as above 27
27. Separating into 2 indehiscent carpels 28
27. Separating into 3 2-valved carpels *Ceanothus* 140
(Compare *Euphorbiaceae*.)
27. Separating into 4 indehiscent carpels 30
27. Carpels in a ring, separating into 5 or more indehis-
cent or 2 valved portions 32
28. Carpels forming a samara with a terminal wing, trees *Acer* 137
28. Carpels not forming samaras, herbs 29
29. In umbels or heads, carpels ribbed or winged on back,
separating from a central axis UMBELLIFERAE 67
29. In heads, calyx inferior, carpels oblong *Lippia* 200
29. Inflorescence open, calyx superior, carpels hemispherical. *Galium* 237
30. Leaves alternate, fruit deeply lobed BORRAGINACEAE 78
30. Leaves whorled, aquatic herbs *Myriophyllum* 174
30. Leaves opposite 31
31. Fruit lobed before separation, style 1, terrestrial herbs. LABIATAE 81
31. Fruit lobed, styles 2, aquatic herbs *Callitriche* 132
31. Fruit oblong, not lobed *Verbena* 199
32. Carpels numerous, indehiscent 33

32. Carpels 2-valved.....	34
33. Carpels beaked	<i>Callirrhoe</i> 148
33. Carpels beakless	<i>Malva</i> 147
34. Carpels 5	35
34. Carpels 12 to 15	<i>Abutilon</i> 146
35. Involucel none, valves beaked	<i>Sida</i> 150
35. Involucel 3-leaved, valves not beaked	<i>Malvastrum</i> 149
36. Fruit from a single pistil, separating transversely into 1-seeded joints	<i>Mcibomia</i> 98
36. Not separating transversely	37
37. Fruit a legume, 1-celled with 1 parietal placenta.	LEGUMINOSAE 41
37. Fruit not a legume	38
38. An utricle, 1-celled, 1-seeded, with papery pericarp	39
38. Not an utricle	40
39. Utricles imbricated with scarious bracts.....	AMARANTACEAE 25
39. No scarious bracts	CHENOPODIACEAE 24
40. Fruit large, 1-celled, 1-seeded, with a deeply 4-lobed embryo, surrounded by a bony nut-shell and a woody or spongy shuck	JUGLANDACEAE 15
40. Not as above	41
41. Fruit indehiscent	42
41. Fruit dehiscent by valves or bursting irregularly.....	60
42. Large (6 to 8 cm), many seeded, with a woody peri- carp	<i>Cucurbita</i> 243
42. Obpyramidal, angled, closely packed in spherical heads, but not surrounded by an involucre, peri- carp woody, 1-2 celled, 1-2 seeded.....	<i>Sparganium</i> 2
42. Three-seeded, surrounded by a scant flesh	<i>Triosteum</i> 240
42. Two-celled, 2-seeded, not in heads	43
42. One-seeded	44
43. A samara, winged all around (sometimes 1-seeded).....	<i>Ptelea</i>
43. Not winged	<i>Circaea</i> 173
44. A samara	45
44. An acorn.....	<i>Quercus</i> 34
44. Fruit in dense peduncled heads, capillary bristles at base of each, trees	<i>Platanus</i> 88
44. Fruits minute on long-bristled stalks, closely aggre- gated in long brown spikes; marsh plants.....	<i>Typha</i> 1
44. Fruits few in a membranous, reticulated, 5-lobed in- volucre, each 5-ribbed.....	<i>Allionia</i> 55
44. An akene, several or many in a head surrounded by an involucre.....	COMPOSITAE 92
44. Akenes 2, enclosed in an indurated bur-like invo- lucre	46
44. Akenes several from one flower.....	47
44. Fruit single in a flower, an akene or 1-seeded nutlet.....	53
45. Wing terminal	<i>Fraxinus</i> 186

45. Wing all around *Ulmus* 35
46. Involucre top-shaped, hooks in a circle around the upper part..... *Agrimonia* 95
46. Involucre ovoid, hooks all over..... *Xanthium* 268
47. Akene bearing a slender hook, heads globular..... *Geum* 94
47. Akene with a long villous or plumose tail (style)..... *Clematis* 64
47. Akenes more or less beaked, but not tailed..... 48
48. Sepals 3, stem endogenous **ALISMACEAE** 4
48. Sepals 5 or more, or deciduous..... 49
49. Sepals 5, with 5 alternating bractlets *Potentilla* 93
49. No bractlets..... 50
50. Sepals deciduous, akenes scarcely flattened, glabrous, strongly ribbed *Thalictrum* 67
50. Sepals persistent, not ribbed..... 51
51. Receptacle much elongated, akenes glabrous..... *Myosurus* 65
51. Receptacle convex or oblong..... 52
52. Akenes glabrous, beak oblique *Ranunculus* 66
52. Akenes pubescent or woolly, beak straight..... *Anemone* 63
53. Pericarp covered with slender, easily detached, downwardly barbed bristles *Sicyos* 242
53. Fruit drupaceous, flesh, very scant..... *Rhus* 133
53. A globose nut with woody, felty-pubescent pericarp, peduncle of cluster attached to a leaf-like bract, trees *Tilia* 145
53. In terminal clusters, globular, bearing the superior, 5-lobed, persistent calyx lobes, herbs..... *Comandra* 45
53. Pericarp thin, fruit enclosed in 5-lobed indurated calyx, deflexed on axis *Phryma* 201
53. Sessile in spikes, 4 to 8 angled or ribbed 54
53. Not as above, an akene..... 55
54. Nutlets 4-angled *Gaura* 171
54. Nutlets 8-ribbed or winged..... *Stenosiphon* 172
55. Endogenous grass or rush-like herbs 56
55. Exogenous plants 57
56. Fruit in the axis of a scale, no scale above fruit... **CYPERACEAE** 6
56. Fruit with a scale above and below, leaves 2-ranked **GRAMINEAE** 5
57. Akene enclosed in an inflated sac, in oblong catkins..... 58
57. Akene not thus enclosed 59
58. Trees, akene oblong, smooth, nerved..... *Ostrya* 33
58. Herbaceous vine, akene orbicular, besprinkled with reddish atoms..... *Humulus* 38
59. Sepal 1, folded around the 2-edged akene *Cannabis* 39
59. Sepals 3 or 4, or calyx tubular or 4-lobed above.... **URTICACEAE** 21
59. Sepals 5 or 6, akene lenticular or 3-angled..... **POLYGONACEAE** 23
- (Compare *Ambrosia* 269.)

60. Capsule dehiscing by holes in the side CAMPANULACEAE 91
60. Capsule many seeded enclosed in a spathe, aquatic
 endogens *Heteranthera* 17
60. Capsule bursting irregularly, or opening by a hole
 or irregularly at top 61
60. Capsule dehiscing regularly 65
61. Capsule 1-celled 62
61. Capsule 2 celled, 1-3 seeded, vines 63
61. Capsule 4-celled, many seeded 64
62. Globose, placenta central, calyx inferior *Utricularia* 231
62. Oblong, placentae parietal, calyx superior *Mentzelia* 157
63. Globose, smooth; parasitic, vines *Cuscuta* 192
63. Ovoid, prickly; not parasitic *Echinocystis* 241
64. Enclosed in 4-angled calyx *Ammannia* 160 and *Rotula* 161
64. Capsule 4-angled, calyx lobes 4, superior *Ludwigia* 164
65. Dehiscence by a circumscissile line 66
65. Dehiscence not circumscissile 68
66. Capsule 2-celled, few seeded *Plantago* 235
66. Capsule 1-celled, many seeded 67
67. Sepals 2, broad and enclosing the sessile capsule *Portulaca* 57
67. Sepals 5, narrow, erect, pedicels slender *Anagallis* 185
68. Capsule 1-celled, 1 2-seeded, 2-valved somewhat
 fleshy *Xanthoxylum* 126
68. Capsule 1-celled, placenta central, seeds four or more 69
68. Capsule 1 celled with parietal placentae or 2-3 celled 78
68. Capsule 4-celled, calyx superior, seeds numerous 71
68. Capsule 5 or more celled 72
69. 3-valved at summit 70
 (Compare *Solanum rostratum* 219.)
69. 5-valved at summit, in umbels *Androsace* 183
69. 6-valved at summit *Silene* 58
70. Capsule enclosed in wing-angled calyx, seeds globose,
 about 4 *Saponaria* 59
70. Not enclosed in calyx, seeds several, angled *Stemonema* 184
71. Seeds comose *Epilobium* 165
71. Seeds not comose *Onagra, etc.*, 166
72. Calyx superior, capsule 10 ribbed, tapering at base *Jussiaea* 163
72. Calyx adherent to lower part of 5 horned capsule *Penthorum* 86
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73. Capsule more than 5-celled 74
73. Capsule 5-celled 75
74. Imperfectly 10 celled, 10 seeded *Linum* 125
74. 12-15 celled, seeds about 3 in each cell *Abutilon* 146
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75. Seeds more than 1 in each cell 76

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79.	Fruit a follicle, 2 to each flower, herbs	80
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80.	Follicles long and slender	<i>Apocynum</i> 188
80.	Follicles ovate or fusiform.....	ASCLEPIADACEAE 73
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81.	Not a follicle.....	83
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82.	Follicles 4 or 5	<i>Aquilegia</i> 61
83.	Capsule 3 celled, or 1 celled with 3 parietal placentae.....	84
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83.	Capsule 1 with 4 or 5 parietal placentae.....	98
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86.	Sepals 3; endogenous herb	<i>Tradescantia</i> 16
86.	Capsule large, leathery, prickly, seeds about 2 cm	<i>Aesculus</i> 138
86.	Capsule 3 lobed, calyx absent or if present, the peri- carp pubescent	EUPHORBACEAE 47
87.	Pericarp bladderly-inflated, capsule 3-celled, 3-lobed at summit	<i>Staphylea</i> 136
87.	Pericarp not much inflated	88
88.	Sepals inferior, 6, narrow and glumaceous, endogens	<i>Juncus</i> 18
88.	Sepals if present not glumaceous.....	89
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90.	Calyx superior, capsules umbellately clustered from a 2-leaved spathe, leaves equitant and stem flat...	<i>Sisyrinchium</i> 27
90.	Calyx inferior	91
91.	Sepals 6, stem endogenous	LILIACEAE 11
91.	Sepals 5, seeds several	<i>Mollugo</i> 56
91.	Sepals 5, seeds 6, velvety, 5 mm.....	<i>Ipomoea</i> 189
91.	Sepals 5, petals 3, withering persistent, seeds 6, very small	<i>Lechea</i> 154
92.	Capsule dehiscent explosively, the valves widely spreading	VIOLACEAE 61

92.	Dehiscence not explosive, valves erect.....	93
93.	Seeds exceedingly small and numerous, calyx superior.....	<i>Gyrostachys</i> 28
93.	Seeds rather few, sepals 5, inferior.....	94
94.	Sepals about equal, leaves all opposite.....	<i>Hypericum</i> 152
94.	Sepals unequal, 2 much smaller, leaves mostly alternate.....	<i>Helianthemum</i> 153
95.	Seeds 4, calyx enlarged, 5 lobed.....	<i>Macrocalyx</i> 194
95.	Seeds more than 4.....	96
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96.	Seeds borne only along the suture.....	97
97.	Seeds crested, oblong.....	<i>Bicuculla</i> 70 and <i>Capnoides</i> 71
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99.	Placentae parietal.....	100
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100.	Placenta 1, fruit 1 carpelled.....	<i>Astragalus</i> 114
100.	Placentae 2, connected by a false partition.....	CRUCIFERAE 35
101.	Calyx superior.....	102
101.	Calyx inferior.....	103
102.	Calyx 5 cleft, 10-angled, seeds numerous.....	<i>Lobelia</i> 244
102.	Calyx 4-cleft, 4-ribbed, seeds few.....	<i>Houstonia</i> 236
103.	Seeds few (1 to 8).....	104
103.	Seeds numerous.....	105
104.	Seeds 2, crested.....	<i>Polygala</i> 127
104.	Seeds 4 to 8, lenticular, supported by curved stalks.....	ACANTHACEAE 86
104.	Seeds 2 to 6, angular, no long stalks.....	CONVOLVULACEAE 747
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105.	Not as above, calyx usually persistent, inferior.....	SCROPHULARIACEAE 83

DESCRIPTIONS OF GENERA.

MONOCOTYLEDONEÆ (Stem Endogenous).

ORDER 1. TYPHACEAE.

1. *Typha*. 1-seeded, closely aggregated on an elongated axis, very small, on long stalks which bear numerous hair-like bristles. Marsh herb.

ORDER 2. SPARGANIACEAE.

2. *Sparganium*. Nut-like, 1 or 2 celled, 1 or 2 seeded, obpyramidal, closely aggregated in globular heads with interspersed scales. Marsh herbs.

ORDER 3. NAIADACEAE.

3. *Potamogeton*. Drupaceous, 4 or less to each flower, flesh scant. Aquatic herbs (entirely submersed).

ORDER 4. ALISMACEAE.

Akenes, several from 1 flower, the 3 outer perianth divisions persistent. Marsh herbs.

4. *Alisma*. Akenes in a circle, flattened. Heads numerous, panicled.

5. *Echinodorus*. Akenes in a head, turgid, ribbed. Heads several.

6. *Lophotocarpus*. Akenes in a head, flattened, ribbed, enclosed by the sepals. Heads few.

7. *Sagittaria*. Akenes in a head, flattened. Sepals reflexed, heads few.

ORDER 5. GRAMINEAE.

Usually a caryopsis, (sometimes the seed is free from the pericarp), enclosed within 2 scales, the upper scale, next to the axis, is 2-keeled on the back, while the lower is 1-nerved or keeled in the middle of the back, or convex. The flowers or fruits are usually in 2-ranked clusters, with a pair of empty scales at the base of the cluster. Herbs with 2-ranked leaves. A large order with numerous genera and species.

ORDER 6. CYPERACEAE.

An Akene in the axis of a bract, often surrounded by bristles or a sac, but no bract between the fruit and the axis. Fruits usually gathered in spikes or heads. Herbs with 3-ranked leaves.

8. *Cyperus*. Scales 2-ranked, strongly keeled. Akene flat or triangular, naked, spikelets in spikes or heads.

9. *Eiophorum*. Scales in this and the following genera, several ranked. Akene triangular, surrounded by several long bristles.

10. *Scirpus*. Bristles around akene few and short or none.

11. *Eleocharis*. Spike single terminating the naked stem. Akene surrounded by bristles and tipped with a tubercle.

12. *Carex*. Akene enclosed in a sac.

13. *Fuirena*. Scales with an awn on the back below the tip.

ORDER 7. ARACEAE.

14. *Arasaema*. Berries crowded on a fleshy axis, usually surrounded or supported by a more or less rolled up leaf (spathe). (Berries scarlet, 1-celled, 1 to few seeded. Herbs).

ORDER 8. COMMELINACEAE.

Capsule 2-3-celled, seeds 3 or more. dehiscence loculicidal. Herbs.

15. *Commelina*. Capsule 3-celled (3-seeded, 1 cell indehiscent. Fruit enclosed in spathe.)

16. *Tradescantia*. Capsule 3-celled, all dehiscent. (Seeds about 3, elliptical, flattish, on one side a pit with radiating ridges, on the other a longitudinal ridge with transverse wrinkles on each side.)

ORDER 9. PONTEDERIACEAE.

17. *Heteranthera*. Capsule more or less completely 3-celled by the intrusion of the placentae, seeds numerous. Aquatic herbs. (Capsule enclosed in the spathe.)

ORDER 10. JUNCACEAE.

18. *Juncus*. Capsule 3-celled or 1-celled with 3 parietal placentae, loculicidally 3-valved. Divisions of perianth 6, scale-like, persistent. Seeds small and numerous. Grass-like herbs.

ORDER 11. LILIACEAE.

Fruit 3-celled, a berry or capsule. Perianth inferior. Herbs.

19. *Zygadenus*. Capsule 3-lobed. (Septicidally 3-valved at summit. Seeds about 6, angled, oblong.

20. *Allium*. Capsules in umbels on naked stems, supported by a 1 to 3-valved spathe, loculicidally dehiscent. Seeds 3-6, usually angular. Plant with the odor of onions.

21. *Nothoscordum*. As in *Allium* but no odor of onions.

22. *Erythronium*. Capsule loculicidal, solitary, nodding. Low plants with 2 leaves and a scape.

23. *Yucca*. Capsules several (large and woody, imperfectly 6-celled, by a false partition from the back of each cell, 6-valved at summit. Seeds

numerous, flat, black, closely crowded crosswise in the 6 cavities. Leaves long and sharp pointed).

24. *Vagnera*. Berries nearly globular, in clusters terminating the stem. Seeds 1-2. Perianth withering, persistent.

25. *Polygonatum*. Berries globular, from the axils of the leaves. Seeds usually not more than six.

ORDER 12. SMILACEAE.

26. *Smilax*. Berry 3-celled, globular, seeds 6 or less. Herbs or woody vines provided with a pair of tendrils near the base of the petiole.

ORDER 13. IRIDACEAE.

27. *Sisyrinchium*. Capsules 3-celled, somewhat 3-angled, loculicidally dehiscent. Flowers from a spathe. Grass-like herbs with equitant leaves and a 2-edged stem.

ORDER 14. ORCHIDACEAE.

28. *Gyrostachys*. Capsule 1-celled, 3-valved, with 3 parietal placentae and innumerable minute seeds. Herbs.

DICOTYLEDONEÆ (Stem Exogenous).

ORDER 15. JUGLANDACEAE.

Fruit 1-seeded, but more or less 2-4-celled by partitions between the lobes of the embryo. The pericarp consists of an inner bony indehiscent portion and an outer more spongy or leathery covering. Trees.

29. *Juglans*. Outer covering, spongy, indehiscent.

30. *Hicoria*. Outer covering leathery or woody, splitting from the top more or less completely into four valves.

ORDER 16. SALICACEAE.

Capsule, 1-celled, 2-4 valved; placentae parietal or basal. Seeds numerous, provided with a silky coma. Trees or shrubs.

31. *Populus*. A cup-shaped disk at base of capsule. (Capsules ovate, 10-12 mm, 2-4 valved, in long, loose racemes. Placentae parietal).

32. *Salix*. No cup-shaped disk. (Capsules tapering above into a beak, 2-valved, in close racemes. Placenta basal).

ORDER 17. BETULACEAE.

33. *Ostrya*. Akene smooth, enclosed in the inflated sac-like involucre, the latter gathered in a short catkin. Tree.

ORDER 18. FAGACEAE.

34. *Quercus*. Fruit an acorn. The 1-celled, 1-seeded nut, supported by an involucre (cup) of numerous scales. Trees or shrubs.

ORDER 19. ULMACEAE.

Fruit 1-celled, 1-seeded, indehiscent, dry or fleshy. Trees.

35. *Ulmus*. Membranaceous samara, winged all around.
 36. *Celtis*. Drupe globular, axillary, solitary or few. Calyx persistent at base. Stone globular (ridged, 5 mm).

ORDER 20. MORACEAE.

Fruit an akene. Calyx inferior.

37. *Morus*. Calyx fleshy. Fruit multiple, resembling a blackberry. Trees.
 38. *Humulus*. Akene enclosed in the sac-like calyx; sacs in an oblong head; bracts foliaceous. Herbaceous vine.
 39. *Cannabis*. Calyx of 1 sepal folded around the 2-edged akene, sharp pointed; bracts narrow. Herb.

ORDER 21. URTICACEAE.

Fruit an akene. Sepals inferior, usually persistent. Herbs.

40. *Urtica*. Sepals 4, the two outer short and narrow, the inner large and enclosing the flat, ovate akene.
 41. *Urticastrum*. Flowers in loose, terminal cymes. Sepals 4 (only 2 noticeable in fruit). Akene flat and very oblique, reflexed on the broadly-winged pedicel.
 42. *Adicea*. Sepals 3. (Three rudimentary stamens curved under the ovate flattened akene, which they discharge at maturity by their elasticity).
 43. *Boehmeria*. Akene enclosed in the calyx. (Calyx continued above the ovoid flattened akene as a thick wing. Fruit in dense spikes).
 44. *Parietaria*. Ovoid akene enclosed in the tubular, 4-lobed, nerved calyx. In axillary-bracted clusters.

ORDER 22. SANTALACEAE.

45. *Comandra*. Fruit 1-celled, 1-seeded, indehiscent, drupaceous (but dry). Calyx lobes 5, superior, persistent. Herb.

ORDER 23. POLYGONACEAE.

Akene lenticular or angled. Calyx inferior, persistent. Herbs with sheathing stipules.

46. *Rumex*. Akene 3-angled, 3 outer sepals reflexed, 3 inner erect, enclosing the akene, often considerably enlarged
 47. *Polygonum*. Akene lenticular or 3-angled, usually enclosed by the 5-6 parted calyx. Sepals all erect.

ORDER 24. CHENOPODIACEAE.

Fruit a 1-seeded utricle, usually enclosed by the inferior, persistent calyx. No scarious bracts. Herbs.

48. *Chenopodium*. Calyx 5-parted. Seed lenticular (horizontal.) Utricle indehiscent, but sometimes easily breaking away.

49. *Cyclotoma*. Calyx 5-parted, partially enclosing the horizontal fruit, the lobes furnished with a continuous, scarios, horizontal wing.

50. *Monolepis*. Sepal 1. Seed vertical, lenticular.

51. *Salsola*. Calyx 5-parted, each division with a broad, scarios wing on back. Seed horizontal, lenticular.

ORDER 25. AMARANTACEAE.

Fruit much as in *Chenopodiaceae*, but imbricated with scarios bracts. Herbs.

51a. *Amaranthus*. Bracts 3, sepals 3-5 (utricle dehiscent by a circumcissile line, 2-3 beaked. Seed horizontal).

52. *Acnida*. No calyx. Utricle circumcissily dehiscent. Seed vertical.

53. *Froelichia*. Bracts 3. Calyx tube 5-cleft, 2-winged and woolly with long hairs, enclosing the indehiscent utricle.

ORDER 26. PHYTOLACCACEAE.

54. *Phytolacca*. Berry 10-celled, 10-seeded, dark purple, the 5 sepals persistent at base and the 10 styles at summit. Seeds vertical. Herb.

ORDER 27. NYCTAGINACEAE.

55. *Allionia*. Fruit nut-like, 1-celled, 1-seeded, indehiscent, tightly enclosed in the persistent base of the calyx tube, 3 to 5 together in a 5-lobed membranous involucre, ribbed or angled. Herbs.

ORDER 28. AIZOACEAE.

56. *Mollugo*. Capsule 3-celled, loculicidally 3-valved, partitions separating from the axis, sepals 5, inferior, persistent. Seeds several. Herb.

ORDER 29. PORTULACACEAE.

57. *Portulaca*. Capsule 1-celled, circumcissily dehiscent, through the pericarp and the two enclosing sepals. Placenta basal, seeds numerous, attached by slender stalks. Herbs.

ORDER 30. CARYOPHYLLACEAE.

Capsule 1-celled (enclosed in the calyx tube). Placenta central or basal. Seeds usually many. Herbs.

58. *Silene*. Capsule sometimes 3-celled at base (6-valved at summit). Seeds several.

59. *Saponaria*. Capsule 4-valved at summit (seeds about 4).

ORDER 31. ANONACEAE.

60. *Asimina*. Fruit an oblong berry, with several large, flat, horizontal seeds (solitary or 2-3 on a receptacle, yellowish-green about 1 dm long). Small tree.

ORDER 32. RANUNCULACEAE.

Fruit a single carpel. (An akene or follicle, more than 1 to each flower.) Herbs.

61. *Aquilegia*. Follicles 5 (or 4) erect. Seeds numerous (smooth).

62. *Delphinium*. Follicles erect (3). Seeds numerous (deeply reticulated).

63. *Anemone*. Akenes numerous, flattened, pointed, but not plumose tailed, from slightly pubescent to densely woolly. (Style not much longer than the body.)

64. *Clematis*. Akenes numerous, long-tailed, margined. Vines.

65. *Myosurus*. Akenes numerous on a much elongated receptacle (flat, quadrangular, with a ridge on back extending up into a beak).

66. *Ranunculus*. Akenes numerous in a globose or oblong head (glabrous, lenticular, more or less obliquely beak-d)

67. *Thalictrum*. Akenes few, ribbed, scarcely flattened.

ORDER 33. MENISPERMACEAE.

68. *Menispermum*. Drupe globular, 1-seeded, stigma scar near base. Stone disc-shaped, thicker at the edges than in the middle. Woody vine.

ORDER 34. PAPAVERACEAE

Fruit dry, 1-celled; placentae parietal, (dehiscent; seeds numerous.) Herbs.

69. *Argemone*. Capsule prickly (4-5 valved from the top along the sutures, placentae extending upward and persistent with the stigma after the separation of the valves. Seeds globose).

70. *Bicuculla*. Placentae 2, capsule dehiscent along the sutures. Seeds crested (black, shining, slightly pitted).

71. *Capsnoïdes*. (Differs from *Bicuculla* in having the capsule more slender, 1 cm long, 1½ mm wide, and torulose).

ORDER 35. CRUCIFERAE.

Fruit a 2-carpelled capsule, 2-celled by a false partition extending between the 2 parietal placentae, dehiscing by the separation of the 2 valves from the partition. Herbs.

KEY TO OUR GENERA.

- | | |
|---|--------------------|
| 1. Capsule more or less elongated, flattened parallel to partition..... | 2 |
| 1. Capsule elongated, terete or 4-angled..... | 5 |
| 1. Capsule short, flattened contrary to partition..... | 6 |
| 2. Valves nerveless..... | 3 |
| 2. Valves 1-nerved, flat, linear, sometimes curved, seeds
(in 1 row) flat, margined or winged..... | <i>Arabis</i> . 72 |
| 3. Capsule oval-oblong, ends rounded, seeds in 2 rows,
(flat, minutely pitted)..... | <i>Draba</i> . 73 |

- 3. Capsule elongated, seeds in 1 row. 4
- 4. Capsule linear, flat, raceme elongated. *Cardamine.* 74
- 4. Capsule tapering upward, raceme short. *Dentaria.* 75
- 5. Valves nerveless, convex. Seeds small and numerous, globular (capsule oblong). *Roripa.* 76
- 5. Capsule strongly beaked, 1-seeded or empty. Seeds globose in 1 row. *Brassica.* 77
- 5. Capsule cylindrical, not strongly beaked (closely appressed to stem). *Sisymbrium.* 78
- 5. As above but capsules erect on spreading pedicels. *Descurainia.* 79
- 6. Elliptical, turgid, style prominent. *Camelina.* 80
- 6. Triangular-obcordate; seeds numerous. *Bursa.* 81
- 6. Lenticular, 2 seeded. *Lepidium.* 82
- 6. Orbicular, with a wide wing; seeds few. *Thlaspi.* 83

ORDER 36. CAPPARIDACEAE.

Capsule 1-celled with 2 parietal placentae. Seeds kidney-shaped. Herbs.

84. *Polanisia.* Capsule sessile in the calyx, (glandular pubescent, flattish. Dehiscent at apex where valves separate from placentae).

85. *Cleome* Capsule raised on a (2 cm) stipe, (glabrous, terete but somewhat knotty. Valves completely separating from placentae).

ORDER 37. CRASSULACEAE.

86. *Penthorum.* Capsules 5 (4-6) celled, the cells extending upwards into a beak. Calyx partially adnate to ovary. Dehiscence by the beaks and sides falling away from the center and partitions. Seeds small and very numerous.

ORDER 38. SAXIFRAGACEAE.

87. *Ribes.* Berry globose, 1-celled, many seeded; placentae, parietal; calyx superior. Shrubs.

ORDER 39. PLATANACEAE.

88. *Platanus.* Fruit 1-celled, 1-seeded, indehiscent, coriaceous, club-shaped, sessile in dense, peduncled heads, furnished with a copious cluster of tawny hairs at base. Trees.

ORDER 40. ROSACEAE.

Pistils 1 to many in each flower, simple. Fruit various, drupe, follicle, akene, or aggregation of drupelets. Herbs, shrubs, or trees.

89. *Pyrus* Fruit a pome, the 2-5 carpels sunk in the receptacle which completely encloses them, and more or less united with each other. Receptacle fleshy, pericarp cartilaginous (the core), each carpel 2-seeded (pome greenish, 2 cm or more). Trees.

90. *Crataegus*. Fruit a small pome (scarlet), but the pericarp or a portion of it, becoming crustaceous, forming 1 to 5, 1-seeded nutlets. Trees.

91. *Rubus*. Fruit an aggregation of numerous little drupelets on an oblong receptacle. Calyx 5 parted, persistent. Shrubs.

92. *Fragaria*. Fruit formed of the enlarged and pulpy, scarlet receptacle, with the numerous akenes upon its surface. Calyx 10-cleft, persistent. Herbs.

93. *Potentilla*. Akenes several in a head (receptacle pubescent). Calyx 10-cleft, persistent. Herbs.

94. *Geum*. Akenes numerous in a head; long style persistent (hooked at extremity). Herbs.

95. *Agrimonia*. Akenes 2, enclosed in the top-shaped "calyx tube," the upper part of which is beset with numerous hooked bristles. Herbs.

96. *Rosa*. Akenes or nutlets several, bony and hairy, enclosed by the urn-shaped fleshy receptacle. Calyx lobes 5, more or less persistent. Shrubs.

97. *Prunus*. Drupe with a large more or less 2-edged stone. (Globose or ovoid, scarlet or yellowish, or dark red.) Trees or shrubs.

ORDER 41. LEGUMINOSAE.

Fruit a legume. A single carpel with a parietal placenta. Dehiscence along both sutures, or indehiscent. Sometimes 2-celled by a false partition between the sutures or jointed by transverse partitions between the seeds. Herbs, shrubs, or trees.

KEY TO OUR GENERA.

- | | | |
|--|----------------------|-----|
| 1. Fruit separating into 1-seeded indehiscent joints,
flat, beset with minute barbed hairs. Herbs..... | <i>Meibomia</i> . | 98 |
| 1. Not separating into joints..... | | 2 |
| 2. Legume prickly..... | | 3 |
| 2. Legume unarmed..... | | 4 |
| 3. Prickles hooked, legume slightly dehiscent, oblong,
few seeded. Herbs..... | <i>Glycyrrhiza</i> . | 99 |
| 3. Prickles straight, legume 4-valved by the separation
of the sides from the two thickened margins.
Seeds several, scurfy. Prickly herbs..... | <i>Morongia</i> . | 100 |
| 4. Elongated, usually dehiscent, several seeded, not
inflated..... | | 5 |
| 4. Not elongated, indehiscent or tardily dehiscent..... | | 15 |
| 5. Large, woody, scarcely dehiscent.... | | 6 |
| 5. Smaller, not woody, dehiscent..... | | 7 |
| 6. Oblong, seeds orbicular, flattish, large (1½ to 2 cm).
surrounded by pulp. Trees..... | <i>Gymnocladus</i> . | 101 |

6	Elongated, usually twisted; seeds oblong 5x13 mm.	
	Thorny trees	<i>Gleditschia.</i> 102
7.	Coiled spirally, several seeded. Herbs.....	<i>Medicago.</i> 103
7.	Not coiled	8
8.	Ventral suture, wing margined, legume thin and flat.....	9
8.	Not winged	10
9.	Legume rounded above. Trees.....	<i>Robinia.</i> 104
9.	Legume acute at both ends. Trees.....	<i>Cercis.</i> 105
10.	Seeds separated by transverse partitions	11
10.	No transverse partitions	12
11.	Legumes in racemes, several seeded... ..	<i>Cassia.</i> 106
11.	Legumes in heads, few seeded.....	<i>Acuan.</i> 107
12.	Legume and seeds flat. Vines	13
12.	Legume terete or somewhat flattened	14
13.	Ciliate margined, 3 to 4 cm long.....	<i>Falcata.</i> 108
13.	Glabrous, margin thickened, 10 cm long.....	<i>Apios.</i> 109
14.	Seeds globular, valves glabrous, not conspicuously coiled in dehiscence.....	23
14.	Seeds oblong or angular, valves pubesent, tightly coiled in dehiscence. Vines.....	<i>Phaseolus.</i> 110
15.	Legume enclosed in the persistent calyx and corolla; in heads; small and thin, few seeded	<i>Trifolium.</i> 111
15.	Corolla deciduous	16
16.	Legume several seeded, usually inflated	17
16.	Legume 1-2-seeded	19
17.	Strongly beaked and stipitate, tardily dehiscent, seeds numerous; calyx persistent.....	<i>Baptisia.</i> 112
17.	Not conspicuously beaked or stipitate.....	18
18.	One-celled, inflated, dehiscent, seeds rattling in the pod.....	<i>Crotalaria.</i> 113
18.	Two-celled and inflated, or 1-celled and turgid, slightly or tardily dehiscent, oblong or ovoid	<i>Astragalus.</i> 114
19.	Flat, orbicular, reticulated, 1-seeded, included in the calyx.....	<i>Lespedeza.</i> 115
19.	Not as above	20
20.	In dense spikes, included in calyx, not flattened....	<i>Kuhnistera.</i> 116
20.	Terete, oblong, not included in calyx.....	21
20.	Flattened or globose, or if oblong, enclosed in calyx ..	22
21.	Canescent or glandular. Shrubs	<i>Amorpha.</i> 117
21.	Glabrous. Herbs.....	<i>Melilotus.</i> 118
22.	Calyx teeth long, persistent, very villose.....	<i>Parosela.</i> 119
22.	Calyx teeth, not villose; legume indehiscent.....	<i>Psoralea.</i> 120
23.	Five to six cm long, 1 cm wide	<i>Lathyrus.</i> 121
23.	Two to three cm long, one-half cm wide	<i>Vicia.</i> 122

ORDER 42. GERANIACEAE.

123. *Geranium*. Capsule 5-celled, 5-valved, 5-lobed, the receptacle extending up between the cells as a long 5-sided beak; cells 1-seeded. Valves dehiscent elastically upward from the base along the beak.

ORDER 43. OXALIDACEAE.

124. *Oxalis*. Capsule 5-celled, (5-sided) oblong, loculicidally dehiscent. Seeds few or numerous, forcibly pinched out during dehiscence, the valves then collapsing. Herbs.

ORDER 44. LINACEAE.

125. *Linum*. Capsule 5-carpelled, 5-celled, or 10-celled by false partitions from the back of each carpel (10-valved from the top, false partitions extending about half way to axis). Seeds flat, smooth, developing mucilage on wetting. Herbs.

ORDER 45. RUTACEAE.

126. *Xanthoxylum*. Carpels 3-5, raised on a short stalk. Pericarp thick and fleshy (red, turning brown), 2-valved, exposing the 1 or 2 globose, shining, black, crustaceous seeds. Prickly shrub.

ORDER 46. POLYGALACEAE.

127. *Polygala*. Capsule 2-celled, 2-seeded, loculicidally 2-valved. Seeds carunculate (caruncle 2 lobed or 2-winged). Herbs.

ORDER 47. EUPHORBIAEAE.

Capsule (except *croton monanthogynus*) 3-lobed, 3-celled, 3-seeded, 6-valved, valves separating from the persistent centre Herbs.

128. *Croton*. Capsule sessile in the calyx (stellate pubescent). *C. monanthogynus* has the capsule 1 or 2 celled and 1 or 2 seeded.

129. *Acalypha*. Capsules supported by a leaf-like involucre. Calyx present. Seeds caruncled.

130. *Tragia*. Calyx present. Seeds not caruncled (globose) capsule bristly.

131. *Euphorbia*. Capsule stalked in a cup-shaped involucre. Calyx none.

ORDER 48. CALLITRICHACEAE.

132. *Callitriche*. Fruit solitary and sessile, or nearly so, in the axils of the leaves, 4-lobed, compressed, 4-celled, separating at maturity into 4 indehiscent nutlets. Low marsh or aquatic herbs.

ORDER 49. ANACARDIACEAE.

133. *Rhus*. Fruit drupaceous, 1-seeded; stone surrounded by thin, waxy pulp. Sepals inferior (persistent). Shrubs.

ORDER 50. CELASTRACEAE.

(Capsule somewhat fleshy, lobed, loculicidally dehiscent. Seeds 1 or 2 in each cell, enveloped in a conspicuous scarlet aril. Shrubs.)

134. *Euonymus*. (Capsule 4-celled, purple. Upright shrub.)

135. *Celastrus*. Capsule orange, 3-celled. Woody vine.

ORDER 51. STAPHYLEACEAE.

136. *Staphylea*. Capsule 3-celled, 3-lobed, thin, much inflated (3-5 cm long), tardily dehiscent along ventral sutures at the top. Seeds few in each cell, bony. Shrub.

ORDER 52. ACERACEAE.

137. *Acer*. Fruit deeply 2-lobed, dry, the lobes separating at maturity, each portion forming a 1-seeded samara. Wing unsymmetrical, terminal and extending down the inner side. Trees.

ORDER 53. HIPPOCASTANACEAE.

138. *Aesculus*. Capsule 3-celled, loculicidally 3-valved, leathery (more or less prickly) 1-3 seeded. Seeds large (2 cm or more) with a thick, shining (brown) seedcoat and a large pale scar. Shrubs or trees.

ORDER 54. BALSAMINACEAE.

139. *Impatiens*. Capsules 5-celled, 5-valved, dehiscing violently and throwing out the few seeds in each cell. Valves coiling after dehiscence. Herbs.

ORDER 55. RHAMNACEAE.

140. *Ceanothus*. Capsules 3-lobed, 3-celled, supported by the cup-shaped disk. Carpels separating from each other and also dehiscing part way down the dorsal suture. Low shrubs.

141. *Rhamnus*. Drupe black, globose and berry-like, stones 2, ovate, flattish, a groove on back and a line along the face, cartilaginous, finally opening along the suture and letting out the smooth, hard, dark-brown seed. Tall shrub.

ORDER 56. VITACEAE.

Berry 2-celled, mostly 4-seeded. Seeds bony (with a prominent dorsal raphe and a deep groove on one side, triangular obovate. Tendril bearing woody vines).

142. *Vitis*. (Berry nearly black, edible. Leaves simple).

143. *Parthenocissus*. Berry nearly black, inedible. Leaves palmately compound.

144. *Ampelopsis*. (Berry blue. Leaves simple.)

ORDER 57. TILIACEAE.

145. *Tilia*. Nut globular, 1-celled, (1-seeded, 7 mm broad, 5-angled at base, surface felty-pubescent). In pedicelled clusters, the peduncle attached to a leaf-like bract, which is deciduous with the cluster. Trees.

ORDER 58. MALVACEAE.

Carpels 5 to many, united in a ring and separating at maturity, or forming a several-celled capsule. Pedicels jointed. Seeds kidney-shaped. Herbs.

146. *Abutilon*. Carpels several (12-16), separating from the central axis and from each other, dehiscent at apex, (pubescent, beaked, seeds about 3 in each carpel).

147. *Malva*. Carpels several, indehiscent, beakless, 1-seeded, calyx lobes 5 with a 3-leaved involucrel.

148. *Callirhoe*. Carpels as in *Malva*, but beaked on inner angle, and the beak separated by a partition (indehiscent). Involucrel 3-leaved or more.

149. *Malvastrum*. (Carpels 5, 1-seeded, kidney-shaped, softly hairy. Calyx with a 3-leaved involucrel. Seeds smooth.)

150. *Sida*. No involucrel, (carpels 5, 1-seeded, dehiscent at apex, enclosed in inflated calyx, beaked, tardily separating).

151. *Hibiscus*. Carpels united into a 5-celled, loculicidal capsule. Involucrel several leaved. (Calyx inflated, hairy, veiny. Seeds black, slightly tuberculate.)

ORDER 59. HYPERICACEAE.

152. *Hypericum*. (Capsule 1-celled, septically 3-valved, with numerous seeds on 3 parietal placentae. Sepals 5, inferior, persistent. Herbs.)

ORDER 60. CISTACEAE.

Capsule 1-celled, with (3) parietal placentae, loculicidally (3) valved. Herbs.

153. *Helianthemum*. (Capsules of the earlier flowers with valves widely spreading, 5 mm long, several seeded; of the later flowers considerably smaller, and the valves spreading only slightly, few seeded.)

154. *Lechea*. Capsule (1½ mm long) imperfectly 3-celled by the intrusion of the placentae. Seeds 2 on each placenta.

ORDER 61. VIOLACEAE.

Capsule 1-celled, loculicidally 3-valved, placentae 3, parietal, on the middle of the valves. (Capsule obtusely 3-angled, dehiscing violently, the valves becoming boat-shaped and widely spreading.) Sepals persistent, inferior. Herbs.

155. *Viola*. Sepals auricled. Seeds numerous (ovate, smooth, hard, with a round scar at base and a linear scar at apex. Capsule ½-1 cm long).

156. *Calceolaria*. Sepals not auricled. (Capsule 6 mm long, 5 mm wide, about 6-seeded. Seeds globose, slightly flattened, nearly black, 2 mm wide.)

ORDER 62. LOASACEAE

157. *Mentzelia*. Capsule inferior, 1-celled, with 3 parietal placentae,

oblong or club-shaped, pubescent with barbed hairs, breaking away at summit. Seed few or several. Herbs.

ORDER 63. CACTACEAE.

Berry inferior, 1-celled, seeds few or numerous on several parietal placentae. (Fleshy, prickly herbs with scale-like leaves.)

158. *Cactus*. Plant globose, covered with spine bearing tubercles. (Berry ovoid, scarlet; seeds few, black, pitted.)

159. *Opuntia*. Plant consisting of joints, (flat, oval. Berry oblong, pink. Seeds numerous, enclosed in a tough aril.)

ORDER 64. LYTHRACEAE.

Capsule thin and membranous, tightly enclosed in the calyx tube. Seeds numerous. Placentae axil. Herbs.

160. *Ammannia*. Calyx 4-ribbed. Capsule 2-4 celled, but at maturity the partitions break away more or less, leaving the placentae in the axis. Dehiscence an irregular bursting. (Capsules clustered in the axils of the sessile leaves.)

161. *Rotala*. Differs from *Ammannia* in having the capsule minutely and densely striate.

162. *Lythrum*. Capsule oblong, 2-celled (dehiscent along partitions at top. Calyx 10-14 ribbed, 5-7 toothed with as many short appendages in the sinuses. Almost sessile in loose racemes.)

ORDER. 65. ONAGRACEAE.

Fruit inferior, dry, dehiscent or indehiscent, 1-5 celled. Herbs.

163. *Jussiaea*. Capsule oblong (arcuate, tapering at base, 5-celled, 10-ribbed, seeds numerous in 1 row, angled). "Opening between the ribs."

164. *Ludwigia*. Capsule short, many seeded (4-angled, 4-celled, dehiscent by a hole in the top or breaking away irregularly. Calyx lobes 4, persistent).

165. *Epilobium*. Capsule linear, many-seeded, 4-celled, loculicidally 4-valved. Seeds numerous, provided with a tuft of fine, soft hair at one end.

166. *Anagra*. Capsule 4-celled, loculicidally 4 valved. Seeds numerous, naked. (Capsule in terminal spikes, 4 sided, ribbed, sessile.)

167. *Oenothera*. As above (but capsules cylindrical, axillary, sessile).

168. *Xylopleurum*. As above (but capsules shortly pedicelled, clavate-fusiform, in a loose spike with 4 narrow wings and ribbed between).

169. *Megapterium*. As above (but capsules axillary, with 4 broad wings, 3 cm wide).

170. *Meriolyx*. As above (but capsules axillary, sessile, 4-sided, usually arcuate, linear, canescent).

171. *Gaura*. Fruit indehiscent, 1 celled, 4-angled or winged (1-seeded).

172. *Stenosiphon*. Fruit as in *Gaura*, but 8-ribbed, 2 or 3 of the ribs winged, transversely wrinkled, villous.

173. *Circaea*. Fruit indehiscent, beset with hooked hairs (2-celled, 2-seeded, rounded, tapering below into the pedicel).

ORDER 66. HALORRHAGIDACEAE.

174. *Myriophyllum*. Fruit 4-celled, 4-lobed, 4-seeded, indehiscent sessile in the axils of the leaves. Aquatic herbs.

ORDER 67. UMBELLIFERAE.

Fruit 2 carpelled, dry. At maturity the 2 carpels separate from the central axis, forming 1-seeded, indehiscent akene-like bodies. Calyx superior. The back of each carpel is provided with 5 primary ribs or wings, and often with 4 intermediate or secondary ribs. Fruit in umbels or heads.

175. *Polytaenia*. Carpels much flattened dorsally, oval, 3 ribs on back fine, 2 lateral corky-thickened.

176. *Peucedanum*. As above, but lateral ribs thin-winged.

177. *Sanicula*. Carpels nearly globose, beset with hooked prickles.

178. *Osmorrhiza*. Carpels linear, attenuate downward into a tail, somewhat bristly (2-3 cm long).

179. *Cicuta*. Carpels slightly compressed laterally, ribbed (3-4 mm).

180. *Deringa*. Carpels linear, glabrous, ribbed (5-7 mm). Umbels irregular.

181. *Spermolepis*. Carpels small (1½ mm), ovate, papillose, ribbed.

ORDER 68. CORNACEAE.

182. *Cornus*. Drupe with a 2-celled, 2-seeded stone. Calyx superior. (In cymes, blue or white. Stone longitudinally ridged. Shrubs.)

ORDER 69. PRIMULACEAE.

Capsule 1-celled, placenta central, seeds several. Herbs.

183. *Androsace*. Capsule 5-valved at apex (ovoid, 4 mm.)

184. *Steironema*. Capsule 4-valved at apex (globose, 5-6 mm).

185. *Anagallis*. Capsule dehiscent by a circumscissile line about the middle.

ORDER 70. OLEACEAE.

186. *Fraxinus*. Samara symmetrically winged from apex. Trees. (Calyx inferior, minute, persistent. Wing somewhat decurrent along the sides. Samara 1-celled, 1-seeded.)

ORDER 71. GENTIANACEAE.

187. *Gentiana*. "Capsula oblong, 2-valved, 1-celled, dehiscent through the 2 ventral sutures. Seeds very numerous, borne over the whole inner surface of the capsule."

ORDER 72. APOCYNACEAE.

188. *Apocynum*. Fruit 2 long and slender follicles. Seed numerous, provided with a coma at apex. (Follicles pendent, glabrous, 10 cm.) Herbs.

ORDER 73. ASCLEPIADACEAE.

Follicles 2, (fusiform). Seeds numerous (comose). Herbs.

ORDER 74. CONVOLVULACEAE.

Capsule mostly 2-celled and 4-seeded or less, (3-celled and 6-seeded in *Ipomoea hederacea*). Twining, trailing or erect herbs.

189. *Ipomoea*. Calyx not bracteate at base. Capsule globose, 2-4-valved. (1 cm or more long.)

190. *Convolvulus*. As in *Ipomoea* but calyx with 2 large bracts at base.

191. *Evolvulus*. (Capsule 3-4 mm long, 2-4-valved. Erect herb.)

ORDER 75. CUSCUTACEAE.

192. *Cuscuta*. Parasitic, orange-colored, twining herbs. (Capsule very thin and papery, indehiscent, breaking away irregularly, 2-3 mm high)

ORDER 76. POLEMONIACEAE.

193. *Phlox*. Capsule 3-celled, loculicidally 3-valved, 3-seeded (calyx lobes long-acuminate, persistent. Capsule globular, smooth, 5 mm long). Herbs

ORDER 77. HYDROPHYLLACEAE.

194. *Macrocalyx*. Capsule 1-celled, 2-valved, with 2 much enlarged parietal placentae, 4-seeded. Calyx enlarged, 5-angled. Herbs.

ORDER 78. BORRAGINACEAE.

Fruit (in ours) deeply 4-lobed, separating into 4 indehiscent, 1-seeded nutlets. Leaves alternate. Herbs.

195. *Cynoglossum*. Nutlets armed all over the back with barbed prickles.

196. *Lappula*. Nutlets armed (along the margin with 1 row of barbed prickles.)

197. *Lithospermum*. Nutlets bony (smooth and glossy, sometimes wrinkled, acutish), often less than 4 maturing, scar basal.

198. *Onosmodium*. Nutlets much as in *Lithospermum*. (Plant bristly-hairy, $\frac{1}{2}$ to $1\frac{1}{2}$ M high. Leaves oblong. Nutlets pearly white.)

ORDER 79. VERBENACEAE.

(Fruit dry, not lobed, separating into 2-4 indehiscent, 1-seeded nutlets. Herbs with opposite leaves.)

199. *Verbena*. Fruits in terminal spikes, enclosed in the 5-toothed calyx, separating into 4 nutlets. (Nutlets oblong, 4-sided, 2 sides occupied by the scar.)

200. *Lippia*. Fruits in short, long-peduncled axillary spikes. (Calyx 2-lipped, 2-edged.)

ORDER 80. PHRYMEAE.

201. *Phryma*. Fruits in a long, loose, slender spike, almost sessile, reflexed and closely appressed to axis, enclosed in the calyx. Calyx teeth 5, the 3 upper, now outer, coriaceous and extending into spine-like projections, 2 lower triangular. Adapted for catching hairs in the 2 "boot jack" sinuses of the upper calyx teeth. Fruit 1-celled, 1-seeded, with thin pericarp. Herbs.

ORDER 81. LABIATAE.

Fruit 4-lobed, separating into 4, 1-seeded nutlets. Herbs with opposite leaves.

KEY TO OUR GENERA.

- | | |
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| 1. Nutlets rugose-reticulated | 2 |
| 1. Not reticulated..... | 3 |
| 2. In a terminal spike, leaves serrate..... | <i>Teucrium</i> . 202 |
| 2. Axillary; leaves narrow, nearly entire..... | <i>Isanthus</i> . 203 |
| 3. Fruit in terminal heads, supported by leaf-like bracts..... | 4 |
| 3. In closely approximate clusters forming a terminal spike..... | 5 |
| 3. Solitary or clustered in the axils..... | 9 |
| 4. Calyx hairy in throat, leaves ovate to lanceolate..... | <i>Monarda</i> . 204 |
| 4. Calyx naked in throat, leaves linear lanceolate..... | <i>Koellia</i> . 205 |
| 5. Calyx strongly 2-lipped..... | 6 |
| 5. Calyx about equally 5-toothed..... | 7 |
| 6. Lobes entire, spike elongated..... | <i>Salvia</i> . 206 |
| 6. Upper lip 3-toothed, lower 2-toothed, spike oblong,
with conspicuous, reniform ciliate bracts..... | <i>Prunella</i> . 207 |
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| 8. Stem smooth except angles, leaves petioled..... | <i>Stachys</i> . 210 |
| 8. Stem downy, calyx-teeth spinose..... | <i>Nepeta</i> . 211 |
| 9. Calyx strongly 2-lipped, closed; upper lip helmet-
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ORDER 82. SOLANACEAE.

Fruit 2-celled, many seeded, a capsule or berry. Calyx inferior. Herbs.

219. *Solanum*. (Berry globose, black or yellow; seeds flat. Calyx persistent at base of berry or in *S. rostratum* enlarged and prickly, enclosing the berry which becomes dry at maturity.)

220. *Physalis*. Berry globose, enclosed in the enlarged and inflated, 5-angled, papery calyx. Seeds flat.

221. *Datura*. Capsule ovoid, beset with stout prickles, 4-valved. Placentae 2 lobed, protruding from center of partition. A false partition extends from the center of each placenta, making the capsule 4-celled except near the top. Seeds flat, (kidney-shaped, pitted).

ORDER 83. SCROPHULARIACEAE.

Capsule 2-celled, many seeded (2-4-valved). Calyx inferior. Herbs.

222. *Verbascum*. Capsules in spikes or racemes, globose, septicidally dehiscent, 2-valved, valves 2-cleft, separating from partitions. Seeds numerous, wrinkled.

223. *Scrophularia*. Capsules (5-6 mm) in a terminal thyrus, septicidally dehiscent, valves beaked, a narrow portion of partition remaining at axis. (Seeds papillate in longitudinal rows.)

224. *Pentstemon*. Capsule (1-1½ cm) in a terminal thyrus, septicidally dehiscent, valves inclined to split. (Seeds very angular.)

225. *Mimulus*. Capsules (5-10 mm) axillary, enclosed in the (angular) calyx, loculicidally 2-valved, valves sometimes 2-cleft. (Seeds plump, sometimes winged, one-fifth to two-fifths mm).

226. *Conoclea*. Capsules 1 to few on capillary pedicels in the axils, (4-valved, separating from axis. Placentae large. Seeds one-fifth mm longitudinally grooved).

227. *Bacopa*. Capsules 1 to few in the axils, on thick pedicels. (Dehiscence as in *Conoclea*. Seeds two-fifths mm, striate.)

228. *Ilysanthes*. Capsules (5 mm) single in the axils, pedicels capillary.

229. *Veronica*. Capsules racemed or axillary (flattened contrary to partition, notched at apex. Dehiscence loculicidal or also septicidal. Seeds concavo-convex or ovoid). Calyx lobes 4.

230. *Gerardia*. Capsules axillary, globose (4-valved, enclosed in hemispherical calyx tube). "Seeds angulate."

ORDER 84. LENTIBULARIACEAE.

231. *Utricularia*. Capsule globose, 1-celled, many-seeded, placenta central. "bursting irregularly" (Pedicels recurved, calyx 2-lipped, persistent, inferior. Seeds oblong, ½ mm). Aquatic herbs.

ORDER 85. OROBANCHACEAE

232. *Orobanche* & *Aphyllon*. Capsule 1-celled, 2-valved. Seeds very small and

numerous. (Each valve carrying 2 parietal placentae $\frac{1}{2}$ the way from the edge. Capsule solitary on a scape about 1 dm high, enclosed more or less in the withered 5 lobed calyx. Seeds one-fifth mm, oblong, coat loose, reticulated,) chlorophyllless herbs.

ORDER 86. ACANTHACEAE.

Capsule 2-celled, loculicidally dehiscent, few seeded; valves separating elastically. Herbs. (Seeds lenticular, supported by curved stalks.)

233 *Ruellia*. (Capsules nearly sessile in axillary clusters, oblanceolate, $1\frac{1}{2}$ to 2 cm. Seeds 4 to 8, minutely hairy.)

234. *Dianthera*. (Clusters of capsules long peduncled Capsules 1 cm. Seeds 4, glabrous.)

ORDER 87. PLANTAGINACEAE.

235. *Plantago* Capsules in dense spikes, 2 celled, few-seeded, circumcissily dehiscent, partition remaining or falling away with lid. Herbs with ribbed leaves, all radical.

ORDER 88. RUBIACEAE.

Calyx superior. (Fruit dry, 2-4-celled, 1 to few seeded.) Herbs or shrubs.

236. *Cephalanthus*. Fruit (5-8 mm long) in dense globose heads, "at length splitting from base upwards into 2-4, 1-seeded portions." Shrubs.

237. *Houstonia*. Capsules in cymes, upper portion free, loculicidally dehiscent across the free portion, 2-celled (2-3 mm, 4-ribbed below. Seeds few, black, oblong, pitted) Herbs.

238. *Galium*. Fruit 2-celled (dry), splitting into 2 (globose, bristly) indehiscent, 1-seeded portions. Herbs with whorled leaves.

ORDER 89. CAPRIFOLIACEAE.

Fruit drupaceous (in ours). Calyx superior. Herbs or shrubs.

239. *Sambucus* (Fruits in broad cymes. Stones 3. Fruit dark purple, globose, 5 mm. Stones flattened, 2-edged, roughened). Shrubs.

240. *Symphoricarpos*. Fruits in axillary clusters. Stones 2. (Fruit red, 3 to 5 mm, globose. Stones plano-convex, smooth, bony.) Shrubs.

241. *Triosteum*. Fruits sessile in axillary clusters, flesh becoming dry. Stones 3. (Fruit yellow or orange, canescent, globular, 1 cm. Stones ribbed). Herbs.

ORDER 90. CUCURBITACEAE.

Calyx superior. Seeds large and flat. Climbing or trailing herbaceous vines.

242. *Echinocystis*. Capsule inflated, weakly prickly, 2-celled, 4-seeded, bursting at apex, inner portion fibrous-reticulated. (the 2 seeds in each cell partially separated by a partition)

243. *Sicyos*. Fruit ovate, flat, indehiscent, 1-celled, 1-seeded, prickly with slender, easily detached, downwardly barbed bristles.

244. *Cucurbita*. Fruit indehiscent, 1-celled, covered with a smooth, hard rind. Seeds numerous on several parietal placentae. (Rind thin, seeds contained in the dry and fibrous contents. Fruit ovoid or globose, light yellow, 6-8 cm long)

ORDER 91. CAMPANULACEAE.

Capsule many seeded, adherent to calyx tube. Herbs.

245. *Lobelia*. Capsule 2-celled, dehiscing loculicidally across the upper free portion. (Seeds $\frac{1}{2}$ mm, oblong, papillose.)

246. *Campanula*. (Capsules clustered in wand-like spikes, 3-celled, dehiscing by a circular hole near the top, opposite each partition)

247. *Legouzia*. (Capsules axillary, 1-celled with 1 parietal placenta, or 2 or 3 celled with axil placentae. Sometimes tending to split from the top.)

ORDER 92. COMPOSITAE.

Akenes sessile in heads surrounded by a many-bracted involucre, usually crowned by bristles, chaff or other appendages (the pappus), and often with interspersed scales on the receptacle. Herbs

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1. Pappus of fine capillary bristles	2
1. Pappus not of capillary bristles	20
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4. Fusiform, ribs not spinulose, pappus tawny.....	<i>Pyrrhopappus</i> 250
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