BOTANY

OF THE

SOUTHERN STATES.

IN TWO PARTS.

PART I.

STRUCTURAL AND PHYSIOLOGICAL BOTANY AND VEGETABLE PRODUCTS.

PART II.

DESCRIPTIONS OF SOUTHERN PLANTS.

ARRANGED ON THE

NATURAL SYSTEM.

PRECEDED BY A

LINNÆAN AND A DICHOTOMOUS ANALYSIS.

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PREFACE.

To an agricultural people, there can be no subject more important, or really demanding a deeper interest, than Botany. To guide in the management of any business intelligently, we must know the conditions of success. Success may, it is true, come, to a greater or less extent, without such knowledge; but if so, it comes in spite of our ignorance, and not by our sagacity. This is most emphatically true in regard to agriculture. Living beings, governed by fixed laws, subject to numerous and varied influences for good or evil, are the subjects with which the planter has to deal. It would seem self-evident, that he would be greatly aided by understanding their constitution and the conditions of their highest development. Botany proposes to lay the foundation for such knowledge, and to lead to practice of philosophical agriculture. It indicates the conditions essential to the growth and perfect development of plants, their food, the means of supplying it, the condition in which it must be furnished, and the means best calculated to gain a given result. All this Botany promises to afford, and, rightly pursued, it will accomplish all it promises.

No department of nature presents higher claims to our attention than the vegetable kingdom. It yields us the every-day necessaries of life. It affords us the articles indispensable for food, clothing, shelter, and warmth; and without its constant ministrations, with

our present constitution, existence would be impossible. But besides the benefits of which all are constant partakers, it lays other claims to our regard. The study and culture of the exquisitely beautiful objects which it presents, exert the happiest influence on all our social and moral feelings. So clearly has this been evinced to observation, that it has become a trite saying, that to the stranger, the flower-pots in the cottage-window of the poor, or about the dwellings of the wealthy, are almost sure indications of purity and social happiness within. On no page of creation can be found more distinctly written the wisdom, benevolence, and love of the Creator, than on that, which exhibits the structure and adaptation of organization to the circumstances of the humblest vegetable. The various beautiful provisions made for protection; the storing up of food which may nourish plants or animals; the purification of the air by vegetable respiration, with innumerable other exhibitions of Divine wisdom and benevolence, are not only subjects fitted to excite our admiration as intellectual beings, but *must* call forth the most devout gratitude and love, from every heart not paralyzed in its workings by unholy and groveling indulgences.

That Botany deserves a high place in every system of liberal education, is abundantly proved by every consideration that places any subject on the schedule of a college course. No subject can present a greater field for the exercise of all the higher intellectual powers. Analysis of the most rigid character, induction in every varied form, and generalization are constant employments of rightly-guided students in Botany. Every department of Natural History presents similar claims. The objects are the productions of God, varied to every form, existing in every condition, subject to every influence, related in a thousand ways, and all to afford boundless interest to the mightiest intellects of man, whose busi-

ness it is, by divine appointment, to study and control the productions of earth. Moreover, the volume of Creation is the best commentary on the volume of Revelation, and the more both are studied, the more do we see, that they both come from the same great, wise, and benevolent Creator. Not a vestige in the one contradicts an expression in the other; but the more deeply we penetrate into the mysteries of both, the more do we experience the truth of the Apostle's language—"The invisible things of God, from the creation of the world, are clearly seen, being understood by the things that are made, even his eternal power and godhead." And the more we see and know of his wonderful arrangements, and the inimitable wisdom exhibited in all that he has done, the more impressively does the language of the Psalmist fall upon our spirits, and unite with our own impulses—"O Lord! how manifold are all thy works! in wisdom hast thou made them all; the earth is full of thy riches."

In the following treatise, we have endeavored to present to the student an outline of Botany in all its most important relations, as a science. That the book should not exceed the size of a convenient text-book, we have been prevented from entering into many interesting and important particulars, and have been compelled to be brief in our descriptions of plants. Botany has been generally considered as limited to enabling one to determine the name of a flower, and, as studied in our schools and colleges, this is about all it accomplishes. A student thus taught, has just as much claim to any useful knowledge of Botany, as one who barely knows the name *whale*, has, on that account, to a knowledge of that animal. To know the names of things, is certainly an important particular, but that such knowledge constitutes any science, is simply absurd.

Most of the facts and principles contained in the following pages, have been subjects of personal observa-

tions by the author. On many points of theory, as well as with regard to some facts, there are differences of opinion among authors. Where our own opinion was decided, we have stated it without reference to that of others; in other cases of difference, we have noticed the contrariety.

We have labored many years to bring the work as near perfection as possible. That it is perfect, the author has not the vanity to believe. To write a perfect work on Southern Botany is impossible; nor will it be possible probably for a century to come.

In a work the author published in 1842, all was arranged on the Natural System. Many teachers objected to it on that account. To accommodate all, we have placed three analyses at the beginning of the 2d part, that each may adopt which he chooses. They will be mutual aids to each other. Difficulties that might occur in a given plant in one, may be entirely obviated in another. We have had an eye to this in their construction. We have also analyzed the more important orders. It may be safely asserted that no work will afford so easy a means for the analysis of plants as the one now presented to the public. We have aimed at presenting to the Colleges and High Schools of the Southern States a text-book, that shall answer all the ends of such a work, in the hands of intelligent and skillful teachers. To them we commend it in all confidence, believing that it will meet with such reception as it may merit. We ask for it no other.

Auburn, Ala., 1855.

PART I.

VEGETABLE ANATOMY AND PHYSIOLOGY.

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1. Botany is that science which treats of plants, and, in its most extensive application, makes us acquainted with the structure, vital action, classification, uses and distribution of vegetables.

2. A plant is an organized being, receiving its nourishment, which is always fluid, by absorption, generally through roots; and elaborating it by exposure to the combined action of air and light, on the surface of leaves or stems, and afterwards assimilating it to its own substance.

3. The science of Botany is generally divided into several subjects for separate investigation:

(1.) *The structure of vegetables*, or *vegetable anatomy*, or *organography* (*organon*, an organ, and *grapho*, I describe), consisting of a description of the various vegetable tissues, and the organs which these tissues compose.

(2.) *Morphology* (*morphe*, shape or form, and *logos*, a discourse) which describes the various changes organs may undergo in course of development, in respect to form, consistence, size, composition, &c.

(3.) *Vegetable Physiology*, or that branch of the science which has for its object the investigation of the functions of vegetable organs; or of all that belongs to vegetables as living beings.

(4.) *Taxonomy* (*taxis*, order, and *nomos*, law), which treats of the laws and principles of classification.

Taxonomy is that branch of Botany which has for its aim an arrangement of all the species of the vegetable kingdom in

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1. What is Botany? With what does it make us acquainted?—2. What is a plant?—3. How is the science of Botany divided? What is the 1st division? 2d? 3d? 4th?

a regular linear series, from one extreme of the scale of organization to the other, or from the lowest to the highest, without any broken or double links in the chain. So that when the organization of a plant is known, its true position may be assigned in the system. Such would be a perfect Natural System.

(5.) *Phytography* (*phuton*, a plant, and *grapho*, I describe) is the art of describing plants, or of expressing properly the characters peculiar to an order, family, genus, and species. It includes a knowledge of all the terms peculiar to the science, which is sometimes called *glossology* (*glossa*, a language, and *logos*, a discourse). It includes also the *synonyma* of the science, that is, a knowledge of the different names under which the same plant has been described by different authors.

(6.) *The examination of vegetable products:*—First, as to their constitution, forming vegetable chemistry; second, as to materials administering to the wants of men and animals.

(7.) *Geographical* Botany includes the study of the distribution of plants on the surface of the globe, determined by physical conditions, such as latitude, elevation, moisture, &c.

The *station* of a plant is its position in respect to physical conditions, such as moisture, dryness, sterility, richness, &c. Its *habitation* is its position in regard to country. Thus, the station of the *potato* was in moist, rich, mountainous regions, its *habitation* Peru.

(8.) *Applied* Botany is that department of the science which investigates the uses of vegetables as food, medicine, and as furnishing materials to be used in the arts and sciences.

4. There are three kingdoms of nature, the *Animal*, *Vegetable*, and *Mineral*, obviously distinct in the common objects that compose them, yet closely connected and dependent.

The *Mineral* is destitute of life, governed by ordinary chemical laws, and supplies the vegetable kingdom with food. The individuals of the *vegetable* kingdom possess life, but all their actions are involuntary, and they supply the animal kingdom with food.

Animals are not only endowed with life, but with sensibility and voluntary motion. At death they supply other animals with food, or their materials return rapidly to their original condition in the mineral kingdom, ready to go the same round again.

5th? 6th? 7th? 8th?—4. How many kingdoms of nature? How is the mineral characterized? How the vegetable? How the animal? What becomes of animals at death?

CHAPTER I.

ELEMENTARY ORGANS.

5. VEGETABLES are composed of solids and fluids. There are three solids: an extremely delicate elementary *membrane*, elementary *fiber* of extreme fineness, and *organic mucus*. From one or all of these are formed several classes of tissue, which make up all vegetable structures.

6. *Membrane* is certainly the most important of the three primitive conditions of vegetable substance. It enters into the composition of all the various tissues, and no doubt forms the great mass of vegetables. With respect to the *constitution* of vegetable membrane, two opinions have been held: one, that it is an inorganic substance, destitute of fibers, like the fine film composing a soap bubble; another, that it is organized. The chemical constitution of membrane is almost identical with starch, into which it is readily transformed. It is called *cellulose*. Membrane, in its early stage, is extremely thin, but becomes thick by the deposition of other matter. It is entirely destitute of visible pores; nevertheless, it is permeable to fluids under certain circumstances. Pores have been described as existing in the membrane, as it composes the tissues, but they have more recently been shown to be an optical illusion: the apparent pores being pits within the membrane, making some parts transparent and thinner than others. That this is the case, has been proved by the chemical action of substances making the membrane opake, when the pores ceased to be discoverable, and all the membrane became of a uniform appearance.

7. *Elementary Fiber* exists in various parts of plants, usually united with membranous vessels, and generally assuming a spiral direction. Most botanists consider it a simple, solid fiber. Its extreme fineness would lead us to this opinion, since the largest kind does not exceed $\frac{1}{7000}$ of an inch. It is not always coiled; sometimes it is straight, at others curved, and sometimes forming a single line; at others anastomosing, and forming a reticulated tissue, and at others, branching. It in-

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5. Of what are vegetables composed? How many solids? What are they? What are formed of these?—6. Which is the most important? What does it form? What is the chemical constitution of membrane? Its state in its earliest stage? Has it any pores? Is it permeable to fluids?—7. Where does elementary fiber exist? In what forms?

creases in size by the deposition of foreign matter, and by this means attains a size much greater than its original dimensions.

8. *Organic mucus* exists in the form of a thin homogeneous membrane, covering the cuticle of many plants, and forming a lining to the intercellular passages, or filling them up. It probably exists in all plants, in some form, if in no other than forming the cement by which the tissues are made to cohere. In the young shoot of the Sambucus nigra it is readily observed. Meyen considers the intercellular mucus a secretion of the cells themselves.

Section 1.—*Cellular Tissue.*

9. This tissue, in its most common form, is composed of minute cells or little bladders, and in the living plant is in a state of greater or less adhesion. Many names have been applied to tissues, made up of the variously formed cells:—1. *Parenchyma* (*para*, between, and *cheuma*, effused, tissue). 2. *Hexagonienchyma* (*hexagonios*, six-angled). 3. *Sphairenchyma* (*sphaira*, a sphere). 4. *Merenchyma* (*meruo*, to revolve), ellipsoidal cells. 5. *Ovenchyma* (*oon*, an egg), oval cells. 6. *Conenchyma* (*konos*, a cone), conical cells, as hairs. 7. *Cylindrenchyma* (*kulindros*, a cylinder), cylindrical cells. 8. *Prismenchyma* (*prisma*, a prism), prismatic cells. 9. *Muriform* tissue (*murus*, a wall), like bricks. 10. *Pinenchyma* (*pinax*, a table), tabular or flat cells. 11. *Prosenchyma* (*pros*, lengthened out), long, tapering cells. 12. *Colpenchyma* (*kolpos*, a fold), sinuous cells. 13. *Cladenchyma* (*klados*, a branch), branched cells. 14. *Actinenchyma* (*aktin*, a ray), star-shaped cells. 15. *Dædalenchyma* (*daidalos*, entangled), entangled cells. Although the walls of the cells, when cut through, appear to be simple membrane, yet, in some cases, they may be separated, and individual cells be exhibited unconnected. If the pith of the elder be cut through with a sharp knife, the cut surface, even under a moderate magnifier, has the appearance of fine honeycomb; but if a piece be boiled in a weak solution of potash, and then gently rubbed, the cells will separate (which they could not do were the walls of simple membrane), and appear in the form of exceedingly minute vesicles, as in Fig. 1. These were the cells that gave the honeycomb appearance to the pith when cut, before boiling. The pressure of the cells on each other caused the hexagonal appearance, and, when freed

Fig. 1.

Simple cells.

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8. How does organic mucus exist?—9. Of what is the cellular tissue composed? How does the pith of the elder appear when cut through? What causes this appearance?

from pressure, they assumed their natural form, that of minute spheroidal bodies. This form of the cellular tissue composes the pith of all plants, all the succulent part of fruits, as of apples, melons, peaches, cucumbers, &c. The soft part of leaves and bark, and a large part of the stems of annual plants; and in general, all the soft parts of the vegetable structure are composed of these minute simple vesicles, assuming generally more or less the hexagonal appearance when cut, as seen in Fig. 2, from the slight pressure to which they are subjected.

Fig. 2.

Pith of the Elder

10. When the cells fit together by their plane faces like geometrical solids, forming the pulpy substances, as in the above cases, it is called *parenchyma*, but when the vessels are elongated and tapering, the ends lying over each other, they form *prosenchyma* (Fig. 3), of which the hardest part of the bark is composed, and a part at least of the wood—perhaps all of it.

Fig. 3.

Woody fibers much magnified.

11. Cellular tissue assumes a great variety of forms, varying with the circumstances in which it is placed. In the stalks of some leaves the cells are in the form of cylinders (Fig. 4,) being forced only in one direction by rapid growth. In the medullary processes they assume the form of regular, thin parallelopipedons. In some cases they are lobed, owing, undoubtedly, to unequal pressure in the early stage of their growth; this frequently happens on the under side of leaves.

Fig. 4.

Cylindrical cells.

12. The *appearance* of cells is very different in different circumstances. They sometimes appear dotted, as though pierced with numerous pores. This is occasioned by

Fig. 5.

Dotted cells.

Fig. 6.

A cell.

Fig. 7.

Cells.

the deposition of an internal layer, which is not continuous, and when this layer is wanting, it gives, by transmitted light, the

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What does this form of cellular tissue compose?—10. What is parenchyma? What prosenchyma?—11. What are some of the forms that cells exhibit?—12. What appearances do cells assume? What is the cause?

above appearance, Figs. 2 and 5. Sometimes the vacant spaces in the lining membrane form bands, Fig. 6; sometimes oval spaces, Fig. 7; sometimes it takes a spiral arrangement, Fig. 8; sometimes that of star-shaped actinenchyma, as in Fig. 9, the pith of the juncus.

Fig. 8.

A cell.

Fig. 9.

Star-shaped cell.

13. To cellular tissue has been assigned the same place in the vegetable economy that flesh occupies in the animal, and we have no hesitation in yielding to it in every respect the importance this comparison gives it. It constitutes the basis, physically considered, of the vegetable kingdom.

14. Although the cells are without visible pores, yet the walls are permeable to fluids, as is proved by their being sometimes full, and at others empty. This may also be shown by taking a piece of the pith of the elder and letting a part of it communicate with water, when the whole mass will become saturated with it; and it is a fact well understood at the present day, that animal and vegetable membrane, even when not under the influence of vital power, is permeable to fluids under certain circumstances; that is, when opposite sides of the membrane are exposed to fluids of different density and the fluids are capable of wetting the membrane.

This passage of fluids through membrane was called, by Dutrochet, *Endosmosis* (*endon*, inwards, and *mao*, I strive), and is one of the most common agents used by nature in the vegetable economy for accomplishing her purposes.

The reverse motion, that is, from within outwards, was called *Exosmosis* (*exo*, outwardly). They both take place at once, but the thinner fluid usually moves the most rapidly.

15. The bursting of capsules is produced by this cause. One may convince himself of the truth of this assertion by closely inspecting the bursting of the common "Touch-me-not:" the inner cells have become in maturity more firmly compressed and smaller, while the outer ones are, in moist weather, turgid and elastic, and by slight agitation, the cohesive resistance of the valves is overcome, and a sudden bursting of the capsules is the consequence; the equilibrium of the pressure being produced by the coiling up of the valves. The opening and shutting of flowers at certain hours of the day, is undoubtedly another effect of the same cause.

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13. What place has been assigned to the cellular tissue?—14. How is it proved that the walls of the cells are permeable to fluids? What fact is now well understood? What did Dutrochet call it?—15. What are some of the effects of it?

16. The cellular tissue is endowed with the power of reproducing itself. This is abundantly proved by the existence of vegetables consisting entirely of these cells; and the extreme rapidity with which they are sometimes generated, is strikingly illustrated by an example given by Prof. Lindley, of a mushroom, the cells of which he estimated to be produced at the rate of four billions per hour. Cells are formed either internally, and the parent cell disappears, or they are formed on the outside; and in either case the young cell supplies the conditions of forming new cells.

17. This tissue, at first soft and mucilaginous, becomes, by age, of a very different consistence, varying remarkably in its composition in different vegetables, and in different parts of the same vegetable. It always commences its existence, as we before remarked, possessed of the same organization, but in its maturity it may become the white, thin, transparent vesicle of the pith of the elder, or the hardened, thickened, unyielding prosenchyma of the wood and the liber. These changes are produced by several circumstances. In the elder all the substance of the cell except the exterior vesicle becomes the food of the plant. The consistence of cellular tissue is most commonly increased by the deposition of a hard matter, *sclerogen* (*skleros*, hard, and *gennaein*, to produce), in concentric layers on the internal wall of the cell. This is often deposited in such quantity as to fill the cell, when it becomes very hard and strong, as in the grains of the Quince and Pear, Cocoanut-shell, the seed of the Ivory Palm, and Peach-stone. The deposition of the first layer is generally strictly followed in succeeding layers. If the cell was originally dotted, the dots become pores extending to the center: if in bands or spires, it is the same in the hardened cell. Fig. 10 represents a transverse section of Fig. 3 filled up.

Fig. 10.

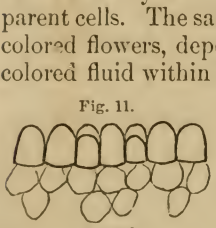
A transverse section of woody fiber.

18. The parenchymous tissue is in general the depository of all the materials which in vegetables administer to the sustenance of man. It is here we find deposited the material that forms our bread, from whatever grain it may be manufactured. It is the cellular tissue, filled with an amylaceous substance, that composes the edible part of the roots that are brought to our tables. The mealiness of potatoes, as it is vulgarly called, is

16. With what power are cells endowed? What fact proves it? How are cells formed?—17. How is the consistence of cells altered? What is the most common cause of the change? To what extent is it deposited? What course does it follow?—18. Of what is the cellular tissue the depository?

but the swollen starch-grains which compose this important vegetable: the beet, carrot, and turnip owe their value, so far as they are suited for food, to the abundance of this tissue, developed in the cellular integument of the bark of the roots, and just in proportion as the other forms are developed, those vegetables become useless. The tough, fibrous form these roots sometimes assume in dry seasons, in poor soil, or in an uncultivated state, is owing to the diminished quantity of the cellular tissue proper, and the abundance of the prosenchymous or woody form. Starch, arrowroot, &c., are but forms of the same substance. The various fruits are composed of cells filled with the various juices peculiar to each species. In the lemon we find the vesicles filled with an acid of considerable intensity. The orange and pine-apple gratify our taste by the mild yet delicious flavor of their contents. In the melon we meet with a fluid of a blandness and insipidity almost equalling fountain water. The various coloring materials drawn from the vegetable kingdom, and used in the arts, have their locality in the same tissue. The coloring matter which produces the great variety of hues that elicit our admiration by their brilliancy and variety, is deposited in transparent cells. The satin-like appearance exhibited by many highly colored flowers, depends (according to Lindley) on the highly colored fluid within the cell gleaming through the white shining membrane of the tissue; and the peculiar appearance of a petal, by which any one readily distinguishes it from a leaf, is occasioned by the irregular arrangement of the cells that form its epidermis, some being more elevated than others, (Fig. 11).

Fig. 11.



A petal.

19. Crystals are sometimes found in the interior of cells. They are usually called *Raphides* (*raphis*, a needle); which term, however, is strictly applicable only to the needle-like crystals, abundant in many plants, Fig. 12 *b*. They may be readily seen in the Rhubarb or Onion. Other forms of crystals are found in cells and in other intercellular spaces, Fig. 12 *a*. The most common substance found crystallized is *Oxalate of Lime*.

Fig. 12.

Crystals in cells.

20. The cell originates in a mucilaginous fluid, which becomes turbid by minute granules which collect in masses,

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Illustrate it by examples. To what is the color of petals owing? To what their peculiar appearance?—19. Where are crystals sometimes found? What substance is most common?—20. How does the cell originate?

to which Schleiden gave the name of *cytoblast* (*kutos*, a cell, and *blastos*, a germ), a nitrogenized body. As soon as the cytoblast has attained its full size, there appears upon it a fine transparent vesicle. This is a young cell, which continues to swell out and increase in size till the cytoblast is only a minute body, imbedded in the side of the wall, or sometimes loose in the cavity. The cytoblast is sometimes absorbed after the growth of the cell, and at others it is permanent.

21. There is a mucilaginous layer on the inner surface of the cell, which, with the cytoblast, seems to control all its vital functions. It is a nitrogen compound, and has been called the *internal utricle.*

Section 2.—*Vascular Tissue.*

22. Vascular tissue consists of tubes whose length generally exceeds several times their breadth. There are various kinds of it.

Dotted Ducts, Fig. 13, are formed of a series of short cylindrical cells, placed end to end. In their young state they may be separated into the individual cells which compose the tubes; but as they advance in age, the separating membrane closing the ends of the cylinders is ruptured, thus forming a continuous tube. This may be distinctly seen, under favorable circumstances, in the young vine, hickory, or oak, where the membrane may be seen ruptured in some cases on one side, leaving the membrane attached to the other side, assuming somewhat the appearance of a valve; in others it is ruptured in the center—the membrane cohering to the sides of the tube. They are the largest of the vessels, and are scarcely found in any other situation than in the wood. They are very distinct in the beech, oak, vine, and hickory, being the largest pores observed on a transverse section of these several kinds of wood; but in the pine, and trees of the same family, they are never found. This form of tissue derives its name from rows of dots regularly arranged on its surface. Sometimes the individual cells are very distinct, and bear some resemblance to a string of beads, when it is called the *moniliform tissue.*

Fig. 13.

Dotted ducts.

What is the cytoblast? How is the cell formed from it? What becomes of the cytoblast?—21. What layer on the interior of the cell? What has it been called?—22. What is vascular tissue? How are dotted ducts formed? How correspond with other vessels in size? Where found? In what trees not found? From what does it derive its name? What is the moniliform tissue?

23. Under this form of tissue is usually arranged a variety found mostly in the roots of plants, and which appear to be spiral vessels with the fiber broken into short pieces and attached to the tube. This is called *continuous bothrenchyma*, differing from the one above described in having no interruptions caused by the adherence of the cells.

Woody Tissue.

24. The woody tissue consists of elongated vessels tapering at each end to a very fine point, which become thickened by the deposition of *sclerogen* till the cavity is nearly filled, and the fiber becomes hard, elastic, and unyielding.

It is the fine shining fibers which are readily distinguished in wood, and which are composed of many woody fibers, formed into bundles. So minute are the individual fibers, that the finest filament of flax, which is composed of woody fiber, is made up of a great number of these fibers joined together; their fine tapering extremities being spliced to like fibers, which go to make up the long fiber extending through the whole plant. Cotton is of the common cellular formation. A modification of the woody fiber occurs in the coniferous plants; the individual fibers are larger in this family, and are marked by depressions which appear like disks. These depressions on one fiber are always opposed by a similar depression in the neighboring fiber, like two watch-glasses placed edge to edge, as seen in Fig. 15, and these may be easily seen in the thin longitudinal slice of the pine placed in water and viewed through a microscope.

Fig. 15

Single fiber of the wood of the Pine.

25. It is this form of tissue that gives strength to vegetables. Without it the stems of trees would be unable to bear their own weight, much less could they be used, as they now are, as materials of strength. The branches of the oak or hickory, destitute of the woody fiber, would break as easily as a mushroom. Besides forming a part of the wood, it is found in the bark and midrib of leaves. It protects other and more delicate portions, and gives form to the plant, appearing to occupy the same place in the vegetable economy that bones do in the animal. In its

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24. Of what does the woody tissue consist? How does it become thickened? Where seen? What does it make up? What peculiar in Coniferæ?—25. What gives strength to vegetables? Where found besides in the wood?

early stages it is endowed with the vital power in a high degree; but in the progress of development the fibers receive large additions of solid matter, and their density increases until their hardness and rigidity unfit them for vital action, but make them a support for the plant, and prepare them as materials for the use of man. It is more than probable that the woody fiber is capable, at some stages of its existence, of conveying fluids. It often becomes a matter of interest to distinguish different organic fibers which enter so abundantly into so many textile fabrics. This is easily accomplished by the microscope.

Fig. 16.

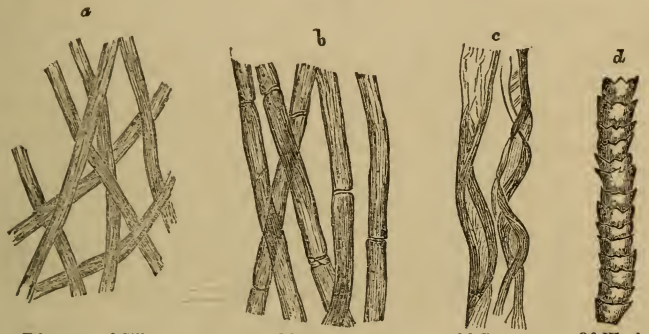

Fig. 16 exhibits the appearance of the most common; *a* represents the magnified filaments of silk, *b* of flax, *c* of cotton, *d* of wool.

Fibro-vascular Tissue.

26. This tissue consists of a tube formed by an external membrane, with an elastic fiber closely coiled within it, Fig. 17. Sometimes there are several fibers, forming something like a ribbon.

Fig. 17.

Spiral Vessels.

The above defines the normal form of this tissue, but the variations are numerous, owing to situation and development. This form of tissue may be easily seen by taking a tender branch of the Pokeweed, and cutting one side just through the outer layer, and then bending it so as to make the edges separate, when there will be seen a coil of the spiral vessel connecting the

What takes place by age? How are different fibres distinguished?—26. Of what does the vascular tissue consist? Where may it be easily seen?

two surfaces. Other young branches will answer the same purpose, some equally well with the one named, as the Asparagus, Strawberry, Currant, Dogwood, &c. In the above cases the vessels are not observed in their natural state, since they are seen uncoiled. In the stem, the fiber that we see uncoiled, when pulled apart, forms a complete tube by its edges coming in contact in coiling. But if either the Pokeweed or Asparagus be boiled, they may then be found in their natural state, having a conical termination.

27. The spiral vessels are found in dicotyledons in a layer surrounding the pith called the medullary sheath, from which they pass into the leaves and form a part of the ribs of those organs. They are found in the sepals, petals, stamens, and pistils, which are modifications of leaves. In monocotyledons they occupy the central portion of every bundle of woody matter. In acotyledons the true spiral is not found, but a modification of it is found in all the Ferns, Equisetaceæ, and it varies in some cases but very little from the true spiral in the last-named family.

28. The office of the spiral vessels in the vegetable economy is far from being determined. They took the name soon after their discovery (by Grew, we believe) of Tracheæ, from the supposition that they perform the same office in vegetables that the organs of the same name perform in insects, but their true function is yet unsettled. Many experiments have been adduced to prove that they contain air only, and many also to prove that their original function is to convey fluids to the recently developed vegetable tissue. Both conjectures are perhaps true. In their earliest stage they certainly contain fluids, and in the more advanced stages, it is equally certain they contain air, as may be shown by cutting a stem under water, when bubbles will be seen to form at the mouths of the spiral tubes. Bischoff has obtained the air and analyzed it, and found it to contain six or seven per cent. more of oxygen than common air.

29. We think we may safely conclude that the true spiral vessels perform different functions in different ages of the plant; and the more important of the two, and for which this tissue is peculiarly adapted, is that of the earliest stage. We find it in the earliest development of the plant. The extreme point of formation, where the matter seems to be just passing from mucilage into cellular substance, we find the spiral vessel. It

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27. Where are the spiral vessels found in dicotyledons? Where in monocotyledons? Are they found in acotyledons?—28. What is the office of the spiral vessels?—29. In what stage of the plant do we find spiral vessels? Why produced here?

seems that in this case we find an adaptation peculiarly fitted to accomplish a given end, and it would require not a very great stretch of imagination in conceiving the design of nature in giving to this tube the form she has. It is the only kind fitted to convey nourishment, and give support to the tenderest shoot as it emerges to light. If a common cylindrical tube were used, the great flexures made by such tender parts, under the influence of wind and rain, would be very liable to crush the tube on one side or tear it asunder on the other, as it is well known that a tube cannot be bent without injury, and it is equally well known that a coil may be bent in any direction, and return to its first position uninjured. Here nature, in her wisdom, has adapted organs to the necessity of the case, and she only uses this kind where the above circumstances seem to demand it, as they are never found in any circumstances where they are not terminated with the organ.

30. The varieties of this tissue, as exhibited by the microscope, are numerous; but we shall notice only a single kind of its variations. *Annular ducts*, as they are called, are tubes in which the spires are apparently broken into rings and joined at their extremities. Sometimes the rings lie in regular order and in contact with each other, having the appearance of the true spiral vessel, as seen in Fig. 18 *a*. At another time the rings appear separated and irregular, and are detached from the tube and lying lengthwise in it, as seen in Fig. 18 *b*. These appearances may be seen in the stem of the Impatiens, and other forms will be readily detected in the same plant.

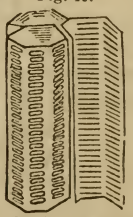
Fig. 18. *b*

With rings detached and broken.

Fig. 18. *a*

Annular duct with some rings detached.

Fig. 19.



Scalariform vessels.

31. *Rayed Vessels.*—These vessels are formed by the rings being broken into regular pieces and arranged in regular order, like the rounds of a ladder, and on that account called *scalariform* by some. The tubes are generally hexagonal prisms, Fig. 19. They are found in ferns and roots of plants.

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30. What are annular ducts?—31. What are rayed vessels

Cinenchyma, or Lactiferous Tissue.

32. *Cinenchyma*, Fig. 20, is a tissue that consists of minute tubes anastomosing with each other, and arranged in no definite direction, in reference to the other tissues. The tubes are of very different diameter in different parts. The vessels generally take a waving direction, seldom proceeding in a straight line. The tubes become thickened in age by the deposition of new matter. The cinenchyma is found in greatest abundance in the liber of the bark, across the parenchyma of the leaves; but, no doubt, exists in almost every part of flowering plants. It has been detected in the pith, in the bark of the roots, in connection with the spiral vessels, and, it is said, in the cells of hairs. We have readily detected this tissue in the liber of a vigorous Fig, in which the vessels were distended with fluid. This tissue is called the Lactiferous, from the circumstance of its containing the milky juices of plants. When the Fig, Lettuce, Asclepias, and Euphorbia are wounded, a milky juice immediately issues; this proceeds from the severed vessels of the cinenchyma. Although in these cases the *latex* (the name of the fluid contained in this system of vessels) is white, in others it is colorless, and in some yellow. It has been thought to be the most highly elaborated juice of the plant. It is doubted by some of the most distinguished philosophers whether these are originally tubes or not. They think them intercellular passages that become lined with membrane, and that the latex, so far from being the highly elaborated sap destined for the nourishment of the plant, is in reality a substance eliminated, unfit for the use of the plant.

Fig. 20.

Lactiferous tissue.

We have given above the forms of tissue which make up every vegetable, from the humblest plant to the largest tree of the forest.

INTERCELLULAR PASSAGES.

33. In placing together the various tissues, which are either globular or cylindrical, spaces are necessarily left between the walls of adjacent cells or tubes, which are called intercellular passages. The appearance on a large scale may be illustrated

32. Of what does the lactiferous tissue consist? Where found in greatest abundance? Why called lactiferous? What doubt about it?—33. What are intercellular passages?

by the spaces that would be seen in a pile of bladders, which would exhibit these passages in the cellular tissue; and the space seen in a bunch of cylindrical rods bound together, would exhibit those seen in the vascular tissue. These spaces are always filled with fluid, and are supposed to afford an important channel for the transmission of sap from one part of the plant to another. The proper juices of plants often collect in these cavities, and by their pressure the latter become enlarged, and afford receptacles which contain large quantities of the peculiar juices of plants: such is the case with the cavities in the bark of the pine and balsam; in the latter they are very large, and also in the rind of the lemon and orange, in which are deposited the peculiar secretions of these plants. Air-cells are cavities built up by cellular tissue in the leaf or stem for the purpose of enabling the plant to float on water. They occur in the leaves of the aquatic varieties of the Ranunculus and Duckweed.

CHAPTER II.

COMPOUND ORGANS.

34. In the preceding chapter we have described, in a brief manner, the various tissues which enter into the composition of vegetables. Our next object will be to describe in the same manner the various organs these tissues compose. An organ is a part of a living body, and the center of a special action, but not independent of the other organs which make up the being to which it belongs. It may be composed of other organs more simple than itself. Thus the leaf, which is an organ and the center of a special action, is, at the same time, composed of more simple organs, as cells and vessels, which are called elementary organs: the leaf is a compound organ. In describing the various vegetable organs, we will take for an object of demonstration and comparison, one of the most complicated and most perfectly developed vegetables. If we take a tree, for instance, we find it composed of various well-defined parts; and to describe a tree, taking it part by part, we shall describe all the compound organs which go to form the whole vegetable kingdom. We find it in the first place covered, in its earliest stage at least, by a thin membrane extending over the whole

With what are these spaces filled? What collect in them?—34. What is an organ? How illustrated by a leaf? If we examine a tree, of what parts d we find it composed?

surface from the deepest root to the highest leaf, called the *cuticle.* Within this covering we find another distinct zone, called the *bark;* within the bark we find the main axis of the plant, called the *wood*, which is composed of two portions, one ascending, and called the *stem*, the other descending, and termed the *root.* Within the stem we find a soft, spongy substance, denominated the *pith.* To the root and stem are attached branches, and to those of the stem are attached leaves, flowers, and fruit.

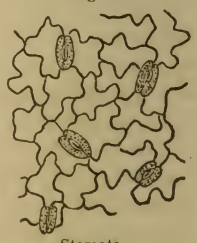
We shall describe the above organs in the order laid down.

Section 1.—*Cuticle and Epidermis.*

35. The cuticle is a thin continuous membrane, covering the whole plant, even the minutest hairs, with the exception of the stomata, which it sometimes enters and lines the cavity beneath. It is thought by some to be a secretion of the subjacent cells, by others that it is a cell membrane, and by others still, that it is organic mucus. It is easily observed in the Cabbage. It is the only covering of some aquatic plants.

36. The epidermis is composed of flattened cells, adhering to each other by their edges, and forming a continuous covering over the whole plant, except the stigmatic surface, spongioles, and parts growing under water, and is generally composed of a single layer of cells, but sometimes in succulent plants of two or more layers. The epidermis of the Oleander is composed of three or four layers of thick-sided cells. The joining lines of the cells may be seen on the leaves of plants by the microscope, presenting, generally, hexagonal figures more or less regular. Sometimes, however, the lines produce irregular figures, assignable to no geometrical form. The epidermis may be easily separated from the subjacent layer of the leaves of the Iris or Lily, by means of a sharp knife, and examined in water with the microscope. If the microscope be good, the cellular cavities will be easily seen, otherwise the flattened surface only can be distinguished.

Fig. 21.



Stomata.

37. On the lines which separate the cells that compose the cuticle, small oval spaces are observed, which are called *stomata,*

35. What is the cuticle? In what plants easily observed? Of what plants is it the only covering?—36. Of what is the epidermis composed? How may the epidermis be obtained and examined?—37. What are stomata?

in allusion to the function they are supposed to perform—that of mouths through which the plant respires, Fig. 21. These stomata are curiously constructed, generally consisting of two oblong cells, placed parallel to each other on opposite sides of the aperture, as seen in Fig. 21, and have the power of shutting the orifice, and at other times of opening it; thus the respiration and evaporation of the plant is controlled by these little cells. Of these we shall speak more particularly when describing the functions of the leaves. Stomata *occur* on the green parts of plants, and not usually on other parts, not even on blanched portions of a plant.

The *number* of stomata is very various on different plants, and even on the same plant, as on the upper and under surfaces of leaves, being much the most numerous usually on the under surface. On the leaf of the *Misletoe*, the number of stomata on a square inch is only 200, the same number being on each surface; on the Vine-leaf 13,600 to the square inch on the under surface, none on the upper; Holly, 63,600 on the under surface, none on the upper; Lilac, 160,000 on the under surface, few on the upper. With regard to the origin of stomata, considerable discussion has been carried on, but no very satisfactory conclusion has been arrived at. Schleiden and Link are supporters of different opinions. The former supposes that the stomata result from the limit of development of cytoblasts; that two internal cells are developed, and by the absorption of the parent cells, the space between them becomes the stomata, and that the cells forming the stomatic sphincter differ in no respect from the other cells. The latter believes the stomata are secreting glands, and not mere openings in the cuticle for the transmission of air and gases.

38. The epidermis gives rise to various little organs, which are classed under the heads of *Hairs*, *Glandular Hairs*, *Stings*, *Prickles*, *Scurf*, and *Lenticels*.

39. *Hairs* are formed of one or more cells proceeding from the epidermis, and are covered with the cuticle. To examine their structure, a good microscope is absolutely necessary. In the Spider-wort (Tradescantia) the hair is composed of cells placed end to end, and has the appearance of the antennæ of insects, and in these cells a circulation is distinctly visible. The sides of these cells are double, although the wall of a cell under common circumstances, appears of simple membrane. That this is not the fact, is proved by permitting the cell to dry on

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Of what do they consist? Where do they occur? What is said of their number?—38. To what does the epidermis give rise?—39. How are hairs formed?

the field of the microscope, when the membranes will separate, and a space be observed between the membranes. It is in this space that the cinenchyma is located, and in which tissue the observed circulation goes on.

40. *Glandular Hairs* are such as possess the power of secreting various substances which give the peculiar odor to some plants. They are terminated at the top by an enlargement of the hair, sometimes containing cavities in which the secretion is deposited before being set free, at others by a cup-like cavity, answering a similar purpose.

41. *Stings* are sharp, stiff pointed hairs, which take their rise from the summits of conical reservoirs composed of many separate cells, which are filled with a poisonous fluid secreted by these organs. The sting has an orifice at its summit, connected with the cells containing the acrid secretion; and, by the force required to pierce the skin, it presses upon the cavities which propels the fluid up the tube, and injects it into the wound made by the point. It is this poison which causes the severe pain occasioned by the sting of the nettle.

42. *Prickles* are hard, sharp-pointed, stiff productions of the cuticle, often hooked at the extremities. When the prickles have acquired their full growth, they are quite firmly attached to the stem; but as the stem advances in size, the prickles, remaining of the same dimensions, become loosened at their base and fall off. Hence, old stems are seldom covered with prickles, while the younger ones are prickly.

43. *Scurf* or *Lepides*, appearing to the naked eye like a mealy substance on some leaves, are scales attached to the stem by their center, and seem to be formed by the cohesion of many hairs having the same point in the cuticle for their origin.

44. *Lenticels* are brown spots appearing on the stems of many trees and shrubs, at first nearly round, but as the stem increases in size, they assume a linear form, and produce transverse spots on the surface of the stem, as may be seen in the Cherry, Willow, Birch, and other trees and shrubs. By a closer examination, we find the lenticels to consist of a corky substance apparently projecting through apertures in the cuticle, and being divided into two lips by a medial slit. By cutting through one of these lenticels transversely, and examining it with a microscope, the student will find that they are placed on the external layer of the bark, between it and the epidermis, and that it has no connection with the bark, much less with the wood.

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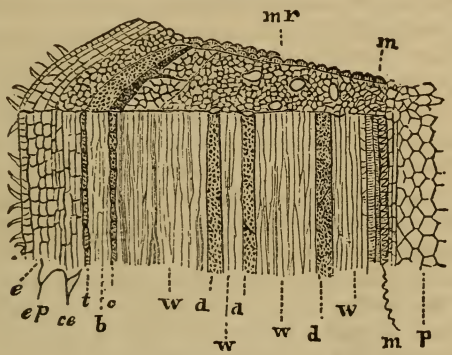
40. Describe glandular hairs.—41. What are stings?—42. What are prickles?—43. What is scurf?—44. What are lenticels?

Section 2.—*The Bark.*

45. *The bark* lies immediately beneath the epidermis. It consists of several layers. In the early state it is entirely cellular, and is exactly like the pith with which it is in contact; but by the production of vessels and woody fiber, they are separated and become very different in appearance and constitution. The bark consists of two portions, the cellular and vascular, the latter of which is called liber, and is the inner portion of the bark. The cellular portion is usually divided into two portions. The outer portion is called the *suberose* or *corky layer*, or Epiphlœum, Fig. 22 *ep*. It is composed of cubical or flat-

Fig. 22.



p—the pith; *m*—medullary sheath; *w w w*—woody fiber; *d d d*—dotted ducts; *c*—cambrim; *b*—liber; *c e*—mesophlœum; *e p*—epiphlœum; *e*—epidermis; *m r*—medullary rays.

tened cells, having no coloring matter within them, but turning brown by age. It is sometimes composed of a single layer of cells, at others it is produced in great quantities, as in the Cork-tree. The form of the cells makes it easy to distinguish it from the subjacent layer.

The inner cellular layer of the bark is called the *mesophlœum*, Fig 22 *c e*. It consists of prismatic cells, usually inclosing the green coloring matter that gives color to the young stem. It lies looser than the suberose layer, and is largely developed in the *coniferæ*. The lactiferous tissue is found beneath this layer.

46. The epidermis, cellular integument, and liber, may be

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45. Of what does the bark consist? Into how many portions is the cellular divided? Describe the suberose layer. What is the inner cellular layer called? Describe it.—46. Where may the several parts of the bark be seen? How often are they formed?

very readily examined in a branch of the Cherry of one year's growth. The epidermis will readily peal off, tearing transversely. The cellular integuments may then be easily separated from the subjacent liber. The two layers of the bark are each formed every year, and of course the thick bark of old trees is made up of alternate layers of cellular integuments and liber. From the enlargement of the stem, and the internal formation of bark, the outer layers become distended and broken, and thereby produce the rugged appearance of some old trees; and the annual peeling off of the bark of the Sycamore, which, from the slight cohesion of the different layers, falls off as soon as broken, prevents its forming longitudinal ridges like those of the Oak and Pine.

47. *The liber* is composed of woody fiber and cylindrical vessels, a modification, undoubtedly, of the spiral. These together form the strong fibers, which compose the net-work of this part of the bark. The fibers of the liber, from their tenacity and interlacing, are often made materials for use. The bark of the flax and hemp consists of these fibers, and when twisted together constitute the cordage, thread, and cloth which are manufactured from these plants. The fibers are sometimes so closely and firmly interwoven as to be used as a substitute for manufactured fabrics for clothing, with no other preparation than that of separating and flattening the layers. Jamaica and the Sandwich Islands afford examples of these productions. A beautiful lace is obtained by the natives of the Pacific and West India Islands, from the liber of different trees of the Mezerium tribe. Cordage also is manufactured from the liber of trees of the same family; and our own Dirca, did it grow to sufficient magnitude, might afford beautiful examples of the same kind of nature's manufacture. From the liber of the Daphne bohlua of Nipal, a very soft, beautiful paper is said to be manufactured. The liber of trees, before the invention of paper or parchment, was stripped into layers, flattened and cemented into leaves, which formed books; and it is from this circumstance that it derives its name. The Russians also manufacture mats, which bear their name from a species of the Tillia (Linden-tree).

48. The cellular integument is not without its uses, deriving its value, too, from its peculiar structure. It is the immense development of this integument that forms cork, so extensively employed for various useful purposes: and it is the development of the same material in this part of the bark, that constitutes

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47. Of what is the liber composed? What use is made of it?—48. Of what use the cellular integument?

the value of many of the garden vegetables, which, in their primitive, uncultivated state, are as unfit for food as any other kind of root; but the effect of cultivation in good soil, is to increase the cellular integument without increasing the liber; thus fitting the roots for becoming food for men and animals.

49. In a great number of trees, the bark is make the depository of important articles. *Tannin*, by which raw hides are converted into leather, is found in the bark of several species of he *Quercus*, or Oak, and in the *Pinus Canadensis*, or Hemlock. Gum is also an abundant product of the bark, and is scarcely found in the wood. *Coloring matter* is often found deposited in this organ, though not so generally as in the wood: also *medicinal* substances of every grade, from the mildest mucilage of the Ulmus fulva and Bene plant, to the most powerful poisons of the Daphne mezerium, and of those yielding the Hydrocyanic or Prussic Acid. Numerous examples might be added of the important productions of this organ, but they will be reserved for a future section.

50. The *functions* of the bark, taken as a whole, seem to be the protection of the newly formed wood, the secreting of various products, and forming a channel through which the descending elaborated sap may pass to the various parts of the stem. The functions of the cellular integument and liber, separately considered, have not been determined. There appears to be plausibility in the conjecture, that the cellular part of the bark, being deposited first, acts the same part in the formation of the liber that the pith performs in a newly formed branch, that of affording nourishment, if it does not act some part in generating the fibers themselves. If, as has been supposed, the cellular system is the generating apparatus of vegetables—and that it is in some cases, we have the best evidence—will it not afford a probable reason for the arrangement of the cellular and vascular tissues in alternate layers, if we suppose that the cellular tissue, being first deposited, acts as the generator of the fibrous tissue of the liber?

Section 3.—*The Stem.*

51. The stem is that part of the plant to which the leaves and flowers are attached. There are three distinct varieties of this organ, characterized by their manner of growth.

The first is called *dicotyledonous*, from the fact that the seed

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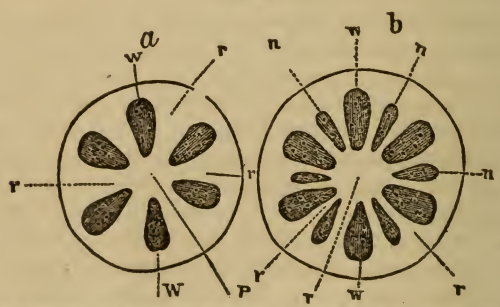
49. What deposition made in the bark?—50. What are the functions of the bark?—51. What is the stem? How many varieties?

has two leaves. It is readily known by the stem consisting of regular concentric layers of wood, and the leaves having reticulated veins, while the number of floral organs is usually five or a multiple of that number. All of these characters are not always coincident, but one or more of them serve to mark the variety. De Candolle called this class of plants *exogens*, which means to grow outwardly, which is true with regard to the wood, but not of the bark, which grows inwardly or by a deposition of matter internally, which is the only real endogenous growth. It includes all the trees and shrubs of the temperate zones.

52. In the embryo state, all plants are composed of cellular tissue. As germination advances, the cells begin to elongate, and form fibers and vessels which penetrate the cellular substance. By multiplying in number, they form a circle of fibro-vascular bundles, about midway between the center and circumference of the young stem. Fig. 23 *a* represents a magnified section in

Fig. 23.



a—a section of a young plant greatly magnified; *r r*—cellular tissue; *w w*—bundles of spiral vessels and woody fiber; *p*—the pith.
b—*n n*—new bundles of spiral vessels and woody fiber, forming a more complete circle.

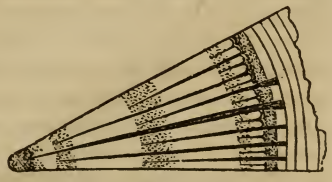
which the bundles begin to present a circular outline. As the season advances, the fibro-vascular bundles increase in number (Fig. 23 *b*), and the lateral spaces become less and less, and by subdivision more numerous, until they are exceedingly thin and the contained cellular substance is compactly pressed, forming very thin plates called *medullary rays.* The inner vessels of this zone are true spiral vessels, and they, together with the fibers and cells, form a thin cylinder called the *medullary sheath*, Fig. 22, *m*.

What is the first called? How characterized? What does it include?—52. What takes place as germination advances? How are the medullary rays formed? What constitutes the medullary sheath?

53. If we take the stem of the Oak of one year's growth, and examine a transverse section of it with a microscope, we shall observe the following appearances, as exhibited in Fig. 22, which represents a wedge extending from the outside to the center of the pith: *p* indicates the cells of the pith, being loose and large at the center, more compact toward the medullary sheath; *m* points out the medullary sheath, composed mostly of spiral vessels; *w w w*, the woody tissue formed the first year; *d d d*, dotted ducts, the largest vessels of the stem, the open mouths of which are seen on that part of the figure representing the transverse section; *c* points out the thin layer of cambium, which is the generating layer; *b*, the liber of the bark; *t*, the lactiferous vessels; *c e*, the cellular envelope or mesophlœum; *e p*, the corky or suberose layer; *e*, the epidermis. These are the products of one year.

54. The *medullary sheath* is composed of spiral vessels and woody fiber connected by cellular tissue. It precedes every other formation except the cellular, in the elongation of branches. The leaves derive their origin from the medullary sheath. The true spiral vessels in the stem of exogenous plants are found only in the medullary sheath. In paragraph 29 we gave our opinion as to the reason for spiral vessels being found only in this organ. They are certainly required in the earliest development of the vegetable, and no increase in length of vascular vegetables ever takes place in which this form of the elementary organs does not enter into its formation. And we very well know that every function, except what its physical properties enable it to perform, is performed by other varieties of tissue; and to our mind there is not a more beautiful instance of adaptation and design, or a clearer illustration of Infinite wisdom in the constitution of the vegetable kingdom, than is exhibited in the structure of the organ under consideration.

Fig. 24.



Exhibiting the medullary rays.

55. If we examine our transverse section again, we shall perceive that the woody part is separated apparently into numerous wedge-shaped portions, their bases terminating in the bark, and their apexes in the pith, as seen in Fig. 24; and a

53. What shall we find in the examination of a stem of oak of one year's growth?—54. Describe the medullary sheath? What derive their origin from it?—55. Describe the medullary rays.

row of the cut cells is seen in the preceding figure (Fig. 24), marked *m r*. By a longitudinal section made in the direction of these lines, we shall find that they are plates of substance proceeding from the pitn and terminating in the bark. They are called *medullary processes*, or *medullary rays*, and are composed of cells in the form of thin parallelopipedons. In the embryo, and in the earliest development of the stem, the cellular substance of the bark and pith, are in contact, but immediately vascular and woody fibers are sent down, which pierce the cellular substance, dividing the mass of the pith from the parenchyma of the bark, but leaving them connected by the medullary processes; so that parts which were in contact in the early stages, become separated, sometimes by several feet, yet a communication is preserved by the medullary rays, which continues as long as life lasts.

56. Each of the layers of wood, as we before remarked, is the product of a single year, and by counting these layers the age of the tree at the point of section is readily determined, and by finding the difference in the number of layers between any two points of section, will determine the time that the tree was growing the distance between the sections. For instance, if we should count the layers of a stick of timber, and find the number twenty at one end, and ten at the other, it would show that ten years were required for the tree to increase in length the distance between these points. From these facts, we readily perceive, that trees must be composed of concentric conical sheaths; the product of the first year forming such a sheath around the pith, and that of the second year forming a layer around the product of the first year and the pith; the pith extending through the whole cone. We also observe, that the mode of increase is inverse to that of the bark, for the bark we found increased by an internal layer of cellular integument and liber, and we now find that the wood increases generally by an external layer of cellular matter and woody fiber, the layer of woody fiber and liber always being in contact when the layers are completed. We may readily convince ourselves of the inverse growth of the bark and wood, by inserting two wires, one through the bark, but not so as to touch the wood, and in time this wire will fall off, having no deposit made exterior to it; but by inserting the other wire so that it shall pass through a slight portion of the wood, instead of falling off, it will become buried deeper and deeper every year by the layers of wood that are

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How are the pith and bark in the earlier stages of growth?—56. How often are layers of wood produced? How can the age of a tree be determined? How are trees composed? How is the growth of wood compared with that of the bark? How may we convince ourselves of this?

formed over it—thus proving most clearly the order in which the wood and bark are formed.

57. A remarkable case of the deposition of external layers of dicotyledonous stems is related of the Baobab-tree (Adansonia digitata) of the Cape de Verde Islands. In the year 1400, Grew cut his name on two of these trees, and in 1749 (three hundred and forty-nine years afterward) Adanson examined the same trees and found the names, with more than three hundred layers of wood deposited over them. If we examine a transverse section of a trunk of a tree, we observe that the wood near the pith and that near the bark present very different appearances: the latter being white and soft, and more or less juicy, is called the *alburnum* or *sap-wood;* the former, being darker colored and hard, is called the *heart-wood.* The vessels of the alburnum are always filled with sap, and no doubt form the channel through which this fluid ascends. This is shown most conclusively in the process of girdling trees. If the sap-wood is cut completely through all around, the tree dies immediately; but, if a part of this is left, the tree may linger through the summer, and perhaps longer, the continuance of life being in proportion to the amount of sap-wood left uncut. In the young tree all the wood is alburnum, but as it increases in age we may notice the time in which the innermost layer is converted into heart-wood. This change from alburnum to perfect wood, is no doubt occasioned in a great measure by the deposition of foreign matter, which prevents the tissue from any longer performing vital functions, increases its density, and of course renders it more firm and compact. The time required for the conversion of alburnum into perfect wood, differs considerably in different trees, and it is also different in trees of the same species, owing to situation: even on opposite sides of the same tree, the number of layers of alburnum is often different. In trees of the same species, exposed to the same influences, the number of layers of alburnum is remarkably uniform. In some cases there is a striking contrast in the appearance of the alburnum and perfect wood. In the Ebony the alburnum is white, while the perfect wood is nearly black. In the Camb-wood, the alburnum is also white, and the perfect wood a deep red. There seems to be a certain fitness required in the vegetable tissues before they are capable of receiving the coloring matter, for otherwise we should suppose the change would be more gradual:

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57. What remarkable case? What is alburnum? What is heart-wood? How shown that there is a circulation in the alburnum? How is alburnum changed into perfect wood? What of the time required for the change? Describe the change in appearance?

but the line of demarkation is often perfect; the black external layer of the perfect wood being surrounded by a perfectly white layer of alburnum, thus showing that the transition is performed at once, and not gradually, as is generally supposed.

58. The *pith* is the central portion of the stem, commencing at its base and extending through it and through every branch, terminating in the buds. It is composed of loose cellular substance, varying considerably in size, form, and appearance in different plants. In some plants it forms a large portion of the stem, as in the Elder; in others but a small part; and in trees, becomes compressed into a mere line, as in the Oak. It never increases in quantity in the same part of the stem. Its only function seems to be that of nourishing the young buds. During its early stages it is filled with fluid, and performs, undoubtedly, the first vital functions: but after the young shoot has become organized so as to derive nourishment from other sources, the now useless pith becomes dry; being exhausted of its fluids and often torn and variously divided by the growth of the stem. It not unfrequently entirely decays, thus showing that it is necessary only in the early stages of the plant.

59. There are frequently to be found in the bark of several trees, particularly of the Beach, small conical bodies composed of wood, pith, and medullary rays, which are called *nodules*. They are generally, in their early stage at least, not connected with the subjacent wood. Dutrochet believes nodules to be adventitious buds, which generally do not acquire force sufficient for their development into branches; but in some cases they do produce branches, which are of a weakly character.

60. *Monocotyledonous* stems are characterized by having the different portions less distinctly marked than they are in the preceding class, having parallel-veined leaves, the number of floral organs three or six, and not having any medullary rays or distinct bark or pith.

The monocotyledonous stem increases, as all other vegetables do, by the deposition of the new matter exterior to the old. The peculiarity of this growth depends mainly upon the fact, that the new leaves are formed on nearly the same plane with older ones. Shorten the internodes of an oak, and let the leaves become formed and produce new matter before they rise above the older ones, and you would essentially convert it into a monocotyledonous growth. You would destroy in a great measure

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58. What is the pith? How the quantity in different plants? Does it ever increase in quantity? How in its earliest stage?—59. What are nodules?—60. How are monocotyledonous stems characterized? How do their stems increase? On what does this peculiarity depend?

the regular deposition of wood, and would interfere more or less with the regular formation of bark, especially toward the top of the stem. This is the case with monocotyledonous arborescent stems.

61. If we make a longitudinal section of a stem of the dwarf Palmetto, we shall observe the following appearances. We find it composed of numerous fibers, interlacing in all directions; but the general direction of the threads, if we commence at the top, is toward the center, where they curve toward the circumference,

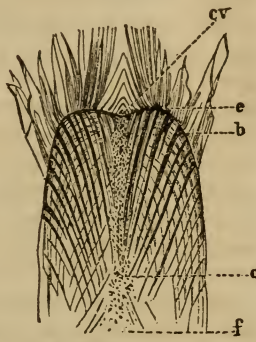
Fig. 25.

A transverse section of a portion of the Yucca gloriosa, from the center to the circumference.

Fig. 26.

Transverse section of a fibro-vascular bundle of a monocotyledonous stem.

Fig. 27.



Longitudinal section of a monocotyledonous stem.

Fig. 27. The point where the bundle approaches nearest the center is where the base of the leaf has its origin, and sends out bundles toward the circumference. The curve from that point to the base of the leaf is the track that the base of the leaf has taken in its growth. These bundles are composed of woody fiber, tubes, and spiral vessels (Fig. 26), toward the top, or nearest the leaf, and of tubes and woody fiber toward the bottom, and ending in woody fiber only.

62. All the leaves have their origin at the center of the stem at the top, around the base of a central vesicle. As new leaves are formed and raised up, the older ones are pushed out by the deposition of cellular matter, and come to the lateral surface of the stem, and then all the new matter goes down on the outside, like a dicotyledon, and forms wood and bark.

63. All monocotyledons are constructed on the same general principle, and most of the variations are explicable by the greater

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61. What is the appearance of a longitudinal section of the dwarf palmetto? What is the point where the bundles approach nearest the center? What is the curve from that point to the base of the leaf? Of what are these bundles composed?—62. Where do all leaves have their origin?—63. What is said of the construction of monocotyledons?

or less lengthening of the spaces between the bases of the leaves, or internodes. In the Onion there is no separation; in the Smilax and Cane a great separation; in the Palmetto just enough to bring the leaves to the lateral surface of the stem. Fig. 25 exhibits the structure of the monocotyledonous stem as seen in a cross-section. It is an exact exhibition of a section of the *Yucca*. The dots are the ends of the fibro-vascular bundles. Fig. 27 exhibits a longitudinal section through the axis and through the terminal vesicle *c v*, around which all the leaves are formed; *b*, the base of a leaf; *c*, the point where the leaf *b* had its origin; *e*, compact cellular substance immediately below the generating surface. The fibers proceeding from the base of the leaves toward the surface of the stem are smaller than the others, as they contain fewer vessels. The ascent of sap in monocotyledons is the same as in the dicotyledons, that is, in the newly formed wood.

Fig. 26 is a transverse section of one of the bundles greatly magnified, as it is found at the base of the leaf; *w*, woody fiber; *d*, dotted ducts; *s*, spiral vessels. The spiral vessels are always toward the center of the stem. This is the structure till it arrives at the point nearest to the center, when it becomes smaller: the spiral vessels are imperfect, and finally they entirely disappear, and nothing remains but woody fiber.

64. *Acotyledons* are such plants as increase by the elongation of their axis without increasing in diameter. The Ferns present a type of this class of stems. On examining the stem of a Fern we find it composed of cellular substance, and vessels generally bearing, in some species, a very close resemblance to a variety of spiral vessels. There is another variety of formation of Acrogens, sometimes called the *centrifugal* formation, as exhibited by fungi and lichens, in which the formation proceeds from a center, the substance being generated nearly upon the same plane. Lichens may often be seen with their centers dead, while the circumference is alive and growing. Fairy rings are the result of this formation.

Section 4.—*Root.*

65. The root is that part of the axis of the plant which descends in its elongation, and is the organ through which the plant receives most of its nourishment, and by which it is at-

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What does Fig. 25 exhibit? What Fig. 27? what of the ascent of sap in monocotyledons? What does Fig. 26 exhibit? What of the spiral vessels?—64. What are acotyledonous plants?—65. What is the root?

tached to the place of its growth. The root in its general appearance resembles the stem; and when taken together they have been, not unaptly, compared to two cones united by their bases. Both take their origin from the same vital points, yet under the influence of the vital power they seem to be endowed with opposite propensities,—one growing upward, seeking light and air, the other with an equal impulse forcing its way downward, and burying itself in the earth. We may consider the plant as endowed with opposite polarities; one pole uniformly taking the direction of gravity, the other as uniformly the opposite direction. The surface of the earth may, in general, be considered the equator of this living magnet, and the zenith and nadir its poles.

Although we speak of Root and Stem being joined at a point called the neck, still there is no line of demarkation drawn by nature by which we may determine the precise point where the stem ends and the root begins. The fibers extend from one to the other, and the union is made by a gradual conversion of the one into the other. The seat of vitality has been supposed to be in the neck, but numerous examples will readily occur to the student disproving such an hypothesis. The neck in many plants may be removed, and the roots and stems will still survive by proper attention; proving not only that the neck is not the seat of vitality, but that there is no such single point which if destroyed, the plant necessarily perishes.

66. The principal differences between the root and the stem are,—1st, the root is destitute of pith, and 2d, the true spiral vessels are not developed in it, hence no medullary sheath: 3d, there are generally no regular buds formed on the roots; yet they are capable of putting them forth under favorable circumstances, as may be seen in the shoots that spring from the roots of the Peach, Plumb, Cherry, and Poplar: 4th, Stomates are not found in the bark of the roots.

In other respects the root does not differ from the stem, and the differences above noticed are in a great degree owing to the situation of the root. The moist, resisting medium in which it is placed, produces the variation, rather than any real difference of organization. Stems, when exposed to different influences, change their type of organization to fit themselves to the different circumstances in which they are placed.

The most important distinction, on which our idea of the root

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To what may the stem and root be compared?—66. What are the differences between root and stem? To what may their differences be in some manner ascribed? What is the most important distinction?

and stem should be founded, is contained in the first part of our definition, that the root is the descending part of the axis of a plant. If it descends it is a root, and if it ascends it is a stem; we mean, of course, when they meet with no physical impediment.

67. The *forms* of roots are various, and receive different names in the descriptions of plants. Although various divisions have been made by different Botanists, yet great discrepancies exist, among them. We shall describe only the most common forms.

Fig. 28.

Branching root.

(1.) *Branching Root*, or *Radix ramosa*, Fig. 28. These roots are such as subdivide in the earth in a manner similar to the divisions of the stem, and are found exhibited in the forest trees and shrubs. This variety forms the true type of roots; and is the one from which our ideas of this organ are formed, as distinguishing it from the other organs of the plant.

Fig. 29.

Fibrous Root.

(2.) The *Fibrous Root*, or *Radix fibrosa*. This variety consists of numerous fibers proceeding from the neck of the plant, and may be seen in most grasses and grains. Fig. 29.

(3.) *Fasciculated roots.* When the fibers of roots become enlarged by the deposition of starch, they form this variety of root, as exhibited by the Dahlia, Peony, &c., Fig. 30.

Fig. 30.

Fasciculated roots.

(4.) The *Tap root*, or *conical root*, when the root sinks perpendicularly into the earth, and tapers regularly from the base to the apex with very few fibrous radicles, as in the Beet, Parsnip, &c., Fig. 31. This variety contains some of the most important garden vegetables, and it is seldom found

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67. What is a branching root? What is a fibrous root What is a fasciculated root? What is a tap root?

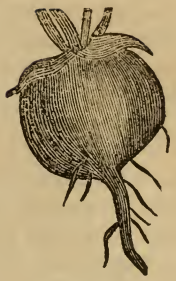
Fig. 31

Tap root.

Fig. 32.

Fusiform root

Fig. 33.



Napiform root.

of natural growth, being almost uniformly produced by cultivation.

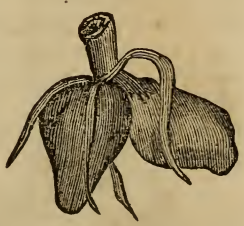
(5.) The *Fusiform Root*, or *Radix fusiformis:* where the root tapers toward each extremity, as seen in the Radish, it is known by the above name. Fig. 32.

(6.) The *Napiform Root* is that variety which is very large at the base, but tapers abruptly, as in the Turnip, Fig. 33.

The three preceding varieties are generally called, in distinction from the other varieties, simple roots, the most of the root being confined to the main axis, and sending off few small fibers.

(7.) The *Filiform Root* consists of a single filament, and is the root of some floating plants, as the Lemna.

Fig. 34.



Didymous roots.

(8.) *Didymous Roots* are those which produce a tubercle each year, and when the tubercle of one year arrives at nearly the dimensions of the one of the preceding year, they answer to the form indicated by the term applied to them; that is, double or twin roots. The Orchis affords examples of this variety, Fig. 34.

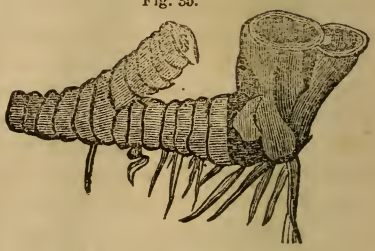
(9.) The *Palmated Roots* are such as differ from the preceding only in having the lobes divided, giving them somewhat the appearance of a hand. The Orchis affords examples of this variety.

68. The following varieties are generally classed as either stems or buds, but are, in common parlance, called roots, and we know of no disadvantage in complying with the popular arrangement by describing them under this organ.

What is a fusiform root? What a napiform? A filiform? Didymous? Palmated?—68. How are the remaining varieties classed?

(1.) The *Rhizoma* or *Rootstock* grows in nearly a horizontal direction, emitting roots from its under side, increasing by one extremity only, at which it puts forth leaves and flower-stems, and gradually dying at the other. Its surface is generally marked by irregular ridges formed by the bases of decayed leaves. The Calamus, Iris, Lily, and some of the grasses afford good examples of this variety, Fig. 35. The scaly roots come under the same variety, as is exhibited in the Hydrophyllum canadense.

Fig. 35.



Rhizoma root.

(2.) The *Cormus* (Fig. 36) is that variety which increases beneath the earth by the development of buds in the axils of the scales, but retains its globular figure, and propagates itself in no particular direction. The Tulip, Arum, Gladiolus, &c., afford examples.

Fig. 36.

Cormus root.

(3.) The *tuber* is an irregular fleshy body produced at the ends of the fibers sent out from the root. They consist in the Potato, which is the best example of this variety, of buds imbedded in cellular substance, consisting principally of starch, which is to become the food for the development of the buds. The buds are what are commonly called the eyes of the potato, and they form that part of it which is used by the farmer for propagating this useful vegetable.

(4.) The *bulb* is a leaf-bud inclosed in scales or concentric layers, and is found either at the base or summit of the stem, or in the axils of the leaves; and differs in no respect from the buds hereafter to be described, but in separating itself from the parent, and forming an independent individual. The Onion and Lily form examples of this variety. Fig. 37 gives an illustration of the bulb. The tree-onion, as it is called, bears bulbs on

Fig. 37.

Bulb root.

What is a rhizoma? The cormus? The tuber? Bulb?

the summit of its stem. The buttons, as gardeners term them, are of this character. Some species of the lily bear them in the axils of the leaves, and they separate from the stem and fall to the earth, and become plants bearing bulbs in their turn. Bulbs are sometimes distinguished into *scaly*, being covered with scales, as in the lily; and *tunicated*, being formed of concentric coats, as in the onion.

69. At the extremities and sides of the fibers of roots, small bodies are observed composed of lax cellular tissue, called *spongioles*, from their resemblance to sponge. It is through the spongioles that all the nourishment of the plant enters, that enters by the root. Duhamel, a long time since, observed that trees exhaust the soil at the extremities of the roots only, but it was reserved for Sennebier to demonstrate, by a very simple experiment, that the spongioles alone absorb fluids from the earth. This he did by taking two carrots of equal size, and immersing the whole of one in water, and the extremities of the roots of another. He found that they both absorbed an equal quantity; but by immersing the whole body of a third, keeping only the spongioles out of the water, none of the fluid was absorbed. When the spongiole is destitute of fluid, it contracts, and lies close to the fiber to which it is attached, and hence is not easily discovered in pulling up a root; but by immersing the fiber in a tumbler of water, the spongioles become turgid, and are easily observed.

Section 5.—*Buds.*

70. In the axil of the leaf of a dicotyledonous tree or shrub, we may observe in the early part of the summer a small protuberance, which will continue to increase until autumn; when it will have assumed the form of a conical body composed apparently of scales. This is the *bud*, which is destined in the following year to produce a branch, or flowers and fruit. These small bodies found in the axils of leaves, are vital points, in which seems to be deposited the vital power during the season of repose, and from which development commences as the season of vegetation returns. That they are important organs, and demand our strictest observation, is apparent from the fact of their being, in many instances in the vegetable economy, the seat of vitality; and it is from this circumstance that we are

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What are button onions? How are bulbs sometimes distinguished?—69. What are spongioles? Give the experiment of Sennebier.—70. Where are buds formed? What are they?

enabled to divide individual trees indefinitely by grafting, budding, and by layers. The *Leaf-Bud* may be defined to be the rudiment of a branch, which, in its development, it always produces. Buds are distinguished by different names, according to the point from which they spring. If they originate in the axils of the leaves, they are called REGULAR; if from any other part of the plant, they are called ADVENTITIOUS.

71. The *regular leaf-bud* has its origin in the pith and medullary sheath. The earliest view of the regular leaf-bud we can obtain by dissection, is in the form of an exceedingly minute green body, surrounded by a nearly transparent cellular substance situated in the stem immediately below the axil of the leaf. If we examine the buds of the same tree through the season, we shall find that the cellular part becomes opake, and its place is occupied by scales, and the central part increases, and becomes the apex of the bud. By a longitudinal section of the bud and stem at this stage, the rudiment of a branch may be distinctly traced under the microscope; the greenish medullary sheath and pith being separated by a white deposit from the greenish portion, which is to become the bark. There is a bud on the extremity of the branch called the *terminal bud*, similarly constituted to the axillary ones above described. The scales by which the rudimentary branch is inclosed, appear to be formed for this express purpose; but they are indurated, partially developed leaves, as one may readily convince himself by taking, in the spring, the bud of the Buckeye, when he will find the outer scale hard, dry, and with a uniform margin; but by removing one after another, he will find them gradually become soft, delicate, and lobed, being the miniature leaves of the plant. The leaves first developed are sacrificed for the protection of the remainder during the cold of winter. Plants of the torrid zone and annuals have no such covering, as, from the nature of the case, they need none; the *one* growing in a climate where the cold of winter is not felt, the *other* existing only through a period favorable for vegetation. The buds are not only inclosed in scales, but they are often provided with means which render their covering much more effectual in resisting outward influences. A resin is not unfrequently secreted by which the scales are attached to each other, and rendered proof against the action of water, as in the Balm of Gilead, the Poplars, &c. In others a coating of soft down is produced on the surface of the

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What is a leaf-bud? When regular? When adventitious?—71. What is the origin of the regular leaf-bud? Explain its growth. What of the scales of the bud? Do annual plants have scales? Do plants of the torrid zone? Why? What other means of protection do buds have?

scales, which affords an additional protection in the colds of winter, as in the Willow, and many others.

72. Buds, we remarked, were the rudiments of branches; but it sometimes happens, from some cause, that these branches are not developed at all; at others, they are only partly developed, receiving a check in their growth, and becoming thorns and spines. The student may readily convince himself of the fact, that thorns are partially developed branches, by observing almost any thorny bush at different times. The Plum often presents striking examples of it, on which the student may find the branch in every state of development; and the thorn of one year may receive an additional impulse the next, and become a branch.

73. Since the development of buds produces branches, it is plain that the arrangement of branches will be the same as that of buds; and as buds have their origin at the base of leaves, it is equally plain that the branches of trees follow the same arrangement as the leaves. If the leaves be alternate, the branches will be so; if opposite, the branches will have the same arrangement. It happens, however, that by the non-development of some of the buds, or the unequal elongation of the stem, the branches exhibit some diversity; but the reasons for any deviation may readily be seen, having, as they do, their foundation in the above facts.

74. *Adventitious buds* may have their origin in any point where there is an anastomosis of woody fiber. (*Lindley.*) Perhaps no subject in Botany has excited more interest, or has more completely eluded the research of philosophers, than the origin of adventitious buds. It is entirely removed from our observation. Every part of a plant, from the root to the flowers, seems to be endowed with the power, under certain circumstances, of developing buds; yet to determine the conditions on which their development depends, has thus far baffled every effort. Duhamel supposed that they had their origin from pre-organized germs, which are deposited by the proper juice in its descent from the leaves, and of course, pervade every part of the plant. This is mere hypothesis, with not a fact to establish its truth; yet, as Mr. Nuttall remarks, it is impossible to prove its falsity. Mr. Knight believed that they have their origin in the alburnous vessels, which he supposed possessed the power of generating central vessels, by which he means vessels of the

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72. Are the leaf-buds always developed? What do they become when partly developed? How may it be seen?—73. What must be the arrangement of branches? How is the diversity of branches explained?—74. Where may adventitious buds have their origin? Mention the theories on this subject?

medullary sheath. His hypothesis is founded on no better basis than that of Duhamel. Mr. Nuttall believes that buds are pre-organized germs, but that they have their origin in the first development of the stem or branch on which they put forth. There are decided objections to this theory, but our space forbids our entering into a discussion on the subject, or even fully stating the theories alluded to.

75. The structure of the adventitious buds is, in all respects, like the normal or axillary buds, having pith in their center, surrounded by spiral vessels, and inclosed by woody fiber and cellular integument. From the existence of spiral vessels in adventitious buds which arise from the root, we derive a strong argument in favor of the existence of spiral vessels in the latter organ, under a very slightly modified form; and from this and various other circumstances, we are led to believe that the constitution of the root and the stem is essentially the same, the difference observed being occasioned by the media in which they are developed. We have seen the common red plum, in the loose earth of a garden, put forth buds from a root with as much regularity as from the branches.

76. The buds seem to possess, in some respects, the nature of seeds, although in others they differ. The seed produces the species or original type, while the bud perpetuates the variety; hence the practice of grafting choice fruit. The bud will continue the characters of the individual variety, while the seed would produce merely the species, with perhaps none of the peculiarities of the plant from the fruit of which the seed was taken.

77. The *manner* in which the rudimentary leaves are folded up within the buds, is a subject of much curiosity and interest. Although the arrangement in different plants is very unlike, yet in the same species there is a remarkable uniformity. This subject has been termed *vernation*, or *gemmation*, or *præfoliation*.

(1.) *Appressed;* in which the surfaces of the leaves are applied to each other without being rolled, as in the Misletoe.

(2.) *Conduplicate;* when the leaves are folded inwardly upon themselves, and placed side by side, as in the Rose.

(3.) *Imbricate;* where they lie over each other, breaking joints, if we may use the expression; that is, when the middle of one leaf corresponds to the margin of the two within it, as in the Lilac.

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75. What is the structure of adventitious buds?—76. What do buds resemble? How do they differ?—77. What is vernation? When appressed? Conduplicate? Imbricate?

(4.) *Equitant;* when the leaves are folded around each other, with the midrib of one corresponding to the margin of the one contiguous to it, as in the Iris.

(5.) *Obvolute;* when one margin of a leaf incloses the margin of a leaf opposite, the remaining margin of each being outward, as in the Sage.

(6.) *Plaited;* folded like a fan, as in the Vine.

(7.) *Involute;* when the margins of the leaves roll inward, as in the Violet.

(8.) *Revolute;* where the margins are rolled outward, as in the Willow.

(9.) *Convolute;* where one leaf is rolled within another, as in the Cherry.

(10.) *Circinate;* where it is rolled from the apex downward, as in the Sundew (Drosera).

Section 6.—*Leaves.*

78. *Leaves* are organs arising at regular intervals along the main axis or branches, having their origin at a node. The spaces of the stem between the leaves are called *internodes.* They are expansions of the parenchymous portion of the bark, with the spiral vessels and woody fiber of the medullary sheath traversing them. The spiral vessels and woody fiber connect the leaf with the center of the stem, and these vessels are expanded on the upper surface of the leaf. The cellular tissue, liber, and lactiferous vessels connect it with the bark, and are expanded on the under surface of the leaf. A leaf consists generally of a petiole and lamina. The *petiole*, which is the support of the lamina (Fig. 38, *a*), consists of cellular and vascular tissue, and woody fiber. The vascular tissue and woody fiber are formed into bundles, the spiral vessels occupying the center of the bundle, and the woody fiber forming a sheath around them. The bundles are imbedded in the cellular tissue, as may easily be seen by observing a transverse section of the petiole of a leaf. The dots observed on the cut surface are these bundles. The *lamina* (Fig. 38, *b*) of the leaf consists of the expansion of the petiole, the materials of its composition being of course the same, but differently arranged. When

Fig. 38.

Equitant? Obvolute? Plaited? Involute? Revolute? Convolute? Circinate?—78. What are leaves? How connected with the center of the stem? How with the bark? Of what does it consist? How is the fibro-vascular system arranged? Of what does the lamina consist?

the bundles of vascular tissue enter the lamina, they divide, and proceed in various directions in different plants, but always in the same manner in the same species, forming the veins (Fig. 38, *c*) of the leaves. The continuation of the petiole forms the middle and largest vein of the leaf, called the *midrib* (Fig. 38, *d*). Those veins arising from the midrib are called *primary*, the branches of the primary are called *secondary*, and the further subdivisions of the veins are called *veinlets*.

The petiole is often wanting when the leaf is said to be *sessile*, and the midrib is often undistinguishable from the veins.

79. The arrangement of the leaves on the stem is various, but in the same species it is uniform: a beautiful symmetry is established in every variety. Sometimes they are arranged in opposite pairs, with one pair at right angles with the pair above or below it; at others they alternate with one above the other, on nearly opposite sides of the stem. The alternate leaves, however, are generally arranged in a spiral form. They are not on exactly opposite sides of the stem. The student will observe, that by taking any leaf on a branch on which the leaves are arranged alternately, he will notice that the second leaf above or below the one observed does not come *immediately* above or below it; but he must pass several pairs before he will find one corresponding exactly with the one first noticed. On the Cherry, or Althea, for instance, he will pass two pairs before he will find one exactly over the one observed. Here two turns of the spire take place before the generating point corresponds with the one below it. Opposite leaves sometimes become alternate, but we believe that they are always exactly on the opposite parts of the stem, never forming the spiral arrangement of common alternate leaves; and the cause of this alternation is undoubtedly the unequal development of the two sides of the stem. It sometimes happens that several opposite pairs are developed on the same horizontal section of the stem, and are called *verticillate*, but the bases of the leaves of any *whorl* are not immediately under the bases of the leaves of the next *whorl* above it; but those of the second whorl correspond with them; so that of four whorls the bases of the first and third correspond, and the second and fourth, and so on. The Pine presents a striking example of the spiral arrangement of organs. If we examine the extremity of a branch covered with leaves,

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What is the midrib? What are primary veins? Secondary? When are leaves said to be sessile?—79. What is said of the arrangement of leaves? How are alternate leaves arranged? Illustrate it. How in the cherry? How do opposite leaves become alternate? How are whorls formed? How in the pine?

we shall readily discover that they are arranged spirally; and by cutting off the leaves composing one spire, we shall find that they do not form a single spire, but a compound one, consisting of three or four spires running parallel to each other. The above are the different arrangements of leaves, but there seems a tendency in opposite and verticillate leaves to assume the spiral arrangement, without, however, varying their relative lateral position; and this is true of all modifications of leaves. There is not only a disposition of the leaves, but of all vegetable productions to assume a spiral arrangement. The stems of plants take, in almost all cases, more or less of the spiral growth, however straight the stem may be. We may see this also in the epidermis of various trees, and more particularly in the stems of twining plants, as the hop and ivy.

80. The spiral arrangement of leaves has excited much interest recently; and Braun, a German naturalist, has applied mathematical formulæ to express the elements of the spires in different species, and for determining their constitution. "All the spires depend upon the position of a fundamental series, from which the others are deviations. The nature of the fundamental series is expressed by a fraction, of which the numerator indicates the whole number of turns required to complete one spire, and the denominator the number of scales or parts that constitute it. Thus $\frac{8}{21}$ indicates that eight turns are made round the axis before any scale or part is exactly vertical to that which was first formed; and the number of scales, or parts that intervene before this coincidence takes place, is 21," which occurs in the Corylus, Plantago lanceolata. $\frac{2}{5}$ expresses that the leaves, buds, or scales make two turns before a leaf, scale, or bud is exactly above the one from which we start, and that there are five of them. This is the most common variety. Cherry, Althea, Potato, Peach, &c., are of this variety; $\frac{1}{2}$ includes the spikes of the grains; $\frac{3}{8}$ includes the Bay, Holly, &c.; $\frac{5}{13}$ expresses the elements of the spire in some of the *pines*. Prof. Lindley remarks, that "it does not, however, appear that this inquiry has led to any thing beyond the establishment of the fact that, beginning from the cotyledons, the whole of the appendages of the axis of plants—leaves, calyx, corolla, stamens, and carpels—form an uninterrupted spire, governed by laws which are nearly constant."

81. Leaves usually present surfaces of different appearance,

What disposition in plants? Where may we see it?—80. Who applied mathematics to this subject? Explain its application.—81. What is said of the different surfaces of leaves?

the upper smooth, green, and shining, the under surface generally with the ribs prominent, of a lighter green, often hairy, and abounding in stomata or pores. The particular position which a leaf assumes, is necessary to its properly performing its functions, and even to its existence; for if a leaf be inverted, it withers and dies. The deeper tint of the upper surface of leaves is owing to the greater compactness of the parenchyma.

82. The first organs that appear in dicotyledons after germination, are the cotyledons themselves, or the lobes of the seed, which supply the young plant with food, till it becomes furnished with organs for obtaining it from other sources. Before the cotyledons become exhausted, leaves are produced, which are called *primordial* leaves, which seem to possess an organization a degree more elevated. These leaves often differ materially from the succeeding true leaves of the plant, and seem to form a kind of medium between the cotyledon and true leaves. A similar course is followed by monocotyledons; but as the cotyledon does not rise above the earth, this organ is not observed. When leaves have their origin at, or below the surface of the earth, seeming to come from the root, they are called *radical leaves*, although it is not strictly a correct term; as it seems to imply that the leaves originate from the root, which is not the case; the root, under ordinary circumstances, not producing leaves. Leaves having their origin on the main stem, are called *cauline;* those arising from branches are distinguished by the term *rameal:* when leaves are found among the flowers or on flower-bearing branches, they are called *floral leaves.*

83. The structure of the leaf demands the most careful attention, both from the singularly curious arrangement of its parts, and the manifest design exhibited in fitting it for the various functions it is found to perform. Although to the common observer the leaf appears a very simple organ, composed only of fibrous veins, and cellular substance; yet, by the aid of the microscope it is found to be one of the most complicated of the vegetable organs. The leaf is covered, like the other parts of the plant, by an epidermis, except such as are submerged in water, and is furnished with pores or stomata. These pores, in most plants, are more numerous on the under than on the upper surface. In leaves which grow nearly perpendicularly

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Is the particular position of a leaf necessary?—82. What are the first organs that appear? What are primordial leaves? What are radical leaves? What cauline? What floral?—83. With what is the leaf covered? What are stomata? On which surface most numerous? How with perpendicular leaves?

the pores are more equally distributed on both surfaces, as in the Iris. Those leaves which lie upon the water have no pores on the under surface; the upper surface performing the functions usually belonging to the under side.

84. The parenchyma appears to the unassisted eye a mass of irregularly arranged cells; but by careful examination, aided by the microscope, we find a remarkable regularity in the arrangement of the cells. If we take a thin slice, made by a vertical section, of the leaf of an Apple or Peach, and observe it by a good magnifier, we shall find immediately beneath the cuticle, which consists of a single row of cells, two or three layers of cylindrical cells arranged perpendicularly to the surface, with very small intercellular cavities. Between them and the under surface are four or five rows of similar cells, but differently arranged, touching each other by their ends, and lying inclined to the surface of the leaf, forming comparatively large cavities, particularly immediately beneath the stomata. Fig. 39 exhibits a type of the arrangement of dicotyledons; that side of the leaf which is furnished with stomata being cavernous, and the opposite side more compact. Those leaves which have the stomata equally distributed on both surfaces, and those also which have no stomata, have cells of the parenchyma of the two surfaces similarly arranged.

Fig. 39.

Internal structure of a leaf.

85. The veins of the leaf, which ramify in every direction through the parenchyma, are composed of vessels inclosed by a sheath of woody fiber. These veins serve two purposes, that of giving form and support to the parenchyma, and affording channels for the circulation of the sap to the various parts of the leaf, and returning it to the stem. The veins are largest where they enter the leaf, and decrease as they proceed and ramify, till they are lost to our observation in the cellular tissue. There are two separate venous systems in the leaf, one over the other, connected by the extremities of the veins; the upper one being the system through which the sap passes into the leaf, while the lower conveys it after elaboration back into the stem. It is generally difficult, and often impossible, to distinguish these

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With those that lie on water?—84. What is the arrangement of the cellular tissue in the section of an apple-leaf? How is that side of the leaf containing stomata?—85. What two purposes do the veins of leaves accomplish? How many systems? How arranged?

two systems; but by maceration some leaves will separate into two laminæ. It is recorded of an East India plant, that the cohesion of the two plates is so slight that the laminæ may be easily separated, and the hand inserted between the surfaces, as in a glove.

86. The leaves of trees have a general position, nearly parallel with the earth. The upper side, exposed to the direct action of the sun's rays, lest evaporation should take place too rapidly under such circumstances, has few or no pores, and the cells being of a cylindrical form, are arranged with their ends toward the surface, thus presenting the least surface of each cell to the influence of the solar rays, by this arrangement limiting their influence. Here we observe three precautions taken, evidently to prevent excessive evaporation. Again, those leaves whose sides are equally exposed to the action of the sun's rays, are equally furnished with these evaporating pores; the number in this case determining the evaporation. In leaves floating upon the surface of the water, it is evident that pores on the under surface would avail nothing in evaporation, and perhaps be destructive to the organ; but the upper surface, in this case, is furnished with numerous exceedingly minute pores connected with deep narrow cavities next the surface, and these are connected with larger ones in the interior; so that by this arrangement evaporation can take place but slowly; Nature using these precautions where she seems obliged to use the upper surface to perform an indispensable function, which without such precaution would endanger the safety of the plant. Leaves developed under water have no stomata, and no fibro-vascular system, but consist entirely of cells, forming cavities in their interior which are filled with air to float the leaf.

87. *Forms of Leaves.*—By the arrangement and development of the veins and parenchymous system of leaves, every variety of form which leaves assume may be reduced to three varieties.

(1.) *Fork-veined* leaves are those in which the primary veins divide into two nearly equal secondary veins, forming a fork, and these subdivided in the same manner. The veins always proceed directly from their origin to the margin of the leaf, without forming any meshes or network, as is exhibited

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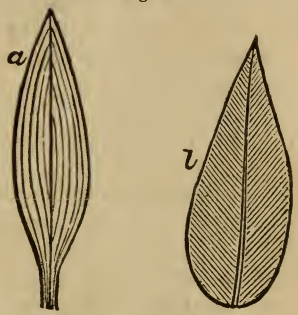
May they be separated? In what plant especially?—86. What is the position of the leaves of trees? What prevents excessive evaporation from the upper surfaces? How with perpendicular leaves? Those floating in water? Leaves under water?—87. How many varieties of forms of leaves? What are fork-veined leaves?

by a leaflet of the Aspidium (Fig. 40). This variety of venation belongs to the *ferns*, and is a distinguishing characteristic of this class of plants.

Fig. 40.

Fork-veined leaf.

Fig. 41.



Parallel-veined leaves.

(2.) *Parallel-veined* leaves are those in which the veins proceed from their origin to their termination without any subdivision; the veins being connected by minute, parallel, straight veinlets, passing perpendicularly from one to the other. The veins of this variety either run from the base of the leaf to the apex, as in Corn, the Lily, Grains, and as seen in Fig. 41, *a*; or from the midrib to the margin, as in the *Canna* and *Arum Walteri*, &c. (Fig. 41, *b*). Of this latter variety there are *comparatively* few specimens in temperate climates, but they become more abundant as we approach the equatorial regions. Parallel-veined leaves are characteristic of monocotyledons.

(3.) *Reticulated* or *net-veined* leaves are those the veins of which branch and ramify in all directions, forming a complete network. (Fig. 42.) This variety of leaves is characteristic of dicotyledonous plants, and they are the most varied in their forms, and comprise the greater proportion of leaves of temperate climates.

88. There are two varieties of venation in the reticulated leaves, occasioned by the origin of the primary veins. If the veins take their rise along the midrib and proceed to the margin, giving the leaf, in structure, a resemblance to a feather, it is called the *Feather-veined*. When the veins that originate at the base

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To what class of plants do they belong? What are parallel-veined leaves? Examples? What are reticulated veined leaves? What class of plants do they characterize?—88. How many varieties in reticulated veined leaves? What are feather-veined leaves?

of the midrib are nearly or quite as large as the midrib itself, they are called *ribbed* leaves. When the petiole expands from its summit at nearly right angles, and in all directions, it constitutes the *radiated* form of leaves. The end of the leaf, toward the stem, is called the *base*, the opposite end the *apex* or summit.

Fig. 42.

Reticulated veined leaf.

89. The figure or outline of leaves is produced by the development of the veins and the cellular tissue.

The more common forms are the following:—When a leaf is bounded by a regular curve, and is three or more times as long as it is broad, it is called *oval* or *oblong*. (Fig. 43.)

It is said to be *ovate* when it has the outline of the longitudinal section of an egg. (Fig. 44.)

Lanceolate, when it is three or more times as long as it is broad, and rounded at the base, and tapering at the apex. (Fig. 45.)

Fig. 43.

Oblong leaf.

Fig. 44.

Ovate leaf.

Fig. 45.

Lanceolate leaf.

Ensiform, when it is sword-shaped, being very long compared with its width, as in the Iris and Flag.

Reniform, when it is kidney-shaped. (Fig. 46.)

Spathulate, broad at the apex, and gradually tapering into the petiole. (Fig. 47.)

What are ribbed leaves? What are radiated leaves? What is the base of a leaf? The apex?—89. How is the form of a leaf produced? What is an oval leaf? Ovate? Lanceolate? Ensiform? Reniform? Spathulate?

Fig. 46.

Reniform leaf.

Fig. 47.

Spathulate leaf.

Fig. 48.

Cordate leaf.

Cordate, having the base rounded in the shape of a heart (Fig. 48.)

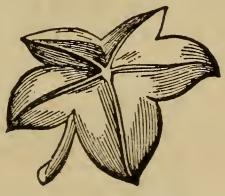
Orbicular, nearly circular (Fig. 49)—Radiate venation.

Peltate, with the petiole inserted in the lamina, but not in the center of it. (Fig. 50.)

Fig. 49.

Orbicular leaf.

Fig. 50.



Peltate leaf.

Fig. 51.

Subulate leaf.

Subulate, in the shape of an awl. (Fig. 51.)

Sagittate, shape of an arrow-head. (Fig. 52.)

Hastate, shape of a spear-head. (Fig. 53.)

Cuneate, wedge-shaped, tapering gradually to the base. (Fig. 54.)

Fig. 52

Sagittate leaf.

Fig. 53.

Hastate leaf.

Fig. 54.

Cuneate leaf.

Linear, narrow and long, and nearly of the same width in all its parts. (Fig. 55.)

Fig. 55.

Linear leaf.

Cordate? Orbicular? Peltate? Subulate? Sagittate? Hastate? Cuneate? Linear?

Perfoliate, when the stem appears to pass through the leaf, sometimes occasioned by opposite leaves united at their base,

Fig. 56.

Perfoliate leaf, caused by the union of two opposite leaves.

Fig. 57.

Perfoliate leaf, caused by the union of the lobes of the leaf.

as Fig. 56; at others, by the lobes of the leaf uniting on the opposite side of the stem. (Fig. 57.) The term *lobed* applies to divisions that extend about half way through the leaves.

Auriculate, having lobes at the base of the leaf. (Fig. 58.)

Pedate, in shape like a foot. (Fig. 59.)

Fig. 58.

Auriculate leaf.

Fig. 59.

Pedate leaf.

Fig. 60.

Hatchet-shaped leaf.

Dolabriform, axe or hatchet shaped. (Fig. 60.)

Acinaciform, scimitar-shaped. (Fig. 61.)

Lyrate, with the terminal lobe much the largest. (Fig. 62.)

Fig. 61.

Acinaciform leaf.

Fig. 62.

Lyrate leaf.

Fig. 63.

Digitate leaf.

Perfoliate? What is meant by lobed leaves? Auriculate? Pedate Dolabriform? Acinaciform? Lyrate?

Digitate, spreading like the fingers of the hand. (Fig. 63.)

90. The above are the simple forms. It is very frequently the case that two of the forms will combine, and then the leaf receives a compound name.

Ovate-lanceolate, when it is too long to be strictly ovate, and gradually tapers to the extremity, resembling an ovate leaf in some respects and a lanceolate one in others.

Ob-cordate, heart-shaped, with the small end towards the stem.

Ob-ovate, egg-shaped, with the small end towards the stem.

91. The edges of leaves are variously formed by irregularities, and receive specific names, of which the following are most common. If the edge is uniform, it is said to be *entire*.

Serrate, having teeth like a saw, the points directed toward the apex. (Fig. 64.)

Dentate, when the teeth are perpendicular to the edge, with the sides equal. (Fig. 65.)

Bidentate, large teeth with small ones on them. *Biserrate*, with similar application.

Fig. 64.

Serrate leaf.

Fig. 65.

Dentate leaf.

Fig. 66.

Crenate leaf.

Fig. 67.

Repand leaf.

Crenate, when the teeth are rounded at their points. (Fig. 66.)

Repand-toothed, when it is hollowed out between the teeth, but the teeth are sharp. (Fig. 67.)

Sinuate-toothed, when the teeth and intermediate angles are rounded. (Fig. 68.)

Fig. 68.

Sinuate leaf.

Fig. 69.

Ciliate leaf.

Fig. 70.

Erose leaf.

Digitate?—90. What is an ovate-lanceolate leaf? Ob-cordate? Ob-ovate?—91. What is an entire leaf? Serrate? Dentate? Bi-dentate? Crenate? Repand-toothed? Sinuate-toothed?

Ciliate, when the teeth and angles are very acute. (Fig. 69.)

Erose, when the edges of the leaf look as though they were bitten or gnawed. (Fig. 70.)

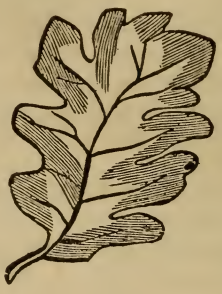
Palmate, when divided so as to resemble a hand. (Fig. 71.)

Sinuate-lobed, when the depressions are broad at the bottom. (Fig. 72.)

Fig. 71.

Palmate leaf.

Fig. 72.



Sinuate-lobed.

Fig. 73.

Pinnatifid leaf.

Pinnatifid, when the lobes go near to the middle. (Fig. 73.)

Runcinate, when the divisions of a pinnatifid leaf are more or less triangular, and pointing downwards. (Fig. 74.)

Panduriform, when there is a concavity on each side of a leaf, so as to make the leaf resemble a violin. (Fig. 75.)

Fig. 74.

Runcinate leaf.

Fig. 75.

Panduriform leaf.

Fan-shaped or *Flabellate*, as in the Palmetto. (Fig. 76.)

Pectinate, comb-shaped. (Fig. 77.)

92. The *extremities* of leaves are *acute* when they terminate in a sharp point. (Fig. 78.)

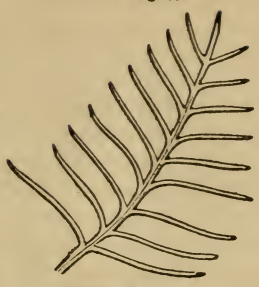
Obtuse, when the extremity is blunt. (Fig. 79.)

Ciliate? Erose? Palmate? Sinuate-lobed? Pinnatifid? Runcinate? Panduriform? Fan-shaped? Pectinate?—92. When is a leaf said to be acute? When obtuse?

Fig. 76.

Fan-shaped leaf.

Fig. 77.



Pectinate leaf.

Fig. 78.

Acute apex.

Acuminate, when the extremity is elongated beyond what would form the regular figure of the leaf. (Fig. 80.)

Emarginate, having a notch at the end. (Fig. 81.)

Fig. 79.

Obtuse apex.

Fig. 80.

Acuminate.

Fig. 81.

Emarginate.

Mucronate, terminating by a spine. (Fig. 82.)

Truncate, when it has the appearance of having been cut off. (Fig. 83.)

Retuse, slightly depressed at the apex with a waved margin. (Fig. 84.)

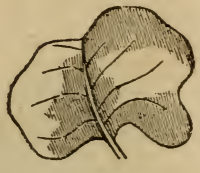
Fig. 82.

Mucronate.

Fig. 83.

Truncate.

Fig. 84.



Retuse apex.

In the earliest stages of growth all leaves are simple, the articulations being the result of growth.

93. *Compound leaves* are those which have the laminæ articulated to a common petiole. This fact must be borne in mind as the real distinction between simple and compound leaves.

Acuminate? Emarginate? Mucronate? Truncate? Retuse?—93. How are all leaves in their earliest stage? What are compound leaves?

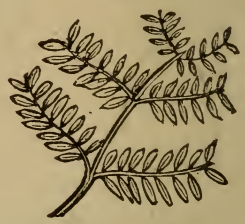
No matter how much the lamina may be divided, if the divisions are not articulated to a common petiole, the leaf is simple; and if the lamina is not divided at all, but articulated to the petiole, the leaf is compound, as in the Orange. The principle of formation of this class of leaves will be readily understood by the above explanation of simple leaves.

94. All compound leaves may be reduced to two varieties, corresponding to the *feather*-veined and *radiated* forms of reticulated leaves. If we recur to the feather-veined leaf given above, and conceive each of the primary veins with the secondary veins belonging to it, to form a distinct lamina, we should have a true type of the *Pinnate* leaf, as exhibited in the Vicia, Pea, &c., and by the continuation of the petiole we have the *tendril* (Fig. 85); and by continuing our supposed dissection of the Chestnut, and conceiving not only each primary vein as being

Fig. 85.

Pinnate leaf.

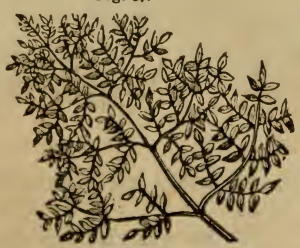
Fig. 86.



Bipinnate leaf.

independent of the others, but each secondary one forming a lamina, and the primary vein becoming a common petiole for them, we then shall have the type of the *bipinnate* leaf, as exhibited in Fig. 86. We may conceive this division to go on

Fig. 87.



Tripinnate leaf.

Fig. 88.

Unequally pinnate leaf.

94. To what varieties may all compound leaves be reduced? What is a pinnate leaf? When bipinnate?

still further and form the *tripinnate* leaf, as in the Thalictrum (Fig. 87), and it even exceeds this subdivision when the term *supra-decompound* is applied to them, no matter how far the divisions may extend. When the midrib is terminated by a leaflet, the leaf is said to be unequally *pinnate*. (Fig. 88.)

95. The radiated form of reticulated leaves often assumes the compound structure, as in the Æsculus, Lupinus, Clover, &c. (Fig. 63), and are then called *digitate*. If there are three leaf

Fig. 90.

Ternate leaf.

lets, it is called a *ternate* leaf. (Fig. 90.) If subdivided by three, they are *bi-ternate*, *tri-ternate*, &c. (Fig. 91.)

96. Besides the preceding varieties of leaves, which may be considered their common forms, they often assume a variety of modifications which deserve a special attention. These variations arise from a variety of causes, which will be noticed under the several examples which we shall adduce. A cohesion of

Fig. 91.

Biternate leaf.

parts not unfrequently creates a variation from the usual form. When two leaves unite by their bases, they are *connate*. When leaves adhere to the stem, forming a kind of wing beneath, then they are said to be *decurrent*. The bases of the upper leaves of the *Caprifolium sempervirens* are brought in contact from the unusual development of both systems of the leaf, and they grow together, forming a *perfoliate* leaf. The same takes

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When tripinnate? If farther divided, what are they called? What is an unequally pinnate leaf?—95. What is a digitate leaf? When called ternate? Bi-ternate? Tri-ternate?—96. When are leaves said to be connate? When decurrent? When perfoliate?

place in many other plants, and the occurrence differs in no respect from what happens in the production of twin apples and other similar formations, except in its uniformity, which De Candolle denominated constant accidents. Why it should uniformly occur, and only in the upper leaves, we are unable to explain by any secondary cause with which we are acquainted; but by examination of the leaves, we are irresistibly led to the conclusion, that the slight variation in the direction of the veins and the great development of the parenchyma are the causes of the phenomenon. The other leaves are of the oval lanceolate form, with the veins forming acute angles with the midrib; but in the perfoliate leaves the veins pass off at nearly right angles, with a much more abundant production of the parenchyma, thus uniformly accomplishing in this case what occasionally happens in other vegetables. Perfoliate leaves occur, from the same cause, in the alternate varieties, by the union of the lobes, of what would otherwise form a cordate leaf, as in the *Uvularia perfoliata*. But the most singular variations produced by the operation of this cause, occur in the pitcher-like leaves. Our common *Sarracenia* (Side-saddle flower) is produced by the cohesion of the edges of the leaf, or, as it is most generally supposed, of the petiole only, and the expansion at the top of the cup is thought to be the real lamina, which is probably the case. The *Nepenthes* or *Pitcher-plant* of India, presents a still more striking instance of variation, and partly from the cause under consideration. This singular leaf, exhibited in Fig. 92, rises from the stem with a round com-

Fig. 92.

Leaf of the pitcher-plant.

mon petiole, like most other leaves, which soon expands into a lamina, and afterwards becomes round, long, and slender, resembling a tendril. At the extremity of this tendril is developed the pitcher, with a lid closely fitting its orifice. The whole of this curious production, except the lid, is supposed

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How in alternate leaves? How is the leaf of the Sarracenia constructed How the Pitcher-plant?

to be the petiole, which at first assumes the common form, and afterwards becomes a *Phyllodium* (as a leaf-like expansion of the petiole is called), and is succeeded by the tendril, and finally, by the cohering of its edges, forms the pitcher, whose lid is the lamina of the leaf.

97. An unusual development of certain parts often produces great variations from the regular form. The petiole is the part of the leaf that experiences most frequent changes from this cause. In the *Dionæa muscipula*, we find the petiole expanded into a phyllodium, and terminated by the lamina, bearing much less the appearance of this part of the organ than the petiole. The Orange, also, has an expanded petiole, with the lamina articulated to its extremity. We have described, by authors, foreign plants exhibiting remarkable variations from any regular type, in some of which the petiole is developed apparently at the expense of the lamina, which is either entirely wanting or but imperfectly developed. The leaves of the Onion are supposed to be a development of the petiole with no lamina, and many of the leaves of the monocotyledons are supposed to be of the same nature, as the Iris, Calamus, &c. The excessive development of the cellular substance in leaves often causes great diversity in appearance, as in the various species of the Mesembryanthemums (Ice-plant). This cause operates to produce the singular forms observed in the different species of this genus. In the Begonia, the parenchymous development on one side of the midrib is much greater than on the other, thus producing the *oblique* or *one-sided* leaf.

98. A want of development and hardening of the parts often produces deviations from the usual forms. The existence of spines at the extremities of the lobes of the Holly is owing to these causes, and in some radiated leaves the veins seem to be converted into spines, and in a species of the *Prosopis* "one half of the leaflets contracts into a spine, while the other half remains leafy. But the most singular instance of this kind of deviation occurs in a palm called the Desmoncus, in which the upper leaflets of its pinnated leaves contract and curve into scythe-shaped hooks, by which the *Desmoncus* climbs, while the lower leaflets retain the usual appearance of leaves."

99. The petiole is sometimes entirely wanting, but at others excessively developed. In sessile leaves it is absent, but in the *Nymphæa odorata*, a Water-lily, it is even six or eight feet

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What is a phyllodium?—97. Explain the Dionæa: the leaves of the Onion. What various forms by parenchymous development?—98. What from want of development in the Holly? What in Desmoncus?—99. What different states of the petiole? How in sessile leaves? How in the Water-lily?

long. In the Palm, Palmetto, and other tropical plants, it is much longer, and assumes more the appearance of a branch than a petiole. The lamina varies, also, from the size of the minute scale-like leaves of the Moss to the prodigious dimensions of some tropical leaves. These organs, in general, bear no proportion in size to the plants on which they are found. On some species of the Oak, of the most sturdy kind, the leaves are small, but feebly corresponding with the gigantic tree itself, while the leaves of the *Rheum rhaponticum* (Pie-plant) are exceedingly large. The plant itself, divested of its leaves, is comparatively insignificant in size.

100. The duration of leaves is various. Some fall almost as soon as developed, and are then said to be *caducous;* others remain till the end of the summer, and fall with the cessation of vegetation, when they are called *deciduous;* while others remain during the winter, and are denominated *persistent*, producing the various evergreens of our forest. Various hypotheses have been formed to account for the fall of the leaf, but the most satisfactory one, to our mind, is that given by Professor Lindley, which is, that while the stem and leaf are both increasing in size, there is an exact adaptation of the base of the leaf to the stem, and no interruption takes place; but when the leaf becomes perfectly developed, and is susceptible of no further increase, the stem continues to enlarge by the deposition of new matter from the leaves above, which breaks the joining vessels, and the leaf of course falls. The breaking of the vessels may be easily observed in the leaves of the *Magnolia heterophylla;* hence the reason for the fall of leaves on the lower part of a stem first. It would seem from the above, that the duration of leaves depends upon the time that they are capable of adapting themselves to the stem on which they grow. Some can exist only for a few days, others through the summer, while the evergreens are so constructed as not to be dislodged but by the growth of the wood of the succeeding year.

Section 7.—*Stipules and Tendrils.*

101. At the base of many leaves we meet with two leaf-like organs, separated by the substance of the base of the petiole,

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Palm? Palmetto? How does the lamina vary? Are the leaves proportional to the size of the plant on which they are found? Illustrate it by examples.—100. What is said of the duration of leaves? When caducous? Deciduous? Persistent? What causes the fall of the leaf?

which are called *stipules*. (Fig. 93.) Stipules frequently fall off upon the development of the leaf, when they are called CADUCOUS; at other times they remain as long as the leaf, and are called PERSISTENT. In the former case they are attached only by their base to the stem; in the latter, they are connected with the petiole and fall only with it. In opposite leaved plants, the stipules corresponding to the two leaves are generally united, forming but two stipules instead of four. The Hop affords an example of this kind. The stipules are in many respects analogous to leaves, and even have buds in their axils, as in the Peach, and in some instances are very much like them in appearance, as in the Pea. In others, they bear no resemblance to the leaves, but are simple membranous appendages, as in the Hickory, or fine bristles, as in the Cherry. They assume a great variety of appearances, by various modifications of structure and attachment. In the Rose, they are attached to the petiole, forming a leaf-like margin to that organ. In the Polygonum and Rhubarb, they form a sheath round the stem by the union of their edges, and are then called OCHREÆ. In some plants, they become hardened and conical, and form spines. In climbing plants, they often lengthen into a slender thread-like appendage, and become the organ by which the plant attaches itself to objects over which it climbs; thus forming for the plant the means of support. But, however various may be their appearances, and however unlike in structure, yet if they originate from the base of a leaf, they are stipules.

Fig. 93.

Stipules.

Fig. 94.

Tendrils.

101. What are stipules? How are they in opposite leaved plants? How in different plants mentioned? What is an ochrea? How in climbing plants?

102. *Tendrils* (Fig. 94) are thread-like organs, by which the plant attaches itself to neighboring objects. Whatever may be their origin, if they correspond to the above definition, they are denominated tendrils. In some plants, they are modifications of branches, as in the Vine; in others, they are the extension of the midrib of the leaf, as in the Vicia and Pea; in others, modifications of the stipule, as above noticed. It is said that the petals sometimes become tendrils, and support the plant, as in the genus Strophanthes, an African plant.

CHAPTER III.

103. The *Organs of Reproduction* compose the *flower*, which consists generally of the *calyx*, *corolla*, *stamens*, and *pistils*. Although all of these organs enter into the composition of most flowers, yet it is by no means necessary that they should all be present. A flower consists of one or more whorls of modified leaves, arising from an axis whose internodes are not developed. All the organs of reproduction are simply modified leaves. A *perfect flower* is one that has stamens and pistils, without reference to the presence of the calyx or corolla. When these latter organs are wanting, and the stamens and pistils have no envelopes, the flowers are said to be *achlamydeous*, or destitute of covering, as the word signifies. They have sometimes a single envelope, and are said to be *monochlamydeous*, or having a single covering, and this envelope is called the *calyx*. At other times, they have a double envelope, and are called *dichlamydeous*, or having a double covering. In this last case, the outer envelope is called the *calyx*, and the inner the *corolla*. By strictly adhering to the above definitions, all flowers which do not have a double envelope have no corollas, whatever may be the appearance of the envelope which is present. The Lily, Anemone, and many other showy flowers, have, correctly speaking, no corolla. It is not unfrequently the case, that there are several rows of envelopes, and so nearly of the same constitution and appearance, as to be undistinguishable from each other. In such cases, the calyx and corolla are said to be *confounded;* that is, they cannot be distinguished,

102. What are tendrils?—103. What are the organs of reproduction? What is a perfect flower? When achlamydeous? When monochlamydeous? What called? When dichlamydeous? What called? When are the envelopes said to be confounded? What is it called?

as in the Calycanthus, and the whole is called in such cases a *perianth.*

104. The word *calyx* is derived from a Greek word (*calux*), which signifies a covering, and is a generic term applied to designate every form of the external envelope which surrounds the stamens and pistils. The general distinguishing characteristics of the calyx are—that it is the outer covering of the flower, green, smaller than the corolla, more firmly attached to the plant, and having more the appearance of leaves. Although the above may be considered as designating this organ in most plants, yet there are numerous exceptions to it. The first part of the definition, that it is the outer covering, is the only characteristic that never varies. It is sometimes even more brilliant in its colors and larger than the corolla itself, and instead of being more permanent, in some species of plant it falls even before the corolla expands; but these are exceptions to a general fact.

105. When the calyx consists of a single piece, it is said to be *monosepalous*, or *gamosepalous*—the latter a term invented to indicate the union of several sepals in forming the calyx. Each leaf of the calyx is called a *sepal.* When it is composed of several distinct leaves, it is called *polysepalous.* In the gamosepalous calyx, that portion formed by the union of the sepals is called the tube; the expansion at the top is called the limb. If the calyx takes its rise below the ovary or seed-vessel, it is said to be *inferior;* if from the summit of the ovary, it is said to be *superior.* The *origin* of the calyx, in both cases, is undoubtedly the same—that is, from beneath the ovary; but in the superior calyx it becomes firmly united to the ovary, and forms a part of it, as in the Apple. The Rose and a few other plants form exceptions to the above, as what appears to be the cup-like calyx of the Rose is considered an expansion, or hollowing out, of the summit of the pedicel in which the calyx is situated.

106. *Corolla.*—As we above remarked, when there are two floral envelopes, the interior is called the *Corolla.* A corolla is said to be regular when the parts are equally and uniformly developed on all sides of the center of the flower. The divisions of the corolla are always alternate with those of the calyx.

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104. What is the calyx? What are its characteristics? Which never varies? How with the others?—105. What is each leaf of the calyx called? When the sepals are united into one piece, how is the calyx said to be? When composed of several pieces? When inferior? Superior? How in the Rose?—106. What is the corolla? When is it regular? How are the divisions of the corolla and calyx in relation to each other?

The individual leaves of which the corolla is composed are called *petals*, and if the petals are united by their margins, forming a *tube*, the corolla is said to be *monopetalous* or *gamopetalous;* if they are distinct, it is called *polypetalous*. The orifice of the tube is called the *throat*.

The forms assumed by *gamopetalous* corollas are various, and have received characteristic names, the principal of which are the following:

1. *Rotate*, having a very short tube, with a spreading limb, as exhibited in Fig. 95.

Fig. 95.

Rotate corolla.

Fig. 96.

Salver-shaped corolla.

Fig. 97.

Funnel-shaped corolla.

2. *Hypocrateriform*, *salver-shaped*, with a border like the preceding, but with a long tube. (Fig. 96.)

3. *Infundibuliform* (Fig. 97), or *funnel-shaped*, having a regularly expanding tube, as in the Convolvulus.

4. *Campanulate* (Fig. 98), with the tube swelling at the base, and then gradually expanding into a limb.

5. *Labiate*. When the corolla is separated into two unequal divisions, called the anterior, or lower, and posterior, or upper

Fig. 98.

Campanulated corolla.

Fig. 99.

Ringent corolla.

Fig. 100.

Personate corolla.

What is each leaf of the corolla called? When called monopetalous? When polypetalous? What is a rotate corolla? Hypocrateriform? Funnel-shaped? Campanulate? Labiate?

lips (Fig. 99), as in the Mint. When the throat is open, it is said to be ringent. (Fig. 99.) The *personate* corolla differs from the ringent in having the throat closed by a projection of the lower lip. (Fig. 100.)

6. *Urceolate* or *pitcher-shaped*, the same as campanulate, but with the orifice contracted and an erect limb. (Fig. 101).

107. In *polypetalous corollas* each petal consists of a *limb* or *lamina*, and an *unguis* or *claw*. The *claw* is the narrow part of the petal by which it is attached to its support, and corresponds to that part in the monopetalous corolla which forms the tube, and is the petiole of the leaf. The *limb* is the dilated portion of the petal supported by the claw, and is the lamina of the leaf. The claw is not always present: when it is present, the petal is said to be *unguiculate*.

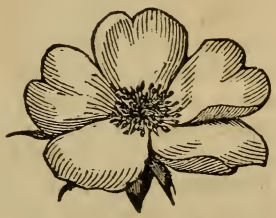
Fig. 101.

Urceolate corolla.

Fig. 102.

Liliaceous corolla.

Fig. 103.



Rosaceous corolla.

108. The terms applied to the different forms of the polypetalous corolla are:

1. *Rosaceous*, when there are several spreading petals without claws, as in the Rose or Apple. (Fig. 103.)

2. *Liliaceous*, when the petals stand side by side with the claw, gradually expanding into a limb. (Fig. 102.)

3. *Caryophyllous*, with long slender claws protected by a tubular calyx with an expanding limb, as in the Pink. (Fig. 104.) When the claws are short, the flowers are called *alsinaceous*.

4. *Cruciform* are such as consist of four petals arranged opposite, or at right angles to each other, as the Turnip, Cabbage, &c. (Fig. 105.)

5. *Papilionaceous* consist of five petals, of which the upper is erect, more dilated than the others, and is called the *vexillum* (Fig. 106, *a*); the two lateral are at right angles with the vex-

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Personate? Urceolate?—107. Of what does each petal consist? What is the claw? Limb?—108. What is a rosaceous corolla? Liliaceous? Caryophyllous? Alsinaceous? Cruciform? Papilionaceous?

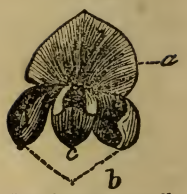
Fig. 104.

Caryophyllaceous corolla.

Fig. 105.

Cruciform corolla.

Fig. 106.



Papilionaceous corolla.

illum, and of course parallel with each other, and are called the *wings* or *alæ* (Fig. 106, *b*); the two lower are shaped like the wings, and parallel with them, and cohere by their lower margin and form the *keel* or *karina*. (Fig. 106, *c*.)

This form of the corolla is peculiar to the order Leguminosæ, including the Pea, Bean, &c.

109. It very frequently happens that we find, in examining flowers, parts which we can refer to no organ with which we have become acquainted. They appear to be distinct from the calyx, corolla, stamens, or pistils, and can be comprehended under none of these organs, although situated among them, and attached, perhaps, to them. All such parts are called *appendages*, and, from the variety of form they assume, much confusion has been created in their description, from the want of uniform terms applied to them.

They have their origin either from the corolla or stamens. Every appendage arising from the corolla is called a *paracorolla*, and if consisting of several pieces, *lamellæ*. When one arises from the stamen, it is called a *parastemon*.

The small appendage at the base of the petals of the Ranunculus, Professor Lindley thinks, is "a barren stamen united to the base of the petal."

The *spur*, *calcar* or *nectarotheca*, is a hollow horn-like appendage, developed on the back and near the base of the petal, opening on the anterior face. Raspail considers this appendage as later in its formation than the petal, and hence concludes that it is rather an accidental organ, and that in cases where it is not developed, the petal is in its normal condition, as sometimes happens in the Aquilegia.

Most of the above forms were considered by the earlier botanists as *nectaries*, but with manifest impropriety, since but few, if any of them, secrete honey.

Bracts.

110. There are often to be found organs situated between the true leaves and the calyx, varying from them in outline, color, and size, which are called BRACTS. Many varieties of bracts have been, till very recently, classed as varieties of the calyx; and some botanists, even at the present day, adopt this arrangement. The bract seems to occupy a space between the leaf and calyx, not only by collocation on the plant, but in constitution and functions. They appear to perform the same office in many cases as the calyx, and in others seem not to differ from the true leaves.

111. Their position and form have given them various names, of which the following are the most common:

When they appear as simple scales on the peduncle, or at its base, they take only the general term *bract*, as in the Heart's-ease and *Veronica agrestis*.

When they are verticillate and surround several flowers, they constitute an *involucre*, as in the *Umbelliferæ*. In *Compositæ*, the involucre assumes the appearance of a calyx, inclosing many flowers, but each floret has a calyx more or less developed, inclosing the seed and appearing on its summit in the form of *egret*, *scales*, *pappus*, or an elevated margin. At the base of this involucre there are often bracts, not constituting a part of it. These are called *bractlets*, and the involucre is said to be *bracteolate*. In the *Cupuliferæ*, the involucre assumes a more singular appearance, forming in the Oaks the hard cup-shaped organ inclosing the base of the acorn, and in the *Chestnut* constituting what is well known by the name of BUR. The real calyx, in these cases, exists in a rudimentary form immediately surrounding the pistils, as may be readily observed in the pistillate flower of the Chestnut. In the *Cornus* or Dogwood, the involucre consists of the four large, white, showy leaves which one, not a botanist, would take for the corolla. In the *Euphorbia*, the involucre is composed of two rows of united leaves, forming what might be easily mistaken for a calyx and corolla, as the outer part is green, while the inner is colored. In the *Beech* it resembles a pericarp.

The bracts of the Catkin are usually called *squamæ* or scales—a term usually applied to any scaly appearance; and the organ on which such scales appear is said to be *squamose*.

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110. What are bracts?—111. When called an involucre? How in Compositæ? In Cupuliferæ? Chestnut? Cornus? Euphorbia? Beech?

The chaff on the receptacle of the compositæ is another form of the bract, and they are called *paleæ*.

The *Spathe* is a bract which incloses the aggregated florets of a spadix, as in the *Arums*.

The bracts which demand the most careful attention of the student, if he expects to encounter with success the large family of plants to which they belong, are those of the *grasses*.

Let the student take the Crab-grass, *Panicum sanguinalis*, as a specimen for examination. It may be found in all places, and in bloom through the summer, and is known by everybody. We find it consisting of three or more spikes of flowers. The flowers of each of these spikes we find arranged on one side of a common support, called *rachis*, in two rows. If we take one of these spikes and bend it, we see the flowers, which before lay so closely to the stem, separate from it, and exhibit themselves as little spikelets of about half an inch long. By examination, we find that each of these spikelets is composed of two flowers. Instead of commencing with the outer envelopes, as is common with other flowers, we will commence at the center. We find at the center the ovary, stamens, and pistils; and immediately surrounding the ovary we find two nearly opposite membranous bracts, which we shall call *paleæ*. Elliott calls them the *corolla*, and by different authors they have the names of *calyx*, *perianthium*, *gluma interior*, *perigonium*, and *gluma*. Within the paleæ of some grasses, as the *Bromus*, there are two small hypogynous, fleshy, colorless scales, which are called *squamulæ*. Elliott calls them *nectaries;* and in other cases, instead of the squamulæ, are found bristles, as in the *Cyperaceæ*, called *hypogynous setæ*. Without the paleæ of our specimen we find two bracts inclosing the others, which are called *glumes*—the *calyx*, *gluma exterior*, and *tegmen* of authors. The glumes do not always inclose a single flower, but most generally are at the base of the spikelet, and inclose many flowers; as in some of the Panicums there are two, and in the Bromus several. In some instances there are many glumes with no flowers, as in the Schœnus, the lower ones being empty. It may be adopted by the student as a general rule, that those bracts immediately surrounding the stamens and pistils are *paleæ*, and all others *glumes*.

What is spathe? What are paleæ in grasses? What are squamulæ? Setæ? What are glumes?

Inflorescence.

112. The manner in which flowers are arranged on the flower-bearing stem, or branch, is termed *Inflorescence*, or *Anthotaxis* (*anthos*, a flower, and *taxis*, order). From the fact that all floral organs are modifications of leaves, and have the same origin, it follows, of course, that primarily they have the same arrangement, however modified this arrangement may become in the course of development. The small branch which bears a single flower or bunch of flowers is called the *peduncle.* When the peduncle bears many flowers, the little organ that supports each flower is called a *pedicel.* Sometimes the peduncle is itself divided, and its divisions are called *branches.*

When the peduncle rises from the earth and bears the flower, it is called a *scape.* A *rachis* is a peduncle that proceeds through the center of the inflorescence from the base to the apex. It is also called the *axis.*

When the part that bears the flower, instead of being lengthened into a rachis, forms an enlarged and flattened surface at its extremity, on which the flowers are arranged, it is called a *receptacle.*

113. We may easily reduce all the various forms of inflorescence to two primitive types, the *determinate* and *indeterminate* arrangements.

By *determinate* arrangement is meant that kind of inflorescence which occurs when the primary axis of the plant is terminated by a flower (meaning by the *primary* axis the stem arising from the root).

The most simple case of this kind is when the stem bears a single flower, there being no secondary axes.

114. The following are the most common forms of determinate inflorescence:

Corymb is when the flower-bearing branches arise from different points of elevation on the stem, but rise to the same height. (Fig. 107.) It is *simple* when each secondary axis bears a single flower, and *compound* when their axes are divided and each division bears a flower.

Fig. 107.

Corymb.

Capitulum or Head is produced when the flowers stand

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112. What is an inflorescence? What is a peduncle? Pedicel? What is a scape? Rachis? What is a receptacle?—113. What is meant by determinate inflorescence?—114. What is a corymb? When simple? When compound? What is a capitulum?

upon an expanded receptacle on the summit of the stem. (Fig. 108.)

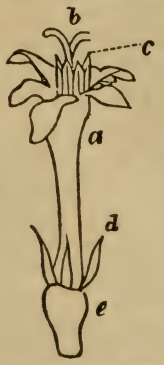
Each little flower comprising a capitulum is called a *floret*. The florets are often very different in appearance, some consist-

Fig. 108.

a. Ray florets. *b*. Disk florets.

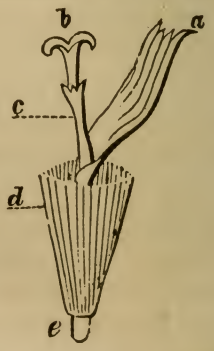
ing of a ligulate or flattened limb, arranged around the circumference like the petals of other flowers, and are called *ray florets*, as are seen in the Sun-flower (Fig. 109), while the central are usually tubular and unconspicuous, and are called

Fig. 109.—Disk Floret.



a. Limb. *b*. Style. *c*. Stamen tube. *d*. Egret or pappus. *e*. Achenium or seed.

Fig. 110.—Ray Floret.

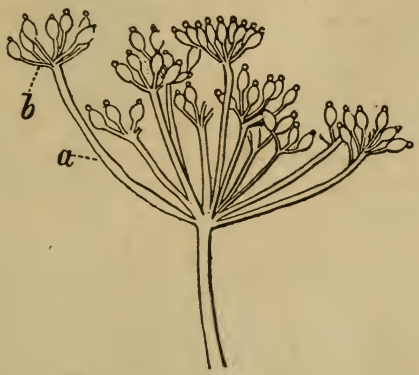


a. Corolla. *b*. Style. *c*. Stamen tube. *d*. Pappus. *e*. Achenium.

What is a floret? What are ray florets?

disk florets. (Fig. 110.) The ray and disk florets often differ in respect to the organs they contain. Sometimes they are both perfect—that is, both containing stamens and pistils—when they are said to be *homogamous;* at other times, the ray florets may be destitute of either stamens or pistils, or contain

Fig. 111.—Umbel.



a. Universal umbel. b. Partial umbe..

pistils only, and the disk contain only stamens; in any of these cases, the capitulum is said to be *heterogamous.*

Umbel (Fig. 111) is formed when the secondary axes originate from the same point on the stem, and rise to nearly the same height. The whole is called a *universal* umbel. If the secondary axes develop tertiary ones in the same manner, each is called a *partial* umbel.

Fig. 112.

Cyme.

115. The preceding varieties follow the *centripetal* order of flowering—that is, the flowers farthest from the center expand first.

But there are others of the determinate form which follow the centrifugal order—that is, the central or upper ones expand first, and the external or lower ones last.

What are disk florets? When homogamous? When heterogamous? What is an umbel? A universal umbel? A partial umbel?—115. What is the centripetal order of inflorescence? The centrifugal?

Cyme is produced when a single flower at the top of the stem has two branches, one on each side, which in turn subdivides in the same way. (Fig. 112.)

Fascicle differs from the cyme only in shortening the peduncles, which brings the flowers into a more compact form, as in the Pink.

116. *Indeterminate inflorescence* is characterized by the continued growth of the primary axis, while the secondary and tertiary axes are arrested.

The *spike* is of this form, and is supposed to be produced by the continued elongation of the primary axis, while the secondary, having no power of elongation, produces sessile flowers along a common axis, which constitutes the *spike* (Fig. 113), as in the Plantains.

Fig. 113.

Spike.

Fig. 114.

Ament.

Fig. 115.

Spadix.

When sessile flowers are arranged on a filiform rachis, which falls off after flowering, it is called an *ament* or *catkin*, as in the Willow, Hazel, &c. (Fig. 114.) When a fleshy axis is densely covered with flowers, inclosed in a spathe, it is called a *spadix*, as in the Arum. (Fig. 115.)

If the secondary axes are equally developed around the primary, as in the Currant and Hyacinth, we have the *raceme* (Fig. 116); the raceme differing in no respect from the spike, but in having pedicellate flowers.

What is a cyme? A fascicle?—116. What is indeterminate inflorescence? What is a spike? An ament? A spadix? A raceme?

Fig. 116.

Raceme.

Fig. 117.

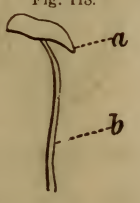
Panicle.

If the secondary axes develop tertiary ones, a *panicle* is formed (Fig. 117), as in the Poa. The term *deliquescent panicle* is applied to that variety of the panicle, when the rachis is lost in its irregular divisions, and does not continue direct through the inflorescence. The ramification of the axes may proceed further, forming compound panicles. A very dense panicle, with the lower branches shorter than the middle ones, is called a *thyrsus*, as in the Lilac.

Stamens.

117. Immediately within the corolla are situated a row of organs called *stamens*. The stamens, like the calyx and corolla, are modifications of leaves. They usually consist of three parts—*filament, anther*, and *pollen*. The *filament* is the thread-like organ which supports the anther. (Fig. 118, *b*.) This is not necessary to the functions of the stamens any more than a petiole is necessary to a leaf. The *anther* is the knob, usually yellow or brown, situated on the summit of the filament (Fig. 118, *a*); or if the filament be absent, it sits upon the receptacle. The *pollen* is the yellow dust-like substance contained within the anther, and is necessary in the vegetable economy to the perfection of the seed.

Fig. 118.



118. The *arrangement* of the stamens is usually alternate with the petals or their segments, and of course opposite those

A panicle? A deliquescent panicle? A thyrsus?—117. Where are the stamens situated? Of how many parts does each consist? What is the filament? What is the anther? The pollen?—118. What is the arrangement of stamens?

of the calyx. It was on this circumstance that Linnæus founded his test for the distinction of calyx and corolla. If the stamens were opposite the segments of the floral envelope, he called it a calyx; if alternate, it was to be called a corolla. When but one row of each is developed, this is no doubt an undeviating criterion; but it may happen, supposing the real corolla to be present, that the whorl of stamens next above it is suppressed and the second whorl only developed. In such cases, the stamens would necessarily be opposite the segment; but by the application of Linnæus' criterion, the inner envelope would be a calyx and the outer the corolla, as in the whole order of *Primulaceæ*, in which the regular calyx is present. This arrangement may easily be accounted for upon the above supposition; and it receives confirmation from the fact, that some plants having twice as many stamens as petals, and having the appearance of being in a single row, yet half of them are alternately longer than the other half. This occurs in the Oxalis, giving probability to the supposition that the five short stamens of the Oxalis were prevented from being developed as perfectly as the other five; and had they been entirely prevented, we should thus have had an arrangement similar to the *Lysimachia* with the opposite stamens.

The number of stamens is generally the same as the petals or lobes of the corolla, or a multiple of the number.

119. Whatever may be the apparent origin of the stamen, its real origin is always the same, that is, between the base of

Fig. 119.

Stamen perigynous.

Fig. 120.

Stamen epigynous.

Fig. 121.

Stamen hypogynous.

the petals and that of the ovarium. Their apparent origin varies remarkably, sometimes appearing to rise from the calyx (Fig. 119), when they are said to be *perigynous;* at other times they rise from the pistil itself (Fig. 120), and are said to

How in the order Primulaceæ? How accounted for? What is usually the number of stamens?—119. What is always the origin of stamens? When perigynous?

be *epigynous*, or from under the pistil, their true origin, and called *hypogynous*. (Fig. 121.)

Fig. 122.

Monadelphous stamens.

Fig. 123.

Diadelphous stamens.

Fig. 124.

Polydelphous stamens.

120. Stamens are often united by their filaments, forming a tube, as in the *Malva*, when they are said to be *monadelphous* (Fig. 122), or in one brotherhood. In other cases they are united into two sets, when they are said to be *diadelphous* (Fig. 123), as in the Pea: if into several sets, the term *polydelphous* is applied (Fig. 124), as in some Hyperica.

If the stamens project beyond the corolla, they are said to be *exserted*, and *included* when shorter than the corolla.

When the stamens all turn to one side of the corolla, they are said to be *declinate*. When a flower has four stamens, two of which are longer than the other two, they are *didynamous* (Fig. 125). If there are six, with four the longest, then they are *tetradynamous*. (Fig. 126.)

Fig. 125.

Didynamous stamens.

121. The *filament* is generally, as its name implies, a slender thread-like organ, having a bundle of vessels in its center composed of woody fiber and spiral vessels, and corresponds undoubtedly to the petiole of the leaf. It assumes a variety of forms. Its normal form is found in the *Rose*, *Apple*, and *Lily*. In the *Canna* the filament resembles so much a petal that it would

Fig. 126.

Stamens tetradynamous.

Epigynous? Hypogynous?—120. When monadelphous? Polydelphous? When are stamens exserted? When included? Declinate? Didynamous? Tetradynamous?—121. What is the filament? What does it resemble in the Canna?

be undistinguishable from one, but for its bearing an anther. In the Water-lily it is found in every degree of development, from its common form to a petal, showing the true nature of the stamen, that it is a modification of leaves. In the *Campanula* the lower part of the filament assumes the form of a fleshy scale. Although generally smooth, still in some plants, as in the *Tradescemtia*, it becomes in some parts covered with hairs. In the *Thalictrum* it is thickest at its summit, and is said to be *clavate*. Sometimes the filaments are united together with the style into a solid column, under the name of *columna* or *gynostegium*, as in the *Asclepiadœ*.

122. The *anther* is generally composed entirely of cellular tissue, and consists of two *lobes*, united by a *connectivum*, and filled with pollen. The connectivum corresponds to the midrib of the leaf, while the lobes are formed by its lamina, folded so as to form its cells. The variations in the form of the anther are very numerous. The true type of the anther, then, is two lengthened parallel cells (connected together), opening by a longitudinal suture corresponding to the margin of the leaf of which the anther is composed. It sometimes happens that the septum is absorbed or not developed, when it is one-celled; at other times one half of the lamina seems not to be developed, and a one-celled anther is the result, as in the *Canna*. Sometimes the connectivum spreads out at its summit, and the lobes, instead of being parallel, assume every degree of inclination. In the Monarda they are at right angles, and should the points of the lobes grow together we have a one-celled anther from this cause. In the *Sage* but one side of the connectivum bears an anther, the other side being very differently developed.

It sometimes happens that the anther is more than two-celled. This is occasioned, in some cases, by the folding inwards of the sutures, so as to form a union with the back of the cell, as in the *Ash*.

The *Cucurbitaceœ* present a curious modification of the anther, in which they are long, narrow, and sinuous, and folded back upon themselves.

123. When the anthers are attached by their base to the summit of the filament, they are said to be *innate;* when by their back, *adnate*. When they seem to be balanced on the top of the filament, they are said to be *versatile*. The anthers of *grasses* are versatile. When the anthers are turned inward, they are said to be *introrse*, and when turned outward, *extrorse*.

In the water-lily?—122. Describe the anther. What is the true type of the anther? When one-celled? How in the sage?—123. When are anthers innate? When adnate? When versatile? When introrse? When extrorse?

The connectivum often appears under modified forms. Some of these we have already noticed, as in the *Sage*. In the *Asclepias*, also, the little horns observed in the flowers of these plants are developments of the connectivun. In some cases it is very much enlarged, in others forked, in others it forms a crest, and again it forms a cup-like body articulated with the apex. The position it occupies in these and other cases, will enable the observer to determine to what organ it is to be referred.

124. The *pollen* consists of exceedingly minute grains, which, under the microscope, appear of various forms. In some they are smooth and spherical, as in the *Marvel of Peru;* in others with conical papillæ, as in the *Hibiscus grandiflorus;* in others angular, some nearly square and of every variety of geometrical figure. It would be useless to specify the great variety of forms under which this substance appears, as it has, as yet, been made of little practical importance in arranging plants, although so far as we have made observations on this subject, we believe it might in some cases be made a good specific character, and in others a generic one of much importance. We have never found a variation of form in the same species; and in some extensive genera, so far as we have examined them, the form is invariable.

The student can scarcely find a field for more curious observation, if he has a good microscope, than is presented by the pollen. The variety of beautiful forms it assumes, in different species, and the curious structure of the pollen grain itself, present subjects of much interest.

125. The pollen grains inclose a fluid of molecular matter essential to the production of the seed. The molecular formation may be beautifully observed by sprinkling some pollen on the port-object of the microscope, and dropping on it some diluted sulphuric acid. The coats of some of the grains immediately burst, and the contents of the grain are projected into the fluid, and the molecules may be distinctly seen. The pollen has been determined, by the most accurate observers, to consist of two coats, at least; the outer and thicker one called the *extine*, the inner the *intine*, which is very extensible and exceedingly thin. This may be exhibited by placing some pollen in very dilute sulphuric acid; instead of bursting, as in the case mentioned in the preceding paragraph, projections will be seen to arise from the surface of the grain and extend into the fluid. These lengthen till the contents of the granule are exhausted, and consist of the

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124. Of what does the pollen consist? What of the form and surface of pollen grains?—125. What do the pollen grains inclose? How may it be seen? What is the extine? The intine?

intine projecting through the coat of the extine. By the sulphuric acid many tubes are projected from the same grain, naturally only one or two.

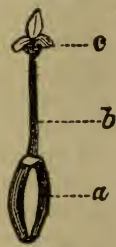
Raspail asserts that the pollen is a production of the internal surface of cells within the theca, to which the grains are attached by a funicle. This is denied by other botanists.

126. The color of pollen is generally yellow; but it assumes in different plants almost every color except green. The matter contained within the pollen cells is called *fovilla*, which we before remarked consists of minute molecules, measuring, according to Lindley, from the 4000th to the 30,000th of an inch in length, and are of two kinds, one larger than the other.

Pistil.

127. The *pistil* is the center of the flower, and forms the summit of the axis of growth. It is, like the other floral organs, a modification of the leaves. Each leaf of the pistil is called a *carpel*. The pistil is divided into three parts, the *germ* (which becomes the ovary), *style*, and *stigma*.

Fig. 127.



Pistil.
a—ovary.
b—style.
c—stigma.

The *stigma* (Fig. 127, *c*) is the summit of the pistil, and is the extremity of the midrib of the leaf which composes the pistil. It is the only part, except the spongioles, that is not covered with the epidermis. It is generally glutinous and moist, thus causing the pollen grains to adhere to it, and at the same time yielding enough moisture to make them put forth the pollen tubes. It is covered with papillæ, which are undoubtedly the cells of the parenchymous substance of which it is composed, and is the channel through which, in all cases, the fecundating matter is transmitted to the ovule. It varies much in form; or if, with some botanists, we consider the stigma only a surface fitted for the reception of the pollen and transmission of the fertilizing substance, the variety of forms of stigma usually described by botanists would properly come under the style. Lindley remarks that nothing, properly speaking, is a stigma except the secreting surface of the style. This surface is usually on the expanded summit of the style, but it frequently occupies other situations. In the Iris it is a line on the back of the trifid petal-like style; in some it occupies the side of the

126. What is the color of the pollen grains? What is the fovilla?—127. What is the pistil Into how many parts divided? What is each leaf that composes it called? What is the stigma? With what is it covered?

pistil; in others no point can be detected, by observation, that corresponds in appearance to the stigmatic surface. The central part of the stigma consists of a more lax tissue which leads directly to the ovary, and is called the *conducting tissue.*

128. The *style* (Fig. 127, *b*) is a vascular organ, varying in length, supported by the ovary, and supporting the stigma. It is generally considered an unessential organ; but Raspail says that the style penetrates the ovary and becomes the placenta, which would render its presence always necessary; but this is in opposition to all other botanists, so far as we know, the placenta being considered the union of the edges of the folded leaves composing the ovary. The style is sometimes articulated to the summit of the ovary, and sometimes forms a continuation of it. Although the style usually rises from the summit of the ovary, yet in some cases it does not. In the *Labiatæ* it comes from the base, and in others from the side. These apparent variations are produced by the unequal development of the parts of the ovary; one side being extended more than the other, would, of course, turn the summit to the least developed side.

129. The *ovary* (Fig. 127, *a*) is the thickened base of the pistil, and is that part of the organ containing the ovules, and becomes the fruit in maturity, whatever may be its form. The ovary, when the pistil is composed of a single leaf, is formed by the folding of the leaf with the upper surface inward and united by its edges, the lamina of the leaf forming the ovary. This arrangement is well exhibited by the *Peach.* The furrow, which is always seen running from the apex to the base of this fruit, on one side, is the united margins. The midrib on the opposite side is undistinguishable on the surface, but by dissection the vessels will be found larger on that side, and running more directly from the base to the apex.

130. The *placenta* is the union of the two margins of the carpels, and bears the ovules, which in maturity become the seed. By carefully breaking the stone of the Peach, we shall find the kernel attached to that side of the cavity which corresponds to the depressed line on the surface, showing that the kernel or nucleus derived its origin and support from that side which is formed by the margin of the leaf. The Cherry is another example of a monocarpelous pistil. (Fig. 128.)

Fig. 128.

Monocarpelous pistil.

131. Although some plants, like those above noticed, have their pistils of one leaf, yet in most cases they

What is the conducting tissue?—128. What is the style?—129. What is the ovary? How is it formed when the pistil is composed of a single leaf? When exhibited? Explain the peach.—130. What is the placenta?

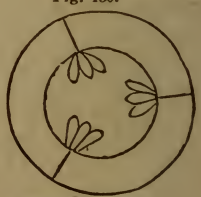
consist of several carpels, assuming a great variety of forms. It is of the first importance that the student study carefully all that relates to the fruit, as it is from it that the most important distinctions in classification are derived. It will be the most difficult as well as the most important subject to which his attention will be called. By perseveringly applying the principles laid down, he will soon acquire a facility in examining one of the most beautiful fields of nature, which will abundantly reward him for all his toil.

132. When the ovary is composed of several carpels, the carpels are arranged with the midrib placed outwardly, and the margins turned inward toward the center, as seen in the transverse section of the *Hibiscus* (Fig. 129), which is composed of five carpels, with their margins meeting in the center, forming a *central* placenta, to which the seeds are attached. The divisions, which form the cells of the ovary, are called *dissepiments*, and are of course, from what we have before remarked, the inflected laminæ of the leaves; and as each carpel is naturally independent of the others, which compose the ovary, it follows that the dissepiments, however thin and membranous they may be, in some cases, are in reality double. All true dissepiments are necessarily vertical, and never horizontal, since the inflected margins of leaves could not unite in such a manner. The number of dissepiments is always equal to the number of carpels of which the ovary is composed, and the dissepiments are always alternate with the stigmas. A simple ovary can have no dissepiment. Should any fruit be observed with dissepiments not reconcilable to the above principles, they are called *spurious* dissepiments. The only common one of this character with which students will meet, is that occurring in cruciferous plants, as the Cabbage, Turnip, &c., in which the expansion of the placenta forms a spurious dissepiment, stretching from one side of the ovary to the other. In some cases in which the ovary is composed of several carpels, there exists no dissepiment. This arises from one of two causes. In one case the edges of the

Fig. 129.

Section of Hibiscus.

Fig. 130.

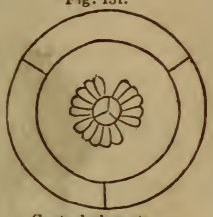


Parietal placenta.

132. When the ovary is composed of several carpels how are they arranged? Explain the hibiscus. What are dissepiments? How many can there be? What are spurious dissepiments?

carpels are united without being inflected much, if at all, as in the *Corydalis* and *Viola* (Fig. 130), where the placenta is said to be *parietal.* In the other case the dissepiments exist in the very early stage of the ovary, but by the enlargement of the ovary without the corresponding development of the dissepiments, they become torn and obliterated, with the placenta remaining alone, as in the *Cerastium.* In this case it is called a *free central* placenta. (Fig. 131.)

Fig. 131.



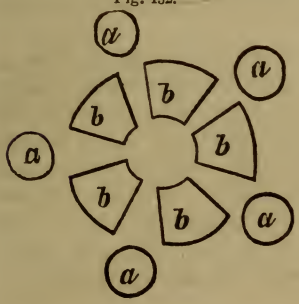
Central placenta.

It is frequently the case that there are numerous carpels, but they contract no union with each other, as in the *Strawberry, Ranunculus,* and *Anemone.*

When the carpels are united, as in the Poppy, Hibiscus, &c., they are said to be *syncarpous.* When they are free, as in the Ranunculus, Strawberry, &c., they are called *apocarpous.*

133. From the fact that the pistil consists of a whorl of leaves immediately superior to those composing the stamens, it follows that the leaves of the whorls should be alternate with each other; and this is their position in cases in which we are able to determine in regard to it.

Fig. 132.



Arrangement of stamens and carpels.

Fig. 133.

Two whorls of carpels.

If in Fig. 132, *a*, *a*, *a*, *a*, *a*, represent five stamens, and *b*, *b*, as many carpels, it will be observed that the stamens occupy alternate positions in respect to the carpels. This is undoubtedly the fact in all cases which are not altered by non-development or unusual modifications. When the carpels consist of several whorls on the same plane, the individuals of contiguous whorls

What is a parietal placenta? A free central placenta? What is a syncarpous fruit? What apocarpous?—133. How are the carpels arranged?

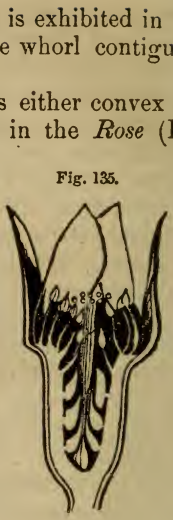
follow the same law of alternation, as is exhibited in Fig. 133, in which *a* represents the axis, *b b* the whorl contiguous to it, and *c c* the exterior whorl.

134. In some cases the receptacle is either convex as in the *Strawberry* (Fig. 134), or concave as in the *Rose* (Fig. 135).

Fig. 134.

Strawberry.

Fig. 135.



Rose.

In the former case the outer series, *a a*, will be the lowermost whorl, and in the latter, the upper whorl will be in reality the lowermost in point of development, becoming the most elevated contrary to its true position by the peculiar development of the receptacle.

135. The extremity of the axis, which supports the carpels is called the *receptacle.* In some cases it is merely the end of the flower-bearing branch without having undergone any modification; at others, it is an expanded disk, and is called a *torus.* When it rises from the basis of the calyx, bearing the stamens as in the *Magnolia,* it is called *Gynophore.* When it is succulent, bearing many ovaries as in the Strawberry, it is called *Polyphore.* We have the *Gynobase* when a fleshy receptacle has but a single row of carpels inclined towards the center.

Ovule.

136. The *Ovule* is the young grain, not having received the influence of the pollen. If we take a flower-bud of the Polygonum, and take the ovary and dissect it carefully, we find situated in the bottom of the cavity a small conical body (Fig. 136, 1, *n*), which is called the *nucleus.* It is a homogeneous

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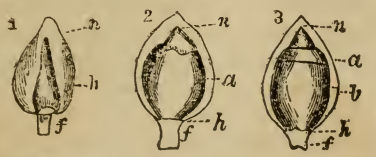
134. Explain the strawberry. The rose.—135. What is the receptacle? Torus? Gynophore? Polyphore?—136. What is the ovule? Nucleus? Describe it.

cellular substance, nearly transparent, with its base forming a part of the wall of the ovary. If we examine a bud a little later, we shall find a ring swelling out from the base of the nucleus, expanding and rising round it, and forming a partial covering to it. (Fig. 136, 2, *a*.) This first integument is

Fig. 136.

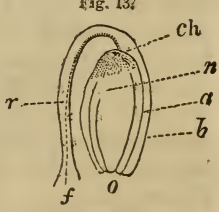


n, the nucleus; *a*, the secundine; *b*, the primine; *f*, the funiculus; *h*, the hilum.

called the *secundine* by Mirbel, and is scarcely formed when a second makes its appearance in the same manner, which is called the *primine*, and both increase until they present the appearance represented in Fig. 136, 3, in which *n* represents the nucleus, *a* the *secundine*, or internal *membrane* of Brown, the inner envelope, and *b* the *primine*, or external membrane of Brown, which is the outer one. These continue to increase until they inclose the nucleus entirely, leaving only a microscopic orifice, called the *foramen*, in the ovule, and *micropyle* in the seed.

137. This is the mode of development of all ovules that have integuments around the nucleus. The ovule is attached to the ovary by a bundle of vessels, of greater or less length, which is called the *funiculus*. (Fig. 136, 1, *f*.) The point of attachment to the ovule is called the *hilum*. (Fig. 136, 2, *h*.) The hilum is always the *base*, and the foramen the *apex* of the ovule.

Fig. 137



r, the raphe.
ch, the chalaza
o, foramen.
n, nucleus.
a, secundine.
b, primine.
f, funiculus.
h, hilum.

138. When the parts are developed as above described, that is, when the nucleus remains in its original position, with its base next the placenta, and its apex in the opposite direction, the ovule is said to be *orthotropous* (*orthos*, straight,

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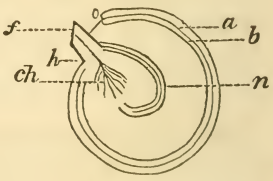
What do we find later? What did Mirbel call it? What next makes its appearance? What is it called? What is the foramen? What is it called in the seed?—137. How is the ovule attached? What is it called? What is the Hilum? What is the base of the ovule? What is the apex? 138 When is the ovule orthotropous?

and *tropos*, form). This is the case in comparatively few plants. The Polygonums, Nettles, Walnuts, and a few others, are in this manner, but scarcely ever the Monopetalæ. Oftener than otherwise the ovule undergoes changes during its development, so that the various parts bear very different relations. The most frequent change is where the ovule is completely reversed; that is, the apex of the nucleus is in contact with the placenta, and the base of it in the opposite direction. In this case the bundle of vessels that we called the *funiculus* becomes extended between the *primine* and *secundine* to the base of the nucleus, and is called a *raphe* (*raphe*, a line). (Fig. 137, *r*.)

139. The place of attachment of the raphe to the base of the nucleus is called the *chalaza*. (Fig. 137, *ch*.) An ovule thus inverted is said to be *anatropous* (*a* privative, and *tropos*, implying the opposite of the former). This is the most common form in the vegetable kingdom. Almost all Monopetalæ, the greater number of Monocotyledons, and many of the Polypetalæ, have anatropous ovules. There is another variety which is quite common in Polypetalæ, in which the base of the ovule remains fixed, but by an enlargement of one side of the ovule more than the other, it is bent or doubled on itself, so as to bring the foramen in close proximity to the funiculus. (Fig. 138.) This form is called the campylotropous (*kampulos*, curved, and *tropos*, form.) Leguminosæ, Solanæ, Cruciferæ afford examples of this form. Other forms are pointed out by botanists, but we have found them of no practical importance. The same letters in the preceding figures point out the same things.

Fig. 138.



n, nucleus; *a*, secundine; *b*, primine; *ch*, chalaza; *h*, hilum; *f*, funiculus; *o*, foramen.

140. The ovule usually has two distinct coverings, as above described, but this is not universal. Sometimes it has none. The nuclei of some Dipsaceæ, Asclepiadæ, and Cuscutaceæ are naked. The nuclei of the Compositæ, Labiatæ, Scrophulariaceæ, and Campanulaceæ, and some others, have but one integument.

141. Some time before the expansion of the flower, the apex of the nucleus is hollowed out by a greater or less cavity,

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Is this form common? How do the vessels run? What is the bundle called?—139. What is the chalaza? What is a campylotropous ovule? 140. Is the nucleus always covered?

much exceeding in any case the cells of which the nucleus is composed. (Fig. 139.) This is called the *embryo sac*, and it is in this that the embryo appears after the perfection of the flower. The embryo is always found at the apex of the nucleus, and of course immediately within the foramen, through which the pollen tubes enter. It is suspended in the embryo sac by a thread called a *suspensor*. The radicle, or root part of the embryo, is always toward the foramen, and the plumula toward the chalaza or hilum. Embryos of orthotropous seeds are, of course, inverted.

Fig. 139.

a, the embryo sac.

142. The contents of the ovule are variously changed after impregnation. Sometimes the embryo consumes the whole contents of the nucleus, when the seed is said to have no albumen; at other times the embryo remains very small, and the nucleus becomes filled with starch, or oils, or other materials of various consistence and forms, which is called *albumen*.

143. When the ovule rises from the base of the ovary, it is called *erect;* when from a little above the base, *ascending;* when it hangs from the summit of the cavity it is *pendulous;* and when from a little below the summit, it is *suspended*.

Fruit.

144. The *fruit* is defined, in botany, to be the pistil or ovary arrived at maturity, including sometimes accessory parts. This definition plainly gives greater extension to the term than it has in common language, as it includes every kind of product which has the mature ovary as a component.

The normal form of fruit, and the type to which all varieties should be reduced, would seem to be that in which the seeds are contained in a pericarp, with the carpels leaf-like in their constitution and appearance, as the Hibiscus, Bean, Cabbage, &c. In these cases it requires no great stretch of the imagination to conceive the ovary composed of leaves slightly modified; but from this type there are remarkable variations, caused by one or more of the following causes. The suppression or hardening of parts in some, their unusual development in others, and the union of other organs with the ovary, are the principal causes of variation. By carefully noticing these occa-

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141. What is the embryo sac? How is the embryo suspended?—142. When has the seed no albumen? What takes place at other times?—143. When is the ovule erect? When ascending? Pendulous? Suspended?—144. What is the fruit? What is the normal form of fruit?

sional modifications, every variety of fruit may be reduced to these simple principles.

145. The *pericarp* is the covering of the seed, whatever may be its form or dimensions. It includes the ovary, and whatever may be attached to it, which goes to make up the seed-vessel. It varies in dimensions from the covering of the minute seeds of grasses to the large fleshy pericarps of the Cucurbitaceæ, which sometimes attain to several feet in diameter. Its composition is not less various, from the finest and most delicate membranes to the coarsest and roughest of vegetable productions—from the softest pulp to the hard bony covering of the kernel of the peach.

146. The pericarp consists of three parts—the *epicarp*, which is the outer covering, and corresponds to the skin; the *sarcocarp*, the middle portion, which constitutes the flesh; and the *endocarp* or *putamen*, the inner coat or shell. By the various modifications which these several parts undergo in the course of development, most of the fruits, however widely they may differ in appearance, may be easily conceived to originate from a common type.

147. In the Peach, for example, the skin, which in many cases may be easily removed, is the epicarp in its natural state; the fleshy portion, which is eaten, is the sarcocarp, which is the parenchymous portion of the leaf excessively developed; the stone of the peach is the endocarp remarkably condensed and hardened. The Cherry and similar fruits are reducible on the same principles. The Apple is a little differently constructed; the epicarp is in its natural state, but the sarcocarp consists of the parenchymous portion of the calyx and ovary united. By making a transverse section of an apple, the outlines of the ovary may be seen, distinguished by points, which are the cords formed by the vessels and woody fiber of the midrib of the leaves which compose the carpels. The hard layer, which immediately surrounds the seed, is the endocarp.

148. The fruit being the perfected ovary, it of course ought to bear the mark of the style or stigma; and it is of importance that the student bear this in mind, as it will often enable him to distinguish seed from fruit, as there are many examples which the common observer would call seeds, but which in reality are fruits, consisting of a pericarp, and a seed within it, as in the Umbelliferæ and Compositæ.

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145. What is the pericarp? How does it vary?—146. Of how many parts does it consist? What is the epicarp? Sarcocarp? Endocarp?—147. Explain the terms from the peach. The cherry. The apple.—148. What ought the fruit to bear? What fruit do we call seeds?

149. There are cases in which suppression of ovules causes a variation in the fruit, from what might be expected from an examination of the ovary in its early stage. If an ovary of the Chestnut be examined before or soon after impregnation, it will be found to contain fourteen ovules in seven cells; but in the progress of development it becomes one-celled, and thirteen of the ovules are obliterated. The ovary of the Oak is originally three-celled, with six ovules; but when perfected it is one-celled and one-seeded. There are many cases of this kind. The reverse of this takes place in some cases, which would be inexplicable were not the ovaries examined in their earliest state. A one-celled ovary becomes a two or more celled fruit: in the Cruciferæ by the enlargement of the placenta; in the Astragalus by the expansion of the suture; in other cases by the dilations of the lining of the pericarps, which form horizontal dissepiments. The Pomegranate presents a remarkable variation from the true type.

150. When the fruit arrives at maturity, the pericarp either bursts or it remains closed; if the latter, it is said to be *indehiscent*, as in the apple, hazel-nut, &c. If it bursts, it is said to be *dehiscent*, and it follows invariably the same course in the same species; hence it is important to notice the varieties. In some cases the dehiscence takes place by dividing the dissepiments, that is, the carpels separate into their original leaves, as in the Delphinium, and this is called *septicidal* dehiscence. Fig. 140 represents this kind, in which *a* represents the axis, *d* the

Fig. 140.

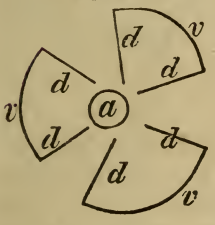


Fig. 141.

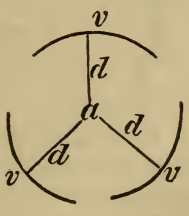
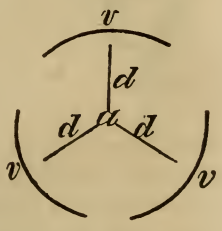


Fig. 142.



dissepiment, and *v* the valves. In other cases the dissepiments are attached to the middle of the valves, and the dehiscence in such cases, no doubt, takes place at the midrib of the leaves that form the carpels. This is called *loculicidal* dehiscence, as

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149. How many ovules in the chestnut? How many perfected? How in the oak? When does the reverse take place?—150. When is the fruit said to be indehiscent? When dehiscent? When is the dehiscence septicidal? When loculicidal?

in the Lilac, Gladiolus, &c. (Fig. 141.) *Septifragal* dehiscence is when the dissepiments separate from the valves, but adhere to the axis, as in the Convolvulus. (Fig. 142.) In *sutural* dehiscence there is but one carpel, and of course no true dissepiments, as in the Pea and Bean. The *circumscissile* dehiscence occurs by a transverse separation of the valves half round the pericarp, as in the Anagallis. This is an uncommon mode. The Plantago has a *transverse* dehiscence.

Besides the above modes of opening, the pericarp is often *ruptured*, produced by a contraction of a portion of it, and holes thus formed for the emission of the seed, as in Campanula. An *aril* is an enlargement of the placenta, occurring after the impregnation of the ovule, and forming, in some cases, an additional envelope for the seed, as in the Euonymus. *Mace* is an aril surrounding the Nutmeg. When the two sutures separate from the valves, they form a kind of frame called *replum*.

151. Fruits are formed by one flower, or they may be formed by the combination of several flowers. Apocarpous fruits, produced by a single flower, may be either *dry* or *succulent*. The dry fruits of this division are either *dehiscent* or *indehiscent*.

An *Achenium* (*a*, privative, and *chaino*, I open) is an indehiscent, one-seeded fruit, the pericarp of which is closely applied to the seed, but may be separated from it. (Fig. 143.) The true *achenia* are found in the Ranunculus, forming a dry

Fig. 143.

Achenium.

Fig. 144.

Head of Ranunculus.

Fig. 145.

Samara.

head (Fig. 144); in the Strawberry, arranged on a fleshy receptacle; in the Rose they are found in a concave receptacle; in the Fig, in a hollow peduncle, which ultimately becomes the fruit. All the fruits mentioned, which are commonly called seeds, may be distinguished from the seeds by bearing the marks of the stigma or style. In *compositæ*, the seeds are called *Cypselæ* (*kupsele*, a box); but they are achenia with the calyx attached to them.

When the achenium is winged, it is called a *Samara*. (Fig.

Septifragal? Sutural? Circumscissile? Ruptured? What is an aril? A replum?—151. How may fruits be formed? What is an achenium? Where are they found? What is a cypsela? A samara?

145.) In the fruit of Corn, Wheat, &c., the pericarp is inseparable from the seed, and the achenium is called a *Caryopsis* (*karua*, a nut, and *opsis*, an appearance).

The fruit of Umbelliferæ is composed of two achenia united to a common axis, or *carpophore* (Fig. 146—*karpos*, fruit, and *phero*, I bear), from which they are suspended, and which is called a *Cremocarp* (*kremao*, I suspend). (Fig. 146, *b*.)

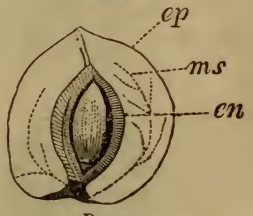
Fig. 146.

Fruit of Umbelliferæ.
a, carpophore.
bb, cremocarp.

Fig. 147.

Nut or Glans.

Fig. 148.



Drupe.
ep, epicarp ; *ms*, mesocarp ; *en*, endocarp.

The *Nut* or *Glans* is a one-celled fruit, with a hardened pericarp, surrounded by bracts. (Fig. 147.) The Chestnut is the nut, and the bur is composed of bracts. The Acorn is the nut: the cup is composed of bracts. So of the Hazelnut, Beach, &c.

Fig. 149.

Cone of the Magnolia.

152. The Drupe is a succulent fruit, covered by a pericarp, composed of an *epicarp*, *mesocarp*, and *endocarp*. (Fig. 148.) The Peach is an example. The skin of the Peach is the epicarp, the flesh the mesocarp, and the stone the endocarp. The fruit of the Cherry, Plum, Walnut, Nutmeg, Date, and Almond are all of this character.

Fig. 150.

Lomentum.

153. *Dehiscent, apocarpous fruits* are found in the Magnolia (Fig. 149), Asclepiadæ, &c. It consists of a single carpel, containing one or several seeds, and dehiscing by its ventral suture.

The *Legume* or *Pod* is a solitary carpel, dehiscing by both sutures, but bearing seeds only on the ventral suture. The Pea, Bean,

What is a caryopsis? A cremocarp? Glans?—152. What is a drupe?—153. What is a legume?

&c., are examples, and the legume characterizes the order Leguminosæ. When the legume is contracted between the seeds, and instead of opening at the sutures, the pods break up into pieces, each piece containing a seed, it is called a *Lomentum*. (Fig. 150.)

154. *Syncarpous* fruits are composed of several carpels united, and are either *dry* or *succulent;* the former being dehiscent, the latter indehiscent.

The *Berry* (Fig. 151) is a succulent, syncarpous fruit, in which the seeds are immersed in a pulpy mass, formed by the

Fig. 151.

Berry.

Fig. 152.

Gooseberry.

placentas. The Gooseberry (Fig. 152), Currant, Tomato, and Grape are usually included under this variety. The Pomegranate consists of two rows of carpels, one above the other, but in other respects would fall under this division. It is called a Balausta. Fig. 153 is a longitudinal section. The *Pepo*

Fig. 153.

Pomegranate.

Fig. 154.

A section of the Pepo.

(Fig. 154) is an inferior fruit, with a thick and fleshy rind, with two or more fleshy parietal placentas, projecting more or

Lomentum?—154. What is a berry? Pepo?

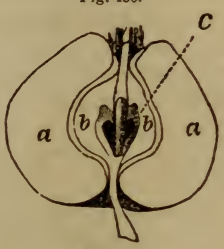
less inward. The Cucumber, Melon, Gourd, and Papaw are examples.

155. The *Hesperidium* (Fig 155) is a fleshy fruit, in which the epicarp and mesocarp form a thick rind, and the endocarp projects inward, forming triangular divisions, in which pulpy cells are developed, which surround the seeds. Oranges, Lemons, &c., are examples.

Fig. 155.

Hesperidium.

Fig. 156.



Pome.

The *Pome* (Fig. 156) is an inferior fleshy fruit, of which the epicarp, mesocarp, and fleshy calyx form the greater part, which is eatable. The endocarp is tough and horny, and forms the cells of the seeds. The Apple, Quince, and Pear are examples.

Fig. 157.

Silique.
r, replum ; *aa*, valves.

Fig. 158.

Silicula.
r, replum ; *vv*, valves.

156. The *Capsule* is a dehiscent, syncarpous fruit, which is dry, and opens commonly by regular dehiscence or pores.

155. Hesperidium? Pome?—156. Capsule?

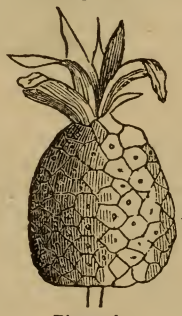
Hibiscus, Poppy, &c., are examples. It is the most common form of seed-vessel.

The *Siliqua* or *Silique* (Fig. 157) is a variety of the capsule, composed of two carpels opening from the base upward, and having a framework called the *replum*, which forms a spurious dissepiment. When the silique is short, it is called a *silicula* or *silicle* (Fig. 158, *r*.) Cruciferous plants afford examples in the Turnip, Cabbage, Peppergrass, &c.

157. When two or more flowers are united to form a single fruit, it is called a *multiple* fruit.

The *Sorosis* is a multiple fruit, formed by a spike of flowers, which becomes succulent. The Pineapple and Mulberry are examples. (Fig. 159.) The Fig is, taken as a whole, a multi-

Fig. 159.



Pineapple.

Fig. 160.

A Syconus.

ple fruit, formed by numerous flowers situated within the hollowed-out peduncle. It is called a *Syconus*. (Fig. 160.)

The *Strobilus* is a fruit-bearing spike, covered with scales, each of which contains a flower, and which has two naked seeds at its base. The Pine, Fir, Cedar, Hop, Cypress, and Juniper are examples.

Seed.

158. The *seed* is a perfected ovule. No sooner has the influence of the pollen been felt by the ovule, than various changes commence; the foramen closes up, the integuments harden, and the heretofore pulpy substance becomes consolidated or assimilated. The most material change that takes place, however, is the appearance of a new body, called the *embryo*.

Silique? What is the replum? What is a silicula?—157. What is a multiple fruit? What is a sorosis? Syconus? Strobilus?—158. What is a seed? What changes occur when the pollen acts on the pistil? What the most material?

The *face* of a seed is that part of it parallel with the placenta; or when the raphe is present, this organ, with only few exceptions, runs over the face. The opposite surface is the back.

159. The parts of the seed demanding our attention are the *covering*, *hilum*, *raphe*, *chalaza*, *embryo*, and *albumen*.

The *integuments* or coverings of the seed are subjects of much discussion, both as to their number and constitution. The diversity of opinion on the subject, originates, no doubt, in a great measure, from the change they undergo, from the transformation of the ovule into a seed. One would naturally suppose that the integuments of the seed would be the same as those of the ovules. But this is not the case in many instances. Three have been named by different writers, corresponding to the three layers of the ovule; but the coats of the seed are not always the same as those that covered the ovule. The outer covering is called by De Candolle the *testa*, the second the *sarcodermis*, the inner the *endopleura*. The *testa* consists of cellular tissue, and presents a great variety of appearances of form and color in different plants. In some the cells are spiral without any membrane; and when moistened, uncoil in a beautiful manner, as in those of the *Salvia*. In some cases it is smooth and polished, in others rough and irregular, marked by dots and projecting points; in some it is covered with *hair*, as in the cotton and epilobium, which is called *coma;* in others it is furnished with wings, as in the Gladiolus and Bignonia. In some it is ribbed, in others it is pitted and marked by irregular depressed lines.

160. The *hilum* is the point by which the seed is attached to the placenta; it is frequently distinguishable by being of a different color, and having the appearance of a scar. The hilum always marks the base of the seed, as the *micropyle* (*mikros*, small, and *pule*, gate) does its apex, toward which the root of the embryo is directed.

161. The terms *raphe* and *chalaza* have the same application in the seed as in the ovule. In orthotropous and campylotropous seeds these parts are not observable, since the chalaza is coincident with the hilum; and as the raphe is the bundle of vessels conveying nourishment from the hilum to the chalaza, the necessity of its development is superseded by the contact of these parts. The raphe is easily observed on the seeds of the Apple and Orange, running between the outer and inner integuments, being an elevated ridge on one side; and in the orange the situa-

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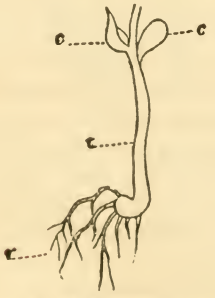
Which is the face of the seed?—159. What did De Candolle call the different coverings of the seed? Of what does the testa consist? What of its different appearances?—160. What is the hilum? How is the position of the embryo known?—161. When is the raphe easily observed?

tion of the chalaza is distinctly marked by a small dark-colored spot. The raphe does not always consist of a single bundle of vessels, but ramifies on the surface of the seed, as may be seen by the veins on the surface of the Almond, which are ramifications of the raphe.

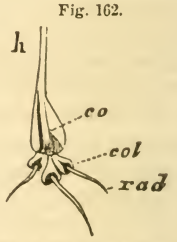
163. The *embryo* is the product of the action of the pollen. If the ovule be dissected soon after impregnation, there will be found within the nucleus and contiguous to the foramen a minute speck, opake and yellowish, which enlarges by the absorption of the surrounding fluid: this fluid is the *amnios.* The minute speck becomes in its enlargement a distinctly organized body, and assumes in time the form of an embryo plant. The embryo consists of three parts, the *radicle*, *plumula*, and *cotyledon;* some add a fourth, a *cauliculus* or *neck.* The *radicle* becomes by development the *root* or descending axis of the plant, and the *plumula* the ascending axis or stem. The *cotyledons* are to be the earliest leaves of the plant. The *cauliculus* or *neck* is the imaginary point of separation of the plumula from the radicle. Fig. 161 represents a young dicotyledonous plant—*a* the plumula, *r* the radicle, *c c* the cotyledons, *t* the cauliculus or neck.

Fig. 161.



Young Dicotyledon.
a, plumula; *cc*, cotyledons; *t*, cauliculus, *r*, radicle.

Fig. 162.



Young Monocotyledon.
co, cotyledon; *col*, coleorhiza; *rad*, radicle.

161. The radicle of the monocotyledon is inclosed within a sheath which it perforates in its elongation, and issues from between its lips, as seen in Fig. 162—*rad* being the radicle, *col* the coleorhiza, *co* the cotyledon. This sheath Mirbel called a *coleorhiza*, and Richard proposed to substitute *Endorhizæ* for monocotyledons, and *Exorhizæ* for dicotyledons, thus founding

163. What is the embryo? Of how many parts does it consist? What do these parts become?—164. How is the radicle in monocotyledons? What did Richard call monocotyledons? What dicotyledons?

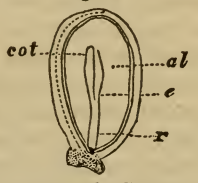
the distinction of the two great classes of flowering plants, on the fact that the radicles of one were inclosed within a sheath, while the radicles of the others were destitute of such a covering.

165. The embryo of the Pine, although reckoned among the dicotyledons, has several cotyledons; but these are opposite, forming a whorl. (Fig. 163.) The distinction made by this arrangement of the cotyledons, being alternate in Endogens, and opposite or verticillate in Exogens, will always be a guide in determining to which an individual should belong. An equally sure mark of distinction is the mode of germination, whether of the endorhizal or exorhizal manner.

Fig. 163.

Embryo of the Pine.

Fig. 164.



A Seed with Albumen.
e, embryo; *al*, albumen.

166. The *albumen,* when present, is a substance surrounding the embryo, and is supposed by some to be the solidified amnios. (Fig. 164, *al.*) It varies remarkably in consistence and appearance; sometimes it is farinaceous, consisting of cells filled with starch, as in our common grains, wheat, oats, corn, &c. Sometimes abundant and fleshy, as in the cocoanut, and often contains oil, as in the *castor-oil* plant. At other times it is hard and bony, as in coffee and the vegetable ivory-nut, which is the albumen of the seed of the Phytelephas. The albumen is the store of food laid up for the nourishment of the embryo, which it consumes in the early development of the plant. In size it varies from an exceedingly small quantity, as in the grasses, to the amount of several ounces in the cocoanut. It is sometimes perforated by dry cellular tissue, in which state it is said to be *ruminated.*

167. To determine the several parts of the seed which we have above defined, and the position they occupy in reference to

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165. How is the embryo of the pine? How are the cotyledons arranged in the two great classes of plants?—166. What is the albumen? What are some of its varieties? What is vegetable ivory? What is the albumen for? What of its size?—167. What is of great practical importance?

each other, is of great practical importance in descriptive botany, and constitutes one of the most important subjects of the student's attention.

168. We have above remarked that the base of the seed was its point of attachment to the placenta, or that the hilum was always the base. One would naturally suppose that the opposite point would be the apex; but this is not generally the case. In orthotropous seeds, only, does the real apex correspond with the geometrical apex. In campylotropous seeds the apex of the seed is nearly in contact with the base, the axis of the ovule having been doubled on itself, thus bringing the real apex in close proximity to the base. It is very common for the surfaces of seeds, particularly of minute ones, to be marked by lines of various kinds, sometimes barely lines of different color, at others by ridges or depressions, and in others by dots, and in some by regularly arranged tubercles. In all these cases the point of their divergence is the hilum or base, and the point of their convergence the apex, so that by this means the base and apex of the seed is often determined, when it would be difficult to do it by any other. Having determined the foramen, base, and chalaza of a seed, which may generally be done by simple inspection, the position of the interior parts is, with certainty, known. It has been demonstrated, that in nearly every case the radicle points toward the foramen, and the plumula toward the chalaza. In orthotropous seeds, therefore, the embryo is inverted, that is, the radical points upward; in campylotropous the embryo is curved; in anatropous the embryo is erect; and so in all cases, the mycropyle being taken for the radicle and the chalaza, when present, and the hilum, when the chalaza is not found, for the plumula, the true position of the embryo is always determined.

169. The embryo answers most important purposes in classification, since the whole vegetable kingdom has been divided into three great classes founded on the varieties in structure of the embryo. There have been found three varieties of embryo, Monocotyledonous, Dicotyledonous, and Acotyledonous; and it has been observed that the vegetables arising from these differently constituted embryos, are distinct and peculiar in their constitution and mode of growth.

170. Fig. 161 exhibits the dicotyledonous embryo, the different parts of which have been already pointed out. The growth of this kind of embryo produces our forest trees, and all

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168. Is the apex of a seed opposite its base? Explain it. What often determine the base and apex? How is the position of the radicle and plumula determined?—169. What three varieties of embryo?

vegetables having a distinct bark and pith. But, as above remarked, it has been discovered, that there are vegetables with the above characteristics, whose embryos are unlike the one above described, some having numerous cotyledons, others but one, and others none. These apparent variations have been sufficient to induce some botanists to reject entirely this classification, but we believe on very insufficient grounds, since by careful observation nearly all these apparent discrepancies may be reduced to a common principle; and even if they could not be explained at all, the foundation of the system would be broader and firmer than any other proposed by the objectors to this. Could we expect that the many thousand different species of vegetables varying almost infinitely in their various parts, could be reduced to three actual, invariable types? It would be requiring of this system, what has never been attained in any other.

171. Orders, in which more than two cotyledons are found, are the Coniferæ, in which they vary in number from two to more than twelve; in Borageneæ and Brassicaceæ, and some other orders, there are four. In all these cases the cotyledons are opposite. In the Horse-chestnut, there is apparently but one cotyledon. Prof. Lindley says, that, by dissection, there is a slit which indicates the division between the two bases of a pair of opposite confluent cotyledons. Some such modification doubtless is the cause of all the variations from the common type.

There are other cases in which no cotyledons exist. The Cuscuta is an example of this kind; but if the cotyledons are leaves, we should not expect to find cotyledons in this genus, since it has no leaves. There are other cases in which it is said no cotyledons are discernible, but by more accurate observation the cotyledons are found to exist in a rudimentary state, the radicle seeming to be developed at their expense.

The monocotyledonous embryo is very different in its structure from the preceding. It is a homogeneous, cylindrical body, tapering at both ends, with no distinction of radicle, plumula, or cotyledon.

What variations in cotyledons?—171. In what family more than two cotyledons? In what species one or more? How is the monocotyledonous embryo?

CHAPTER IV.

FUNCTIONS OF THE ROOT AND LEAVES—ORIGIN OF WOOD.

172. In the preceding chapters we have described the various organs, which compose the vegetable in its most perfect state; but we have considered them, with few exceptions, simply as they present themselves to the eye, without supposing them possessed of life, or considering them in their combined action in performing the various operations peculiar to organized beings. We have seen, that the whole vegetable kingdom, however various in form and constitution, had its origin, at least, in minute vesicles. We have also seen that all the organs of reproduction and nutrition, are simple modifications of leaves. Who can fail to admire the wisdom of that Being, who could construct with materials so simple, the endless variety of vegetable organs, and make them yield products of every variety, from the blandness of water to the most powerful agents; and to afford nutriment to men and animals, and deposit contemporaneously and contiguously the most virulent poisons!

Our next object is to consider plants as living beings, and so far as possible to explain the various phenomena connected with them as such.

SECTION 1.—*The Root.*

173. The first organ that appears in the germination of a seed is the root. It bends downward, and soon commences the proper functions for which it is intended, that of absorbing nourishment from the medium which it penetrates, and giving support to the plant. These seem to be the only functions which the root performs. It lengthens by additions to its extremity, which always consists of cellular tissue, before described under the name of *spongiole*. Through this extremity the nourishment of the plant which is absorbed from the soil passes.

174. It has been thought that the root not only had the power of selecting appropriate food for the plant, but also of

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173. What is the first organ that appears in germination? What are its functions? Where does the sap enter?—174. What power has the root been supposed to have?

searching for it. The experiment of planting a Strawberry in a sandy soil, surrounded by rich earth, but not coming in contact with it, when it was found that the roots immediately sought the rich earth, was considered conclusive on this point. But the explanation of this phenomenon is easy without having recourse to any power or instinct on the part of the root for seeking nourishment. The influence of the rich soil was felt by the roots, although not in contact, and they became stimulated by its action. There are other cases in which roots seem to be endowed with the power of seeking nourishment. An example is mentioned by Lord Kaimes of a Plane-tree standing upon a ruined wall in Ireland; and when its nourishment was exhausted, it sent down roots to the earth, a distance of ten feet, and continued its existence by this act, prompted, apparently, by self-preservation. We have seen vines growing in very rich moist soil send down roots four and five feet long to the earth; but in those cases it was at a curve downward of the stem, so that the descending fluid must rise to reach the roots. In all these cases we believe that it is the effect of gravity rather than of any voluntary or determining power of the plant. In the corn, roots put forth from the lower nodes of the stalk, and particularly in those that are luxuriant, and in seasons of abundant moisture,—proving from their origin, and the circumstances under which they occur, that it is the accumulation of descending sap that causes their development. All this is purely the result of physical causes. It has been thought that plants had the power of returning to the soil matters injurious to them; but this has been proved to be a simple result of exosmosis, and that rotation of crops was not demanded to avoid poisons eliminated by the plant, but from the fact of certain necessary elements being exhausted from the soil.

175. We have mentioned before that the root always descends in its course of development, unless obstructed by physical impediments. Numerous experiments have been made which strikingly exhibit this vital impulse. To Dutrochet, more than to any other man, is the world indebted for placing this subject in its present interesting position. In several memoirs he has discussed the subject in its various connections, and from his numerous experiments we arrive at the conclusion, that *quantity of matter* seems to exercise the most powerful influence in controlling the direction of the root. When the root

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What experiment with a strawberry? How explained? What case mentioned by Lord Kaimes? How explained? How do vines and corn illustrate it? Have plants the power of returning to the soil useless or injurious materials?—175. What controls the direction of the root?

has its situation naturally in the earth, it descends perpendicularly to its surface. Previous to his investigations, various hypotheses were abroad to account for the uniform direction of the root and stem; but all were unsatisfactory. If seeds are permitted to sprout in a box, and after the plumula and radicle are developed in their common directions, the box be inverted, the root will change its direction downward, and the plumula upward; and if they are permitted to sprout in a tube in which they cannot turn after inversion, they will assume a spiral form. The cause in these cases is made plain by a curious experiment contrived by Dutrochet. It was found that the Mistletoe had the same impulse toward the center of the branch of a tree on which it grows that most other plants have to the center of the earth; and it was also found that the Mistletoe might be made to germinate on a thread so small that it would exercise no influence over the direction of the root. This he did, and then fixed it to a fine needle, and had it accurately balanced, so as to turn like a compass-needle with the slightest force. He then placed near the radicle a piece of wood, and covered the whole with a glass, and in process of time the radicle was seen to turn directly toward the wood, and that too without moving the needle; showing that the quantity of matter controlled the direction of the radicle, but by the exercise of no power with which we are acquainted. It could not have been by attraction, for then it would have produced a movement of the needle. It seems to be an exercise of power over the vital energies in producing the turning of the radicle in that direction. The earth no doubt exercises its influence in the same manner. This influence, however, has been counteracted by the application of agents in an unusual manner. Professor Schultz is said to have succeeded in reversing the growth of plants by planting them in moss, and so arranged that the light which they received was the solar rays reflected from a mirror from below upward. Under such circumstances, it is said, the roots take their directions upward, and the stems downward. Similar experiments have not succeeded in the hands of others.

Notwithstanding such experiments *may* succeed, we may nevertheless, draw the conclusion, that all roots direct themselves perpendicularly to the surface of the body on which they naturally germinate; if they are parasites, they will be perpendicular to the surface on which they grow.

How with seeds in a box? What the experiment with mistletoe? How did Shultz reverse the growth of plants?

Color seems to exercise an important influence in the direction of organs. If they are of deep color, they ascend; if colorless, or of a pale color, they take a descending direction. Roots, if they become green, will then ascend, or turn toward the light, if placed in circumstances to have the light come to them in only one direction.

Section 2.—*Functions of Leaves.*

176. From the *structure* of leaves, we should be led to suppose that they perform an important part in vegetation. They have been compared to the lungs of animals, but they perform much more for the plant than this comparison would indicate. They are not only the organs of respiration, but also of digestion and nutrition. They perform in every respect for vegetables what is performed by the lungs and stomach and the whole digestive apparatus in animals. They receive the crude sap from the roots through the stem, and elaborate it by exposing it to the action of the atmosphere, throwing off the superfluous moisture, decomposing water and carbonic acid. They send immediately downward the materials of the alburnum and liber, and nourish with this elaborated food the contiguous parts.

177. That the nutrition of a plant depends upon its leaves is abundantly proved by depriving a plant of these organs through a season, and it withers and dies. It does not die immediately, since it possesses the power of putting forth new leaves, which soon come into action, and supply imperfectly the places of those removed; but if it is deprived of its leaves through the season, its power of putting them forth becomes exhausted, and all functions cease.

The presence of cotyledons also shows the necessity of leaves to prepare food for the embryo. If the cotyledons be removed, the seed seldom germinates, and if it does germinate, it is in a sickly state. The structure of the leaf shows its adaptation to the purposes of respiration.

178. By what we have called crude sap, we do not mean that it is not changed at all in its ascent through the root and stem, but that it is unfit for assimilation until it has passed through the leaves.

It would be an important point to determine the real state of

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What exerts an important influence on the direction?—176. To what have leaves been compared? Do they do more? and what?—177. What proves that nutrition depends on leaves? How with the cotyledons?—178. Is the sap changed before it arrives at the leaves?

the sap as it enters the leaves. That it is changed in its ascent is certain. Of this we have often convinced ourselves by making an incision in the spring of the year near the root of a Birch, and sap, with very little taste, will be obtained; but by making the incision several feet high, the sap is bitter, and the bitterness increases with the elevation of the incision.

The sap in this partially altered state, which is owing to chemical changes, enters the leaves.

179. The *first action* of the leaves is to get rid of the superfluous water, in which its food is dissolved. Whether this is any thing more than simple evaporation, we are not prepared to say, yet we believe the plant has partial control, at least, over the quantity. The construction of the stomata plainly indicates this. It is influenced by the same causes which govern common evaporation. Under the direct influence of the sun's rays it is most rapid; in the diffused light of day it is less; and in the dark it almost ceases.

180. The *quantity* of fluid given out by plants is in some cases very great. We may convince ourselves of this by holding a glass near the under surface of a vigorous leaf of the vine, and it will soon be covered with moisture, and in a little while it will accumulate in drops, and run off the plate. Hales found the evaporation of a Sunflower to be one pound and four ounces, and a Cabbage one pound and three ounces in a single day, and estimates the evaporation of plants to be seventeen times greater than that of animals.

181. The next and most important function of leaves is the *decomposition of carbonic acid.* It is only by the performance of this function by the leaves that the solid parts of vegetables are deposited. Any cause which arrests this operation immediately renders the plant sickly, and its peculiar secretions cease to be deposited. Light is absolutely essential to the performance of this function of the leaves. In the dark no carbon is deposited, and no oxygen is liberated.

De Candolle says: "If two plants are exposed, the one to darkness, and the other to the sun's rays, in a close vessel, and in an atmosphere containing a known quantity of carbonic acid, and are removed at the end of twelve hours, we shall find that the first has diminished neither the quantity of oxygen or carbonic acid, and that in the second, on the contrary, the quantity of carbonic acid has diminished, while the quantity of

What proves it?—179. What is the first action of the leaves? What partially controls it? When most rapid?—180. What of the quantity of fluid given out? How proved?—181. The next function? What does De Candolle say?

free oxygen has increased in the same proportion." This experiment shows beyond doubt the function of the leaves in decomposing carbonic acid, and that the light of the sun is necessary for its operation.

182. The same author instituted another ingenious experiment, to show the absorption of carbonic acid by the roots, and its subsequent decomposition. He filled a cistern and an inverted bell-glass with distilled water, the glass having a sprig of mint floating in it; in the same cistern was placed another bell-glass containing carbonic acid. The surface of the water was covered with a stratum of oil, to prevent the access of atmospheric air. The whole was then exposed to the direct action of the sun. The carbonic acid diminished daily, while the glass containing the mint had acquired a quantity of oxygen exactly equal to the loss of carbonic acid. A similar plant placed under similar circumstances, with the exception of the jar of carbonic acid, disengaged no oxygen, and at the end of twelve days, the time the experiment continued, commenced to decay, while the other one was in good health. No further proof certainly could be required to establish any fact, than these afford in establishing the function of the leaves in decomposing carbonic acid by the aid of the sun's light.

It is a singular fact that such experiments will not succeed unless exposed to the direct action of the sun's rays. Although these operations take place in some degree in plants growing in shaded places, yet when placed under circumstances for experiment, they require the direct action of the sun to perform this function.

183. That the carbon has been deposited in the plant is also proved by exposing plants to the action of an atmosphere that contains carbonic acid, and similar ones to an atmosphere that contains none: the former will increase in carbon, while the latter will not. The two principles established by these experiments are of much practical importance. They teach us that the presence of carbonic acid is absolutely necessary for the growth of vegetables, and that if we expect the full and perfect development of plants, they must have the direct action of the sun's light. To secrete all the peculiar products in perfection, these circumstances must conspire. The gardener is well aware of these facts in practice. To *prevent* the deposition of unpleasant products, which are natural to the plant, he covers the stem of the celery, and it deposits little except the simplest tissue,

182. What other experiment? When only will such experiments succeed?—183. What other proof? What do these facts teach us? How does the gardener prevent unpleasant products?

and becomes loaded with nearly insipid fluids; the sterner juices of the plant previously deposited becoming diluted, so that it is a healthful and agreeable food. This plant, uncultivated in the manner it is, yields substances exceedingly rough and acrid, and but little corresponding to the mild sweetish stems produced by the gardener's care. This, however, it must be observed, is an immature state of the plant; and the principle of the deposition of carbon by light is used, although empirically, in converting an otherwise useless weed to an article of delicacy. We might multiply examples, but one is sufficient to illustrate the principle; and we may make the remark, which the cultivator would do well to bear in mind, that when plants yield naturally agreeable products, the more light they receive the better they will be; but when the products, in a state of too great concentration, become acrid, shade will make them more palatable. Of the latter of these is the Radish, and of the former the Potatoe. Hence the Potatoes are much drier, and contain more nutritive matter, which have been grown on open land, exposed to the sun, than those grown in orchards. The truth of these principles is strikingly illustrated also in the geographical distribution of plants. Those of high latitudes, growing through a summer of a few weeks or months, possess few decided properties. They yield the simplest vegetable products, possessing but few properties not common to all vegetables. But as we approach the Equator, the properties become more decided, odors more varied and pungent, fruits more delicious, medicines more powerful and efficient, poisons of the most fatal character, till we arrive at the equatorial regions, where all these products, in all their variety, arrive at perfection.

184. Forest trees are affected very much by the same principles. The wood of dense forests is known not to be as firm or as durable as that of trees growing in open grounds. We see also the effect of these principles in the turning of plants toward the light when it comes to them in only one direction. The side next the light deposits its carbon, and becomes firmer, harder, and of course contracted, while the other side remains turgid with unassimilated fluid. The plant of course bends toward the light, not from any attraction it has for it, but from the influence the light exerts upon it. We see the same exemplified in the growth of forest trees. When the forest is dense, light being received entirely on their tops, trees stretch upward,

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When should light, and when should shade be used? How with plants in high latitudes? How in the tropics?—184. How with forest trees? Why do plants turn toward the light? Why do trees grow tall in dense forests?

the lower branches decay, and thus forming tall, straight, cylindrical trunks, with the branches near their summits. Trees in open fields never grow as tall as in forests, but they have a greater number of branches, and nearer to the earth, and the reason is plain from the foregoing remarks. They receive the direct rays of the sun at every different position it assumes through the day, thus having no propensity to development in any particular direction by the action of the light.

185. We are unable to account for the constitution of various vegetable products, without supposing the decomposition of water, from which the vegetable derives the hydrogen used in the formation of those substances. Oil, for instance, is composed of 1 atom of oxygen, 11 of hydrogen, and 10 of carbon. No substance that enters as food into the plant can yield this great amount of hydrogen but water. This decomposition of water, no doubt, in a great measure, takes place in the leaves, for volatile oils are very commonly found in these organs, and when they are not found in the leaves, they often exist in cavities, with apparently no secreting bodies for their formation, in the situations in which we find them. In many cases, at least, it seems probable, from these considerations, that they are generated in the leaves, or in parts performing the same functions. The bark, in certain states, is capable of performing the same operations as the leaves.

186. The absorption of oxygen takes place in the night. We may convince ourselves of this by confining a plant during night in atmospheric air, and the oxygen will be perceptibly diminished. This oxygen unites chemically with substances contained within the leaves, and probably with carbonaceous food not in the form of carbonic acid, and it would seem that only in this state is it fitted for assimilation. The oxygen is immediately given back to the atmosphere on the return of day. The quantity of oxygen absorbed by plants is too small to have any effect on the health of animals by its abstraction.

187. Besides absorbing and giving off oxygen, plants constantly, in healthy action, give off a small quantity of carbonic acid, both day and night. It has been supposed that this was the true and only effect of vegetable respiration on the atmosphere, and that the absorbing and giving off oxygen and decomposing carbonic acid and water belonged to digestion. From this it would result that the respiration of vegetables vitiates the atmosphere as does that of animals; but the effects

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Why expanding in the open fields?—185. What proves that water is decomposed?—186. What takes place at night?—187. What other function have leaves? What have some supposed?

of their digestion abundantly compensates not only for the carbonic acid which they yield to the atmosphere, but also for the vast amount constantly given out by animals, and that produced by combustion. They not only yield oxygen, but they take the noxious gas and decompose it, and retain the carbon, and return to animals the vital air. Thus the two great kingdoms of animated nature mutually yield to each other its vital fluid. Were it not for this compensative arrangement, we see no other result, constituted as the beings of this globe now are, that could happen, but that the atmosphere would become so vitiated as to be unfit for the support of animal existence. How beautifully they now operate! The expelled carbonic acid, which is poisonous to the animals, which throw it off in vast quantities, is taken up by the vegetation as the most healthful and appropriate food for them, and the oxygen, which they do not require by their constitution, gives life to man.

That very important operations take place in the leaves, is conclusively proved by many observations on the leaves of different plants at different periods of the day. Hayne found the Bryophyllum calcynum to be acid in the morning, tasteless at noon, and bitter in the evening. The same is true of many other leaves, and some will even redden litmus paper in the morning, but produce no effect upon it at any other part of the day.

Section 3.—*Origin of the Wood.*

188. We might occupy pages in the various discussions which have been carried on concerning the origin of the wood. From the time of Linnæus to the present, various theories have been formed and advocated with spirit; but the discovery of new facts has compelled, in some cases, the authors to yield their favorite opinions, and fall in with views more in accordance with what, at least, appears to be nature's operation.

189. There are now two systems which divide botanists as to the origin of wood. One of these theories supposes two distinct simultaneous systems of growth—the cellular and fibro-vascular, of which the former is horizontal, and the latter vertical. The cellular gives rise to the pith, medullary rays, and the remaining cellular substance of the wood and bark. The fibro-vascular system gives rise to the vascular portion of the plant. All the woody portion of the trunk are the roots of leaves imbedded in the cellular system by which they are confined. The

What relation have animal and vegetable respiration to each other?—188. What is said in relation to the origin of wood?—189. How many systems? What does one of these suppose?

buds differ from the seed in no important respect. They send up the ascending axis in the form of a branch, and the descending axis in the form of fibers, which united form the stem, and terminate in the earth, modified in some respect by the cellular system, forming what, taken as a whole, is called the wood. The various varieties of wood are produced by the action of the cellular system. Of this we may be convinced by removing a ring of bark of one tree, and supplying the place of the removed portion by a ring from a different tree of the same family, and the wood formed under the strange portion will be of the same kind as the tree from which it was taken, but the wood above and below will remain unaltered. The same is the case with grafts. The graft will always remain unaltered, while the wood of the stock remains unaffected by the graft.

190. Some uncommon examples are upon record, which go to confirm the position. In the Pandanus, the stem near the ground is extremely slender; higher up it is thicker, and gives out aerial roots, which act as props to the plant by entering the earth obliquely. The aerial roots are what would have composed a part of the stem, had they remained bound by the cellular substance into one cylinder, but from some cause they separate and subtract so much from the mass of the stem near the root. Professor Lindley describes another instructive case on this subject in the Barbacenia from Rio Janeiro, recently discovered.

It consists of a central portion similar to common monocotyledonous stem, but this column is surrounded by bundles of vascular fibers, the bundles having no connection with each other, corresponding, in the opinion of the professor, to the aerial roots of the Pandanus. The putting forth of roots from buds when planted, as in the case of the Multicaulis, appears easily explicable on this principle. These will put forth roots immediately from the bud, and in all essential points agree exactly with the germination of the seed. A complete bud of a Multicaulis will germinate, when all the substance of wood and bark is removed, which does not enter into the composition of the bud. The vitality of most buds seems to be much less, and in some cases cannot be made to germinate at all when removed from the parent stock. Whence come the roots from a bud, if they are not the direct production of the bud? When the bud is removed from the parent, the fibers it would otherwise have sent through the trunk become proper roots at once.

What of buds?—190. What of the Pandanus? Barbacenia? What of the buds of the multicaulis? What does it prove?

From the above theory, we are cautioned against excessive pruning, where we wish to obtain substantial stocks; for all other things being equal, the growth of the body of a tree will be in direct proportion to the leaves, which, of course, will be in proportion to the branches. If these are removed to a great extent, the growth of the tree is retarded, if not otherwise injured.

191. Opposed to the above theory are some of the most distinguished philosophers. They suppose the vascular bundles proceed from below upward, originating in the cambium cells in dicotyledons, and in monocotyledons from the terminal buds.

192. The *duration* of vegetables is exceedingly various. Some come forth during the darkness of a single night, and wither and die on the approach of day; others go through their different stages of growth to perfection in a few days, and disappear. Some require the length of several months for the same operation, and others of two years, while others still come to perfection only after several years, and then are continued in existence for indefinite periods. The latter is the case with forest trees. We see nothing, theoretically considered, opposed to the unlimited duration of dicotyledonous trees. Each year's growth may be considered a distinct individual, having in itself all the elements for the production of a similar individual, which, when produced, has no necessary dependence upon its progenitor; since each layer of any tree has been endowed during its time with all the productive functions of the individual. But to this unlimited duration of vegetables, nature offers impassable barriers. The action of the elements, the attacks of insects and larger animals, the exhaustion of the soil by other vegetables, the constant lengthening of the roots, making the circulation too extensive, are all causes constantly operating to prevent the duration of the most of forest trees beyond one or two centuries. But there are cases in which favorable circumstances have conspired to lengthen out the lives of particular individuals to as many thousands. Some trees of great age have become subjects of history. The celebrated Chestnut of Mount Etna has a circumference of 160 feet. This tree has been said to be several trees united; but more recent and accurate observations have proved it to have but a single root, and of course it is a single tree. Its age, by any calculation, must be that of many centuries. Some of the oldest Cedars of Lebanon are supposed to have an age of three

191. What is the opposing theory?—192. What of the duration of vegetables? What is each year's growth of a d cotyledonous tree? What limits its duration? How old are some trees?

thousand years. The Baobab trees of Africa, and the Dragon tree of Orotava, are said to be even six thousand years old. Pliny believes there were trees in his time as old as the world, as he says they were "*intacta ævis et congenita mundo*, untouched by age and brought forth with the world."

Means have been devised for the determining the ages of trees by the diameters, but they are so liable to error, that they are unworthy of repetition.

CHAPTER V.

Section 1.—*Fertilization.*

193. The subject of fertilization is one of much interest, from the singularity of the operations by which it is in some cases carried on, and the beautiful adaptation of the means to bring about this indispensable end.

All plants possess some apparatus for the production of seed, or of bodies which, independent of the parent, will vegetate and produce the species; from the most simple Confervæ, with stems scarcely larger than films of silk, to the most perfect plants. The fact that some plants possessed two systems by whose conjoined action the fruit and seed were perfected, has been long known. The ancients were acquainted with this fact in reference to the Date Palm. They discerned that in the blossom of one tree, rudiments of fruit existed, while in that of others no such rudimentary fruit was produced, but that the powder produced by the flower of the latter must be sprinkled in the flowers of the other, in order to the perfection of the fruit. The above and similar facts constituted all the knowledge of the ancients on the subject of fertilization; and it was not till the latter part of the seventeenth century that any thing like proper notions began to prevail. Ray, in England, and Malpighi, in Italy, were among the first who placed the subject in its true light. Their investigations led them to the conclusion that the "pollen was endowed with prolific power, and served to fertilize the seeds."

Within the last few years this subject has received the particular attention of the most distinguished philosophers, and the

193. What do all plants possess? What has been long known? What conclusion did Ray and Malpighi come to?

important facts which they have disclosed constitute a proud triumph of their skill and sagacity over the most hidden operations of nature.

194. The anther, in its early stage, together with the pollen, forms a compact and moist body. After the flower expands, the anther matures; the pollen absorbs the fluid from the cells lining the anthers. These cells were proved by Purkinje to consist of the fibrous cellular tissue, and this tissue, when deprived of moisture, becomes exceedingly elastic, and the fibres then act as springs in bursting the anther. Mirbel has demonstrated that, during the perfection of the pollen, the fluid of this tissue is drawn by the endosmose of the pollen from it. The presence of this fluid is necessary to the perfection of the pollen, and it is equally necessary, that it should be drawn from the fibrous tissue, that it may perform its appropriate and necessary function of bursting the anther. What a beautiful provision for insuring the due preparation of all parts, so that none might be prematurely or tardily performed! Under this organization, the anther cannot burst till the pollen has drawn its perfecting nourishment. On the other hand, the pollen cannot mature only by a means which insures its immediate escape when perfected.

195. During this preparation of the pollen, the pistil is undergoing important changes. The stigmatic surface assumes an irregular, granular appearance, becoming more lax in its texture, and secreting a viscid fluid, all of which is accomplished by the time the pollen is perfected. The pollen then falls upon the stigma, is made to cohere by this viscidity, and moistened by the secreted fluid.

196. After the grains of pollen have remained upon the moist stigmatic surface for several hours, the extine bursts at one or more points, and through the apertures the intine is protruded containing the contents of the pollen grain. These *pollen tubes* penetrate the lax tissue of the stigma, and make their way through the whole length of the style to the ovule, and reach, and probably in all cases enter, the foramen. The remarkable exhibitions of design for accomplishing this object are unsurpassed by any phenomena in nature, and the researches of Brown, Amici, Schleiden, and Brogniart have laid open a field which cannot be viewed by a lover of nature with any other feelings than those of unmingled delight.

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194. How is the pollen perfected? What relation to the opening of the anther?—195. What change is the pistil undergoing in the mean time?—196. What takes place with the pollen grains? What course do the pollen tubes take?

197. There are three points involved in one theory which is extensively adopted. *First*, that the tubes come in contact with the sac of the *amnios; second*, that the tubes do not perforate the membrane; and *third*, that by the action of the contents of the tubes, an embryo is formed within the sac. These, in substance, were the opinions of the first observers of the action of the pollen tubes, and are still those of the English and some continental botanists. But there are those who present the phenomena in an entirely different light, and endow the different parts with as different functions. The German botanists, Schleiden and Endleicher, are the most prominent advocates of the following theory, which is an abridgment of Schleiden's views. The pollen tubes enter the ovule, and pass through the intercellular passages of the nucleus, and reach the embryo sac, which, being forced forward, is pressed, indented, and becomes the cylindrical bag which contains the embryo in this first stage of its development, and which consequently consists solely of a cell of parenchyma, supported upon the summit of the axis. This bag is therefore composed of a double membrane (except the open radicular end), viz., the indented embryo sac, and the membrane of the pollen tube itself. In Taxus, and especially in Orchis, he has succeeded in drawing out that part of the pollen tube from the embryo sac which contains the embryo, and that too at a considerably advanced stage.

198. The student will observe from the above, that in Schleiden's view of the subject, the pollen tube becomes itself the vessel that contains the embryo, instead of the embryo being formed in the sac of the amnios; and it will also result from this view, that so far from this impregnation of the embryo *sac* coming from the pollen tube, the pollen tubes become themselves the subjects of this influence. This reverses entirely the order of things, as they have been considered in all past times.

199. After the discovery of pollen tubes, and the necessity of the pollen coming in contact with the moist surface of the stigma, in order to put them forth, it was thought that the impregnation of the Asclepiadæ and Orchideæ formed exceptions to the general manner of producing impregnation by their emission, since nature seemed to have prevented the possibility of any such operation; but more recent discoveries show these plants to exhibit most beautiful examples of this arrangement.

In the Asclepiadæ, the stigma is a fleshy, five-cornered disk,

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197. How many points involved in one of the theories of fertilization? What are they? What is Schleiden's theory?—198. What are the chief points of this theory?—199. What arrangement for fertilization in Asclepiadæ? Orchideæ?

having a gland on each angle. To each gland there is attached a pair of yellow bags containing the pollen, and called *pollen masses.* These do not open, and the stigma has no secreting surface. In these circumstances, the impregnation of these plants offered an important problem for solution. Ehrenberg found that through one side, that next the stigma of these pollen manes, pollen tubes were emitted, and directly entered the stigma, and made their way to the ovary, as in other cases, thus showing the perfect agreement, in this case at least, with other phanerogamous plants. It has also been proved more than probable that similar arrangements accomplish the same end in Orchideæ. In orthotropous plants, threads in some cases hang down in the cavity of the ovary, through which the pollen can pass into the foramen. In other cases, the conducting tissue elongates so as to reach the foramen during the time of fertilization. In Euphorbia, the apex of the nucleus is protruded far beyond the foramen, so as to lie within a kind of hood-like expansion of the placenta.

Section 2.—*Fruiting.*

200. By fruiting we understand the changes the ovarium and its connected parts undergo in arriving at maturity. We have already noticed the changes which take place in the contents of the ovary. The changes of the other floral organs, in many cases, are no less prompt and distinct. The floral envelopes soon wither, unless connected with the ovary; the stamen falls off, the pistil dries up or hardens when composed in part of the axis of the plant, and all the energies of the plant seem to be directed to the perfection of the fruit or ovary. That these changes are effected by the act of fertilization, may be made manifest by preventing the access of the pollen to the pistil, and the parts will for a much longer time remain unchanged. There seem to be two different courses taken in the perfection of different fruits. In one, the ovary becomes dry, hard, membraneous or woody, as in the Poppy, Cantua, &c In others, the ovary becomes fleshy, affording various agreeable articles of food, as Apples, Pears, Peaches, Melons, &c. This has been supposed to depend upon the number of stomata on the surface of the ovary. In the dry one, the stomata were sufficient to permit the evaporation of all the moisture, while in the fleshy comparatively little evaporation took place, from the

200. What is fruiting? How are the floral envelopes affected by fertilization? How made manifest? What two courses taken in the perfection of fruit?

small number of stomata on its surface. The effects of fruits, when green, on the atmosphere are the same as those of the leaves, but generally of a more limited extent. In the night they absorb oxygen like the leaves, and return most of it during the day.

201. The constitution of the fruit differs materially in its ripe from what it was in the green state. Water and lignine diminish, and sugar increases. Water diminishes from two to ten per cent. in different kinds; lignine generally in a greater proportion. Sugar increases in currants from 0.52 to 6.25, it being twelve times the quantity in a ripe from what they possessed in a green state. This the remarkable changes in taste would lead us to suppose without analysis. In many cases we know that sugar is produced at the expense of starch, but no starch can be discovered in those fruits which generate the greatest amount of sugar, such as Currants, Apples, Peaches, &c. That it takes place at the expense of the other proximate principles, aided by water, is certain, since it goes on without any increase of weight, and even when separated from the parent stock, and also in the process of cooking. It is a well known fact in chemistry, that the action of various vegetable substances on each other, aided by moderate heat, will produce the saccharine principle. The vegetable acids, with gum and mucilage, will produce this effect. These principles are contained in all succulent fruits, tartaric acid, malic acid, gum, and various other substances peculiar to each fruit. The act of ripening, therefore, is a chemical process, which consists in converting the various unpleasant and injurious principles of the green fruit into the most nourishing and healthy of vegetable products.

202. Although the above conveys the general principles on which, we believe, the ripening of fruit proceeds, yet in some cases these substances from which we suppose the sugar to be formed increase at the same time; yet we believe that in all cases either the acid or the other principles diminish, and never both increase or remain stationary in the same fruit. If the acid increases, the other principles diminish. If the other principles increase, the acid diminishes.

For these processes to go on, an atmosphere containing oxygen is necessary; showing that this active agent is required in these operations, and performs some necessary office in the con-

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201. How does the constitution of ripe fruit differ from unripe? What is well known in chemistry? Is the act of ripening a chemical process? —202. What seeming variation from the above? What necessary for these processes to be good?

version of the crude material of green fruit into the palatable ones of the ripe. For additional remarks on this topic, see "vegetable products," *pectose* and its variations.

Section 3.—*Germination.*

203. By germination we understand the commencement of the vital action, which produces a development of the embryo of the seed. The necessary conditions of germination are the presence of *water*, *heat*, and *oxygen gas*.

204. Germination cannot take place in the absence of any one of these agents; and in the absence of water, no effect is produced toward germination by the exposure to both of the other agents. With it they act promptly. The water enters the seed by the hilum, and passes to the perisperm by the chalaza, from the perisperm to the embryo through its point of attachment. This is the direct course of the fluid through appropriate vessels; but in some cases, as in the Beans and Peas, it will penetrate the testa and enter the embryo directly through its substance, when the vessels of the hilum are obstructed, by being covered with wax or other substances impermeable to water, but germination goes on much more tardily.

205. Seeds will not germinate in a vacuum, nor in any gas except oxygen; nor in distilled or recently boiled water; but by the presence of 0.3 of oxygen in any of these cases, germination will commence. The action of the oxygen seems to be in combining with the carbon of the seed, and forming carbonic acid; producing, as Raspail says, fermentation: a part of the acid is thrown off, and a part no doubt elaborated by the increasing embryo. It has been proved by Edwards and Collin, that the oxygen which the plant uses does not all come from the air, but that the embryo possesses the power of decomposing water, and using the oxygen and hydrogen for different operations in developing the plant. It would seem, however, that a small quantity of oxygen was necessary to produce a commencement of the vital action, to give the first impulse to vitality. By numerous experiments it has been proved, that the best proportion of oxygen with other gases is as one to four, the ratio found in nature in the constitution of the atmosphere. Seeds may be exposed to other agents, and not germinate or lose their vitality.

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203. What do we understand by germination? What are the necessary conditions?—204. How does the water enter the seed?—205. What gas is necessary to germination? What is the best proportion of oxygen? May seeds retain their vitality and be exposed to other agents?

Seeds buried deep in the soil will not germinate, but on exposure to the air immediately spring up. Turnip-seeds have been eight years in the soil. Seeds taken from a pit, in which condition they had lain hundreds of years, germinated readily. This fact probably explains the springing up of different trees when a forest is cut down and the ground broken up. A weak solution of chlorine hastens germination, probably by aiding the decomposition of water.

206. *Heat* is another necessary condition on which germination depends. Germination cannot take place in a temperature, unless some degrees above freezing, and it may take place in a temperature which would be entirely inadequate to the perfection of its growth. If the temperature is too high, the seeds may germinate, but unhealthy action is produced, and the plant perishes by over-action, produced by this powerful agent.

It has been found that Wheat, Barley, and Rye would germinate at 44 degrees Fahr., which is about the lowest point it would take place. These grains being composed in a great degree of starch, and at the expense of which germination proceeds, it was thought that these seeds would sustain any temperature as high as the grains of starch would, without bursting their integuments. Under ordinary circumstances this takes place at a little above 167°, but this temperature was found sufficient to destroy the vitality of the various grains, Beans, Peas, and like seeds. Many lost their vitality at 125° and some as low as 113°, temperatures which the surface of our soil often exceeds. These facts teach us the necessity of shading, or of planting our flower and delicate garden seeds in cool places, when it is done after the warm days of our spring come on. Much of the vituperation against seedmen would be saved by this course. Darkness is favorable to germination ordinarily. The yellow rays are most injurious, while the blue accelerate the process, containing as they do the actinic or chemical rays.

207. When the three agents above noticed are brought to act upon the seed in due proportion it begins to swell, bursts its integuments, generally by the protrusion of a radicle, which takes its direction downward, and soon after the plumula or stem makes its appearance and takes its course upward. During germination considerable heat is generated, no doubt the effect

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Examples. What fact does it explain?—206. How is germination affected by temperature? At how high or how low temperature will seeds germinate? At what temperature do many seeds lose their vitality? What do these facts teach us? How does darkness affect germination?—207. How does germination proceed? What is generated during the process?

of the action of the oxygen on the carbon of the seed. This may be witnessed in the germination of large masses of Barley.

208. The most important change produced in germination on the contents of the seed is the conversion of the amylaceous portion into sugar. This is through the action of *Diastase.* This substance is produced at the commencement of germination, and the sole object of its production seems to be the conversion of starch into sugar for the use of the embryo plant. It does this with the greatest promptness; even when artificially obtained it will convert two thousand times its own weight of starch into sugar. It is perfectly inert in relation to any other vegetable product. Its situation in the grain would lead us to suppose that its operation was of the character above assigned to it. It does not exist in the radicle, or in the cotyledons of the seed, but immediately in the passage from the cotyledons to the germ. It also exists in tubers, as the potato, and in them it is not distributed throughout the substance, but only at the very origin of the eyes, precisely at the place where one would conceive it to be placed to dissolve the amylaceous substance for the nourishment of the growing organs. This is an exceedingly important discovery in relation to vegetation, as it carries us one step further into the mysterious operations of nature, as exhibited in the nourishment and growth of vegetables.

209. The time required for germination is very different in different species of plants, and even of the same species. Much influence also is exercised over this operation by soil, climate, and localities as to moisture and exposure.

Under favorable circumstances, Wheat, Oats, Rye, and Millet, will germinate in *one* day; Spinage, Bean, Turnip, Radish, Mustard, in *three* days; Lettuce in *four* days; Melon, Cucumber, &c., in *five* days; Horse-radish in *six*—Barley in *seven*—Purslain in *nine*—Cabbage and Hyssop in *ten*—Parsley in *fourteen* or *fifteen;* Almond, Peach, Peony, in a *year;* Rose, Hawthorn, *two years.* These results will vary from the age of the seed before exposure to the agents that produce germination, and the influences to which it has been exposed, whether its vitality may have been injured by moisture, heat, or light, all of which exercise a deleterious influence on seeds.

210. The time through which seeds will retain their vitality is very different in different species, when exposed to the same

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208. What is the most important change? Through the action of what? When produced? How much starch will it convert into sugar? When produced?—209. What is said of the time required for germination? Mention some examples.—210. What of the time seeds will retain their vitality?

influence. We believe, however, more depends on the action of elements of the atmosphere and light than upon the necessarily limited time of suspension of vitality in the seed itself. We have known seeds, which are generally considered as losing their vitality at the end of one year, readily germinate after being kept for several years in a dry atmosphere, and of nearly uniform temperature, and protected from the light. Seeds which are generally considered as retaining their vitality only one year, have been known to germinate at the end of *one hundred years*, and cases are often recorded of seeds germinating after lying buried in the earth beyond the reach of the atmosphere for at least *seventeen hundred years*. Any table on this subject, therefore, is necessarily a very imperfect guide, unless it should be based on some specified manner of keeping the seeds. The best course to follow in the *preservation* of seeds, is to keep them as much as possible in a temperate and dry atmosphere, protected from the action of the light. The coffee-seed has never been made to germinate, unless planted immediately on its ripening. Oily seeds soonest lose their vitality. In the purchase of seeds, kept in the usual manner, fresh ones should always be required.

Section 4.—*Food of Plants.*

211. The principal food of plants is water and carbonic acid and ammonia, which are received through the roots in a liquid state, and through the leaves in a gaseous form. Besides these, various salts enter in a greater or less degree into the composition of vegetables.

To determine the food of plants, it is an important element in the investigation to know of what the plant is composed. This has been determined by various philosophers with great accuracy. The following is the constitution of some of the most common plants, taking 1000 parts of the dry vegetable :

	Carbon.	Hydrogen.	Oxygen.	Nitrogen.	Ashes.
Wheat	455	57	430	35	23
Oats	507	64	367	22	40
Peas	465	61	401	42	31
Turnips	429	56	422	17	76
Potatoes	441	58	439	12	50

Quite a uniformity will be observed in these elements; about one half being carbon, less than half oxygen; about one-twentieth hydrogen, less than one-twentieth nitrogen, with a

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The best conditions of keeping them?—211. The principal food of plants? What is important to know to determine the food of plants? Mention the constitution of some plants.

much greater variation in the ashes, which consist mostly of *potash*, *silex*, *lime*, *sulphur*, *phosphorus*, and some other elements in minute quantities.

212. The first four elements are called *organic elements*, or *organogens;* the materials of the ashes, *inorganic elements.* The most abundant element is *carbon*, and no organic product exists without it, although either of the others may be absent.

213. The plant derives its carbon from carbonic acid, CO_2. It cannot take up carbon in an uncombined state, as it is solid, and it can obtain it from no other compound of carbon, as no other exists in sufficient quantities. The carbonic acid in the air, the result of respiration of animals, the combustion of wood and coal, and the decay of carbonaceous substances, and that contained in the soil from the action of manure, affords the plant its carbon. It is chiefly derived from the air. Numerous facts prove this position. Originally, before there was any vegetation, there could have been carbonic acid nowhere else. Plants grow in the air and deposit carbon. The growth of plants increases the carbonaceous matter in the soil where they grow. Plants will grow and increase in carbon in distilled water. These well-known facts prove that carbonic acid in the atmosphere supplies most of the carbon to plants.

214. The *oxygen* and *hydrogen* in plants are principally derived from water, OH; hydrogen, perhaps, partly from ammonia.

215. *Nitrogen* is obtained by the plant mostly by the decomposition of *Ammonia*, NH_3. Ammonia is generated wherever organic substances are decaying, especially animal substances. The ammonia is dissolved in water, and absorbed by porous substances in the soil, and from either condition is furnished to the roots of the plants. During thunder-storms small quantities of nitric acid, NO_5, are produced, which is brought down by the rains, and in a very diluted state furnishes food for the plant in the form of N and O. Volcanoes and springs probably throw out immense quantities of the gases that afford food to plants, especially Carbonic Acid and Ammonia.

216. Although the above four elements are the organic elements of plants, yet, for the perfection of any plant, except of the very lowest character, inorganic elements are essentially necessary. *Sulphur* and *Phosphorus* are essential to the production

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212. What are the first four elements called? Elements in the ashes? Which element is universal?—213. Whence does the plant derive its carbon? Whence comes the carbonic acid? What facts prove this position? —214. Whence oxygen and hydrogen?—215. Whence the nitrogen? —216. What other elements are necessary? For what are sulphur and phosphorus essential?

of the most important elements of vegetation, the proteine compounds. The analysis of the ash of one of our common plants will convey an idea of the constitution of ashes generally as to the number of elements: their proportion will vary very much in different plants. The wheat, in 1000 lbs., gave $11\frac{3}{4}$ lbs. of ashes, with the following composition:

Potash	2.25	Silica	4.00
Soda	2.40	Sulphuric acid	.50
Lime	.96	Phosphoric acid	.40
Magnesia	.90	Chlorine	.10
Alumina	.26	Iron a trace.	

217. When plants of the same species perfect their seed the analysis will give the same proportion, although growing in very different soils; and in different species of plants, although growing in the same soil, the elements will be in very different proportions, showing that plants require definite quantities of the inorganic elements in order to perfect growth, and in the soil that does not yield these elements a deficient growth only can be obtained.

These facts lie at the foundation of the rotation of crops and manuring. When any given plant has exhausted the soil of the soluble elements requisite for its growth, another plant requiring other elements, or the same in different proportions, may grow with luxuriance and in perfection in the same soil. Generally the *grasses*, such as wheat, oats, &c., require larger quantities of silica. Peas, clover, and tobacco, much lime; turnips, beets, corn, and sweet potatoes, potash and soda. The stalk and fruit often require the different elements in different proportion: both, of course, must be supplied. These elements might exist in the soil, but not in a soluble condition, and of course yield no benefit to the plant.

218. *Silica* is soluble in the alkalies, and by them it is rendered fit for the absorption of the plant.

Phosphorus and *Sulphur* are acidified by oxygen, and combined with some base, forming appropriate food for plants.

The soluble salts of lime and iron are formed spontaneously in the soil. These changes, from an insoluble to a soluble state, are continually going on in the soil; and for a continuation of

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What is the constitution of the ashes of the wheat?—217. When plants perfect their seed, how will the constitution of the ashes be? What is said of these facts? How explained? What do grains require? Peas, clover, &c.? Turnips, beans? What of the stalk and fruit? In what condition must their elements be? How is silica rendered soluble? Phosphorus and sulphur? Lime and iron?

the same crop, which requires a large amount of a given material, it may require it faster than the circumstances of the case can supply, and a crop that requires little or none of that material may flourish.

The supplying of the requisite materials in greater quantity than nature furnishes them, is called *manuring*. This ordinarily is accomplished by applying refuse vegetable or animal matter. Either or both of these, of course, would, by their decay, afford the appropriate nourishment, as it is of the same composition. Decaying vegetables of the same kind would, of course, be the most appropriate food.

219. To perfect the seed requires other elements than the growth of the stalk. *Nitrogenized* substances are required for this purpose, and these are especially afforded by animal manures; hence these are the most highly esteemed for the raising of grain. Wheat or other grains raised by nitrogenized substances are much richer in the nutritive elements for animals. Guano supplies large quantities of ammonia; hence its importance in agriculture. *Phosphates* are also required to perfect the seed; hence pounded bones, which are phosphate of lime, are highly esteemed. To render them soluble, however, sulphuric acid must be applied to them. Nitrogenized substances are calculated especially to give vigor to vegetable growth; hence the gardener, when he wishes to produce double flowers, supplies the plant abundantly with this kind of food, and the stamens are converted into petals. But when the fruit is to be forced into excessive development, the phosphates also must be present. An abundant supply of both these materials produces the most perfect development. Many articles are beneficially applied to crops which do not act directly themselves.

Gypsum acts by fixing the ammonia; *lime* by liberating other substances, and perhaps by stimulating the plant; and so of many others.

Fallowing, that is, raising green crops, and ploughing them wholly or partially in, is a most excellent mode of furnishing food for crops.

220. Boussingault takes the following view of the subject. He supposes a farm devoted to the cultivation of grain, possessing, of course, a sufficient amount of stock. One knows by experience what quantity of manure is indispensable, therefore the

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What is manuring? How usually accomplished?—219. To perfect the seed, what is required? How is wheat affected by the soil? Why is guano valuable? What of phosphates? The combination of what materials produces the most perfect development? How does gypsum act? How lime? What is fallowing?—220. Give Boussingault's illustration.

relation which ought to exist between the surface cultivated in forage, and that devoted to the cultivation of merchantable produce. Each year they will export grain, cheese, and some animals. Thus there will be a constant export of azotic products, without any importation of similar matter, and during all this time the fertility of the soil is not impaired. The organic material constantly exported will be replaced by the culture of ameliorating plants or by fallowing; and the art of agriculture consists in adopting the rotation which best favors the most prompt transition of the elements of the atmosphere into the soil.

221. The above is a true representation of the course pursued on numerous farms, where there is a constant exportation of products, but no importation of manure, and yet the farms are increasing in richness; but it is a lamentable fact that the soil of many other farms which export no more, by carelessness and mismanagement, is becoming exhausted. The latter class of farmers are inflicting serious injury on posterity, as it will require a long series of years to bring back an exhausted plantation to a state of fertility, although it requires but little proper management to keep a good plantation good for ages.

222. Raspail remarks that, "for the reason that a plant would die in a vacuum, for the same reason would it die in a soil destitute of the bases which were necessary for its organic constitution. This would be asphyxia for want of soil, as the other is asphyxia for want of air; for to live is to combine, and without elements no combination would be possible." But in most soils all the necessary elements are found in a greater or less degree. To these facts the eye of the agriculturist should be open, and the constitution of his soil should be known, that he may be enabled, as much as is in his power, to supply the deficient element necessary for the crop he wishes to produce. It is a common complaint in almost every section of country that some plants uniformly degenerate. In some places it will be one kind, in others another. Raspail has shown that although a soil might be rich in every other respect, but not containing the necessary salt for the particular species, the plant uniformly degenerates, and finally ceases to produce seed. The gardener, being aware of this fact, should make such application as the general nature of his soil seems to indicate.

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221. What is a lamentable fact?—222. What does Raspail say? How is it in most soils? What should the agriculturist know? What is said in regard to some plants and their seed?

Section 5.—*Circulation of the Sap.*

223. There are three kinds of circulation recognized by most Botanists. 1. A *general* circulation from the roots to the leaves and back again. 2. *Cyclosis*, or the circulation in the lactiferous tissue. 3. Circulation of *rotation* in the individual cells.

That there is a *general* circulation from the roots to the leaves, is plainly indicated by the rapid evaporation which is constantly going on from the surface of those organs. How soon does a vigorous plant wither and diminish sensibly in weight when cut in the mid-day sun! and plainly for no other reason than that the source of its supply of fluid is cut off. Hales, many years ago, made some interesting experiments, not only proving this general circulation, but determining the force with which the fluid moved forward.

224. By the aid of a glass tube, containing mercury, attached to the stalk of a vine cut off two feet and nine inches from the ground, the force of the sap at its maximum raised the mercury 32½ inches, which was on the twelfth day after the experiment commenced, April 18, at 7 A. M., which force was sufficient to raise water thirty-six feet.

"In another like mercurial gauge, fixed near the bottom of a vine which ran 20 feet high, the mercury was raised by the force of the sap 38 inches, equal to 43 feet 3 inches of water; which force is more than five times greater than the force of the blood in the great crural artery of the horse, seven times greater than the force of the blood in the like artery of the dog, and eight times greater than the blood's force in the same artery of a fallow doe."

225. These experiments show not only circulation, but that it is carried on with great force. The *force* with which the sap moves in vegetables varies with the seasons and the hours of the day. It is *most powerful* in the spring, and in the morning of the day, and under the direct action of the sun after a rain. The *course* which the sap takes in its general circulation is from the roots through the alburnum to the leaves, and downward through the bark, and laterally by the medullary processes. These facts may be shown by cutting in early spring into the sugar-maple, and we shall find the sap running from the alburnum only, and mostly from the lower surface of the wound, showing the upward course of the sap is through this

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223. How many kinds of circulation? What are they? What proves the general circulation?—224. What was Hales' first experiment? Second? —225. What do these experiments show? How does the force vary? What is the course of the sap? What proofs?

part of the stem. If the same tree be cut in mid-summer, there will be little or no issue from the alburnum, but the bark will now give out a fluid from the upper edge of the wound, proving that the downward current is through the bark. The reason that has been assigned for little or no sap issuing from the cut alburnum in summer is, that the draft made upon it by the evaporation prevents the vessels from holding enough sap to issue from the cut ends.

226. That the sap, before elaboration, ascends within the wood, and that most of it, after this process, descends within the bark, is proved by tying a ligature very tight round a branch in spring, and the branch will greatly increase above the ligature, and but very little below it, thus showing that the sap was not obstructed in its ascent, but was obstructed in its descent. This operation will very much increase the size of fruit on any branch for a single year, but it injures the tree for succeeding years, since the proper amount of alburnum is not deposited in the trunk, and from the hardening of the previous alburnum, the sap for the succeeding year is obstructed in its course.

227. The *cause* of the ascent of the sap has been attributed to the *evaporation* of the leaves, to *capillary attraction*, aided by the motion of the stem produced by the wind, to *endosmose*, and to *vital action*. We believe it is generally not due to any one of these, but to all of them, and we believe more is due to vital action than to any other cause. That it was wholly owing to vital action in the first experiment quoted from Hales, is evident from the fact that none of the other alleged causes could act. Evaporation from the leaves could not have produced it, for he states that there were no branches on the stem subjected to experiment. Evaporation or Endosmose cannot produce a force exterior to the body in which they act. To vital action alone, then, we must ascribe the principal force with which the sap is propelled. It seems remarkable that so much pains should be taken to explain phenomena on mechanical principles, which are wholly impotent when applied to the circumstances under consideration. We are gravely told, and I quote high authority, that "when a young bud is first excited to growth in the spring, the fluids it contains are increased in density by evaporation; endosmose immediately takes place between it and the tissue below it, which latter parts with the thinnest portion of its contents, and then acts by endosmose

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Why does not the sap flow in summer?—226. How is the direction of the sap proved? What effect on the fruit?—227. To what causes has the ascent of the sap been attributed? What do Hales' experiments prove?

upon the tissue below, and thus the whole cord of vegetation is set in vibration. It may be supposed that the mere effect of gravitation will carry downward the sap, in its densest state, after it has ceased to obey the attraction of the leaves, and that it will descend by simple filtration till it reaches the roots; but how we are to account for its lateral transmission through the medullary rays is still unknown."

228. The first phenomenon quoted is, that by evaporation the fluids in the leaves are made more dense, which puts in action endosmose, or capillary attraction. Now, we are acquainted with no experiment on the action of these forces, where they ever separate the fluids under their influence. We have no particular objection to resorting to these new agents in putting the sap in motion, but we should like to know how this dense fluid, in the cell into which the lighter fluid is entering by this power, is to be discharged from the cell? We have been unable, either from our own experiments or those recorded by others, to devise any method. Endosmose, or Exosmose, will not do it, for if we resort to exosmose, it can only pass out into the ascending current, and by becoming lighter by dilution, is drawn by Endosmose immediately back again. But our author solves the difficulty, by saying that gravity will carry the denser sap downward! True, but how comes the denser sap separated from the lighter? and why does it not return in the same vessels in which it ascends?

229. How does gravity operate in carrying the denser fluid upward, as in many cases in which the extremities of branches are lower than the point of insertion? We know of no solution to these questions, and we are compelled to say that they are facts, which we can only refer to the action of that mysterious principle which we call life. The action of this principle is, of course, modified by circumstances. It requires the action of external agents to call it into operation, and its force is increased or retarded by the same. Heat and moisture exercise great influence over it in circulation. In the cold of winter it is nearly suspended, but the warmth of spring calls it into action. After its action has commenced with some vigor, a cold night seems to retard or suspend its operations for the succeeding day. This is seen in the Sugar-maple. The sap commences to flow from the incisions, when the warm days and cold nights of spring come on. But if several successive nights are so warm that it does not freeze, the sap ceases to flow, and for the same reason

228. What is the first phenomenon?—229. What difficulties in the way of gravitation being the cause of the descent of sap? What is the cause? How illustrated in the sugar-maple?

that it does not flow in the summer, viz., vital action commences in the buds, and the sap is directed to them; but when it freezes again at night, the sap will flow the next day, as the vitality of the buds is checked or suspended in its action by the cold.

Section 6.—*Cyclosis.*

230. In the cinenchyma there has been discovered a circulation called *cyclosis;* the term, we presume, is derived from *kuklos*, a circle. The cinenchyma, as we have before described it, has its arrangements in no regular order, but lies imbedded in the other tissues, running in every direction. In this tissue the cyclosis takes place; the circulating fluid being generally, though not always, a milky substance, and is called *latex.* The latex, which conveys granular matter, circulates through a plexus of reticulated vessels in all directions; when the vessels are parallel, and near each other, the currents rise in some and fall in others; but, in connecting or lateral vessels, the currents are directed from right to left, or the reverse, according to no apparent rule. The contiguous rows of vessels anastomose from place to place, which produces a permanent interruption of the rising and falling currents. In order to enable the circulating motion to take place, it is necessary that the system of vessels should be reticulated. It often happens, that when strong currents are formed, weak ones disappear. In cases when the cyclosis cannot be actually seen in the vessels, it may be inferred from the following fact: When the two ends of a stem containing milk are cut through, the latex is seen to run out at both ends of the fragment, which proves that there must be both an ascending and a descending current: the same phenomenon is visible in plants having a colorless latex, therefore there must be a motion of ascent and descent in them also.

231. In the cells of some, at least, of the lower orders of plants, there is a circulation in the individual cells called the *circulation of rotation*, which has excited much interest. The Chara fragilis has long been a subject of notice. As early as 1774, Corti, an Italian physician of Lucca, discovered the circulation in the tube of the Chara.

The Chara is an aquatic plant, consisting of slender stems with a central tube surrounded by numerous small cortical tubes, all of which are filled with a fluid having minute globules

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230. What is cyclosis? What is the fluid called? How do the currents move?—231. When does the circulation of rotation take place? What plant has been long noticed? Who discovered the circulation? Describe the Chara.

floating in it. The roots of the plant also are of the same construction, and contain the same kind of fluid, suspending like globules. The tubes of the stem are lined on their inside with innumerable green elliptical globules placed end to end. By removing the cortical tubes with care and applying the microscope, we observe the floating globules following with perfect regularity the direction of the spirally arranged globules attached to the tube. The ascending current, when it arrives near the node, turns and forms a descending current on the opposite side, following with equal regularity the green globules. Between these two currents there is a line destitute of green globules, and under which the fluid does not circulate, and which is called the line of repose. If the green globules make accidentally any sinuosities, the floating globules follow these sinuosities. If the green globules are removed in any part, the current is arrested at this point, and the floating globules accumulate there, until finally they are deflected from their course and return by the opposite current. These phenomena occur in perfection only in the young internodes. As the parts become old, the globules become detached in spots, and the current becomes irregular in proportion. In more advanced age they often become entirely removed from the surface of the cell and float in the contained fluid, which ceases to circulate. At other times they entirely disappear.

232. Any cause which will accelerate or retard vegetation, accelerates or retards this circulation. Within certain limits heat will accelerate the movement, and cold retard it. Excess of either will destroy it entirely, as it does the life of the plant. Light and atmospheric air are necessary for its continued motion. Poisons act variously on the circulation, and the motion of the intercellular fluid is a true index of its effect, as its change is the first indication of their influence. This plant has been made the means of determining what substances are poisonous and their mode of action, and is said to be the most delicate test for a poisonous substance, and is called by Raspail a *Toxicometer*.

233. The power which plants possess of *accumulating* sap, and drawing on this store, as food for future use, is a subject of much interest, and of much practical importance. Striking examples of this kind we see exhibited in the Radish, Turnip, Beet, &c. In these cases the energies of the plant are spent, in the first period of their existence, in laying in stores of food in the

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How does the current move?—232. Effect of external agents? How do poisons affect it? What does Raspail call it?—233. What is said of the accumulation of sap? Examples. Explain them.

form of large succulent roots, which is to be used when the plant requires large supplies of nourishment in the perfection of its seed. But plants which do not so obviously provide this accumulation of food, nevertheless, require a fit state of development before they can perfect their fruit. The gardener is well acquainted with this fact, since he knows that Melons and like fruits, which set early, either uniformly fall off, or are diminutive and useless; but if they are not permitted to set till the vine is well developed and filled with sap, they then grow rapidly and come to perfection, having a full supply of food laid in store for their use. It is a well-known fact, also, that when a fruit-tree is prevented from bearing one year, the fruit for the next year is much better than the ordinary fruit of the tree; the tree having accumulated food during the year of rest, which contributes to the abundance and perfection of the fruit. Trees also sometimes cease to bear only every other year, either from age or from want of sufficient nourishment in the soil in which they grow; they cannot bear the exhaustion attendant on the perfection of a yearly crop of fruit.

234. The fleshy receptacles also of many plants afford nourishment during the perfection of the seed. In some of the grasses, when they grow in moist soils, they become tuberous, laying up food in the tubers for times of drought.

Section 7.—*Irritability.*

235. The vitality of plants is often exhibited by various spontaneous motions; by the sensible effects produced by the actions of external agents; all of which phenomena are attributed to *irritability*.

Of the former of these phenomena the most common is what is generally called the sleep of plants. In plants with compound leaves the leaflets often close on the approach of darkness, and expand again on the return of day. Many flowers also undergo the same changes. Some flowers, however, are unable to sustain the light for the whole day, and close their flowers under the direct rays of the sun. In some cases, also, the calyx and floral leaves embrace the flower, seemingly for the purpose of protecting it from the action of the cold and moisture of the night. Most of the preceding phenomena are, no doubt, due to the action of the light, since they may be made to take place by

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How with early fruits? With fruit trees?—234. What is said of the roots of some grasses?—235. What is meant by irritability? What of the sleep of plants?

artificial arrangements for the production of light and darkness. Lamp-light will make some plants unfold their petals, which have been closed for the night.

236. In some cases there are constant movements of leaves or petals. We have upon record remarkable examples of this kind. In the *Megaclinium falcatum* the labellum is in constant motion. In the Pterostylis there is a kind of convulsive action of the labellum. The filaments of the Oscillatorias are continually writhing like worms in pain. The Hedysarum gyrans is the most remarkable instance of this character. This plant has ternate leaves: the terminal leaflet, which is larger than those at the side, does not move, except to sleep; but the lateral, especially in warm weather, are in continual motion, both day and night, even when the terminal leaflet is asleep. External stimuli produce no effect. The motions are very irregular, the leaflets rise or fall more or less quickly, and retain their position for uncertain periods. Cold water poured upon it stops the motion, but it is immediately renewed by warm vapor.

237. The spores of some cryptogamic plants exhibit motions, which are said to depend on *hair-like* processes or *cilia*. In certain cells, also, of the same class of plants, bodies are met with, called *Phytozoa—plant-animals*, which exhibit movements.

In the higher orders, also, movements have been observed in the fovilla, or contents of the pollen grains, when moistened with water. These have been considered the result of irritability, but they are now generally regarded as mere mechanical movements, which may be exhibited by many forms of matter, as minute grains of Gamboge and other substances.

238. Movements produced by the action of external agents are various. The common sensitive plant offers a familiar example; by touching one of the leaflets the whole closes, and the petiole bends downward to the stem. The touching the base of the stamens of the Cassia causes it to fly up against the pistil. The Dionea muscipula is a case very much in point, but not very common. The lamina of the leaf is surrounded by long stiff bristles, and if the upper surface of the leaf is touched, the sides collapse, the bristles passing each other like the teeth of a steel-trap, thus effectually holding any insect that may light upon its surface, and the more the insect struggles for liberty, the more closely the leaf contracts.

239. The effect of poison on plants is exhibited by movements indicating their action.

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236. What cases of constant movement?—237. What of some spores? What of the contents of pollen grains?—238. What example of movements occasioned by external agents?—239. What effect of poisons?

A solution of the oxyde of arsenic killed Beans, Roses, Lilacs, &c., after an action of a few hours in the former case, and in some days in the latter cases. Corrosive sublimate and various other mineral poisons produced similar effects; but salts that are harmless to animals are so to vegetables. Vegetable poisons, such as Alcohol, Prussic acid, Belladonna, Laurelwater, and the like, destroy the life of vegetables, as they do that of animals.

240. From numerous experiments of the most distinguished physiologists, it is thought that the action of poisons operates on vegetables through a system similar in its organization to that of animals. Any one, seeing the effect of vegetable poisons on various plants, throwing them into apparent convulsions, and producing immediate death, without any disorganization of the tissue, must confess that there is an endowment of plants, which the physiologist has as yet been unable satisfactorily to attach to any appropriate apparatus.

Section 8.—*Color.*

241. The products of no department of nature have been more admired for the beauty of their colorings, and the variety of their tints, than those of vegetables. Flowers have ever been the noted examples of nature's penciling, and from their beauty in this respect they have been the subjects of the poet's strains

> "Who can paint
> Like nature? Can imagination boast,
> Amid her gay creation, hues like hers?
> Or can she mix them with that matchless skill,
> And lose them in each other, as appears
> In every bud that blows?"

Our Saviour with unequalled beauty, in his allusion to the Lilies of the field, yields his assent to the same sentiment.

The various colors are supposed to have their origin in a substance called *Chromule*, and that the great variety of hues presented in the vegetable kingdom is produced by the action of acids and alkalies on the chromule.

Chromule in its natural state is green, and by maceration may be readily separated from the tissue, to which it gives coloring. The grains of chromule are of an irregular shape, rather approaching the sphere, but somewhat angular, and consist of a semi-fluid, gelatinous mass, not inclosed in a sac. It is affirmed by some to contain iron and manganese, to which the

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240. How is it thought poisons act?—241. To what do the various colors owe their origin? The natural state of chromule? Shape of the grains?

varieties of color are owing, produced by the accession of these different substances, as it is well-known that almost every hue may be produced by these two metals. But the quantity of chromule which exists in plants is exceedingly small; Berzelius estimated the quantity in the leaves of a large tree not to exceed three and a half ounces.

242. To enable plants to deposite chromule, *light*, in most cases, is absolutely necessary. This is abundantly shown by the fact, that plants growing in the dark become blanched; not that the chromule already deposited becomes less, but that it is surrounded by the deposition of substances containing no chromule, and of course becomes less observable. There are examples, however, of plants growing in deep mines, having never enjoyed the light of day, which, nevertheless, are green.

243. *Green* is considered the natural color of vegetation, and when it is not of this hue, in the language of Botany, it is said to be colored.

244. The change of color produced on chromule has been referred to different causes. The two most deserving of notice are the one of Schubler and Funck of Tubingen, and the other of Macquart.

Both theories consider green as the original color, but the means by which the variations are produced are accounted for on very different principles by the supporters of the two theories. Schubler and Funck maintain that all variations from green are produced by acid or alkaline secretions. The green chromule, acted on by these substances, assumes every variety of hue. The hues assumed by the flowers are determined by the different agents by which they are produced, with the exception of red; this is common to both. Those produced by the action of the alkaline secretions, from green, are—

Greenish-blue,	Violet-blue,	Violet-red,
Blue,	Violet,	Red.

This is called the *Blue*, *Cyanic*, or *Deoxydized* series, and any variation of color from one of these hues will always be by passing into some other of the same series.

Those colors produced by the acid secretions are—

Yellow-green,	Orange-yellow,	Orange-red,
Yellow,	Orange,	Red.

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242. What agent is necessary for the production of chromule? How shown?—243. The natural color of vegetation?—244. The theory of Schubler and Funck? Give the blue series. The yellow.

These constitute what is called the *yellow, xanthic*, or *oxydized* series.

This theory has been attacked by the most able physiologists, and they have considered themselves successful in pointing out errors in experiments and observations which are sufficient to invalidate this extensively received theory. Mohl, in a memoir in the *Annales des Sciences Naturelles*, vol. ix., p. 212, examines various theories on this subject with apparent impartiality, and gives his decided preference to the following theory of Macquart, although it does not receive his unqualified approbation.

245. Macquart admits that the various colors are owing to the various modifications of Chlorophyll, but denies that it is owing to its being oxydized by acids, or deoxydized by alkalies, but that it is converted into two distinct substances by the addition and abstraction of water. By the loss of water it is converted into a blue substance, called *anthocyane*, which is soluble in water, but not in alcohol. By the addition of water, the chlorophyll is converted into a yellow substance, called *anthoxanthine*, which is partly soluble in alcohol, and partly in water. These two substances form the basis of the two series of colors above given. They both sometimes exist in the same flower, but occupy different cells; the anthoxanthine being situated in the inferior cells, while the anthocyane occupies the superficial ones. This gives a great variety of tints, according as the colors of the inferior cells are more or less distinctly exhibited through the superior layers. By the action of acid and alkaline secretions, these substances assume every variety of hue ascribed to the action of the same agents on chromule.

246. The outward circumstances which tend to change the color of vegetable organs are various. The action of light is one of the most efficient agents in the production and change of colors, and it is not a little singular that the power which is absolutely necessary to the production of color, in the great majority of cases, should be the most powerful agent in destroying it. We are all acquainted with the influence of light in blanching vegetable substances when dead.

247. The change of the color of leaves in autumn, of fruit when ripening, of some evergreen leaves during the winter, are phenomena whose explanation has as yet baffled the most acute observers. The memoir of Mohl, above quoted, leads us one

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245. What is Macquart's theory? How converted into anthocyane? How into anthoxanthine? How are these arranged?—246. The most efficient agent in changing colors? What singular about it?

step further than had before been taken in the explanation of these common phenomena.

We can only give in few words the results to which his extended observations have led him. He concludes that these various changes are owing to a derangement or suspension of functions of the organs of nutrition. This point he strengthens by the consideration that the puncture of an insect will cause an organ to pass through all the steps to maturity, giving all the hues belonging to its species, whether of fruit or leaves. Also, the cold of autumn and winter produces a similar derangement: although the agent is different, yet the result is the same. Many evergreen leaves become tinged with red in winter from the influence of cold, but, with the return of summer, assume their accustomed greenness; also, the leaves of the extremities of the branches being most exposed to atmospheric influences are changed to red, while those nearer the trunk continue green. If one half of a leaf be protected from the cold it will remain green, while the other half will change to red. But in the case of fruit, heat is the agent in producing similar effects to those above ascribed to mechanical injury and cold.

Section 9.—*Odors.*

248. Much of the importance attached to flowers by people generally, is owing to the odors they exhale. The rose has long been cultivated by amateurs, no less for its grateful fragrance, than for its beauties of form and color; and those which combine these properties, are the most favored objects of the Florist's care. The *cause* of the odors of plants is, no doubt, the disengagement of a volatile oil, which, in some cases, is easily obtained, and made subservient to the use of man; in others it entirely eludes every effort to confine or preserve it, being as evanescent as the light, which is the agent of its production.

249. Odors are distinguished into *permanent*, *fugitive*, and *intermittent*. *Permanent odors* are such as are inclosed in the tissues of the wood and bark of plants in a concentrated form; and either from being but slightly volatile, or contained in close vesicles which prevent exhalation, they remain for a long time, giving to the organs in which they are contained their peculiar odor. There is probably no part of a vegetable absolutely destitute of permanent odor. Every variety of wood, under certain

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247. How does Mohl explain the change of color in ripening fruit? Autumn leaves and evergreens in winter?—248. What is the cause of odor in plants?—249. How are odors distinguished? What are permanent odors? Give examples.

circumstances, exhibits it. Some, nearly scentless otherwise, become strongly odorous when rubbed or heated. The Pine, Oak, and Beach, are examples of this kind. Others are odorous for a long time after being cut, under ordinary circumstances; of this kind are the Rosewood of Teneriffe, the Cedar and Sandal-wood (Santalum album) of India, so highly esteemed in Eastern Asia for its fragrance. The slight volatility of the oil, to which these species owe their odors, and the compactness of the wood, enable them constantly to yield their fragrance for an indefinite length of time.

250. Others are fragrant when first cut, but lose this property in a very short time, as is the case with the Cinnamon and Cassia, the fragrant substances being volatile, and the wood porous, both causes concurring to render the wood in a short time scentless.

251. *Fugitive* odors are such as belong to organs of short duration, as the leaves and flowers, and we meet with them in the greatest abundance, and most frequently in the latter. All are aware that the flower is the source whence flows the delightful fragrance of the flower garden; and during the season of bloom of our Magnolias, the woods and swamps are perfumed by the odor of their flowers. It must have been remarked also, by the most heedless observer, that the odor of the garden, or forest of Magnolias, is much more pungent at some parts of the day than at others. During the direct action of the mid-day sun, little or no perfume is perceptible from either; but as the sun sinks to the horizon, and the dews begin to settle on the leaves, the evening air becomes scented with their fragrance. The odor accumulates during the night, and as the dew begins to exhale with the rising sun, it is borne on the air in much greater abundance than at any other hour. Thus these silent worshipers pour forth their incense in a morning sacrifice to Him who extends to them, as to all, his kind regards.

A *shower* produces similar effects. Who has not enjoyed the grateful odor exhaled from the flowers of the field or garden after a summer's shower?

252. The causes of these apparently great emissions of odor, under the circumstances mentioned, and the apparent suspension of their emission, have not been satisfactorily determined. It has been supposed that the heat of mid-day, under the direct action of the sun's rays, produces so much evaporation as to

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250. How with cinnamon and cassia?—251. What are fugitive odors? When is the odor the strongest? What effect has a shower?—252. How are the above phenomena explained?

empty, in a great measure, the cells, and that the stomatas close and prevent the emission of the odorous substance; again, it is thought that the excessive evaporation would carry off more of the odors than the plant could generate, and thus the supply becomes exhausted during these hours of heat, and it requires the coolness of evenings, when aqueous evaporation is nearly suspended, for the plant to regain its supply; but a more probable reason (were we disposed to attribute it to any one alone) we conceive to be, that the excessive heat of mid-day, producing upward currents of vapor, the odorous emissions are carried with them beyond our notice; but, as night comes on, the currents cease, and the fragrant exhalations accumulate near the earth. A shower plainly would produce the same effect, cooling the surface of the earth, and reversing, in some degree, the atmospheric currents.

253. In the production of odors the direct light of the sun is necessary; hence, after long rains, flowers become comparatively scentless; and this circumstance adds weight to the reason given above, and shows that the emission, so far from depending on the absence of light, as would seem at first view, from the fact of their becoming more sensible at the approach of night, and ceasing as the light becomes more intense; a long continuance of even cloudy weather prevents the emission entirely, showing that the generation of the fragrant fluid is dependent, as above observed, on the direct action of the sun's rays. And it is well-known, that most of the secretions of Phanerogamous vegetables require the same action, and the more volatile products especially. From the extreme volatility of the substances producing fugitive smells, and the necessity of the direct solar rays for their secretion, we could not be led to suppose that any loss of the secretions could take place under the influence of the mid-day sun, or that they could be detained in tissues which were continually emitting watery exhalations.

254. *Intermittent odors* are such as are given off at particular times, and the plants which yield them are entirely destitute of such odors at other times. Many Orchidaceæ are perfectly scentless during the day, but during the night are fragrant. A remarkable example of this class of odors is exhibited by the *Cacalia septentrionalis*, which, when exposed to the direct rays of the sun, emits a strong aromatic odor, but by merely interposing a screen between it and the sun, its fragrance vanishes. The Cereus gives out flashes or puffs of perfume, as its intermittent odors are called. "Morren observed in one case of a

253. What is necessary for the production of odors? How do long rains affect odors?—254. What are intermittent odors? What of the Cacalia? Cereus?

cut-flower, that it gave off puffs of odor every half hour, from 8 to 12 P. M., when it faded, and the smell became very slight. On another occasion, when the flower was left on the plant, it began to expand at 6 P. M., when the first fragrance was perceptible in the green-house. A quarter of an hour afterward the first puff of odor took place, after a rapid motion of the calyx; in rather less than a second quarter of an hour, another powerful emanation of fragrance took place; by 35 minutes past 6 the flower was completely open; and at a quarter to 7 the odor of the calyx was the strongest, but modified by the petals; after this time the emanations of odor took place at the same periods as before."

Many other cases might be cited of singular phenomena, properly coming under this head. The odors in these cases are certainly developed or emitted on different principles, in the different cases under this variety. The explanations are entirely beyond our reach. There seems to be a specific action of the organs for the production of the odors, as there can be no glands discovered by which the odorous fluid is secreted. That the odorous fluid is emitted as it is generated, which of course must be periodically, is rendered probable by the fact, that emission of carbonic acid took place in the same manner from the flower of the Cereus.

255. Odors have also been classed, from their similarity of effect on the human system, into *aromatic*, *stimulating*, *penetrating*, and *sweet*, but the difficulty of fixing definite limits to the application of these terms renders the classification of little use.

256. *Schubler* and *Köhler* have made many interesting observations on odors as well as colors. They found that, of the various colors of flowers, some are more commonly odoriferous than others, and that some colors are more commonly agreeable than others.

Color.	No. of species.	Odoriferous.	Agreeable.	Disagreeable.
White	1193	187	175	12
Yellow	951	75	61	14
Red	923	85	76	9
Blue	594	31	23	7
Violet	307	23	17	6
Green	153	12	10	2
Orange	50	3	1	2
Brown	18	1	0	1

The white most odoriferous and agreeable, the yellow and brown most disagreeable.

255. How have odors been classed?—256. What did Schubler and Köhler find with regard to the relation of color to odor? What color most odoriferous? Which most disagreeable?

CHAPTER VI.

INFLUENCE OF EXTERNAL AGENTS ON VEGETATION.

257. The agents which exercise a decided influence on vegetation are *light*, *heat*, *water*, and *earth*.

The concurrent influence of all these agents, in a greater or less degree, is absolutely required for the perfection of vegetable products; and according as some of them exist in excess, or in diminished quantity, is the functional operation of the vegetable organs injured or destroyed. Different plants require these agents in very different degrees, and hence the distribution of plants over the face of the globe; some flourishing near the snow-line of the mountains, or near the limits of perpetual snow, north or south, while others can exist only under the influence of tropical heat. Some grow amidst the sandy deserts, others only immersed in water. Some grow in the caverns of the earth, while others must have the direct rays of the sun. Some require a rich soil, others grow suspended in the air. From this adaptation of vegetation to every variety of influence, the earth is covered with verdure; from the perpetual snows of the mountains or the arctics to the equator, each position giving existence to its appropriate flora.

Section 1.—*Light.*

258. The most obvious effect of light on vegetation is the production of colors, and this it affects by decomposing carbonic acid, and depositing the carbonaceous matter. In most cases, certainly, light is absolutely necessary for the deposition of the green coloring matter, since most plants become perfectly colorless by growing in situations in which they are deprived of light. There are cases, however, in which plants deposit the green chromule, when excluded from the light. Green vegetables have been found in caves of the earth, from which the light of day was excluded, and we have seen the cotyledons of the Mustard and the Impatiens balsamina green, when the seeds have germinated

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257. What agents most affect vegetation? Are they all necessary in some degree? Do they require them in different degrees? Illustrate it.—258. What is the most obvious effect of light on vegetation? Is it universally necessary? What examples?

within the perfectly closed pericarp; and I have now before me a large onion in which several of the central layers are as green as the leaves, while the parts above and around them are perfectly white. That these are exceptions to a general rule is manifest from innumerable examples to the contrary, constantly occurring within the observation of every one. If a board lies upon the grass for a short time, the grass becomes blanched; plants growing in a dark cellar are colorless; the interior of the cabbage is white, while the other leaves are green, and if these are removed, those that are exposed soon become green. Plants, which in their natural situation are white, by accidental exposure become green; the side of a potato from which the soil has been by chance removed, soon changes its color from white to green. It may then be laid down as a general principle, that light is the great agent in the production of vegetable colors. All parts of the solar spectrum are not equally efficient in the production of vegetable colors. The *yellow rays*, according to Draper and Hunt, are the most powerful in the production of colors.

259. Light, Raspail says, influences plants to produce vascular tissue, and to make them combine with earthy bases; while in darkness they produce the cellular tissue, and combine with ammoniacal bases. That light exercises an important agency over the growth of vegetables and their secretions, cannot be doubted. An equal amount of light and darkness seems to be the proportion in which the greatest amount of vegetable vigor is attained. This is seen exhibited in the equatorial regions, where the days are uniformly twelve hours long, and the nights of equal length, and there we find the most luxuriant vegetation.

260. If, according to the hypothesis, light acts in producing the firmer and more compact parts of vegetables, and in its absence the more *yielding* and succulent parts are generated, we should be led to suppose, that where these periods were equal, the perfection of vegetable products would be found; and if the light is in much greater proportion than that of equality, just in the same proportion should we expect to find the products of such regions harder, smaller, and less symmetrical. This is the exact state of vegetable products in high latitudes. Trees become harder, smaller, and less luxuriant the higher the latitude, for during the period of their growth, the sun is a great part of the time above the horizon. That this is owing to the action of light, is proved by the fact, that by transporting vegetables

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Are all parts of the solar spectrum equally active? Which most?—259. What does Raspail say? What seems the best proportion? When exhibited?—260. What should we be led to conclude from these facts?

into higher latitudes, from equatorial regions, and keeping them in an atmosphere, at the temperature of their natural situations, by means of the hot-house, they flourish during the summer; but during the short days, and long nights of winter, they droop, exhibiting their suffering from the due influence of the solar rays.

261. Raspail's theory above noticed receives confirmation from the fact, that those vegetables which consist entirely of cellular substance, are produced only in the absence of the light of the sun, such as mushrooms, &c., their growth ceasing at the coming of light. And it is a common notion among gardeners that melons, cucumbers, and like pulpy fruits, increase much more at night than during the day. Although Fungi grow only in darkness, they will never produce spores capable of germination, without the action of the sun's light, and in cases where the light of day never enters, there may be Fungi, but they never increase or perpetuate themselves by the production of spores.

262. It is during the direct action of the sun's rays, and by their agency, that the most important vegetable products are generated. It is by their influence that water and carbonic acid are decomposed, the oxygen being mostly liberated, and the elements combining in other proportions, for the formation of the various oils, resins, &c., including the most important and abundant of the vegetable products. What is generally termed the sleep of plants, that is, the folding up of compound leaves, and the closing of flowers, is, no doubt, in most instances, occasioned by the want of the stimulating action of the solar rays; for we see leaves and flowers, that were folded up during the night, expand with the first rays of the morning sun.

263. We have upon record many instances of the singular phenomena of flowers during twilight emitting flashes of light. It is said the daughter of Linnæus first observed this emission, exhibited by the *Tropæolum Majus* or Garden Nasturtium. The flashes occur only during twilight, in the morning or evening; those of the evening being much the most brilliant. The plants, from whose flowers these flashes have been observed to issue most frequently, are the Marigold, *Calendula officinalis*, *Orange lily*, *Lilium bulbiferum*, African marigold, *Tagetes patula*, and *Sunflower*, *Helianthus annuus;* but Mr. Trimmer, in an article in the 2d vol. of "Paxton's Magazine of Botany," p. 193, observes that he had observed it in many other flowers.

H. How is it in high latitudes?—261. What confirms Raspail's theory? How with Fungi?—262. What is accomplished by the direct action of the sun's rays?—263. What examples of flowers' light?

264. The cause is supposed to be electrical, as the flashes are more brilliant, when the atmosphere is most highly charged with electricity. "In walking in my garden," says Mr. Trimmer, "in which was a considerable quantity of Nasturtium in bloom, not at all thinking of the flashing of plants, I was struck with the very vivid flashes that proceeded from them; the scintillations were the most brilliant that I had ever observed, at the same time the sky was overcast with a thunder-cloud;" and he further remarks, that he always found them most brilliant under such circumstances. The lower orders of plants, as the fungi, have long been noticed as giving light under particular circumstances. Some in New Holland, species of Agaric, are said to produce light enough to read by. In the mines of Germany certain fungi have been long celebrated for the light they emit.

Section 2.—*Heat.*

265. *Heat* is the most obviously necessary, of any external agent, to the existence and growth of vegetables; without a considerable degree of it no vegetation takes place. We observe amid the colds of winter vegetable life is suspended, and as the warmth of spring comes on, vegetation commences, and as the heat increases, plants become more vigorous, in the same proportion.

266. The beautiful arrangement in the vegetable economy, for the adaptation of vegetables to this season of repose, can but afford matter for the most agreeable contemplation. In equatorial regions, where heat is constant, a great proportion of the vegetables are of a peculiar organization, not yielding their leaves, not covered with bark, and producing no coverings to the buds; while in higher latitudes we find our forest trees expressly adapted to a season of repose, or a kind of hybernation. The leaves at the approach of summer come forth in immense profusion, perform with energy their functions during the heat of summer, and at the approach of autumn disengage themselves, by their own depositions, from the parent stock. We find also our forest trees covered with a thick bark, composed of materials possessing the least power for conducting caloric; and the buds, the rudiments for the perfection of which the succeeding year's energies are to be devoted, inclosed in scales, nicely fitted for the protection and preservation of their important contents.

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264. Supposed cause? What examples among the lower order of plants? —265. What is said of heat?—266. What arrangement does nature make in reference to this agent at the equator and in high latitudes?

The equatorial regions are emphatically the regions of monocotyledons, destitute of bark, and always in verdure. The temperate regions, with the year distinctly marked by the four seasons, is as emphatically the region of the dicotyledons, clothed with transient verdure, and covered by thick non-conducting bark.

267. Herbaceous annual plants seem in their economy to have been constituted in reference to their preservation during a season in which they could not flourish. The annuals of temperate regions produce seed fitted to withstand the various influences of a period entirely unsuited to vegetable growth. They are composed of materials the least affected by atmospheric influences, being capable of resisting, uninjured, the utmost intensity of cold; and it is a remarkable fact, that the seeds of tropical annuals, which are peculiar to that region, are much less able to resist the changes of temperature, and retain their vitality, generally, but for a very short time. In the former case, the very continuance of the species depends on their producing seeds that will retain their vitality through considerable periods, and at the same time resist the influence of rigorous climates; while in the latter there is not the same necessity for the same provisions, and in many instances, at least, these provisions are not made, while they are uniformly provided in the other.

268. Plants, like animals, seem to possess the power in some degree of preserving a uniform temperature; whether this is owing in part to the action of vital power, or entirely to physical causes, is doubtful. The uniform temperature of the earth, from which they derive their food, the non-conducting power of the covering, which, in a great measure, excludes both the heat of summer and cold of winter, and the evaporation in hot weather, and its suspension in cold, are causes, perhaps, sufficient to account for their uniform temperature. Cases, however, are mentioned of plants growing in soil, in the vicinity of hot springs, receiving their food through a medium but little less than boiling water, and at the same time their temperature was but little affected by these circumstances.

269. Although plants may preserve their temperature to a certain extent, yet it is well known that excess of heat or cold will destroy them. The temperature they will bear without injury is very different in different species. While our forest trees will bear uninjured the most intense cold of our winters, others

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What class of vegetables prevail in equatorial regions? What in temperate regions?—267. How with annual plants?—268. How is the uniform temperature produced?—269. Can they resist equally well great degrees of heat and cold?

will perish in an atmosphere of thirty-two degrees, and annuals are destroyed by the first frost of autumn. The manner in which cold operates in the destruction of vegetables has of late excited considerable interest. The long prevalent opinion has been, that the well-known phenomenon, that water at the moment of its conversion into ice expands, was the cause of their destruction. The tissues being filled with sap, it was supposed that when this was frozen the consequent expansion ruptured the tissues, and unfitted them for any longer performing their functions. This very plausible theory, it seems, has been entirely set aside by some, but by others it is still considered a concurrent cause in the destruction of some vegetables at least.

The following is compiled from an article in the 39th vol. of Silliman's American Journal of Science, from the pen of Prof. Lindley.

270. "Mr. Gœppert denies that the laceration of tissue takes place in freezing, and asserts that cold operates in destroying the vitality of plants, which is followed by a change in the chemical constitution of their juices."

Prof. Morren has given the following conclusions as the result of his inquiries:

1. "That no organ whatever is torn by the action of frost, except in very rare cases when the vesicles of cellular tissue give way, but that the vesicles of plants are separated from each other without laceration. 2. That neither the chlorophyll, the nucleus of cells, elementary fiber, amylaceous matter, raphides, nor the various crystals contained in vegetable tissue, undergo any alteration, unless perhaps in the case of amylaceous substances, which, in some cases, are converted into sugar, no doubt in consequence of the action of some acid, formed by the decomposition of the organic parts. 3. That the action of frost operates separately upon each individual elementary organ, so that a frozen plant contains as many icicles as there are cavities containing fluid; the dilatation thus produced not being sufficient to burst the sides of the cavities. 4. That such dilatation is principally owing to the separation of the air contained in the water. 5. That this disengagement of air from water, during the act of congelation, is the most injurious of all the phenomena attendant upon freezing; introducing gaseous matter into organs not intended to elaborate it, and bringing about the first stage in a decomposition of the sap and the matter it precipitates; so that with a thaw commences a new chemical action destructive

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How is it supposed frost acted?—270. What is the opinion of Gœppert? What are the positions of Morren?

of vegetable life. 6. That the expansion of the cells and aquiferous organs drives a great quantity of water into the air-cells and air-vessels, so that the apparatus intended to convey liquid only, contains water and air, while that which is naturally a vehicle for air conveys water. Such an inversion of functions must necessarily be destructive to vegetable life, even if death were not produced in frozen plants by the decomposition of their juices, the loss of their excitability, and the chemical disturbance of all their contents."

271. Prof. Lindley's conclusions, on this subject, coincide in many respects with the conclusions of Prof. Morren, but in some important points they differ. Prof. Lindley remarks, that in the most succulent species of plants, he did not find the vesicles of the cellular tissue separable from each other; and that in several instances he found them lacerated, as if by the distension of the fluid they had contained. He also gives as one of his conclusions, "A chemical decomposition of the tissue and its contents, especially the chlorophyll," which is at variance with the second conclusion of Prof. M. above.

The displacement of the fluids by freezing is one of the most curious and interesting phenomena connected with this subject; and it would appear one of the most important. Prof. L. supposes that the difference in the effect produced by freezing, when frozen plants are thawed suddenly, or by degrees, is owing to the gradual return of the fluids to their appropriate vessels when gradually thawed, and that when heat is suddenly applied, the air is expanded and increases the disturbance already produced by its expulsion from the air-cavities. We are all well aware of the fact, that it makes a great difference in the effects of a frost on vegetables, whether they are suddenly or gradually thawed. The gardener often preserves plants, which would otherwise inevitably perish, though perhaps not completely frozen in such cases, by watering them some time before sunrise on a frosty morning with well or spring water; by the application of a temperature but a few degrees above freezing, the plant thaws gradually, and permits the air "to retract by degrees from its new situation, without producing additional derangement of the tissue." But if permitted to remain till the rays of the sun come upon them, destruction is inevitable. Apples and Potatoes also, if immersed in well-water while frozen, are injured less by the frost than they would be if permitted to be thawed by a more elevated temperature.

272. The effect of frost in converting starch into sugar is well

271. What are Lindley's views?—272. What effect on starch?

exhibited in the potato. This tuber when frozen is decidedly sweet, and the starch, which it before possessed in great quantities, has, in a great measure, disappeared.

"Finally," says Prof. L., "it appears that frost exercises a specific action upon the latex, destroying the power of motion. If, as Prof. Shultz supposes, this is the vital fluid of plants, such a fact alone would account for the fatal effects of a low temperature. In all the cases I have observed, frost coagulates this fluid, collecting it into amorphous masses."

273. It has been observed, that the most succulent plants suffer most readily and most severely by frost. This is thought to be owing to the conducting power of the tissue, saturated with sap. Hence plants that remain uninjured in dry soils are very liable to be destroyed by frosts, if raised in damp and shaded situations. It may be adopted by the cultivator as a fact, that whatever tends to render tissue moist will increase its power of conducting heat, and consequently augment the susceptibility of plants to the influence of frost; and whatever tends to diminish their humidity will also diminish their conducting power, and with it their susceptibility.

274. The disengagement of caloric during the flowering of plants is a subject of considerable interest, and might, perhaps, with equal propriety, have been noticed under fertilization; but as the phenomenon is as yet of doubtful origin, we thought it proper to notice it here.

The rise of the thermometer, when applied to the spadix of the Arums at the time of flowering, has long been known. Senebier found the temperature 7° higher than the surrounding atmosphere. Hubert, in experiments on the Arum cordifolium, in the Isle of France, found the thermometer rise from 66°, the temperature of the surrounding atmosphere, to 111° when placed in the center of the spadix, and in others to 121°, thus indicating a difference in one case of 45°, and in others of 55°. The greatest difference was observed to be in the morning. The accurate experiments of Brongniart have rendered it more than probable that in all cases of flowering heat is liberated, although from the structure, or size of the flower, it may be impossible to detect it by instruments.

275. It is well known that during the flowering of plants oxygen is absorbed, and in some cases this absorption has amounted to thirty times the volume of the subject of experi-

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273. What kind of plants suffer most by frost?—274. What takes place in the flowering of plants? Give the experiments with the Arum.—275. What well-known phenomena during flowering?

ment in twenty-four hours; during this time carbonic acid is given off. These phenomena plainly indicate the cause of the heat during the period of fertilization. An inquiry of interest suggests itself from these facts as to the changes effected on the flower by these operations. The disk and petals are now supposed to act an important part in the process of fertilization, and that the process of fertilization is the same as that of germination. The following conclusion confirms this hypothesis. In both cases oxygen is absorbed, and an equal quantity of carbonic acid given off. In both cases amylaceous substances disappear, and a saccharine substance is generated. Heat also is alike generated in both cases. The constitutions of the disk and petals have been found to be similar to the nourishing parts of the seed. From these facts it has been concluded that the most important function of the disk and petals is to afford nourishment to the pollen and ovule, and the greatest vigor of these organs is exhibited during the process of fertilization. After this effect has been accomplished, these organs wither. The honey which is found in such abundance in flowers is the excess of the saccharine production over what was required for the perfection of the pollen, and the nourishment of the ovule. This excess serves for the support of numerous insects, and yields the store laid up by the Bee, which is gathered without injury to the plant.

Section 3.—*Water.*

276. We have already had occasion to remark on the importance of water in vegetation, it being the only vehicle by which the plant receives its nourishment, and by its decomposition and solidification constituting a considerable part of vegetable products. It only remains for us to notice a few other points connected with the operations of this agent. This element, as it exists in the earth, holds in solution various earths and alkalies, and vegetable and animal substances, and on this account determines in a great measure the *habitat* of particular families of plants. Those waters which contain much vegetable substance nourish those vegetables whose tissues abound in carbon, as our forest trees. The cruciferous plants, into whose composition nitrogen enters as an element, seek localities in which the waters may be more or less impregnated with animal substances. Some families of monocotyledons, which contain more or less of silex, flourish best in those situations where the

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What supposed action of the floral agents? What substance is generated?—276. What office does water perform in vegetation?

water by which they are nourished passes through silicious soils. Leguminous plants are decidedly partial to those waters which contain lime in greater or less abundance. But the most decided influence exerted on vegetables is that of salt-water. Many species of vegetables cannot flourish when supplied with water which does not hold salt in solution. These plants are such as have soda as a necessary ingredient in their composition.

277. Water also varies very much the texture of plants according to the quantity which enters into the tissues. Those vegetables which have leaves with few pores are succulent, with loose distended cellular tissue, as in the Mesembryanthemum, while in those furnished with abundant pores the tissues are more compact and rigid.

Some plants will live only in moist situations, while others will avoid such localities, and flourish in dry sandy situations. The Fungi requiring moisture are sent forth in profusion under circumstances in which the Arenarias would perish from the abundance of moisture.

VEGETABLE PRODUCTS.

For the benefit of those who may not have studied Chemistry, we give the following brief explanations:

278. An elementary body is one that has never been decomposed or reduced to a simple form, as Oxygen, Sulphur, Iron, &c. Each elementary body has a symbol, which is generally the first letter, or first two letters of its English or Latin name. The following are the symbols of the elements that enter into the constitution of organic products, except some others in very minute quantities. O=Oxygen, H=Hydrogen, C=Carbon, Ch=Chlorine, N=Nitrogen, S=Sulphur, P=Phosphorus, K=Potassium, Na=Sodium, Si=Silicon, Fe=Iron. Each of these elements combines with any other element in a different quantity, which is called its atomic weight. O=8, H=1, C=6, Cl=35.45, N=14, S=16, P=32, K=40, Na=23, Si=21, Fe=28.

279. When any two or more combine we express their com-

277. What effect on the tissue of plants? What influences this?—278. What is an elementary body? Name the symbols of the elements that enter into the constitution of vegetable products? Their atomic weights?—279. Express by symbols some compound bodies.

position by symbols: thus HO means that Hydrogen and Oxygen combine one of each and form water; but the weights are 1 of Hydrogen and 8 of Oxygen. If 1 of Nitrogen unites with 5 of Oxygen, we express it thus: NO_5, which is Nitric acid, which means that one atom of Nitrogen, which weighs 14, is united with 5 atoms of Oxygen, which weighs $5 \times 8 = 40$. So Starch is C_{12}, H_{10}, O_{10}, meaning that 12 atoms of Carbon, united with 10 each of Hydrogen and Oxygen, form Starch.

280. Oxygen, Hydrogen, Carbon, and Nitrogen, are called the *organic* elements, because they are essential to the constitution of every living being. The other elements are called *inorganic*. *Oxygen* (O) is a gas or air, and forms one fifth of the atmosphere $\frac{8}{9}$ of water. It supports combustion, and respiration. No animal can live without it.

Hydrogen (H) is a gas also, and forms one ninth of water. It is the lightest body in nature and inflammable, and produces, by its combustion, the highest heat known resulting from combustion.

Nitrogen (N) is a gas, and forms four fifths of the atmosphere, and is neither a supporter of combustion nor combustible. It has no decided properties by itself.

Carbon (C) is a solid, and is nearly pure in charcoal, and quite so in the diamond. No organic substance exists without it. Organic substances may want one or more of the other elements, but never this.

Phosphorus and *Sulphur* are well-known solids. *Potassium* and *Sodium* are metals, and, when united with Oxygen, form Potash, KO, and Soda, NaO. *Silica*, or sand, which enters in large quantities in grains and grasses, is an acid, SiO_3. When oxygen unites with another element, and does not form an acid, it is called an oxide.

Carbonic Acid, CO_2, is a gas, and is the principal food of plants, and is yielded in great quantities from the respiration of animals and combustion and decay of organic substances.

Ammonia, NH_3, is a pungent gas, and yields most of the Nitrogen in plants. It is formed spontaneously in the decay of organic substances.

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280. What are the organic elements? Describe oxygen. Hydrogen. Nitrogen. Carbon. What element must all organic products have? Describe Potassium and Sodium. When do they form Potash and Soda What is carbonic acid? Ammonia?

CHAPTER VII.

VEGETABLE PRODUCTS.

281. The vegetable is the laboratory in which the materials of all organic products are, in the first place, prepared. The animal has no power to convert inorganic elements into organic. All come through the agency of plants.

Vegetable products are naturally divided into two great classes. 1st, Those into whose composition Nitrogen enters; and 2d, Those which contain no Nitrogen.

282. The substances that compose the second class make up the great mass of vegetation.

This class may be conveniently studied under the following divisions: 1st, Such as contain Oxygen and Hydrogen, in pro portions to form water, as Starch, Gum, Sugar, &c.; 2d, Acids, containing usually more Oxygen than Hydrogen, by atoms; 3d, Oils, containing more Hydrogen than Oxygen.

283. *Cellulose* (Lignin, vegetable fiber), C_{12}, H_{10}, O_{10}, is the most abundant vegetable product. It forms the basis of all vegetable structures. It is the original membrane that forms all the vessels of the plant. Other materials may be deposited on it which greatly modify the various tissues, especially the cellular.

It is insoluble in alcohol, water, ether, dilute acids or alkalies. It is soluble in concentrated sulphuric acid. Bleached paper, linen, and cotton are nearly or quite pure cellulose. It is made to resist the action of external agents when it constitutes wood, by soaking the wood in various saline solutions, or by charring. Charred wood has been known to last thousands of years. Perfect dryness and exclusion from the air prevent the decay of wood. Low temperature has also great effect in the preservation of wood, when the other agents are present. Poplar, in the Mammoth Cave of Kentucky, at a uniform temperature of 57°, is undecayed after nearly 50 years, when the same wood, exposed on the surface, will decay in three years.

The different kinds of wood vary remarkably in the *time they*

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281. What is the vegetable? What two classes of vegetable products? —282. What subdivision of the second class?—283. What is cellulose? What does it form? What are its properties? What are nearly pure cellulose? How made to resist the action of external agents? Why does sap-wood decay sooner than heart-wood?

will resist ordinary atmospheric agents. This is undoubtedly owing to the constitution of the materials contained in the wood, or to products formed after the tree is dead. The reason that heart-wood will last longer than sap-wood is principally owing to the fact that the nitrogenized materials, which rapidly decay, are all removed from the old wood, and are abundant in the sap of the new. The *hardness* of wood is very various, owing, in a great measure, to the compactness of the woody layers and the amount of sclerogen deposited in the woody fibers.

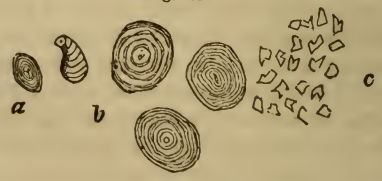
284. By replacing three atoms of the Hydrogen in Cellulose, by three atoms of Nitric acid, we have gun-cotton (Xyloidine, Pyroxiline), C_{12}, H_7 3 (NO_5), O_8. This is accomplished by mixing two parts of Nitrate of Potash and three parts of Sulphuric acid; and into the solution put some perfectly clean and loose cotton, and after a few minutes the change is effected. The cotton being thoroughly washed and dried, at a very moderate heat, is gun-cotton.

It is soluble in Sulphuric Ether, and the solution is called *Collodium* A thin coat of it forms immediately a cuticular membrane, which is often formed over sores or abraded surfaces when collodion is applied to them. It is also used in Photography, furnishing, with other materials, a sensitive coating on glass. It explodes violently, leaving no residuum, being resolved into CO_2, CO, NO_2, and HO.

285. *Starch*, C_{12}, H_{10}, O_{10}. Next to cellulose, starch is undoubtedly the most abundant and universal product of vegetation. It exists in the cells of plants, sometimes nearly filling them. Fig. 167 exhibits a cell with starch grains in it.

Fig. 167.

Fig. 168.



The grains are regularly formed, being composed of concentric layers with an insoluble external covering, and each grain having one or more points on its surface, resembling the hilum of a seed. (Fig. 168, *a*, potato grains; Fig. 168, *b*, wheat grains; Fig. 168, *c*, rice grains.) It is an interesting employ-

284. What is gun-cotton? What is collodion? For what used?—285. What is the constitution of starch? Where does it exist? Describe the grains. Where found? What are the properties of starch?

ment for the student to examine the form of grains in different plants with a magnifying power of at least 100 linear. By rubbing up any cellular substance in water, and washing the mass in a linen cloth in a vessel of water, the starch grains will pass through the cloth and settle in the water. The starch grains in hot water swell up thirty times their volume and spread out, forming the paste used for stiffening clothes. At the temperature of 150° it is converted into *dextrin*, or British gum, which is soluble in cold water.

286. The Potato contains little else than starch and water. The bursting of the potato in cooking is owing to the swelling of the starch grains. The starch diminishes as the potato grows old. In combination with nitrogenized compounds it forms our flour and meal. It exists in the cotyledons of the Pea and Bean. *Arrowroot* is pure starch. *Tapioca*, from the poisonous root of the *Janipha manihot*, is starch, partially altered by heating. Sulphuric acid, or diastase, converts it into sugar. Other agents do the same. Frost seems to produce the same effect. It is the stored-up food of the plant. Iodine detects the minutest portion, turning it blue. Iodine, diluted a million times, can be detected by starch. The presence of starch has been revealed in many places by Iodine, where it was not supposed to exist, as in the latex and fovilla.

287. There are several substances found in plants closely resembling starch, but not formed into grains. *Inulin*, in many roots of the Compositæ, is a white tasteless powder. *Lichenin*, in the Iceland moss, resembles starch in composition and properties.

288. *Gum*, C_{12}, H_{10}, O_{10}, abounds in certain genera of plants, existing in seeds, and exuding from stems when wounded. It has been supposed by some to be the form which all elaborated sap assumes before assimilation. The gum which exudes from trees, and is perfectly soluble in water, is called *Arabin*. It is insoluble in alcohol, and is precipitated from its solution by it. It seems to differ in some respects from *dextrin*, but in what is not easily pointed out. Some chemists have given characteristics which, with us, have not proved true, so far as we have determined. *Gum Arabic* is the type of gums. Various species of Acacia afford it. It is produced in Egypt, Nubia, Arabia, and Senegambia. The cherry and plum yield it. Mucilage, a

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What is dextrin?—286. Give some of the sources of starch. What effect has sulphuric acid on it? What is the test of starch?—287. What substances resemble starch?—288. Constitution of Gum? Where found? What is arabin? Its properties? What is the source of Gum Arabic? What is mucilage?

closely allied substance, is afforded by the Malvaceæ and from Flax-seed, &c. *Bassorin*, an insoluble gum, exists in the Gum Tragacanth, which exudes from species of the Astragalus. This insoluble substance is called by some *vegetable gluten*, and differs from Arabin in containing phosphate of lime. By digesting it in muriatic acid it becomes completely soluble, and pure gum is precipitated by alcohol.

289. Gum enters largely into our food, in the form especially of dextrine, into which starch is converted by cooking. It is employed largely in the arts, especially in manufactories of cloth and calico printing. In medicine it is extensively employed as a medium for the administration of medicines, and as a demulcent for covering inflamed surfaces, and blunting the action of acrid secretions. *Lozenges*, *Pastiles*, and *Gum Pastes*, are frequently formed mostly of gum and sugar.

290. *Pectin*, C_{64}, H_{40}, $O_{56} + 8$ HO, is a substance undergoing various changes, and possessing various properties. The characteristic property is, that it will form jelly with water. It occurs in almost all plants, especially in the fruits of the Pomaceæ, in oranges, lemons, tamarinds, &c.

The material first formed in the plant is an insoluble substance, *pectose*, so closely connected with cellulose as not to be separated from it without change. It exists only in quite unripe fruits, together with a substance called *pectase*, which acts upon it, converting it into *pectin* as the fruit ripens. Pectin is soluble in water, but insoluble in alcohol. The still continued action of pectase forms *pectosic acid*, which is slightly soluble in cold water, but soluble in boiling water. Boiling converts this acid into *Pectic acid*, which is insoluble in water, and forms our vegetable jellies: alkalies, or *pectosic acid*, does the same. Too long boiling converts pectic acid into parapectic or metapectic, neither of which form jellies. These are the substances formed when the housewife does not succeed in making jellies.

291. *Sugar.* There are several varieties of saccharine substances found in plants, which differ more or less in properties, and even in their chemical constitution.

Cane-sugar, C_{12}, H_{10}, O_{10}. This variety is found especially in the Sugar-cane, Sugar-maple, and Beet. From these plants it is obtained for commercial purposes. It is in solution in the cells

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What is bassorin? How does it differ from arabin?—289. How employed in the arts? How in medicine?—290. Constitution of pectine? Its characteristic property? Where mostly occur? What is pectose? Where only exist? How converted into pectin? Properties of pectin? What next converted into? What does boiling do? What does it form? What effect of too long boiling?—291. Constitution of cane-sugar? Whence obtained?

of plants with more or less of the nitrogenous compounds and mineral salts. That obtained from the sugar-cane is the most highly esteemed. The juice is pressed out between cylinders, and must soon be boiled with a small quantity of lime to destroy the effect of the nitrogen compounds, which would otherwise produce fermentation. It is then evaporated, and crystallized, and then called *Muscovado sugar*. It is afterward more or less purified, forming various kinds of white sugar. The plants are said to require, for their perfect maturation, a year or fourteen months.

Fruit-sugar, C_{12}, H_{12}, O_{12}. An uncrystallizable sugar, found in sweet fruits, in connection with *grape-sugar*.

292. *Grape-sugar*, C_{12}, H_{12}, $O_{12}+2$ OH (*Starch-sugar*, *Glucose*). It occurs in the juices of many plants, and in the product of the action of diastase or sul. acid on starch. It gives sweetness to most fruits that contain acids. It gives sweetness to all fermented liquors. It is this sugar alone that undergoes fermentation, and when materials containing sugar ferment, the sugar is first converted into grape-sugar by the action of the ferment.

293. *Oils.* There is a variety of substances that come under this head that are yielded by vegetables, which agree in certain important particulars.

Fixed Oils. The fixed oils occur mostly in the seeds, especially in the cotyledons of the embryo: sometimes, however, in the pericarp, as in the *olive*. Oils are generally divided into *greasy oils*, or those that will not dry, and *dry oils* such as will form a hard varnish.

This difference in their character is owing to the acids which enter into their constitution. The acid in the non-drying oils is called *oleinic*, and the drying *olinic*. These acids have a great tendency to absorb more oxygen, and this is sometimes so great as to set fire to the materials with which they are in contact; hence manufactories have been burned.

The common drying oils are *linseed-oil*, *hemp-oil*, *poppy-oil*, *nut-oil*, &c.

The greasy oils are *olive-oil*, *almond-oil*, *rape-seed oil*, &c.

294. These oils occupy cells with a greater or less amount of mucilaginous substance, which in the drying oils prevents the

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What is Muscovado sugar? What is fruit-sugar?—292. Constitution of grape-sugar? Where does it exist? To what does it give sweetness? When is cane-sugar converted into grape-sugar?—293. Where do fixed oils occur mostly? How are fixed oils divided? To what is the difference owing? What is the acid in greasy oils? In drying oils?—294. Where are the oils found?

absorption of oxygen, and of course impedes their drying, and which is removed by boiling with oxide of lead (litharge.)

Sometimes they are lodged in intercellular spaces or cysts. There are numerous hard or semi-fluid fats that occur in various plants that differ in some respects from the general class. *Palm-oil*, with the consistence of butter, comes from the *Elais Guiniensis*, and is imported mostly from Liberia. It is extensively employed in the manufacture of toilet soaps, and has *palmitic acid* instead of *stearic*. The *butter* of *Cacao* is from the chocolate-nuts of the Theobroma cacao, as also the butter of *Nutmeg*, *Shea*, *Galam;* and *vegetable tallow* is from the Stillingia Sibifera.

295. All these oils are composed of two or more salts which have a common base, Oxide of *glycyl:* C_6, H_3, O. The acids vary; Stearic, Margaric, Oleinic, and Olinic, are the most common. The first two form solids with oxide of *glycyl*, the two latter liquids. The relative quantities of the solid and liquid salts give the consistence of the oil or fat.

296. *Volatile Oils.* These occur in the leaves, stem, flowers, seed, &c., of the plant. They occur in cavities formed especially for their use, as in the vittæ of the seed of the Umbelliferæ; the sacs in the rind of the Lemon and Orange; or in other cases diffused through the cellular portions of the plant. Some of these are simply hydro-carbons, as Oil of Turpentine from the Pinus and Abies; Oil of Juniper from the Juniperus communis; Oil of Lemon and Oranges. Some contain oxygen, as Oil of Cinnamon, Peppermint, Rose, &c. Some contain Sulphur, as Oil of Mustard, Asafœtida, from Narthex asafœtida, and the volatile oil of onions. Camphor is a solid volatile oil, from the Camphora officinarum of India, called *stearoptene.*

These oils are usually obtained by distillation. Although the boiling point of the oils is higher than that of water, yet from their volatility they rise more rapidly than the water.

297. *Balsams and Resins.* A *balsam* is a volatile oil with a resin dissolved in it. Common turpentine, from the Pinus palustris, is a balsam. By distillation we get Spirits of Turpentine; and we have left, in the still common rosin, colophony.

Rosin, C_{40}, H_{30}, O_4, is an acid, or a combination of two acids, under different circumstances. When obtained by distillation it is *Silvic acid;* when by spontaneous evaporation it is *Silvic*

What is with them? How removed from the drying oils? Mention some other substances.—295. Of what are all oils composed?—Which form solids?—296. Where do volatile oils occur? What are some of them? Which contain oxygen? Which sulphur? What is camphor? How usually obtained?—297. What is a balsam? What is a rosin? Mention some other balsams.

and *Pinic acids*. *Canada balsam* is from the Abies balsamea, and is the clearest variety of balsams; and on this account is employed in putting up microscopic objects. *Venice turpentine* from the Larix Europea; *Copaiva balsam*, from the Copaifera officinalis of *Brazil* and *Antilles*, consists of an oil and resin; the latter consists of Copaivic acid and an indifferent resin. *Sandarach*, from the Juniperus communis, consists of three acid resins. *Olibanum*, from the Boswellia serrata, the frankincense of the ancients, used for burning in churches and cathedrals *Mastic*, from the Pistacia lentiscus, comes from the island of Chios; consists of two acid resins; soluble in alcohol, and makes the finest varnish. *Copal* flows from the *Hymenæa verrucosa*, and is imported from Calcutta, Bombay, and Madagascar. It is a mixture of several acid resins, which are soluble in alcohol and spirits of turpentine; hence its use in making varnishes. *Gum Lac*, from species of Ficus of India. It exudes from punctures of insects. It is an acid resin with various other substances: soluble in alcohol and acetic acid. The best non-electric is *Benzoin*, from the Styrax benzoin, in the island of Sumatra.

298. *Gum* resins are mixtures of various materials, a part soluble and a part insoluble in water. The chief are Ammonia Gum, which flows from the root of the Heracleum gummiferum, or, according to others, from the Dorema ammoniacum. It consists of 72 per cent. of resin, and the balance is gum, volatile oil, &c. One of the ancient medicines; not much used now. *Galbanum*, supposed to come from the Berbose galbanum: not of much importance. *Asafœtida*, from the root of the Ferula or Narthex asafœtida, growing in Persia, consists of resin, gum, sulphurous oil, &c. It is one of the most powerful antispasmodics. *Myrrh*, from the Balsamodendron myrrha, a tree of Arabia and Abyssinia, consists of resin, gum, and volatile oil. The resin is neutral. Used as a tonic extensively in medicine. Gamboge is from the Stalagmitis gambogioides; consists of gum 19 per cent., and 80 per cent. of acid resin. Used extensively as a yellow color.

299. Closely allied to the preceding substances are *Caoutchouc* (India-rubber) and *Gutta Percha*. Several families of plants yield more or less caoutchouc from their juices. To obtain the pure caoutchouc, the juice is washed with water, and the caoutchouc rises like cream on the surface of the water. The other materials of the juice remain in the water, or sink to the bottom. When once it becomes thick, it can never be

Whence Copal? Lac?—298. What are gum resins? Mention some. Of what does asafœtida consist? What gamboge?—299. What is India-rubber? How obtained? What are its properties?

mingled with water again. Is soluble in Ether, Oil of Turpentine, and especially in its own empyreumatic oil. The families of Urticaceæ, Euphorbiaceæ, and Apocyneæ yield it. Its uses and importance are too well known to be pointed out.

Gutta Percha, C_8, H_7, is a nearly allied substance to India-rubber, being the hardened juice of the Isonandra gutta, and is imported from Borneo and Singapore. It is harder than caoutchouc when cold, but becomes soft and coheres to itself at a temperature less than boiling water, but it will stick to nothing else. Its most appropriate solvent is Turpentine Oil. Its constitution is the same as India-rubber, and is thought to be only a modified form of that substance.

300. *Vegetable Acids.* The acids are numerous, and exist in the juices of the plant in combination with some base, organic or inorganic. They are variously constituted, sometimes containing only carbon and oxygen, at other times O, C, and H in various proportions.

Oxalic Acid, C_2, O_3, is extensively diffused in the vegetable kingdom, occurring in the Rhubarb, Oxalis, and many Lichens, usually in combination with lime, though sometimes free. Easily formed by the action of nitric acid on sugar.

Malic Acid, C_4, H_2, O_4, occurs in nearly all the sour juices of plants, in connection with other acids. Apple, Plum, Currant, Whortleberry, &c., owe their acidity mostly to this acid.

Tartaric Acid, with the preceding, is found in most sour fruits. Tamarind, Pineapple, and unripe Grapes derive their sourness mostly from this acid.

Citric Acid, C_6, H_3, O_6, is the predominating acid in Lemons and Oranges, and, together with the two preceding, forms the acids of most edible fruits.

Gallic Acid, C_{14}, H_6, O_{10}, is found in some plants. Tannin is readily converted into it.

Tannic Acid, C_{18}, H_8, O_{12}, is a weak acid, found in most plants. It is characterized by its astringent taste, turning soluble salts of iron blue or black, and precipitates gelatine. Exists abundantly in Nutgalls, Oak bark, and Chestnut-wood. Converts skins into leather.

Meconic Acid is one of the acids in opium. *Kinic Acid* in the Cinchona bark, with Quinine.

301. VEGETABLE PRODUCTS CONTAINING NITROGEN.—These are in much smaller quantities than many of the preceding, but no less important. Those that make part of our food are

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What is gutta percha? Whence obtained? Its properties?—300. How do vegetable acids exist? What is said of oxalic acid? Malic? Tartaric? Citric? Gallic? Tannic?

called *Protein* compounds, and exist, in greater or less quantities, in nearly or quite all the vegetable products that come to our table.

Protein, C_{48}, H_{36}, N_6, O_{14}, (from *proteuo*, I have the first place), is a compound obtained by certain agencies on flesh, white of an egg, milk curd, and hence has been made the basis of *Fibrin*, *Albumen*, and *Casein*, which are found not only in flesh, egg, and milk, but are diffused, under some slight modifications, throughout the vegetable kingdom.

302. The nitrogenized substance of flour is obtained by washing a piece of dough inclosed in a thin linen cloth in much water. We get a mass of gray elastic substance, consisting of coagulated albumen and what has been called gluten. The gluten is soluble in boiling alcohol, and precipitates on cooling, and this has been called fibrin. The albumen does not differ from the white of an egg. *Legumin*, or vegetable *casein*, is found with starch in the Leguminous plants. The three varieties may be derived from the same juice in the following manner: Take some Turnip juice, and when first pressed out it is clear. By standing it becomes turbid by the deposition of the fibrin, which coagulates spontaneously. Boil a portion of the liquid, and the albumen coagulates. Add a small quantity of vinegar to another portion, and it will coagulate the *casein*. The nitrogenized compound of corn is called *zeine*.

The Formula for these compounds is:

20 Proteine + S_2 + P for albumen.
" S + P for fibrin.
" + S for casein.

These form the nutritious portions of the plants we eat, being most abundant in flour and beans.

303. Another class of vegetable nitrogenized products are the *organic* bases or alkalies. The most common are the following:

Daturin is a base found in the Datura stramonium, Jamestown weed, very poisonous, and is the active principle in that powerful plant.

Morphin, NC_{36}, H_{20}, O_6, is one of the active ingredients in Opium, the one whose action is supposed to occasion sleep.

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301. What the nitrogenized compounds called? Constitution of protein? Forms the basis of what?—302. How is the nitrogenized materials of flour obtained? What portion called fibrin? Where is casein found? How may albumen, casein, and fibrin be obtained from the same juice? What are the formula for these compounds? Mention some of them.—303. What other class of nitrogenized compounds? Mention some of them.

Narcotin is another element of Opium, and is said to be nearly inert, medicinally.

Codein is a third compound in Opium; resembles morphin in its effects, and is a strong base.

Emetin, from Ipecacuanha, is the active portion of the Ipecac, producing vomiting in very small doses.

Cinchonin, N_2, C_{40}, H_{24}, O_2, is found with Quinine in the Cinchona bark. Quinine is produced from the *Cinchona flava*, brought from the west coast of South America. It is the active principle in the cinchona bark, and is used most extensively as a tonic when such an effect is to be produced promptly.

Piperin is the active principle of pepper, and is sometimes used in medicine.

304. *Coloring matters.* These exist in great varieties in plants, and are very different in character and constitution.

Indigo. NC_{16}, H_5, O_2. This is one of the most durable vegetable colors. It is yielded by several plants. It occurs in the cells in a colorless state, and is converted into blue Indigo by absorbing oxygen from the air. Several species of the Indigofera, Galega tinctoria, Nerium tinctorium, Polygonum tinctorium, Asclepias tingeus, and several species of Orchis, yield Indigo. By allowing the full flowering plant to lie in a tub or vat covered with water till it ferments, we obtain a yellowish solution; by adding a little limewater, and exposing it to the air, the Indigo is deposited. Fuming sulphuric acid dissolves Indigo, and this solution is used by the manufacturers.

Chlorophyl. NC_{18}, H_9, O_3. All the green parts of plants owe their color to chlorophyl. Digest fresh leaves with ether, evaporate and dissolve the residue by absolute alcohol, evaporate again, and digest the residue in concentrated hydrochloric acid. By diluting this solution, the chlorophyl is deposited in a deep-green powder. Soluble in sulphuric acid, yielding a beautiful green color.

Xanthophyl is the yellow coloring matter in the leaves of autumn. It is a dark yellow fat. Insoluble in water. Soluble in ether and pure alkalies.

Erythrophyl. This is the coloring matter of red leaves and red fruit. Soluble in water. Alkalies give it a grass-green color, which acids turn again to red.

Coloring matter of flowers we have treated of in color of flowers. The substance of the blue series is soluble in water

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304. What is said of coloring matter? Constitution of indigo? How does it occur? How obtained? What is chlorophyl? How obtained What is xanthophyl? Erythrophyl?

and alcohol. The coloring matter of the yellow series is rather resinous, and is colored blue by sulphuric acid. They are undoubtedly modifications of chlorophyl.

Alizarin and *Purpurin*, C_{20}, H_{10}, O_{10}, are the coloring matter of Madder, from the root of the Rubia tinctoria. Alizarin is soluble in boiling water. Takes various colors in varied circumstances, but is used in dyeing red. The Turkey-red produced on cotton is produced by alizarin. With alumina it forms *Madder-lake.* Animals with madder taken in their food have their bones colored red.

Anchusin, a red, resinous coloring matter, is from the Anchusa tinctoria. It assumes a great variety of colors, under different circumstances.

Carthamin, from the Carthamus tinctorius. A red and yellow coloring matter is obtained from it.

Hæmatoxylin is the coloring matter of Logwood. The extract by ether is yellow. Ammonia changes it to a dark red; Potassa, to a violet; Hydrates of the earths, oxides of zinc, and Bismuth, to purple; Iron, to black.

Cucurmin, turmeric, is from the root of the Cucurma longa; Dragon's-blood, from the Dracæna draco. Various lichens give peculiar coloring matters, from one of which our Litmus comes.

Whence alizarin and purpurin? Anchusin? Carthamin? Hæmatoxylin? Turmeric? Dragon's-blood? Litmus?

PART II.

TAXONOMY;

OR THE

CLASSIFICATION OF PLANTS.

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305. To classify requires knowledge of the objects to be classed; and the more extensive the knowledge, the more valuable the classification. We might have before us any number of bodies, and class them readily by their color. We might put gold, sulphur, and turmeric in the same class, because they are yellow. Any one, however, acquainted with these substances, would read our ignorance in our classification. Any classification that throws together bodies that are entirely unlike in all important particulars, can have no claim to a scientific or philosophical classification, however useful it may be in some respects.

To arrange the individuals which nature presents us, in such a manner, that those, most nearly related in fact, may be contiguous in our system, is the true object of scientific classification. To throw the unnumbered species of plants in groups, and place these groups in the positions with regard to each other that their real nature demands, is the aim of botanical classification.

306. Nature presents us only with species. All the groups we make are more or less artificial.

A *species* includes all those individuals that may be considered as originating from a common parent. Plants arising from seeds, cuttings, grafts, buds, bulbs, or layers, are of the same species as the plant from which they originated. These plants may differ in many respects, more or less, from the parent plant, owing to the different circumstances under which they are produced, thus forming *varieties.*

Races are produced by the long-continued application of the causes that produce varieties, so that the variation becomes comparatively permanent. Races are produced and kept up and varied by the skill of the gardener; as is exhibited in our grains, cabbages, turnips, peas, beets, &c. *Hybrids* are pro-

duced by the application of the pollen of one species to the stigma of a nearly allied species. Nature perhaps often exhibits the products of this operation to the perplexity of the botanist. The seeds of hybrids rarely germinate, although they may appear perfect.

307. A *genus* is a group of nearly related species. Many of the genera are made up of species so nearly and obviously related, that the most common observer would at once adopt the same grouping. The oaks, pines, lilies, &c., are natural genera. Sometimes some of the species are more nearly related to each other than to the other members of the genus. These are grouped as *sub-genera.*

308. Genera are founded entirely on the character of the floral organs: the species, on the whole plant. To be of the same genus, the plants must have a general agreement as to the floral organs: to be of the same species, they must agree throughout, from root to fruit.

In naming a plant we give it two names: the name of the genus and the name of the species. Thus the common maple is *Acer rubrum.* Acer is the genus including all maples, *rubrum* is this particular kind of maple: the former is called the *generic*, the latter the *specific* or *trivial* name.

309. Generic names are variously derived. Sometimes in honor of some man; as *Kalmia*, in honor of a Swedish botanist, *Kalm.* At other times, from the general locality of the species; as *Ranunculus*, from growing in marshy places, which frogs inhabit. Sometimes from some quality or structure of the plants; as *Sanguinaria*, *blood-root*, &c. The generic name is always considered to be a Latin noun, in the nominative case singular, and takes its gender according to the laws of that language. The specific name is an adjective generally, and must agree in gender with the generic name, with the termination of Latin adjectives. If the specific name is derived from a proper name, or from an old genus, it must retain its capital initial letter. If the name is given in honor of the discoverer of the plant, or its describer, it must be put as a noun in the genitive case: thus *Aster Curtisii* shows that Mr. Curtis presented this plant to the world as a discoverer, or that he pointed out its peculiar characters, that made it a new species. If simply in honor of an individual, it is formed into a Latin adjective, and must agree in gender with the genus; thus *Aster Lindleyanus* is an Aster named in honor of Dr. Lindley, with which perhaps he had no acquaintance.

310. *Orders* are formed by grouping together several genera agreeing in some general characters. Thus *Compositæ* in-

cludes all compound flowers; *Labiatæ*, the labiate flowers; *Umbelliferæ*, flowers growing in umbels. *Sub-orders* include genera that stand nearly related. *Tribes* are genera under sub-orders. The names of orders are adjectives, and in the nominative plural, feminine gender, to agree with *plantæ*, and generally end in *aceæ*. The sub-orders and tribes generally end in *æ*.

311. *Classes* are still more general divisions, depending on some very general characteristic. *Sub-classes* are formed on the same principles as sub-genera. *Alliances* are still less general divisions, being groups of nearly allied orders.

There are but two classes in the following Flora. If the seed has two or more cotyledons, it belongs to the first class, *Dicotyledonæ;* if but one cotyledon, it belongs to the second class, *Monocotyledonæ*. These two classes include all flowering plants. The flowerless plants are not described.

312. In describing plants it is important that a regular order should be followed.

In giving the characters of an order or genus, we observe the following order: first the calyx is described; then the corolla; next the stamens, including anther, filament, and pollen; then the disk, if any; then the ovary, with the pistil and its parts and ovules; next the fruit and seed. In describing a species, we commence at the root and pass through the stem, branches, leaves, inflorescence, and flowers, and describe them in the order as given for genera. Color of the flower, duration of plant, station, habitat, time of flowering, height, may succeed.

313. The portion of country especially included in the following Flora is from lat. 30° to 35° north, long. 80° to 90° west from London, including South Carolina, Georgia, Alabama, and parts of North Carolina, Florida, and Mississippi. It will answer as a text-book equally well for all the Southern States. It includes four great botanical regions: the mountainous region on the north, the coast region on the east, the partially tropical and gulf region on the south, and the upland or plane region of the middle portion. This middle region is very distinctly marked by a peculiar Flora into two regions—the primitive and tertiary. We might point out other sections of the territory included, corresponding with the geological character.

314. Lindley makes 275 orders of flowering plants in the world; we have 142. He makes 3336 genera; we have 754. He makes 70,073 species; we have 2231. We have a little more than one-half the orders, less than one-fourth the genera, and $\frac{1}{31}$ of the species of all flowering plants.

According to a table constructed by Ad. de Jussieu (see d'Hist. Naturelles, vol. vi. p. 102), in which the relative number

of species in the principal orders is given for tropical, temperate, and arctic regions), there is considerable discrepancy found by comparing our orders in the same way. Cyperaceæ, which in our Flora contains $\frac{1}{17}$ of all the species, would place us above lat. 50° north; Gramineæ, $\frac{1}{11}$, would do the same; Compositæ, $\frac{1}{6}$, Leguminosæ, $\frac{1}{18}$, would give us a latitude between 45° and 52°; Ericaceæ, $\frac{1}{47}$, and Euphorbiaceæ, $\frac{1}{75}$, would place us below 45°, or about in our true position; Labiatæ, $\frac{1}{75}$, Umbelliferæ, $\frac{1}{56}$, give about the same.

In comparing our Flora with that of New York (see Nat. Hist. N. Y. Bot. vol. ii. p. 523), we find a general correspondence with the principles of Jussieu. The relative number of Cyperaceæ, $\frac{1}{17}$ with us, $\frac{1}{9}$ in New York, shows the general decrease of this order from the north toward the south. Labiatæ, Ericaceæ, Umbelliferæ, Leguminosæ, and Euphorbiaceæ, confirm the principles laid down—that the species of some orders, which are extensively distributed, increase in number from the equator toward the poles; that others increase from toward the poles to the equator; and that others decrease from the temperate regions both ways.

315. From the limits of a text-book, including so many species, we have been compelled to make the descriptions short. We have aimed to make them correct, and as far as possible characteristic. The greater number of the species we have examined in their places of growth, during the last twenty years, from the mountains to Florida, along the coast and through the interior, and at different seasons of the year. In those genera with numerous species, it is impossible, in a limited description, to enable the student to determine unerringly every species. We would recommend to students who intend to pursue practical botany to any extent beyond class duties in connection with our book, the invaluable work of Torrey and Gray, *The Flora of North America.*

316. We have adhered as much as possible to the old genera. The disposition in botanists to increase the number of genera by subdividing old ones, we conceive to be a great evil. There may be good grounds, theoretically, in most cases, for the subdivision, but practically it is increasing the difficulties, which are already numerous enough, to the pursuit of this subject. Andromeda, for example, a very natural genus, is divided into *Zenobia*, *Lyoni*, *Oxydendrum*, *Leucothœ*, and *Cassandra*, and a pupil, even by knowing one species, would hardly fail to recognize any other species of the genus. Other genera are treated with as little respect.

317. We have given the Linnæan Analysis, and the Dichot-

omous Analysis. Let the student take any plant, after having studied the First Part, and he can find no difficulty in using either. In many cases we have appended to terms, not in common use, the number of the paragraph where the explanation of the term will be found. After the name of each genus we have put the number indicating the Linnæan Class and Order.

318. In the practical part of Botany, there are certain articles necessary to the student. The most important are the following: a pocket microscope, with forceps, a sharp knife, and several sharp pins or needles. He wants his knife to cut and dissect objects of observation, and his needle to raise up, separate, and fix portions for examination: his forceps to hold small objects steady for observation, and with freedom of motion, that they may be viewed in every position. For the analysis of plants the above will be all that is essential. If the elementary tissues are to be examined, or the contents of the pollen, or the circulation in the cells, or the starch grains, a good compound microscope must be at command.

319. To *collect* plants, the student wants a tin box, cylindrical or flattened, as may be desired, 18 inches long, and from 5 to 8 inches in diameter. If it is large, it is better to be flattened, the ends being oval—five inches in their shortest diameter and eight inches for the longest. There should be a large opening on the side least curved, extending nearly the whole length of the box, and the lid be made to fit as closely as possible. Two rings should be attached to the ends, or on one side, to receive a strap, by which it may be carried, putting the strap over the shoulder. Plants will remain in such a box or *vasculum* many hours without wilting, and even days by sprinkling a very little water on them.

In collecting plants, the whole of a plant should be gathered when it can be. When the plant is too large for this, leaves should be taken from the bottom, middle, and top of the stem. The root and ripe fruit should always be gathered when possible, and if too large to be otherwise preserved, should be labeled and placed on shelves.

A stiff-covered blank-book, with a strap round it, with a buckle, is always convenient to put up delicate plants in, and those flowers which might be injured in the box, or which fall off as soon as expanded.

320. To preserve the plants after they are collected, requires no little labor and care. This the student must meet promptly and fully, if he expects to accomplish any thing useful. A little perseverance accomplishes all, and no labor is better rewarded.

Take two pieces of stiff plank, of the size of the paper to be used,

with cleats on one side of each to keep them from warping, and a supply of unsized paper (newspapers will do), folded to a proper size—10 by 18 inches is large enough. If it is larger or smaller, it will do. Lay one of the boards on the floor, cleats down, and spread on this a dozen thicknesses of paper. Then place a plant in a separate sheet, laying out the leaves and parts of the flower in as natural a manner as possible, aiming always so to arrange the specimens that every organ may be distinctly seen after the plants are dry. Several specimens, if small, may be put in one sheet. Lay this sheet with the specimens in it on the sheets on the board. Lay several empty sheets on this, and then one filled with specimens, till all are made up. Then lay as many sheets on the top of all as were at the bottom. On all place the other board, with the cleats up, and on it place weights to the amount of one hundred pounds, taking care that the weight presses equally on all sides. They may remain in this state not longer than a day, when the specimens must be changed to dry sheets, and the sheets from which they were taken placed to dry. If all the sheets are exposed to dry, and an entirely new set put in, it is better. This changing must be continued until the thickest parts of the specimens are thoroughly dry. This drying of plants is the most troublesome part of the pursuit, but when well done, the value and beauty of the specimens fully compensate for all. Several specimens of a kind should be put up, and if the plant is peculiar to the region in which the collection is made, a great number should be put up for exchange.

When the specimens are perfectly dry, they may be put up in the herbarium. The mode of putting up herbaria is various. All that is requisite is to have sheets of paper, either single or double, with the specimens attached to them, in any convenient manner.

321. There should always be attached to each plant its *name, order, locality, time of flowering,* and any points of interest that may be observed. Plants will be attacked by insects unless great care is taken to keep them out. A tight can or box, with camphor kept in it, is the most effectual mode we have ever tried. They may lie on dry shelves in portfolios with camphor among the leaves, if examined occasionally to remove any insects that may get in. The most convenient mode of attaching specimens is to have narrow slips of paper and a vial of gum tragacanth, or thick paste, and stick the two ends of the paper on each side of the main part of the specimen, or several may be put on different parts. Those intended for exchange should be kept by themselves.

TABLE OF LINNÆAN ARTIFICIAL CLASSES AND ORDERS

A. *Stamens and pistils in the same flower.*

* *Stamens free and equal.*

Cl. 1. Monandria, with 1 stamen.
2. Diandria, 2 stamens.
3. Triandria, 3 stamens.
4. Tetrandria, 4 stamens.
5. Pentandria, 5 stamens.
6. Hexandria, with 6 stamens.
7. Heptandria, 7 stamens.
8. Octandria, 8 stamens.
9. Enneandria, 9 stamens.
10. Decandria, 10 stamens.
11. Icosandria, 20 or more stamens, perigynous or inserted on the calyx.
12. Polyandria, 20 or more stamens, hypogynous or inserted on the receptacle.

Orders.—In the first 12 classes the orders depend solely on the number of pistils, and they are named—*Monogynia*, 1 pistil. *Digynia* 2. *Trigynia* 3. *Tetragynia* 4. *Pentagynia* 5. *Hexagynia* 6. *Heptagynia* 7. *Octagynia* 8. *Enneagynia* 9. *Decagynia* 10. *Polygynia* more than 10

** *Stamens free, unequal.*

13. Didynamia, 4 stamens, 2 longer than the others.

Two orders. 1. *Gymnosperma*, the seeds naked. 2. *Angiosperma*, the seeds inclosed in a pericarp.

14. Tetradynamia, 6 stamens, 4 longer than the others.

Two orders. 1. *Siliculosa*, fruit a silicle or pouch. 2. *Siliquosa*, fruit a long pod or silique.

*** *Filaments united.*

15. Monadelphia, filaments forming 1 set.
16. Diadelphia, filaments forming 2 sets.

Orders depend upon the number of stamens, and have the same names as the first 12 classes.

**** *Anthers united.*

17. Syngenesia, 5 stamens, the anthers united (compound flowers).

Five orders. 1. *Polygamia Æqualis*, florets all perfect. 2. *P. Superflua*, disk florets perfect, rays pistilliferous. 3. *P. Frustranea*, disk perfect, rays neutral. 4. *P. Necessaria*, disk with stamens, rays with a pistil. 5. *P. Segregata*, with a perianth to each floret.

***** *Anthers united to the pistil.*

18. Gynandria.

Orders named according to the number of stamens, as *Monandria*, &c.

B. *Stamens and Pistils in different flowers.*

19. Monœcia, stamens and pistils on the same individuals.
20. Diœcia, stamens and pistils on different individuals.

Orders named according to the number of stamens, except where there is a union of the filaments; then named *Monadelphia*.

GENERA ARRANGED ACCORDING TO THE LINNÆAN ARTIFICIAL SYSTEM.

CLASS I.—MONANDRIA.

Order I.—MONOGYNIA.

Salicornia. Perianth ventricose, fleshy, free from the ovary. *Chenopodiaceæ*, 100.

Canna. Calyx 3-leaved, permanent. Corolla 6-parted, 3 exterior segments reflexed. Capsule 3-celled, many-seeded. *Marantaceæ*, 123.

Thalia. Sepals 3, concave, small. Corolla tubular, 6-parted. Capsule 2-celled. *Marantaceæ*, 123.

Order II.—DIGYNIA.

Callitriche. Flowers polygamous, with 2 colored bracts. Fruit 4-lobed, 4-celled, 4-seeded. *Callitrichaceæ*, 113.

Grasses that may fall in this class are referred to the Analysis of Graminaceæ, Order 142.

CLASS II.—DIANDRIA.

Order I.—MONOGYNIA.

A. *Corolla 1-petaled, inferior.*

Chionanthus. Calyx minute, 4-cleft. Corolla 4-cleft, with long, linear segments. (Fringe-tree.) *Oleaceæ*, 78.

Jasminum. Calyx 5-cleft. Segments subulate. Corolla 4—5-parted. Ovary 2-celled, 2-lobed. (White Jasmine.) *Jasminaceæ*, 77.

Syringa. Calyx usually 4-cleft. Corolla salver-shaped, 4-cleft. Capsule 2-celled. (Lilac.) *Oleaceæ*, 78.

Olea. Calyx small, 4-toothed. Corolla with a short tube, 4-cleft. Fruit a drupe, 1-seeded by abortion. (American Olive.) *Oleaceæ*, 78.

Elytraria. Calyx 4—5-parted, with the front segment bifid. Corolla 3-cleft. Stamens with 2 barren filaments. Capsule 2-celled. *Acanthaceæ*, 93.

B. *Corolla 1-petaled, inferior, irregular.*

Veronica. Calyx 4-parted. Corolla 4-lobed, lower division smaller. Capsule obcordate, 2-celled. (Speedwell.) *Scrophulariaceæ*, 90.

Gratiola. Macranthera. Calyx 5-leaved or 5-parted. Corolla irregular, sometimes with 2 sterile stamens. Capsule 2-celled. (Hedge-hyssop.) *Scrophulariaceæ*, 90.

Ilysanthes. Lindernia. Gratiola. Calyx 5-parted. Corolla bilabiate; upper lip short, erect, bifid; lower lip larger, trifid. Capsule ovate or oblong. (Herbaceous plants.) *Scrophulariaceæ*, 90.

Lindernia. Calyx 5-parted, pubescent. Corolla ringent; upper lip very short, retuse; lower lip unequally 3-cleft, 2-keeled at the base.

The two longest stamens barren. Capsule 2-celled, 2-valved. *Scrophulariaceæ*, 90.

Pinguicula. Calyx bilabiate, 5-cleft. Corolla ringent, spurred at the base; upper lip 3-lobed, lower one 2-lobed. Capsule 1-celled, many-seeded. *Lentibulariaceæ*, 94.

Catalpa. Calyx 2-parted. Corolla campanulate, with the base of the tube swollen. Stamens 2, fertile, with 2 or 3 sterile. Pod long, slender, 2-valved, 2-celled. Trees. (Catalpa.) *Bignoniaceæ*, 83.

Justicia. Rhytiglossa. Dicliptera. Calyx 5-parted. Corolla bilabiate; upper lip emarginate; lower one 3-cleft. Capsule 2-cleft. Capsule 2-celled. (Herbaceous plants.) *Acanthaceæ*, 93.

Utricularia. Calyx bilabiate, lips undivided. Corolla ringent, the lower lips spurred at the base. Capsule 1-celled. Plants growing in water or wet places. (Water-plants.) *Lentibulariaceæ*, 94.

Micranthemum. Calyx 4-parted. Corolla 4-cleft, segments unequal Capsule 1-celled, 2-valved. (Small, herbaceous plants.) *Scrophulariaceæ*, 90.

C. *Fruit with* 1—4 *nut-like seeds inclosed in the calyx.*

Lycopus. Calyx campanulate, 5-cleft. Corolla 4-cleft; segments nearly equal, one broader than the others. Nuts 4. (Water-horehound.) *Labiatæ*, 91.

Monarda. Calyx elongated, 15-nerved, 5-toothed. Corolla ringent; tube long, cylindric; upper lip linear, entire; lower lip reflexed, 3-lobed. Nuts 4. (Mountain Mint.) *Labiatæ*, 91.

Salvia. Calyx ovate, or campanulate, 2-lipped; upper lip 3-toothed; lower lip bifid. Corolla ringent, bilabiate; upper lip straight or curved, entire or notched; the lower lip 3-lobed, middle lobe largest. Connectivum elongated, bearing a half anther on each end. (Sage.) *Labiatæ*, 91.

Collinsonia. Calyx tubular, 2-lipped; upper lip 3-toothed, lower one bifid. Corolla funnel-form; under lip many-cleft, segments capillary. Nut one. (Horse-balm.) *Labiatæ*, 91.

Rosmarinus. Calyx ovate, campanulate, bilabiate. Corolla bilabiate; lips nearly equal; upper one erect, emarginate; lower one trifid. (Rosemary.) *Labiatæ*, 91.

Grasses that would properly fall here are referred to the Analysis of Graminaceæ, No. 142.

CLASS III.—TRIANDRIA.

Order I.—MONOGYNIA.

A. *Flowers superior.*

Fedia. Calyx obsolete, or a border, 3—4-toothed. Corolla somewhat irregular, with the border 5-parted, inserted on the top of the ovary, slightly spurred at the base. Ovary 3-celled, with two empty cells, 1-seeded. (Corn Salad.) (Lamb Lettuce.) *Valerianaceæ*, 67.

Iris. Perianth 6-parted; the 3 outer divisions large and reflexed; the inner smaller and erect. Style none. Stigmas 3, petal-like, covering the stamens. (Flower de Luce.) *Iridaceæ*, 124.

Lacnanthes. Perianth 6-parted, wooly. Style thread-like, declining. Capsule 3-celled, globular. *Iridaceæ*, 124.

Oxybaphus. Involucre 3—5-cleft, 1—3-flowered. Perigonium tabular, limb plicate, campanulate. Stamens 3—4. Fruit ovate, ribbed. (Herbaceous plants.) *Nyctaginaceæ*, 98.

Boerhaavia. Perianth on a minute, glandular ring, white and tinged with purple. Stamens varying in number. Fruit angled, obconic. *Nyctaginaceæ*, 98.

Burmannia. Perianth tubular, winged, 6-parted. Alternate segments small, connivent. Capsule 3-celled, 3-valved, many-seeded. *Burmanniaceæ*, 125.

Ixia. Perianth 6-parted, expanding. Spathe ovate, short, 2—3-valved. *Iridaceæ*, 124.

B. *Flowers inferior.*

Commelyna. Sepals 3, unequal. Petals 3, unequal. Stamens unequal. Style simple. Capsule 3-celled, 3-valved. (Day-flower.) *Commelynaceæ*, 136.

Xyris. Flowers in dense heads; bracts coriaceous, each inclosing a single flower. Sepals 3, unlike. Petals 3, with long claws, more or less cohering. Style 3-cleft. (Yellow-eyed grass.) *Xyridaceæ*, 133.

Heteranthera. Perianth salver-form, equally 6-parted. Stamens unequal. Capsule 3-celled, many-seeded. (Mud-plantain.) *Pontederiaceæ*, 132.

Syena. Mayœa. Sepals 3, or calyx deeply 3-parted, persistent. Petals 3, roundish. Anthers 2-celled. Stigma 3-cleft. Capsule 1-celled, 3-valved. *Pontederiaceæ*, 132.

Stipulicida. Sepals 5, or calyx deeply 5-parted. Petals 5, oblong. Style short. Stigmas 3. Capsule 1-celled, 3-valved. *Illecebraceæ*, 20.

Any grasses that might come in this place are referred to the Analysis of Cyperaceæ, No. 141.

Order II.—DIGYNIA.

This order embraces a large portion of the grasses which are referred for analysis to the order *Graminaceæ*, No. 142.

Order III.—TRIGYNIA.

Mollugo. Sepals 5. Petals usually wanting. Stamens varying from 3—5. Styles short. Pod 3-celled, 3-valved, many-seeded. (Chick-weed.) *Caryophyllaceæ*, 21.

Lechea. Sepals 3. Petals 3, narrow, lanceolate. Stamens varying from 3—12. Style short. Stigmas fringed. (Pin-weed.) *Cistaceæ*, 18.

Proserpinaca. Calyx 3-parted. Tube 3 sided. Petals none. Stigmas papillose, fruit bony, 3-angled, 3-celled, 3-seeded. (Mermaid-weed.) *Onagraceæ*, 50.

Polycarpon. Calyx 5-leaved. Petals 5, linear, very short, emarginate. Stamens longer than the corolla. Capsule ovate, 1-celled, 3-valved. *Illecebraceæ*, 20.

Triglochin. Perianth 4—6-leaved, lanceolate, membranous. Anthers sessile. Style none. Carpels 3—4-seeded, 1 in each cell. *Alismaceæ* 137.

CLASS IV.—TETRANDRIA.

Order I.—MONOGYNIA.

A. *Flowers superior.——a. 1-petaled.*

Cephalanthus. Flowers in a dense globose head. Calyx 4-toothed. Corolla 4-toothed. Style exserted. (Button-bush.) *Rubiaceæ*, 66.

Galium. Calyx teeth obsolete. Corolla rotate, 4-cleft. Styles 2. Fruit twin-carpeled, each 1-seeded. (Bed-straw, cleavers.) *Rubiaceæ*, 66.

Spermacoce. Calyx 4-leaved, or 4-parted. Corolla 4-parted. Capsule 2-celled, with 1 seed in each cell. *Rubiaceæ*, 66.

Diodia. Calyx 2-cleft. Corolla funnel-shaped, 4-cleft. Capsule 2 celled, 1 seed in each cell. (Button-weed.) *Rubiaceæ*, 66.

Hedyotis. Houstonia. Calyx 4-parted, persistent. Corolla 4-cleft, shorter than the calyx. Capsule 2-celled, 2-valved, many-seeded. (Venus' pride.) (Dwarf-pink.) (Bluets.) *Rubiaceæ*, 66.

Mitchella. Flowers in pairs. Calyx 4-toothed. Corolla 4-lobed, funnel-form, bearded inside. Stigmas 4. Fruit a double drupe. (Partridge-berry.) *Rubiaceæ*, 66.

Polypremum. Calyx 4-parted, persistent. Corolla 4-cleft, rotate, throat hairy, capsule compressed, many-seeded. *Rubiaceæ*, 82.

Allionia. Involucre oblong, simple, 3-flowered. Perianth longer than the involucre, irregular. *Nyctaginaceæ*, 98.

Rubia. Calyx 4-toothed. Corolla 4—5-cleft, bell-form. Berries 2, one-seeded. (Madder.) *Rubiaceæ*, 66.

b. 4-petaled.

Cornus. Calyx 4-toothed, minute. Petals 4, distinct. Fruit a drupe, berry-like. (Dog-wood.) *Cornaceæ*, 63.

Ludwigia. Calyx 4-parted, united to the ovary. Ovary quadrangular, 4-celled, many-seeded. (False Loose-strife.) *Onagraceæ*, 50.

B. *Flowers inferior.——a. 1-petaled.*

Plantago. Calyx 4-cleft. Corolla 4-cleft. Pod 2-celled, 2-several-seeded. (Rib-grass.) (Plantain.) *Plantaginaceæ*, 97.

Centaurella. Burtonia. Calyx 4-parted, persistent, glabrous. Corolla 4-cleft. Capsule 1-celled, 2-valved, many-seeded. *Gentianaceæ*, 82.

Sanguisorba. Calyx tubular, quadrangular. Limb 4-parted. Petals none. Carpels 1—2. Fruit an achenium, included in the calyx. (Herbaceous.) *Rosaceæ*, 44.

Frasera. Calyx 4-parted. Corolla 4-parted, segments with bearded glands. Capsule oval, flattened, 1-celled, 2-valved, few-seeded. (Wild Colombo.) *Gentianaceæ*, 82.

Scoparia. Calyx 4—5-parted. Corolla rotate, 4-cleft, pilose in the throat. Stamens 4. Anthers sub-sagittate. Seeds numerous, angular, minutely reticulated. (Herbaceous.) *Scrophulariaceæ*, 90.

Lycium. Calyx 4-toothed, short. Corolla tubular. Stamens sometimes 5. Fruit 2-celled, many-seeded. (Matrimony.) *Solanaceæ*, 88.

Centunculus. Calyx 4-cleft, with lanceolate segments. Corolla 4-lobed, persistent, with acute segments. Capsule 1-celled, many-seeded *Primulaceæ*, 95.

Callicarpa. Calyx small, persistent, 4-cleft. Corolla tubular, 4 cleft. Fruit baccate, 4-celled, juicy. Purple or white. (French Mulberry.) *Verbenaceæ*, 92.

Hypobrichia. Calyx 4-lobed, campanulate. Petals none. Stamens 2—4. Ovary globose, 2-celled, many-seeded. (Aquatic plants.) *Lythraceæ*, 47.

Ammania. Calyx 4-lobed, with 4 intermediate appendages. Corolla wanting, or 4-petaled. Capsule 4-celled, many-seeded. (Tooth-cup.) *Lythraceæ*, 47.

Ptelea. Calyx 4-sepaled, united at the base. Petals 4, spreading. Filaments hairy at the base. Fruit a samara, 2-celled. *Zanthoxylaceæ*, 28.

Croomia. Sepals 4, broadly oval. Petals none. Stamens 4, opposite the sepals. Fruit ovate, compressed. Seeds 1—2. Peduncles axillary, 2—3 flowered. *Berberidaceæ*, 6.

Krameria. Sepals 5, more or less irregular, spreading, colored. Petals 4—5, smaller than the sepals, unequal. Stamens more or less unequal. Fruit globose, 1—2 seeded. *Polygalaceæ*, 15.

Order II.—DIGYNIA.

Hamamelis. Involucre 3-leaved. Petals 4, long. (Witch-hazel.) *Hamamelaceæ*, 60.

Order IV.—TETRAGYNIA.

Ilex. Calyx minute. Corolla rotate. Stigmas 4. Capsule 4-celled, each cell 1-seeded. (Holly.) *Aquifoliaceæ*, 75.

Sagina. Calyx 4-sepaled. Capsule 4-celled, many-seeded. *Caryophyllaceæ*, 21.

Potamogeton. Calyx 4-sepaled. Petals 0, seeds 4. Flowers in a spadix. (Pond-weed.) *Naiadaceæ*, 139.

Ruppia. Perianth wanting. Flowers on a spadix. Fruit pediceled. *Naiadaceæ*, 139.

CLASS V.—PENTANDRIA.

Order I.—MONOGYNIA.

A. *Flowers monopetalous, inferior. Fruit achenia.*

Plants of this division form the Natural Order *Boraginæ*.

B. *Flowers monopetalous, inferior. Fruit a capsule or berry.*

1. *Capsule 1-celled.*

Anagallis. Calyx 5-parted. Corolla rotate, 5-parted, dehiscent transversely. *Primulaceæ*, 95.

Lysimachia. Calyx 5—6-parted. Corolla 5—6-parted. Capsule globose, 5—10-valved. *Primulaceæ*, 95.

Dodecatheon. Calyx 5-parted, reflexed. Corolla rotate, lobes reflexed. Capsule ovate, 5-valved, many-seeded. *Primulaceæ*, 95.

Hottonia. Calyx 5-parted. Corolla salver-form, 5-lobed. Stamens on the tube of the corolla. Capsule globose. *Primulaceæ*, 95.

Villarsia. Calyx 5-parted. Corolla rotate. Capsule 1-celled, 2-valved, many-seeded. *Gentianaceæ*, 82.

Samolus. Calyx 5-cleft. Corolla salver-form, with 5 sterile filaments. Capsule 1-celled, many-seeded. *Primulaceæ*, 95.

Sabbatia. Calyx 5—12-parted. Corolla rotate, 5—12-parted. Stigmas 2, spiral. Capsule 1-celled, 2-valved. *Gentianaceæ*, 82.

Hydrophyllum. Calyx 5-parted, lobes subulate. Corolla campanulate, filaments bearded in the middle. *Hydrophyllaceæ*, 85.

Nemophila. Calyx 10-parted, alternate lobes reflexed. Corolla campanulate, 5-lobed. Capsule 1-celled, 2-valved, 4-seeded. Small succulent plants. *Hydrophyllaceæ*, 85.

Ellisia. Calyx 5-parted. Corolla tubular, campanulate, about equal to the calyx; tube with 10 minute appendages within. Limb 5-lobed. Ovary conical, 2-seeded. Annual herbs. *Hydrophyllaceæ*, 85.

2. *Capsule 2-celled, rarely 3-celled.*

Phacelia. Cosmanthus. Calyx 5-parted. Corolla somewhat campanulate, with 10 plaits on the inside. Capsule 2-valved. *Hydrophyllaceæ*, 85.

Spigelia. Calyx 5-parted. Corolla funnel-form, 5-cleft, long tube. *Loganiaceæ*, 81.

Verbascum. Calyx 5-parted. Corolla rotate, somewhat irregular. Stamens declined, hairy. (Mullein.) *Scrophulariaceæ*, 90.

Batatas. Convolvulus. Sepals 5. Corolla campanulate. Stamens included. Stigma capitate, 2-lobed. Ovary 4-celled, or by abortion 2—3-celled. Herbaceous vines. *Convolvulaceæ*, 86.

Convolvulus. Calystegia. Calyx 5-parted, with or without 2 bracts at the base. Corolla funnel-form or campanulate, with 5 plaits. Capsule few-seeded. *Convolvulaceæ*, 86.

Ipomea. Calyx 5-cleft. Corolla funnel-form, or campanulate. Capsule many-seeded. *Convolvulaceæ*, 86.

Quamoclit. Ipomea. Sepals 5. Corolla tubular, cylindrical. Stamens exsert. Stigma capitate, 2-lobed. Ovary 4-celled. Cells 1-seeded. Vines. *Convolvulaceæ*, 86.

Nicotiana. Calyx urceolate or campanulate, 5-cleft. Corolla funnel-form, the limb 5-lobed and plaited. (Tobacco.) *Solanaceæ*, 88.

Ophiorhiza. Mitreola. Calyx 5-cleft. Corolla 5-cleft, funnel-form. Stigmas 2. Capsule many-seeded. *Gentianaceæ*, 82.

Bumelia. Calyx 5-parted. Corolla salver-form, deeply 5-parted. Corona 5-leaved. Fruit a drupe, 1-seeded by abortion. *Sapotaceæ*, 76.

3. *Capsule*, 3—5-*celled.*

Phlox. Calyx prismatic, 5-parted. Corolla salver-form, 5-lobed, with the tube slightly curved. *Polemoniaceæ*, 84.

Polemonium. Calyx campanulate, 5-cleft. Corolla rotate. Stamens bearded at the base. *Polemoniaceæ*, 84.

Diapensia. Calyx 5-sepaled, with 3 bracts at the base. Corolla salver-form. Stigmas 3. Capsule 3-celled, many-seeded. *Hydrophyllaceæ*, 85.

Datura. Calyx tubular, angled. Corolla plaited. Capsule thorny. *Solanaceæ*, 88.

Azalea. Calyx 5-parted. Corolla tubular, oblique. Stamens declined. *Ericaceæ*, 72.

Collomia. Calyx expanding, 5-cleft. Corolla funnel-form. Tube straight, long, slender. Capsule 3-cornered. *Polemoniaceæ*, 84.

Cantua. Gilia. Calyx 3—5-cleft. Corolla funnel-form. Long capsule, 3-celled, 3-valved, many-seeded. *Polemoniaceæ*, 84.

Seed in a berry.

Physalis. Calyx 5-cleft, becoming ventricose. Corolla campanulate, rotate. Limb plaited. Tube short. Berry 2-celled. *Solanaceæ*, 88.

Solanum. Calyx 5—10-parted. Corolla rotate or sub-campanulate, limb plaited, 5—10-cleft. Anthers opening by pores. Berry 2—6-celled. *Solanaceæ*, 88.

Atropa. Calyx 5-parted, 5-angled. Segments sagittate. Corolla campanulate. Berry 3—5-celled. *Solanaceæ*, 88.

Capsicum. Corolla rotate. Calyx angular. Fruit inflated, juiceless. (Pepper.) *Solanaceæ*, 88.

Corolla monopetalous. Calyx superior. Fruit a capsule.

Campanula. Calyx 5-cleft. Corolla campanulate. Capsule 3—5-celled, opening by lateral pores. *Campanulaceæ*, 70.

Lobelia. Calyx 5-cleft. Corolla irregular. Anthers cohering. *Lobeliaceæ*, 69.

Diervilla. Calyx oblong, 5-cleft, with 2 bracts. Corolla funnel-form, 5-cleft, much larger than the calyx. Capsule 4-celled, many seeded. *Caprifoliaceæ*, 65.

Pinckneya. Calyx 5-parted, 1 or 2 of the divisions large, showy. Corolla long, tubular, border recurved. *Rubiaceæ*, 66.

Chiococca. Calyx 5-toothed. Corolla funnel-form. Berry compressed, 2-seeded. *Rubiaceæ*, 66.

Psychotria. Calyx ovate, crowned. Corolla funnel-form, 5-cleft. Berry drupe-like. *Rubiaceæ*, 66.

Seed in a berry.

Symphoricarpus. Calyx globose, limb small, 4—5-toothed. Corolla funnel-form, 4—5-lobed. Berry 4-celled, crowned with the calyx. *Caprifoliaceæ*, 65.

Triosteum. Calyx persistent, 5-cleft. Corolla 5-cleft, as long as the calyx, gibbous at the base. Berry 3-celled, 3-seeded. *Caprifoliaceæ*, 65.

Caprifolium. Lonicera. Calyx tube sub-globose. Limb short, 5-toothed. Corolla tubular, campanulate, limb 5-cleft, often gibbous at the base. Stems more or less twining. *Caprifoliaceæ*, 65.

Flowers 5-petaled, inferior.

Itea. Calyx campanulate, 5-toothed, teeth subulate. Petals 5, lance-linear. Capsule 2-celled. *Saxifragaceæ*, 59.

Impatiens. Sepals 5, the lower one spurred. Corolla 4-petaled, irregular. Stigmas 5, united. Capsule 5-valved. (Touch-me-not.) *Balsaminaceæ*, 25.

Viola. Calyx 5-sepaled. Corolla irregular, with a horn behind. Capsule 1-celled, 3-valved. (Violet.) *Violaceæ*, 16.

Solea. Sepals 5, nearly equal. Flowers irregular, the lower petal 2-lobed. Stamens cohering. Capsule 3-sided. Seeds large, 6—8. Flowers greenish. *Violaceæ*, 16.

Claytonia. Sepals 2 or calyx 2-parted. Corolla 5-petaled, emarginate. Capsule 1-celled, 3-valved. *Portulacaceæ*, 22.

Ceanothus. Calyx cup form. Petals scale-like, vaulted, claws long. Capsule 3-celled, 3 seeded. (New Jersey Tea.) *Rhamnaceæ*, 42.

Evonymus. Calyx 5-parted, flat. Corolla flat. Capsule 5-angled. 5-celled, 5-valved, colored. *Celastraceæ*, 41.

Cyrilla. Calyx minute, 5-parted. Petals 5, stellate. Capsule 2-celled, 2-seeded. *Ericaceæ*, 72.

Galax. Calyx 5-parted. Corolla 5-petaled. Anther tube 10-cleft. Stigma 3-lobed. Capsule 3-celled, 3-valved. *Crassulaceæ*, 58.

Sageretia. Calyx urceolate, 5-cleft. Petals convolute or cucullate. Fruit baccate, 3-celled. *Rhamnaceæ*, 42.

Fruit a berry or drupe.

Rhamnus. Calyx urceolate, 4—5-cleft. Petal minute or wanting. Fruit drupaceous, 2—4 nuts. *Rhamnaceæ*, 42.

Berchemia. Flowers minute. Calyx tubular, 5-parted. Segments erect. Petals 5, convolute. Stamens 5. Fruit drupaceous, with a long 2-celled nut. Climbing, woody. *Rhamnaceæ*, 42.

Vitis. Calyx minute, 5-toothed. Petals cohering at the apex. Berry 2-celled, 1—4-seeded. (Grape.) *Vitaceæ*, 37.

Ampelopsis. Calyx nearly entire. Petals 5. Berry 2—4-seeded. *Vitaceæ*, 37.

Flowers 5-petaled, superior. Petals sometimes wanting.

Ribes. Calyx campanulate, 4—5-cleft. Petals 4—5, minute, inserted on the calyx. Berry 1-celled. (Currant, Gooseberry.) *Grossulaceæ*, 55.

Theseum. Comandra. Perianth urceolate, campanulate. Stamens villous. Fruit dry, 1-celled. *Santalaceæ*, 105.

Anychia. Sepals 5, united at the base, sub-saccate at the apex. Petals none. Styles short. Fruit 1-seeded. *Illecebraceæ*, 20.

Paronychia. Sepals 5, linear. Petals minute or wanting. Fruit 1-seeded, inclosed in the calyx. *Illecebraceæ*, 20.

Siphonychia. Sepals 5, linear, petaloid above, cohering into a tube below. Style filiform. Nectaries 5. Fruit 1-seeded. *Illecebraceæ*, 20.

Order II.—DIGYNIA.

1. *Corolla 1-petaled, inferior.*

Gentiana. Calyx 4—5-cleft. Corolla bell-form. Stigmas 2, subsessile. Capsule 1-celled, elongated; placentæ 2, longitudinal. Floral parts sometimes 4. *Gentianaceæ*, 82.

Cuscuta. Calyx 4—5-cleft. Corolla 4—5-cleft, sub-campanulate. Capsule 2-celled. Stamens sometimes 4. (Love-vine.) *Convolvulaceæ*, 86.

Apocynum. Calyx 5-parted. Corolla campanulate, 5-cleft, with scales at the base, alternating with the lobes. Anthers sagittate. Follicles long, slender. (Dog-bane.) (Indian Hemp.) *Apocynaceæ*, 80.

Gelseminum. Sepals 5, small. Corolla funnel-form, border 5 lobed. Capsule 2-celled, many-seeded. (Yellow Jessamine.) *Loganiaceæ*, 81.

Asclepias. Calyx 5-parted, small. Corolla 5-parted; lobes lanceolate, reflexed. Staminal crown 5-leaved; leaflets opposite the anthers, each usually with a subulate process. Follicles smooth or muricate, ventricose. (Milk-weed, Silk-weed.) *Asclepiadaceæ*, 79.

Amsonia. Calyx 5-parted. Corolla funnel-form, with the throat closed. Æstivation twisted. Follicles 2, erect. *Apocynaceæ*, 80.

Echites. Calyx 5-parted, with acute segments. Corolla funnel-shaped, 5-parted, throat naked. Follicles 2, distinct, long, slender. *Apocynaceæ*, 80.

Gonolobus. Calyx 5-parted. Corolla rotate, 5-parted. Staminal crown shield-form, 5-parted. Follicles 2, ventricose. *Asclepiadaceæ*, 79.

Hydrolea. Calyx 5-parted. Corolla campanulate. Anthers cordate. Styles long, diverging. Capsule 2-celled. Seeds numerous. *Hydrophyllaceæ*, 85.

Dichondra. Calyx 5-parted. Segments spatulate. Corolla short, bell-form, 5-parted. Capsule 2-celled, 1 seed in each cell. *Convolvulaceæ*, 86.

Stylisma. Convolvulus. Sepals 5, equal. Corolla campanulate. Styles 2, rarely 3, stamens included. *Convolvulaceæ*, 86.

Corolla 5-petaled.

Heuchera. Calyx inferior, 5-cleft. Petals small. Capsule 2-celled, many-seeded. (Alum-root.) *Saxifragaceæ*, 59.

Panax. Polygamous, or diœcious. Flowers in umbels. Styles 2—3. Involucre many-leaved. Fruit somewhat globular, 2—3-seeded. (Ginseng.) *Araliaceæ*, 62.

Boykinia. Calyx turbinate, or urceolate, cohering to the ovary; limb 5-cleft. Petals entire. Styles 2—3. Capsule 2—3-celled, many-seeded. Herbaceous, perennial plants. Flowers small in corymbose cymes. *Saxifragaceæ*, 59.

Corolla wanting.

Atriplex. Flowers polygamous. Calyx 5-sepaled in the perfect flower, 2-sepaled in the pistillate. Fruit depressed, 1-seeded. *Chenopodiaceæ*, 100.

Chenopodium. Calyx 5-parted, inclosing the fruit. Style 2-cleft. Seed 1, lens-like. *Chenopodiaceæ*, 100.

Salsola. Perianth 5-cleft, investing the fruit. Styles 2. Embryo spiral. *Chenopodiaceæ*, 100.

Ulmus. Calyx campanulate, 4—5-cleft. Seed 6, inclosed in a samara. Stamens 4—8. (Elm.) *Ulmaceæ*, 110.

Celtis. Polygamous. Perfect flowers. Calyx 5-parted. Styles spreading. Drupe 1-celled. Staminate flowers, with the calyx 6-parted. Stamens usually 6. Small tree. *Ulmaceæ*, 110.

Beta. Sepals 5. Seed inclosed in the hardened calyx. (Beet.) *Chenopodiaceæ*, 100.

Planera. Polygamous. Calyx 4—5-cleft, campanulate. Capsule globose, membranaceous, 1-celled, 1-seeded. *Ulmaceæ*, 110.

Flowers in umbels, petals 5, superior, carpels 2, order Umbelliferæ, No. 61.

ORDER III.—TRIGYNIA.

Flowers superior.

Viburnum. Calyx 5-parted, small. Corolla funnel-form, 5-cleft. Stigma almost sessile. Drupe 1-seeded. *Caprifoliaceæ*, 65.

Sambucus. Calyx 5-parted, small. Corolla sub-urceolate or rotate, 5-cleft. Stigmas minute, sessile. Berry globose, 1-celled, 3-seeded. (Elder.) *Caprifoliaceæ*, 65.

Flowers inferior.

Rhus. Calyx 5-parted. Petals 5. Fruit 1-seeded, small, nearly globular. (Sumac.) (Poison-vine.) *Anacardiaceæ*, 29.

Staphylea. Calyx 5-parted, colored. Petals 5. Capsules inflated, 2—3-celled. Seeds globular, compressed, generally 2 in each cell. (Bladder-nut.) *Celastraceæ*, 41.

Turnera. Calyx 5-cleft, funnel-form. Petals 5. Ovary 1-celled, with 3 parietal placentæ. Seeds numerous. *Turneraceæ*, 52.

Lepuropetalon. Calyx 5-parted, with ovate obtuse lobes. Petals 5, minute, spatulate. Capsule 1-celled, many-seeded. *Saxifragaceæ*, 59.

ORDER IV.—TETRAGYNIA.

Parnassia. Sepals 5, more or less united. Corolla 5-petaled. Stamens perigynous. 5 phalanges of sterile stamens opposite the petals. Capsule 4-valved, 1—2-celled. *Droseraceæ*, 17.

ORDER V.—PENTAGYNIA.

Aralia. Flowers in umbels, or panicles. Calyx 5-toothed, superior. Petals 5, spreading. Fruit 5-lobed, 5-celled, 1 seed in each cell. *Araliaceæ*, 62.

Statice. Calyx tubular, plaited, entire. Petals 5, regular. Fruit 1-seeded, indehiscent. *Plumbaginaceæ*, 96.

Linum. Sepals 5, persistent. Petals 5, hypogynous, unguiculate. Capsule globose, sometimes 10-celled. (Flax.) *Linaceæ*, 23.

Suriana. Sepals 5, persistent; æstivation twisted. Petals 5. Carpels 5, coriaceous, 1-seeded. (Sea-side shrubs.) *Surianaceæ*, 57.

ORDER VI.—HEXAGYNIA.

Drosera. Sepals 5. Petals 5, hypogynous. Capsule 1—3-celled, many-seeded. (Sun-dew.) *Droseraceæ*, 17.

ORDER XII.—POLYGYNIA.

Myosurus. Sepals 5, produced downward, at the base. Petals 5, claw filiform and tubular. Stamens 5—20. (Mouse-tail.) *Ranunculaceæ*, 1.

Zanthorhiza. Sepals 5. Petals 5, on pedicels. Capsule 1-seeded. *Ranunculaceæ*, 1.

CLASS VI.—HEXANDRIA.

Order I.—MONOGYNIA.

a. Flowers having both Calyx and Corolla.

Tradescantia. Sepals 3, inferior. Petals 3. Filaments with jointed beard. Capsule 3-celled, many-seeded. (Spider-wort.) *Commelynaceæ*, 136.

Leontice. Caulophyllum. Sepals 6, inferior. Petals 6, bearing a reniform fleshy scale. Carpels stipitate, 2—4-seeded. *Berberidaceæ*, 6.

Berberis. Sepals 6, bracteolate, inferior. Petals 6, with 2 glands at the base of each. Stamens irritable. Fruit a berry, 1—9-seeded. (Barberry.) *Berberidaceæ*, 6.

Prinos. Calyx 4—8-cleft. Corolla 4—8-parted, rotate. Stamens 4—8, often diœcious. Fruit baccate, 4—8-seeded. *Aquifoliaceæ*, 75.

Gynandropsis. Sepals 4, distinct, spreading. Petals 4. 1 stamen, usually abortive. Receptacle elongated, forming a long stipe. Pod linear, oblong. *Capparidaceæ*, 14.

Cleomella. Sepals 4, minute, spreading. Petals 4, sub-spatulate. Pod obovate, 4—6-seeded. Flowers in terminal racemes. *Capparidaceæ*, 14.

Tillandsia. Calyx 3-parted, persistent. Petals 3. Fruit capsular, 3-celled. Seeds comose. (Hanging Moss.) *Bromeliaceæ*, 129.

Diphyllia. Sepals 3, deciduous. Petals 6, opposite the calyx. Ovary ovate. Fruit baccate, 1-celled, 2—3-seeded. *Berberidaceæ*, 6.

b. Flowers having a spathe or glume.

Amaryllis. Perianth 6-parted, petaloid, filaments unequal, inserted into the throat of the tube. Capsule 3-valved, 3-celled, many-seeded. (Atamasco Lily.) *Amaryllidaceæ*, 127.

Allium. Nothoscordum. Perianth 6-parted, spreading, many flowers in the spathe, umbellate. Capsule 3-celled, 3-valved, many-seeded. (Onion.) *Liliaceæ*, 130.

Hypoxis. Flowers in a 2-valved spathe. Perianth 6-parted. Capsule elongated, 3-celled, many-seeded. Flowers yellow. (Star-grass.) *Hypoxidaceæ*, 128.

Pontederia. Perianth 6-parted, bilabiate; the under side perforated. Capsule 3-celled, fleshy, many-seeded. Flowers blue. *Pontederiaceæ*, 132.

Narcissus. Corolla campanulate, 6-parted. Corona campanulate, shorter usually than the corolla. (Jonquil.) *Amaryllidaceæ*, 127.

Pancratium. Tube of the perianth long, with the border 6-parted, bearing a 12-cleft paracorolla, which bears the stamens. *Amaryllidaceæ*, 127.

Conostylis. Perianth 6-parted, persistent, with branching hairs. Style conic, 3-parted. Capsule 3-celled, many-seeded. *Hæmodoraceæ*, 126.

c. Flowers not having a spathe.

Aletris. Perianth tubular, ovate, 6-cleft, rugose. Style triquetrous Capsule 3-celled, many-seeded. *Hæmodoraceæ*, 126.

Agave. Perianth 6-parted, erect, tubular, furrowed. Style spotted. Capsule triangular, many-seeded. *Amaryllidaceæ*, 127.

Ornithogalum. Perianth 6-leaved, erect, persistent. Filaments dilated at the base. Capsule angled, 3-celled. *Liliaceæ*, 130.

Lilium. Perianth campanulate, deeply 6-parted. Segments nearly straight, or reflexed, with a line below the middle. (Lily.) *Liliaceæ*, 130.

Erythronium. Perianth 6-leaved; leaves reflexed, campanulate. Style 3-angled. Capsule somewhat stiped. Flowers yellow. *Liliaceæ*, 130.

Uvularia. Perianth six-leaved; leaves erect, with a nectariferous cavity at the base. Stigmas 3, reflexed. Capsule 3-celled, with transverse partitions, many-seeded. Flowers yellow. *Melanthaceæ*, 131.

Streptopus. Prosartes. Hekorima. Perianth 6-parted, revolute, campanulate, with nectariferous pores at the base. Fruit baccate. *Melanthaceæ*, 131.

Convallaria. Perianth 6-cleft, campanulate. Fruit globose, 3-celled, 1—2 seeds in each cell. Flowers white. *Liliaceæ*, 130.

Smilacina. Perianth 6-parted, expanding. Fruit baccate, 3-celled. Flowers pale yellow or white. *Liliaceæ*, 130.

Polygonatum. Perianth cylindrical, 6-cleft. Stamens inserted near the summit of the tube. Fruit baccate, 3-celled, 2 seeds in each cell. *Liliaceæ*, 130.

Asparagus. Perianth inferior, 6-cleft or 6-parted, erect; the 3 inner divisions reflexed at the apex. Style very short. Stigmas 3. Berry 3 celled, cells 2-seeded. *Liliaceæ*, 130.

Polyanthus. Perianth funnel-form, incurved. Stamens inserted into the throat. Stigma 3-cleft. (Tuberose.) *Liliaceæ*, 130.

Hyacinthus. Corolla urceolate or campanulate. Border reflexed, 6-cleft. Stamens inserted into the middle of the corolla. (Hyacinth.) *Liliaceæ*, 130.

Tulipa. Perianth 6-leaved, liliaceous. Style none. Stigma thick. Capsule 3-sided, oblong. (Tulip.) *Liliaceæ*, 130.

Yucca. Perianth campanulate, deeply 6-parted. Segments reflexed. Flowers in large panicles. (Dwarf Palmetto.) *Liliaceæ*, 130.

d. Flowers incomplete.

Orontium. Spadix cylindrical, crowded with flowers, all compact. Stigma sessile. Fruit 1-seeded. Yellow. *Araceæ*, 138.

Acorus. Spadix cylindrical, covered with flowers. Perianth glumaceous, 6-leaved. Capsule 3-celled, many-seeded. (Sweet Flag.) *Araceæ*, 138.

Juncus. Perianth 6-parted, with 2 bracts at the base, glumaceous Capsule 3-celled, many-seeded. (Bulrush.) *Juncaceæ*, 134.

Luzula. D. C., *Juncus.* Perianth 6-leaved, regular, glumaceous, spreading. Stamens 6. Anthers linear Capsule 1-celled, 3-valved, 3-seeded. (Grass-like.) *Juncaceæ*, 134.

Order II.—DIGYNIA.

Oryza. Glumes 2, 1-flowered. Paleæ 2, adhering to the seeds. (Rice.) *Graminaceæ*, 142.

Cabomba. Sepals 3, petaloid. Petals 3. Stamens as long as the calyx. Carpels numerous, 1—3-seeded, somewhat fleshy. *Cabombaceæ*, 7.

Order III.—TRIGYNIA.

Melanthium. Amiantanthus. Perianth 6-parted, expanding rotate, with 2 glands at the base. Capsule sub-ovate, 3-celled, partly trifid. Seeds numerous, winged. *Melanthaceæ*, 131.

Zigadenus. Perianth 6-leaved, spreading, with 2 glands at the base. Capsule membranaceous, 3-celled, many-seeded. *Melanthaceæ*, 131.

Helonias. Perianth 6-leaved; leaves flat, sessile, without glands. Capsule 3-celled, few-seeded, horned. *Melanthaceæ*, 131.

Veratrum. Perianth calyx-like, deeply 6-parted, spreading, persistent, without glands. Capsule ovoid, membranaceous, 3-lobed; seeds numerous. *Melanthaceæ*, 131.

Schœnocaulon. Perianth 6-leaved, persistent; leaves linear, oblong, slightly 3—5-nerved. Stamens 6. Anthers reniform. Carpels 3, united by their interior angles. Ovules 6—8 in each carpel. (Herbaceous, with bulbous roots.) *Melanthaceæ*, 131.

Tofielda. Perianth 6-parted, with a small 3-parted involucre. Capsule 3—6-celled; cells united at the base, many-seeded. *Melanthaceæ*, 131.

Stenanthium. Perianth 6-leaved, colored; leaves lanceolate, spreading. Stamens 6. Styles 3. Capsule 3-celled, many-seeded. (Herbaceous, with grass-like leaves.) *Melanthaceæ*, 131.

Medeola. Gyromia. Perianth petaloid, 6-parted, revolute. Stamens inserted into the base of the perianth. Berry 3-celled, 1—3-seeded. *Trilliaceæ*, 120.

Trillium. Perianth deeply 6-parted; 3 outer segments sepaloid, spreading; 3 inner petaloid. Fruit ovoid, 3-celled, many-seeded. *Trilliaceæ*, 120.

Rumex. Perianth 6-leaved, 3 inner leaves somewhat colored. Stigmas many-cleft. Nut triquetrous. (Sorrel.) *Polygonaceæ*, 102.

Sabal. Flowers perfect. Spathes partial. Filaments thickened at the base. Fruit dry, cartilaginous, bony. *Palmaceæ*, 135.

Chamerops. Flowers polygamous. Spathe compressed. Spadix branching. Fruit 3-celled, 1 cell only containing a seed. *Palmaceæ*, 135.

Nolina. Perianth 6-parted, expanding. Capsule 3-angled, 3-celled, 3-seeded. *Liliaceæ*, 130.

Triglochin. Perianth 6-leaved. Anthers 3 or 6, sessile. Stigmas sessile. Carpels 3—6, each 1-seeded. *Alismaceæ*, 137.

Order VI.—HEXAGYNIA.

Cocculus. Wendlandia. Sepals 6, in a double series. Petals 6, fleshy auricled. *Menispermaceæ*, 5.

Order XII.—POLYGYNIA.

Alisma. Sepals 3, persistent. Petals 3. Ovaries numerous. Capsules numerous, distinct, 1-seeded. *Alismaceæ*, 137.

CLASS VII.—HEPTANDRIA.

Order I.—MONOGYNIA.

Æsculus. Sepals united, forming a 4—5-toothed tubular calyx. Petals 4—5, more or less unequal. Stamens 6—8, usually 7. (Buckeye.) *Hippocastanaceæ*, 39.

Order IV.—TETRAGYNIA.

Saururus. Flowers naked, seated on a scale. Anthers cuneate. Fruit consisting of 4 indehiscent nuts. *Saururaceæ*, 114.

CLASS VIII.—OCTANDRIA.

Order I.—MONOGYNIA.

a. Flowers superior.

Rhexia. Calyx, with the tube ventricose—ovate at the base, narrowed at the apex. Limb 4-cleft. Petals 4, obovate. Capsule 4-celled. *Melastomaceæ*, 46.

Œnothera. Calyx tubular, 4-cleft, 4-sided. Petals 4, obovate. Stigmas 4-lobed. Capsule 4-valved, many-seeded. *Onagraceæ*, 50.

Gaura. Calyx 4-cleft, tubular, prolonged beyond the ovary. Petals 4, unguiculate. Fruit 1-celled, 1-seeded by abortion, somewhat ligneous. *Onagraceæ*, 50.

Epilobium. Calyx campanulate. Segments 4, spreading. Petals 4. Stamens 8, alternate ones largest. Stigma clavate. Capsule 4-angled, 4-celled. *Onagraceæ*, 50.

Oxycoccus. Calyx 4-cleft. Corolla with 4 linear segments. Anthers tubular, 2-parted. Fruit a berry, many-seeded. (Cranberry.) *Vacciniaceæ*, 71.

b. Flowers inferior.

Menziesia. Calyx 4-cleft. Corolla globose, 4—5-cleft. Capsule 4-celled. Seeds numerous, oblong. (Shrubs.) *Ericaceæ*, 72.

Acer. Calyx 4—5-cleft. Stamens varying from 5—10. Fruit a samara, by abortion, 1-seeded. (Trees.) *Aceraceæ*, 38.

Dirca. Perianth tubular, colored, campanulate. Stamens unequal. Fruit a drupe, 1-seeded. (Shrubs with tough bark.) *Thymeliaceæ*, 104.

Jeffersonia. Sepals 4—5, fugaceous, colored. Petals 8, linear, oblong. Capsule 1-celled, opening by a slit near the summit; many-seeded. *Berberidaceæ*, 6.

Elliottia. Calyx 4-toothed. Corolla deeply 4-parted. Filaments glandular. Anthers sagittate. Ovary 4-celled, many-seeded. *Ericaceæ*, 72.

Amyris. Calyx 4-toothed, persistent. Petals 4, cuneate, having claws. Stamens shorter than the petals. Fruit 1-seeded. *Amyridaceæ*, 31.

Dodonea. Sepals 4. Petals none. Style 3 cleft at the apex. Capsule winged. Seeds 2 in each cell. *Sapindaceæ*, 40.

ORDER II.—DIGYNIA.

Chrysosplenium. Calyx 4-cleft, colored within. Petals none Stamens 8—10, filaments short, subulate. Capsule 1-celled, many seeded. *Saxifragaceæ*, 59.

ORDER III.—TRIGYNIA.

Polygonum. Perianth 5-parted, petaloid, persistent. Stamens 5—9 Fruit 1-seeded, mostly triangular. *Polygonaceæ*, 102.

Cardiospermum. Calyx 4-leaved, leaves concave, two exterior ones smallest. Corolla 4-petaled. Capsule membranous, 3-valved. Seeds globose, solitary. *Sapindaceæ*, 40.

Sapindus. Sepals 4—5, two exterior ones largest. Petals 4—5, lanceolate. Stamens 8—10. Stigmas 2—3. Fruit of 1 carpel, 2 suppressed. *Sapindaceæ*, 40.

ORDER IV.—TETRAGYNIA.

Diamorpha. Sepals 4. Petals 4, concave. Stamens 8, with purple anthers. Carpels 4. (Succulent herbs.) *Crassulaceæ*, 58.

CLASS IX.—ENNEANDRIA.

ORDER I.—MONOGYNIA.

Laurus. Perianth 4—6-cleft, perfect, polygamous, or diœcious. Petals none. 3 inner stamens usually sterile. Fruit 1-seeded, drupe. (Sassafras.) *Lauraceæ*, 103.

ORDER II.—DIGYNIA.

Eriogonum. Involucre campanulate, many-flowered. Perianth 6-cleft. Stigmas 3. Seed 3-angled. *Polygonaceæ*, 102.

ORDER III.—TRIGYNIA.

Plecа. Perianth 6-parted, expanding. Styles 3. Capsule 3-angled, 3-valved, 3-celled, many-seeded. *Melanthaceæ*, 131.

Rheum. Perianth 6-cleft, permanent. Nut 1, 3-sided. *Polygonaceæ*, 102

CLASS X.—DECANDRIA.

ORDER I.—MONOGYNIA.

a. Flowers polypetalous, irregular.

For *Cassia*, *Baptisia*, *Cercis*, *Sophora*, *Cladrastris*, see order *Leguminosæ*, 43.

b. Flowers polypetalous, regular.

Pyrola. Calyx minute, 5-parted. Anthers opening by 2 pores. Corolla rotate, 5-lobed. Capsule 5-celled. *Ericaceæ*, 72.

Decodon. Calyx short, campanulate, with 10 teeth, unlike. Petals 5. Capsule globose, 3-celled, many-seeded. *Lythraceæ*, 47.

Chimaphila. Calyx and corolla as in the preceding. Stigma sessile. Anthers beaked. Capsule 5-celled, dehiscing at the angles. *Ericaceæ*, 72.

Leiophyllum. Calyx deeply 5-parted. Petals 5, scarcely united. Stamens exserted. Capsule 5-celled, opening at the summit. (Small shrub.) *Ericaceæ*, 72.

Clethra. Calyx 5-parted, persistent. Petals 5. Style 1—3-cleft at the summit. Capsule 3-celled, 3-valved, inclosed by the calyx. *Ericaceæ*, 72.

Mylocarium. Calyx 5-cleft. Petals 5. Stigma capitate, 3-cornered. Capsule 3-celled, angular. *Ericaceæ*, 72.

Melia. Sepals 5. Petals 5, hypogynous, often cohering at the base. Stamens united by their filaments. Fruit globose, 5-celled, 5-seeded. (China Tree.) *Meliaceæ*, 35.

Swietenia. Calyx short, 5-cleft. Petals 4—5. Stamens alternately shortened. Ovary 5-celled, on a torus. Fruit a woody 3—5-celled capsule. (Mahogany.) *Cedrelaceæ*, 36.

Dionea. Calyx parted. Petals 5. Stigma fringed. Capsule roundish, gibbous, 2-celled, many-seeded. (Venus' Fly-trap.) *Droseraceæ*, 17.

Jussiæa. Calyx 4—5-parted, superior, permanent. Petals 4—5, ovate. Capsule 4—5-celled, oblong, ribbed. Seeds numerous. *Onagraceæ*, 50.

Limonia. Calyx 4—5-cleft, urceolate. Petals 4—5. Anthers cordate. Fruit 4—5-celled, or by abortion fewer. *Aurantaceæ*, 30.

Kallstræmia. Sepals 5. Petals 5, obovate. Ovary 5-carpeled, 10-celled, 10-seeded. *Zygophyllaceæ*, 27.

c. Flowers monopetalous.

Epigæa. Calyx 5-parted, with 3 bracts at the base. Corolla hypocrateriform, border 5-parted, tube villous within. Carpels 5-celled. *Ericaceæ*, 72.

Gaultheria. Calyx 5-cleft, with 2 bracts at the base. Corolla ovate. Filaments hairy. Capsule 5 celled, baccate. *Ericaceæ*, 72.

Vaccinium. Calyx superior, 4—5-cleft. Fruit globose, 4—5-celled, many-seeded. *Vaccinaceæ*, 71.

Andromeda, Zenobia, Lyoni, Oxydendrum, Leucothœ, Cassandra. Calyx inferior, small, 5-parted. Corolla ovate, roundish, a sub-cylindric border, 5-cleft. Capsule 5-celled, 5-valved. Stamens sometimes 8. *Ericaceæ*, 72.

Kalmia. Calyx 5-parted. Corolla salver-form, continuing at the base into 10 cornute protuberances, in the cavities of which the anthers are concealed. Capsule 5-celled. *Ericaceæ*, 72.

Rhododendron. Calyx 5-parted. Corolla 5-cleft, funnel-shaped, with an irregular border. Stamens declined. Capsule 5-celled. Stamens varying from 5—10. *Ericaceæ*, 72.

d. Flowers without green herbage.

Schweinitzia. Sepals 5, erect, unguiculate, gibbous. Corolla campanulate, 5-cleft. Nectary 5-cleft, in the base of the corolla. Ovary sub-globose, 4—5-angled. Flowers in terminal spikes, emitting the odor of violets. *Ericaceæ*, 72.

Monotropa. Calyx 5-parted, cucullate at the base. Corolla 5-petaled. Capsule 5-valved, 5-celled, many-seeded. (Parasite.) (Indian Pipe.) *Ericaceæ*, 72.

Hypopitys. Calyx none. Petals erect, oblong. Stamens shorter than the petals. Ovary sub-globose, 4—5-angled, many-seeded. Flowers in a terminal raceme. (Parasite.) *Ericaceæ*, 72.

ORDER II.—DIGYNIA.

Hydrangea. Calyx 5-toothed. Flowers futile or sterile. Calyx of the sterile flowers membranaceous, colored, flat, dilated. Petals 5, ovate, sessile. Capsule 2-celled, many-seeded. (Shrubs.) *Saxifragaceæ*, 59.

Saxifraga. Sepals 5, more or less united. Petals 5. Capsule 2-celled, 2-beaked, opening by a hole between the beaks. *Saxifragaceæ*, 59.

Saponaria. Calyx tubular, 5-toothed. Petals 5, unguiculate. Capsule oblong, 1-celled, 2-valved. *Caryophyllaceæ*, 21.

Dianthus. Calyx inferior, cylindrical, with several bracts at the base. Petals 5, with claws. Capsule cylindrical, 1-celled, dehiscing at the top. *Caryophyllaceæ*, 21.

Astilbe. Tiarella. Calyx campanulate, 5-parted. Petals 5. Stamens exserted. Anthers cordate. Capsule 2-celled. Flowers in panicles. Leaves compound. *Saxifragaceæ*, 59.

ORDER III.—TRIGYNIA.

Silene. Sepals usually 5, inserted into a tube. Petals 5, unguiculate, with long claws, crowned at the summit of the claw. Limb 2-cleft. Capsule 3-celled, opening at the apex with 6 teeth. *Caryophyllaceæ*, 21.

Stellaria. Sepals 5, expanding. Petals 5, 2-parted. Capsule 3-valved, 1-celled, many-seeded. *Caryophyllaceæ*, 21.

Arenaria. Sepals 5, expanding. Petals 5, entire. Carpels 3-valved, 1-celled, many-seeded. *Caryophyllaceæ*, 21.

ORDER V.—PENTAGYNIA.

Spergula. Sepals 5. Petals 5, entire. Capsule 3—5-valved, many-seeded. Seeds compressed, orbicular, or reniform. *Illecebraceæ*, 20.

Cerastium. Sepals 5. Petals 5, 2-cleft, or emarginate. Capsule 1-celled, 5-valved, dehiscing at the apex, with 5 or 10 teeth. *Caryophyllaceæ*, 21.

Lychnis, Agrostema, or *Githago.* Calyx tubular, 5-sided. Petals 5, unguiculate; limb entire. Capsule 1-celled, or partly 5-celled. *Caryophyllaceæ*, 21.

Oxalis. Sepals 5. Petals 5. Alternate stamens longest. Capsule 5-angled. Seeds few, rugose. *Oxalidaceæ*, 26.

Penthorum. Calyx 5-cleft. Petals 5, or none. Carpels 5, united into a 5-angled, 5-celled capsule, with 5 diverging beaks. Seeds numerous, minute. *Crassulaceæ*, 58.

Sedum. Calyx 5-cleft, inferior. Petals 4—5. Pods many-seeded, a little scale at the base of each. *Crassulaceæ*, 58.

ORDER X.—DECAGYNIA.

Phytolacca. Perianth 5-parted, petaloid. Ovary 10-celled, 1 ovule in each cell. Fruit indehiscent. (Pokeweed,) *Phytolaccaceæ*, 101.

CLASS XI.—ICOSANDRIA.

Order I.—MONOGYNIA

Cactus or *Opuntia*. Sepals numerous, adhering to the ovary. Petals numerous, obovate, spreading. Stamens numerous. Fruit 1-celled, many-seeded. *Cactaceæ*, 56.

Lythrum. Calyx cylindrical, with 4—6 short teeth, generally with as many intermediate processes. Petals 4—6. Capsule 2-celled, many-seeded. *Lythraceæ*, 47.

Cuphea. Calyx tubular, ventricose, 6-toothed, generally with as many intermediate processes. Petals 6, unequal. Capsules membranous, 1—2-celled. *Lythraceæ*, 47.

Decumara. Calyx 8—12-cleft, tube campanulate. Petals 8—12, narrow, oblong. Capsule 5—10-celled, ribbed, opening between the ribs. *Saxifragaceæ*, 59.

Philadelphus. Calyx 4—5-parted, persistent. Petals 4—5, broadly obovate. Styles more or less united. Capsules 4—5-celled. Seeds numerous. *Saxifragaceæ*, 59.

For *Prunus*, *Cerasus*, *Amygdalos*, *Chrysobalanus*, see Natural Order, 44.

Mentzelia. Calyx 5-lobed. Petals 5, sometimes 10, the inner ones usually smaller. Stamens numerous, the outer ones often petaloid. Ovary inferior, 1-celled, about 6-seeded. (Herbaceous.) *Loasaceæ*, 51.

Order II. to Order V.—DI-PENTAGYNIA.

Fothergilla. Calyx 5—7-toothed, or truncate, campanulate. Petals none. Styles 2, filiform, distinct. Capsule 2-lobed. Seeds one in each cell. *Hamamelaceæ*, 60.

For the other genera of this order, viz., *Agrimonia*, *Crategus*, *Amelanchier*, *Pyrus*, *Spirea*, and *Gillenia*, see Natural Order, 44.

Order XII.—POLYGYNIA.

Calycanthus. Sepals and petals confounded. Segments colored, petaloid, seeds numerous, contained in an enlarged, ventricose calyx. (Sweet shrub.) *Calycanthaceæ*, 45.

For the other genera of this order, viz., *Rosa*, *Rubus*, *Waldsteinia*, *Geum*, *Potentilla*, *Fragaria*, see Natural Order, 44.

CLASS XII.—POLYANDRIA.

Stamens numerous, perigynous.

Tilia. Sepals 5, united at the base. Petals 5. Ovary 5-celled, with 2 ovules in each cell. Fruit ligneous, sometimes only 1-celled, 1—2-seeded. Trees. *Tiliaceæ*, 34.

Corchorus. Sepals 4—5. Petals 4—5, hypogynous. Capsule 2—5-celled, pod-like, seeds numerous. Nearly herbaceous. *Tiliaceæ*, 34.

Helianthemum. Sepals 5, unequal, the 2 exterior small, bract-like, sometimes wanting. Petals 5, sometimes wanting. Stigmas 3. Capsule 3-angled. *Cistaceæ*, 18.

Portulacca. Calyx superior, 2-parted. Petals 4—6, equal, inserted

on the calyx. Styles 3—6-cleft. Capsule 4-celled, many-seeded. *Portulacaceæ*, 22.

Talinum. Sepals 2. Petals 5, distinct. Style filiform, cleft at the apex. Capsule 3-valved, 1-celled, many-seeded. *Portulacaceæ*, 22.

Chelidonium. Sepals 2, caducous. Petals 4. Capsule 2-valved, 1-celled, many-seeded, linear, dehiscing from the base upward. *Papaveraceæ*, 11.

Polanisia. Sepals 4, spreading. Petals 4, unequal, entire, nearly orbicular. Pod linear, sessile or nearly so. *Capparidaceæ*, 14.

Glaucium. Sepals 2, caducous. Petals 4. Capsule linear, 2-valved, 2-celled, many-seeded, seeds reniform. *Papaveraceæ*, 11.

Argemone. Sepals 3, caducous. Petals 6. Stigmas 4—7. Capsule opening by valves, separating from the placenta. *Papaveraceæ*, 11.

Sanguinaria. Sepals 2, caducous. Petals 8—12. Stigmas 2. Capsule oblong-ovate. Seeds numerous. *Papaveraceæ*, 11.

Papaver. Sepals 2. Petals 4. Stigmas 4—20, sessile, radiating. Capsule 1-celled, opening by pores beneath the lobes of the stigma. *Papaveraceæ*, 11.

Podophyllum. Sepals 3, caducous. Petals 6—9, obovate. Stigma large, sessile. Fruit fleshy. Seeds numerous, on a lateral placenta. *Berberidaceæ*, 6.

Actæa. Sepals 4—5. Petals 4—8 or none, spatulate, oblong, shorter than the stamens. Fruit baccate, solitary, many-seeded. *Ranunculaceæ*, 1.

Sarracenia. Sepals 5, with a 3-leaved involucre. Petals 5, unguiculate. Stigma very large, 5-angled, petaloid, covering the stamens. Capsule 5-celled, 5-valved, many-seeded. *Sarraceniaceæ*, 10.

Nuphar. Sepals 5—6. Petals numerous, small, inserted on the receptacle. Fruit berry-like, many-celled, many-seeded. *Nymphæaceæ*, 9.

Nymphæa. Sepals 4. Corolla many-petaled. Stigma a broad disk. Fruit berry-like, many-celled, many-seeded. *Nymphæaceæ*, 9.

Bejaria. Calyx 7-cleft. Corolla 7-petaled. Style 1. Capsule many-seeded, 7-celled. *Ericaceæ*, 72.

Rhizophora. Calyx superior, limbs 4, many-lobed. Petals oblong, emarginate, coriaceous. Fruit ovate, 1-celled, indehiscent. Trees. *Rhizophoraceæ*, 48.

Citrus. Calyx 5-cleft. Petals 5, oblong, dilated at the base. Fruit 9—18-celled. *Aurantaceæ*, 30.

Order II. to Order V.—DI-PENTAGYNIA.

The genera belonging to these orders will be found under the Natural Orders 1 and 19. *Delphinium*, *Aconitum*, *Aquilegia*, *Cimicifuga*, under the 1st; *Ascyrum*, *Hypericum*, and *Elodea*, under the 19th.

Order XII.—POLYGYNIA.

Magnolia. Sepals 3, caducous. Petals 6—12. Carpels arranged in a cone, 2-valved, 1-seeded. *Magnoliaceæ*, 2.

Liriodendron. Sepals 3, concave. Petals 6, in two series, obovate, lanceolate, campanulate. Carpels imbricated in a dense cone, 1—2-seeded. (Tulip-tree.) *Magnoliaceæ*, 2.

Illicium. Sepals 3—6, petaloid. Petals numerous, interior ones smallest. Carpels numerous, arranged in a circle, follicular. *Magnoliaceæ*, 2.

Asimina. Sepals 3. Petals 6, the 3 outer ones larger. Carpels oblong, pulpy within, several-seeded. (Papaw.) *Anonaceæ*, 3.

Brasenia. Sepals 3—4, persistent, petaloid. Petals 3—4, longer than the sepals. Carpels numerous, 1—2-seeded. *Cabombaceæ*, 7.

Nelumbium. Sepals 4—6, petaloid. Petals numerous. Filaments petaloid. Disk remarkably developed. Ovaries lodged in separate cavities. Fruit a nut. *Nelumbiaceæ*, 8.

The remaining genera of this order, viz., *Hepatica, Ranunculus, Adonis, Hydrastis, Clematis, Thalictrum, Anemone, Caltha, Isopyrum,* and *Trautvetteria,* will be found under the Natural Order *Ranunculaceæ*, 1.

CLASS XIII.—DIDYNAMIA.

Order I.—GYMNOSPERMA.

Plants with bi-labiate corolla, 4 nuts in the bottom of the calyx, form the first order of this class. It is a part of the Natural Order *Labiatæ*, No. 91, to which the student is referred. *Verbena* is referred to *Verbenaceæ*, Order 92.

Order II.—ANGIOSPERMA.

Obolaria. Calyx 2-parted, in the form of bracts. Corolla campanulate, 4-cleft, segments equal, entire, or crenulate. Carpels 1-celled, 2-valved, many-seeded. *Gentianaceæ*, 82.

Lantana. Calyx 4-toothed. Corolla with the limb 4-cleft. Stamens 4, didynamous. Flowers in heads. Fruit a drupe, 2-celled. *Verbenaceæ*, 92.

Zapania. Calyx 5-toothed. Corolla 5-lobed. Stamens 4, didynamous. Flowers in heads. Seeds 2, the membranous pericarp disappearing. *Verbenaceæ*, 92.

Orobanche. Conopholis. Anoplanthus. Calyx 4—5-cleft. Segments unequal. Corolla ringent. Capsule ovate, 1-celled, many-seeded. *Orobanchaceæ*, 89.

Epiphegus. Calyx short, 5-toothed. Flowers polygamous, upper ones sterile, lower ones fertile. Capsule truncate, oblique, 1-celled. *Orobanchaceæ.* 89.

Bignonia, Tecoma. Calyx obscurely 5-cleft, cup-shaped. Corolla campanulate, 5-lobed, ventricose beneath. Stamens 4, didynamous. Pod 2-celled, seeds with membranaceous wings. *Bignonaceæ*, 83.

Ruellia. Hygrophyla. Calophanes. Diptericanthus. Cryphiacanthus. Calyx 5-parted, often with 2 bracts. Corolla campanulate, with a 5-lobed border. Stamens 4—5. Capsule tapering, seeds few. *Acanthaceæ*, 93.

Martynia. Calyx 5-cleft. Corolla bilabiate. Limb 5-lobed. Stamens 4, didynamous. Ovary spuriously 4-celled. Fruit ligneous, terminated by a hooked beak. *Bignonaceæ*, 83.

The remaining genera of this order belong to the Natural Order *Scrophulariaceæ*, No. 90.

CLASS XIV.—TETRADYNAMIA.

Order I.—SILICULOSA. *Pod short.*

Order II.—SILIQUOSA. *Pod long.*

The genera of this class make the Natural Order *Cruciferæ*, 13.

CLASS XV.—MONADELPHIA.

Order III.—TRIANDRIA.

Sisyrinchium. Perianth 6-leaved. Stamens 3, usually monadelphous. Capsule triangular. Small plant with grass-like leaves. *Iridaceæ*, 124.

Order V.—PENTANDRIA.

Passiflora. Calyx 5-parted, with a campanulate tube. A filamentous crown inserted in the throat. Stigmas 3, clavate. *Passifloraceæ*, 53.

Achyranthes. Telanthera. Perianth double, exterior one 3-leaved, the interior 5-leaved. Stamens 5. Style 1. Capsule 1-celled, 1-seeded. *Amaranthaceæ*, 99.

Oplotheca. Frœlichia. Perianth double, the exterior 2-leaved, truncate, the interior 5 cleft, tomentose. Stamens 5. Capsule 1-seeded. *Amaranthaceæ*, 99.

Order VIII.—OCTANDRIA.

Pistia. Perianth a spathe, tubular, strap-shaped, hooded. Stamens 3—8. Capsule 1-celled, many-seeded. An aquatic plant. *Araceæ*, 138.

Order X.—DECANDRIA.

Geranium. Sepals 5, equal. Petals 5, regular. Stamens 10; alternate ones largest, with a scale at the base. Carpels with long awns. *Geraniaceæ*, 24.

Acacia, Mimosa, Darlingtonia, and *Schrankia* will be found in *Leguminosæ*, order 43.

Order XII.—POLYANDRIA.

The genera of this order will be found forming the three Natural Orders *Malvaceæ*, No. 33, *Ternstrœmiaceæ*, No. 32, and *Styraceæ*, No. 73.

CLASS XVI.—DIADELPHIA.

Order V. to Order VIII.—PENTOCTANDRIA.

Polygala. Sepals 5, permanent, unequal, 2 of them wing-like, large, colored. Corolla irregular. Capsule obcordate, 2-celled, 2-valved. *Polygalaceæ*, 15.

The remaining genera of these orders form the Natural Order *Fumariaceæ*, No. 12.

Order X.—DECANDRIA.

The genera of this order belong to the Natural Order *Leguminosæ*, No. 43.

CLASS XVII.—SYNGENESIA.

This class forms the Natural Order *Compositæ*, No. 68, where it will be found explained and analyzed.

CLASS XVIII.—GYNANDRIA.

Orders I. and II.—MONANDRIA and DIANDRIA.

The genera of these orders form the Natural Order *Orchidaceæ*, No. 122.

Order V.—PENTANDRIA.

Asclepias. Sepals small, 5-parted. Corolla 5-parted, reflexed. Staminal crown 5-leaved, each with a subulated, averte process. Pollen in 10 masses, arranged in pairs. Follicles 2. Seeds comose. *Asclepiadaceæ*, 79.

Gonolobus. Calyx small. Corolla rotate, 5-parted. Staminal crown shield-form, lobed. Pollen masses in 5 pairs. Follicles 2. *Asclepiadaceæ*, 79.

Apocynum. Calyx persistent, 5-cleft. Corolla 5-lobed, regular. Æstivation twisted. Stamens 5. Anthers sagittate. Follicles long, linear. *Apocynaceæ*, 80.

Amsonia. Calyx 5-parted. Corolla funnel-shaped, with the throat closed. Follicles 2, erect. Seed terete. *Apocynaceæ*, 80.

Echites. Calyx 5-parted, with acute segments. Corolla funnel-shaped. Throat naked. Anthers adhering to the stigma. Follicles 2, long, slender. *Apocynaceæ*, 80.

Orders VI. and X.—HEXANDRIA and DECANDRIA.

These genera form the Natural Order *Aristolochia*, No. 106.

CLASS XIX.—MONŒCIA.

Order I.—MONANDRIA.

Zostera. Perianth none. Stamens and pistils separated in two rows upon one side of the spadix. Drupe 1-seeded. *Naiadaceæ*, 139.

Caulina. Najas. Perianth none. Anther 1, sessile. Style filiform Stigma 2-cleft. Capsule 1-seeded. *Naiadaceæ*, 139.

Euphorbia. Involucre campanulate, 5—10-toothed, the inner segments erect. Stamens attached to the inside of the involucre. Filaments articulated. Pistil central. Fruit stiped, 3-angled, 3-celled. *Euphorbiaceæ*, 108.

Order II.

Podostemum. Flowers naked, bursting through an irregularly lacerated spathe. Stamens monadelphous. Ovary 2-celled, capsular. Seeds numerous. *Podostemaceæ*, 112.

Lemna. Spirodela. Sterile and fertile flowers collateral. Perianth 1-leaved. Stigma funnel-form. Capsule 1-celled, 1—5-seeded. *Araceæ*, 138.

Order III.—TRIANDRIA.

Typha. Flowers collected into a long, dense, cylindric spike. Staminate florets above. Pistillate florets below, on the same axis. Fruit very small, oblong, stipitate. *Araceæ*, 138.

Sparganum. Flowers in dense, spherical heads, the sterile ones above. Perianth 3-leaved. Fruit dry, 1-seeded. *Araceæ*, 138.

Carex. Flowers monœcious, rarely diœcious. Stamens usually 3, rarely 1—2. Fertile Fl. Perigynium membranaceous, 2-toothed, emarginate or truncate. Stigmas 2—3. Achenium lenticular. *Cyperaceæ*, 141.

Scleria. Staminate flowers. Glumes 2—6, many-flowered. Paleæ without awns. Fertile flowers. Glumes 2—6, 1-flowered. Paleæ none. Seeds sub-globose. *Cyperaceæ*, 141.

Tripsacum. Sterile spikelets in pairs, on each joint of the rachis collateral, 2-flowered; each with 2 paleæ. Fertile spikelets solitary, 2-flowered. Flowers with 2 paleæ; the lower one neutral, upper one fertile. *Graminaceæ*, 142.

Comptonia. Sterile florets in cylindrical aments. Scales 1-flowered. Perianth 2-parted. Stamens 3-forked. Fertile florets in globose heads. *Amentaceæ*, 115.

Zea. Staminate flowers in a terminal panicle. Glume 2-flowered, awnless. Pistillate flowers in a lateral compact spike. Style 1, long, filiform. Seed solitary. *Graminaceæ*, 142.

Tragia. Flowers in spikes. Staminal ones with perianth 3-parted. Pistillate flowers perianth 5-parted. Capsules 3-celled, 3-seeded. *Euphorbiaceæ*, 108.

Order IV.—TETRANDRIA.

Eriocaulon. Lachnocaulon. Pœpalanthus. Flowers in dense heads, sterile florets occupying the center. Perianth 4-parted. Fertile florets in the circumference. Perianth 4-parted. *Restiaceæ*, 140.

Alnus. Sterile flowers in a long, cylindrical ament. Scales 3-lobed, 3-flowered. Fertile flowers in an ovate ament. Scales 2-flowered. Styles 2. *Amentaceæ*, 115.

Bœhmeria. Sterile flowers with a 4-parted perianth. Fertile flowers with no perianth. Style 1. Nut compressed. *Urticaceæ*, 109.

Urtica. Sterile flowers with a 4-leaved perianth. Stamens 4. Fertile flowers with a 2-leaved perianth. Seed 1, shining. *Urticaceæ*, 109.

Parietaria. Flowers surrounded by a many-cleft involucre. Perianth 4-cleft. Seed 1, inclosed by the perianth. *Urticaceæ*, 109.

Morus. Flowers in aments or heads. Perianth usually divided. Fruit a fleshy receptacle covered by numerous achenia. *Artocarpaceæ*, 111.

Pachysandra. Flowers in spikes, the upper sterile, the lower fertile. Perianth 4-leaved. Styles 3. Capsule 3-horned, 3-celled, 2 seeds in each cell. *Euphorbiaceæ*, 108.

Order V.—PENTANDRIA.

Crotonopsis. Flowers in spikes. Perianth 5-parted, with 5 petaloid scales. Stigmas 3, bifid. Capsule 1-seeded, indehiscent. *Euphorbiaceæ*, 108.

Amaranthus. Euxolus. Perianth 2—5-leaved. Styles 3. Ovary 1-celled, superior, 1-seeded. *Amaranthaceæ*, 99.

Schizandra. Sepals and petals confounded, roundish, concave. Anthers connate. Ovaries numerous, on a conical torus, which elongates in maturity. Carpels baccate, 1-seeded, forming a loose spike. *Schizandraceæ*, 4.

Order VI.—HEXANDRIA.

Zizania. See *Graminaceæ*, 142.

Order XII.—POLYANDRIA.

a. Stems not woody.

Myriophyllum. Calyx 4-parted. Petals 4, or none. Stamens 4—8. Ovary 4-celled. Fruit of 4 indehiscent carpels. (Aquatic plants.) *Onagraceæ*, 50.

Sagittaria. Flowers in whorls; the upper sterile, the lower fertile Petals 3. Stamens numerous. Carpels numerous, indehiscent, each 1-seeded. *Alismaceæ*, 137.

Arum. Peltandra. Arisæma. Flowers on a spadix, naked at the summit; staminal flowers in the middle; fertile ones at the base. Perianth none. Fruit 1-celled, many-seeded. *Araceæ*, 138.

Caladium. Flowers on a spadix; staminate ones at the summit; fertile ones at the base. Perianth none. Stamens numerous. Fruit 1-celled, many-seeded. *Araceæ*, 138.

b. Stems woody.

The genera under this division are included in the Natural Order *Amentaceæ*, No. 115, and *Juglandaceæ*, 116.

Order XV.—MONADELPHIA.

The running plants of this order belong to the Natural Order *Cucurbitaceæ*, No. 54.

The erect, herbaceous plants of the order belong to *Euphorbiaceæ*, No. 108.

The woody plants of the order belong to *Coniferæ*, No. 117.

CLASS XX.—DIŒCIA.

Order II.—DIANDRIA.

Vallisneria. Flowers on a spadix. Spathe 2—4-parted. Sepals 3. Stamens 2. Fertile flowers, with a spiral scape. Spathe 2-cleft. Sepals 3. Elongated petals 3. Capsule cylindrical, 1-celled, many-seeded. *Hydrocharidaceæ*, 121.

Salix. Sterile flowers, in a cylindrical ament. Scales 1-flowered, imbricate. Perianth none. Stamens 1—5. Fertile flowers in an ament. Scales 1-flowered. Capsule 1-celled, many-seeded. Seeds comose. *Amentaceæ*, 115.

Fraxinus. Calyx small, 3—4-cleft, or none. Corolla 4-petaled, or none. Samara 2-celled, compressed, winged at the apex; by abortion 1-seeded. *Oleaceæ*, 78.

Borya. Flowers in spikes. Perianth 4-leaved. Stigma capitate. Fruit 1-seeded. *Euphorbiaceæ*, 108.

Ceratiola. Flowers in the axils of the leaves. Perianth consisting of imbricated scales. Fruit a berry, 2-celled, 2-seeded. *Empetraceæ*, 107.

Order III.—TRIANDRIA.

Ficus. Receptacle fleshy, spherical, inclosing the florets; calyx adhering to the ovary, 3—5-parted. *Artocarpaceæ*, 111.

Order IV.—TETRANDRIA.

Myrica. Flowers in aments. Scales crescent-shaped. Anthers 4-valved. Fertile flowers. Stigmas 2. Drupe 1-celled, 1-seeded. *Amentaceæ*, 115.

Viscum. Sterile florets, with calyx 3—4-parted. Segments triangular, erect. Anthers many-celled, opening by pores. Fertile flowers. Calyx obsolete. Petals 3—4, coriaceous. Fruit baccate, 1-celled, 1-seeded. *Loranthaceæ*, 64.

Maclura. Calyx and corolla none. Style 1, filiform, villous. Carpels numerous, uniting into a dense globose head, fleshy. Seeds ovate, compressed. (Osage Orange.) *Artocarpaceæ*, 111.

Order V.—PENTANDRIA.

Nyssa. Staminate flowers. Perianth 5-parted. Stamens 5—10. Pistillate flowers. Perianth 5-parted. Style 1. Drupe inferior, 1-seeded. (Trees.) *Santalaceæ*, 105.

Hamiltonia. Perianth turbinate, campanulate, 5-cleft. Stamens 5. Stigmas 2—3. Drupe inferior, 1-seeded. (Shrub.) *Santalaceæ*, 105.

Zanthoxylum. Staminate flowers. Calyx 5-parted. Corolla none. Stamens 3—8. Pistillate flowers. Styles 2—5. Carpels crustaceous, 2-valved, 1—2-seeded. *Zanthoxylaceæ*, 28.

Cannabis. Staminate flowers. Calyx 5-parted. Stamens 5. Fertile flowers. Perianth oblong, acuminate, convolute; the base ventricose, including the ovary. Stigmas 2, long, subulate. Nut 2-valved. (Hemp.) *Urticaceæ*, 109.

Acnida. Sterile florets, with the perianth 5-parted. Stamens 5. Fertile florets, with the perianth 3-parted. Stigmas 3—5, sessile. Fruit 1-seeded. *Chenopodiaceæ*, 100.

Humulus. Sterile florets, with the perianth 5-parted. Anthers with 2 pores. Fertile florets in aments, with large scales. Perianth none. *Urticaceæ*, 109.

Irisine. Sterile florets, with a double perianth, exterior ones 2—3-leaved; the interior 5-leaved, petaloid. Fertile florets, with the inner perianth surrounded by long hair. Capsule ovate, 1-celled, 1-seeded. *Amaranthaceæ*, 99.

Negundo. Calyx minute, unequally 4—5-toothed. Petals none. Anthers 4—5, linear, sessile. (Ash-leaved Maple.) *Aceraceæ*, 38.

Darbya. Perianth simple, turbinate, 4—5-cleft to the middle. Lobes ovate, spreading. Stamens 4—5, arising from the disk, opposite the lobes of the perianth. (Small shrub.) *Santalaceæ*, 105.

Order VI.—HEXANDRIA.

Smilax. Perianth campanulate, spreading, 6-parted, petaloid; 3 styles. Fruit baccate, globose, 3-celled. (Mostly twining plants.) *Smilaceæ*, 119.

Dioscorea. Perianth superior, 6-cleft. Ovary 3-celled, 1—2 ovules in each cell. Fruit a thin compressed capsule. (Twining plants.) *Dioscoreaceæ*, 118.

Gleditschia. Calyx consisting of 3—8 sepals, united at the base. Petals equal in number to the sepals. Legume large, compressed. (Trees.) *Leguminosæ*, 43.

ORDER VIII.—OCTANDRIA.

Populus. Ament cylindrical. Scales lacerate. Perianth turbinate. Capsule superior, 2-celled, 2-valved, many-seeded. Seeds comose. *Amentaceæ*, 115.

Diospyros. Calyx 4—6-cleft, persistent. Corolla urceolate, regular, 4—6-cleft. Fruit fleshy, globular, 8—12-seeded. (Persimmon.) *Ebenaceæ*, 74.

ORDER IX.—ENNEANDRIA.

Hydrocharis. Sepals 3, oval, membranaceous. Petals 3, narrower than the sepals. Spathe 2-leaved. Capsule 5-celled, many-seeded. *Hydrocharidaceæ*, 121.

ORDER XII.—POLYANDRIA.

Menispermum. Sepals 4—8, in a double series. Petals 4—8, or none. Fruit a drupe, solitary. Nut woody, globose, reniform. *Menispermaceæ*, 5.

ORDER XV.—MONADELPHIA.

Juniperus. Sterile florets, in an ovate ament. Calyx a scale, peltate. Fertile flowers are in a globose ament. Scales 3, concave. Fruit a berry; 3 long 1-seeded nuts. (Cedar.) *Coniferæ*, 117.

DICHOTOMOUS ANALYSIS.

ANY term that the student may not understand, he will find it explained by turning to the Index at the end of the volume, or he will find a number referring to the paragraph in the First Part, where it is explained.

1. Plants having distinct bark and pith, reticulately-veined leaves. Floral organs, usually 4—5 in a whorl 2
   Plants with no distinct bark and pith, parallel-veined leaves. Floral organs, usually 3—6 in a whorl 188

DICOTYLEDONOUS PLANTS.

2. Flowers having calyx and corolla 3
   Flowers having no corolla 91

Dichlamydeæ.

3. Petals distinct 4
   Petals united, forming a tube 143

Polypetalæ.

4. Stamens numerous, generally more than 20 5
   Stamens few, less than 20 25

5. Ovary inferior 6
   Ovary superior 10

6. Leaves with stipules ..... Sub-order *Pomeæ*—Order *Rosaceæ*, 44
   Leaves without stipules 7

7. Aquatic plants ..... *Nymphæaceæ*, 9
   Not aquatic plants 8

8. Shrubs or vines ..... *Styraceæ*, 73. *Saxifragaceæ*, 59
   Herbaceous plants 9

9. Fleshy plants ..... *Cactaceæ*, 56
   Not fleshy plants ..... *Loasaceæ*, 51

10. Leaves with stipules 11
    Leaves without stipules 18

11. Carpels more or less distinct or solitary 12
    Carpels united 13

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    Stamens perigynous ..... *Rosaceæ*, 44

13. Flowers monœcious ..... *Euphorbiaceæ*, 108
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14. Herbaceous plants 15
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15. Stamens Monadelphous ..... *Malvaceæ*, 33
    Stamens not Monadelphous 16

16. Sepals 2 ..... *Portulacaceæ*, 22
    Sepals more than 2 ..... *Cistaceæ*, 18

17. A small shrub, with 1—2 ovules ..... *Rosaceæ*, 44
    A tree, or with more than 2 ovules ..... *Tiliaceæ*, 34

18. Carpels more or less distinct or solitary 19
    Carpels united 23

19. Stamens perigynous ..... *Rosaceæ*, 44
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21 Leaves peltate 22
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27. Leaves opposite ..... *Rhizophoraceæ*, 48
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28. Fruit 3-celled, or drupaceous ..... *Rhamnaceæ*, 42
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29. Placentæ parietal 30
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30. Flowers monœcious ..... *Loranthaceæ*, 64. *Cucurbitaceæ*, 54
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33. Calyx 5-cleft, or 5-leaved 34
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34. Leaves compound ..... *Araliaceæ*, 62
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35. Stamens opposite the petals ..... *Rhamnaceæ*, 42
Stamens alternate with the petals ..... *Saxifragaceæ*, 59

36. Stems herbaceous 37
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38. Leaves with stipules 39
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95. Flowers having only stamens or pistils 96
Flowers having both stamens and pistils 99

96. Flowers in aments or catkins 97
Flowers not in aments 98

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DESCRIPTIVE BOTANY.

DICOTYLED'ONÆ.

TRUNK consisting of bark, wood, and pith distinct, more or less conical, increasing by an annual deposit of new wood and cortical substance between the wood and bark. *Leaves* attached to the stem by articulation; their veins, and those of the floral envelopes, reticulated. *Embryo* with two or more opposite cotyledons.

(The student will readily distinguish the plants of this class by the reticulated veins of the leaves, sepals, and petals; by the presence of bark and pith. It includes all our shrubs and forest trees.)

POLYPET'ALÆ.

Flowers generally consist of calyx and corolla; *calyx* consisting of several distinct sepals. *Petals* several, distinct, hypogynous, rarely united, sometimes wanting.

ORDER I.—RANUNCULA'CEÆ. (*Crow-foot Family.*)

Sepals 3—15, usually 5, mostly deciduous. Æstivation imbricate (except Clematis, which is valvate). *Petals* 3—15 or none. *Anthers* adnate. *Carpels* numerous, distinct, or united into a single pistil. *Seeds* anatropous, erect, or pendulous. *Embryo* minute. *Albumen* large, corneous, or fleshy. *Plants* generally with acrid, transparent juice.

ANALYSIS.

1. Vines ..... *Clematis*, 1
   Not vines 2
2. Fruit achenia 3
   Fruit a capsule, pod, or berry 9
3. Petals none. Perianth petal-like 4
   Petals present 6
4. Involucre separate from the flower, leaf-like 5
   Involucre calyx-like 7
5. Achenia ribbed, grooved, or inflated ..... *Thalictrum*, 15
   Achenia not ribbed or inflated ..... *Anemone*, 2

6. Leaves palmately lobed ..... *Trautvetteria*, 14
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7. Leaves tripinnate ..... *Adonis*, 4
Leaves 3-lobed ..... *Hepatica*, 3
Leaves simple, dissected, lobed 8

8. Achenia in an elongated spike ..... *Myosurus*, 6
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10. Sepals 3, petaloid ..... *Hydrastis*, 17
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11. Flowers yellow. Leaves simple ..... *Caltha*, 7
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12. Stem woody ..... *Zanthorhiza*, 16
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15. Petals 5, spurred, tubular ..... *Aquilegia*, 9
Petals 4, of two forms ..... *Delphinium*, 10
Petals 2, concealed under the hood of the sepal ..... *Aconitum*, 11

Genus I.—CLEM'ATIS. L. 12—12. (*Virgin's Bower.*)

(From the Greek *klema*, a shoot or tendril, in allusion to the climbing habit of the genus.)

Sepals and *Petals* confounded. *Perianth* 4—10-leaved, colored. *Anthers* linear, extrorse. *Fruit* an achenium, usually with long plumose tails.

a. Flowers paniculate. Leaves ternately or biternately divided.

1. C. Virginia'na, (L.) Climbing, covering small trees and bushes with its foliage. *Stem* terete, pubescent when young. *Leaves* ternate, leaflets cordate-ovate, acute, coarsely toothed, or lobed; veins and margins pubescent. *Flowers* panicled, dicœcious. *Sepals* 4, oval, pubescent, fragrant. *Carpels* with long plumose tails.—White. ♄. Aug. Can. to Flor. Fertile soil.

2. C. Catesbya'na, (Pursh.) *Stem* climbing, pubescent, similar to the preceding species. *Leaves* ternate; leaflets subcordate, 3-lobed, lobes entire, acuminate. *Panicle* divaricate, dichotomous. *Flowers* small, the pistillate florets bearing abortive stamens. *Sepals* 4, oblong, downy on the outer surface.—White. ♄. July to Aug. So. Ca. and Geo.

3. C. holoser'icea, (Pursh.) Climbing, the whole plant silky. *Flowers* dicœcious in paniculate corymbs, trichotomous, few-flowered. *Leaves* ternate, pubescent on both sides; leaflets oblong-lanceolate, entire. *Sepals* linear. Tails of the carpels long, feathered.—White. ♄. July to Aug. Geo.

b. Peduncles solitary, 1-flowered. Leaves pinnately divided.

4. C. cylin'drica, (Pursh.) Climbing, pubescent. *Leaves* pinnate, membranaceous, decompound; leaflets ovate, acute at each end, glabrous, petiolate. *Peduncles* 1-flowered, terminal, solitary. *Flowers* cylindrical, nodding. *Sepals* coriaceous, acuminate, margin undulate. Tails of the seed plumose.

5. C. Walte'ri differs from the preceding in having the leaflets linear lanceolate.—Bluish purple. ♄. July. Car. and Geo.

6. C. linearilo'ba, (D. C.) *Stem* terete, slender, glabrous. *Leaves* pinnate, 3—4 pair, smooth; leaflets entire or 3-parted; lobes linear. *Peduncles* 1-flowered, terminal, solitary. *Sepals* acute, pubescent along the margins, twice as long as the stamens.—Perhaps the above is a variety of Cylindrica.

7. C. vior'na, (L.) *Stem* climbing. *Leaves* glabrous, pinnately divided; segments oval, lanceolate, entire or 3-lobed. Floral leaves entire. *Peduncles* 1-flowered, occasionally 2 or 3-flowered. *Sepals* coriaceous, about one inch long, with the apices reflected. *Flowers* nodding.—Purple. ♄. Penn. to Geo.

8. C. reticula'ta, (Walt.) Climbing. *Leaves* coriaceous, glabrous, pinnate; leaflets 3 or 4 pairs, petiolate, entire or variously lobed, sometimes obtuse, at other times acute and mucronate, strongly veined on both sides. *Sepals* connivent. *Carpels* with plumose tails.—Dull purple. ♄. Middle Car. and Geo. May to Aug.

9. C. cris'pa, (L.) *Stem* climbing, pubescent. *Leaves* pinnate, ternate, or 3-lobed, generally glabrous. *Flowers* solitary, on the summit of small branches, campanulate. *Sepals* coriaceous, rugose, the apex reflexed, margin crisped. *Stamens* very numerous, half the length of the sepals. *Carpels* numerous, tomentose, with short tails.—Purple. ♄. Low country. May.

c. Herbaceous plants, erect.

10. C. ochroleu'ca, (L.) *Stem* erect, simple, pubescent. *Leaves* simple, ovate, entire; when young, pubescent, on short petioles. *Flowers* solitary, terminal, pedunculate, inclined. *Sepals* silky on the outside.—Yellowish. 2♃. Mountains. 12 in.

11. C. ova'ta, (Pursh.) *Stem* erect, simple. *Leaves* broad, ovate, glabrous, on short petioles; lower ones subcordate. *Flowers* terminal, solitary. Tails of the seed very long.—Purple. 2♃. Mountains.

12. C. Baldwin'ii, (T. & G.) *Stem* erect, somewhat branching, slender, slightly pubescent. *Leaves* varying from oblong to linear-lanceolate, entire, or 3-cleft, or lobed, the lobes linear. *Peduncle* terminal, elongated, 1-flowered. *Flowers* cylindrical, campanulate. *Sepals* woolly on the margin. *Carpels* with very long plumose tails.—Purplish. 12 to 18 in. Florida.

The above genus contains no plants used for any other purpose than ornament. Some of them secrete an exceedingly acrid juice, which produces blisters; and the C. erecta and flammula are used, it is said, by the beggars on the continent of Europe for the production of ulcers, to excite the compassion of the public.

Genus II.—ANEMO'NE. L. 12—12. (*Wind-flower.*)

(From the Greek *anemos*, wind, from the supposition that the flowers open only when the wind blows.)

Involucre 3-leaved, variously divided, remote from the flower. *Perianth* 5—15-leaved. *Carpels* numerous, mucronate. *Herbs* perennial, with radical leaves.

1. A. Carolinia'na, (Walt.) Scape 6—18 inches high, pubescent, particularly towards the summit. *Leaves* ternate; leaflets notched and

serrated. *Involucre* 3-leaved near the middle of the scape; leaflets 3-cleft, sessile. *Sepals* 16—20; the exterior oblong, oval, thick, and sprinkled with purple specks; the inner thin, petal-like, and sometimes almost linear. *Carpels* in an oblong cylindrical head, covered with a silky down.—White. ♄. March. Geo. and Car.

2. A. NEMORO'SA, (L.) *Stem* 6—12 inches high. *Leaves* ternate; leaflets lobed, toothed, acute, 1-flowered. *Corolla* 5 or 6-petaled. *Seeds* ovate, with a short, hooked point. 6—17 in.—White, tinged with purple. March. Geo. and Car. *Wood Anemone.*

3. A. VIRGINIA NA, (L.) *Stem* 2—3 feet high, simple, pubescent. *Leaves* ternate, rugose, hairy. *Segments* 3-cleft, acuminate, serrate. *Involucre* similar, petiolate. *Sepals* 5, pubescent on the outer surface, coriaceous; the 2 exterior green, lanceolate, acute; the interior elliptical. *Carpels* in an oblong ovate capitulum, woolly. *Peduncles* 1-flowered, 3—4 from each involucrum.—Yellowish green. ♄. Car. and Geo. July to August. 18 inches. *Wind-flower. Thimble-weed.*

Many beautiful foreign species of this genus are cultivated, which are very showy, varying in color through the series from blue to red; but of our own species no care has been taken for their improvement by cultivation, which would richly repay the florist's care.

GENUS III.—HEPAT'ICA. Dill. 12—12. (*Liver-leaf.*)

(From the Greek *hepar*, the liver, from the shape of the leaves.)

Involucrum 3-leaved, resembling a calyx near the flower. *Leaves* of the perianth 6—9, arranged in 2 or 3 rows. *Achenia* numerous, without tails.

1. H. TRI'LOBA, (Chaix.) *Leaves* cordate, 3-lobed, entire, thick, coriaceous. *Scape*, petioles, and involucrum villous.—Rose-colored. ♄. Common. Feb. 5 in. *Liverwort.*

This plant has enjoyed great celebrity, both in this country and Europe. It has been deemed almost a specific in hepatic or liver affections, and, not many years since, was highly extolled as a certain cure for chronic coughs. It is a mild tonic and astringent, and may be taken in any quantities by infusion in water.

GENUS IV.—ADO'NIS. L. 12—12. (*Pheasant's Eye.*)

Sepals 5. *Petals* 5—15, emarginate, concave, connivent. *Achenia* spicate, terminated by the short style. *Leaves* cauline, tripinnate, segments linear and numerous. *Flowers* solitary, on the extremity of the stem or branches.

1. A. AUTUMNA'LIS, (L.) *Stem* branched, herbaceous. *Carpels* somewhat reticulate, collected into an ovate head.—Bright scarlet. ☺. Aug. Car. and Lou.

A beautiful plant of easy culture. Derives its name from the supposition that it sprung from the blood of Adonis, when wounded by a boar.

GENUS V.—RANUN'CULUS. L. 12—12. (*Crowfoot. Buttercup.*)

(From the Latin *rana*, a frog, the plants growing in wet places where frogs abound.)

Sepals 5. *Petals* 5 or none, with a scale on the inside of the base of the petals. *Stamens* generally numerous. *Ache-*

nia numerous, ovate, pointed, compressed, smooth, striated, or tuberculated, arranged in a cylindric or globose head.

1. R. AQUAT'ILIS, (L.) *Stem* floating, long, slender, jointed. *Leaves* submersed, capillary, alternate, petioled. *Calyx* glabrous. *Petals* white; claw yellow, with a conspicuous pore. *Achenia* transversely wrinkled.—♄. June to Aug. Ponds and streams. Car. and Geo.

a. Leaves undivided, flowers yellow, carpels smooth.

2. R. LAXICAU'LIS, (T. & G.) *Stem* weak, much branched, declined, rooting at the lower joints, glabrous. *Leaves* smooth, linear-lanceolate, or elliptical, oblong; upper ones linear. *Peduncles* opposite the leaves, 1—2 inches long. *Carpels* with a subulate beak in a globular head. *Petals* much longer than the calyx, slender at the base.—♄. Ditches Car. and Geo. July.

3. R. PUSIL'LUS, (Poir.) *Stem* decumbent, little branched, glabrous. *Leaves* on long petioles, entire or denticulate, obtuse; lower ones ovate or subcordate; upper ones linear-lanceolate. *Peduncles* opposite the leaves, 1-flowered. *Sepals* ovate, obtuse. *Flowers* small. *Petals* small, nearly round. *Pore* at the base of the limb of the petal. *Stamens* few. *Styles* none. *Achenia* ovate.—Yellow. ♄. Very common in wet soils. March.

b. Leaves divided.

4. R. ABORTI'VUS, (L.) *Stem* glabrous, simple, or branching. Radical leaves on petioles, cordate, reniform, or broadly ovate; sometimes 3-parted, crenate; cauline ones 3—5-parted, with long, entire, linear lobes. *Sepals* glabrous, reflexed, longer than the petals. *Flowers* small, scale large. *Carpels* in a globose head.—♄. Common in the middle regions of Geo. and Car. May.

5. R. SCELERA'TUS, (L.) *Root* fibrous. *Stem* 1—2 feet high, fistulous, thick, leafy. *Leaves* on petioles, lower ones with petioles 4 or 5 inches long, sheathing, 3-parted, radical ones with the divisions 3-lobed and obtusely incised, upper ones with oblong linear entire lobes. *Sepals* reflexed, colored. *Flowers* small, solitary, generally opposite the leaves; petals longer than the sepals, shining. *Stamens* 12—15, shorter than the petals. *Carpels* small, numerous, in a cylindrical head.—♄. Common in the low country. May.

6. R. PUR'SHII, (Richards.) Submerged leaves filiformly 2 or 3-chotimously dissected, with segments flat; emersed ones reniform, 3—5-parted, the lobes variously divided. *Petals* twice as large as the reflexed sepals. *Carpels* in globose heads, smooth, with a short and straight ensiform style.—In ponds and muddy places. N. Car. and Lou. Torrey & Gray.

7. R. RE'PENS, (L.) *Stems* prostrate and creeping, sometimes erect. *Leaves* trifoliate, segments cuneate, 3-lobed, incisely toothed, middle one petioled. *Calyx* spreading. *Carpels* with a straight point. This plant is very variable: sometimes villous, at others glabrous. *Flowers* vary in size, and number of petals from 5—8. The R. Nitidus of Elliott, we believe, is only a variety of this, as we have seen it assuming all the peculiarities of that plant, with good reason to believe it was the one described.—In wet grounds, very common in Middle Geo.

8. R. PALMA'TUS. CAROLINIA'NUS. *Stem* erect, 12—18 inches high, hairy, hair above appressed, below spreading; branches long, 1-flowered

Leaves all petioled, radical ones palmately 3-parted, lobes toothed, the upper 3-cleft, with the lobes nearly entire, linear-lanceolate. *Flowers* opposite the leaves, on long slender peduncles. *Carpels* compressed, margined, with beak broad, nearly straight.—May. Swamps. Car. and Geo.

9. R. HIS'PIDUS, (Mich.) *Stem* erect, branching, 12—18 inches high. *Leaves* 3-cleft or 3-parted, segments oval, acute, toothed. *Petioles* covered with dense expanding hair. Radical leaves, with segments generally separate, hairy. *Flowers* generally on long peduncles, covered with appressed hair. *Petals* much larger than the calyx, obovate. *Carpels* with a short straight point.—Rich, shaded soil. May—June.

10. R. RECURVA'TUS, (Poir.) *Stem* erect, 12—18 inches high, clothed with spreading hairs. *Leaves* 3-parted, but not to the base, villous, sometimes nearly glabrous, hair appressed, segments broad, ovate, acutely serrate, lateral ones 2-lobed. *Flowers* small, on short peduncles, calyx reflexed, petals narrow-oblong, smaller than the sepals. *Carpels* in a globose head, with a hooked point. Woods. July.

11. R. PENNSYLVA'NICUS, (L.) *Stem* erect, strong, branching, 1—2 feet high, hispid, with stiff spreading hairs. *Leaves* ternate, villous, hairs appressed, petioles covered like the stem, lower ones on long petioles, leaflets petiolate, lanceolate, incised. *Flowers* small, calyx reflexed, sepals much larger than the petals. *Carpels* compressed in an ovate head, smooth, with a sharp point.—July. In the upper districts of Geo. and Car.

12. R. TOMENTO'SUS, (Poir.) *Stem* short, ascending at the summit, covered with dense soft expanding hair, 1 or 2-flowered. *Leaves* 3-parted, segments 3-lobed, ovate, dentate, tomentose, hair appressed, upper leaves sessile, ovate, entire. *Petals* obovate. *Sepals* villous, nearly as large as the petals.—Upper districts of Car. and Geo.

c. Carpels tubercled or prickly.

13. R. MURICA'TUS, (L.) *Stem* erect or procumbent, 12—18 inches high, branching, succulent, pilose. *Leaves* glabrous, petioled, sometimes entire, sometimes 3-cleft even to the base, lobes toothed, floral ones oblong or lanceolate, entire, lower ones slightly cordate, shining, toothed. *Peduncles* opposite the leaves, about 1 inch long. *Petals* obovate, longer than the calyx. *Sepals* reflected, lanceolate. *Carpels* with a thick margin, tuberculate, aculeate, with a straight or slightly hooked beak.—☺. In cultivated land. March—May.

14. R. PARVIFLO'RUS, (L.) *Stem* erect or slightly decumbent, 12—15 inches high, slender, villous. *Leaves* orbicular, 3-lobed or ternate, notched, pubescent. *Peduncles* opposite the leaves, short. *Flowers* small. *Petals* 3—5, equal to the sepals. *Sepals* reflexed. *Carpels* with thin margin, tubercled, with a hooked point.—May.

The Ranunculi are distinguished for an exceedingly acrid juice, which is so volatile that drying or infusion in water renders plants, which otherwise act as a powerful epispastics, perfectly inert. Some of these plants have been used for drawing blisters, and for the want of the Spanish flies, may be used with advantage, although, from their powerful action, should be used with care. The R. Sceleratus will produce a blister in an hour and a half.

GENUS VI.—MYOSU'RUS. Dill. 5—12. (*Mouse-tail.*)

(From the Greek *mus*, a mouse, and *oura*, a tail, from the resemblance of the spike to the tail of a mouse.)

Sepals 5, produced downward, at the base, beyond their insertion. *Petals* 5, the claw filiform and tubular. *Stamens* generally numerous, 5—20. *Achenia* triquetrous, spicate, on an elongated torus. *Seeds* suspended.

1. M. MIN'IMUS, (L.) *Scape* 2—4 inches high. *Leaves* 1—2 inches long, very narrow, radical. *Flowers* minute. *Spikes* of carpels terete, tapering.—Pale yellow. ☺. April. Geo. and Lou.

GENUS VII.—CAL'THA. L. 12—12. (*Cowslip. Marsh Marigold.*)

(From the Greek *kalathos*, a goblet.)

Calyx colored. *Sepals* 5—9, resembling petals. *Petals* none. *Stamens* numerous. *Follicles* numerous, compressed, many-seeded. *Seeds* ovate, raphe prominent.

1. C. FICARIOI'DES, (Pursh.) *Stem* erect, 1-flowered, 1-leaved, radical. *Leaves* petioled, cordate-ovate, obtuse, sparingly-toothed, many-nerved. *Sepals* elliptic.—Yellow. ♄. 8—12 in. Swamps.

The Caltha possesses the same acrid properties as the Ranunculus, but by boiling is rendered harmless, and is prepared for food in early spring.

GENUS VIII.—ISOPY'RUM. T. & G. 12—12.

(From the Greek *isos*, equal, and *puros*, wheat; the allusion uncertain.)

Sepals 5, petaloid. *Petals* wanting. *Stamens* 10—40. *Ovaries* 3—20. *Follicles* ovate, or oblong.

1. BITERNA'TUM, (T. & G.) (Enemion biternatum, Raf.) Slender herb, with leaves 2—3-ternately divided, the segments 2—3-lobed. *Flowers* axillary and terminal. *Carpels* 3—6, broadly ovate, divaricate, nerved, 2-seeded.—☺. Kentucky and Florida.

GENUS IX.—AQUILE'GIA. L. 12—5. (*Columbine.*)

(Latin name *aquila*, an eagle.)

Sepals 5, deciduous, colored. *Petals* 5, somewhat bilabiate, each petal being produced into a spur, projecting between the sepals. *Follicles* 5, many-seeded, terminated by a style.

1. A. CANADEN'SIS, (L.) *Stem* 12—18 inches high. *Leaves* on long 3-cleft footstalks, ternate and biternate, leaflets lobed and crenate, glaucous. *Flowers* pendulous, spurs straight, stamens exsert, numerous, disposed in several parcels.—Scarlet, tinged with yellow. ♃. Mountains. May.

Aquilegia affords beautiful ornaments for the flower garden, and as such several species are cultivated.

GENUS X.—DELPHIN'IUM. L. 12—5. (*Larkspur.*)

(From the Greek *delphin*, a dolphin, from a fancied resemblance of some part of the flower.)

Sepals 5, deciduous, irregular, petaloid, the upper one produced downward into a long spur. *Petals* 4, irregular, two upper ones horned, with the horns inclosed in the spur of the calyx. *Capsules* mostly 3, many-seeded. *Flowers* in terminal racemes.

1. D. CONSOL'IDA, (L.) *Stem* erect, divaricately branched, glabrous. *Leaves* petiolate, palmately divided. *Flowers* few, in a loose raceme. *Pedicels* longer than the bracts. *Petals* united into one. *Carpels* smooth or pubescent.—White, blue. Common. Introduced.

2. D. TRICOR'NE, (Mich.) *Root* tuberous. *Stem* 8—12 inches high, glabrous. *Leaves* 5-parted, with the divisions 3—5-cleft. *Petioles* slightly dilated at the base, 2—4 inches, glabrous, lobes linear, acute. *Flowers* in loose terminal racemes, large, 6—12-flowered, hairy on the outside. *Spur* straight, as long as the calyx. *Carpels* 3, ovate.—Blue. ♄. Mountains. May.

3. D. AZU'REUM, (Mich.) *Stem* 3—5 feet high, pubescent. *Leaves* on short petioles, 3—5-parted, many-cleft, segments linear, pubescent. *Flowers* in long racemes, on short peduncles, petals bearded at the apex, shorter than the sepals, lower ones deeply 2-cleft, claw hispid on one side, the other with a spur-like process at its base.—Blue, large. ♄. Middle Geo. May.

4. D. EXALTA'TUM, (Ait.) *Stem* 2—4 feet high, pubescent toward the summit, branching. *Leaves* flat, 3—5-cleft below the middle, lobes wedge-shaped, 3-cleft at the summit, acuminate. Lateral ones often 2-lobed. Racemes erect, petals pubescent on the outer surface, the lower petals fringed. *Spur* straight, as long as the calyx.—Bright blue. ♄. Mountains.

5. D. VIRES'CENS, (Nutt.) *Stem* 8—12 inches high, pubescent. *Leaves* 3—5-parted, the middle division generally entire, lateral lobes 2—3-cleft; lobes lanceolate. petioles slightly dilated. *Flowers* in a loose few-flowered raceme, slightly pubescent. *Sepals* oblong or lanceolate, marked with a spot near the apex, longer than the petal; lower petals deeply 2-cleft, densely bearded, capsules 3.—Flowers large, yellowish or greenish white. ♄. June. Macon.

6. D. VIMIN'EUM, (Don.) *Petioles* scarcely dilated at the base. *Leaves* flat, 3-parted, segments cuneate, obtuse, 3-lobed, mucronate, uppermost ones linear, undivided or 3-parted, racemes loose, velvety, limbs of the inferior petals bifid at the summit, spur straight, as long as the sepal, ovary silky.—Torrey & Gray.—Azure. Texas.

A beautiful genus, with every variety of hue through the blue series, much cultivated as a border flower. The D. consolida has been used in medicine. The flowers are bitter and acrid, and have been used in healing wounds. A tincture of an ounce of seeds in a pint of alcohol is said to be useful in asthma and dropsy; ten drops a dose. The root possesses the same properties.

GENUS XI.—ACONI'TUM. L. 12—5. (*Monk's-hood.*)

(From *Acone*, a town in Bithynia.)

Sepals petaloid, the two lateral ones orbiculate, the two

lower ones oblong, irregular, deciduous, upper one concave, shield-like. *Petals* 5, three lower ones minute, often wanting, the two upper on long claws, concealed under the upper sepal. *Follicles* 3—5, many-seeded. *Stamens* numerous.

1. A. UNCINA'TUM, (L.) *Stem* twining, branching, slender, pubescent when young. *Leaves* 3—5-lobed, coriaceous, coarsely-toothed, truncate at the base. *Lobes* 3-ribbed, lateral segments often 2-lobed. *Flowers* in a loose panicle, galea large, tapering to an obtuse beak, spur thick, inclined.—Blue. 2. Mountains. 2 feet. *Monk's-hood.*

The same powerful, volatile principle noticed under Ranunculus exists in the Aconitum in a state of much greater concentration. Another principle of a narcotic character is found in the different species of this genus, called *Aconitin.* The leaves of the Aconitum act powerfully on the human system, producing, in large doses, the usual effects of the most violent poisons. In small doses of one or two grains of the powdered leaves, it has been employed in rheumatism (in which it has produced most salutary effects), gout, scrofula, cancer, &c. It acts most powerfully on the nervous system, producing delirium in over doses. The A. uncinatum is cultivated as an ornament of the flower garden.

GENUS XII.—ACTÆ'A. L. 12—1. (*Baneberry. Cohosh.*)

(From the Greek *aktè*, the elder, from a resemblance in the leaves.)

Sepals 4—5, deciduous. *Petals* 4—8, spatulate, oblong, shorter than the stamens, or none. *Stamens* numerous, anthers introrse. *Stigma* sessile. *Carpels* baccate, solitary, many-seeded. *Seeds* compressed, smooth.

1. A. AL'BA, (Big.) *Stem* 2—3 feet high. *Leaves* ternately decompound, leaflets acutely serrate, notched, slightly pubescent. Raceme oblong, pedicels very thick when the fruit is matured, flowers crowded. *Fruit* white.—Mountains. April—May. *Necklace weed.*

GENUS XIII.—CIMICIF'UGA. L. 12—5. (*Bugbane.*)

(From the Latin *cimex*, a bug, and *fugo*, to drive away.)

Sepals 4—5. *Petals* 4, sometimes none, concave or unguiculate. *Stamens* numerous. *Anthers* introrse. *Styles* short. *Leaves* 2 or 3-ternately divided. *Segments* incised, toothed. *Flowers* in long racemes.

1. C. RACEMO'SA, (Ell.) *Stem* 3—8 feet high, generally pubescent, furrowed, leafy near the middle. *Leaves* decompound, incised, acutely serrate. *Flowers* monogynous, bracteate, in long terminal racemes, branched. *Sepals* caducous. *Petals* none, or very small, with long claws. *Capsules* ovate, seeds 7 or 8, compressed.—Yellowish white. ♄. Thick woods. Mid. Geo.

2. C. AMERICA'NA, (Mich.) *Stem* 2—4 feet high, glabrous. *Leaves* decompound, triternate, segments ovate, the terminal 3-parted or 3-cleft, incisely lobed, cuneate or subcordate at the base. *Flowers* in racemes, on short bracteate pedicels. *Sepals* 5, ovate. *Ovaries* 2—5, stipitate, smooth, compressed, generally fewer in the upper than in the lower flower.—Mountains. Aug. and Sept.

3. C. CORDIFO'LIA, (Pursh.) Resembles the two preceding. *Leaves* biternate. *Leaflets* 3—5—7-lobed, cordate. *Ovaries* 2—3, glabrous, sessile.—Mountains. July.

The C. racemosa has long been used in medicine; in families as a remedy fo rheumatism, dropsy, hysteria, and affections of the lungs; and by physicians with decided success in cases of chorea, St. Vitus' dance. The decoction of the root is th form in which it is usually administered.

Genus XIV.—TRAUTVETTE'RIA. F. & M. 12—12.

(In honor of Trautvetter, a German botanist.)

Perianth 4—5-leaved, leaves equal, orbiculate. *Stamens* numerous. *Anthers* introrse. *Capsules* 15—20, membranaceous and indehiscent, 3-carinate, 1-seeded, tipped with a very short hooked style, seed erect. Perennial herbs. *Leaves* palmately lobed. *Stem* simple, or branching above. *Inflorescence* cymose.

1. T. Palma'ta, (F. & M.) *Leaves* slightly coriaceous with conspicuous reticulated veins. *Cymes* mostly compound. Torrey & Gray.—Mountains, N. C. July and Aug. 2—3 feet.

Genus XV.—THALIC'TRUM. L. 12—12. (*Meadow-rue.*)

(Supposed to be from the Greek *thallo*, to be green.)

Sepals and *Petals* confounded. *Perianth* 4—5-leaved. *Stamens* numerous, very long. *Anthers* innate. *Carpels* 4—15, without tails, striate. *Flowers* in corymbs or panicles. Often dicœcious or polygamous.

1. T. cornu'ti, (L.) *Stem* slender, erect, glabrous. *Leaves* ternately decompound; leaflets roundish, obovate, or elliptical, 3-lobed or entire, glaucous beneath, slightly rugose on the upper surface, margin revolute when old. (The leaves of this species vary from the common type in almost every respect.) *Panicle* terminal, compound. *Sepals* oblong, small. *Filaments* clavate. *Anthers* oblong, pointed. *Carpels* glabrous. —White. ♄. Can. to Geo. June—August.

2. T. dioi'cum, (L.) *Stem* herbaceous, glabrous. *Leaves* generally triternate on short petioles; leaflets rounded, crenately and obtusely lobed, glaucous beneath. *Flowers* dicœcious. *Filaments* filiform. *Anthers* linear, mucronate. *Carpels* strongly striate, sessile, oblong.
Var. *Stipitatum*. *Carpels* stipitate.—White. ♄. May to July. Mountains.

3. T. anemonoi'des, (Mich.) *Stem* 6—10 inches high, in bunches. *Leaves* radical and cauline; radical ones on long petioles; biternate, cauline ones verticillate, trifoliate, sessile; leaflets roundish, petiolate, obtusely 3—5-lobed. *Sepals* 6—10, elliptical. *Ovaries* 6—10; stigma sessile, simple.—White 4—8 in. Mar. Ap. Mountains. *Rue Anemone.*

4. T. fil'ipes. *Stem* smooth. *Leaves* thin, biternate; leaflets roundish, 3—5-lobed. *Flowers* in a loose corymbose panicle. *Carpels* compressed, striate.—N. Ca. 2 feet.

The Thalictrums are easy of cultivation, and quite ornamental, from their bright green and decompound leaves and delicate flowers. They possess, in a slight degree, the acrid properties characteristic of the order, but are applied to no use except ornament.

GENUS XVI.—ZANTHORHI'ZA. Mar. 5—12. (*Yellow-root.*)

(From the Greek *xanthos*, yellow, and *rhiza*, a root.)

Sepals 5. *Petals* 5, on pedicels. *Stamens* 5—10. *Ovaries* 5—10, with 2—3 ovules. *Follicles* small, mostly 1-seeded, seed suspended.

1. Z. APIIFO'LIA, (L'Her.) A shrub. *Root* large, yellow, and bitter. *Stem* simple, smooth, and glabrous. *Leaves* triternate, crowded at the summit of the stem, leaflets incised, under surface pubescent, petioles 6—8 inches long. *Flowers* in racemes, axillary and compound, minute, often polygynous.—Dark purple. ♄. Ap. Upper districts of Car. and Geo. 2—3 feet.

The root of this plant is exceedingly bitter, and is used as a tonic. It is also used in coloring yellow. It possesses decided properties, and we doubt not might be applied to useful purposes.

GENUS XVII.—HYDRAS'TIS. L. 12—12.

(From the Greek *hudor*, water, in allusion to its habit.)

Leaves of the perianth 3, ovate, petaloid. *Stamens* and ovaries numerous. *Carpels* berry-like, in a globose head; 1, and rarely 2-seeded.

1. H. CANADEN'SIS, (L.) *Root* yellow and bitter. *Stem* simple, 2-leaved. *Leaves* alternate, cordate, palmate, acutely serrate; lower leaf petioled, upper subsessile, glabrous. *Flowers* solitary, terminal.—Rose-color. 2ℓ. Mountains. April—May. 6—8 inches.

Yellow Root. Orange Root. Turmeric Root.

ORDER II.—MAGNOLIA'CEÆ. Juss. (*Magnolia Family.*)

Sepals 3—6, deciduous. *Petals* 3—30, hypogynous, in several rows; æstivation imbricate. *Stamens* numerous, hypogynous; anthers *adnate*, introrse, bursting by a longitudinal slit; filaments short. *Carpels* few in a single row, or numerous in several rows. *Seeds* anatropous, suspended, or ascending. *Embryo* minute; albumen fleshy. *Leaves* alternate, entire, coriaceous, with caducous stipules. *Flowers* generally large, and fragrant. *Trees* and *shrubs.*

GENUS I.—MAGNO'LIA. L. 12—12.

(In honor of Magnol, a French botanist.)

Sepals 3, caducous, sometimes wanting. *Petals* 6—12, caducous. *Carpels* 2-valved, 1-seeded, imbricate in their arrangement, forming an ovate strobile-like fruit. *Seeds* suspended. *Trees.*

1. M. GRANDIFLO'RA, (L.) *Leaves* evergreen, oval, lanceolate, coriaceous, ferruginous underneath, 6—8 inches long, branches somewhat whorled. *Petals* 9—12, obovate, abruptly unguiculate. *Stamens* nu

merous, imbricate. *Style* short, recurved. *Carpels* 1—2-seeded; seeds covered with a scarlet pulp.—White. ♃. June. Geo. to the Miss. A large tree. *Magnolia.*

2 M. GLAU'CA, (L.) *Leaves* deciduous, alternate, acute, oval, glaucous underneath, pubescent when young, the upper surface shining. *Flowers* terminal, solitary, fragrant. *Sepals* membranous, as long as the petals. *Petals* 6—12, obovate, narrowed at the base.—White. ♃. Common in swamps. Small tree. April and May. *Bay.*

3. M. ACUMINA'TA, (L.) *Leaves* deciduous, oval, acuminate, sometimes broad and lanceolate, pubescent beneath. *Petals* obovate, obtuse. *Fruit* cylindrical, 2—3 inches long.—Dull yellow, tinged with blue. ♃. June and July. Geo. 50—60 feet. *Cucumber-tree.*

4. M. TRIPET'ALA, (L.) *Leaves* large, deciduous, cuneate, lanceolate, acute, silky when young, crowded at the extremity of the branches, 15—20 inches long, 6—8 wide. *Sepals* 3, reflexed. *Petals* 9, oval-lanceolate, acute, odor of the flowers disagreeable. *Fruit* oval, red, 3—4 inches long.—White. ♃. May to June. Common. 30—40 feet. *Umbrella-tree.*

5. M. CORDA'TA, (Mich.) *Leaves* deciduous, broad-ovate, subcordate, acute, 4—6 inches long, slightly tomentose underneath. *Sepals* small. *Petals* oblong, acute, 6—9. *Fruit* cylindric, 3—4 inches long. Bark furrowed.—Yellowish, faintly streaked with red. ♃. Mountains. May 45—50 feet.

6. M. AURICULA'TA, (Walt.) *Leaves* deciduous, spatulate-ovate, acute, auriculate at the base, glabrous on both sides, 8—12 inches long. *Sepals* 3, spreading. *Petals* 9, oblong-lanceolate, attenuate at the base, 2—3 inches long.—White, fragrant. ♃. May. Mountains. 34—40 feet.

7. M. MACROPHYL'LA, (Mich.) *Stem* smooth with fragile branches, bark white. *Leaves* deciduous, alternate, very large, 1—3 feet long and 6—8 inches wide, crowded near the summits of the branches. *Flowers* large; petals 4—5 inches long, ovate.—White, tinged with purple, fragrant. ♃. June. Mid. Geo. 20—30 feet.

The individuals of this interesting genus present subjects of much interest among the trees of their native forests. The majestic and noble appearance of the *grandiflora*, the enormous leaves of the *auriculata* and *macrophylla*, and the abundant odor of the *glauca* during its season of flowering, perfuming the atmosphere of the sections of its growth, render the species of this genus conspicuous objects wherever they are found. The *glauca* and *acuminata* have been used in medicine, and an infusion of the bark or fruit in brandy is a popular remedy in rheumatism.

For cultivation, they require moist, rich soil, and much care is required to continue in vigor the growth of the larger-leaved species.

GENUS II.—ILLI'CIUM. L. 12—12.

(From the Latin *illicio*, to allure, in allusion to its pleasant odor.)

Sepals petaloid, 3—6. *Petals* numerous, in three series, interior ones smallest. *Carpels* numerous, arranged in a circle, follicular. *Seeds* shining. *Leaves*, when bruised, exhale the odor of anise. *Evergreen shrubs.*

1. I. PARVIFLO'RUM, (Mich.) *Leaves* smooth, perennial, on short petioles, oblong. *Flowers* small, axillary, nodding; petals 6—12, ovate or roundish, concave. *Stamens* short. *Carpels* arranged around a cen

tral receptacle.—Dull yellow. ♄. May. Flor. and lower districts of Georgia. 6—10 feet. *Anise-tree.*

2. L. FLORIDA'NUM, (Ellis.) *Leaves* acuminate. *Petals* 27—30, the exterior oblong, the interior ligulate. *Flowers* larger than the preceding.—Dark purple. ♄. May. Florida in swamps.

In this country, the Illiciums are used only as ornaments, but they are used in other countries as aromatics, and stimulants, and carminatives. In China they are burnt in the temples. In Europe they are used in giving a peculiar flavor to certain liquors. They are easily propagated by layers.

GENUS III.—LIRIODEN'DRON. L. 12—12. (*Tulip-tree.*)

(From the Greek *lirion*, a tulip, and *dendron*, a tree.)

Sepals 3, concave. *Petals* 6, in 2 series, obovate, lanceolate, campanulate. *Fruit* composed of densely imbricated carpels 1—2 seeded, the apices produced into lanceolate wings.

1. L. TULIPIF'ERA, (L.) *Leaves* 3-lobed, the middle lobe truncate, glabrous.—Greenish yellow, orange within. ♃. May. Common. 50—100 feet. *Whitewood.*

The Liriodendron is one of the largest trees of our forests, sometimes attaining the size of 8—9 feet in diameter, and 120—150 feet in height. It possesses similar properties to the magnolia. It has been used as a substitute for the Peruvian bark, in intermittents. The powdered bark is said to be the most efficient in its operation.

ORDER III.—ANONA'CEÆ. Juss. (*Custard-apple Family.*)

Sepals 3—4. *Petals* 6, coriaceous, with a valvular æstivation, arranged in two rows, hypogynous. *Stamens* indefinite; filaments short, angular; anthers adnate. *Ovaries* numerous, closely packed; styles short, or none; stigma simple. *Fruit* succulent, or dry, composed of carpels separate, or united, 1 or many seeded. *Seeds* anatropous. *Albumen* ruminated. *Embryo* small. *Leaves* alternate, entire. *Flowers* axillary.

GENUS I.—ASI'MINA. Adan. 12—12. (*Uvaria*, L.)

(Named from Asiminier, of the French colonists.)

Sepals 3, sometimes united at the base. *Petals* 6, the three outer ones larger. *Stamens* numerous, inserted on a conical or hemispherical torus. *Carpels* oblong, pulpy within, several-seeded. Trees or shrubs.

1. A. PAVRIFLO'RA, (Dunal.) A small shrub with a few branches near the summit. *Leaves* alternate, obovate, cuneate, mucronate, on short petioles. Branches covered with a brownish pubescence. *Flowers* solitary. *Calyx* deciduous, pubescent. *Petals* 6, the 3 exterior ones twice as large as the calyx, pubescent. *Fruit* 1 inch long, fleshy.—Greenish purple. ♃. May. On the coast of Car. and Geo. 2—3 ft.

2. A. TRIL'OBA, (Dunal.) A small tree, with alternate slender and glabrous branches. *Leaves* glabrous, oblong-ovate, acuminate, alternate, on short petioles. *Flowers* solitary. *Petals* nearly round, much larger

than the calyx. *Fruit* 2—3 inches long, eatable, with 6—8 seeds.—Brownish purple. ♃. April. Middle Geo. 15—20 ft. *Papaw.*

3. A. GRANDIFLO'RA, (Dunal.) *Leaves* cuneate, obtuse, with the under surface and branches covered with a ferruginous pubescence. *Flowers* few, large; the outer petals obovate, 2—3 inches long.—Yellowish white. ♃. April. Middle Car. and Geo. 1—2 feet.

4. A. PYGMÆ'A, (Dunal.) *Leaves* coriaceous, long, 4—6 inches, cuneate, obtuse, oblong, obovate or elliptical, variable in size and form. *Petals* obovate-oblong, outer ones 1 inch long.—Reddish brown. ♃. April. Geo. and Flor. 6—18 inches.

ORDER IV.—SCHIZANDRA'CEÆ. Blum.

Flowers monœcious; staminate flowers 5-sepaled, 5-petaled, anthers sessile; pistillate flowers, ovaries numerous, on a conical torus, which in maturity becomes elongated. *Carpels* baccate, 1-seeded, in maturity forming a loose spike on the elongated torus. *Albumen* fleshy, cotyledons ovate.

GENUS I.—SCHIZAN'DRA. Mich. 19—5.

(From the Greek *schizo*, to cut, and *andros*, a stamen, the stamen being cleft.)

Sepals and *petals* confounded, roundish, concave. *Anthers* connate. Before the *fruit* ripens the carpels are aggregated, as in the Rubus, but as it matures the torus lengthens and the carpels separate, and do not form a mass as in the Rubus, but become detached and scattered.

1. S. COCCIN'EA, (Mich.) A trailing shrub. *Leaves* alternate, variable, ovate or oval, sometimes denticulated, tapering at each end, frequently somewhat cordate. *Flowers* solitary, axillary, on short peduncles, upper ones staminate. *Carpels* small, red; torus red. *Seed* suspended.—Red. ♃. May, June. Rich damp soil. 10—15 feet.

A handsome plant, and easily cultivated.

ORDER V.—MENISPERMA'CEÆ. Jus. (*Moonseed Family.*)

Flowers diœcious, small, in racemes or panicles. *Sepals* and *petals* often confounded, hypogynous, deciduous. *Stamens* monadelphous, or separate, generally equal the petals in number, and opposite them, sometimes three or four times as many. *Anthers* adnate or innate, 4-lobed. *Ovaries* several, distinct. Drupes baccate, 1-seeded, incurved. *Embryo* curved. Climbing shrubs or suffructicose plants. *Leaves* alternate, simple, palmately veined. No stipules.

GENUS I.—COC'CULUS. Bau. 6—6.

(From the Latin *coccus*, cochineal, in allusion to the shape of the fruit.)

Sepals 6, in a double series. *Petals* 6, fleshy, auricled. *Staminate flowers*, stamens 3—6, distinct; filaments thickened

at the summit. *Pistillate flowers*, sometimes with 6 abortive stamens. *Ovaries* 3—6. *Drupes* 1—6.

1. C. Caroli'nus, (D. C.) *Stem* slender, sarmentose, minutely pubescent. *Leaves* variable, cordate or ovate, or nearly orbicular, commonly with several obtuse lobes, mucronate, pubescent underneath, frequently coriaceous when mature. *Petals* with two inflexed auricles at the base of each. *Drupe* compressed, red; nut curved, forming nearly a ring — White. ♄. June. Geo. to Mississippi.

Genus II.—MENISPER'MUM. L. 20—12.

(From the Greek *mene*, the moon, and *sperma*, seed; in allusion to the crescent shape of the seed.)

Flowers dicœcious. *Sepals* 4—8, in a double series. *Petals* 4—8, sometimes none. *Stamens* numerous, distinct; anthers 4-lobed, 2-celled, adnate. *Ovaries* 2—4; drupes usually solitary, nut woody, globose, reniform. Racemes axillary. Staminate and pistillate flowers often dissimilar.

1. M. Canaden'se, (Lin.) *Stem* climbing, slender, herbaceous or suffructicose. *Leaves* with 3—5 lobes, peltate, petiole obtusely angled, inserted near the base. *Flowers* small, sterile ones in paniculate supra-axillary compound racemes. *Sepals* 4—7, larger than the petals, obovate. *Petals* 6—7, orbicular, obtusely cuneate. Drupe black, when mature, curved so that the style is brought near the base; nut compound, forming nearly a ring. Greenish yellow. Common on banks of streams. 8—12 feet. *Moonseed.*

2. M. Lyo'ni, (Pursh.) *Stem* climbing. *Leaves* large, long-petioled, peltate, 3—5-lobed, cordate, lobes acuminate, hirsute on the veins beneath. *Sepals* 6, obovate, oblong, obtuse. *Staminate flowers* with 12 stamens, shorter than the sepals, cells of the anthers linear-oblong, filaments compressed. *Pistillate flowers* with 6 abortive stamens, stigmas sessile, fimbriate. *Drupe* oval, compressed, nut excavated in front, convex on the back. ♃. July. Near New Orleans.

Order VI.—BERBERIDA'CEÆ. Vent.

Sepals in two rows, 3—4—6, deciduous, often surrounded by petaloid scales. *Petals* hypogynous, equal or double the number of sepals, and opposite them, generally with an appendage at the base. *Stamens* equal or double the number of petals, and opposite them. *Ovarium* solitary, 1-celled, style lateral, stigma orbicular. *Fruit* baccate or capsular. *Seeds* 1—2—3, attached to the bottom of the cell, or numerous, attached to the ventral suture.

ANALYSIS.

1. Sepals 3 2
   Sepals more than 3 3
2. Flowers solitary ..... *Podophyllum.* 5
   Flowers in a terminal cyme ..... *Diphyllia.* 8
3. Sepals 6 4
   Sepals 4—5 5

4. A shrub.....*Berberis.* 1
An herbaceous plant.....*Leontice.* 2
5. Stamens 4.....*Croomia.* 6
Stamens 8.....*Jeffersonia.* 4

Genus I.—BER'BERIS. L. 6—1. *Barberry.*

(From *berberis*, the Arabian name of the fruit.)

Sepals 6, generally bracteolate. *Petals* 6, with 2 glands at the base of each. *Stamens* 6, irritable, flying up on being touched at the base. *Stigma* sessile, orbicular, depressed. *Fruit* a berry, 1-celled, 1—9-seeded, seeds erect.

1. B. Canaden'sis, (Pursh.) *Branches* thickly dotted, numerous, angular, when young, yellow, glabrous. *Leaves* simple, obovate, with remote spine-like serratures, obtuse, mucronate, cuneate at the base, glabrous, by pairs on young shoots, clustered on the summits of the last year's buds. *Flowers* in racemes, 6—8-flowered. *Sepals* ovate, acute. *Petals* ovate, emarginate, with 2 purple glands. *Berry* oval, red, acid. Yellow. ♃. April. Mountains. 1—3 feet.

The Barberry of the gardens (which is the European variety) differs in some respects from the B. Canadensis above described. The berries are larger and more juicy. It is cultivated for the berries and bark; the former are sour, and are used for their grateful acid flavor. They are used in preparing drinks in febrile diseases, and are said to be antiscorbutic. The bark is used in medicine for jaundice, and in the arts for dyeing yellow. The coloring matter is a crystallizable substance called *berberin.*

Genus II.—LÉON'TICE. L. 6—1. *Cohosh.*

(Abridged from *Leontopetalon*, which is derived from *leon*, a lion, and *petalon*, a leaf, because the leaf of the L. leontopetalon is said to bear some resemblance to a lion's foot.)

Sepals 6, colored. *Petals* 6, opposite the calyx, bearing a reniform scale within. *Stamens* 6, opposite the petals. *Carpel* stipitate, 2—4-seeded; seeds erect, globose.

1. L. thalictroi'des, (Linn.) *Stem* simple, glabrous. *Leaves* 3-ternate, leaflets ovate, oblique at the base, terminal one broadest, petiolate, radical ones with long petioles, cauline ones sessile, lower 3-ternate, upper smaller, and 2-ternate. *Leaflets* incisely lobed. *Flowers* small, in panicles. *Seeds* oval, dark blue, stiped.—Greenish yellow. ♄. April. Upper districts of Car. and Geo. 12—14 in. *Pappoose Root.*

Genus III.—DIPHYLLE'IA. Mich. 6—1.

(From the Greek *dis*, double, and *phullon*, leaf.)

Sepals 3, deciduous. *Petals* 6, without glands. *Stamens* 6, opposite the petals; anthers oblong, 2-celled. *Ovary* ovate, eccentric; stigma subsessile, peltate. *Fruit* baccate, 1-celled, 2—3-seeded; seeds reddish.

1. D. cymo'sa, (Mich.) *Root* perennial, thick. *Stem* herbaceous, erect. *Leaves* alternate, usually 2 on each stem, peltate, deeply 2-lobed, lobes angled, each division 7—9-lobed, serrate. *Flowers* in a terminal cyme. *Petals* oval. *Style* short.—White. ♃. June. Mountains. 1—2 feet.

GENUS IV.—JEFFERSO'NIA. Bart. 8—1. (*Twin-leaf.*)

(In honor of Thos. Jefferson.)

Sepals 4—5, fugacious. *Petals* 8, linear, oblong. *Stamens* 8; anthers linear. *Ovary* obovate; stigma peltate. *Capsule* 1-celled, opening by a slit near the summit. *Seeds* arranged on a broad lateral placenta, in several rows. *Rhizoma* horizontal, throwing up a 1-flowered scape.

1. J. DIPHYL'LA, (Pers.) *Leaves* in pairs, glaucous beneath. *Stigma* with an undulate margin. *Pericarp* coriaceous.—White. 2f. May. Mountains.

There are two varieties of this species; *a*, leaves obscurely sinuate or nearly entire, *b*, leaflets incisely 5—7-lobed.

GENUS V.—PODOPHYL'LUM. L. 12—1. (*Mandrake, May Apple.*)

(From the Greek *podos*, a foot, and *phullon*, a leaf.)

Sepals 3, caducous. *Petals* obovate, 6—9. *Stamens* 16—18; anthers linear. *Stigma* large, sessile. *Capsule* indehiscent, fleshy. *Seeds* numerous, on a lateral placenta.

1. P. PELTA'TUM, (L.) *Rhizoma* horizontal; stem simple, terminated by 2 leaves and 1 flower. *Leaves* peltate, 5—7-parted; lobes toothed or cleft at the apex. *Flowers* arising from between the leaves, large, nodding.—White. 2f. May. Common. 12—15 inches.

The root of the Podophyllum is an important medicine. It is among the most powerful cathartics, and is said to resemble Jalap in its operations, and has been used as a substitute for that article in connection with calomel. In bilious complaints it is said to act very favorably. In minute doses, it produces relief from distressing coughs in consumption and catarrh. Full dose, 20 grains of powdered root.

GENUS VI.—CROOMIA. T. & G. 4—1.

(In honor of the late H. B. Croom of Florida.)

Sepals 4, broadly oval. *Petals* none. *Stamens* 4, opposite the sepals. *Ovary* globose-ovate, with 4—6 suspended ovules. *Fruit* ovate, compressed. *Seeds* 1—2. *Peduncles* axillary, 2—3-flowered; flowers small.

C. PAUCIFLO'RA, (T. & G.) An herbaceous plant, throwing up several simple stems, sheathed at the base. *Leaves* oblong-ovate, cordate at the base, entire, 5—9-ribbed, crowded at the summit of the stem. (*Cisampelos pauciflora*, Nutt. *Anonymous discoroides*, Croom.) —2f. Greenish white and purplish. Middle Flor. 8—12 inches.

ORDER VII.—CABOMBA'CEÆ. Rich. (*Water-shield Family.*)

Sepals 2—4, petaloid. *Petals* 2—4, alternate with the sepals. *Stamens* 6—18—36, hypogynous; anthers innate. *Ovaries* 2—18. *Carpel* 1—2-seeded, terminated by the permanent style. *Seeds* orthotropous, globular, pendulous. *Embryo* minute; albumen fleshy, with the embryo at its base. *Plants*

growing in the water, with floating, peltate leaves, the submersed leaves with filiform lobes.

GENUS I.—CABOM'BA. Aub. 6—2. (*Nectris*, Pursh.)

Sepals 3, petaloid. *Petals* 3. *Stamens* 6, as long as the calyx. *Carpels* numerous, 1—3-seeded, somewhat fleshy. *Leaves* opposite.

1. C. CAROLINIA'NA, (Gray.) *Stem* branching. *Leaves* floating and submersed, the floating ones elliptical or oblong, about an inch long, submersed ones filiformly dissected. *Petals* oval, obtuse, with two yellow spots at the base. Sometimes only two sepals and 2 petals.—White. 2. May. From N. Car. to Lou.

GENUS II.—BRASE'NIA. Schr. 12—12. (*Hydropeltis*, Mich.)

Sepals 3—4, persistent, petaloid. *Petals* 3—4, longer than the sepals. *Stamens* numerous. *Carpels* numerous, somewhat oblong, 1—2-seeded. All the submersed parts of the plant covered with a transparent, gelatinous substance.

1. B. PELTA'TA, (Pursh.) *Stem* long, slender, of a purplish color, no part of the plant being green but the upper surface of the leaves. *Leaves* alternate, the floating ones peltate, entire, elliptical. *Peduncles* 1-flowered, solitary. Grows in still water.—Brownish purple. 2. July. Canada to Geo. 1—10 feet. *Water-shield.*

ORDER VIII.—NELUMBIA'CEÆ. L. 12—12.

Sepals 4—6, petaloid. *Petals* numerous from the outside of the disk. *Stamens* numerous, in several rows; filaments petaloid; anthers introrse. *Disk* remarkably developed, with the ovaries lodged in separate cavities in its substance. *Fruit* a nut, crowned with the persistent style. *Seed* orthotropous, without albumen. *Embryo* very large, with two fleshy cotyledons. Herbaceous plants growing in deep water.

GENUS I.—NELUM'BIUM. Juss. 12—12. (*Sacred Bean.*)

(The name of an East Indian species.)

1. N. LU'TEUM, (Wild.) *Peduncles* arising from a rhizoma. *Leaves* large, 1—2 feet in diameter, peltate, orbicular. *Flowers* large.—Pale yellow. 2. N. Y. to Lou. June. *Water chinquepin.*

This is one of the most splendid aquatic plants of North America. It yields a milky juice when wounded. The root bears tubers, which are very farinaceous, and are used as food by the Indians. The flowers are the largest of any North American plant except the *Magnolia macrophylla.* (Nuttall.)

ORDER IX.—NYMPHÆA'CEÆ. Sal. (*Water-lily Family.*)

Sepals persistent, 4—5—6. *Petals* numerous, imbricate. *Stamens* numerous in several rows, some of the filaments peta-

loid. *Anthers* adnate, introrse. *Fruit* many-celled, fleshy, many-seeded. *Seeds* anatropous, containing farinaceous albumen. *Embryo* minute. Aquatic plants, herbaceous.

Genus I.—NYMPHÆ'A. Tourn. 12—1.

(From the Greek *numphe*, a nymph.

Sepals 4, persistent. *Petals* and *Stamens* numerous and passing into each other.

1. N. odora'ta, (Ait.) *Rhizoma* very large. *Leaves* floating, nearly orbicular or cordate, strongly veined beneath. *Stigma* sessile, with numerous rays, incurved. The leaves of this plant vary considerably in form, giving rise to several varieties—the lobes of some being much more acute than those of others; and in one variety, called the *N. rosea*, the leaves are smaller and flowers rose-color.—White. ♃. June. Common in ponds. *White Pond-lily.*

We have met with a variety of this plant, having round leaves, smaller flowers, and perfectly inodorous.—Black Lake, near Macon.

A beautiful plant, distinguished by the delicious odor of its large white flowers. The genus is more properly the indigenous production of the East Indies—several species growing there, and but one on the continent of North America. The plant has been sometimes employed in medicine, but we believe has pretty much passed from use. The Egyptian Lotus is a species of this genus,—the N. lotus, which is said to resemble our species.

Genus II.—NUPHAR'. Smith. 12—1.

(The Arabic name for Pond-lily.)

Sepals 5—6. *Petals* numerous, small, externally nectariferous, inserted with the stamens into the base of the torus. *Fruit* fleshy, many-celled, many-seeded.

1. N. adve'na, (Ait.) *Leaves* semi-orbicularly cordate, lobes diverging; petioles long, solitary. *Flowers* large, emerging. *Petals* and filaments nearly confounded. Cells of the fruit equal in number to the rays, and when perfectly matured, separate spontaneously.—Yellow. ♃. July. Canada to Florida, in deep water. *Yellow Pond-lily.*

2. N. sagittifo'lia, (Pursh.) *Leaves* on long sub-spiral petioles, membranaceous, nearly a foot long, sagittate, obtuse. *Petals* none; the inner sepals petaloid, the outer green.—♃. Ju. N. C. to Geo.

Order X.—SARRACENIA'CEÆ. (*Pitcher-plants.*)

Sepals 5, persistent, æstivation imbricate, with a three-leaved involucre. *Petals* 5, unguiculate, concave. *Stamens* numerous; anthers adnate, introrse. *Ovary* 5-celled, with a central placenta. *Stigma* very large, 5-angled, petaloid, peltate, covering the stamens. *Capsules* 5-celled, 5-valved, many-seeded, with loculicidal dehiscence. *Seeds* anatropous. Herbaceous plants, growing in swamps.

GENUS I.—SARRACE'NIA. Tourn. 12—1. (*Sidesaddle flower.*)

(In honor of Dr. Sarrazin, of Quebec.)

Roots fibrous. *Leaves* all radical, pitcher-shaped, the petiole being formed into a tube generally inflated in the middle, and the lamina, which is small, generally inflected over the orifice. *Scape* 1-flowered; flower nodding.

1. S. PURPU'REA, (L.) *Leaves* short, curved inward, with a broad wing running down the tube, inflated, partially filled with water. *Lamina* erect, cordate. *Petals* inflected over the stigma.—Purple. 2f. June. Can. to Geo. in swamps. 1—2 feet.

2. S. RU'BRA, (Walt.) *Leaves* slender, elongated, with the wing linear; throat not contracting. *Lamina* erect, mucronate, hairy on the inner surface, contracted at the base. *Petals* obovate, narrowed at the base. —Dark purple. 2f. May. N. C. to Geo. 1—2 feet.

3. S. FLA'VA, (L.) *Leaves* large, with throat expanding, scarcely any wing. *Lamina* erect, reniform, with reflected margins; base contracted, mucronate, with purple veins. *Petals* obovate-oblong. *Stigma* very large, with each angle 2-cleft.—Yellow. 2f. April. Middle Car. and Geo. 18 inches to 2 feet.

Croom thinks the *S. Catesbœi* of Elliott is only a variety of the *S. flava.*—Sill. Jour., vol. xxviii. p. 167.

4. S. DRUMMON'DII, (Croom.) *Leaves* very long, erect. *Tube* dilated above, with a very narrow wing; the upper portion, as well as the orbicular, erect. *Lamina* whitish, and strongly reticulated with purple veins, 20—30 inches long. *Flower* large.—Purple. 2f. April. Florida. 2—3 feet.

5. S. PSITTACI'NA, (Mich.) *Leaves* 3—4 inches long, decumbent, purple, spotted nearly all over with white; dorsal wing broad, lanceolate; appendix nearly closing the tube, and shaped like the head of a parrot. Grows in the wet pine barrens of Florida.—Croom, Sill. Jour., vol. xxv. p. 75.

6. S. VARIOLA'RIS, (Mich.) *Leaves* nearly erect, slightly ventricose *Tube* spotted on the back. *Lamina* arched; wing slightly dilated. *Petals* obovate-spatulate, inflected over the stigma.—Yellow. 2f. Ju. Geo. and Car. in pine-barren ponds.

This genus affords a striking example of a great modification of the petiole, since there is no doubt that the tube part is the petiole, and what we called the lamina, the true lamina of the leaf. These tubes are generally filled with water, which is supposed to be secreted by the plant, and this always contains dead insects. The tube could not have been formed in a better manner to accomplish a given end. than this is to catch insects. The saccharine secretion which surrounds the orifice decoys insects to the tube, and the water entices them in. There are hairs pointing downward, so as to permit an easy descent, but makes the egress difficult.

ORDER XI.—PAPAVERA'CEÆ. (*Poppy Family.*)

Sepals 2—3, caducous; æstivation imbricate. *Petals* 4—12. *Stamens* as many as the petals, or some multiple of their number. *Anthers* innate. *Ovary* composed of two or more carpels. *Stigma* generally sessile. *Fruit* 1-celled, many-seeded, with parietal placentæ either opposite or alternate with the stigmas. *Seeds* minute, anatropous; albumen oily. *Plants*

generally with a milky or yellow juice, often acrid, and generally narcotic. *Flowers* all belonging to the *yellow* series.

ANALYSIS.

1. Sepals 2 2
   Sepals 3 ..... *Argemone*, 2
2. Petals 8—12 ..... *Sanguinaria*, 3
   Petals 4 3
3. Plants yielding a white juice ..... *Papaver*, 1
   Plants yielding a yellow juice 4
4. Peduncles 1-flowered ..... *Glaucium*, 5
   Flowers in umbels ..... *Chelidonium*, 4

Genus I.—PAPA'VER. L. 12—1. (*Poppy.*)

(Origin of the name uncertain.)

Sepals 2. *Petals* 4. *Stamens* numerous. *Style* 1. *Stigmas* 4—20, radiating, sessile. *Capsule* 1-celled, opening by pores beneath the lobes of the stigma; many-seeded.

1. P. somnif'erum, (L.) *Stem* erect, smooth. *Leaves* amplexicaul, incised, repand; teeth blunt. *Petals* large. *Capsule* smooth, with numerous parietal placentæ, opposite the lobes of the stigma.—White or purple. July. Nearly naturalized.

This is the species that yields the opium of commerce. The opium is the hardened juice of the capsule, obtained by incision soon after flowering. The composition of opium is very complex, containing not less than seventeen distinct substances.

Genus II.—ARGEMO'NE. L. 12—1. (*Prickly Poppy.*)

(From the Greek *argeme*, a disease of the eye, for which the juice was used.)

Sepals 3, caducous. *Petals* 6. *Stamens* numerous. *Stigmas* 4—7, sessile, or nearly so. *Capsule* opening by valves separating from the placentæ. *Herbs* with a yellow juice.

1. A. Mexica'na, (L.) *Leaves* alternate, pinnatifid, and spiny. *Flowers* solitary, axillary, and terminal. *Calyx* and *capsule* prickly.

There seems to be several variations from the above description, which constitute varieties of this species. The flowers vary much in size and color, and in some the capsule is not prickly. We have never met with such a one.—White. ☺. From June through the summer. In cultivated places, common.

Genus III.—SANGUINA'RIA. L. 12—13. (*Blood-root.*)

(From its juice resembling blood.)

Sepals 2, caducous. *Petals* vary from 8—12. *Stamens* numerous. *Stigmas* 2, sessile. *Capsule* oblong-ovate. *Seeds* numerous. *Rhizoma* yellowish-red.

1. S. Canaden'sis, (L.) *Leaves* reniform, palmate, 5—7-lobed, glaucous. *Petals* oblong, caducous. *Scape* 1-flowered. *Plant* yields a light red juice.—White. ♃. March. Common. *Puccoon root.*

This plant enjoys considerable reputation, both in the regular practice of medicine and in the family practice. It is a powerful medicine, and should be used by those

unacquainted with it with care. It is a stimulant in small doses; in larger, produces violent vomiting and much irritation. It is one of the earliest and prettiest flowers of spring, and as an early border flower deserves the attention of the florist.

GENUS IV.—CHELIDO'NIUM. L. 12—1. (*Celandine.*)

(From the Greek *chelidon*, a swallow, the plant flowering at the return of swallows.)

Sepals 2, caducous. *Petals* 4, small. *Stamens* numerous. *Capsules* 2-valved, 1-celled, many-seeded, linear, dehiscing from the base upward. Yields a deep yellow juice.

1. C. MA'JUS, (L.) *Leaves* pinnate-lobed, glaucous. *Segments* ovate, the terminal one obovate. *Flowers* in axillary umbels.—Yellow. 2. Naturalized. Grows in waste places.

GENUS V.—GLAU'CIUM. L. 11—1. (*Horned Poppy.*)

(From the Greek *glaukos*, glaucous, from the appearance of the plants.)

Sepals 2, caducous. *Petals* 4. *Capsule* linear, 2-valved, 2-celled, many-seeded. *Seeds* somewhat reniform. *Plant* yielding a yellow juice.

1. G. FLA'VUM, (Crant.) *Stem* glabrous. Floral leaves repand; cauline ones clasping and pinnatifid; radical ones bipinnatifid, large, pubescent. *Peduncles* 1-flowered. *Capsule* tuberculate.—Yellow. ☺. June. Introduced.

The *Eschscholt'zia Califor'nica*, extensively cultivated, belongs to *Papaveraceæ*.

ORDER XII.—FUMARIA'CEÆ. (*Fumatory Family.*)

Sepals 2. *Petals* 4, cruciate; one or both of the two outer ones saccate or spurred at the base; the two inner cohering at the apex, and inclosing the anthers and stigma. *Stamens* 6, in two parcels. *Anthers* membranous, adnate, extrorse; the lateral ones of each parcel 1-celled, the middle one 2-celled. *Ovary* 1-celled, 2-valved, with parietal placentæ. *Style* filiform. *Stigma* with two or more points. *Fruit* a nut or capsule; if a nut 2-seeded, if a capsule many-seeded. *Seeds* arilled, anatropous. *Herbaceous* plants, with watery juice.

ANALYSIS.

1. Climbing plant ..... *Adlumia*, 2
   Plants not climbing 2
2. Flowers yellow ..... *Corydalis*, 3
   Flowers purple 3
3. Capsule many-seeded ..... *Dielytra*, 1
   Fruit 1-seeded ..... *Fumaria*, 4

GENUS I.—DIELY'TRA. Borh. 16—5.

(From *dis*, two, and *elytron*, a sheath, in allusion to double spurs at the base of the petals.)

Sepals 2. *Petals* 2-spurred or saccate at the base. *Capsule* many-seeded, pod-shaped. *Flowers* in a compound raceme, with cymose branches.

1. D. FORMO'SA, (D. C.) *Leaves* 3—8, or one rising from the crown of the rhizoma. *Spur* short, obtuse, somewhat incurved; wings of the inner petals projecting beyond the summit. *Stigma* 2-horned at the apex.—Reddish-purple. ♃. Mountains of Vir. and N. C. 8—12 inches. (T. & G.)

GENUS II.—ADLU'MIA. Raf. 16—5. (*Climbing Colic-weed.*)

(In honor of Major Adlum.)

Petals united into a spongy, persistent, monopetalous corolla, bigibbous at the base, 4-lobed at the apex. *Capsule* pod-shaped, linear-oblong, many-seeded. *Flowers* in racemose cymes. *Plant* climbing, herbaceous.

1. A. CIRRHO'SA, (Raf.) *Stem* branching, climbing by cirrhose tendrils. *Leaves* biternately divided. *Segments* obovate. *Flowers* numerous. Stamens monadelphous.—Pale violet or white. ♂. June. Canada to N. C.

GENUS III.—CORYD'ALIS. D. C. 16—5.

(From the Greek *corudalis*, the name of the plant.)

Only one of the petals spurred. *Capsule* 2-valved, many or few seeded, compressed. *Style* persistent. *Racemes* terminal or opposite the leaves, simple.

1. C. AU'REA, (Wild.) *Stem* branching. *Leaves* bipinnate, or variously dissected; lobes oblong, linear, glaucous, alternate. *Spur* straight, obtuse. *Flowers* in terminal, supra-axillary racemes, or opposite the leaves. *Pedicels* bracteolate, with bracts sometimes extending beyond the flower.—Yellow. ☉. April to August. Middle Geo.

GENUS IV.—FUMA'RIA. L. 16—5. (*Fumitory.*)

(From the Latin *fumus*, smoke.)

One petal only gibbous or spurred. *Fruit* a 1-seeded nut, indehiscent.

1. F. OFFICINA'LIS, (L.) *Root* annual, fusiform. *Stem* branching, glabrous. *Leaves* variously dissected, glabrous, and slightly glaucous. *Segments* many-cleft. *Flowers* in small, dense racemes. *Sepals* toothed. *Petals* 4; the lower one free; the three upper united at the base, bearing a spur. *Stigma* bilamellate.—Purple. ♂. April. Naturalized.

The order *Fumariaceæ* possesses some striking peculiarities. The general form of the flower is singular, resembling more the works of art than of nature. The characteristic of having the different celled anthers some unilocular and others bilocular, is a striking variation. Torrey & Gray remark, that "the two lateral stamens of each parcel, having unilocular anthers, may be considered as *half* stamens, formed by the division of the two stamens which correspond to the inner petals; the true number in the order, according to this view, being 4—one to each petal." The situation of the anthers and stigma in the indurated summit of the petals, in which they remain firmly inclosed till after fertilization, would seem to preclude the possibility of the pollen's coming in contact with the stigma. To adapt herself to these circumstances, nature has placed two horn-like appendages to the stigma, which extend under the anther cells, and by the mere contraction of the valves, the pollen is conveyed to the stigmatic surface without any change in position of the organs. The different genera of this order possess nearly the same properties, and the Fumaria has been used in medicine, particularly for its action on the liver and in cutaneous eruptions.

Order XIII.—CRUCIF'ERÆ. (*Mustard Family.*)

Sepals 4, deciduous, cruciate; æstivation generally imbricate. *Petals* 4, cruciate, alternating with the sepals. *Stamens* 6, tetradynamous; the two shorter lateral, occasionally toothed, inserted lower than the others. *Disk* often with small green glands inserted between the petals and the stamens and ovarium. *Ovary* 1-celled, consisting of two carpels, with two parietal placentæ, which are reflected into the cavity, where they unite and form a false dissepiment. *Stigma* opposite the dissepiments (a remarkable variation.) *Fruit* a silique or silicle, 2-celled, produced by the spurious dissepiment mentioned above; one or many seeded. *Seeds* campylotropous, attached in a single row to each side of the placentæ. *Herbaceous* plants, with a watery and generally with an acrid juice, forming Class XIV. of the Linnæan system.

ANALYSIS.

1. Fruit linear, a silique 2
   Fruit nearly as broad as long, a silicle 8
2. Seeds arranged in two rows in each cell ..... *Nasturtium*, 1
   Seeds in one row in each cell 3
3. Silique 4-cornered ..... *Erysimum*, 7
   Silique terete or flat 4
4. Flowers purple or pink ..... *Warea*, 8
   Flowers white 5
   Flowers yellow 7
5. Silique lanceolate, flowers in terminal racemes ..... *Dentaria*, 4
   Silique linear 6
6. Silique curved, long ..... *Arabis*, 2
   Silique straight, flowers small ..... *Cardamine*, 3
7. Silique terete, tapering, appressed to the stem ..... *Sisymbrium*, 6
   Silique oblong, linear, compressed, few-seeded ..... *Leavenworthia*, 5
   Silique ensiform, or nearly terete ..... *Sinapis*, 10
8. Silicle oval, oblong ..... *Draba*, 12
   Silicle reniform ..... *Coronopus*, 13
   Silicle emarginate ..... *Capsella*, 15
9. Silicle cordate ..... *Lepidium*, 14
   Silicle 2-jointed, somewhat 4-angled ..... *Cakile*, 16

Genus I.—NASTUR'TIUM. R. Br. 14—2. (*Cresses.*)

(From the Latin *nasus tortus*, convulsed nose, from its pungent qualities.)

Silique nearly terete, sometimes resembling a silicle, usually curved. *Stigma* 2-lobed. *Sepals* spreading. *Seeds* arranged in two series, minute, destitute of margins. Found in wet places.

1. N. officina'le, (Brown.) *Leaves* pinnately divided; segments ovate, sub-cordate, repand. *Petals* longer than the calyx.—White. Introduced.

2. N. tanacetifo'lium, (Hook.) *Stem* much branched, diffuse. *Leaves* pinnately divided, lobes sinuate or toothed, obtuse, smooth. *Flowers*

small; petals linear *Stigmas* nearly sessile. *Siliques* erect or curved. *Seeds* numerous.—Yellow. ♂. South Carolina. 5—12 inches.

3. N. PALUS'TRE, (D. C.) *Leaves* pinnatifid, 2—3 inches long, clasping and ciliate at the base, lobes confluent, toothed, glabrous, oblong-lanceolate. *Flowers* very small; petals equal the sepals. *Silique* declined, ovate-oblong, a little curved.—Yellow. 2f. June to August. Wet places. 1—2 feet.

GENUS II.—AR'ABIS. L. 14—2. (*Rock Cress.*)

(Named from the country, Arabia.)

Silique linear, generally compressed, terminated by the sessile stigma, valves 1-nerved. *Seeds* in one series, orbicular, compressed. *Calyx* erect.

1. A. CANADEN'SIS, (L.) *Stem* simple, glabrous toward the summits, pubescent below. *Leaves* alternate, sessile, pubescent, oblong-lanceolate, remotely toothed, the lower ones petiolate and occasionally lyrate. *Flowers* in long terminal racemes. *Sepals* hispid, colored. *Petals* oblong-linear, much longer than the sepals. *Silique* long, 2—3 inches, linear, curved.—White. 2f. June. Middle Georgia. *Sickle-pod.*

GENUS III.—CARDAM'INE. L. 14—2.

(From the Greek *kardia*, a heart.)

Silique linear, usually dehiscing elastically, with revolute valves; valves nerveless. *Sepals* expanding at the summit. *Seeds* ovate.

1. C. SPATHULA'TA, (Mich.) *Stem* decumbent, slender, glabrous. Radical leaves spatulate, pubescent, about an inch in length, entire; cauline ones narrow and somewhat toothed. *Flowers* in terminal and axillary racemes. *Sepals* hairy, oval. *Petals* oblong and obovate. *Silique* about an inch long.—White. ☺. April. Mountains and Mid. Dist. of Geo. and Car. 4—6 inches.

2. C. VIRGIN'ICA, (L.) *Stem* erect, glabrous. *Leaves* alternate, pinnate, leaflets lanceolate, with a single tooth on one or both sides. *Flowers* in terminal racemes, erect. *Petals* a little longer than the sepals; stigma sessile. Varies much during the summer, and in different locations, so that any description may be inapplicable under different circumstances.—White. 2f. April to June. Upper districts of Geo. and Car. 4—12 inches.

The *Pennsylvanica* of Elliott, and Virginica, are supposed to be a variety of the *Hirsuta* of Linnæus.

GENUS IV.—DENTA'RIA. L. 14—2. (*Tooth-wort. Pepper-root.*)

(From the Latin *dens*, a tooth.)

Silique lanceolate, dehiscing elastically. *Valves* nerveless, plane; dissepiment somewhat fungous. *Stigma* emarginate. *Rhizoma* fleshy, often dentate. Perennial, herbaceous plants, with variously divided leaves.

1. D. LACINIA'TA, (Muhl.) *Rhizoma* moniliform, tubers slightly connected. *Leaves* usually 3, ternate, leaflets incised or irregularly notch

ed, lateral ones lobed; radical leaves sometimes wanting. *Flowers* in terminal racemes. *Sepals* lanceolate, acute. *Petals* much larger than the sepals. Taste of the root pungent, like mustard.—Pale purple. 4. May to June. Mountains and Middle Geo. 4—12 inches.

2. D. DIPHYL'LA, (Mich.) *Rhizoma* toothed, creeping. *Leaves* cauline, 1—2, ternately divided; leaflets ovate, oblong, toothed, and incised; petioles about 1 inch long. Root very pungent.—Pale purple. 4. May to June. Mountains.

3. D. MULTIF'IDA, (Muhl.) *Rhizoma* tuberous. *Leaves* 2, opposite, 2—3 inches long, variously divided; segments and lobes linear. *Flowers* in a terminal raceme. *Sepals* lanceolate. *Petals* much longer than the sepals.—White. 4. N. C. and Ala. 4—6 inches.

GENUS V.—LEAVENWOR'THIA. Tor. 14—2.

(In honor of Dr. Leavenworth.)

Calyx somewhat erect, equal at the base. *Petals* equal, cuneate, truncate, emarginate. *Filaments* distinct, toothless. *Silique* sessile, oblong-linear, compressed, somewhat inflated, and contracted between the seeds. *Seeds* in a single series, flattened, with a broad winged margin. Annual herbaceous plants. *Leaves* lyrately-pinnatifid. *Flowers* in loose racemes, or solitary on long sub-radical peduncles.

1. L. AU'REA, (Torrey.) *Stem* at first short and simple, but at length branching from the base; branches ascending. *Leaves* mostly radical, pinnatifid, somewhat fleshy; segments 2—4 pairs, roundish oblong, obtusely toothed. *Racemes* 4—10-flowered. *Sepals* loose, tinged with purple. *Petals* golden yellow, tapering into a long cuneate base. *Silique* rather more than an inch long. *Seeds* 4—5 in a cell.—Alabama. 2—6 inches.

GENUS VI.—SISYM'BRIUM. L. 14—2.

(The Greek name of the plant.)

Silique terete, or slightly angled, with a short beak. *Stigma* capitate. *Sepals* equal at the base, expanding. *Petals* expanding. *Seeds* ovate or oblong.

1. S. CANES'CENS, (Nutt.) *Root* annual. *Stem* erect, branching. *Leaves* 2—3 inches long, hoary, doubly-pinnatifid; segments hoary, dentate, obtuse. *Flowers* in terminal racemes. *Sepals* oval, pubescent. *Petals* obovate, equaling the calyx, expanding. *Silique* somewhat clavate, half as long as the pedicels, angled. *Seeds* obovate, many in each cell.—Yellowish. ☺. March and April. Common. 1—2 ft.

2. S. OFFICINA'LE, (Scop.) *Stem* hairy. *Leaves* runcinate, hairy. *Flowers* in elongated racemes, small, pedicels very short, appressed to the axis after flowering. *Petals* cuneate, larger than the calyx. *Silique* sub-ovate, tapering into a short style.—Yellow. ☺. May and Aug. Waste places. 1—3 ft. *Hedge Mustard.*

The latter plant possesses somewhat the pungency of mustard, and has been recommended in the treatment of chronic coughs, hoarseness, and ulceration of the mouth. The juice with sugar, or the seeds may be taken.

Genus VII.—ERYS'IMUM. L. 14—2.

(From the Greek *eruo*, to cure.)

Silique columnar, 4-sided. *Sepals* deciduous, closed. *Style* short. *Stigma* small. *Cotyledons* oblong.

1. E. CHEIRANTHOI'DES, (L.) *Stem* simple or branched with a minute appressed pubescence, somewhat scabrous. *Leaves* lanceolate, entire, sometimes denticulate. *Silique* erect, about an inch long. *Flowers* small.—Yellow. July and Aug. ☺. 1—2 ft. Along streams.

Genus VIII.—WA'REA. Nutt. 14—2.

(In honor of Mr. Ware.)

Silique flat, stiped, elongated, slender, curved, pendulous. *Sepals* deflected, spatulate, or ligulate, colored, caducous. *Petals* spreading, with long claws. With six glands at the base of the stamens. *Leaves* entire.

1. W. AMPLEXIFO'LIA, (Nutt.) *Stem* branched above, glabrous. *Leaves* oblong, ovate, acute. *Flowers* in umbel-like racemes, much crowded; petals with the limb nearly orbicular, claw longer than the limb. *Silique* linear, stipe filiform, purplish.—Pale purple. ☺. Flor. 1—3 feet.

2. W. CUNEIFO'LIA, (Nutt.) *Stem* branched above, glabrous. *Leaves* nearly sessile, oblong, obtuse, upper ones oblong-linear. *Racemes* with the flowers clustered at the extremities of the branches. *Sepals* minute. *Petals* with the limb nearly round, supported on a long claw. *Stamens* longer than the petals. *Anthers* linear. *Stigmas* sessile. *Silique* filiform, nearly 2 inches long.—White, tinged with purple. ☺. June and Aug. Middle Geo. and Car. 1—2 ft.

The last species is a beautiful plant, and would well repay the florist's care, if it improved none by cultivation.

Genus IX.—BRAS'SICA. L. 14—2. (*Cabbage.*)

(From the Celtic word *bresic*, which signifies cabbage.)

Calyx erect, converging. *Silique* roundish, crowned with a short style. *Seeds* in one row. *Flowers* in racemes, pedicels filiform, bractless. Radical leaves lyrate or pinnatifid. Biennial plants.

1. B. OLERA'CEA, (L.) *Leaves* glaucous, fleshy, repand or lobed.—☺. Yellow. England. *Cabbage, Cauliflower, Collard, Brussels Sprouts.*

2. B. RA'PA. *Radical leaves* lyrate, not glaucous, upper ones entire. *Roots* napiform, or fusiform.—☺. Europe. *Turnips.*

Genus X.—SINA'PIS. L. 14—2.

(From the Greek *sinapi*, applied to all plants resembling cabbage or turnip.)

Silique nearly terete, nerved. *Style* short, acute. *Seeds* in a single series. *Sepals* spreading. *Leaves* usually lyrate. *Flowers* in elongated racemes.

1. S. NI'GRA, (L.) Lower leaves large, lyrate, scabrous; upper ones lanceolate, entire, glabrous. *Sepals* colored. *Petals* obovate, unguiculate. *Silique* appressed, about three quarters of an inch long, glabrous.—Yellow. ☺. June. Introduced. *Black Mustard.*

The seeds of the S. nigra (common mustard) are too extensively known and used to demand a notice of their properties here. There are circumstances connected with the exhibition of their well-known properties, which are singular and interesting. The mustard-seeds, in a perfectly dry state, may be pressed and made to yield an oil, possessing none of the active properties of mustard, these remaining in the seed. But if the oil be obtained by water, it is powerful in its operation, producing speedy vesication. This latter oil it seems does not exist ready formed in the seed, but is formed by the action of the water. The chemical difference of the two is, probably, that the latter contains sulphur, as this is found in the white mustard in a principle called *Sulpho-sinapisin*, possessing the same properties as this oil, and formed by the action of water.

GENUS XI.—RAPH'ANUS. L. 14—2.

(From the Greek *raphanis*, to appear quickly; from the rapid germination of the seed.)

Calyx closed. *Silique* transversely many-celled. *Seeds* in one row. *Flowers* in racemes, opposite the leaves.

R. SATI'VUS, (L.) *Pods* terete, pointed. *Roots* more or less fleshy, of various forms.—☺. Asia. *Radish.*

GENUS XII.—DRA'BA. L. 14—1.

(From the Greek *drabe*, acrid.)

Silicle oblong-lanceolate or oval, minutely hispid, especially along the margin, or glabrous. *Seeds* numerous. *Calyx* equal. *Petals* emarginate or entire.

1. D. CUNEIFO'LIA, (Nutt.) *Stem* leafy at the lower part, very pubescent, slender. *Leaves* with few teeth; cauline ones oblong-ovate, narrowed at the base; radical ones spatulate-oblong. *Flowers* large; petals several times the length of the calyx.—White. ☺. Florida. 4—8 inches.

2. D. CAROLINIA'NA, (Walt.) *Stem* leafy and hispid at the base, naked and smooth above. *Leaves* hispid, entire. *Flowers* corymbic or racemed; petals oblong, twice as long as the sepals, or minute, and sometimes wanting. *Silicle* nearly linear, glabrous, 4—6 lines long, many-seeded.—White. ☺. April and June. Mid. Geo. 1—6 inches.

3. D. BRACHYCAR'PA, (Nutt.) *Stem* simple or branched, leafy. *Leaves*, cauline ones linear or oblong, with 2 or 3 minute teeth or entire; radical ones roundish-ovate, petioled. *Flowers* in racemes, many-flowered; silicles oval, glabrous, cells 5—6 seeded; petals entire or slightly emarginate.

Var. FASTIGIA'TA, (Nutt.) *Stem* more pubescent, seldom branched; radical leaves generally 4-toothed, silicle pubescent.—White. ☺. March—April. Middle Georgia.

GENUS XIII.—CORONO'PUS. L. 14—1. (*Senebiera.*)

(From the Greek *korone*, a crow, and *pous*, a foot.)

Silicle reniform, didymous, compressed contrary to the sep-

tum, sometimes 1-celled; cells 1-seeded; seeds globose-triquetrous. Herbaceous plants with small white flowers

1. C. Did'yma, (Pursh.) *Stem* branching, lying flat on the earth. *Leaves* alternate, sessile, pinnately divided; the lobes 3—4-parted, toothed or incised, mucronate. *Flowers* in small corymbs, opposite the leaves; but by the elongation of the rachis, the fruit is in racemes. *Calyx* 4-leaved. *Petals* none, or very minute. *Silicle* emarginate.—White. ☺ or ♂. February—June. Open, dry fields. Common.

2. C. Ruel'lii, (Pursh.) Resembles the preceding, and grows with it. *Leaves* pinnately divided; segments entire, toothed, or pinnatifid. *Flowers* few. *Style* prominent. *Silicle* entire, not emarginate.

Genus XIV.—LEPID'IUM. L. 14—1. (*Wild Pepper-grass.*)

(From the Greek *lepis*, a scale, in allusion to the form of the pods.)

Silicle cordate, emarginate, 2-seeded; valves keeled. *Seeds* compressed.

1. L. Virgin'icum, (L.) *Stem* herbaceous, branching generally, leafy, glabrous. *Leaves* alternate, sessile, ciliate, notched; upper ones smaller and nearly entire. *Flowers* in terminal racemes. *Sepals* lanceolate, membranaceous along the margin, pubescent on the back. *Petals* a little longer than the sepals. *Silicle* compressed, orbicular, slightly emarginate.—White. ☺. Through the summer. Common.

Genus XV.—CAPSEL'LA. Vent. 14—1. (*Thlaspi*, L.)

(The diminutive of *capsula*, a little capsule.)

Silicle triangular, cuneiform; valves boat-shaped, wingless, coriaceous; cells small, many-seeded.

1. C. bur'sa-pas'toris, (L.) *Stem* erect, furrowed, slightly branched. Radical leaves pinnatifid, tapering at the base into a petiole; cauline leaves small, entire, or with a few teeth, connate, lanceolate, pubescent. *Flowers* in elongated racemes.—White. ☺. Sent to me by Wm. S. Rockwell, Esq., Baldwin Co. 12 inches.

Genus XVI.—CAK'ILE. Tourn. 14—1.

(An old Arabic name.)

Silicle lanceolate, somewhat 4-angled, jointed. *Seed* in the upper cell erect, in the lower pendulous. Annual maritime herbs.

1. C. mariti'ma, (Scop.) *Stem* erect, with expanding branches. *Leaves* alternate, oblong, cuneiform, sinuately toothed, lower ones sometimes nearly hastate. *Flowers* in terminal corymbose racemes. Lower joint of the silicle short, the upper one with a line on each side. *Seed* 1 in each joint, oval, glabrous.—White. ☺. April—July. On the coast.

This plant deserves the attention of the gardener as a culinary vegetable. It has been, in some cases, cultivated, and has always been highly esteemed. Many other useful plants belong to this order. The Horseradish is the *Cochlearia armoracea*. *Isatis tinctoria* yields the Woad, which yields a blue dye. *Crambe maritima* is the sea-kale.

Order XIV.—CAPPARIDA'CEÆ.

Sepals 4, deciduous, sometimes marcescent; æstivation imbricate or united, forming a tube. *Petals* 4, hypogynous, cruciate, unguiculate, sometimes a nectary at the base of the outer petal, more or less unequal. *Stamens* almost perigynous, 7—12, or many, seldom 4. *Disk* hemispherical or elongated. *Ovary* compressed, of 2 carpels united, stipitate, with parietal placentæ; styles united, filiform, or none. *Fruit* a 1-celled, pod-shaped capsule, many-seeded. *Seeds* campylotropous, reniform; albumen wanting. *Embryo* curved. *Leaves* alternate. Annual plants.

Genus I.—CLEOMEL'LA. D. C. 6—1.

(The diminutive of Cleome.)

Sepals minute, spreading. *Petals* 4, sub-spatulate. *Torus* oblong. *Stamens* 6. *Pod* 4—6-seeded, obovate; stipe filiform. *Embryo* conduplicate. *Leaves* compound; leaflets linear. *Flowers* in terminal racemes, leafy.

1. C. Mexica'na, (D. C.) *Stem* branching, glabrous. *Leaves* with flat linear-lanceolate leaflets, longer than the petiole. *Pod* flattened. *Style* short.—Yellow. ☺. Louisiana.

Genus II.—GYNANDROP'SIS. L. 6—1.

(From *gune*, a pistil, *amer*, stamen, and *opsis*, like, from the resemblance of the stamens and pistils to each other.)

Sepals spreading. *Petals* 4. *Torus* elongated. *Stamens* 6, adhering to the torus. *Pod* raised, on a long stipe rising from the summit of the torus.

1. G. pentaphyl'la, (D. C.) *Stem* pubescent, viscid. *Leaves* simple and 3—5-foliate; upper ones simple, cordate-lanceolate; middle and lower ones 3—5-foliate; leaflets lanceolate or ovate, tapering at each extremity, entire or slightly serrulate. *Flowers* in a terminal raceme. *Calyx* deciduous. *Petals* with long, slender claws. *Pod* 2—3 inches long.—White. ☺. May—July. In cultivated grounds. Introduced. 2—3 feet.

Genus III.—POLANIS'IA. Raf. 12—1.

(From the Greek *polu*, much, and *anisos*, unequal, in allusion to the stamens.)

Sepals 4, spreading. *Petals* 4, unequal, entire, nearly orbicular, on short claws. *Stamens* 8—12, on the receptacle. *Torus* minute. *Pod* linear, scarcely stipitate. Annual plants.

1. P. tenuifo'lia, (T. & G.) *Stem* slender, branched, viscid, glandular. *Leaves* trifoliate, nearly glabrous; leaflets linear, filiform. *Flowers* in racemes; pedicels filiform; styles longer than the ovary. *Plant* with an unpleasant odor.—Nearly white. ☺. June. Georgia. Low country. 1—2 feet.

Order XV.—POLYGALA'CEÆ.

Sepals 5, persistent; the two lateral ones introrse, large, and petaloid; the three exterior small. *Petals* 3, irregular, somewhat papilionaceous, the keel crested. *Stamens* hypogynous, from 6—8, monadelphous, with the tube split on the upper side. *Ovary* consists of two carpels, with a central placenta, 2-celled, with a solitary ovule in each cell, pendulous. *Seeds* anatropous, with much albumen. *Embryo* generally straight, as long as the albumen. Herbaceous, with bitter root.

Genus I.—POLYG'ALA. Mich. 16—5.

(From the Greek *polu*, much, and *gala*, milk.)

Sepals 5, permanent, unequal, the two lateral ones larger, colored. *Petals* 3, united to the tube of stamens. *Fruit* a capsule, 2-celled, compressed, obcordate, or elliptical. *Flowers* in racemes, approaching, in different cases, spikes or heads, more commonly the latter.

a. Flowers capitate or in spikes. Seeds with a 2-lobed caruncle.

1. P. sanguin'ea, (L.) *Stem* branched. *Leaves* linear, acute, less than an inch long. *Flowers* capitate or in an oblong spike. *Wings* membranaceous, bright rose-color. *Crest* minute. *Capsules* obovate. *Seeds* black.—Red. ☺. Aug.—Sept. In dry soils, common. 4—6 inches.

2. P. purpu'rea, (Nutt.) *Stem* fastigiately branched; sometimes simple, erect, angular, and slightly winged. *Leaves* alternate, linear-lanceolate, 1 inch long. *Flowers* in oblong spikes. *Wings* broad-ovate, green, tinged with purple. *Crest* minute. *Seeds* hairy, with a *caruncle* nearly as long as the seed, nearly black.—Red. ☺. June. Common. 8—12 inches.

3. P. crucia'ta, (L.) *Stem* erect, branching, winged. *Leaves* verticillate, linear, punctate. *Flowers* in ovate spikes, nearly sessile. *Stamens* short. *Wings* dilated at the base, with a purple border. *Crest* minute. *Seed* obovate, slightly hispid.—Red, with green. ☺. July. 8—12 inches.

4. P. lu'tea, (L.) *Stem* branched or simple. *Flowers* in an ovate spike, nearly globular. *Wings* broad, lanceolate, acuminate, yellow. *Crest* minute. Radical leaves spatulate; the cauline ones lanceolate, acute. *Seeds* hairy.—Yellow. ☺. June—September. Common. 8—12 inches.

5. P. na'na, (D. C.) *Stem* simple. *Leaves* cuneate, obovate, obtuse; sometimes with a long attenuated base. *Flowers* in a dense cylindrical spike, nearly sessile. *Wings* ovate, acuminate, with a setaceous point, yellowish-green. *Crest* large. *Seed* obovate, a little hairy.—Yellowish-green. ☺. June—Sept. Pine woods. 1—6 inches.

b Flowers in terminal cymes; caruncle with no, or very small, appendage.

6. P. CORYMBO'SA, (Mich.) RAMO'SA, (Ell.) *Stem* simple, angular, terminated with a large cyme, nearly naked. *Leaves* spatulate, the upper ones linear, and at the summit small. *Flowers* in a compound cyme. *Wings* oval, long, mucronate, greenish-yellow. *Seed* oblong.—Yellow. ♂. June—Aug. Wet places in pine barrens. Common. 8—12 in.

7. P. CYMO'SA, (Walt.) CORYMBO'SA, (Ell.) *Stem* erect, terete, nearly naked. Lower leaves long, linear-lanceolate; upper ones small, linear, at the summit degenerated into scales. *Cyme* simple. *Wings* oval or elliptical-oblong, obtuse, slightly mucronate. *Seeds* smooth.—Yellow. ♂. June—Aug. Common in wet pine barrens. 2—5 feet.

8. P. BALDWIN'II, (Nutt.) *Stem* erect, branching near the summit, leafy. *Leaves*, lower ones spatulate, upper ones lanceolate. *Flowers* in a compound cyme, sub-globose, compact. *Wings* lanceolate, longer than the corolla; keel but slightly fimbriate, if at all. *Seeds* ovate, very hairy.—Yellowish-white. ♂. June—Aug. Low country of Geo. 2—3 feet.

c. Flowers in cylindrical spikes; caruncle spongy, cristate.

9. P. INCARNA'TA, (L.) *Stem* simple, slender, slightly angled. *Leaves* scattered, subulate, nearly linear. *Flowers* in long terminal spikes. *Wings* oval, margin colored, limbs of the petals not united. *Crest* conspicuous. *Seeds* ovate, hairy.—Purple. ♂. May—Aug. Common in the middle region of Geo. 1—2 feet.

10. P. SETA'CEA, (Mich.) *Stem* very small, erect, angled, generally with several slender, erect branches. *Leaves* very small, setaceous. *Flowers* in a compact spike, small. *Wings* oblong, acuminate; limbs of the lateral petals ovate. *Crest* conspicuous. *Seeds* ovate, hairy.—Rose-color. ☺. Ju. Middle Car. and Geo. 10—12 inches.

d. Flowers in elongated, racemose spikes · caruncle with a 2-lobed appendage.

11. P. VERTICILLA'TA, (L.) *Stem* erect, branching. *Leaves* verticillate, linear, acute, glabrous. *Flowers* in pedunculate tapering spikes, dense. *Wings* nearly round or obovate, longer than the corolla. Lateral petals spreading; keel fimbriate. *Seeds* hispid.—Greenish-white. ☺. June—Aug. Old sandy fields. 6—10 inches.

12. P. SEN'EGA, (L.) *Stem* erect, simple, terete. *Leaves* alternate, lanceolate, sometimes broad, acute, acuminate. *Flowers* in a dense spike, sessile. *Wings* orbicular, obovate, concave. *Seed* hirsute, with spreading hairs.—White. ♃. Mountains and upper districts of Car. and Geo. 6—8 inches.

13. P. BOYKIN'II, (Nutt.) *Stem* branching. *Leaves* verticillate by fours or fives, obovate, lanceolate. *Flowers* in dense tapering spikes, pedicellate. *Wings* obovate. *Petals* obovate, scarcely as long as the wing. *Crest* minute. *Seed* hirsute, with appressed hairs.—☺. June—September. Middle Geo. 12—18 inches.

14. P. CHAPMAN'II, (T. & G.) *Stem* glabrous, branching from the base or summit. *Leaves* numerous, linear, subulate. *Flowers* in a loose spike. *Wings* with a short claw; the posterior sepal very broad,

obtuse; scarcely any crest; limb of the petals distinct. *Seed* black, hairy. *Lobes* of the caruncle small.—Rose-color. ☺. Florida. 12—15 inches.

15. P. POLYGA'MA, (Walt.) *Stem* glabrous, angled, branching from the base, numerous. *Leaves* sessile, oblong, linear, mucronate. *Flowers* pedunculate, in loose racemes. *Wings* with short claws; keel 3-lobed, middle lobe fimbriate. Radical racemes destitute of corolla or wings. —Purple or reddish-purple. ♂. Dry lands. Common. 6—12 inches.

e. Flowers in loose racemes; keel not cristate; caruncle without appendages.

16. P. GRANDIFLO'RA, (Walt.) *Stem* erect, pubescent, branching. *Leaves* oblong-lanceolate, acute, pubescent, strongly veined. *Flowers* 12—18, the lowest more remote. *Pedicels* recurved after flowering. *Wings* large, nearly round, covering the other parts of the flower; when first expanded red, afterward green. *Seed* villous.—Red. 2f. May—Aug. S. C. and Geo. Dry soils. 8—12 inches.

f. Flowers few, axillary or terminal.

17. P. PAUCIFO'LIA, (Willd.) *Stem* simple, erect, naked at the base, leafy at the summit, rising from a branching rhizoma. *Leaves* clustered, ovate, petioled. *Flowers* generally terminal, by threes, larger than those of any other species; keel fimbriate; wings obovate, attenuate at the base. Lateral petals united with the keel nearly to the summit.—Purple. 2f. May—July. Mountains. 3—4 inches.

The *P. senega* or *Seneca snake-root* is the only plant of this order appropriated to any use in this country, although several of the species are beautiful flowers, and would make ornaments of the flower garden. The root of the *Senega* is extensively used as a medicine, and possesses valuable properties: among the most important is its action as an expectorant. On this account it enters into the composition of most medicines for coughs, croup, asthma, and affections of the lungs. It is entirely an American medicine, being first used in Virginia. It is cathartic, and is used, in combination with other medicines, for this property.

GENUS II.—KRAME'RIA. Loefl. 4—1.

(In honor of Kramer, a German botanist.)

Sepals 4—5, more or less irregular, colored, the innermost smaller. *Petals* 4—5, smaller than the sepals, three with long claws. *Stamens* 4, hypogynous, more or less unequal. *Ovary* 1-celled, gibbous, hairy, or hirsute. Under-shrubs.

1. R. LANCEOLA'TA. *Stem* much branched from the base, silky or hirsute. *Leaves* alternate, simple or rarely 3-foliate. *Flowers* terminal and axillary, sometimes in secund racemes. Claws of the petals united.—Florida.

ORDER XVI.—VIOLA'CEÆ.

Sepals 5, persistent; æstivation imbricate, usually auricled, or elongated at the base. *Petals* 5, hypogynous, marcescent, or deciduous, with an oblique, convolute æstivation, one-spurred at the base, generally unequal. *Stamens* 5, alternate with the

petals; anthers adnate, bilocular; filaments extending beyond the anthers, two of them appendaged at the base. *Ovary* 1-celled, with 3 parietal placentæ; capsule many-seeded, with a loculicidal dehiscence. *Seeds* anatropous, with a conspicuous chalaza. Herbaceous plants.

Genus I.—VI'OLA. L. 5—1.

(The Latin name of the plant.)

Sepals 5, unequal, auricled at the base. *Petals* 5, irregular, with a horn at the base of one of them. *Stamens* 5; anthers cohering, the two lower ones with appendages on the back. *Capsule* 3-valved, 1-celled. *Seeds* caruncled. *Leaves* alternate. *Flowers* nodding. Perennial, herbaceous plants.

a. Without stems, scape and leaves arising from a rhizoma. Stigma with a recurved beak.

1. V. PEDA'TA, (L.) *Leaves* pedate, 7-parted, segments entire, or incisely toothed, linear-lanceolate, slightly pubescent or glabrous. *Stigma* thick, margined; beak short. *Petals* glabrous.—Blue or nearly white. 2f. April—May. Common in the middle and upper country of Georgia. 4—6 inches.

2. V. PALMA'TA, (L.) RHIZO'MA. *Leaves* thick, cordate, very variable, pubescent, palmate, 5—7-lobed, lobes of various forms, toothed, the middle one the largest. *Sepals* lance-ovate, ciliate. *Petals* entire, veined, white at the base, lateral petals bearded, the upper one marked with blue lines. Early plant with almost entire leaves. A variable plant.—Bright blue, sometimes pale. 2f. May. Common. 4—6 inches.

3. V. CUCULLA'TA, (Ait.) *Leaves* reniform or cordate, cucullate, serrate, generally glabrous. *Sepals* subulate, acuminate. *Petals* white at the base, lateral ones bearded, which, with the upper one, are marked with blue lines. *Stigma* triangular, margined.

There have been several varieties found of this species by botanists, but the situation and the time when observed, will account for nearly, if not quite, all the variations. In open dry places the plant is pubescent; in spring, the leaves are almost uniformly cordate, in fall as uniformly reniform; the color of spring is blue, of summer, nearly or quite white.—Blue or purplish-blue. 2f. Common. 4—6 inches.

4. V. SEPTEMLO'BA, (Le Conte.) *Leaves* ovate-cordate, slightly succulent, glabrous, dentate, lower leaves entire, the others pedate, 7-lobed, middle lobe the largest. *Sepals* lanceolate. *Petals* entire, upper ones large, villous, lateral ones densely bearded, marked with blue lines.—White. 2f. March. Low country of Car. and Geo.

5. V. SAGITTA'TA, (Ait.) *Leaves* oblong, acute, cordate, sagittate, incised at the base, pubescent, slightly ciliate. Inferior petal glabrous, the rest bearded. *Spur* short, obtuse.

VAR. OVA'TA. *Leaves* ovate, somewhat cordate; petiole margined.

VAR. EMARGINA'TA. Glabrous. *Leaves* almost triangular, lacerately toothed near the base.—Pale blue. 2f. March and April. Upper districts of Geo. and Car. 6—8 inches.

6. V. VILLO'SA, (Wal.) *Leaves* cordate, obtuse, pubescent, appressed, toothed, with purple veins. *Sepals* acute or obtuse. *Petals* villous, lateral ones bearded.—Pale blue. 2f. March and April. Sandy soil, common.

7. V. ROTUNDIFO'LIA, (Mich.) *Leaves* orbicular, cordate, somewhat crenate, glabrous. *Petiole* pubescent. *Sepals* obtuse. *Petals* sometimes emarginate, upper ones small, marked with a few brown lines. *Spur* short.—Yellow. 2f. May. Mountains.

8. V. PRIMULÆFO'LIA, (L.) *Leaves* oblong, somewhat cordate, serrate. *Petioles* membranous. *Petals* entire, green at the base, lateral ones bearded. *Stigma* capitate, margined.—White. 2f. Feb. to April. Common. 2—3 inches.

9. V. LANCEOLA'TA, (L.) *Leaves* lanceolate, narrow, glabrous, attenuate at the base into a long petiole, obtuse, cuneate. *Peduncles* reddish, of the length of the leaves; divisions of the calyx lanceolate, acute. *Petals* entire, green at the base, the upper one marked with blue lines; all beardless.—White. 2f. April—May. Damp places. 3—8 inches.

b. With stems. Stigma convex, not margined.

10. V. STRIA'TA, (Ait.) *Stem* erect, glabrous, nearly terete, branching. *Leaves* roundish, cordate, acute, serrate, with conspicuous stipules, ciliate. *Sepals* lanceolate, acuminate, ciliate. *Petals* entire, upper one marked with blue lines, naked, glabrous, lateral ones bearded. *Stigma* tubular, recurved.—Yellowish-white. 2f. April—May. Common in moist places. 6—12 inches.

11. V. MUHLENBER'GII, (Torrey.) *Stem* glabrous, terete, weak, assurgent or prostrate. *Leaves* reniform-cordate, upper ones ovate, cruciate. *Stipules* lanceolate, sub-pinnate, serrate, ciliate. *Sepals* linear, acute, sub-ciliate. *Petals* without veins, lateral ones bearded, and with the upper one marked with blue lines. *Stigma* tubular, papillose.—Bluish-purple. 2f. May. Moist places. 6—10 inches.

12. V. HASTA'TA, (Mich.) *Stem* simple, leafy at the summit, nearly glabrous. *Leaves* alternate, hastate, with obtuse lobes, and deltoid-lanceolate, slightly serrate, on short petioles. *Stipules* ovate dentate. *Sepals* lance linear; lateral petals slightly bearded. *Stigma* hairy on each side, with a furrow on the top.—Yellow. 2f. May. Upper districts of Georgia, Culloden. First discovered by Dr. James Green. 6—12 inches.

13. V. TRIPARTI'TA, (Ell.) *Stem* hirsute, simple, leafy only at the summit. *Leaves* deeply 3-parted, the lobes lanceolate, dentate, very hairy sometimes ternate. *Stipules* villous, lanceolate. *Peduncles* long, with 2 minute, alternate scales near the middle. *Sepals* acute, the upper petal streaked with purple.—Yellow. 2f. March—April. Upper districts of Geo. 8—12 inches.

14. V. PUBES'CENS, (Ait.) *Stem* terete, erect, villous, naked below. *Leaves* broad ovate, cordate, dentate, on short petioles. *Stipules* large, ovate dentate. *Sepals* lanceolate. *Petals* striate, lateral ones bearded. *Stigma* globose, strongly bearded on each side.—Yellow. 2f. April—May. Common. 6—12 inches.

15. V. CANADEN'SIS, (L.) *Stem* erect, terete, nearly glabrous. *Leaves* broadly cordate, acuminate serrate, nerves pubescent. *Stipules* entire, membranaceous, oblong, sub-ovate. *Sepals* subulate, entire. *Petals*

entire, veined, upper one broad, expanding, lateral ones bearded, spur short, saccate. *Stigma* short, pubescent. *Flowers* odorous.—Different petals white, yellow, and violet. ♃. May. Woods. 6 in. 2 ft.

c. With stems. Stigma urceolate, hairy on each side.

16. V. ARVEN'SIS, (D. C.) *Stem* angled, furrowed, glabrous. *Leaves* spatulate, ovate, lower ones nearly orbicular. *Stipules* pinnatifid. *Sepals* ciliate, about equal in length to the petals. *Petals* with the lateral ones bearded.—Yellowish-blue, spotted with purple. ☺. May. Middle Geo. 10—12 inches.

The plants of this genus have been objects of regard in all ages, and the *heart's ease* is much and justly esteemed for its modest beauty. The *palmata* particularly is very mucilaginous, and is used by the negroes in their soups. The roots are all emetics, and the roots of plants belonging to this order are met with in commerce as Ipecacuanha.

GENUS II.—SO'LEA. Gin. 5—1.

(In honor of Mr. W. Sole.)

Sepals 5, nearly equal, not auricled. *Flowers* irregular, the lowest petal 2-lobed, and somewhat gibbous at the base, the others emarginate. *Stamens* cohering, the two lowest bearing a gland above the middle. *Stigma* uncinate. *Capsule* 3-sided, surrounded at the base by a concave torus. *Seeds* 6—8, large.

1. S. CONCO'LOR, (Gin.) *Stem* simple, leafy. *Leaves* oblong, lanceolate, somewhat erect, attenuated at each extremity. Lowest petal twice as long as the others. *Stigma* hooked, perforate. *Spur* short.—Greenish. ♃. July—August. Mountains of Carolina. Near Table Rock. Culloden, Ga. 1—2 feet.

ORDER XVII.—DROSERA'CEÆ.

Sepals 5, persistent, equal, æstivation imbricate. *Petals* 5, hypogynous, marcescent. *Stamens* 5—10—15, distinct, marcescent, filaments capillary, or flattened; anthers extrorse, innate. *Fruit* a capsule, 1-celled, 3—5-valved, with parietal placentæ, many-seeded, loculicidal. *Styles* 2—5, distinct, or connected at the base, each 2-parted or branched. *Seeds* anatropous. Herbaceous plants, generally glandular. *Leaves* alternate with circinate vernation.

GENUS I.—DRO'SERA. L. 5—6. (*Dew-plant.*)

(From the Greek *drosera*, dewy.)

Sepals 5. *Petals* 5. *Stamens* 5. *Styles* 3—5, each 2-parted or multifid. *Capsules* 3—5-valved, valves placentiferous to the summit. *Seeds* numerous in several rows on each placenta; small herbs growing in wet places. *Leaves* bearing glandular hairs.

1. D. ROTUNDIFO'LIA, (L.) Without stem. *Leaves* orbicular, spreading, tapering at the base. *Petiole* long, hairy, appressed to the ground,

covered with glandular hairs, rufous. *Scape* 5—10-flowered, with the calyx and scape of nearly the same color as the leaves.—White. ☉. April. Common in shaded spots. 4—10 inches. *Sun-dew.*

2. D. LONGIFO'LIA, (L.) *Stem* terete, ascending or decumbent, spatulate, oblong, erect, attenuate into a long naked petiole. *Scape* declined at the base. *Petals* short. *Style* very short.—White. 2. June—Aug. Swamps of the middle and low country of Ga. 3—8 inches.

3. D. BREVIFO'LIA, (Pursh.) *Leaves* forming a dense tuft, not more than an inch in diameter, broadly cuneiform, obtuse. *Petals* obovate, more than twice the length of the calyx, 2—8 flowers in a scape. *Scape* filiform. *Styles* deeply 2-parted.—Rose-color. 2. June. Florida 3—8 inches.

4. D. FILIFOR'MIS, (Raf.) *Leaves* long, 6—10 inches, filiform, nearly erect, glandular, hairy, petiole naked. *Scape* sub-ramose, terete, glabrous, 8—20-flowered. *Petals* obovate, erosely denticulate, much longer than the calyx. *Styles* 2-parted to the base.—Nearly white. 2. Aug.—Sept. Florida. 12—15 inches.

GENUS II.—DIONÆ'A. Ellis. 10—1.

(One of the names of Venus.)

Stamens 10—15. *Stigma* fimbriate. *Capsule* 2-celled, many-seeded, gibbous.

1. D. MUSCIP'ULA, (Ellis.) Without stem. *Leaves* spreading. *Petiole* winged, foliaceous; lamina articulated to the petiole, circular, armed with stiff, spine-like ciliæ, very sensitive; when touched, it closes up with considerable force. *Scape* about 10-flowered.—White. 2. April—May. North and South Carolina, on the Cape Fear and Santee rivers; in turfy sandy bogs. 6—12 inches. *Venus' Fly-Trap.*

This is a most interesting plant. The "sensitiveness of its lamina" is said to reside, by the Rev. M. A. Curtis, "in only three or four hair-like processes of its upper surface, so placed that an insect can hardly traverse it without interfering with one of them, when the two sides suddenly collapse and inclose the prey, the fringe or hairs of the opposite sides of the leaf interlacing like the fingers of two hands clasped together." The circumscribed geographical section in which the plant has been found is remarkable. This plant is found only in the section above indicated, nor has this or any other species of the genus been found in any other quarter of the globe.

GENUS III.—PARNAS'SIA. Tourn. 5—4.

(Named from Mt. Parnassus.)

Sepals 5, more or less united, æstivation imbricate, united to the ovary at the base. *Petals* 5, nearly perigynous, persistent. *Stamens* 5, perigynous, alternate with the petals, with an indefinite number of ovate sterile stamens united into 5 phalanges opposite the petals; these probably consist of two series, accounting for their being opposite the petals. Perennial herbs, growing in wet places. *Capsule* 4-valved.

1. P. CAROLINIA'NA, (Mich.) *Leaves* orbicular-ovate, or broad cordate, entire, glabrous, 5—7-nerved on long petioles, 2—8 inches, rather coriaceous. Cauline leaves low down, clasping. *Stem* 1-flowered. *Sepals* small, united at the base, oval, 3 ribbed, with a membranaceous margin.

Petals oval or ovate, with 5—7 green nerves. *Sterile* filaments in 5 bunches, each composed of 3 filaments, distinct nearly to the base, about the length of the stamens, terminated by an awn. *Anthers* sagittate. *Styles* 4, short.—White. 4. July—Aug. Near Columbia, S. C. 10—20 inches.

2. P. ASARIFO'LIA, (Vent.) *Leaves* reniform, the cauline one nearly orbicular, slightly cordate, sessile. *Petals* ovate, broad, obtuse, unguiculate; sterile filaments separate nearly to the base, united by threes. Leaves and flowers larger than in the preceding species.—White. 4. July—August. Mountains. 1—2 feet.

ORDER XVIII.—CISTA'CEÆ.

Sepals 5, persistent, unequal, the outer smallest or wanting, the 3 inner with an imbricate and sometimes twisted æstivation. *Petals* 5, hypogynous, fugitive, twisted in an opposite direction from the sepals. *Stamens* indefinite, hypogynous, distinct. *Anthers* short, innate. *Ovary* 3—5-valved, 1-celled capsule, with a loculicidal dehiscence, or with the membranes bearing the placentæ extending nearly to the center, making it imperfectly 3-celled, and in the *Lechea* called 3-celled. *Seeds* 3 to many, orthotropous. *Perennial* herbaceous plants.

GENUS 1.—HELIAN'THEMUM. Tourn. 12—1.

(From *helios* the sun, and *anthos*, a flower; because the flower opens with the rising of the sun.)

Sepals 5, unequal, the two exterior small, bract-like, and sometimes wanting. *Petals* 5, fugitive, or occasionally wanting. *Stigmas* 3, large, more or less united into one. *Capsule* 3-valved, few or many seeded, triangular. *Sun-rose.*

1. H. CANADEN'SE, (Mich.) *Stem* erect, at first simple, afterward branched, branches hairy. *Leaves* oblong-lanceolate, acute, hairy, pale beneath, margins revolute. *Flowers* of the stem few or solitary, terminal, large; of the branches axillary, small, nearly sessile, with very small or no petals. *Petals* erosely emarginate, double the length of the sepals.—Yellow. 4. May—June. In dry soils. Middle Geo. and Car. 6—18 inches.

2. H. CORYMBO'SUM, (Mich.) *Stem* branching, covered with stellular pubescence. *Leaves* oblong-lanceolate, canescent beneath. *Flowers* in terminal, corymbose cymes. *Petals* twice the length of the calyx; secondary flowers mostly apetalous. *Sepals* villous, the two exterior long and linear.—Yellow. 4. April—May. Dry soils on the coast of Car. and Geo. 10—15 inches.

3. H. CAROLINIA'NUM, (Mich.) *Stem* erect, hirsute, generally purple. *Leaves* nearly sessile, obovate, slightly denticulate, villous when young, crowded near the base of the stem, sometimes nearly orbicular. *Flowers* near the summit of the stem, few, large. *Sepals*, the two exterior linear, expanding; the three interior larger, ovate-lanceolate, acuminate. *Petals* twice as long as the calyx. *Stamens* numerous, unequal. *Seeds*

numerous.—Yellow. 2f. May—June. Dry soils, Geo. and Car. 6—12 inches.

This is a beautiful genus of flowering plants, of which Europe produces more than forty species, while North America produces only five. We know not that our indigenous species are cultivated, but well deserve it, beyond that of many imported plants.

Genus II.—LE'CHEA. L. 3—3.

(In honor of Leche, a Swedish naturalist.)

Sepals 3, with two exterior, narrow, and bract-like. *Petals* 3, minute, lanceolate. *Stamens* 3—12. *Stigmas* 3, on a short, somewhat united style, fimbriate. *Capsule* 3-valved, apparently 3-celled, with roundish placentæ, nearly as broad as the valves, about 2-seeded. Perennial herbs.

1. L. MA'JOR, (Mich.) *Stem* herbaceous, branching, scabrous; young branches villous, radical branches tufted. *Leaves* ovate-lanceolate; those on the radical branches opposite, and sometimes nearly round on the stem, alternate. *Flowers* in lateral racemes, with short pedicels. *Capsule* somewhat 3-sided, depressed. *Petals* lanceolate, obtuse. *Anthers* bilocular, pink.—White. 2f. July—Aug. Sandy soils, common. 1—2 feet.

2. L. MI'NOR, (Lam.) *Stem* erect, branching, pubescent; radical branches, if any, hairy. *Leaves* linear-lanceolate, scattered, or occasionally nearly verticillate. *Flowers* in terminal panicles, with appressed pedicels.

VAR. RACEMULO'SA. *Stem* much branched near the summit, with seldom any radical branches. *Leaves* small, narrow.

VAR. TENUFO'LIA. *Stem* decumbent and assurgent, very much branched, somewhat hairy. *Leaves* subulate, linear. *Flowers* solitary, at the extremities of the branches.—White. 2f. Sandy soils, in middle Car. 6—18 inches.

3. L. THYMIFO'LIA, (Mich.) *Stem* frutescent, decumbent at the base, much branched above, hoary-villous. *Leaves* linear, acute, numerous; those of the procumbent radical branches small, imbricate, elliptical. *Flowers* 2—6, at the extremities of the branches, in leafy panicles. *Calyx* tomentose.—White. 2f. Sandy soils. May—Aug. 10—15 inches.

Order XIX.—HYPERICA'CEÆ.

Sepals 4—5, cohering at the base, or distinct, persistent, unequal; æstivation imbricate. *Petals* hypogynous, as many as the sepals; veins oblique, with a twisted æstivation. *Stamens* hypogynous, usually very numerous, polydelphous, usually in three parcels. *Anthers* versatile, introrse. *Ovary* composed of 2—5 united carpels. *Styles* several, persistent. *Capsule* with a septicidal dehiscence, 1—2—5-celled; when 1-celled, the placentæ parietal; when more than 1-celled, the placentæ central. *Seeds* very numerous, anatropous. *Embryo* straight, cylindrical. Herbs and shrubs. *Leaves* opposite, entire, without stipules, dotted.

GENUS I.—ASCY'RUM. L. 12—5. (*St. Andrew's Cross.*)

(From *a*, privative, *not*, and *skuros*, hard—a soft plant.)

Sepals 4; the two exterior usually broad and foliaceous; the two interior smaller. *Petals* 4. *Stamens* usually united by their filaments into four parcels. *Capsule* oblong, 1-celled, 2 valved, with parietal placentæ. *Styles* 2—3, occasionally united. Shrubby or suffructicose. *Leaves* usually with black dots. *Flowers* yellow.

1. A. CRUX-AN'DREÆ, (L.) *Stem* erect, much branched, spreading. *Leaves* oblong-lanceolate, obtuse, sessile, dotted, small. *Flowers* solitary, axillary, and terminal. The outer sepals cordate, ovate, acute; the interior small; two small bracteal leaves at the base of the calyx. *Petals* linear-oblong. *Styles* 2. *Capsule* 2-valved, compressed.—Yellow. 2. July. Pine woods. Car. and Geo. 8—12 inches.

2. A. PUMI'LUM, (Mich.) *Stem* prostrate, much divided, slightly winged. *Leaves* linear-oval, small, obtuse, *toothed*, perennial. *Flowers* solitary, axillary; exterior sepals ovate, acute, marked with dots. *Petals* obovate, a little longer than the calyx. *Stamens* numerous, not distinctly united into parcels. *Style* 1, long. *Capsule* ovate. A variable plant.—Yellow. 2. March. Pine barrens, middle Geo. 6—10 inches.

3. A. HYPERICOI'DES, (L.) *Stem* erect, sparingly dichotomous, branched, ancipital, slightly winged. *Leaves* sessile, opposite, somewhat clasping, oblong, obtuse, glaucous. *Flowers* terminal or axillary, on erect peduncles; exterior sepals large, cordate-ovate, nearly orbicular, nerved, dotted. *Petals* obovate. *Stamens* very numerous. *Styles* 2. *Capsule* triangular. *Seeds* striate.—Yellow. ♄. Through the summer. Damp soils.

4. A. AMPLEXICAU'LE, (Mich.) *Stem* erect, sparingly branched; branches ancipital. *Leaves* broadly ovate, oblong, cordate, clasping. *Flowers* erect; exterior sepals cordate, broad. *Petals* obovate. *Stamens* very numerous. *Styles* 3.—Yellow. 2. Through the summer. Southern Geo. and Florida. 1—2 feet.

5. A. MICROSEP'ALUM, (T. & G.) *Stem* nearly terete, much branched. *Leaves* very small, oblong-linear, crowded. *Flowers* erect, on long peduncles, large, clustered at the summit of the branches. *Sepals* nearly equal in length; the exterior ones about a third broader than the others. *Petals* more than twice as long as the sepals; one of them usually much shorter than the others. *Styles* filiform, long.—Yellow. March—April. Middle Florida. A foot or more high.

GENUS II.—HYPER'ICUM. L. 12—5.

(Origin of the name doubtful.)

Sepals 5, united at the base, foliaceous. *Petals* 5, oblique. *Stamens* numerous, united at the base into 3—5 parcels. *Pistils* 3—5, persistent. *Capsule* 1-celled, with parietal placentæ, or 3—5-celled.

1. H. PROLIF'ICUM, (L.) *Stem* shrubby or suffructicose, with dichoto-

mous, ancipital branches. *Leaves* narrow, lanceolate. *Sepals* foliaceous, ovate-lanceolate, acuminate. *Petals* obovate, longer than the sepals. *Capsules* 3-celled, ovate-oblong.—Yellow. ♄. June. Middle Geo. and Car. 2—3 feet.

2. H. GALIOI'DES, (Lam.) *Stem* terete, slender. *Leaves* fasciculate, linear-lanceolate, narrowed at the base; margin revolute, dotted *Flowers* axillary, terminal. *Sepals* linear, reflexed when mature. *Petals* obovate, with a tooth near the summit. *Stamens* numerous, scarcely divided into parcels. *Pistils* 3.—Yellow. ♄. June—Aug. Wet places. Geo., Car., and Florida. 2—3 feet.

3. H. FASCICULA'TUM, (Lam.) *Stem* branching, branches angled. *Leaves* linear, coriaceous, crowded, sessile, revolute, dotted. *Flowers* axillary, near the summit. *Sepals* linear, resembling the leaves. *Petals* oblong, ovate, toothed like the preceding. *Filaments* slightly cohering into parcels. *Pistils* 3, united. *Capsule* 3-celled, 3-valved.—Yellow. ♄. June—Aug. Pine barrens. 1—2 feet.

4. H. AU'REUM, (Bar.,) AMŒ'NUM, (Pursh.) *Stem* much branched, branches ancipital. *Leaves* oval, oblong, with slightly undulated margin, glaucous beneath. *Flowers* axillary, solitary. *Sepals* ovate, acute. *Petals* ovate, reflexed. *Stamens* very numerous. *Styles* 3, separating as the fruit matures.—Yellow. ♄. June—Aug. On the Ocmulgee, one mile above Macon. 2—3 feet. *Golden Hypericun.*

5. H. MYRTIFO'LIUM, (Lam.,) GLAU'CUM, (Mich.) *Stem* terete, with a few branches near the summit. *Leaves* cordate-ovate, obtuse, clasping, glaucous, dotted, coriaceous. *Flowers* in fastigiate cymes, leafy. *Sepals* ovate, reflexed. *Petals* about as long as the sepals, with a tooth near the summit. *Stamens* numerous, nearly as long as the petals. *Stylcs* 3, at first united, but separating as the fruit matures.—Yellow. ♄. May—June. Wet places. Middle Geo. 18—24 inches.

6. H. AMBIG'UUM, (Ell.) *Stem* with numerous ancipital, opposite branches, with scaly bark. *Leaves* linear-lanceolate, acute, thin, mucronate, with a white point. *Flowers* axillary and terminal, near the summits of the branches. *Sepals* unequal, lanceolate, attenuate at the base. *Petals* oblique, obovate, with a tooth near the summit. *Styles* united. *Capsule* 3-celled.—Yellow. ♄. May—June. On the Congaree, near Columbia. 2—4 feet.

7. H. NUDIFLO'RUM, (Mich.) *Stem* branching; branches angled and winged. *Leaves* sessile, oblong-ovate, obtuse, punctate, with reddish dots, pale. *Flowers* in a dichotomous panicle. *Sepals* lanceolate, oblong, or linear. *Petals* obovate, double the length of the calyx. *Styles* 3, united at the base. *Capsule* 3-celled.—Yellow. ♄. Aug.—Sept. Swamps. Car. and Geo. 1—2 feet.

8. H. OPA'CUM, (T. & G.) *Stem* slender, with few, opposite, slender branches, nearly square, winged. *Leaves* narrow, oblong, sessile, punctate with minute brown dots, thick, somewhat coriaceous. *Flowers* in a naked cyme. *Sepals* oblong or obovate, unequal. *Petals* very oblique, double the length of the sepals. *Pistils* 3, united.—Yellow. ♄. July—Aug. Near Macon. 18—24 inches.

9. H. FASTIGIA'TUM. *Stem* branching; branches ancipital. *Leaves* long, narrow-lanceolate, acute, connate, tapering at the base, dotted, paler on the under surface. *Flowers* in corymbs, with solitary flowers in the lower divisions of the corymbs. *Sepals* lanceolate, half the

length of the petals. *Styles* united, not separating with the maturing of the fruit.—Yellow. ♄. June—July. Low country, pine woods. 2—3 feet.

10. H. MACULA'TUM, (Walt.) *Stem* terete, glaucous, erect, the whole plant dotted with black. *Leaves* cordate-oblong and oval, clasping. *Flowers* numerous, in a compound panicle. *Sepals* lanceolate, united at the base. *Petals* obovate-oblong, double the length of the calyx. *Stamens* numerous. *Pistils* 3, longer than the stamens. *Stigmas* purple. *Capsule* 3-celled, 3-valved.—Yellow. 2♃. May—Aug. Dry soils. Geo. and Car. 2—2 feet 6 inches.

11. H. PILO'SUM, (Walt.,) SIMPLEX', (Mich.) *Stem* terete, erect, virgate, tomentose. *Leaves* ovate-lanceolate, sessile, appressed, dotted, acute, amplexicaul. *Flowers* in panicles. *Sepals* unequal, ovate-lanceolate. *Petals* oblong. *Styles* 3. *Capsule* 1-celled.—Yellow. ☺. June—Sept. Common in the middle country, in wet places. 1—2 feet.

12. H. ANGULO'SUM, (Mich.) *Stem* erect, angled, branching toward the summit. *Leaves* oblong-lanceolate, sessile, amplexicaul, dotted, appressed. *Flowers* in a loose panicle, frequently in the divisions of the stem. *Sepals* united at the base, unequal, ovate, acute. *Petals* obovate, with a tooth near the summit. *Pistils* 3. *Capsule* 3-valved, 1-celled.—Yellow. 2♃. May—Aug. Wet places. 1—2 feet.

13. H. PARVIFLO'RUM, (L.,) MU'TILUM. *Stem* erect, branching, glabrous, 4-angled. *Leaves* ovate-oblong, clasping, punctate. *Flowers* in the divisions of the stem. *Sepals* lanceolate. *Petals* oblong. *Stamens* 6—10, longer than the corolla. *Pistils* 3, expanding. *Capsule* 1-celled, 3-valved.—Yellow. ☺. July—Sept. Wet grounds, common. 1—2 feet.

14. H. CANADEN'SE, (L.) *Stem* slightly angled, dichotomous toward the summit. *Leaves* linear, sessile, tapering at the base, dotted. *Sepals* lanceolate, acute. *Petals* shorter than the sepals, oblong. *Pistils* 4—5. *Stigmas* capitate. *Capsule* of a dull red color.—Yellow. ☺. June—Aug. Common in wet places. 6—12 inches.

15. H. SAROTH'RA, (Mich.) *Stem* erect, branching from the base, filiform, quadrangular. *Leaves* subulate, minute, opposite, appressed. *Flowers* minute, solitary, axillary. *Sepals* linear-lanceolate. *Petals* oblong, linear, longer than the calyx. *Stamens* 5. *Pistils* 3, spreading. *Stigmas* capitate. *Capsule* 1-celled, 3-valved, purple.—Yellow. ☺. June—Aug. Common. 8—12 inches.

Sarothra Gentianoides of Elliott.

16. H. DRUMMOND'II, (T. & G.) *Stem* branching, terete below, quadrangular above; branches generally alternate. *Leaves* linear, acute dotted. *Sepals* unequal, lanceolate. *Petals* oblong, longer than the sepals. *Stamens* 10—20. *Pistils* 3. *Capsule* 1-celled, 3-valved. *Seeds* ribbed.—Yellow. ☺. July—Sept. Middle Geo. 10—18 inches.

Sarothra Drummondii.

We are not aware, with one exception, that the hypericums are used for any other purpose than ornament. Some of them bear elegant flowers. The *H. amœnum* bears a splendid flower, of the richest golden yellow. It has been gathered from the banks of our streams and transferred to gardens, and it is hardly surpassed by any exotics in its claims on the florist's attention. The *H. perforatum*, an introduced species, and which covers the fields in the Northern and Middle States, has long enjoyed considerable reputation in the cure of diseases; but with the faculty, we believe, it is pretty much abandoned, but still retains a place among the housewife's herbs. It is astringent, and possesses, no doubt, some of the properties of the turpentine. It is used for burns and bruises, in pectoral complaints, jaundice, and as a vermifuge.

GENUS III.—ELO'DEA. Ad. 12—5.

(From the Greek *elos*, a marsh.)

Sepals 5, united at the base. *Petals* 5, unguiculate. *Stamens* 9—15, united into three parcels, with an intervening gland. *Pistils* 3, distinct, spreading. *Capsule* 3-celled, 3-valved.

1. E. VIRGIN'ICA, (Nutt.) *Stem* glabrous, terete, with opposite branches. *Leaves* opposite, oblong, sessile, clasping, glaucous underneath. *Flowers* in axillary and terminal cymes; axillary ones about 3-flowered; terminal ones more numerous. *Sepals* oval, nerved, not dotted, glabrous. *Petals* oval or obovate-oblong, marked with reddish veins. *Stamens* usually 9.—Orange-purple. 4. Aug.—Sept. Wet soils. 18—24 inches.

2. E. PETIOLA'TA, (Pursh.) *Stem* glabrous. *Leaves* petiolate, attenuated at the base, oblong-oval. *Flowers* opposite, by threes. *Stamens* united above the middle. *Sepals* oval, obtuse, with membranaceous margins. *Petals* lanceolate, a little longer than the calyx. *Stamens* 9, in three parcels. *Capsule* 3-celled.—Orange-purple. 4. Aug.—Sept. Around ponds and ditches. 2—2 feet 6 inches.

ORDER XX.—ILLECEBRA'CEÆ.

Sepals 5, persistent, distinct, or united at the base. *Petals* 5 or none, alternate with the sepals, minute, sometimes resembling sterile filaments. *Stamens* equal in number to the sepals, or fewer, and opposite them, perigynous, filaments distinct, anthers 2-celled. *Ovary* compressed, of several carpels, with the dissepiments obliterated, so as to form a pyxidium, with central placentæ, 1 or many seeded. *Seeds* campylotropous. *Embryo* more or less curved. Herbaceous plants, with opposite, entire leaves, with scabrous stipules.

ANALYSIS.

1. Style 1, filiform, petals none, or subulate ..... *Siphonychia*, 3
   Styles or stigmas more than 1 2
2. Styles 5 ..... *Spergula*, 6
   Styles less than 5 3
3. Styles 3 4
   Styles 2 5
4. Flowers in fascicles, terminal, stipules multifid ..... *Stipulicida*, 4
   Flowers cymose ..... *Polycarpon*, 5
   Flowers axillary, solitary ..... *Spergula*, 6
5. Sepals cuspidate, or curved at the summit ..... *Paronychia*, 1
   Sepals sub-saccate at the apex ..... *Anychia*, 2

GENUS I.—PARONY'CHIA. Jus. 5—1.

(From the Greek *paronuchia*, something that cures maladies of the nails.)

Sepals united at the base, cuspidate or curved at the summit, the inner portion colored, cucullate, or concave at the summit.

Petals resembling sterile filaments, very minute or wanting. *Stamens* 5, inserted into the edge of the disk that lines the base of the sepals. *Stigmas* 2. *Styles* more or less united. *Pyxidium* inclosed in the sepals.

1. P. DICHOT'OMA, (Nutt.) *Stem* branching from a thick woody base, glabrous. *Leaves* opposite, subulate, mucronate, dotted, with 4 stipules at each joint. *Flowers* in dichotomous cymes, diffuse. *Sepals* yellowish, linear, 3-ribbed, lined with a whitish disk. *Style* filiform, cleft about one-fourth its length.—♃. July—Nov. North and South Carolina. Texas. 6—12 inches.

2. P. ARGYROCO'MA, (Nutt.) *Root* fusiform. *Stem* terete, jointed, branching, dichotomous, glabrous toward the summit. *Leaves* linear, acute, slightly hairy, with 2 stipules, sometimes 4, longer than the joints. *Flowers* in glomerate cymes. *Sepals* linear, hairy, setaceously cuspidate, the inner portion bearded above.—♃. Aug. Mountains. 4—10 inch.

3. P. HERNIARIOI'DES, (Nutt.) *Stem* diffusely branched, prostrate. *Leaves* sessile, oblong-oval, ciliate, mucronate. *Flowers* sessile in the axils of the leaves. *Sepals* subulate, mucronate, expanding. *Stipules* longer than the leaves.—♃. Upper districts of S. Car. and Geo.

GENUS II.—ANY'CHIA. Mich. 5—1.

(Name of similar origin with the preceding, application not apparent.)

Sepals ovate-oblong, united at the base, slightly concave, sub-saccate at the apex, sub-mucronate on the back. *Corolla* none. *Stamens* 2—5, inserted on the base of the sepals. *Pistils* very short, 2. *Styles* distinct or united. Annual plants, dichotomously divided.

1. A. CANADEN'SIS, (Ell.) *Stem* erect or decumbent at the base, much branched at the summit, dichotomous, pubescent. *Leaves* opposite, nearly glabrous, sessile, dotted. *Stipules* generally four at each joint, membranous. *Flowers* solitary, and terminal on each branch. *Sepals* somewhat hooded at the point. *Stamens* commonly 3, shorter than the calyx. *Stigmas* 2.—☉. July—Aug. Upper districts of Car. and Geo. 4—10 inches.

2. A. BALDWIN'II, (T. & G.) *Stem* decumbent, diffuse, branching from the base. *Leaves* lanceolate, acute. *Stamens* 5. *Styles* distinct nearly to the base.—☉. Middle Florida.

GENUS III.—SIPHONY'CHIA. T. & G. 5—1.

Sepals 5, cohering below into a tube, petaloid above, concave at the summit. *Petals* none, or subulate, filaments like the petals inserted into the tube of the calyx. *Stamens* 5. *Style* filiform, about the length of the calyx.

1. S. AMERICA'NA, (Nutt.) *Stem* branching, diffuse, procumbent, minutely and retrorsely puberulent. *Leaves* oblong-lanceolate, ciliate, slightly hairy beneath, shorter near the summit. *Flowers* in glomerate cymes, at the extremities of the branches numerous. *Sepals* white above, minutely hispid, with hooked bristles at the base.—☉. July—August. Middle Georgia.

Genus IV.—STIPULI'CIDA. Mich. 3—1.

(From *stipula*, a stipule, and *cædo*, to cut, the stipule being divided.)

Sepals 5, united at the base, or separate. *Petals* 5, narrow, oblong, cuneate. *Stamens* 3. *Pistils* 3, with short styles. *Capsule* 3-valved, many-seeded.

1. S. SETA'CEA, (Mich.) *Stem* erect, dichotomous, setaceous. *Leaves* near the root opposite, spatulate, petiolate; of the stem small, setaceous. *Stipules* multifid. *Flowers* minute, in small terminal fascicles.—White ☺. May. Middle Geo. Common. 6—10 inches.

Genus V.—POLYCAR'PON. L. 3—3.

(Fom the Greek *polus*, many, and *karpos*, fruit or seed.)

Sepals 5, distinct, ovate, acuminate, keeled, unequal. *Petals* 5, linear, emarginate, shorter than the sepals, persistent. *Stamens* 3, longer than the corolla. *Pistils* 3, styles united, short. *Capsule* 3-valved, 1-celled, many-seeded.

1. P. TETRAPHYL'LUM, (L.) *Stem* ascending, much branched, glabrous, striate, knotted. *Leaves* opposite and by fours, obovate, obtuse, glabrous, entire, narrowed at the base; several membranous stipules at each joint. *Flowers* in corymbose panicles, dichotomous, with a flower in each division. *Petals* much shorter than the sepals.—White. ☺. May—June. Charleston. Introduced. 3—6 inches.

Genus VI.—SPER'GULA. Bart. 10—5.

(From *spargo*, to scatter.)

Sepals 5, distinct. *Petals* 5, entire. *Stamens* 5—10, sometimes only 2, inserted with the petals. *Pistils* 3—5. *Capsule* 3—5-valved, many-seeded. *Seeds* compressed, orbicular, or reniform.

1. S. ARVEN'SIS, (L.) *Stem* erect, glabrous. *Leaves* verticillate, subulate-linear, numerous at each joint. *Flowers* in dichotomous panicles, with a flower in each division. *Petals* longer than the sepals. *Pistils* 5. *Seeds* margined.—White. ☺. May—August. Common. 10—12 inches.

2. S. DECUM'BENS, (Ell.) *Stem* branching, decumbent. *Leaves* linear, subulate, glabrous, opposite, connected by a stipular membrane. *Flowers* on solitary or axillary peduncles. *Sepals* persistent. *Petals* oblong, obtuse, persistent. *Stamens* 10, as long as the calyx. *Stigmas* 5, nearly sessile. *Seeds* small.—White. ☺. March—April. Common. 1—4 inches.

3. S. RU'BRA, (T. & G.) (*Arenaria rubra. A. Canadensis.*) *Stem* much branched, glabrous, procumbent and assurgent, succulent. *Leaves* linear, subulate, fleshy, mucronate. *Stipules* ovate, cleft, membranaceous. *Flowers* axillary, solitary. *Sepals* lanceolate, with membranaceous margins. *Petals* lanceolate. *Stamens* variable, 2—10. *Stigmas* glandular. —Pale rose-color. ☺. April—May. Salt marshes. 3—6 inches.

Order XXI.—CARYOPHYLLA'CEÆ. Juss.

Sepals 4—5, distinct or united at the base into a tube, persistent. *Petals* 4—5, sometimes wanting, hypogynous, unguiculate, inserted on the pedicel of the ovary, or destitute of claws, and inserted on a nearly perigynous disk. *Stamens* generally twice as many as the petals, and inserted with them. *Filaments* sometimes cohering. *Ovary* stipitate. *Pistils* 2—5, with the stigmatic surface extending the whole length. *Capsule* 2—5-valved, 1-celled, rarely 2—5-celled, dehiscence loculicidal, or by the apex, by the capsule splitting into twice as many teeth as stigmas, with a central placenta. *Seeds* campylotropous. *Herbs*, with tumid nodes. *Leaves* opposite, or in whorls.

ANALYSIS.

1. Calyx tubular 2
   Calyx not tubular 3
2. Styles 2 ..... *Saponaria*, 8
   Styles 3 ..... *Silene*, 6
   Styles 5 ..... *Lychnis*, 7
3. Capsule 3-celled ..... *Mollugo*, 1
   Capsule 1-celled 4
4. Petals 2-parted ..... *Stellaria*, 4
   Petals entire 5
5. Capsules opening by 10 teeth ..... *Cerastium*, 5
   Capsules opening by 3—5 valves 6
6. Pistils 3 ..... *Arenaria*, 3
   Pistils 4 or 5 ..... *Sagina*, 2

Genus I.—MOLLU'GO. L. 3—3.

(The Roman name of this or some similar plant.)

Sepals 5, united at the base. *Petals* 5, minute, or more frequently none. *Stamens* 3—5, opposite the sepals. *Styles* 3. *Capsule* 3-valved, 3-celled, many-seeded.

1. M. verticilla'ta, (L.) *Stem* prostrate, branching, glabrous. *Leaves* spatulate—those toward the summit lanceolate, generally verticillate, with 6 in a whorl. *Flowers* axillary in sessile umbels. *Sepals* expanding, 3-nerved, with membranaceous margins. *Stamens* usually 3. *Styles* 3. *Stigmas* plumose.—April—Sept. Common.

Genus II.—SAGI'NA. Bart. 4—4.

(From *sagina*, fatness, in allusion to its fattening sheep.)

Sepals 3—5, united at the base. *Petals* 4—5, or none. *Stamens* 4—10. *Styles* 4—5. *Capsule* 4—5-valved, 1-celled, many-seeded.

1. S. Procum'bens, (L.) *Stem* procumbent, glabrous. *Leaves* linear, clustered at the extremity of the branches. *Flowers* on solitary, axillary peduncles. *Petals* about half the length of the sepals, or none.—Barren fields. South Carolina. 2—4 inches.

Genus III.—ARENA'RIA. L. 10—3.

(From *arena*, sand, in which the species grow.)

Sepals 5, expanding. *Petals* 5, entire. *Stamens* almost always 10. *Pistils* 3. *Capsule* 3-valved, 1-celled, many-seeded.

1. A. SERPYLLIFO'LIA, (L.) *Stem* diffuse, dichotomously divided, retrorsely pubescent. *Leaves* ovate, ciliate. *Flowers* axillary, or in the divisions of the stem, solitary. *Sepals* hairy, acuminate, lanceolate, somewhat unequal. *Petals* oval, erect, shorter than the sepals. *Stamens* unequal, shorter than the calyx. *Stigmas* 3, simple.—White. ☺. April—May. Common in dry pastures. 3—6 inches.

2. A. SQUARRO'SA, (Mich.) *Stem* much divided near the base, glandular pubescent. *Leaves* short, subulate, the lower ones densely squarrose-imbricate, rather obtuse, upper ones few. *Flowers* in terminal panicles, few-flowered. *Sepals* ovate, obtuse, without nerves. *Petals* obovate, three times as long as the sepals.—White. ♃. April—June. Sand-hills. Common. 6—10 inches.

3. A. STRIC'TA, (Mich.) *Stems* diffusely-cæspitose, glabrous, branched from the base. *Leaves* subulate, linear, erect, 1-nerved, fascicled in the axils. *Flowers* in a few-flowered panicle. *Sepals* ovate, rigid, 3-ribbed. *Petals* oblong-ovate, longer than the sepals.—White. ♃. May—June. Mountains. 4—6 inches.

4. A. GLA'BRA, (Mich.) *Stems* filiform, decumbent at the base, cæspitose, glabrous. *Leaves* linear, spreading, almost setaceous. *Flowers* 8—12. *Sepals* oval, obtuse, membranaceously margined, nerveless. *Petals* obovate-oblong, twice the length of the sepals.—White. ☺. June—July. Mountains. 4—6 inches.

Genus IV.—STELLA'RIA. L. 10—3. (*Chickweed.*)

(From *stella*, a star, the form the petals assume.)

Sepals 5, expanding, somewhat united at the base. *Petals* 5, 2-parted, often perigynous. *Stamens* 10, or fewer by suppression. *Pistils* 3, or rarely 4. *Capsules* 3-valved, 1-celled, many-seeded.

1. S. ME'DIA, (Smith.) *Stem* procumbent, with an alternate pubescent line. *Leaves* ovate, glabrous. *Flowers* terminal or axillary. *Sepals* hairy. *Petal* oblong, deeply divided, hypogynous. *Stamens* 3—10. *Pistils* 3.—White. ☺. March—Oct. Common. 4—8 inches.

2. S. PROSTRA'TA, (Bald.) *Stem* procumbent, slightly channeled, fistulous, slightly pubescent. *Leaves* ovate or cordate, acute, smooth, the lower ones on slender ciliate petioles. *Flowers* solitary. *Sepals* erect, ovate. *Petals* deeply divided, segments linear. *Stamens* usually 7.—White. ☺. March—April. Flor. 1—4 feet long.

3. S. PU'BERA, (Mich.) *Stems* decumbent, with two opposite pubescent lines. *Leaves* sessile, ovate, ciliate. *Flowers* axillary, solitary. *Sepals* with membranaceous margin. *Petals* deeply divided, longer than the sepals. *Stamens* 10. *Pistils* 3.—White. May. In rich soils 6—12 inches.

4. S. UNIFLO'RA, (Walt.) (*Arenaria glabra of Ell.*) *Stem* branching,

glabrous, erect, slender. *Leaves* subulate, acute, slightly connate. *Flowers* on filiform, axillary peduncles. *Sepals* oblong, persistent. *Petals* obcordate, emarginate, twice the length of the sepals.—White. ☺. May. In the low country, swamps. 10—12 inches.

5. S. LANUGINO'SA, (T. & G.) (*Arenaria diffusa of Ell.*) *Stem* branching, diffuse, decumbent. *Leaves* oblong-lanceolate, acute, alternate at the base. *Flowers* on solitary, axillary, 1-flowered peduncles. *Sepals* ovate, acute, persistent. *Petals* oval, very small, or entirely wanting. —White. ☺. April—June. Damp soils. 2—3 feet long, supporting itself on small plants.

GENUS V.—CERAS'TIUM. L. 10—5. (*Chickweed.*)

(From the Greek *keras*, a horn, the shape of the capsules.)

Sepals 5, somewhat united at the base. *Petals* 5, 2-cleft, or emarginate. *Stamens* 10, seldom a less number. *Pistils* 5. *Capsules* 1-celled, 5-valved, dehiscing at the apex, producing 10, rarely 5 teeth, many-seeded.

1. C. VULGA'TUM, (L.) (*C. hirsutum of Ell.*) *Stem* procumbent, branching, fistulous, hirsute. *Leaves* ovate or obovate, obtuse, connate. *Flowers* in dichotomous panicles with a flower in each division. *Sepals* persistent, with membranaceous margin. *Petals* oblong, expanding, double the length of the sepals. *Stamens* unequal. *Styles* short. *Stigmas* glandular.—White. ☺. April—Sept. Very common. 6—12 inches.

2. C. VISCO'SUM, (L.) *Stem* hirsute and viscid, diffuse. *Leaves* lanceolate-oblong, obtuse. *Flowers* in a loose cyme. *Petals* obovate, scarcely longer than the calyx. *Capsule* nearly twice as long as the calyx. —White. ♃. May—Sept. Old pastures, common.

3. C. ARVEN'SE, (L.) *Stems* declined at the base, retrorsely pubescent. *Leaves* linear or linear-lanceolate, acute. *Flowers* few on an elongated peduncle. *Sepals* obtuse, half the length of the petals. *Petals* obcordate.—White. ♃. May—July. Rocky places. 2—8 inches.

GENUS VI.—SILE'NE. L. 10—3.

(From *sialon*, saliva, from the viscid substance on the stem.)

Sepals 5, united into a tube. *Petals* 5, unguiculate, with long claws, usually crowned at the summit of the claw; limb 2-cleft. *Stamens* 10, inserted on the stype of the ovary. *Pistils* 3. *Capsule* 3-celled, opening at the apex with six teeth.

1. S. STELLA'TA, (Ait.) *Stem* erect, branching, minutely pubescent. *Leaves* verticillate by fours, broad-lanceolate, acute. *Flowers* in panicled cymes. *Petals* fimbriate, not crowned.—White. ♃. Through the summer. So. Car. Dry woods. 2—3 feet.

2. S. (C.) A'TA, (Pursh.) *Stem* simple, erect, pubescent, many from the same root. *Leaves* broad at the base, lanceolate-ovate, acuminate, 3-nerved. *Flowers* in cymose panicles. *Calyx* ovate. *Petals* 4-cleft; lobes multifid. No crown.—White. ♃. Car. and Geo. 2—4 feet.

3. S. QUINQUEVUL'NERA, (L.) *Stem* divided from the base, hairy, hir-

sute. *Leaves* cuneate-oblong, obtuse, upper ones linear. *Flowers* in spikes. *Sepals* very villous. *Petals* with nearly round lamina, small; crown biñd.—Pink color. ☺. July. On the coast. 8—12 inches.

4. S. PENNSYLVA'NICA, (Mich.) *Stem* viscidly pubescent, numerous from the same root. *Leaves* lanceolate-acute, radical ones cuneate. *Flowers* in trichotomous panicles, terminal. *Calyx* tubular, viscid, 5-cleft, slightly ventricose. *Claws* of the petals a little longer than the calyx, crowned with a 2-lobed leaflet. *Limb* erosely crenulate, emarginate.—White or rose-color. 2ɟ. April—June. Middle and low country. 8—10 inches.

5. S. VIRGIN'ICA, (L.) *Stem* erect and generally simple, pubescent, viscid. *Leaves* of the stem oblong-lanceolate; radical ones spatulate, with ciliate petioles. *Calyx* slightly ventricose. *Petals* obovate, deeply 2-cleft. *Stamens* exserted.—Bright crimson. 2ɟ. June—July. On the coast. 12—18 inches.

6. S. RE'GIA, (Sims.) *Stem* large, rigid, viscid, branched above, the lower nodes approximate, swollen. *Leaves* ovate or ovate-lanceolate. *Flowers* many, in cymes. *Calyx* tubular, long, 10-striate. *Petals* usually entire, broad-lanceolate. *Stamens* and styles exserted.—Bright scarlet. 2ɟ. June—July. Lou. 4—5 feet.

7. S. ANTIRRHI'NA, (L.) *Stem* pubescent near the base, occasionally spotted. Lower leaves spatulate, pubescent along the midrib. *Flowers* in dichotomous panicles, with a flower in each division. *Calyx* 10-nerved. *Petals* sometimes wanting, small, 2-cleft. *Stamens* nearly as long as calyx, sometimes 5, abortive.—White. ☺. March—April. Moist soil. Common along rivers in middle and lower Georgia. 1—2 feet.

8. S. FIMBRIA'TA, (Bald.) *Stem* weak, pilose; lower leaves obovate or spatulate, ciliate, obtuse; upper leaves small, lanceolate, pubescent. *Flowers* in a 3—5-flowered cyme. *Petals* with the limb broadly cuneiform, fimbriate.—White. 2ɟ. April. Common about Macon, Geo. 6—8 inches. *S. Baldwinii, Nutt.*

GENUS VII.—LYCH'NIS. D. C. 10—5. (*Agrostemma*, L.)

(From *luchnos*, a lamp.)

Calyx tubular, 5-sided. *Petals* 5, unguiculate; limb entire. *Stamens* 10. *Styles* 5. *Capsule* usually 1-celled, or partly 5-celled, at the base.

1. L. GITHA'GO, (Lam.) *Stem* hirsute, dichotomous. *Leaves* opposite, linear-lanceolate. *Segments* of the calyx longer than the corolla. *Flowers* solitary, large.—Purple. ☺. June—July. Introduced. 18—20 inches. *Corn Cockle*

GENUS VIII.—SAPONA'RIA. L. 10—2.

(From *sapo*, soap.)

Calyx tubular, 5-toothed. *Petals* 5, unguiculate. *Stamens* 10. *Styles* 2. *Capsule* 1-celled, 2-valved.

1. S. OFFICINA'LIS, (L.) *Stem* terete, glabrous. *Leaves* ovate-lanceolate or oval, opposite, connate, 3-nerved, glabrous. *Flowers* in clus-

tered panicles, frequently double; crown of the petals linear.—White, tinged with red. 4. Through the summer. Introduced. 12—20 inches.

GENUS IX.—DIAN'THUS. L. 10—2.

(From the Greek *dios*, divine, and *anthos*, a flower.)

Calyx tubular, 5-toothed, with scales at the base. *Petals* 5, with long claws. *Stamens* 10. *Styles* 2. *Capsule* 1-celled.

1. D. CAROLINIA'NA, (Walt.) *Flowers* aggregated, on long peduncles, pink. Scales of the calyx half as long as the tube.

ORDER XXII.—PORTULACA'CEÆ. Juss.

Sepals 2, seldom 3—5, cohering at the base. *Petals* generally 5; æstivation imbricate. *Stamens* 5—20, and opposite the petals, inserted with them into the base of the sepals. *Anthers* versatile. *Styles* 3-cleft, stigmatose within. *Capsule* 1—4-celled, with a transverse dehiscence. *Placenta* central. *Seeds* numerous, campylotropous. *Embryo* curved. Succulent plants. *Leaves* without stipules.

GENUS I.—PORTULAC'A. L. 12—1.

(From *porto*, to carry, and *lac*, milk.)

Calyx cohering to the ovary, 2-parted. *Petals* 4—6, inserted on the calyx, equal. *Stamens* 8—20. *Styles* 3—6-cleft at the apex, or parted. *Capsule* 4-celled, many-seeded.

1. P. OLERA'CEA, (L.) *Stem* fleshy, spreading on the ground. *Leaves* cuneiform, obtuse, fleshy. *Flowers* sessile, in clusters, axillary and terminal, small.—Yellow. ☺. Introduced. *Purslane.*

GENUS II.—TALI'NUM. Adans. 12—1.

(Supposed to be derived from *thalia*, a green branch, in allusion to its verdure.)

Sepals 2. *Petals* 5, distinct or somewhat united at the base. *Stamens* 10—20. *Style* filiform, cleft at the apex. *Capsule* 1-celled, 3-valved, many-seeded.

1. T. TERETIFO'LIUM, (Pursh.) *Stem* 1—4 inches long. *Leaves* terete, subulate, fleshy. *Flowers* in cymes. *Peduncles* elongated, 3—8 inches, naked.—Purple. 4. N. C.

GENUS III.—CLAYTO'NIA. L. 5—1.

(In honor of John Clayton.)

Calyx 2-sepaled. *Petals* 5, hypogynous, obcordate, emarginate, bifid, sometimes entire, unguiculate, the claws more or less connate. *Stamens* 5, inserted into the claws of the petals. *Style* 3-cleft. *Capsule* 3-valved, few-seeded. *Seeds* smooth and shining. Herbs with simple stems.

1. C. Carolinia'na, (Mich.) *Root* tuberous. Radical leaves long petioled, spatulate; cauline leaves ovate-lanceolate or oval, one or two pair on a stem. *Flowers* in racemes, on a nodding pedicel. *Sepals* obtuse. *Petals* nearly round, with purple veins.—Rose-colored. 2f. March. Mountains.

2. C. Virgin'ica, (L.) Radical leaves few, linear-lanceolate; cauline ones a single pair, linear-attenuate at the base, glabrous. *Flowers* in a simple raceme. *Peduncles* 1—2 inches long, nodding. *Sepals* lanceolate-acute, persistent. *Petals* oval, obtuse, striate, much longer than the sepals. *Anthers* erect, oblong, rose-colored.—Rose-colored. 2f. March—April. Near Columbia and Macon. *Spring-beauty.*

Order XXIII.—LINA'CEÆ. D. C.

Sepals 5, persistent, with an imbricated æstivation. *Petals* 5, alternate with the sepals, with a twisted æstivation, hypogynous, unguiculate. *Stamens* 5. *Anthers* attached by the middle. *Pistils* 5. *Styles* few, spreading. *Stigmas* capitate. *Capsule* globose, or by false dissepiments, 10-celled; dehiscence septicidal. *Seeds* suspended, anatropous, ovate, compressed, mucilaginous when moistened. Herbaceous plants, annuals.

Genus I.—LI'NUM. L. 5—5.

(Latin *linum*, a thread.)

There is but this genus belonging to this order, and the description of the order will suffice for the genus.

1. L. Virginia'num, (L.) *Stem* erect, smooth, branching above, glabrous. Radical leaves ovate, spatulate; cauline ones alternate, linear lanceolate. *Flowers* in corymbose panicles, lax. *Sepals* acute, ovate. *Petals* small. *Capsule* nearly globose.—Yellow. ☺. May—June. Common in Middle Car. and Geo. 18—36 inches. *Wild Flax.*

2. L. rig'idum, (Pursh.) *Stem* angled, branched above. *Leaves* linear, acute, rigid, with scabrous margins. *Sepals* broad-lanceolate, cuspidate, with scabrous margins, with 3 strong nerves. Yellow. ☺.

The *Linum usitatissamum*, the common *Flax*, has become almost naturalized in some parts of the United States, and is the only species which is appropriated to any use; but the others possess similar useful properties. The woody fibre of the bark is the material from which all linen fabrics are manufactured, and a mucilage composing a part of the testa of the seed is used in medicine, and a fixed oil, contained in the kernel of the seed, is the common *painters' oil*, known under the name of *Linseed Oil.*

Order XXIV.—GERANIA'CEÆ. D. C.

Sepals 5, persistent, with an imbricated æstivation, ribbed, one sometimes spurred or saccate. *Petals* 5, hypogynous, unguiculate, distinct. *Stamens* hypogynous, monadelphous, 10. *Ovary* composed of 5 carpels, arranged around the extended axis. *Styles* 5, cohering round the axis, the stigmatic surface within the summit. *Carpels* distinct in fruit, each 1 or 2 seeded, dehiscing by the inner suture. *Seeds* pendulous, anatro-

pous, without albumen. *Embryo* curved, cotyledons plaited. *Stems* tumid, and separate at the joints.

Genus I.—GERA'NIUM. L. 15—10.

(From *geranos*, a crane; the long termination of the carpels gives it the name of Crane's-bill.)

Sepals 5, equal. *Petals* 5, equal. *Stamens* 10, alternate ones larger, with nectariferous scales at the base. *Carpels* terminated by long awns.

1. G. MACULA'TUM, (L.) *Stem* erect, retrorsely pubescent, dichotomous, somewhat angled. *Leaves* opposite, 3—5-parted, notched. *Segments* cuneate, pubescent. *Flowers* few, the terminal peduncle 2-flowered. *Sepals* hairy, oblong-lanceolate. *Petals* villous, obovate, cuneate, entire.—Purple. ♃. April—May. Common.

Crow-foot. Spotted Crane's-bill.

2. G. CAROLINIA'NUM, (L.) *Stem* procumbent, assurgent, pubescent, diffusely branched. *Leaves* opposite, 5-lobed, 3-cleft. *Flowers* in the divisions of the stem. *Peduncles* 2-flowered. *Sepals* ovate, hairy, 3-nerved, mucronate. *Petals* obovate, emarginate, equal in length to the sepals; five exterior stamens shortest. *Stigmas* 5. *Seeds* oval, minutely reticulated.—Rose-color. ☺. March—June. Common about cultivated lands.

Order XXV.—BALSAMINA'CEÆ. Rich.

Sepals 5, apparently only 4, from the union of the two upper ones, and sometimes only 2, the lowest one spurred; æstivation imbricate. *Petals* 4, united so as to appear but 2, hypogynous. *Stamens* 5, hypogynous. *Filaments* subulate. *Anthers* 2-celled. *Ovary* 5-celled, with a central placenta. *Stigmas* 5, sessile. *Fruit* 1 or 5 celled, 5-valved, many-seeded. *Seeds* suspended. *Embryo* straight, anatropous. Succulent herbs. *Flowers* axillary.

Genus I.—IMPA'TIENS. L. 5—1.

(Latin *impatiens*, impatient, from the bursting of the seed-vessel when touched.)

Sepals apparently only 4. *Petals* apparently only 2. *Stamens* 5, more or less united at the summit.

1. I. PAL'LIDA, (Nutt.) (*I. Noli Tangere of Ell.*) *Stem* much branched, succulent, smooth. *Leaves* oval or ovate, serrate; teeth mucronate, on long petioles, glabrous. Lower sepal broad, spurred.—Yellow. ☺. July—Sept. Common in wet places. 2—5 feet.

Balsam. Snap-weed.

2. I. FUL'VA, (Nutt.) (*I. biflora of Ell.*) *Leaves* rhombic-ovate, serrate; teeth mucronate. *Peduncles* 2—4-flowered. Lower sepal acutely cordate, with a long resupinate spur. *Flower* spotted with brown spots. *Plant* similar to the preceding.—Deep orange. ☺. July—October. Swamps.

Order XXVI.—OXALIDA'CEÆ. D. C.

Sepals 5, distinct or slightly cohering at the base, persistent; æstivation imbricate. *Petals* 5, hypogynous, unguiculate, equal, with a twisted æstivation. *Stamens*, those alternate with the petals shorter. *Anthers* innate, 2-celled. *Ovary* composed of 5 united carpels, opposite the petals, 5-angled, 5-celled, with 5 filiform styles. *Fruit* a 5-celled, 5-valved capsule, 1—12-seeded. *Seeds* anatropous, with a loose fleshy testa, which bursts when the seeds are mature. *Embryo* straight, with a long radicle and foliaceous cotyledon. Plants herbaceous, with an acid juice.

Genus I.—OXA'LIS. L. 10—5. (*Wood-sorrel.*)

(From *oxalis*, acid, from the sourness of the leaves.)

Sepals 5, distinct or slightly cohering at the base. *Petals* 5. *Stamens* 10, those opposite the petals longer, monadelphous at the base. *Styles* 5. *Capsule* 5-angled. *Seeds* one or several; tegmen ribbed, rugose.

1. O. viola'cea, (L.) *Bulb* scaly. *Scape* umbelliferous, 3—7-flowered. *Leaves* obcordate, ternate, glabrous, dotted. *Flowers* large. *Sepals* lanceolate, obtuse, with an orange-colored 2-cleft gland at the summit. *Petals* obovate. *Stigmas* 2-cleft.—Violet-colored. ♃. March —May. Rich soils. Common. 6—9 inches.

2. O. cornicula'ta, (L.) *Stem* decumbent, branched, leafy, pubescent. *Leaves* glabrous on the upper surface, hairy underneath, ciliate. *Flowers* generally two on each peduncle. *Sepals* pubescent, erect, ciliate. *Petals* emarginate.—Yellow. ♃. Feb.—May. Low country.

3. O. stric'ta, (L.) *Stem* erect, leafy, branching, hairy. *Flowers* in small umbels. *Peduncles* 2—6-flowered. *Petals* obovate, generally entire. *Leaves* alternate near the base of the stem, in verticillate clusters towards the summit; leaflets obcordate. *Styles* not half as long as the shortest stamens, recurved.—Yellow. ☺. April—May. Common.

Order XXVII.—ZYGOPHYLLA'CEÆ. R. Br.

Sepals 5, persistent. *Petals* 5, obovate; æstivation convolute. *Stamens* 10, hypogynous, the 5 opposite the petals somewhat abortive. *Ovary* of 5 carpels, apparently 10-celled, with an ovule in each cell. *Style* conical, furrowed. *Stigma* capitate, ribbed. *Fruit* a regma, with 5 or 10 indehiscent cocci. *Seeds* anatropous. *Embryo* green, with foliaceous cotyledons. Herbaceous plants, with opposite stipulate leaves.

GENUS I.—KALLSTRŒ'MIA. Scop. 10—1.

(From an obscure botanist.)

1. K MAX'IMA, (T. & G.) *Stems* procumbent, diffuse, trailing, pubescent. *Leaves* pinnate, generally with 3, sometimes 4 pairs of leaflets *Leaflets* oblong, mucronate, slightly falcate, pubescent beneath, the terminal one largest. *Flowers* on solitary, axillary, 1-flowered peduncles. *Calyx* persistent. *Petals* obovate, longer than the calyx, withering. *Cocci* gibbous below, tubercled.—Yellow. ♃. June—Sept. Introduced from the West Indies. Savannah. 1—2 feet long.

ORDER XXVIII.—ZANTHOXYLA'CEÆ. Ad. Juss.

Flowers diœcious or perfect, regular. *Sepals* 3—7, cohering at the base. *Petals* as many as the sepals or none, æstivation twisted-convolute. *Stamens* as many or twice as many as the petals. *Filament* distinct. *Anthers* introrse. *Ovaries* as many as the sepals, or sometimes fewer, distinct or united. *Fruit* of several drupes, or baccate or membranaceous, 2—5-celled, sarcocarp fleshy, separable from the endocarp. *Seeds* anatropous, solitary or in pairs, pendulous. *Embryo* lying within fleshy albumen. Trees or shrubs, usually with prickles.

GENUS I.—ZANTHOX'YLUM. L. 20—5.

(From the Greek *xanthos*, yellow, and *xulon*, wood.)

DIŒCIOUS. *Sepals* usually 5, small, united at the base. *Corolla* none. *Stamens* 3, 5, 6, or 8, those of the pistillate flowers rudimentary. *Pistillate flowers* sometimes with a corolla. *Styles* 2, 3, or 5, and ovaries as many. *Carpels* crustaceous in fruit, 2-valved, 1—2-seeded. *Seeds* black, shining, and globose when solitary, hemispherical when in pairs.

1. Z. AMERICA'NUM, (Will.) (*Z. Clava, Herculis of Linn.*) A shrub, with the branches armed with strong stipular prickles. *Leaves* pinnate. *Leaflets* ovate, acuminate, nearly sessile, more or less pubescent. *Flowers* in axillary umbels, greenish.—♄. April—May.
Prickly-ash. Toothache-bush.

2. Z. CAROLINIA'NUM, (Lam.) (*Z. tricarpium of Ell.*) A small tree, with numerous expanding branches, bark with prickles. *Leaves* pinnate, alternate; leaflets obliquely lanceolate, crenate, serrulate, glabrous, shining above. *Flowers* in terminal panicles. *Sepals* minute. *Petals* long-oval, longer than the sepals. *Stamens* usually 5, but variable. *Styles* 2—3, incurved. *Capsule* 1-seeded. Leaves and bark very pungent to the taste.—June. On the coast of Car., Geo., and Florida. 12—20 feet. *Prickly-ash.*

GENUS II.—PTE'LEA. L. 4—1.

(From the Greek *ptelea*, the Greek name for Elm.)

DIŒCIOUS. *Sepals* 4, united at the base. *Petals* 4, spread-

ing, much larger than the sepals. *Stamens* 4, alternate with and longer than the petals. *Filaments* hairy on the inside. *Fruit* a samara, 2-celled, with one seed in each cell, wing reticulated.

1. P. TRIFOLIA'TA, (L.) A shrub, branching; the young branches pubescent. *Leaves* ternate. *Leaflets* sessile, ovate, the terminal one attenuate at the base, obscurely crenulate. *Flowers* in terminal panicles. *Petals* oval, pubescent, greenish. Flowers with a disagreeable odor.—Greenish. May—June. Middle Car. and Geo. 6—8 feet.

Ailanthus glandulosa, or *Tree of Heaven*, has become a very common and very troublesome tree. It has little or nothing to recommend it, and its unpleasant odor, when in bloom, and the innumerable shoots it sends up in all its neighborhood, are great drawbacks to its cultivation. It belongs to this order.

ORDER XXIX.—ANACARDIA'CEÆ. R. Br.

DIŒCIOUS or perfect, regular. *Sepals* generally 5, distinct, or united at the base. *Petals* of the same number as the sepals, or none, when present inserted into a glandular disk at the bottom of the calyx, æstivation imbricate. *Stamens* the same number as the sepals, and opposite them, or twice as many, anthers introrse. *Ovary* solitary, of 1—5 carpels, all but one abortive, 1-celled. *Styles* usually 3, distinct or united. *Stigmas* 3. *Fruit* usually drupaceous, 1-seeded. *Seed* erect or suspended, anatropous. *Embryo* curved. *Albumen* none. Vines and shrubs, or small trees with a caustic juice. *Cotyledons* foliaceous.

GENUS I.—RHUS. L. 5—3.

(From the Greek *rous*, red, in allusion to its fruit.)

1. R. TYPHI'NA, (L.) A shrub or small tree, branches very villous *Leaves* unequally pinnate, 11—31 leaflets, lanceolate-oblong, acuminate, acutely serrate, pubescent beneath. *Petioles* sometimes 2—3 feet long, villous. *Flowers* often polygamous or diœcious, in dense panicles. *Fruit* a compressed drupe, covered with an acid, crimson, velvet-like down. Cellular tissue of the wood orange-color, with a strong aromatic odor. *Juice* resinous, copious.—Greenish-yellow. ♄. June. 15—20 feet. Middle Georgia, in dense bunches, on rich land.

Stag-horn Sumach.

2. R. GLA'BRA, (L.) A large shrub, with milky juice, glabrous, generally tinged with purple. *Leaves* pinnate, with 13—31 leaflets, lanceolate-oblong, acuminate, smooth, acutely serrate, glaucous beneath. *Flowers* in terminal, thyrsoid panicles, often diœcious. *Fruit* clothed with crimson acid hairs.—Greenish-yellow. ♄. July. Around fields, common. 6—12 feet.

Smooth Sumach.

3. R. PUMI'LA, (Mich.) A procumbent shrub, villous. *Leaves* pinnate, about 11 leaflets, oval or oblong, toothed, pubescent. *Flowers* in terminal panicles, nearly sessile. *Fruit* clothed with a red silky pubescence. Said to be very poisonous.—♄. July. Upper country. 10—14 inches

4. R. COPALLI'NA, (L.) A branching shrub; branches pubescent. *Leaves* pinnate. *Leaflets* 9—21, obliquely-lanceolate, slightly revolute, glabrous on the upper surface, pubescent on the lower, unequal at the base. *Petiole* winged and jointed. *Flowers* in terminal panicles, somewhat leafy. *Fruit* red, hairy, sour.—Dull yellow. ♄. Aug. Common. 3—12 feet. *Sumach.*

5. R. VER'NIX, (L.) A shrub, with glabrous branches, poisonous. *Leaflets* 7—13, membranaceous, oval, acuminate, entire, glabrous. *Flowers* in slender panicles, axillary, mostly diœcious. *Fruit* sub-globose, smooth, greenish-white.—Greenish. ♄. May—June. Middle and upper districts of Geo. and Car.

Poison Sumach. R. venenata, D. C.

6. R. TOXICODEN'DRON, (L.) A small, slender shrub. *Leaves* trifoliate, somewhat pubescent; leaflets broad-oval or rhomboidal, acuminate, the lateral ones nearly sessile, unequilateral. *Flowers* in axillary racemes. *Fruit* sub-globose, white, poison.—White. ♄. April—May. Common in dry pine woods. 2—6 feet. *Poison Oak. Poison Vine.*

7. R. RAD'ICANS, (L.) This plant agrees in many respects with the R. toxicodendron, and is made a variety of that species by Torrey & Gray. A large vine, climbing the highest trees, giving out radicles all along the stem, which enter the bark of the tree, and afford support to the vine; small glabrous branches numerous. *Leaves* ternate, ovate, lanceolate, acute or acuminate, generally entire, lower ones rhomboidal. Differs entirely in habit from the R. t., preferring damp places. *Fruit* white.—Yellow. ♄. May. Common. 40—60 ft. long. *Poison Ivy.*

8. R. AROMAT'ICA, (Ait.) A small aromatic shrub; the young branches tomentose. *Leaves* pubescent when young, glabrous and coriaceous when old, ternate. *Leaflets* sessile, rhomboid-ovate, incisely toothed, the terminal one narrowed at the base. *Flowers* diœcious, in axillary compact panicles, amentaceous. *Fruit* nearly spherical, light red, hispid, acid.—Yellow. ♄. May—June. Upper districts of Car. and Geo. 2—3 feet.

ORDER XXX.—AMYRIDA'CEÆ. R. Br.

Flowers perfect, regular. *Sepals* 4, small, persistent. *Petals* 4. *Stamens* hypogynous, 8. *Ovary* solitary, simple, 1-celled, on a thickened disk; ovaries 2—6, pendulous. *Fruit* drupaceous, 1-seeded. *Seeds* anatropous, without albumen.

GENUS I.—AM'YRIS. L. 8—1.

(From the Greek *a*, and *muron*, balm.)

Genus same as the Order.

1. A. FLORIDA'NA, (Nutt.) A shrub. *Leaves* on very short petioles, 3-foliate; leaflets ovate, strongly veined. *Flowers* somewhat panicled. *Drupes* sub-globose.—White. East Florida.

ORDER XXXI.—AURANTIA'CEÆ. Corr.

Calyx tubular, 4—5-cleft, urceolate or campanulate. *Petals* 4—5, broad at the base, inserted on an hypogynous disk. *Sta-*

mens usually not less than 10; filaments dilated at the base. *Ovary* several-celled, composed of several carpels. *Style* 1, cylindrical. *Fruit* pulpy, 1 or more celled, with a thick rind, containing receptacles of volatile oil. *Seeds* anatropous, raphe distinct. Trees or shrubs.

GENUS I.—LIMO'NIA. L. 10—1. (*Lime, Lemon, and Orange.*)

(From *limoun*, the Arabic name of the fruit.)

Calyx 4—5-cleft, urceolate. *Petals* 4—5. *Stamens* 8—18. *Filaments* subulate. *Anthers* cordate, receptacle elevated. *Fruit* 4—5-celled, or by abortion fewer.

1. L. ACIDIS'SIMA, (L.) *Leaves* pinnate; leaflets roundish-oval, crenate; spines geminate. *Flowers* odorous. *Fruit* yellowish, about the size of a nutmeg. *Pulp* very acid, flesh-colored.—Florida.

GENUS II.—CIT'RUS. L. 10—1. (*Kitria*, lemon-tree.)

Calyx 5-cleft. *Petals* 5, oblong. *Filaments* dilated at the base, in several parcels. *Fruit* 9—18-celled.

1. C. MED'ICA, (L.) *Leaves* ovate, acuminate, with linear petioles, not winged.—Asia. *Citron.*

2. C. LIMO'NUM, (L.) *Leaves* oblong, acute. *Stamens* 25—35. *Styles* usually wanting. *Fruit* yellow, with a thin rind, very sour.—Asia. *Lemon*

3. C. AURAN'TIUM, (L.) *Leaves* oval-oblong. *Stamens* about 20. *Fruit* globose, with sweet pulp.—Asia. *Orange.*

ORDER XXXII.—TERNSTRŒMIA'CEÆ. Mirb.

Sepals 5, deciduous, concave, coriaceous, æstivation imbricate. *Petals* 5, united at the base, alternate with the sepals. *Stamens* numerous, monadelphous, generally adhering to the base of the petals. *Ovary* 5-celled, situated on a flattened torus. *Placenta* central. *Styles* 5 or 6, distinct or united. *Fruit* 5 or 6 celled; capsule baccate, or coriaceous and indehiscent. *Seeds* anatropous or campylotropous, large. *Embryo* straight or curved. Trees or shrubs. *Leaves* alternate, without stipules. *Flowers* large and showy.

GENUS I.—GORDO'NIA. Ellis. 15—12.

(In honor of Gordon, a London nurseryman.)

Sepals 5, coriaceous, broad, ovate, or nearly round, imbricate. *Petals* 5, united at the base. *Styles* 5, united, forming a five-angled column. *Capsule* ligneous, 5-celled, 5-valved, with 2 winged seeds in each cell.

1. G. LASIAN'THUS, (L.) A large tree, with light, coarse-grained, ma-

hogany-colored wood. *Leaves* lanceolate-oblong, alternate, glabrous, attenuate at the base, coriaceous, lucid on both sides, perennial, serrate. *Flowers* solitary, axillary toward the summit of the branches. *Sepals* silky, ciliate, ovate, nearly round. *Petals* hairy on the outside, obovate, united at the base, with the stamens forming a short tube. *Stamens* very numerous. *Capsule* 5-celled, 5-valved.—White. ♄. May—Aug. Swamps and wet lands near the coast. 60—80 feet. *Holly-bay.*

2. G. PUBES'CENS, (L'Her.) A tree, with spreading branches, the young branches smooth, pubescent at the summit. *Leaves* oblong-cuneate, sharply serrate, shining on the upper surface, hoary beneath, thin, somewhat membranaceous. *Flowers* solitary, axillary, on short thick peduncles. *Sepals* nearly round, silky beneath. *Petals* obovate, silky on the outer surface. *Stamens* unequal, numerous. *Styles* short. *Capsule* nearly globular.—White. ♄. June—Aug. On the Altamaha. 40—50 feet.

GENUS II.—STŪAR'TIA. Cav. 15—12.

(In honor of John Stuart, Marquis of Bute.)

Sepals 5, united at the base, lanceolate. *Petals* 5, united at the base. *Stamens* very numerous, monadelphous, with the tube united to the base of the petals. *Styles* 5, distinct or united. *Capsule* 5-celled, 5-valved, somewhat ligneous. *Seeds* 2 in each cell slightly margined. Shrubs with showy flowers.

1. S. VIRGIN'ICA, (Cav.) A handsome shrub, with somewhat geniculate branches, pubescent when young. *Leaves* oval-lanceolate, acuminate, serrate, pubescent beneath. *Flowers* solitary or by pairs, axillary, on very short peduncles. *Sepals* united, forming a campanulate calyx, persistent, mucronate, 2 ovate bracts at the base, and with the sepals covered with a silky pubescence. *Petals* 5, a little hairy, obovate. *Filaments* purple, hairy at the base. *Styles* united. *Stigmas* 5-lobed. *Capsule* hairy.—White. ♄. May. Rich soils. Middle Car. and Geo. 8—12 feet. *S. malachodendron*, L.

2. S. PENTAGYN'IA, (L'Her.) A shrub very much like the preceding. *Sepals* lanceolate, bracteolate. *Petals* larger than the preceding, undulate, deeply crenulate. *Styles* distinct. *Capsule* hairy, with 5 angles, ligneous.—Cream-colored. ♄. June. Mountains. Car. and Geo. 8—12 feet.

ORDER XXXIII.—MALVA'CEÆ. Juss.

Sepals 5, seldom 3 or 4, more or less united at the base, often calyculate, æstivation valvate. *Petals* hypogynous, equal the number of sepals. *Stamens* numerous, monadelphous, hypogynous. *Anthers* reniform. *Pollen* hispid. *Ovary* composed of several carpels, generally united, with as many styles. *Fruit* usually capsular, seldom baccate; cells 1 or many seeded; dehiscence loculicidal or septicidal. *Seeds* campylotropous or heterotropous. *Embryo* curved with foliaceous cotyledons. Herbs or shrubs. *Leaves* alternate.

ANALYSIS.

1. Calyx having no involucel 4
   Calyx having an involucel 2
2. Involucel many-leaved 5
   Involucel 3-leaved 3
3. Carpels with 2 horns ..... *Modiola*, 3
   Carpels without horns ..... *Malva*, 2
   Carpels without horns, yellow ..... *Malope*, 1
4. One ovule in each cell ..... *Sida*, 7
   Three or more ovules in each cell ..... *Abutilon*, 6
5. Styles 10, cells 1-seeded ..... *Malvaviscus*, 4
   Styles 5, cells several-seeded ..... *Hibiscus*, 8

Genus I.—MAL'OPE. L. 15—12.

(From the Greek *malos*, tender; soft leaves.)

Sepals 5, united, with 3 setaceous bracteoles, hairy. *Capsules* with many distinct carpels, each 1-seeded, aggregated.

1. M. MALACOI'DES, (L.) *Stem* sparingly branched, with hairs near the summit. *Leaves* ovate, crenate, obtuse at the base, glabrous on the upper surface, hairy along the veins beneath. *Flowers* axillary solitary. *Petals* about twice as long as the sepals. *Capsules* hispid. *Seeds* compressed.—Yellow. ☺. Virginia.

Genus II.—MAL'VA. L. 15—12.

(From *malake*, soft, in allusion to the mucilaginous qualities of the species.)

Sepals 5, united, with 3 bracteoles at the base, both hairy. *Carpels* generally more than 5, arranged circularly, indehiscent.

1. M. ROTUNDIFO'LIA, (L.) *Stem* prostrate, hairy. *Leaves* 5—7-lobed, cordate, orbicular, on long petioles; lobes obtuse, hairy. *Flowers* axillary; bracteoles subulate, nearly as long as the sepals, hairy. *Style* many-cleft.—White. ♃ May—July. About buildings. 1—2 feet long.

2. M. PAPA'VER, (Cav.) *Stem* herbaceous, prostrate, 1—2 feet long, hairy. *Petioles* long (5—6 inches), hairy. *Leaves* digitate. *Lobes* from 3—5, long; margins and nerves bristled. *Peduncles* long (5—6 inches), hairy. *Calyx* usually double, the interior 5-parted; margins and nerves furnished with acute bristles. *Petals* 5, obtuse, fringed, or laciniate on the exterior margins, large, dark purple.—In pine woods. Florida and southern parts of Georgia.

Croom in Sill. Jour., vol. xxvi. p. 313.

Genus III.—MODI'OLA. Mœn. 15—12.

(From *modiolus*, the nave of a wheel, in allusion to the arrangement of the carpels.)

Calyx 5-cleft, with 3 bracteoles at the base. *Carpels* arranged circularly, 2-valved, spuriously 2-celled, 2-seeded.

1. M. MULTIF'IDA, (Mœn.) (*Malva Carolinia'na of Ell.*) *Stem* diffuse, hirsute, prostrate. *Leaves* 3—5-lobed, obtuse, cordate at the base. *Lobes* dissected. *Carpels* numerous, hispid, with 2 subulate horns, lunate, compressed, united in a truncated head.—Red. ☺. April—June. Common about buildings.

GENUS IV.—MALVAVIS'CUS. Dill. 15—12.

(From *malva*, mallows, and *viscus*, glue.)

Calyx deeply 5-cleft, surrounded by a many-leaved involucel. *Petals* erect, convolute. *Stigmas* 10. *Carpels* 5, baccate, 1-seeded, united or distinct.

1. M. FLORIDA'NUS, (Nutt.) A small shrub, hirsute. *Leaves* cordate-ovate, hispid, crenately serrate, 1—2 inches long. *Peduncles* axillary; involucel 8—9-leaved. *Flowers* nodding, solitary.—Scarlet. 4. East Florida.

GENUS V.—GOSSYP'IUM. L. 15—12.

(From an Arabic word which signifies soft.)

Calyx cup-shaped, obtusely 5-toothed, surrounded by a 3-leaved involucel, cordate, deeply toothed or incised. *Stigmas* 3—5. *Capsule* 3—5-celled; dehiscence loculicidal, many-seeded. *Seeds* imbedded in the cotton. *Cotton.*

1. G. HERBA'CEUM, (L.) *Stem* smooth, pubescent. *Leaves* usually 3—5-lobed, pubescent; lobes sometimes rounded, acuminate, mucronate. *Flowers* yellowish-white, turning to red when old.—Native of India, Africa, and Syria. *Common Cotton.*

2. G. BARBADEN'SE, (L.) *Leaves* 3—5-lobed, with 3 glands beneath. *Flowers* large, with a purple spot at the base of each petal.—Yellowish, finally turning red. Native of Barbadoes. *Sea-Island Cotton.*

Fourteen species of cotton are described by authors, but many of them probably are only varieties.

GENUS VI.—ABU'TILON. Dill. 15—12. (*Sida Abutilon of Ell.*)

(The Greek for the Mulberry, applied to this from the resemblance of its leaves.)

Calyx 5-cleft, naked. *Style* multifid. *Ovary* 5 or many-celled, 3—5 seeds in a cell.

1. A. AVICEN'NÆ. (Gært.) *Stem* 2—4 feet, with spreading branches. *Leaves* broad-cordate, velvety, tomentose, acuminate, crenately toothed. *Carpels* generally 15, 3-seeded, birostrate, hairy. *Peduncles* solitary or in pairs, 1—many-flowered.—Orange-yellow. ☺. Introduced. Roadsides.

GENUS VII.—SI'DA. L. 15—12.

(The Greek name of a plant resembling the Althaca.)

Calyx 5-cleft, angled, without an involucel. *Ovary* 5 or many-celled, with a single ovule in each cell. *Capsules* consisting of 5 or more carpels, commonly 2-valved.

1. S. SPINO'SA, (L.) *Stem* branching, finely pubescent. *Leaves* alternate, cordate-ova., or broad-lanceolate, serrate. *Stipules* setaceous, with a spinose tubercle at the base. *Flowers* axillary, solitary, on short peduncles. *Calyx* pubescent. *Petals* obovate. *Stigma* 5-cleft. *Carpels* 5, easily separated when mature, 2-lobed.—Yellow. ☺. May—July. Sandy soils. 1—2 feet.

2. S. Elliotti'ii, (T. & G.) *Stem* slender, herbaceous, nearly glabrous with spreading branches. *Leaves* linear, serrate, varying in width, obtuse at the base, nearly glabrous. *Flowers* axillary. *Segments* of the calyx broad. *Petals* emarginate, striate, expanding. *Styles* many-cleft. *Carpels* 10, united into a spherical head, glabrous.—Yellow. 2f. Aug.—Sept. On the coast of Car. and Geo. 2—4 feet. *Sida glaber.*

3. S. his pida, (Pursh.) *Stem* branching, stellular tomentose. *Leaves* lanceolate, serrate, slightly hairy on both surfaces. *Flowers* on small axillary branches, crowded, and nearly sessile. *Calyx* angular, hairy. *Petals* rather longer than the calyx.—Yellow. 2f. July—Aug. Sandy soils.

4. S. rhombifo'lia, (L.) *Stem* suffructicose, branching, stellular pubescent. *Leaves* in alternate clusters, hairy on the upper surface. *Flowers* axillary and usually solitary, on peduncles much longer than the petioles. *Carpels* 10—12, with 2 subulate horns. *Petals* obovate. *Calyx* angular; segments very broad, acuminate.—Yellow. 2f. July—Sept. Dry pastures. 1—2 feet.

5. S. gla'bra, (Nutt.) *Stem* glabrous or minutely pubescent. *Leaves* linear, oblong, and lanceolate, incisely and unequally serrate. *Flowers* axillary, crowded. *Calyx* wide, plaited. Varying very greatly in size, from a few inches to two feet.—Yellow. ☉. Florida.

Genus VIII.—HIBIS'CUS. L. 15—12.

(From *hibiscos*, one of the names for Mallow.)

Calyx consisting of 5 sepals, united at the base with a 5-toothed summit, surrounded by a many-leaved involucel, usually distinct. *Petals* 5. *Stigmas* 5. *Capsules* 5-valved, 5-celled, many-seeded; dehiscence loculicidal.

1. H. Moscheu'tos, (L.) *Stem* suffructicose, erect, slightly tomentose, branching. *Leaves* ovate, serrate, acuminate, often with 3 acuminate lobes, tomentose underneath. *Flowers* axillary, attached by a long pubescent peduncle to the base of the petiole. *Calyx* persistent, pubescent; involucel 1—5-leaved, subulate, acute. *Petals* obovate, retuse. *Styles* exserted. *Capsule* ovate.—White, rose-color, crimson at the center. 2f. Aug.—Sept. Margins of ponds. 3—5 feet.

2. H. Virgin'icus, (L.) *Stem* and leaves tomentose. *Leaves* cordate-ovate, acuminate, those on the middle of the stem 3-lobed. *Flowers* in paniculate racemes, nodding. *Calyx* tomentose, the involucel 8 or 9 leaved, subulate. *Petals* fringed and hairy on the outer surface. *Capsules* hispid, with acute angles.—Rose-color. 2f. July—Sept. In wet soils. 2—4 feet.

3. H. aculea'tus, (Walt.) Whole plant very scabrous, with minute recurved prickles. *Leaves*, the lower ones cordate and angular, upper ones palmately 3—5-lobed, the lobes obovate, dentate. *Flowers* axillary, at the upper parts of the branches. *Calyx* hispid, 5-lobed, each segment 3-ribbed. *Petals* hairy on the outer surface. *Capsule* hairy —Yellow. 2f. June—Sept. In wet places. 3—6 feet.

4. H. inca'nus, (Wend.) *Stem* tall, minutely tomentose. *Leaves* ovate, acuminate, obtusely serrate, tomentose on both surfaces. *Flowers* very large, axillary, solitary, on peduncles jointed near the middle,

confluent with the petiole.—Yellow. 4. July—Aug. Southern Geo. 3—5 feet.

5. H. CAROLINIA'NUS, (Muld.) *Stem* smooth, tall. *Leaves* cordate, acute, serrate, acuminate, glabrous on both surfaces, sometimes obscurely 3-lobed. *Flowers* axillary. *Calyx* slightly scabrous; involucel 12-leaved. *Petals* pubescent on the inner surface.—Purple. 4. July—Sept. Raised by Elliott, from seed obtained from Wilmington Island, Geo. 4—6 feet.

6. H. MILITA'RIS, (Cav.) *Stem* branching, glabrous. *Leaves* hastate, 3-lobed, acuminate, serrate. *Flowers* solitary, axillary; involucels 12—14-leaved, incurved, linear, subulate. *Corolla* tubular, campanulate, finely pubescent. *Capsule* ovate, 5-valved, 5-celled, glabrous.—Rose-color. 4. July—Sept. Common on the banks of streams in the middle country. 3—4 feet.

7. H. SPECIO'SUS, (Ait.) *Stem* branching, glabrous. *Leaves* palmate, 5 parted, alternate, cordate; lobes irregularly-serrate, generally with colored veins. *Flowers* solitary, axillary, on peduncles jointed near the summit; involucels 12—15-leaved, subulate. *Petals* 4—5 inches long, obovate, a little pubescent near the base. *Capsule* glabrous, ovate, acute, obscurely angled. *Seed* pubescent.—Red. 4. July—Sept. Southern Georgia and Florida. 4—8 feet.

The flowers of this genus are very showy, and though coarse, form a conspicuous and beautiful ornament of the flower garden. They are used for no other purpose than ornament, with a single exception. An Egyptian species affords seeds which are employed in preparation of perfumery, on account of their peculiar odor, resembling musk. The plants of this order are wholesome, yielding, some of them, a mucilage in large quantity, which is employed as demulcents and emollients. The *Okra* is the seed-vessel of the *Abelmoschus esculentus* or *Hibiscus esculentus*.

ORDER XXXIV.—TILIA'CEÆ. Juss.

Sepals 4—5, deciduous, with a valvate æstivation. *Petals* 4—5, hypogynous. *Stamens* generally numerous, hypogynous, distinct. *Anthers* 2-celled. *Ovary* with 4—10 united carpels, with as many stigmas. *Styles* united. *Fruit* 2—5-celled. *Capsule* with several seeds in each cell. *Seeds* anatropous. *Leaves* alternate, with deciduous stipules. *Flowers* axillary.

GENUS I.—COR'CHORUS. L. 12—1.

(The Greek name of a pot-herb.)

Sepals 4—5. *Petals* 4—5, hypogynous. *Stamens* indefinite, rarely equal the number of petals. *Styles* short. *Stigmas* 2—5. *Capsule* 2—5-celled, with a loculicidal dehiscence, pod-like. *Seeds* numerous. Nearly herbaceous.

1. C. SILIQUO'SUS, (L.) *Stem* branching. *Leaves* ovate or broad-lanceolate, serrate. *Flowers* generally with 4 sepals and petals, late in the summer, often 5. *Capsule* pod-shaped, 2-valved, many-seeded, linear.—Yellow. 4. Through the summer.

GENUS II.—TIL'IA. L. 12—1.

(Latin name of the genus.)

Sepals 5, united at the base, deciduous. *Petals* 5. *Stamens* numerous, hypogynous. *Ovary* 5-celled, with 2 ovules in each cell, globose. *Fruit* ligneous or coriaceous, sometimes only 1-celled, 1—2-seeded. *Trees* with simple, alternate, cordate leaves. *Flowers* with the peduncle attached to an oblong, foliaceous bract.

1. T. AMERICA'NA, (L.) A large, beautiful tree, with light, soft, white wood. *Leaves* obliquely-cordate, nearly orbicular, glabrous, somewhat coriaceous. *Flowers* in axillary cymes. *Sepals* lanceolate, pubescent without, woody within. *Petals* truncated at the summit, longer than the sepals. *Fruit* small, covered with a grayish pubescence.—Yellowish. ♄. May—June. On the coast, from Penn. to Geo. 20—60 feet.

2. T. AL'BA, (Mich.) *Leaves* cordate, glabrous, pubescent beneath, sparingly toothed. *Flowers* in loose panicles. *Petals* emarginate. *Styles* longer than the petals.—Yellowish. ♄. May—June. On the coast, from Penn. to Geo. 30—50 feet.

3. T. PUBES'CENS, (Ait.) *Trees* with young branches pubescent, old ones glabrous. *Leaves* alternate, cordate, glabrous on the upper surface, pubescent beneath, serrate, slightly mucronate. *Flowers* with the sepals scarcely united, deciduous, lanceolate, acute, tomentose. *Petals* lanceolate, longer than the calyx, crenulate at the summit.—Yellow. ♄. May—June. Fertile soils. Low and middle country. 20—60 feet.

ORDER XXXV.—MELIA'CEÆ. JUSS.

Sepals 5, united at the base, with an imbricate æstivation. *Petals* 5, hypogynous, longer than the sepals, often cohering at the base or attached to the stamen tube. *Stamens* usually 10, usually with united filaments. *Anthers* sessile, within the orifice of the tube. *Ovary* 5-celled, 1—2 ovules in each cell. *Fruit* capsular, 5-celled, 1-seeded. *Seeds* mostly anatropous; cotyledons foliaceous; albumen fleshy.

GENUS I.—MEL'IA. L. 10—1.

(The Greek name for Ash; resemblance to it in its leaves.)

1. M. AZEDA'RACH, (L.) A medium-sized tree, with thick, spreading branches. *Leaves* bipinnate; leaflets smooth, about 5 together, obliquely ovate-lanceolate, toothed. *Flowers* in axillary panicles. *Petals* glabrous or very slightly pubescent.

This tree, although a native of Persia, has become naturalized in the Southern States. It affords a good shade, and is not subject to the attacks of insects. The bark of the root has been used as a vermifuge, administered in decoction. It possesses narcotic properties, and should be followed by some cathartic medicine.

ORDER XXXVI.—CEDRELEA'CEÆ. R. Br.

Calyx short, 4—5-cleft. *Petals* 4—5, alternating with the segments of the calyx. *Stamens* twice the number of the petals, the opposite ones shorter. *Ovary* 5-celled, situated on a torus. *Fruit* a woody 3—5-celled capsule.

GENUS I.—SWIETE'NIA. L. 10—1.

(In honor of Van Swieten, a Dutch botanist.)

Genus same as the order.

1. S. MAHOG'ONI, (L.) A large tree, with reddish-brown wood *Leaves* abruptly pinnate; leaflets small, usually 4 pairs, ovate-lanceolate, unequal at the base. *Flowers* in panicles, axillary. South America, Honduras, Southern Florida. *Mahogany.*

ORDER XXXVII.—VITA'CEÆ. Juss.

Calyx minute, 5-toothed. *Petals* 4—5, caducous. *Flowers* dicœcious. *Stamens* equal the number of petals and opposite them. *Filaments* sometimes slightly cohering. *Anthers* versatile. *Ovary* 2-celled, 2 ovules in each cell, surrounded at the base by an expansion of the torus. *Styles* short or none. *Stigma* simple. *Fruit* a globose, pulpy berry. Lower leaves opposite, upper alternate. *Flowers* sometimes polygamous, small, greenish. Climbing shrubs.

GENUS I.—VI'TIS. L. 5—1.

(From a Celtic word signifying the best of trees.)

Calyx scarcely toothed, small. *Petals* 4—5, spreading, or more generally united at the top, caducous. *Ovary* usually 2-celled, with 2 ovules in each cell. *Fruit* a berry, 1—3-celled and 1—5-seeded. *Peduncles* usually changed into tendrils.

1. V. ROTUNDIFO'LIA, (Mich.) *Stem* twining, ascending the highest trees, with smooth bark, sometimes not climbing; branches verrucose. *Leaves* cordate, both surfaces shining, glabrous; small tufts of hair at the junction of the veins, obscurely 3-lobed, toothed. *Flowers* in racemes, composed of numerous small umbels, polygamous. *Fruit* large, with a coriaceous integument, pleasant to the taste.—Yellow. ♄. May—June. Common in the middle and low country of Georgia and Carolina. *V. vulpica,* (*L.*) *Bull-grape. Muscadine-grape. Fox-grape.*

2. V. CORDIFO'LIA, (Mich.) *Leaves* cordate, acuminate, toothed, glabrous, often slightly 3-lobed. *Flowers* numerous, in loose racemes. *Fruit* small, sour, nearly black when ripe.—Yellow. ♄. Common on the banks of streams. May. *Winter-grape. Frost-grape.*

3. V. RIPA'RIA, (Mich.) *Leaves* unequally incised and toothed; teeth very coarse, acuminate, somewhat 3-lobed; petioles, margins, and

veins pubescent. *Flowers* fragrant, in loose racemes. *Fruit* small, dark purple.—Yellow. ♄. May—July. Along the margins of rivers in the upper country. *Winter Grape*—pleasant fruit.

4. V. ÆSTIVA'LIS, (Mich.) *Stem* very long, glabrous; young branches tomentose. *Leaves* broadly cordate, 3—5-lobed, ferruginous, tomentose beneath when young, coarsely and unequally toothed, sometimes not lobed. *Flowers* in racemes, opposite the leaves, polygamous or dicecious. *Fruit* small, black, very sour.—Greenish-yellow. ♄. May. In rich soil. *Summer Grape.*

5. V. LABRUS'CA, (L.) A large vine, covering the loftiest trees; branches covered with a ferruginous pubescence. *Leaves* broadly cordate, lobed, and angled; repand toothed, tomentose beneath. *Racemes* small, fertile. *Fruit* dark purple, globose, large, of a disagreeable flavor. From the seeds of this species have been produced several very highly esteemed garden varieties.—Greenish-yellow. ♄. June. Rich, high spots in swamps.

Isabella, Alexander's, Catawba, and Bland's Grape.

6. V. BIPINNA'TA, (T. & G.) (*Cissus bipinnata of Ell.*) *Stem* upright, somewhat twining, without tendrils. *Branches* numerous, glabrous, a little angular. *Leaves* bipinnate, glabrous, leaflets serrate, lower ones sometimes decompound, leaflets slightly cordate, acute. *Flowers* in short spreading panicles. *Petals* expanding, generally pentandrous. *Style* conical. *Fruit* globose, depressed, glabrous or slightly hairy, nearly black, 2-celled.—Greenish-yellow. ♄. June—July. Rich soils.

7. V. AMPELOP'SIS. *Stem* climbing, glabrous. *Leaves* simple, 3-lobed, or truncate, serrate, pubescent on the veins beneath. *Flowers* in dichotomously divided panicles, without tendrils, opposite the leaves. *Calyx* obscurely toothed. *Petals* 5. *Stamens* 5. *Fruit* 1-celled, 1—2-seeded, small.—Yellow. ♄. June. S. Car. in swamps

GENUS II.—AMPELOP'SIS. Mich. 5—1.

(From the Greek *ampelos*, a vine, and *opsis*, a resemblance.)

Calyx entire. *Petals* 5, reflexed, spreading. *Stamens* 5. *Ovary* 2-celled, with 2 ovules in each cell. *Style* conical. *Fruit* a 2-celled berry, with 1 or 2 seeds in each cell. *Flowers* perfect, in corymbose panicles. A shrubby vine.

1. A. HEDERA'CEA, (D. C.) *Stem* climbing lofty trees, throwing out short lateral fibres by which it attaches itself. *Leaves* on long petioles, digitate, by fives. *Leaflets* petiolate, oblong, coarsely serrate, glabrous, the middle leaflet largest. *Panicles* many-flowered, opposite the leaves, the ultimate divisions umbellate, peduncles crimson. *Petals* much longer than the calyx. *Fruit* deep blue, about as large as a pea.—Yellowish green. ♄. June. In moist soils.

American Ivy. Virginian Creeper. A. quinquefolia, Mich.

ORDER XXXVIII.—ACERA'CEÆ. Juss.

Sepals 5, or rarely 4—9, united at the base, colored, with an imbricate æstivation. *Petals* as many as sepals and alternate

with them, occasionally wanting. *Stamens* 8—12, distinct. *Anthers* oblong, versatile or introrse. *Torus* discoid. *Ovary* composed of 2 united carpels. *Styles* united. *Stigmas* separate. *Fruit* a samara, composed of 2 indehiscent carpels, each 1-celled, 1 or 2 seeded. *Embryo* curved, with foliaceous cotyledons. Trees with opposite leaves.

GENUS I.—A'CER. Mœn. 8—1.

(From *acer*, hard or sharp, in allusion to the hardness of the wood.)

Calyx 4—5-cleft. *Petals* 5 or wanting. *Stamens* 5—7—10. *Leaves* simple.

1. A. PENNSYLVAN'ICUM, (L.) A small tree, with smooth striped bark. *Leaves* glabrous, sub-cordate, serrate, 3-lobed, lobes acuminate. *Flowers* in nodding racemes, large. *Petals* obovate.—Yellowish-green. ♄. May. Mountains. 10—15 feet. *Striped Maple. Dogwood.*

2. A. MONTA'NUM, (Ait.) A small tree. *Leaves* sub-cordate, generally 5-lobed, serrate, pubescent beneath; lobes acuminate. *Racemes* compound, erect. *Flowers* small. *Fruit* reddish, glabrous, with slightly spreading wings.—Greenish-yellow. April—May. Mountains. 8—12 ft. *A. spicatum*, Lam.

3. A. SACCHARI'NUM, (L.) A large tree, with compact, white wood, and from the peculiar arrangement of its woody tissues often exhibits an appearance distinguished by artists and mechanics by *Bird's-eye* Maple *Leaves* 3—5-lobed, acuminate, dentate, sub-cordate at the base. *Flowers* in nearly sessile corymbs, with filiform long villous pedicels, pendulous. *Petals* wanting. *Fruit* glabrous.—Greenish-yellow. ♄. May. Cool, damp places. Middle Geo. 50—80 ft. *Sugar Maple.*

4. A. DASYCAR'PUM, (Ehrh.) A large tree. *Leaves* palmate, deeply 5-lobed, acuminate, serrate, and incised, pubescent underneath, almost white. *Flowers* small in fascicles, with very short pedicels. *Petals* wanting. *Fruit* yellowish, wings large, pubescent when young.—Pale yellowish-purple. Feb. In river swamps, common. 50—70 feet. *Soft Maple.*

5. A. RU'BRUM, (L.) A small tree. *Leaves* cordate, 3—5-lobed, serrate, glaucous beneath, lobes acute, doubly serrate, terminal one longest. *Flowers* in small axillary fascicles. *Petals* linear or oblong, polygamous. *Stamens* 5—8. *Fruit* glabrous, with slightly divergent wings, reddish.—Bright red or purplish. ♄. Feb. In swamps, common. 20—50 feet. *Scarlet Maple. Red Maple. Swamp Maple.*

6. A. NEGUN'DO, (L.) A middle-sized tree. *Leaves* pinnate, 3—5 leaflets; leaflets petiolate-oval or ovate, unequally toothed toward the apex. *Flowers* dicœcious, in pendulous racemes. *Pedicels* of the staminate flowers filiform. *Petals* none. *Fruit* oblong, with pale yellow, obovate wings.—Yellowish-green. ♄. May. Common on the banks of streams. 30—50 ft. *Ashed-leaved Maple. Box Elder.*

ORDER XXXIX.—HIPPOCASTANA'CEÆ. D. C.

Calyx composed of 5 united sepals, either campanulate or tubular, 5-lobed or 5-toothed, with imbricate æstivation. *Petals*

4—5, unequal and irregular, hypogynous, unguiculate. *Stamens* 7—8, distinct, unequal. *Anthers* versatile. *Ovary* composed of 3 united carpels, 3-cornered, 3-celled. *Styles* united, filiform. *Ovules* 2 in each cell. *Fruit* coriaceous, sub-globose, 1—2—3-celled, with 1 seed in each cell, dehiscence loculicidal. *Seeds* large, with a smooth shining testa and pale hilum. *Embryo* curved, inverted, without albumen. *Cotyledons* very thick, fleshy, cohering, not rising in germination.

GENUS I.—ÆS'CULUS. L. 7—1.

(From *esca*, nourishment.)

Sepals united, forming a 4—5-toothed, tubular calyx, more or less unequal. *Petals* 5, or by the abortion of the anterior one but 4, more or less unequal and often dissimilar. *Stamens* 6—8, usually 7. *Capsules* 2 or 3 celled. *Seeds* large, solitary.

1. Æ. PA'VIA, (L.) A shrub or small tree, with irregular, thick, ob tuse branches. *Leaves* by fives. *Leaflets* oblong-lanceolate, unequally toothed, glabrous, or minutely pubescent along the veins. *Flowers* in terminal racemes. *Calyx* tubular, purplish. *Petals* 4, unequal, connivent, the claws of the lateral ones about as long as the calyx, upper ones the longest. *Stamens* 6—8. *Capsules* nearly round, 3-celled, coriaceous.—Red. ♄. April—May. Common. 3—5 feet. *Buck-eye.*

2. Æ. FLA'VA, (Ait.) A small shrub or tree, branches flexuous, glabrous. *Leaves* by fives, pubescent along the midrib on the under surface. *Leaflets* lanceolate, ribbed, acuminate, serrate. *Petiole* long, with a pubescent line along the upper side. *Flowers* in a terminal condensed panicle. *Calyx* pubescent, 5-cleft, with obtuse segments. *Petals* irregular, very unequal, claws pubescent within, limb of the upper ones minute, of the lateral ones larger, roundish. *Stamens* usually 7. *Filaments* villous. *Fruit* large, 2 inches in diameter, pubescent.—Yellow. ♄. March—April. Mountains, a tree 30—80 feet, and in Middle Georgia a small shrub, 4—6 feet.

3. Æ. PARVIFLO'RA, (Walt.) A small shrub. *Leaves* by fives or sevens, tomentose underneath. *Leaflets* petiolate, oval-obovate, serrate, acuminate. *Flowers* in long racemes. *Calyx* ob-conical. *Petals* 4, expanding, spatulate, nearly equal, longer than the calyx. *Stamens* much longer than the petals, 6—7.—White. ♄. April—May. Upper districts of Geo. and S. Car. 3—4 feet.

ORDER XL.—SAPINDA'CEÆ.

Sepals 4, unequal, æstivation imbricate, 2 of them outer and larger. *Petals* equal in number to the sepals, and alternate with them, with a tuft of hair at the base of each. *Stamens* 6—8, filaments hairy near the base, anthers introrse. *Ovary* composed of 3 united carpels, surrounded by a glandular disk. *Styles* united. *Stigmas* obtuse. *Ovules* generally solitary. *Fruit* capsular, 3-celled, 2 obliterated, 1—2-seeded.

Genus I.—CARDIOSPER'MUM. L. 8—3.

(From the Greek *cardia*, a heart, and *sperma*, a seed, from the form of the seed.)

Calyx 4-leaved, leaves concave, the two exterior ones smallest. *Corolla* 4-petaled, the lateral ones usually cohering to the sepals, each with a scale, above the base within. *Disk* with two glands opposite the inferior petals. *Stamens* 8. *Style* trifid. *Capsule* membranous, 3-valved. *Seeds* globose, solitary. Herbaceous climbing plants. *Leaves* biternate.

1. C. HALICAC'ABUM, (L.) *Stem* nearly glabrous. *Leaflets* ovate-lanceolate, incisely lobed and toothed. *Flowers* in axillary, racemose panicles.—White. ☺. July. On the Ocmulgee, above Macon.

Genus II.—SAPIN'DUS. L. 8—3.

(From *sapo*, soap, and *indicus*, Indian.)

Sepals 4—5, two exterior ones largest. *Petals* 4—5, lanceolate, bearded within, or with a scale above the claw. *Stamens* 8—10. *Stigmas* 2—3. *Fruit* of 1 carpel, 2 suppressed.

1. S. SAPONA'RIA, (L.) Small tree with smooth branches, somewhat geniculate. *Leaves* pinnate, generally 4 or 5 pairs. *Leaflets* falcate very oblique, not opposite, entire. *Petioles* 6—10 inches long, slightly furrowed. *Flowers* in dense, compound terminal and axillary panicles, dicœcious or polygamous.—White. ♄. On the coast of S. Car. and Geo. 20—50 feet. *Soap-berry.*

Genus III.—DODONÆ'A. L. 6—1.

(In honor of Dodoens, a physician of Germany.)

Sepals 4. *Petals* none. *Stamens* 8. *Style* filiform, 3-cleft at the apex. *Capsule* winged, 2 or 3 valved. *Seeds* 2 in each cell.

1. D. VISCO'SA, (L.) A shrub with simple leaves. *Leaves* ovate-oblong, cuneiform, viscous. *Flowers* in racemes.—♃. East Florida.

Order XLI.—CELASTRA'CEÆ.

Sepals 4—5, persistent, united at the base, æstivation imbricate. *Petals* equal in number to the sepals and alternate with them, with the same æstivation. *Stamens* usually 5, alternate with the petals, inserted on a broad fleshy disk at the bottom of the calyx. *Ovary* more or less surrounded by the disk, 2—5-celled, each with 1 or 2 or several ascending ovules. *Styles* 2—5, distinct or combined. *Fruit* capsular, 2—5-celled, with a loculicidal dehiscence. *Seeds* anatropous. *Embryo* straight. Shrubs.

Genus I.—STAPHYLE'A. L. 5—3.

(From the Greek *staphule*, a bunch or cluster.)

Sepals 5, united at the base, oblong, erect, colored, persistent. *Petals* 5, obovate. *Stamens* 5. *Ovary* composed of 3 carpels, hairy. *Styles* separable. *Fruit* inflated, capsule 2—3-celled. *Seeds* globular, slightly compressed, generally two in each cell. *Leaves* compound.

1. S. TRIFO'LIA, (L.) A shrub, with slender, smooth branches. *Leaves* ternate, opposite. *Leaflets* ovate, acuminate, finely serrate, scarcely pubescent when grown. *Petioles* pubescent near the leaflets. *Flowers* in terminal, pendulous panicles. *Petals* obovate, spatulate, ciliate at the base. *Stamens* exserted, filaments hairy at the base. *Fruit* 3-lobed, with the carpels distinct at the summit.—White. ♄. May. In middle Car. and Geo. 6—12 feet. *Bladder-nut*

Genus II.—EUON'YMUS. Tour. 5—1.

(From the Greek *eu*, good, and *onoma*, a name—well named.)

Sepals generally 5, united at the base, spreading. *Petals* 5. *Stamens* inserted into the upper surface of the broad disk. *Anthers* with a thick connectivum at the back. *Ovary* imbedded in the disk, 3—5-celled, with 2—3 ovules in each cell. *Styles* short and thick. *Fruit* a 4—5-celled and as many lobed capsule, dehiscence loculicidal. *Seeds* usually inclosed in a fleshy aril. *Shrubs* with opposite serrate leaves. *Peduncles* axillary.

1. E. AMERICA'NUS, (L.) A slender shrub, with small, slender, 4-angled branches. *Leaves* usually nearly elliptic, varying to lanceolate, oval or obovate, acute, obscurely serrate. *Flowers* on axillary peduncles, each usually bearing 3. *Calyx* very small. *Petals* obovate, small, expanding, flat. *Stamens* short. *Capsule* deep red when mature, verrucose, fleshy. *Seed* 1 in each cell, covered by a scarlet aril.—Green tinged with purple. ♄. Common. 4—5 feet.
Strawberry-tree. Burning-bush.

2. E. ATROPURPU'REUS, (Jacq.) A shrub, with smooth branches. *Leaves* petiolate, oblong, lanceolate, acuminate, serrate, acute at the base. *Peduncles* compressed, many-flowered, parts of the flower usually by fours. *Petals* broad-obovate. *Capsules* lobed, smooth, red.—Dark purple. ♄. June—July. Common along streams. 4—12 feet.

Order XLII.—RHAMNA'CEÆ.

Calyx 4—5-cleft, æstivation valvate. *Petals* 5, distinct, cucullate or convolute, narrowed at the base, inserted into the throat of the calyx, sometimes wanting. *Stamens* 5, and opposite the petals. *Ovary* composed of 2—4 united carpels, 2—4-celled, cohering to the calyx or imbedded in a fleshy disk. *Ovules* erect, solitary. *Styles* more or less united. *Stigmas* distinct. *Fruit* fleshy or dry, generally united to the calyx. *Scales* ana-

tropous, generally with fleshy albumen. *Shrubs*, generally, sometimes small trees, with thorny branches. *Flowers* not conspicuous, usually perfect, but sometimes monœcious, dicœcious, or polygamous.

GENUS I.—BERCHE'MIA. Nick. 5—1. (*Zizyphus of Ell.*)

(Named after Berchem.)

Flowers minute. *Calyx* tubular, 5-parted, with erect segments. *Petals* 5, convolute. *Stamens* inclosed by the petals. *Ovary* half inclosed in an annular disk. *Stamens* 5. *Style* 1. *Fruit* drupaceous, with a long, 2-celled nut. *Flowers* in small racemose panicles. A climbing shrub, with tough, flexible, pendent branches.

1. B. VOLU'BILIS, (D. C.) *Leaves* ovate, ribbed, slightly undulate, mucronate, glabrous. *Flowers* in small umbels, racemes, or panicles, axillary and terminal. *Fruit* drupaceous, 1—2-seeded, purple.—♄. May—June. In rich, damp soils. Macon. 12—15 feet.

GENUS II.—RHAM'NUS. L. 5—1.

(From a Celtic word, signifying a tuft of branches.)

Calyx urceolate or tubular, 4—5-cleft. *Petals* 4—5, emarginate or 2-lobed, convolute. *Torus* lining the tube of the calyx. *Ovary* free, 2—4-celled. *Styles* 2—4, generally distinct. *Fruit* a drupe, containing 2—4 seeds. *Flowers* small, generally in axillary clusters.

1. R. CAROLINIA'NUS, (Walt.) A shrub, unarmed. *Leaves* alternate, oval-oblong, obscurely serrate or entire, glabrous, with parallel veins. *Flowers* in small umbels, perfect, 4—6-flowered. *Petals* 2-lobed, minute, embracing the stamens. *Stamens* 4 or 5. *Fruit* the size of a pea, generally 3-seeded.—White. ♄. May—June. Common along the coast. 4—6 feet.

GENUS III.—SAGERE'TIA. Brong. 5—1.

(Named after Segeret.)

Calyx urceolate, 5-cleft. *Petals* convolute or cucullate. *Stamens* 5. *Disk* concave, entire. *Ovary* partly imbedded in the disk, 3-celled, peduncles very short. *Style* short, 3-lobed. *Fruit* indehiscent, baccate, 3-celled.

1. S. MICHAUX'II, (Brong.) A shrub, much branched, thorny when old. *Leaves* small, shining, opposite, membranaceous, oblong-ovate, denticulate, petioles very short. *Flowers* minute, in paniculate spikes. *Petals* small, entire, inclosing the stamens. *Stigma* nearly sessile. *Fruit* 3-angled.—White. ♄. Oct.—Nov. Along the sea-coast. 6—8 feet.

Genus IV.—CEANO'THUS. L. 5—1.

(From the Greek *keanothos*, a spring plant.)

Calyx campanulate, 5-cleft. *Petals* 5, saccate and arched, unguiculate. *Stamens* 5, exsert. *Disk* fleshy at the margin, surrounding the ovary. *Ovary* composed of 3 united carpels, 3-celled, with 3 ovules. *Fruit* a dry, triangular, 3-celled, 3-valved capsule, 1 seed in each cell. *Seeds* obovate. Small shrubs, unarmed, with alternate leaves. *Flowers* perfect.

1. C. America'nus, (L.) *Root* large, dark red. *Stem* frutescent, the young branches pubescent. *Leaves* ovate, or oblong-ovate, 3-nerved, acutely serrate, veins beneath very hairy, reflexed. *Petals* with long claws, inclosing the stamen. *Disk* with a 10-toothed border. *Seeds* convex, externally concave within.—White. ♄. June—July. Common in Middle Geo. and Car. 1—3 feet. *New Jersey Tea.*

2. C. microphyl'lus, (Mich.) *Stem* much branched, many from each root, branches straight, slender, glabrous, yellow. *Leaves* small, obovate, clustered, glabrous on the upper surface, 3-nerved, somewhat denticulate, or entire. *Flowers* a loose raceme. *Peduncles* slender.—White. ♄. April. Sandy pine forests. Common. 1—2 feet.

3. C. serpyllifo'lius, (Nutt.) A small, slender shrub, decumbent, diffusely branched, branches filiform. *Leaves* very small, ovate-elliptical, serrulate, obtuse, the lower surface as well as the petioles strigose. *Peduncles* axillary. *Flowers* few, in a simple corymbose head.—White. ♄. St. Mary's, Ga.

The Ceanothus Americanus, commonly known by the names of New Jersey Tea and Red-root, has enjoyed considerable reputation among the Faculty. It takes the former name from its leaves having been used by the American army, as a substitute for tea, during the Revolutionary War. In apthous sore mouth, it has been highly recommended, and in the sore throat accompanying Scarlet Fever.

Order XLIII.—LEGUMINO'SÆ.

Sepals 5, united into a 5-toothed calyx, hypogynous, segments often unequal and variously combined, the odd segment inferior. *Petals* 5, sometimes none, or less than 5 by abortion, inserted into the base of the calyx, sometimes regular, at others papilionaceous, the odd petal superior. *Stamens* generally definite, distinct, monadelphous, or diadelphous. *Anthers* versatile. *Ovary* simple, 1-celled, 1 or many seeded. *Stigma* simple. *Fruit* generally a legume, sometimes a drupe. *Seeds* 1 or several, attached to the upper section; heterotropous or anatropous, sometimes with one aril, or large caruncle. *Embryo* straight, destitute of albumen, or with the radical curved along the edge of the cotyledons. *Leaves* alternate, stipulate, mostly compound, leaflets entire.

Exotics and genera not falling strictly in our geographical limits, are mostly omitted in the Analyses.

ANALYSIS.

1. Corolla papilionaceous 2
Corolla not papilionaceous 42

2. Leaves trifoliate or palmate, 5-7 foliate 3
Leaves pinnate 20
Leaves simple or palmate 38

3. Leaves pinnately trifoliate 4
Leaves palmate 18

4. Fruit a legume 5
Fruit a loment 16

5. Legume many-seeded 6
Legume few-seeded 12

6. Plants trailing or vines 7
Plants not vines 11

7. Calyx 5-cleft 8
Calyx 4-cleft, or bilabiate 9

8. Keel, stamens, and style twisted together ..... *Phaseolus*, 5
Keel not twisted ..... *Clitoria*, 14, and *Centrosema*, 15

9. Calyx 4-cleft ..... *Galactia*, 13
Calyx bilabiate 10

10. Flowers yellow ..... *Vigna*, 6
Flowers purple ..... *Dolichos*, 7

11. Flowers red ..... *Erythrina*, 8
Flowers white, blue, or yellow ..... *Baptisia*, 43

12. Calyx 5-cleft ..... *Psoralea*, 24. *Melilotus*, 29
Calyx 4-cleft 13

13. Vines 14
Not vines 15

14. Flowers yellow ..... *Rhynchosia*, 11
Flowers white or violet ..... *Amphicarpæa*, 16

15. Flowers in racemes ..... *Rhynchosia*, 11
Flowers solitary or in pairs ..... *Pitcheria*, 12

16. Loment composed of several joints, each 1-seeded ..... *Desmodium*, 37
Loment 1 or 2 seeded 17

17. Loment uncinate ..... *Stylosanthus*, 34
Loment unarmed ..... *Lespedeza*, 39

18. Flowers in heads or dense spikes 19
Flowers in oblong spikes or racemes ..... *Psoralea*, 24
Flowers in long racemes or solitary ..... *Baptisia*, 42

19. Flowers yellow ..... *Medicago*, 30
Flowers not yellow ..... *Trifolium*, 28

20. Leaves equally pinnate 21
Leaves unequally pinnate 23
Leaves irregular ..... *Psoralea*, 24

21. Leaves terminated by tendrils 22
Leaves not terminated by tendrils 24

22. Flowers purple ..... *Lathyrus*, 4
Flowers white or blue 23

23. Legume smooth, many-seeded ..... *Vicia*, 2
Legume hairy, 2-seeded ..... *Ervum*, 3

24. Shrubs or trees 25
Herbaceous plants 26

25. Stamens diadelphous ..... *Agati*, 17
Stamens monadelphous ..... *Amorpha*, 25
Stamens not united ..... *Gleditschia*, 47

26. Stamens diadelphous 27
Stamens not united ..... *Cassia*, 75

27. Legume many-seeded ..... *Sesbania*, 18
Legume few-seeded ..... *Chapmannia*, 35, and *Glottidium*, 19

28. Twining plants or vines 29
Not twining plants or vines 31

29. Calyx 4-cleft ..... *Galactia*, 13
Calyx somewhat bilabiate 30

30. An herbaceous vine ..... *Apios*, 9
A shrubby vine ..... *Wistaria*, 10

31. Trees and shrubs ..... *Amorpha*, 25. *Robinia*, 20
Herbaceous plants 32

32. Leaflets few ..... *Petalostemon*, 27
Leaflets 7 or more 33

33. Stamens diadelphous 34
Stamens monadelphous 35

34. Stamens 5 in each division ..... *Æschynomene*, 36
Stamens 1 in one division, 9 in the other ..... *Indigofera*, 23

35. Legume 2-celled ..... *Astragalus*, 31
Legume 1-celled 36

36. Legume many-seeded ..... *Tephrosia*, 21
Legume few-seeded 37

37. Flowers in dense spikes or capitate ..... *Dalea*, 26
Flowers in racemes ..... *Phaca*, 32

38. Trees or shrubs ..... *Cercis*, 45
Herbaceous plants 39

39. Flowers yellow 40
Flowers not yellow ..... *Lupinus*, 41

40. Flowers in racemes 41
Flowers in spikes ..... *Zornia*, 33

41. Peduncles opposite the leaves ..... *Crotalaria*, 40
Peduncles not opposite the leaves ..... *Rhynchosia*, 11

42. Trees ..... *Gleditschia*, 47
Not trees 43

43. Flowers yellow 44
Flowers rose-color 45
Flowers white ..... *Darlingtonia*, 50

44. Calyx 5-sepaled ..... *Cassia*, 46
Calyx 4-toothed ..... *Acacia*, 51

45. Legume many-seeded ..... *Schrankia*, 49
Legume few-seeded ..... *Mimosa*, 48

Sub-order I.—PAPILIONA'CEÆ.

Sepals with an imbricated æstivation. *Stamens* 10, perigynous, or inserted with the petals into the bottom of the calyx. *Corolla* papilionaceous.

Tribe I.—VIC'IEÆ.

Stamens diadelphous. *Legumes* continuous, without contractions. *Cotyledons* thick, radicle curved. *Leaves* equally pinnate, the midrib usually produced into a tendril.

Genus I.—PI'SUM. Tourn. 16—10.

(The Latin name of *Pea*.)

Segments of the calyx foliaceous, the 2 superior ones shortest. *Style* triangular, carinated, with a sharp edge, downy on the upper side. *Legume* oblong. *Seeds* globose.

1. P. sati'vum, (L.) *Petioles* terete, bearing 3 pairs of ovate, entire, glaucous leaflets. *Stipules* ovate. *Peduncles* 2 or many flowered.—☺. Native of the south of Europe. *Pea.*

Genus II.—VI'CIA. Tourn. 16—10.

(From *vincio*, to bind; the tendrils binding other plants.)

Calyx tubular, 5-toothed, the two upper teeth shortest. *Style* bent; outside of the style, near the summit, villous. *Legume* many-seeded. *Leaves* pinnate. *Leaflets* in several pairs. *Petioles* extended into tendrils.

1. V. Carolinia'na, (Walt.) *Stem* much branched, running over shrubs. *Leaflets* 8—12, glabrous, oblong-linear, obtuse, mucronate, petiole extended into a 3-cleft tendril. *Flowers* numerous, in loose racemes. *Calyx* teeth short and obtuse. *Legume* oblong, mucronate, coriaceous. *Seeds* nearly globular, dark-colored.—White or blue. 2. April—May. Along the margins of swamps. 2—8—10 feet.

2. V. acutifo'lia, (Ell.) *Stem* somewhat angled, glabrous. *Leaflets* 3—6, glabrous, usually acute, linear, petiole terminating generally in an undivided tendril. *Stipules* linear-lanceolate, entire. *Flowers* in racemes, longer than the leaves, 3—7-flowered; lower teeth of the calyx ovate-lanceolate, upper ones very short. *Legume* somewhat falcate, mucronate, 4—10-seeded, seeds small.—White, tinged with blue. ☺. April. Rich soils. Common. 4—6 feet.

Genus III.—ER'VUM. L. 16—10.

(From a Celtic word meaning tilled land.)

Calyx deeply 5-cleft, hairy, with nearly equal segments, linear, acute, about equal in length to the corolla. *Stigma* glabrous. *Legume* 2—4-seeded, oblong, seeds nearly globose. *Petioles* produced into tendrils. *Peduncles* axillary.

1. E. hirsu'tum, (L.) *Stem* much branched, diffuse. *Leaflets* 8—20, linear-lanceolate, truncate, or retuse at the apex. *Stipules* subulate. *Petioles* terminating in divided tendrils. *Peduncles* 3—6-flowered near the summit. *Legumes* hairy, obliquely truncate, drooping, 2-seeded.—Bluish-white. ☺. March—April. On cultivated grounds.

Genus IV.—LATH'YRUS. L. 16—10.

(From the Greek *lathuros*, a kind of pulse.)

Calyx campanulate, 5-cleft, the 2 upper segments short. *Style* flat, villous on the upper side, widened toward the summit. *Legume* oblong, several-seeded. *Peduncles* axillary. *Petioles* produced into tendrils.

1. L. pusil'lus, (Ell.) A slender branching vine, glabrous, angled and winged. *Leaflets* a single pair, linear-lanceolate, acute at each end, slightly mucronate. *Stipules* large, acute, sagittate, slightly falcate. *Legume* 11—15-seeded.—Purple. ☺. April—May. Common.

Tribe II.—PHASEOLEÆ.

Stamens diadelphous. *Legume* continuous, sometimes with partitions between the seeds. Usually twining plants. *Leaves* trifoliate or unequally pinnate.

Genus V.—PHASE'OLUS. L. 16—10.

(From *phaseolus*, a little boat, in allusion to the pods.)

Calyx 5-cleft, the 2 upper teeth often partially united, campanulate. Keel, stamens, and style spirally twisted together. *Legume* falcate, slightly compressed, many-seeded. *Seed* reniform. *Hilum* small, naked. An herbaceous, trailing plant.

1. P. PERENNIS, (Walt.) *Stem* voluble, climbing over small shrubs, pubescent. *Leaves* ternate, the lateral leaflets inequilateral, the terminal generally slightly cordate, pubescent beneath. *Stipules* lanceolate, small. *Flowers* in axillary racemes, loosely-flowered. *Calyx* somewhat bilabiate, with 2 bracts at the base, teeth of the calyx broad and short. *Vexillum* reflected, keel compressed and spiral. *Legume* falcate, mucronate, many-seeded, seeds attached alternately to each valve.—Purple. ♃. July—Sept. In damp rich land.

2. P. DIVERSIFO'LIUS, (Pers.) *Stem* prostrate, diffuse, retrorsely hirsute. *Leaves* ternate. *Leaflets* ovate, angular, or 2—3-lobed, slightly hairy along the margin and veins. *Flowers* capitate, 8—14, and peduncles 3—6 inches long, the lower tooth of the calyx narrow, longer than the tube, the upper formed of 2 sepals cohering nearly to the summit, having the appearance of a 4-cleft calyx. *Vexillum* reflected, keel acuminate, twisted. *Legume* terete, slender, slightly pubescent, many-seeded, seeds pubescent, hilum linear.—Purple. ☺. Aug.—Oct. Sand-hills and the coast. 2—8 feet long. *Strophostyles angulosa*, Ell.

3. P. HELVO'LUS, (L.) *Stem* slender, prostrate, or climbing, retrorsely hirsute. *Leaves* ternate; leaflets oblong-ovate, or linear-oblong, tapering toward the summit. *Flowers* in heads, few, calyx with the upper segment broad, lower lanceolate, about the length of the tube; vexillum nearly round, keel as long as the vexillum, with a tooth at the base of the beak. *Legume* terete, pubescent, straight, linear, many-seeded. *Seeds* reniform, pubescent.—Purple. ♃. July—Sept. In dry fertile soils. 3—5 feet. *Strophostyles pedunculoris*, Ell.

4. P. VULGA'RIS, (L.) Plant naturally twining, but becomes dwarfish and bushy. *Leaflets* ovate, acuminate. *Flowers* in racemes. *Seeds* usually ovate, compressed.—East Indies. *Common Bean.*

Genus VI.—VIG'NA. Sav. 16—10.

(Named after Vigna, a botanist of the middle ages.)

Calyx somewhat bilabiate; upper lip entire. *Vexillum* with 2 callosities, near the base of the limb, compressing the wings. *Keel* not spirally twisted. *Stigma* lateral. *Legume* terete.

1. V. GLA'BRA, (D. C.) (*Dolichos luteolus of Ell.*) *Stem* twining, running over small shrubs. *Leaves* ternate, leaflets ovate, acuminate. *Flowers* 3—5, and peduncles 2—4 inches long, lower tooth of the calyx longer than the other; vexillum reflected; wings rhomboidal. *Keel* longer than the vexillum. *Legume* a little hairy, slightly compressed.—Yellow. ☺. Oct.—Nov. Around rice fields in the low country. 4—8 feet.

GENUS VII.—DO'LICHOS. L. 16—10.

(From the Greek *dolichos*, long, from the length of the vines.)

Calyx bilabiate, the upper lip generally 2-cleft, seldom entire; lower lip 3-cleft or 3-toothed. *Vexillum* with 2—4 callosities near the base of the limb. *Styles* cylindric. *Legume* compressed, few-seeded. *Seeds* oval, compressed. *Hilum* oval.

1. D. MULTIFLO'RUS, (T. & G.) *Stem* retrorsely pubescent, twining. *Leaves* ternate, large; leaflets nearly orbicular, abruptly acuminate, pubescent when young, nearly glabrous when old. *Flowers* numerous in elongated racemes, peduncles axillary, pedicels fasciculate, upper lip of the calyx generally entire, middle division of the lower lip longest, lanceolate, lateral ones short. *Legume* compressed, obtuse, 4-seeded. *Seed* oval, separated by partitions.—Purple. ♃. June—July. On the banks of the Oconee and Ocmulgee. 6—12 feet.

GENUS VIII.—ERYTHRI'NA. L. 16—10.

(From the Greek *eruthros*, red; the color of the flowers.)

Calyx cylindrical, truncate or bilabiate, 2-lobed. *Corolla* with a very long, lanceolate vexillum, destitute of callosities; wings and keel small. *Stamens* unequal, straight, usually diadelphous, as long as the vexillum. *Style* straight, glabrous. *Legume* torulose, stipitate, many-seeded, compressed between the seeds. Herbaceous plants, with trifoliate leaves.

1. E. HERBA'CEA, (L.) *Stems* glabrous, arising from a cormus, somewhat prickly. *Leaves* trifoliate, leaflets glabrous, rhomboidal, sometimes almost hastately lobed. *Flowers* in terminal spikes, very long. *Stamens* monadelphous at the base, diadelphous above. *Seeds* bright scarlet.—Scarlet. ♃. March—May. In rich soils. Mid. Geo. 2—4 ft.

GENUS IX.—A'PIOS. Boer. 16—10.

(From *apion*, a pear; the shape of the tubers.)

Calyx somewhat bilabiate, the upper lip with 2 short rounded teeth, the lower with 3 teeth, the middle tooth lanceolate, subulate, the lateral ones very minute. *Vexillum* reflected; keel falcate. *Legume* coriaceous many-seeded, slightly falcate, nearly terete.

1. A. TUBERO'SA, (Mœn.) *Root* tuberous. *Stem* climbing, covering small shrubs with its foliage, slightly pubescent. *Leaves* unequally pinnate, 5—7 leaflets, ovate-lanceolate, acute, sprinkled with hairs. *Racemes* axillary, many-flowered. *Calyx* with the upper lip usually truncate, lower one with 1 lanceolate tooth, the lateral ones very small or none. *Seeds* reniform.—Brown. ♃. July—Aug. Damp rich soils. Common.

GENUS X.—WISTA'RIA. Nutt. 16—10.

(In honor of Dr. Wistar, of Penn.)

Calyx campanulate, bilabiate, the upper lip truncate, the

lower ones 3-cleft, forming 3 lanceolate teeth. *Vexillum* with 2 callosities at the base; keel and wings falcate. *Legume* torulose, stipitate, many-seeded, nearly terete, coriaceous. *Seeds* reniform, spotted. Twining shrubby plants, with unequal pinnate leaves.

1. W. FRUTES'CENS, (D. C.) *Stem* twining, running over shrubs, branches pubescent and somewhat angular. *Leaflets* 4—6 pair, with a terminal one, pubescent, ovate-lanceolate. *Flowers* in axillary racemes, clustered, with large colored bracts at the base of the pedicels. *Vexillum* broad, reflexed at the summit, green at the base. *Legume* rugose. —Purple. ♄. April—May. Damp rich soils. Common.

GENUS XI.—RHYNCHO'SIA. D. C. 16—10. (*Glycine of Ell.*)

(From the Greek *rhunchos*, a beak, in reference to the end of the keel.)

Calyx 4-cleft, or 4-parted, or somewhat bilabiate; the lower lip 3-parted, the upper 2-toothed. *Vexillum* without callosities. *Keel* falcate. *Wings* with 2 teeth at the base. *Style* smooth. *Legume* compressed, 1—2-seeded, short, generally ovate. *Seeds* generally caruncled. Generally herbaceous plants.

1. R. CARIBÆ'A, (D. C.) *Stem* voluble, climbing over large shrubs, slightly pubescent, angled, branching. *Leaves* ternate; leaflets round, rhomboidal, acute, thin, dotted with resinous glands beneath, 3-nerved. *Flowers* in filiform racemces; peduncles angled. *Calyx* about half as long as the corolla, bilabiate; upper lip cleft half way down. *Petals* equal. *Legume* pubescent, falcate. *Seeds* glabrous, reniform.—Yellow. ♃. Aug.—Oct. On the coast and islands of Geo.

2. R. MONOPHYL'LA, (T. & G.) *Stem* pubescent, erect, low. *Leaves* simple, orbicular, or reniform, rugose, with yellow glandular dots on the under surface. *Flowers* in axillary racemes, or aggregated at the summit of the stem. *Calyx* slightly bilabiate, the upper lip 2-cleft; wings toothed on each side. *Anthers* globose. *Legume* pubescent, mucronate, falcate. *Seeds* orbicular, spotted.—Yellow. ♃. May—Aug. Common in dry soils. 2—3 inches.

3. R. VOLU'BILIS, (T. & G.) *Stem* twining, angled, villous. Upper leaves ternate, the lower single; leaflets nearly round or broadly ovate, rugose. *Racemes* few-flowered. *Segments* of the calyx very acute. *Legume* falcate, villous. *Seeds* compressed, reniform, spotted.—Yellow. ♃. May—July. In dry soils. Common. 1—3 feet.

4. R. MOLLIS'SIMA, (T. & G.) *Stem* erect, angled, tomentose. *Leaves* ternate; leaflets oval, rugose, obtuse, velvety-tomentose, glandular dots less distinct than in the three preceding species. *Flowers* in long (5—8 inches) racemes. *Calyx* deeply cleft; wings toothed near the base.—Yellow. ♃. Near St. Mary's, Geo.

5. R. EREC'TA, (T. & G.) *Stem* erect, angled, tomentose. *Leaves* ternate; leaflets oblong, nearly acute, slightly rugose, middle ones somewhat rhomboidal. *Calyx* 4-parted, the upper segment bifid. *Corolla* small; wings toothed near the base. *Legume* falcate, villous. *Seeds* reniform.—Yellow. ♃. June—Aug. Common in poor, dry soils. 1—2 feet.

Genus XII.—PITCHE'RIA. Nutt. 16—10.

(In honor of Dr. Pitcher, of the U. S. Army.)

Calyx 4-cleft; lobes nearly equal, subulate, the lower one a little the largest, the upper one slightly bifid. *Vexillum* nearly orbicular, without callosities. *Wings* small, narrow, with a subulate tooth at the base. *Keel* large, rounded. *Ovary* compressed, hairy, with 2 ovules. *Style* hairy toward the base. *Legume* oblong, sessile, compressed, 1—2-seeded. *Seeds* slightly carunculate, variegated.

1. P. galactoi'des, (Nutt.) *Stem* rigid, branching; branches angled, pubescent. *Leaves* small, numerous, trifoliate; leaflets oval or obovate-oval, glabrous, the lateral leaflets smaller and sessile. *Flowers* solitary or in pairs, on axillary peduncles. *Vexillum* partly inclosing the other petals.—Red or yellow. 2. May. Alabama. 2—3 feet.

Genus XIII.—GALACTIA. R. Br. 16—10.

(From the Greek *gala*, milk; yields a milky juice.)

Calyx 4-cleft. *Segments* acute, upper one broadest, with 2 bracts at the base. *Vexillum* broad, incumbent, without callosities; other petals oblong. *Petals* of the keel united at their apex. *Legume* terete or slightly compressed, linear, many-seeded. *Stigma* obtuse. *Racemes* axillary.

1. G. glabel'la, (Mich.) *Stem* spreading or climbing over shrubs, terete, glabrous, or a little hairy. *Leaves* ternate, glabrous above, a little hairy beneath; leaflets ovate or elliptic-oblong, obtuse, emarginate. *Racemes* axillary, a little longer than the leaves; segments of the calyx acuminate, nearly glabrous. *Anthers* linear.—Reddish purple. 2. June—Sept. Rich shaded soils. 2—4 feet.

2. G. pilo'sa, (Nutt.) A vine climbing over small shrubs, retrorsely hirsute, terete. *Leaflets* ovate or oval, hirsute, particularly on the under surface. *Racemes* axillary, 6—12 inches long. *Flowers* scattered. *Anthers* linear-oblong. *Legume* villous.—Pale purple. 2. June—Sept. In dry, shaded soils.

3. G. mol'lis, (Mich.) *Stem* prostrate or climbing over small plants, retrorsely pubescent, terete. *Leaves* ternate; leaflets oval, villous, canescent, pale beneath. *Racemes* longer than the leaves, somewhat crowded. *Flowers* small. *Calyx* 4-cleft; lower segment longer than the others, with 2 subulate bracts at the base. *Anthers* oval. *Legume* straight, hispid.—Purple. 2. June—Sept. In dry soils.

4. G. Elliott'ii, (Nutt.) *Stem* twining, running over small shrubs, sparingly pubescent. *Leaves* unequally pinnate; leaflets 7—9, elliptical-oblong, lucid on the upper surface, pubescent beneath; petiole 2—3 inches long. *Flowers* on long racemes, clustered toward the summit of the peduncle. *Pedicels* short. *Calyx* hairy; lower segment longest, upper one ovate. *Legume* compressed, villous, falcate. *Seeds* 3—4, smooth, speckled.—White, tinged with red. 2. May—July. On the coast.

Genus XIV.—CLITO'RIA. L. 16—10.

(From *clitoris*, a term in anatomy.)

Calyx tubular, 5-cleft, or by the union of the two upper segments, 4-cleft. *Vexillum* large, expanding, covering the wings; 2 bracts at the base of the calyx. *Legume* linear, compressed, many-seeded.

1. C. Maria'na, (L.) *Stem* sometimes erect, at others voluble, smooth. *Leaves* ternate; leaflets ovate-oblong or ovate-lanceolate, occasionally subcordate at the base. *Peduncles* 1—3-flowered. *Calyx* cylindrical, smooth, acute, much longer than the bracts. *Flowers* larger than the preceding species. *Style* longitudinally bearded. *Legume* torulose, glabrous, about 4-seeded.—White or pale blue. 2f. May—Aug. Dry soils. 2 feet.

Genus XV.—CENTROSE'MA. D. C. 16—11.

(From the Greek *kentron*, a spur, and *sema*, the standard.)

Calyx campanulate, 5-cleft, or by the union of the two upper segments, 4-cleft. *Vexillum* large, with a spur behind. *Stamens* mostly monadelphous. *Style* bearded at the apex. *Legumes* linear, compressed.

1. C. Virginia'na, (Benth.) *Stem* climbing, slightly scabrous, slender, angled. *Leaves* ternate; leaflets ovate or linear-oblong, slightly mucronate, scabrous, pubescent, or glabrous. *Flowers* in axillary racemes, generally 3. *Segments* of calyx linear-subulate, the two upper united nearer the summit than the others. *Style* glabrous. *Corolla* large. *Legume* long (nearly 6 inches).—Pale violet. 2f. June—Sept. Dry soils. Common. *Clitoria Virginiana*, L.

2. C. Plumie'ri, (Benth.) *Stem* twining; branches pubescent. *Leaves* ternate; leaflets ovate-oblong, acuminate, coriaceous, glabrous. *Calyx* campanulate, shorter than the bracts. *Corolla* large. *Legume* long and narrow.—New Orleans. *Clitoria Plumieri*, Tur.

Genus XVI.—AMPHICAR'PÆA. Ell. 16—10.

(From the Greek *amphi*, both, and *karpos*, fruit; bearing fruit apparently on the root and stem.)

Calyx 4-toothed; the two upper sepals united nearly or quite to the summit, tubular, slightly gibbous at the base, destitute of bracts. *Vexillum* broad, slightly auricled at the base, appressed. *Keel* and wing petals nearly straight and nearly equal, unguiculate; lamina oblong. *Stamens* diadelphous. *Ovary* stiped, with 2—4 ovules. *Style* glabrous, filiform. *Legume* compressed, stipitate, 2—4 seeded. The flowers of this genus, toward the summit of the stem, usually differ from those near the base, the upper ones usually perfect in all their parts, while the lower sometimes are wanting in a corolla and a part of the stamens; but the latter are the ones that usually mature the fruit. Climbing, herbaceous plants.

1. A. MONOI'CA, (Ell.) *Root* creeping. *Stem* slender, climbing over small shrubs, retrorsely-hirsute, angular. *Leaves* ternate, ovate, or rhombic-ovate, thin, glabrous, or hairy, a little oblique. *Flowers* in pendulous racemes, on filiform peduncles. *Calyx* hairy at the base, 4-toothed, acuminate. *Legume* smooth, 3—4-seeded.—White, tinged with violet. ♃. June—Sept. Rich lands. Common. 2—5 feet.

TRIBE III.—GALE'GEÆ.

Legume continuous, dehiscent, 1—several-seeded, or 1—2-seeded and indehiscent. *Leaves* usually unequally pinnate. *Inflorescence* in spikes or racemes. Erect herbs, shrubs, or trees.

GENUS XVII.—AG'ATI. Adans. 16—10.

(A Sanscrit word for one of the species.)

Calyx campanulate, slightly bilabiate. *Vexillum* shorter than the wings. *Legume* stiped, linear, a little compressed, many-seeded, contracted between the seeds. Small trees.

1. A. GRANDIFLO'RA, (Desv.) *Leaves* equally pinnate; leaflets numerous. *Stipules* lanceolate. *Racemes* axillary, 2—4-flowered. *Flowers* large. *Legume* long, pendulous. *Seeds* oval.—White. ♃. Southern Florida.

GENUS XVIII.—SESBA'NIA. Pers. 16—10.

(An Arabic name of one of the species.)

Calyx 5-toothed; teeth nearly equal, with 2 caducous bracteoles at the base. *Vexillum* roundish, with 2 appendages on its claw. *Stamens* diadelphous. *Legume* long (10—12 inches), linear, slender, cylindrical, or compressed, many-seeded. *Seeds* cylindrical-oblong. Herbaceous plants, with pinnate leaves.

1. S. MACROCAR'PA, (Muhl.) *Stem* with expanding branches, glabrous, herbaceous. *Leaves* pinnate, 10—25 pair; leaflets linear-elliptical, glabrous, entire, slightly mucronate. *Flowers* in axillary racemes, few-flowered, shorter than the leaves. *Calyx* pubescent along the margin, two upper teeth reflected. *Vexillum* reflected. *Legume* somewhat 4-angled, about 12 inches long.—Yellow. ☺. So. Car. and Lou.

GENUS XIX.—GLOTTIDI'UM. Desv. 16—10.

(From the Greek *glossa* or *glotta*, a tongue, in reference to the valves of the legume.)

Calyx 5-toothed; teeth nearly equal, small, obtuse. *Vexillum* short, broad, slightly unguiculate, reniform. *Keel-petals* united at the middle. *Legume* elliptical-oblong, stipitate, compressed, 2-seeded. *Seeds* compressed.

1. G. FLORIDA'NUM, (D. C.) *Stem* glabrous. *Leaves* equally pinnate, 10—20 pairs. *Petioles* terminated by a bristle. *Leaflets* oblong-linear, mucronate, glabrous. *Racemes* 4—8-flowered. *Petals* nearly equal. *Legume* about 2 inches long, rigidly mucronate. *Valves* separating into an exterior coriaceous portion, and an interior membrane inclosing the seeds.—Yellow. ☺. Aug.—Sept. Damp soils. So. Car. and Florida. 4—6 feet. *Sesbania vesicaria*, Ell

Genus XX.—ROBIN'IA. L. 16—10.

(After Robin, a French botanist.)

Calyx campanulate, 5-toothed, the 2 upper sepals united nearly to the summit, so as to give the calyx somewhat the appearance of being only 4-toothed. *Vexillum* broad and large. *Keel* obtuse. *Stamens* diadelphous. *Style* bearded next the free stamen. *Legume* compressed, many-seeded, long, the placental suture margined. *Seeds* compressed. *Leaves* unequally pinnate. Trees or shrubs, with stipular spines.

1. R. Pseudaca'cia, (L.) A tree, with virgate branches. *Leaves* with 4—7 pairs of leaflets; leaflets frequently alternate, oval, emarginate, with setaceous stipules. *Flowers* odorous, in axillary racemes. *Calyx* pubescent, spotted. *Legumes* 2—3 inches long, smooth.—White. ♄. March—April. A large tree among the mountains, 60—80 feet; smaller in the middle country. 30—70 feet. *Common Locust.*

2. R. visco'sa, (Vent.) A small tree, with viscid branches. *Leaves* with 5—7 pairs; leaflets ovate, stipular spines very short. *Petioles* glandular-viscid. *Flowers* inodorous, in axillary, erect racemes. *Legumes* obliquely-lanceolate, mucronate, 3—5-seeded, glandular-viscid.—White, tinged with red. ♄. Mountains. Car. and Geo. 20—40 feet.

3. R. his'pida, (L.) A small shrub, the young branches reddish, hispid. *Leaves* unequally pinnate; leaflets oval, nearly round, mucronate, almost destitute of stipular spines. *Racemes* loose. *Flowers* inodorous, axillary.—Rose-color. ♄. April. Mountains. 3—6 feet.

Var. Ro'sa, (Pursh.) *Leaflets* mostly scattered, not hispid; stipules spiny; young branches, petioles, and under surface of the leaves pubescent.—Middle Car. and Geo. 2—4 feet.

Var. Na'na, (Ell.) Very small shrub, scarcely a foot high.—Near Columbia, So. Car., and Macon, Geo.

Genus XXI.—TEPHRO'SIA. Pers. 16—10.

(From *tephros*, ash-colored, in allusion to the general color of some of the species.)

Calyx 5-toothed; teeth subulate, nearly equal; no bracts at the base of the calyx. *Vexillum* large, nearly round, spreading or reflexed. Generally monadelphous. *Style* usually bearded, filiform. *Legume* sessile, compressed, coriaceous, many-seeded. *Seeds* compressed. Herbaceous plants, with unequally pinnate leaves.

1. T. Virginia'na, (Pers.) *Stem* erect, pubescent, in dense branches, slightly angular. *Leaflets* numerous, oblong-lanceolate, mucronate, silky-pubescent. *Flowers* in terminal racemes, compact. *Calyx* deeply 5-cleft, hairy. *Legume* compressed, hairy. *Seeds* reniform.—Dull yellow, tinged with purple. 2♃. May—July. Common in pine barrens. 10—15 inches.

2. T. paucifo'lia, (Nutt.) *Stem* erect or decumbent, pilose, hispid, with rusty hairs. *Leaves* scattered, few; leaflets 4—7 pairs, elliptic,

often slightly cuneate, mucronate, silky-pubescent; petiole villous. *Flowers* on long peduncles, opposite the leaves, bearing but few flowers, 4—5. *Calyx* hispid. *Vexillum* hairy on the outer surface. *Legume* compressed, hispid.—Purplish-red. 2. June—Sept. Common in pine woods. 10—15 inches. *T. spicata*, T. & G.

3. T. HISPIDU'LA, (Pursh.) *Stem* erect, much divided, dichotomous, slightly pubescent. *Leaflets* numerous, 11—17, elliptical-oblong, mucronate, glabrous on the upper surface, hirsute on the lower, slightly retuse. *Racemes* as long as the leaves, few-flowered, opposite the leaves. *Calyx* very villous; segments expanded. *Legume* straight, mucronate, somewhat hispid. *Seeds* reniform, compressed, spotted.—Pale red. 2. May—Aug. Dry soils. Common. 10—18 inches.

4. T. CHRYSOPHYL'LA, (Pursh.) *Stem* prostrate, pubescent, dichotomous. *Leaves* nearly sessile, with 5—9 leaflets, cuneate-obovate, obtuse, coriaceous, smooth above, silky hirsute beneath. *Peduncles* longer than the leaves, few-flowered, slightly compressed. *Legume* linear, 8—10-seeded.—Reddish-purple. 2. May—Aug. Common around Savannah; found in middle Georgia and Florida. 10—12 inches.

GENUS XXII.—GLYCYRRHI'ZA. Tourn. 16—10.

(From the Greek *glukus*, sweet, and *rhiza*, root.)

Calyx tubular, gibbous, without bracteoles, bilabiate, 5-cleft. *Vexillum* straight, ovate-lanceolate. *Legume* ovate, compressed, 1—4-seeded. *Leaves* unequally pinnate.

1. G. LEPIDO'TA. *Roots* long, creeping. *Leaflets* oblong-lanceolate, acute, with glandular scales beneath. *Legumes* covered with hooked bristles, 2—6-seeded.—Whitish. Missouri. 2—5 feet. *Liquorice.*

GENUS XXIII.—INDIGOF'ERA. L. 16—10.

(From *indigo*, a blue dye-stuff, and *fero*, to bear.)

Calyx 5-cleft, expanding, minute, subulate. *Vexillum* nearly round, emarginate. *Keel* with a spur on each side. *Stamens* diadelphous. *Style* filiform, glabrous. *Legume* 1 or many seeded.

1. I. CAROLINIA'NA, (Walt.) *Stem* erect, branching, glabrous, striate. *Leaves* unequally pinnate. *Leaflets* 5—6 pairs, mucronate, oval-oblong, slightly pubescent, glaucous underneath. *Flowers* in slender axillary racemes, a bract at the base of each pedicel. *Calyx* small, with 5 subulate teeth, pubescent. *Keel* longer than the vexillum. *Legume* short, pointed with the style.—Yellowish brown. 2. July—Sept. Poor soils. 3—7 feet. *Indigo Plant.*

2. I. LEPTOSEP'ALA, (Nutt.) *Stem* decumbent, rough. *Leaves* unequally pinnate. *Leaflets* 7—9, obovate-oblong, nearly glabrous on the upper surface. *Flowers* in racemes longer than the leaves, nearly sessile. *Segments* of the calyx equal, subulate. *Legumes* reflexed, linear, nearly terete, 6—7-seeded, pubescent, terminated by the style.—Pale scarlet. 2. Georgia. 2—3 feet.

Genus XXIV.—PSORA'LEA. L. 16—10.

(From the Greek *psoraleos*, scurfy; the appearance of the calyx.)

Calyx campanulate, 5-toothed, sprinkled with glandular dots, lower segments a little the longest. *Stamens* diadelphous. *Legume* indehiscent, 1-seeded, slightly beaked, as long as the calyx.

1. P. canes'cens, (Mich.) *Root* tuberous. *Stem* branching, canescently pubescent. *Leaves* entire, simple above and trifoliate below, broad obovate-lanceolate, dotted. *Stipules* subulate. *Peduncles* axillary, 4—7-flowered. *Calyx* inflated, glandular, brownish. *Legume* short, glandular.—Yellowish. 2f. May—July. Middle Car. and Geo. Common. 2—3 feet.

2. P. Lupinel lus, (Mich.) *Stem* somewhat branched, slender, glabrous. *Leaves* digitate on long petioles. *Leaflets* filiform, 5—7-foliate. *Racemes* longer than the leaves, many-flowered. *Peduncles* thick. *Calyx* small, glandular, the lower segment longest. *Corolla* much longer than the calyx, with a sub-orbicular vexillum, small, with a recurved point, rugose.—Pale violet. 2f. May—July. Sand-hills of middle Georgia. 2—3 feet.

3. P. virga'ta, (Nutt.) *Stem* virgate, somewhat branched, slightly pubescent. *Leaves* simple, linear-lanceolate, remote, with setaceous stipules. *Flowers* in cylindrical spikes. *Spikes* axillary, not as long as the leaves. *Bracts* oblong, calyx dotted with glands, lower segment a little the longest. *Corolla* but little longer than the calyx. *Legume* 1-seeded.—Pale violet. 2f. Near St. Mary's, Geo. 2 feet.

4. P. melilotoi'des, (Mich.) *Stem* diffuse, slightly pubescent, branching. *Leaves* ternate. *Leaflets* oblong-lanceolate, dotted with glands. *Flowers* in oblong spikes, with broad, conspicuous, colored, caducous bracteas. *Spikes* axillary and terminal. *Calyx* hairy, purplish, glandular. *Keel* small. *Legume* mucronate, oval, rugose, 1-seeded.—Purple. 2f. May—June. Very common in middle and upper Carolina and Georgia. 2 feet.

5. P. eglandulo'sa, (Ell.) *Stem* pubescent. *Leaves* trifoliate, leaflets oblong-lanceolate. *Flowers* in oblong spikes. *Bracts* broad, lanceolate, acuminate. *Calyx* very villous. *Legume* nearly orbicular, with transverse wrinkles. Very similar to the preceding.—Purple. 2f. May—June. Dry soils. 1—2 feet.

6. P. multiju'ga, (Ell.) *Stem* thick, glabrous, furrowed. *Leaves* pinnate, irregular, 9—10 pairs. *Leaflets* oblong-lanceolate, hairy on the under surface, sometimes pubescent on the upper. *Flowers* in oblong spikes. *Bracts* small. *Calyx* with very long teeth, villous on the margin. *Legume* 1-seeded.—Violet. 2f. May—June. Middle and upper country. We found it near Greenville, S. Car. 10—20 inches.

Genus XXV.—AMOR'PHA. L. 16—10.

(From *a*, priv., and *morphe*, form, in allusion to the irregular form of the corolla.)

Calyx campanulate, 5-cleft, persistent. *Vexillum* ovate, concave, unguiculate; wings and keel wanting. *Stamens* monadelphous. *Style* filiform. *Legume* falcate, rough or tubercu-

late with glands, 1—2-seeded. *Shrubby* or herbaceous plants, with pinnate leaves, leaflets numerous, punctate. *Flowers* in spiked racemes, numerous, pedicels articulated with the flower.

1. A. FRUCTICO'SA, (L.) A shrub with pubescent branches. *Leaves* alternate, petiolate, generally pinnate, leaflets oval, or elliptical-oblong, obtuse, petiolate. *Flowers* in terminal racemes. *Calyx* turbinate, pubescent. *Vexillum* emarginate, obovate, twice the length of the calyx. *Style* hairy. *Legume* 2-seeded.—Dark purple. ♄. On the margin of rivers in the low country. 6—16 feet.

2. A. PUBES'CENS, (Willd.) A small shrub, pubescent, slightly muricate. *Leaves* equally pinnate, many pairs, 20—24. *Leaflets* elliptical, petiolate, mucronate, very pubescent. *Flowers* in long panicled spikes. *Teeth* of the calyx nearly equal, purple. *Vexillum* obcordate, longer than the calyx.—White. ♄. June—July. Damp soils. 2—4 feet.
A. herbacea, Walt.

3. A. CANES'CENS, (Nutt.) *Stem* suffrucicose, softly canescent. *Leaves* numerous and crowded, 15—34 pairs of leaflets, closely arranged, ovate-elliptical, mucronate, small. *Flowers* in paniculate spikes, sessile, terminal. *Vexillum* nearly orbicular, tapering slightly at the base, *Legume* 1-seeded.—Blue. ♄. July—Aug. Banks of streams, middle Georgia. 1—3 feet. *Lead Plant.*

4. A CAROLINIA'NA, (Croom.) A small shrub, nearly glabrous. *Leaflets* oblong or elliptical, petiolate, dotted, the lowest pair approximated to the stem. *Flowers* on very short pedicels. *Calyx* with short teeth, the two upper obtuse, the three lower longer or nearly equal, villous on the margin. *Style* hairy toward the base.—Dark blue. ♄. July. Near Wilmington and Newbern. 4—5 feet. (*Curtis & Croom.*)

GENUS XXVI.—DA'LEA. L. 16—10.

(In honor of Dale, an English botanist.)

Calyx 5-cleft, often glandular, with nearly equal segments. *Petals* unguiculate, the keel and wing petals united to the stamen tube. *Vexillum* inserted into the base of the calyx, short, limb cordate. *Stamens* monadelphous, the tube being 3-cleft. *Ovary* with two collateral ovules. *Legume* 1-seeded, indehiscent. *Leaves* unequally pinnate. *Flowers* in dense spikes, often capitate.

1. D. ALOPECUROI'DES, (Willd.) *Stem* erect, glabrous, branched. *Leaves* numerous. *Leaflets* 10—14 pairs, narrow, elliptical, dotted beneath. *Flowers* in cylindrical spikes, villous, caliculate. Segments of the calyx lanceolate, acuminate, hairy.—Blue. ☉. Middle Carolina and Georgia. 1—2 feet.

GENUS XXVII.—PETALOSTE'MON. Mich. 16—5.

(From the Greek *petalon*, a petal, and *stemon*, a stamen; the stamens and petals being joined together at the base.)

Calyx 5-toothed, teeth nearly equal. *Petals* 5, on filiform claws, 4 of them united to the stamen tube, the fifth free, with

an oblong-cordate limb. *Stamens* 5, monadelphous. *Legume* indehiscent, 1-seeded. Herbaceous plants, glandular. *Flowers* in terminal spikes or heads.

1. P. CAR'NEUM, (Mich.) *Stem* glabrous, much branched, slender. *Leaves* fascicled. *Leaflets* 2—3 pairs, linear, lanceolate, entire, glandular. *Flowers* in oblong spikes. *Calyx* glabrous, ovate, striate, 5-cleft, slightly pubescent on the margin, deeply cleft on the upper side. *Petals* oblong, unguiculate.—Rose-color. 4. August. Near Macon, on the Houston road. 1—2 feet.

2. P. CORYMBO'SUM, (Mich.) *Stem* erect, branching, glabrous. *Leaves* fascicled; leaflets 3—4 pairs, linear, entire, glabrous, dotted underneath. *Stipules* 2, subulate. *Flowers* in heads. *Peduncles* glandular. *Calyx* deeply cleft, plumose; the upper petal with a long claw. *Legume* small, 1-seeded, oblong.—White. 4. Sept.—Oct. Near Macon, on the road to Brown's Mountain. 1—2 feet.

TRIBE IV.—TRIFO'LIEÆ.

Legume continuous, several-seeded, and dehiscent, or few-seeded and indehiscent. Generally herbaceous, erect or procumbent. *Leaves* radiated, 3—5—7-foliate.

GENUS XXVIII.—TRIFO'LIUM. Tourn. 16—10.

(From *tris*, three, and *folium*, a leaf; the species having three leaves.)

Calyx campanulate, 5-cleft, with setaceous segments. *Petals* more or less united, vexillum longer than the wings. *Legume* membranaceous, 1—6-seeded, generally indehiscent. *Leaves* palmately divided, or trifoliate; leaflets 3—7. *Flowers* in dense spikes or heads. *Clover. Tree-foil.*

1. T. ARVEN'SE, (L.) *Stem* silky, pubescent, erect, branching. *Leaflets* spatulate-lanceolate, obtuse, ternate, minutely 3-toothed. *Flowers* in oblong, villous spikes. *Petals* nearly separate. *Legume* 1-seeded.—Whitish, with purple spot on the wings. ☺. June—Aug. 8—12 inches. *Stone Clover. Rabbit-foot.*

2. T. PRATEN'SE, (L.) *Stem* glabrous, ascending, sometimes slightly hairy; leaflets oval, finely serrulate, or nearly entire. *Flowers* in ovate spikes. *Calyx* very hairy. *Corolla* longer than the calyx. *Petals* unequal.—Purple. 4. April—May. Rich soils. 2—3 feet. *Red Clover.*

3. T. REFLEX'UM, (L.) *Stem* pubescent, decumbent, or ascending. *Leaves* ternate; leaflets obovate, somewhat rhomboidal, pubescent, upper ones acute, lower ones emarginate. *Flowers* in somewhat umbellate dense heads. *Calyx* hirsute, deeply-parted, with subulate teeth. *Vexillum* broad-ovate, twice as long as the calyx. *Legume* 3—5-seeded.—Vexillum red, wings and keel white. ☺. April—June. 12—18 inches. *Buffalo Clover.*

4. T. RE'PENS, (L.) *Stem* glabrous, creeping, diffuse, sometimes sprinkled with a few hairs. *Leaves* ternate, nearly glabrous; leaflets ovate-oblong, emarginate, denticulate. *Flowers* in umbellate, globose heads,

on long axillary peduncles, at first erect, afterward reflected. *Calyx* nearly glabrous, with unequal teeth. *Legume* 4-seeded, cylindrical.—White. 2f. April—Nov. Waste places. Common. 6—12 inches.
White Clover.

5. T. Carolinia'num, (Mich.) *Stem* small, procumbent, hairy. *Leaves* ternate, obcordate, pubescent, toothed, glaucous beneath. *Flowers* in small umbels, at first erect, afterward reflected. *Calyx* persistent, unequally 5-cleft. *Vexillum* longer than the calyx. *Keel* very short. *Legume* 4-seeded, turgid.—White, tinged with purple. ☺. March—May. Sandy fields.

Genus XXIX.—MELILO'TUS. Tourn. 16—10.

(From *mel*, honey, and *lotus*,—honey-lotus.)

Calyx tubular, campanulate, 5-toothed, persistent. *Petals* deciduous. *Vexillum* longer than the wings; keel petals united, cohering to the wings. *Style* filiform. *Legumes* coriaceous, 1 to few seeded, nearly globose. *Leaves* trifoliate. *Flowers* in axillary racemes.

1. M. officina'lis, (Willd.) *Stem* erect, angular, glabrous, with spreading branches; leaflets obovate, obtuse, remotely serrate, glabrous. *Flowers* in loose racemes, teeth of the calyx unequal. *Legumes* 2-seeded, rugose, acute, ovate.—Yellow. ☺. June—Aug. Rich soils. Introduced. 2—4 feet.
Yellow Melilot.

Genus XXX.—MEDICA'GO. L. 16—10.

(From *medike*, a name given to a species of grass.)

Calyx somewhat cylindrical, 5-cleft, keel of the corolla bending from the vexillum. *Legume* spirally coiled, 1-seeded, compressed.

1. M. Lupuli'na, (L.) *Stem* procumbent, diffuse, assurgent, angled, hairy. *Leaves* ternate, on short petioles; leaflets oblong, cuneate, emarginate, denticulate near the summit, hairy. *Flowers* in axillary heads. *Legumes* reniform, 1-seeded, black.—Yellow. 2f. June—Aug. Cultivated grounds. Introduced. 6—12 inches.

Tribe V.—ASTRAGA'LEÆ.

Stamens monadelphous. *Legume* continuous, usually inflated, and often 2-celled, commonly several-seeded. Erect or decumbent plants, usually herbaceous.

Genus XXXI.—ASTRAG'ALUS. L. 16—10.

(From the Greek *astragalos*, vertebra; the seeds in the pod being flattened longitudinally like vertebræ.)

Calyx 5-toothed, keel obtuse. *Stamens* monadelphous. *Legume* 2-celled, by the inflexion of the lower suture. *Leaves* unequally pinnate; leaflets numerous.

1. A. OBCORDA'TUS, (Ell.) *Stem* nearly glabrous, decumbent, or assurgent; leaflets 15—25, obcordate, small, on petioles. *Flowers* in ovate spikes. *Calyx* hairy, with subulate teeth. *Legumes* oblong, slightly curved, acute.—White. 2f. Southern Geo., Flor. 4—8 inches.

2. A. CANADEN'SIS, (L.) *Stem* erect, canescent, somewhat branched; leaflets very numerous, 25—41, oblong, pubescent underneath. *Flowers* in compact, elongated, axillary spikes; peduncles long, bracts subulate. *Calyx* hairy, teeth subulate, small, corolla much longer than the calyx. *Legume* terete, glabrous, many-seeded.—Pale yellow. 2f. June—July. Mountains. 1—3 feet.

3. A. GLA'BER, (Mich.) *Stem* erect, glabrous. *Leaflets* numerous, 15—23, small, linear oblong, hairy underneath. *Flowers* in elongated spikes, few-flowered, 3—6; peduncles long as the calyx. *Legume* glabrous, acute at each end, incurved.—Whitish. 2f. April. Low country of Georgia. 1—2 feet.

GENUS XXXII.—PHA'CA. L. 16—10.

(From the Greek *phake*, a lentil.)

Calyx 5-cleft, the two upper segments more remote than the others. *Keel* obtuse. *Style* smooth; stigma capitate. *Legume* inflated, 1-celled. *Flowers* in axillary racemes. Herbaceous.

1. P. VILLO'SA, (Nutt.) A small, hairy plant, procumbent. *Leaves* unequally pinnate; leaflets 9—17, oval, oblong, petiolate, rather distant. *Flowers* on peduncles about as long as the leaves, clustered near the summit, 8—20. *Segments* of the calyx acute, long, bracts lanceolate-subulate. *Legumes* villous, sessile, inflated. *Seeds* small, few.—Yellow. ⊙. April—May. On the coast. 4—6 inches.

TRIBE VI.—HEDYSA'REÆ.

Legume transversely divided into indehiscent, 1-seeded joints Erect or procumbent herbs or shrubs.

GENUS XXXIII.—ZOR'NIA. Gmel. 16—10.

(In honor of Zorn, a Medical Botanist.)

Calyx bilabiate; upper lip emarginate, the lower 3-cleft. *Petals* inserted into the calyx; vexillum broad-cordate, revolute; keel-petals cohering. *Stamens* monadelphous, alternately shorter; anthers alternately oblong and globose. *Legume* jointed, hispid, 4—5 joints. *Leaves* digitate, petioled, stipulate. *Flowers* with 2 bracts. Perennial, herbaceous plants.

1. Z. TETRAPHYL'LA, (Mich.) *Stem* prostrate, branching, diffuse. *Leaflets* 4, lanceolate, glabrous. *Flowers* in long spikes, 5—9-flowered, alternate; bracts ovate, 5-nerved; upper segments of the calyx broad, emarginate; all the segments ciliate; vexillum broad, reniform; wings broadly ovate, as long as the vexillum; keel short. *Legume* 2—4-jointed, joints nearly round.—Yellow. 2f. July. Sandy lands. 1—2 feet long.

Genus XXXIV.—STYLOSAN'THES. Swartz. 16—10.

(Greek *stulos*, a style, and *anthos*, a flower, from the flower having a long style.)

Calyx tubular, somewhat bilabiate, with 2 lanceolate bracts at the base. *Corolla* inserted into the calyx; vexillum broad; keel small. *Stamens* monadelphous; anthers alternately linear and ovate. *Style* short and recurved. *Legume* 1—2-jointed, hooked.

1. S. ela'tior, (Swartz.) *Stem* erect, pubescent on one side. *Leaves* pinnate; leaflets 3, lanceolate, glabrous, entire. *Leaves* around the capitulum simple, lanceolate. *Flowers* in a terminal, compact capitulum, all sterile but 2. *Calyx* with the upper lip 2-cleft, the lower 3-cleft. *Legume* hooked at the summit, 1-celled. Sterile flowers, furnished with 2 plumose, lanceolate bracts.—Yellow. 2. May—Aug. Common. 10—15 inches.

Genus XXXV.—CHAPMAN'NIA. T. & G. 16—10.

(In honor of Dr. A. W. Chapman, Appalachicola, Florida.)

Calyx with 2 bracteoles at the base; tube long and slender; limb 5-toothed, the lowest tooth longest. *Stamens* monadelphous, alternately longer. *Ovary* sessile, 2—3 ovules.

1. C. Florida'na, (T. & G.) Herbaceous plant, branched, hirsute, and viscid. *Leaves* unequally pinnate, 2—3 pairs of leaflets, each elliptical, oblong, nearly glabrous above, hairy and purplish beneath. *Stipules* small. *Flowers* in somewhat paniculate racemes. *Calyx* hispid. *Petals* nearly equal in length. *Anthers* large.—Yellow. Southern Florida. 2—3 feet.

Genus XXXVI.—ÆSCHYNOM'ENE. L. 16—10.

(From the Greek *aischuno*, to be ashamed, from the apparent sensitiveness of the leaves of some of the species.)

Calyx bilabiate; the upper lip bifid, the lower 3-cleft. *Corolla* inserted into the base of the calyx; vexillum nearly round; wings oblong; keel cymbiform. *Stamens* 10, diadelphous, 5 in each division. *Legume* compressed, straight, generally composed of many 1-seeded joints; joints truncate, easily separated. *Seeds* compressed. *Leaves* unequally pinnate. *Flowers* in axillary racemes. Annual plants.

1. Æ. his'pida, (Willd.) *Stem* erect, hispid, tubercled. *Leaves* in many pairs, with hispid petioles; leaflets linear, obtuse; stipules subsagittate, ovate. *Flowers* in simple racemes. *Calyx* bilabiate, deeply divided, the upper lip bifid, the lower trifid. *Corolla* much larger than the calyx, showy. *Legume* very hispid, 6—10-jointed.—Yellow, tinged with red. ☺. Aug. Along rivers. 2—3 feet.

2. Æ. viscid'ula, (Mich.) *Stem* prostrate, viscidly pubescent, slender, diffuse. *Leaflets* generally 7—9, obovate, oblique, lanceolate *Peduncles* generally 2-flowered; bracts like the stipules. *Calyx* almost equally 5 cleft. *Lomentum* with 2 joints, hispid.

Genus XXXVII.—DESMO'DIUM. D. C. 16—10.

(From the Greek *desmos*, a band; the stamens being often connected.)

Calyx 5-cleft, bilabiate; upper lip 2-cleft or 2-toothed, the lower lip 3-cleft or 3-toothed, usually bracteolate, bearing the corolla at its base. *Vexillum* nearly round; keel obtuse. *Stamens* 10, sometimes partially monadelphous, but usually diadelphous. *Stigma* capitate. *Legume* composed of several 1-seeded joints, compressed. *Leaves* usually trifoliate. *Flowers* becoming more or less green by age. Herbaceous and suffrucicose plants. *Hedysarum*, L.

1. D. NUDIFLO'RUM, (D. C.) *Stem* simple, erect, pubescent, leafy at the summit. *Leaves* ternate; leaflets oval or broad-ovate, acuminate, pale beneath, slightly scabrous above. *Flowers* in an elongated, loose panicle, on a leafless stalk or scape from the root. *Pedicels* filiform. *Calyx* with short teeth, spreading, the lower tooth longest. *Petals* nearly equal, the vexillum marked by two dark spots at the base. *Stamens* monadelphous. *Legume* pubescent, 3—4-jointed, stiped.—Purple. 2f. July—Aug. Common in rich, shaded soils of middle Geo. 6—12 inches.

2. D. ACUMINA'TUM, (D. C.) *Stem* erect, simple, pubescent, leafy at the summit. *Leaves* ternate; leaflets ovate, nearly orbicular, acuminate, terminal one the broadest, on long petioles, slightly hairy. *Flowers* in a terminal panicle, with a very long naked peduncle, 1—2 feet. *Calyx* 4-toothed. *Petals* nearly equal in length. *Stamens* monadelphous. *Legume* with 2—4 rounded joints.—Nearly white, or pale violet. 2f. June—Aug. Common in shaded places. 10—15 inches.

3. D. CANES'CENS, (D. C.) *Stem* erect, hairy, scabrous, branching, striate. *Leaves* ternate; leaflets ovate, tapering at the apex, pubescent on both sides, stipulate. *Flowers* in large terminal, canescent panicles. *Calyx* hairy, conspicuously bilabiate, with acute segments. *Corolla* much larger than the calyx. *Legume* large, 3—6-jointed, scarcely stiped, truncate at each end.—Violet-purple. 2f. July—Aug. Moist soils. Common. 3—4 feet.

4. D. CUSPIDA'TUM, (T. & G.) *Stem* erect, glabrous toward the base, scabrous near the summit. *Leaves* ternate; leaflets ovate, acute, acuminate into a long point. *Flowers* in large, sparingly-branched panicles, 1—2 feet long; bracts large. *Calyx* 5-cleft, the lower segment long. *Corolla* large. *Stamens* diadelphous. *Legume* scabrous; segments nearly triangular, 3—6.—Purplish-violet. 2f. Aug.—Sept. Common on the banks of streams. 4—5 feet.

5. D. VIRIDIFLO'RUM, (Beck.) *Stem* erect, pubescent. *Leaves* ternate; leaflets ovate, obtuse, scabrous on the upper surface, villous beneath. *Flowers* in an elongated, naked panicle. *Peduncles* scabrous. *Calyx* hairy, short, the lower segment longest. *Stamens* generally diadelphous. *Legume* with 3—4 oblong, triangular joints.—Purplish. 2f. June—Oct. Common. 3—5 feet.

6. D. RHOMBIFO'LIUM, (D. C.) *Stem* erect, pubescent. *Leaves* ternate, somewhat coriaceous; leaflets rhomboidal, obtuse, pubescent along the veins, rugose, paler beneath. *Flowers* in compound racemes, scabrous;

bracts small. *Calyx* with the lower segment longest. *Legume* with 2—4 joints, hispid, nearly rhomboidal.—Purple. 4. Sept.—Oct. On the coast of Car. and Geo. 2—3 feet.

7. D. GLABEL'LUM, (D. C.) *Stem* erect, nearly glabrous. *Leaves* ternate; leaflets small, ovate, obtuse, pubescent on both surfaces. *Flowers* in terminal, leafy panicles. *Calyx* with the upper lip entire. *Legume* with 3—5 reticulated, rhomboidal, hispid joints.—Purple. 4. Aug.—Sept. Common in shady places. 2—3 feet.

8. D. OBTU'SUM, (D. C.) *Stem* erect, branching, hairy toward the summit, glabrous below. *Leaves* ternate; leaflets small, ovate, obtuse, often slightly cordate. *Flowers* in terminal, elongated, erect panicles; upper lip of the calyx emarginate, the lower lanceolate. *Legume* with 2—3 hispid, nearly orbicular, reticulate joints.—Purple. 4. Sept.—Oct. In dry soils. Common. 2—3 feet ⊙. *D. Marilandium*, Boott.

9. D. CILIA'RE, (D. C.) *Stem* erect, pubescent. *Leaves* ternate, on short, hairy petioles; leaflets small, ovate, pubescent underneath, ciliate, somewhat coriaceous. *Flowers* in a terminal, racemose panicle *Calyx* hairy, upper lip shortest, mostly entire. *Legumes* with 2—3 nearly round, reticulate joints.—Purple. 4. Sept.—Oct. In sandy soils. 2—3 feet.

10. D. RIG'IDUM, (D. C.) *Stem* erect, much branched, with rigid pubescence toward the summit, striate. *Leaves* ternate; leaflets oblong-ovate, obtuse, ciliate, hairy underneath; petioles hairy. *Flowers* small, in long, erect, paniculate racemes. *Calyx* with acute segments. *Legumes* with 2—3 hispid joints.—Purple. 4. Aug.—Sept. In dry soils. Common. 2—3 feet.

11. D. STRIC'TUM, (D. C.) *Stem* erect, generally simple, or branching toward the summit, slender, pubescent, or glabrous. *Leaves* ternate; leaflets linear, elongated, coriaceous, reticulate, glabrous, or slightly pubescent. *Flowers* in terminal or axillary racemes, few-flowered, on slender pedicels; upper lip of the calyx emarginate, shorter than the lower. *Legume* 1—2-jointed; joints semi-obovate, hispid.—Purple, green at the base. 4. Aug.—Sept. In pine-barrens. 3—4 feet.

12. D. PANICULA'TUM, (D. C.) *Stem* erect, furrowed, slender, hairy toward the summit. *Leaves* ternate; leaflets oblong-lanceolate or linear-lanceolate or oval, slightly hairy, and paler beneath; margins revolute. *Flowers* in paniculate racemes, with long, slender pedicels; upper lip of the calyx emarginate, much shorter than the lower. *Legume* usually 5-jointed, pubescent; joints somewhat triangular.—Purple. 4. Aug.—Sept. Common. 2—3 feet.

13. D. ROTUNDIFO'LIUM, (D. C.) *Stem* angular, prostrate, hirsute, branching, geniculate. *Leaves* ternate; leaflets large, orbicular, pubescent, ciliate. *Flowers* in axillary, paniculate racemes. *Calyx* nearly equally 4-cleft. *Legumes* hispid, with 3—5 rhomboidal joints, hispid.—Pale purple or nearly white. 4. Aug.—Sept. In dry soils. Common. 2—4 feet.

14. D. LINEA'TUM, (D. C.) *Stem* creeping, angled, striate. *Leaves* ternate, on very short petioles; leaflets nearly round, small, almost glabrous; stipules persistent, subulate. *Flowers* in loose, terminal, elongated panicles; upper lip of the calyx 2-cleft, lower one 3-cleft, with the middle segment longest. *Legumes* sessile, hispid, generally with 3 joints, which are nearly orbicular.—Pale purple. 4. Aug.—Sept. Near Culloden, Geo. 6—15 inches.

Genus XXXVIII.—LESPEDE'ZA. Mich. 16—19.

(In honor of Lespedez, Governor of Florida.)

Calyx 5-cleft, with nearly equal segments, with 2 bracteoles at the base. *Corolla* inserted into the base of the calyx; vexillum unguiculate, oblong, or nearly round, generally with an appendage at the base; keel obtuse, as long as the wings, on long claws; wings straight. *Stamens* diadelphous. *Stigma* capitate. *Legume* lenticular, flat, unarmed, 1-seeded. Perennial or suffructicose plants, with ternate, reticulated leaves.

(*a.*) Flowers of two kinds. *Some* with all the organs perfectly developed apparently, but seldom perfecting their fruit. *Others* perfecting their fruit, but generally destitute of corolla and stamens. Both kinds may be on the same plant; the fertile ones usually occupying a lower situation than the others.

1. L. procum'bens, (Mich.) *Stem* procumbent, tomentose, slender. *Leaves* ternate; leaflets oval, emarginate, very pubescent. *Flowers* on axillary peduncles. *Calyx* slightly bilabiate, shorter than the corolla. *Legume* nearly round, pubescent.—Purple. 2f. Aug.—Oct. In dry soils. Common. 2—3 feet.

2. L. re'pens, (T. & G.) *Stem* prostrate, nearly glabrous. *Leaves* ternate, on short petioles; leaflets obovate, elliptical, slightly pubescent on the under surface. *Flowers* on axillary, filiform peduncles. *Legumes* minutely pubescent, nearly round.—Purple. 2f. Aug.—Oct. In dry, sandy soils. 1—2 feet.

3. L. sessilflo'ra, (T. & G.) *Stem* erect, branching, pubescent. *Leaves* ternate; leaflets elliptic, sprinkled with hairs, mucronate. *Flowers* in small, nearly sessile clusters, sometimes in small racemes. *Calyx* hairy. *Legumes* pubescent, mucronate, ovate.—Pale violet. 2f. Sept. Dry, sandy soils. 2—3 feet.

4. L. Stu'vei, (Nutt.) *Stem* simple or branching, erect, pubescent. *Leaves* ternate, tomentose; leaflets oval or nearly round. *Flowers* in axillary racemes or spikes, few-flowered. *Peduncles* longer than the leaves. *Legumes* pubescent, ovate, a little longer than the calyx.—2f. Sept. Dry, sandy soils. 2—3 feet.

b. Flowers all perfect and fertile, in dense oblong or nearly globose spikes.

5. L. hir'ta, (Ell.) *Stem* erect, branching, whole plant pubescent. *Leaves* ternate, nearly sessile; leaflets nearly orbicular or obovate, covered with soft pubescence. *Flowers* in axillary, oblong spikes. *Peduncles* long. *Calyx* hairy, with narrow, lanceolate segments. *Petals* nearly equal, about as long as the calyx. *Vexillum* with a purple spot in the center. *Legume* hairy, oval, swollen.—Nearly white or light yellowish-brown. 2f. Sept. Common. 3—4 feet.

6. L. capita'ta, (Mich.) *Stem* erect, pubescent, scarcely branched. *Leaves* ternate, on short petioles; leaflets elliptical, obtuse, pubescent. *Flowers* in dense, axillary, capitate spikes. *Peduncles* short. *Calyx* hairy, 3-nerved. *Vexillum* with a purple spot near the base. *Legume* oval, pubescent.—White. 2f. Aug.—Sept. Middle Car. and Geo. 4—6 feet.

7. L. ANGUSTIFO'LIA, (Pursh.) Similar to the preceding species, but the leaflets vary from elliptical-oblong to linear; are smaller than those of the *L. capitata*.—Grows through middle and southern Car. and Geo. 4—5 feet.

The two preceding genera are exceedingly perplexing in arranging descriptions even of well-known species, from the frequent variations produced by different circumstances; and were we to disregard these variations, and describe the specimens as varieties or distinct species, we should multiply the species and varieties to an indefinite extent. We have given descriptions of those which are well-established species. We have little doubt that there are other species, when sufficient examination shall have determined their characteristics.

GENUS XXXIX.—AR'ACHIS. L. 16—10.

(From *a*, privative, and *rachis*, a branch, having no branches.)

Calyx bilabiate. *Legume* gibbous, torulose, veiny, woody.

1. A. HYPOGÆ'A, (L.) *Stem* pilose, procumbent. *Leaves* abruptly pinnate. *Flowers* axillary. *Peduncles* becoming elongated, and deposit the legume under ground to ripen.—Yellow. ☺. Native of South America. Cultivated extensively in some parts of the Southern States. *Peanut. Ground Pea. Guber.*

TRIBE VII.—GENISTE'Æ.

Stamens 10, monadelphous; anthers of two forms. *Legume* continuous. *Leaves* simple or palmately compound. Herbs or shrubs.

GENUS XL.—CROTALA'RIA. L. 16—10.

(Greek *krotalon*, a castanet, in allusion to the rattling of the seeds in the pod.)

Calyx slightly bilabiate, 5-cleft. *Vexillum* cordate, large; keel generally acuminate; wings somewhat plicate toward the base. *Stamens* monadelphous, the tube cleft on the upper side; the 5 alternate anthers smaller. *Legume* pedicellate, turgid. *Seeds* reniform. Herbaceous plants, with yellow flowers.

1. C. SAGITTA'LIS, (L.) *Stem* erect, branching, hirsute. *Leaves* simple, nearly sessile, oval, or oblong-lanceolate; stipules decurrent, acuminate, sagittate. *Flowers* on rather short, few-flowered peduncles, opposite the leaves. *Corolla* about as long as the calyx or shorter. *Legume* inflated, nearly black when mature. *Seeds* small, smooth, and shining; when ripe, rattling in the capsule.—Yellow. ☺. April—July. Common. 8—12 inches. *Rattle-box.*

2. C. PARVIFLO'RA, (Pursh.) *Stem* erect, hirsute, branching. *Leaves* linear, or linear-lanceolate, nearly sessile, lower ones broader than the upper, upper stipules decurrent. *Peduncles* opposite the leaves, 3—7-flowered; corolla about as long as the calyx or shorter.—Yellow. ♃. April—July. In shady soils, Mid. Car. and Geo. 10—20 inches. *C. Purshii*, D. C.

3. C. OVA'LIS, (Pursh.) *Stem* diffuse, decumbent, branching, hairy. *Leaves* oval, petiolate; stipules small, or wanting, slightly decurrent. *Flowers* in racemes, opposite the leaves, corolla equaling the calyx. *Legume* slightly stipitate.—Yellow. ♃. April—July. Common in dry sandy soils. 6—12 inches.

Genus XLI.—LUPI'NUS. Tourn. 16—10.

(A name given by Pliny; origin doubtful.)

Calyx distinctly bilabiate, upper lip usually 2-cleft, the lower entire or 3-cleft. *Vexillum* with reflexed margins; wings united at the summit; keel falcate, acuminate. *Stamens* monadelphous; alternate anthers oblong, the others round. *Legume* coriaceous, slightly compressed. Herbaceous plants with palmate or simple leaves.

1. L. perenne, (L.) *Root* creeping. *Stem* pubescent, striate, procumbent, branching. *Leaflets* 7—9, obovate, slightly pubescent beneath. *Flowers* in long, loose racemes; upper lip of the calyx gibbous at the base, lateral segments of the lower lip setaceous. *Petals* nearly equal; vexillum spotted. *Legume* hirsute.—Bluish-violet. 2f. April—May. Common in sandy soils. 12—15 inches. *Wild Lupine.*

2. L. villosus, (Willd.) *Stem* clothed with a dense silky pubescence, decumbent. *Leaves* simple, large, lance-oblong, on long hairy petioles. *Flowers* in long dense spikes; calyx bracteolate. *Legumes* woolly, oblong, 4—5-seeded.—Reddish-purple. ♂. April—May. Common. 10—15 inches.

3. L. diffusus, (Nutt.) *Stem* decumbent, diffuse, villous. *Leaves* oblong-ovate, obtuse, on short petioles, destitute of hairs. Resembles in other respects the preceding species.—Blue. 2f. April—May. Sand-hills of Car. and Geo. 10—15 inches.

Tribe VIII.—SOPHO'REÆ.

Stamens 10, distinct; anthers uniform. *Legume* continuous, sometimes moniliform, but not jointed.

Genus XLII.—BAPTIS'IA. Vent. 10—1.

(From the Greek *bapto*, to dye; some of the species being used for dyeing.)

Calyx 4—5-cleft, campanulate or bilabiate. *Vexillum* nearly orbicular, emarginate, reflexed; wings about equal in length to the vexillum, oblong. *Keel* slightly curved, scarcely as long as the wings. *Petals* slightly united. *Stamens* separate, deciduous. *Legume* stipitate, many-seeded, ventricose. *Flowers* in terminal racemes, or axillary and solitary. Perennial herbaceous plants.

1. B. perfolia'ta, (Br.) *Stem* glabrous, somewhat branched. *Leaves* perfoliate, orbicular or oval, glaucous, entire. *Flowers* solitary, axillary, small. *Legume* large, inflated. *Seeds* small, reniform.—Yellow. 2f. May—July. In dry, sandy soils, middle Car. and Geo.

2. B. lanceola'ta, (Ell.) *Stem* pubescent, sometimes nearly glabrous, branching. *Leaves* ternate, nearly sessile; leaflets cuneate-lanceolate, obtuse, glabrous on the upper surface, puberulent on the lower. *Flowers* axillary, solitary, or in terminal racemes. *Legume* large, somewhat

globose, or ovate-lanceolate, generally villous.—Yellow. 4. April—May. In dry soils. Common. 2—3 feet.

3. B. TINCTO'RIA, (Br.) *Stem* glabrous. *Leaves* ternate, nearly sessile; leaflets obovate. *Flowers* in terminal racemes, few. *Legumes* small, glabrous, on long stipes.—Yellow. 4. June—Aug. Common in dry soils. 1—2 feet. *Wild Indigo*

4. B. AUSTRA'LIS, (Br.) *Stem* glabrous, somewhat decumbent. *Leaves* ternate, nearly sessile; leaflets cuneiform, obtuse. *Stipules* often persistent, lanceolate. *Flowers* in long racemes, large, vexillum shorter than the wing. *Legumes* large, acuminate, oblong.—Blue. 4. June—July. In moist soils. 2—3 feet.

5. B. VILLO'SA, (Ell.) *Stem* villous, pubescent, branched. *Leaves* ternate, nearly sessile; leaflets lanceolate-oblong, or slightly cuneate, pubescent when young, afterward nearly or quite glabrous. *Flowers* in terminal elongated racemes. *Pedicels* erect. *Bracts* subulate. *Calyx* 4-cleft, with appressed hairs. *Corolla* 4-cleft. *Legumes* oblong, woolly. —Grayish. 4. June—July. Middle Geo. 2—3 feet.

6. B. AL'BA, (Br.) *Stem* branching, glabrous. *Leaves* ternate, on slender petioles; leaflets lanceolate, cuneate, obtuse. *Flowers* in elongated racemes. *Pedicels* filiform. *Calyx* 4-cleft, segments short, upper one emarginate. *Legumes* cylindrical, inflated. *Seeds* small.—White. 4. March—April. Common. 1—2 feet.

7. B. BRACTEA'TA, (Mich.) *Stem* pubescent, branching from the base; branches divaricate. *Leaves* ternate on short petioles or sessile; leaflets lanceolate or oblong-ovate. *Stipules* large, foliaceous, persistent. *Flowers* large, in declined, many-flowered racemes. *Pedicels* long, drooping. *Bracts* like the stipules. *Calyx* 4-cleft, the upper one broadest and emarginate. *Legume* inflated, villous.—Grayish. 4. April—May. Middle Geo. 1—2 feet. *B. leucophœa*, Nutt.

The *baptisias* are quite conspicuous among the flowering plants of the early part of summer. The *B. tinctoria* possesses valuable properties. It is decidedly antiseptic, and, on this account, is used in cases approaching mortification, either internally, or applied to the surface in the form of cataplasms, as the case requires. It is an emetic and cathartic in large doses, but in small ones is a mild laxative. The root is the part generally used, but the whole plant is said to possess similar properties.

GENUS XLIII.—SOPH'ORA. L. 16—10.

(From *sophero*, an Arabic name of a tree.)

Calyx campanulate, obliquely truncate. *Vexillum* obovate or roundish, equal in length with the other petals. *Ovary* nearly sessile, linear; ovules numerous. *Legume* moniliform, indehiscent.

1. S. TOMENTO'SA, (L.) A tree. *Leaves* pinnate; leaflets 15—19, roundish-oval, obtuse, canescently tomentose on the under side. *Flowers* in racemes, vexillum emarginate.—Yellow. ♄. Tampa Bay, Flo

GENUS XLIV.—CLADRAS'TRIS. Raf. 16—10.

Calyx cylindrical, campanulate, 5-toothed. *Petals* on rather long claws; vexillum large, roundish, entire. *Stamens* distinct.

Ovary stipitate, linear, pubescent. *Legume* 4—6-seeded. In florescence terminal.

1. C. TINCTO'RIA, (Raf.) A tree with yellow wood. *Leaves* pinnate; leaflets 7—11, usually alternate, broadly oval, the terminal one rhomboid ovate. *Flowers* resembling the locust. *Legumes* flat.—White. ♄. West Tennessee. 20—40 feet. *Yellow wood.*

GENUS XLV.—CER'CIS. L. 10—1.

(From the Greek *kerkis*, a shuttlecock; a name given by Theophrastus.)

Calyx 5-toothed, campanulate, gibbous at the base. *Petals* distinct; vexillum smaller than the wings; keel larger than the wings, composed of two distinct petals. *Stamens* distinct, unequal. *Legume* compressed, many-seeded, oblong, acute, on a short stipe. Trees with simple leaves, flowering before putting forth leaves.

1. C. CANADEN'SIS, (L.) A small tree, with smooth bark, and somewhat geniculate branches. *Leaves* broad-cordate, acuminate, villous along the veins beneath. *Flowers* in axillary racemes. *Calyx* pubescent at the margin. One of the most ornamental trees of our forests.—Rose-color. ♄. March. Common. 15—20 feet.
Red-bud. Judas-tree.

TRIBE IX.—CAS'SIEÆ.

Corolla not papilionaceous, but generally irregular. *Stamens* usually 10, distinct. *Legume* continuous. *Leaves* pinnate or bipinnate.

GENUS XLVI.—CAS'SIA. L. 10—1.

(The name given by Dioscorides.)

Calyx 5-sepaled; sepals slightly united at the base, generally unequal. *Petals* 5, unequal. *Stamens* unequal, the three upper sterile. *Legume* ligneous, terete, or compressed, sometimes with several transverse partitions. Mostly annual plants, with pinnate leaves.

1. C. TO'RA, (Walt.) *Stem* glabrous, or slightly sprinkled with hair, branching. *Leaflets* in 3 pairs, obovate, obtuse, slightly mucronate, a little pubescent on the under surface when young, a gland between the lower pair. *Stipules* ciliate. *Sepals* obtuse, ciliate, 5-nerved. *Petals* emarginate, 3-nerved, obovate. *Stamens* shorter than the petals, unequal. *Anthers* dehiscing by two pores at the apex. *Legume* compressed or terete, many-celled by transverse partitions, long. *Seeds* numerous, reniform.—Yellow. ☺. Aug.—Oct. Common. 3—4 feet.
C. obtusifolia, L.

2. C. OCCIDENTA'LIS, (L.) *Stem* erect, glabrous, branching, or simple. *Leaflets* in 5 pairs, occasionally 3 or 6 pairs, ovate or ovate-lanceolate, slightly ciliate, acuminate, unequal at the base, and serrulate; gland at the base of the petiole. *Flowers* in axillary racemes, few. *Legumes* long, glabrous, many-seeded. *Seeds* compressed, nearly oval.—Yellow. ☺ July—through the summer. 4—6 feet. *Styptic-weed.*

3. C. Marilan'dica, (L.) *Stem* glabrous, or covered with scattered hairs. *Leaflets* in about 8 pairs, oblong-lanceolate, slightly ciliate, mucronate; gland at the base of the petiole. *Flowers* in short axillary racemes, numerous, paniculate at the summit of the stem. *Legumes* curved, linear, pubescent, or glabrous.—Yellow. ☺. June—August. On the banks of streams. 3—4 feet.

4. C. Chamæcris'ta, (L.) *Stem* erect, or somewhat decumbent, with divaricate, hirsute, and scabrous branches. *Leaflets* in 10—15 pairs, glabrous, oblique, oval, narrow, mucronate, glaucous beneath, serrulate; petiole hirsute, with a cup-like gland near the base of the lowest pair of leaflets. *Flowers* in supra-axillary fascicles. *Stamens* all fertile, a part of the petals spotted at the base, 4 of the anthers yellow, 6 purple. *Legumes* villous, linear. The *C. fasciculata* is considered only a variety of this; differing from it in being nearly glabrous, anthers all yellow, petals not spotted at the base.—Yellow. ☺. Aug.—Sept. Common. 1—2 feet.

5. C. nictitans', (L.) *Stem* erect or procumbent, pubescent when young, glabrous when old. *Leaflets* in 10—15 pairs, linear, mucronate, gibbous at the base; gland below the base of the leaflets. *Flowers* in supra-axillary fascicles, small; petals unequal; stamens 5; anthers purple. *Legumes* somewhat hairy, oblong, compressed.—Yellow. ☺. Aug.—Oct. Common. 1—2 feet.

6. C. as'pera, (Ell.) *Stem* hirsute, with spreading hairs, with erect branches. *Leaflets* numerous, in 10—15 pairs, linear-lanceolate, ciliate, gland near the base of the lowest pair of leaflets. *Flowers* on supra-axillary peduncles, generally 3 on each peduncle; stamens 7—9, unequal. *Legume* compressed, obtuse, mucronate, hirsute.—Yellow. ☺. July—Sept. Common in the low country. 1—3 feet.

The *C. Marilandica*, a plant very common throughout the Southern States, and known by the name of American Senna, possesses the properties of the imported Senna, which is from plants indigenous to Egypt and Arabia, and is the product of several species of Cassia. It is a mild cathartic, owing this effect to a substance obtained by the analysis of Lassaigne, and called *Cathartin*.

Genus XLVII.—GLEDIT'SCHIA. L. 20—6.

(In honor of Gleditsch.)

Flowers dicœcious or polygamous. *Calyx* consisting of 3—5—8 sepals, united at the base. *Petals* equal in number to the sepals, or fewer. *Stamens* generally equal the sepals, occasionally fewer by abortion. *Stigma* pubescent. *Legume* compressed, stipitate. *Seeds* oval, testa crustaceous. Trees with pinnate leaves, and generally spiny branches.

1. G. triacan'thos, (L.) A large tree, wood hard, generally bearing compound spines. *Leaves* pinnate; leaflets lanceolate-oblong, glabrous, slightly crenulate near the summit. *Flowers* in axillary racemes. *Legumes* falcate, 12—14 inches long, slightly twisted, mucronate, many-seeded; the spaces between the cells of the seed filled with a sweet pulp.—Greenish. ♄. May. In rich soils. 50—60 feet.

Honey Locust. Sweet Locust.

2. G. monosper'ma, (Walt.) A tree armed on the trunk and branches with spines. *Leaves* equally and compoundly pinnate; leaflets numer-

ous, glabrous, small, oval. *Flowers* in small, axillary racemes. *Legumes* oval, compressed, destitute of pulp, 1-seeded.—Greenish. ♄. July. Mid. Car. and Geo., in swamps. 40—50 feet. *Water Locust.*

SUB-ORDER II.—MIMO'SEÆ.

Sepals and petals regular, the latter hypogynous. *Stamens* as many as the petals, or numerous; inserted into the base of the corolla. *Leaves* pinnate or bipinnate.

GENUS XLVIII.—MIMO'SA. Adans. 15—10.

(Greek *mimos*, a mimic; the leaves of some species mimic animal sensibility.)

Flowers polygamous. *Calyx* 4—5-toothed, or entire, urceolate. *Petals* 4—5, united into a somewhat campanulate corolla with a 4—5-cleft border. *Stamens* 4—15, exserted, inserted into the base of the corolla, sometimes monadelphous at the base, but generally distinct. Herbaceous plants. *Flowers* in globose heads, rose-color. *Leaves* pinnate, sensitive.

1. M. STRIGILLO'SA, (T. & G.) *Stem* prostrate, diffuse, slightly prickly. *Leaves* pinnate, 10—15 pairs; leaflets oblong-linear, glabrous, with the under surface sometimes strigose, falcate. *Flowers* in heads, on long peduncles. *Legumes* 1—3-jointed, when more than 1-jointed oblong, when 1-jointed ovate.—Rose-color. 2f. July—Aug. Flor., Louisiana.

GENUS XLIX.—SCHRANK'IA. Willd. 15—10.

(In honor of Schrank, a German botanist.)

Flowers polygamous. *Calyx* 5-toothed, minute. *Petals* 5, united into an infundibuliform corolla. *Stamens* 8—12, distinct or monadelphous. *Legume* 1-celled, many-seeded, 4-valved. Prickly, herbaceous plants, with bipinnate, sensitive leaves. *Flowers* in spherical heads, on axillary peduncles.

1. S. UNCINA'TA, (Willd.) *Stem* procumbent, or running over other objects, armed with uncinate prickles, grooved or angled. *Leaflets* numerous, oblong-oval, reticulated beneath. *Flowers* generally in solitary heads, peduncles axillary. *Legumes* rugose, acuminate, oblong-linear, somewhat 4-sided, or terete. *Seeds* elliptical.—Rose-color. 2f. May —July. Common. 1—4 feet.

A beautiful plant when cultivated and trained; its sensitive leaves and beautiful heads of pink flowers, distinguish it as a subject of attention. Its abundance, however prevents that care being bestowed upon it, which it would otherwise receive from the hand of the florist.

GENUS L.—DARLINGTO'NIA. D. C. 15—5.

(In honor of Dr. Darlington of Penn.)

Flowers perfect. *Calyx* campanulate, 5-toothed. *Petals* 5, distinct. *Stamens* 5, distinct. *Legume* lanceolate, compressed, 4—6-seeded.

1. D. BRACHYLO'BA, (D. C.) *Stem* glabrous, unarmed. *Leaves* bipinnate, 6—14 pairs of linear leaflets, numerous, with a gland at the base of each pair, or only at the lowest pair. *Flowers* in axillary heads. *Legumes* crowded, by abortion often 1—2-seeded.—White. 2f. Florida and Southwestern States. 1—3 feet.

GENUS LI.—ACA'CIA. Necker. 15—10.

(From *ac*, a point, and *akazo*, to sharpen, many of the species having thorns.)

Flowers polygamous. *Calyx* 4-toothed. *Petals* slightly united at the base. *Stamens* 10, inserted into the base of the corolla. *Legume* 1-celled, many-seeded. *Plants* with bipinnate leaves; leaflets numerous. *Flowers* in heads or spikes.

1. A. LUTE'A, (Leav.) *Stem* herbaceous, procumbent, unarmed, pubescent, with angular branches; stipules nearly subulate, petioles without glands. *Leaflets* linear-oblong, ciliate. *Flowers* on axillary peduncles, in oblong heads; calyx deeply cleft; petals ovate-acute. *Legumes* stipitate, compressed, about half an inch long.—Yellow. 2f. Ala. and Lou.

GENUS LII.—VACHEL'LIA. W. & Arn.

Calyx 5-toothed. *Flowers* polygamous. *Petals* united, forming a 5—6-toothed corolla. *Stamens* numerous, distinct. *Legume* cylindrical, turgid, filled with pulp. *Seeds* in a double row.

1. V. FARNESIA'NA, (W. & Arn.) A small tree, with stipular spines. *Leaves* bipinnate; leaflets numerous. *Flowers* in globular heads. *Peduncles* axillary. Yields gum.—Yellow. ♄. Flor. and Lou.

The Order Leguminosæ is one of the most extensive and important. It yields to medicine and the arts its full proportion of the substances derived from the vegetable kingdom. In the Pea and Bean it affords two important articles of food, and in point of beauty many of its productions are scarcely rivalled. Among the most important articles of the Materia Medica derived from this order are the gums *Tragacanth*, *Arabic*, and *Kino*; Senna, Tamarind, Catechu, from a species of Acacia; Dragon's Blood, Cowhage, from the Dolichos pruriens; and Balsam Copaiva and Tolu. To the arts it affords Indigo, Logwood, Rosewood, a species of Mimosa, Sandal-wood, &c.; as food for men and animals, the Pea, the Bean, Clover, Lucerne, &c.

ORDER XLIV.—ROSA'CEÆ.

Sepals usually 5, more or less united, persistent. *Petals* 5, perigynous, occasionally absent. *Stamens* numerous, inserted into the lining of the calyx. *Ovaries* solitary or several, sometimes united with the calyx or with each other. *Seeds* anatropous. *Leaves* alternate, stipulate, simple, or compound.

ANALYSIS.

1. Calyx inferior 2
   Calyx superior 12
2. Ovary solitary 3
   Ovaries more than 1 5
3. Style arising from the base of the ovary ..... *Chrysobalanus*, 1
   Style terminal 4

4. Flowers in spikes ..... *Sanguisorba*, 9
Flowers in umbels ..... *Prunus*, 2
Flowers in racemes ..... *Cerasus*, 4

5. Ovaries 2—6 6
Ovaries more than 6 9

6. Leaves simple, undivided ..... *Spiræa*, 5
Leaves lobed or compound 7

7. Flowers white ..... *Gillenia*, 6
Flowers yellow 8

8. Flowers on a scape ..... *Waldsteinia*, 8
Flowers on a peduncle ..... *Agrimonia*, 10

9. Flowers yellow ..... *Potentilla*, 11
Flowers not yellow 10

10. Receptacle dry ..... *Geum*, 7
Receptacle fleshy 11

11. Carpels inclosed by the receptacle ..... *Rosa*, 14
Carpels imbedded in the receptacle ..... *Fragaria*, 12
Carpels pulpy ..... *Rubus*, 13

12. Thorny shrubs ..... *Crategus*, 15
Unarmed shrubs or small trees 13

13. Flowers in racemes ..... *Amelanchier*. 17
Flowers not in racemes ..... *Pyrus*, 16

Sub-Order I.—CHRYSOBALA'NEÆ.

Calyx inferior. *Petals* and stamens more or less irregular. *Fruit* a drupe.

Genus 1.—CHRYSOBAL'ANUS. L. 11—1.

(From the Greek *chrusos*, gold, and *balanos*, an acorn, in reference to its yellow fruit.)

Calyx 5-cleft, persistent, campanulate, with nearly equal segments. *Petals* 5. *Stamens* numerous, those next the ovary usually shortest and sterile; ovary sessile; ovules 2. *Fruit* a drupe, with very little pulp, 1-seeded. Shrubs with flowers in terminal or axillary paniculate cymes.

1. C. oblongifo'lius. (Mich.) *Stem* slender, prostrate, branching. *Leaves* nearly sessile, oblong, or lanceolate-oblong, slightly crenulate, glabrous, or tomentose beneath. *Flowers* small, terminal. *Petals* nearly round. *Fruit* oblong, about 1 inch in length.—White. ♄. May —June. Geo. and Ala. 1—2 feet.

Sub-Order II.—AMYGDA'LEÆ.

Calyx inferior. *Fruit* a drupe, 1-seeded. *Bark* yielding gum.

Genus II.—PRU'NUS. Tourn. 11—1.

(Ancient name of the Plum.)

Calyx 5-parted, somewhat urceolate. *Petals* spreading, unguiculate. *Stamens* numerous. *Ovary* with 2 pendulous ovules, glabrous. *Fruit* an ovate drupe, fleshy, with a compressed nucleus, having grooved margins. Small trees and shrubs. *Leaves* with a convolute vernation, serrate. *Flowers* usually appearing before the leaves. *Plum.*

1. P. America'na, (Marsh.) *Stem* smooth, with long, flexible branches; the old branches somewhat rough and thorny. *Leaves* ovate or oblong-ovate, acuminate, sharply serrate, veined beneath; petioles with two glands, nearly glabrous when old. *Flowers* in umbels, 2—5. *Segments* of the calyx lanceolate. *Fruit* a roundish drupe, reddish when ripe, large, with a tough skin.—White. ♄. March and April. Along the banks of streams. 15—20 feet. *Yellow Plum. Red Plum.*

2. P. Chica'sa. *Branches* thorny. *Leaves* oblong-lanceolate or oblanceolate, acute, serrulate. *Umbels* 2—3-flowered; calyx usually glabrous, sometimes pubescent. *Drupe* globose, red. *Chickasaw Plum*

3. P. mariti'ma, (Wang.) A low shrub. *Leaves* oval or ovate, acuminate, finely serrate. *Umbels* few-flowered. *Fruit* nearly globular covered with bloom, red or purple; pleasant to the taste.—White. ♄. March and April. On the sea-coast.

Genus III.—AMYG'DALUS. Tourn. 11—1.

(From the Greek *amusso*, to lacerate, in allusion to the appearance of the stem.)

Calyx 5-cleft, inferior. *Petals* 5. *Fruit* a drupe. *Peach.*

1. A. Per'sica, (L.) *Leaves* lanceolate, serrate; serratures acute. *Flowers* sessile, solitary.—Red. ♄. Feb.—March. The Flowering Almond is the *A. nana.*

Genus IV.—CER'ASUS. Juss. 11—1.

(From Cerasus, a town in Pontus, Asia.)

Calyx inferior, campanulate, 5-cleft. *Petals* 5-spreading. *Stamens* numerous. *Drupe* globose; nucleus smooth. *Leaves* conduplicate in vernation. *Cherry.*

1. C. Virginia'na, (D. C.) A tree with smooth branches, or small shrubs with grayish bark. *Leaves* broadly oval or oblong-lanceolate, mucronate, serrate, or entire; petioles glandular. *Flowers* in axillary racemes, short, erect; segments of the calyx acute, whitish. *Petals* nearly orbicular. *Fruit* a dark red, globular drupe, very astringent.—White. ♄. March—April. Near Columbia, S. C. 10—30 feet. *Choke Cherry.*

2. C. seroti'na, (D. C.) A large tree, with spreading, smooth branches. *Leaves* oval, lanceolate, acuminate, generally glabrous, somewhat lucid, serrate; petioles with glands. *Flowers* in elongated racemes. *Petals* nearly orbicular. *Drupes* nearly black, eatable.—White. ♄. April—May. In rich soils. 30—80 feet. *Wild or Black Cherry.*

3. C. Carolinia'na, (Mich.) An evergreen tree of ornamental growth. *Leaves* oblong-lanceolate, slightly acuminate, mucronate, entire, or serrate, coriaceous, shining above; petioles short. *Flowers* in dense racemes, from the axils of the leaves of the preceding season. *Petals* small, obovate. *Stamens* long. *Drupe* black, persistent, dry.—White. ♄. March—April. On the Congaree, near Columbia. Middle Geo.

Sub-Order III.—ROSA'CEÆ.

Calyx inferior, 3—5-cleft. *Ovaries* solitary or several. *Fruit* follicular, 1—10-seeded, or achenia.

Genus V.—SPIRÆ'A. L. 11—2.

(From the Greek *speirao*, to become spiral, in allusion to the fitness of the plants to be twisted into garlands.)

Calyx 5-cleft, expanding, persistent. *Petals* 5, nearly round. *Stamens* numerous, exsert. *Carpels* 3—12, 1—3-seeded, distinct, or slightly united at the base, follicular, generally 2-valved. Shrubs or perennial herbs. *Leaves* alternate. *Flowers* sometimes dicœcious.

1. S. opulifo'lia, (L.) A small shrub, with the old bark detaching itself. *Leaves* ovate, roundish, or subcordate, 3-lobed, doubly serrate, glabrous. *Flowers* in terminal corymbs, numerous; pedicels filiform. *Carpels* 3—5, inflated. *Seeds* obovate, shining, very bitter.—White. ♄. June—July. Mountains. 3—5 feet. *Nine Bark.*

2. S. salicifo'lia, (L.) A shrub, with slender, somewhat angular branches, and slightly pubescent. *Leaves* lanceolate, sharply serrate. *Flowers* in crowded, paniculate, terminal racemes; segments of the calyx lanceolate. *Petals* slightly unguiculate, shorter than the calyx. *Carpels* 5, glabrous, united at the base. *Seeds* numerous.—White. ♄. June—July. In wet places. 3—6 feet.
Queen of the Meadow. Meadow-sweet.

3. S. tomento'sa, (L.) A shrub, with ferruginous, tomentose branches. *Leaves* on short petioles, ovate or oblong, unequally serrate, crowded, tomentose beneath. *Flowers* in numerous, dense, paniculate racemes. *Calyx* tomentose, with reflected segments. *Petals* small, hairy on the outer surface. *Carpels* 5, tomentose. *Seeds* few, subulate. —Purple. June—July. Upper districts of Car. and Geo. 3—6 feet.
Hardhack.

4. S. loba'ta, (Murr.) *Stem* herbaceous, glabrous, striate, angled. *Leaves* pinnate; leaflets 3—5—7, the terminal ones large, 7—9-lobed; lateral ones 3-lobed, cuneiform; lobes serrate; stipules reniform. *Flowers* in a very compound panicle. *Sepals* reflexed. *Carpels* 6—8, glabrous. Deep rose-color. ♃. June—August. Near the mountains. 5—8 feet.

5. S. Arun'cus, (L.) *Stem* branching, herbaceous. *Leaves* tripinnate; leaflets lanceolate, oblong, acuminate, doubly serrate. *Flowers* dicœcious, numerous, in paniculate spikes. *Carpels* 3—5, glabrous.—White. ♃. June—July. Mountains of Car. and Geo. 3—5 feet.
Goat's Beard.

The Spiræas are cultivated as ornaments, and the bark of the S. tomentosa is possessed of tonic and astringent properties, and is used both in the regular practice and families where such properties are demanded. In debility it has proved very serviceable. It is administered in decoction or extract.

Genus VI.—GILLE'NIA. Mœnch. 11—2.

(From Gillen.)

Calyx 5-toothed, campanulate, with the orifice contracted. *Petals* 5, inserted into the calyx, cuneate, lanceolate, very long. *Stamens* 10—15, unequal. *Carpels* 5; styles filiform; stigmas subcapitate. *Seeds* ascending, 2—4. Perennial herbs,

with trifoliate leaves. *Flowers* axillary and terminal, on elongated peduncles.

1. G. TRIFOLIA'TA, (Mœnch.) *Leaves* ternate; leaflets lanceolate, acuminate, serrate; stipules entire, linear. *Flowers* in loose panicles, large. *Petals* long. *Seeds* exceedingly bitter.—White. 2f. June—August. Upper dist. Car. and Geo. 2—3 feet. *Indian Physic.*

2. G. STIPULA'CEA, (Nutt.) An herbaceous plant, with ternate leaves; leaflets lanceolate-serrate; stipules ovate, foliaceous, large, incised. *Flowers* in loose panicles. *Carpels* 5.—White. 2f. June—July. Mountains. 2—3 feet.

GENUS VII.—GE'UM. L. 11—12.

(From the Greek *geuo*, to give a relish.)

Calyx 5-toothed, campanulate, with the orifice contracted. *Petals* 5, inserted into the calyx, cuneate, lanceolate, very long *Stamens* numerous, unequal. *Carpels* numerous; styles filiform; stigmas subcapitate. *Seeds* ascending, 2—4. Perennial herbs, with trifoliate leaves. *Flowers* axillary and terminal, on elongated peduncles.

1. G. VIRGINIA'NUM, (L.) *Stem* pubescent or nearly glabrous. Radical leaves ternate or pinnate, with minute lateral leaflets, on long petioles; cauline ones simple or variously divided or lobed, toothed or serrate, pubescent or nearly glabrous; stipules ovate, entire, or toothed. *Flowers* on erect or diverging peduncles. *Calyx* rather longer than the petals. *Petals* cuneate-obovate. *Carpels* somewhat hispid, with hooked awns.—White. 2f. July—Aug. Along streams. 1—3 feet. *White Avens.*

GENUS VIII.—WALDSTEI'NIA. Willd. 11—12. (*Syn. Dalibarda.*)

(From Waldstein, a German botanist.)

Calyx 5-cleft, tubular, sometimes with 5 bracteoles at the base. *Petals* 5, sessile. *Stamens* numerous, inserted into the calyx. *Filaments* filiform, persistent. *Styles* long, caducous. *Carpels* 2—6, dry or fleshy, pubescent. Perennial herbs, with a creeping rhizoma. *Flowers* always yellow.

1. W. FRAGARIOI'DES, (Tratt.) *Rhizoma* thick; stem hairy. *Leaves* trifoliate; leaflets cuneiform, and generally petiolate and incised. *Flowers* numerous, on an erect scape. *Calyx* obconic, the segments shorter than the petals. *Petals* obovate. *Carpels* 4—6, minutely hairy.—Yellow. 2f. May—June. Mountains. 4—8 inches. *Barren Strawberry.*

2. W. LOBA'TA, (T. & G.) *Stem* hirsute. *Leaves* generally 3—5-lobed, hirsute on the veins, pubescent beneath, somewhat cordate, nearly orbicular, incised. *Flowers* 4—8, on filiform scapes, bracteate. *Calyx* with a narrow tube; segments longer than the petals. *Petals* oval. *Carpels* generally 2, canescent.—Western Geo.

Genus IX.—SANGUISOR'BA. L. 4—1.

(From *sanguis*, blood, and *sorbio*, to absorb, from the supposed vulnerary qualities of some of the species.)

Flowers perfect or polygamous. *Calyx* 4-parted, quadrangular. *Petals* none. *Stamens* 4. *Carpels* 1—2. *Stigma* more or less fimbriate. *Fruit* an achenia.

1. S. Canaden'sis, (L.) *Stem* glabrous. *Flowers* in spikes; stamens much longer than the calyx. *Leaves* unequally pinnate; stipules foliaceous; leaflets ovate or oblong, serrate, sometimes cordate, 1-achenium. —2f. Mountains. *Burnet-saxifrage.*

Genus X.—AGRIMO'NIA. Tourn. 11—12.

(From the Greek *argos*, white, supposed to be in allusion to its removing the cataract of the eye, that being white.)

Calyx 5-cleft, connivent, turbinate, armed with hooked bristles. *Petals* 5. *Stamens* 11—15, inserted into the throat of the calyx. *Carpels* 2, included within the calyx. *Seeds* suspended. Perennial herbs, with pinnate leaves. *Flowers* in racemes, yellow.

1. A. Eupato'ria, (L.) *Stem* and petioles hirsute. *Leaves* pinnate, the terminal leaflet petioled; leaflets 5—7, oblong, obovate, coarsely toothed, pubescent, generally with several minute leaflets intermingled. *Flowers* in virgate spikes, with the calyx sulcate toward the base. *Petals* much longer than the calyx. *Fruit* hispid.—Yellow. 2f. July. Common. 2—4 feet. *Agrimony.*

2. A. parviflo'ra, (Ait.) *Stem* and petioles hirsute, with brownish hairs. *Leaves* dotted on the under surface, pinnate; leaflets 11—19, crowded, with minute ones intermixed, toothed, lanceolate, acute, scabrous above, pubescent beneath; stipules incised. *Flowers* small, in virgate racemes. *Petals* small.—Yellow. 2f. July—Aug. Upper districts of Car. and Geo. 4—5 feet. *Dotted Agrimony.*

3. A. inci'sa, (T. & G.) *Stem* and petioles pubescent, intermixed with hirsute hairs. *Leaves* pinnate; leaflets 3—5 pairs, intermixed with smaller ones, incised, oblong, with unequal teeth on each side, almost glabrous above, hairy beneath. *Flowers* in virgate racemes, small, on short pedicels; teeth of the calyx very short.—Yellow. 2f. July —Aug. Middle Geo. 1—2 feet.

Agrimonia Eupatoria is said to be one of the Indian medicines for the cure of fevers. Its properties seem to be principally astringent, and on this account it is used in affections of the mucous membrane of the alimentary canal. It has also been employed in jaundice.

Genus XI.—POTENTIL'LA. L. 11—12.

(From *potens*, powerful, in allusion to the medical qualities of some of the species.)

Calyx 4—5-cleft, with 4 or 5 exterior segments. *Petals* 4—5, obcordate. *Stamens* numerous, inserted into the base of the calyx. *Carpels* numerous, collected into a head. Plants with compound leaves.

1. P. Norve'gica, (L.) *Stem* erect, hirsute, dichotomously divided. *Leaves* palmate; leaflets 3, obovate-oblong, upper ones lanceolate, coarsely serrate. *Flowers* in leafy cymes; segments of the calyx longer than the petals. *Petals* obovate, emarginate. *Carpels* rugose, ribbed, or striate.—Yellow. ☺. July—Aug. Common. 8—18 inches.

Cinquefoil.

2. P. Canaden'sis, (L.) *Stems* pubescent, sarmentose, procumbent. *Leaves* palmate; leaflets 5, obovate, cuneiform, silky when young, incisely toothed. *Flowers* on elongated, axillary pedicels; segments of the calyx ovate, lanceolate. *Petals* obcordate. *Carpels* somewhat rugose.—Yellow. 4. April—Aug. Common. 10—12 inches.

Barren Strawberry. Five-finger.

3. P. tridenta'ta, (Ait.) *Stem* branching, creeping at the base. *Leaves* trifoliate, leaflets cuneiform, 3-toothed at the apex, shining above, pale and pubescent beneath. *Flowers* small and few. *Petals* obovate-oblong. *Carpels* nearly globular, villous.—Yellow. 4. June—July. 6—8 inches.

Genus XII.—FRAGA'RIA. Tourn. 11—12.

(From *fragrans*, fragrant; odor of the fruit.)

The different organs of the flower the same as in Potentilla. *Carpels* placed on an enlarged, succulent receptacle. Perennial herbs with trifoliate leaves; receptacle red, edible. *Strawberry.*

1. F. Virginia'na, (Ehrh.) *Stem* stoloniferous. *Leaves* ternate, coarsely toothed. *Flowers* on cymosely divided scapes. *Calyx* spreading. *Fruit* roundish-ovoid, pitted, carpels imbedded in the receptacle.—White. 4. April—May. In shady places. *Wild Strawberry.*

Genus XIII.—RU'BUS. Tourn. 11—12.

(From *rub*, red, Celtic.)

Calyx 5-parted, flattish at the base. *Petals* 5, deciduous. *Stamens* numerous. *Carpels* pulpy, collected on a conical or cylindrical receptacle. Shrubby plants, and generally with prickly stems. *Flowers* white or rose-color. *Fruit* eatable.

Raspberry. Blackberry.

1. R. odora'tus, (L.) *Stem* hispid, shrubby, branched. *Leaves* simple, 3—5-lobed, the middle lobe elongated, acute, serrulate, toothed. *Flowers* numerous, large. *Calyx* covered with glandular hairs. *Petals* nearly orbicular. *Fruit* broad and flat. Yellowish and red.—Rose-color. 4. June—July. Shady places. 3—5 feet.

Rose-flowering Raspberry.

2. R. occidenta'lis, (L.) *Stems* shrubby, armed with hooked prickles, glaucous. *Leaves* pinnate; leaflets 3—5, ovate, acuminate, doubly serrate, tomentose beneath, lateral ones somewhat petioled. *Flowers* on 1—3-flowered axillary peduncles. *Fruit* roundish, nearly black, glaucous.—White. 4. May—June. Mountains.

Black Raspberry. Thimble-berry.

3. R. villo'sus, (Ait.) *Stem* erect or bending, angular, armed with stout prickles curved downward; branches villous. *Leaves* 3—5-foli-

ate, glandular, pubescent beneath; leaflets ovate, acuminate, unequally serrate, the terminal one petioled. *Flowers* in racemes, sepals linear-acuminate. *Petals* spreading, obovate. *Fruit* black, large.—White or rose-color. ♃. May—June. Common. 3—8 feet. *Blackberry.*

4. R. HIS'PIDUS, (L.) *Stem* shrubby, slender, prostrate, covered with retrorse prickles. *Leaves* persistent, 3—5-foliate; leaflets somewhat coriaceous, obovate, unequally serrate, glabrous. *Flowers* small, in corymbs, with filiform pedicels. *Sepals* spreading half the length of the petals. *Petals* obovate. *Fruit* small, black, composed of large grains, sour.—White. ♃. May—June. Mountains.

5. R. TRIVIA'LIS, (Mich.) *Stem* shrubby, procumbent, sarmentose, armed with prickles. *Leaves* 3—5-foliate; leaflets ovate, or oblong-lanceolate, acute, serrate, generally glabrous. *Flowers* 1—3 on each peduncle, large. *Sepals* reflexed, not half the length of the petals. *Petals* obovate, broad. *Fruit* large, black.—White. ♃. March—May. Common. *Low-bush Blackberry.*

VAR. Some of the leaves simple, obscurely 3-lobed, broad-ovate. Flowers but 1 on each peduncle; sepals seldom reflexed; petals lanceolate; stem and young branches glabrous.

6. R. CUNEIFO'LIUS, (Pursh.) *Stem* shrubby, erect, low, armed with stout recurved prickles. *Leaves* trifoliate; leaflets obovate, cuneate, tomentose beneath, somewhat coriaceous, serrate toward the apex, with revolute margins near the base. *Flowers* few on each peduncle. *Sepals* mucronate, oblong, tomentose. *Petals* obovate. *Fruit* black.—White or rose-color. ♃. May—June. Common. 1—2 feet.

The genus *Rubus* affords fruit, which is much used for food, and is healthy and agreeable when perfectly ripe. A jelly made from the fruit of the *R. villosus*, common Blackberry, is much esteemed as an article of diet by patients suffering under dysenteric affections. The root of this species is much valued in domestic practice in the same diseases, and is considered by many as a certain remedy. The Faculty recommend it in such affections as require vegetable astringents.

GENUS XIV.—RO'SA. Tourn. 11—12.

(From *ros*, red, Celtic.)

Calyx 5-cleft, tube urceolate, contracted at the summit, inclosing several distinct ovaries. *Carpels* 1-seeded, hairy, indehiscent. Shrubby plants, with pinnate leaves, with stipules adhering to the petiole.

1. R. CAROLI'NA, (L.) *Stem* erect, branching, branches red, armed with stout prickles. *Leaves* pinnate, leaflets 5—9, large, oblong, lanceolate, acute, serrate, pubescent beneath. *Flowers* in corymbs, on short glandular peduncles. *Calyx* glandular, hispid. *Petals* obcordate. *Fruit* globose.—Reddish. ♃. July. In wet grounds, 4—6 feet. *Swamp Rose.*

2. R. LU'CIDA, (Ehrh.) *Stems* glabrous, erect, colored, armed with setaceous prickles. *Leaflets* 5—9, ovate-lanceolate, obtuse, serrate, glabrous and shining above, pubescent on the under surface. *Flowers* in corymbs, generally 3; segments of the calyx foliaceous, glandular-pubescent, longer than the corolla. *Petals* obcordate. *Fruit* red, globose.—Reddish. ♃. May—June. Common. 1—3 feet.

3. R. PARVIFLO'RA, (Ehrh.) *Stem* glabrous, dotted, branches genicu

late. *Leaflets* 5, the lateral ones ovate, obtuse, terminal one lanceolate, acute, glabrous or slightly pubescent on the veins beneath. *Spines* stipulate, generally straight. *Flowers* terminal, solitary, or by pairs. *Calyx* hispid; segments subulate. *Petals* emarginate, obovate. *Fruit* nearly glabrous.—Red. ♃. May—June. In dry fertile soils. Common. 1—2 feet.

4. R. LÆVIGA'TA, (Mich.) *Stem* glabrous, branches flexible, armed with strong recurved prickles. *Leaflets* 3—5, lanceolate, serrate, coriaceous, shining. *Flowers* solitary, terminal; segments of the calyx acuminate, unequal, serrate. *Petals* obovate, obtuse, with the point crenulate.—White. ♃. April—May. Common. 15—20 feet.
Cherokee Rose.

The Rose has been an object of esteem in all civilized nations. The species and varieties of this genus, most of them produced by the horticulturist, amount to 400—500. As an ornamental shrub, it stands unrivaled in public esteem; it yields but little to the mass of vegetable materials made subservient to the uses of man. The leaves of the Red-rose are slightly astringent and tonic, but are used chiefly in infusions as a vehicle for the administration of cathartic medicines. Rose-water is produced by the distillation of the flowers of various species. The *Attar of Roses* is a volatile oil existing in very minute quantities in rose leaves, is obtained by distillation, and sold at high prices as a perfume.

SUB-ORDER IV.—POMA'CEÆ.

Calyx superior. *Carpels* 2—5, united to form a pome, each with 1—2 ovules. *Fruit* usually edible.

GENUS XV.—CRATÆ'GUS. L. 11—5.

(From the Greek *kratos*, strength; in allusion to the hardness of the wood.)

Calyx 5-cleft, tube urceolate. *Petals* 5, spreading, orbicular. *Stamens* numerous. *Styles* 1—5. *Fruit* fleshy or baccate, crowned with the teeth of the persistent calyx, 1—5-seeded. *Seeds* bony. Thorny shrubs, with simple leaves. *Fruit* often edible.
Thorn-tree.

1. C. CRUS-GAL'LI, (L.) *Stem* spiny, branching; branches geniculate, divaricate. *Leaves* obovate, deeply serrate, cuneiform, shining, glabrous, coriaceous, nearly sessile. *Spines* long. *Flowers* in terminal, compound corymbs; segments of the calyx linear-lanceolate, sometimes serrate. *Styles* 2. *Fruit* red.—White. ♄. May—June. Common. 10—20 feet.

2. C. COCCIN'EA, (L.) *Stem* spiny. *Leaves* on long petioles, roundish, ovate, acutely lobed, serrate, glabrous, obtuse at the base. *Petioles* glandular. *Flowers* numerous, in corymbs. *Calyx* glandular, peduncles hairy. *Styles* 5. *Fruit* large, red, eatable.—White. ♄. May. On banks of streams. 10—25 feet.
White Thorn.

3. C. VIR'IDIS, (L.) *Stem* spiny; branches slender. *Leaves* nearly sessile, spatulate, ovate, serrate, with round lobes generally. *Segments* of the calyx with glandular serratures. *Flowers* in small corymbs. *Fruit* large, globular; 3—4-seeded, red.—White. ♄. May—June. 8—14 feet.

4. C. POPULIFO'LIA, (Ell.) *Stem* spiny, glabrous, with slender branches; spines large, and sometimes branched. *Leaves* small, ovate, serrate,

sprinkled with a few hairs, slightly lobed, cordate at the base. *Flowers* in small corymbs. *Fruit* globose, 5-seeded.—White. ♄. April. Middle and Southern Carolina and Georgia.

5. C. PUNCTA'TA, (Jaq.) A small tree, spiny or unarmed, with numerous rugged branches. *Leaves* obovate, cuneate, glabrous, serrate, decurrent into a slender petiole, sometimes incised toward the apex. *Spines* stout when present. *Flowers* in tomentose corymbs. *Calyx* villous. *Fruit* globose, large, tough, and pleasant to eat; dotted.—White. ♄. May. Upper dist. Car. and Geo. 12—25 ft. *Thorn.*

6. C. ARBORES'CENS, (Ell.) A tree, unarmed. *Leaves* on short petioles, lanceolate, acute at each end, serrate, glabrous on the upper surface, hairy on the under at the division of the veins. *Flowers* numerous, in corymbs. *Calyx* hairy. *Segments* obtuse, reflexed. *Styles* 5 *Fruit* globose, small, red.—White. ♄. March—April. Southern Geo. 20—30 feet.

7. C. APIIFO'LIA, (Mich.) A spiny shrub, much branched. *Leaves* deltoid on long petioles, in fascicles, pubescent, 5—7-cleft, segments incisely lobed, serrate; spines stout. *Flowers* in simple corymbs; calyx villous; segments lanceolate, reflexed; styles 2—3.—White. ♄. March—April. Common. 4—12 feet.

8. C. CORDA'TA, (Ait.) A large shrub, glabrous and spiny. *Leaves* cordate-ovate, on long slender petioles, 3—5—7-lobed; lobes acuminate, acutely serrate. *Flowers* in compound corymbs; segments of the calyx short, obtuse. *Styles* 5. *Fruit* globose, small, depressed, red.—White. ♄. June. Mountains. 15—20 feet. *Washington Thorn.*

9. C. SPATHULA'TA, (Mich.) A small tree, somewhat spiny, glabrous. *Leaves* clustered in fascicles, with a long cuneate base, generally 3-lobed, crenate, glabrous. *Flowers* numerous, in lateral corymbs. *Calyx* small, glabrous, segments ovate, obtuse. *Styles* 5. *Fruit* small, globose, red, eatable.—White. ♄. April. Common. 12—15 feet.

10. C. ÆSTIVA'LIS, (T. & G.) *Stem* spiny, branching from the base. *Leaves* elliptical or obovate, cuneate, on short petioles, sinuate toothed, or angled toward the summit, tomentose when young, glabrous above when old; veins beneath covered with a rusty pubescence. *Flowers* in small corymbs, glabrous. *Styles* 4—6. *Fruit* globose, large, acid, red, used for tarts or preserves.—White. ♂. Feb.—March. In wet places. 20—30 feet. *May Haw. Apple Haw.*

11. C. FLA'VA, (Ait.) A shrub, spiny, with coarse bark. *Leaves* obovate, cuneate, acute at the base, running into a glandular petiole, glabrous, shining, incised or lobed toward the apex. *Flowers* in small corymbs; segments of the calyx serrated with globular glands. *Styles* 4—5. *Fruit* globular, yellow.—White. ♃. May. Sandy soils. 15—20 feet.

12. C. LU'CIDA, (Ell.) A shrub with short spines, very strong. *Leaves* cuneate, obovate, crenate, coriaceous, lucid, on short branches. *Flowers* few in simple corymbs, on small lateral branches. *Styles* 5. *Fruit* large, globose, red, 5-seeded.—White. ♄. April. Southeastern Geo. 10—12 feet.

13. C. ELLIP'TICA, (Ait.) A spiny shrub, with coarse rough bark. *Leaves* obovate or nearly round, cuneate at the base, coriaceous, margined, with glandular dots, pubescent in the axils of the veins, and on the petioles, slightly lobed toward the apex. *Flowers* solitary, or in

small corymbs. *Calyx* pubescent; segments incised or serrate. *Fruit* oval, large, red, 5-seeded.—White. ♄. April. In sandy soils. 8—12 feet. *Summer Haw.*

14. C. PARVIFO'LIA, (Ait.) A spiny shrub, much branched; branches geniculate and divaricate; young branches tomentose; spines numerous, long and slender. *Leaves* obovate, deeply serrate, entire at the base, tomentose. *Flowers* generally solitary, terminal. *Calyx* tomentose; segments lanceolate, incised, foliaceous, with 2 or 3 bracts at the base. *Styles* 5. *Fruit* large, greenish yellow, eatable.—White. ♄. April—May. Dry soils. Common. 3—6 ft. *Winter Haw.*

GENUS XVI.—PY'RUS. L. 11—5.

(The Celtic name for Pear.)

Calyx 5-cleft, tube urceolate or campanulate. *Petals* 5, nearly round. *Styles* usually 5. *Fruit* a fleshy pome, indehiscent. *Carpels* 2—5. *Seeds* 2 in each carpel. Trees or shrubs. *Leaves* simple.

1. P. CORONA'RIA, (L.) A small tree, with spreading branches. *Leaves* large, broad oval or ovate, sometimes sub-cordate, irregularly serrate, smooth. *Flowers* in large terminal corymbs, fragrant. *Petals* somewhat unguiculate. *Fruit* globose, depressed; disagreeable to the taste.—Rose-colored. ♄. April. Common. 10—20 ft. *Crab Apple.*

2. P. ANGUSTIFO'LIA, (Ait.) A small tree, resembling the preceding *Leaves* oblong-lanceolate, acute at the base, dentate or nearly entire, glabrous, shining above. *Flowers* in corymbs. *Fruit* small.—White. ♄. March—April. In rich soils. 10—20 feet.

3. P. ERYTHROCAR'PA. (T. & G.) (*Aronia arbutifolia of Elliott.*) A shrub sparingly branched, unarmed. *Leaves* obovate, acuminate, sometimes lanceolate, crenate, dentate, tomentose underneath when young. *Flowers* in terminal corymbs. *Calyx* campanulate, with erect, acute, glandular segments. *Petals* nearly round. *Stamens* numerous. *Fruit* small, red.—White or rose-color. ♄. March—April. Common in damp soils. 3—8 feet.

This genus affords some of our most important fruits. The Pyrus communis is the *Pear;* the Pyrus malus is the *Apple;* the Pyrus cydonia is the *Quince;* and the Pyrus prunifolia is the *Siberian Crab.*

GENUS XVII.—AMELAN'CHIER. Medic. 11—5.

(The Savoy name of the Medlar.)

Calyx 5-cleft. *Petals* 5, obovate, oblong. *Stamens* numerous, short. *Styles* 5, more or less united; pome 5—10-celled; cells 1—2-seeded; endocarp cartilaginous. Small trees or shrubs, with simple leaves.

1. A. BOTRYA'PIUM, (T. & G.) (*Aronia botryapium of Ell.*) A small tree. *Leaves* cordate or ovate, oblong, serrate, tomentose when young, glabrous when mature. *Flowers* in racemes. *Petals* oblong or linear-lanceolate; segments of the calyx glabrous, short. *Styles* pubescent at the base. *Fruit* red, eatable.—White. ♄. Feb.—March. Common. 10—12 feet. *Shad Flower.*

5. A. ROTUNDIFO'LIA, (T. & G.) (*Aronia ovalis of Ell.*) A small shrub. *Leaves* nearly round, acute, glabrous, sharply serrate. *Flowers* 6—10, in a raceme. *Petals* obovate, small; segments of the calyx pubescent. *Fruit* black, eatable.—White. ♄. March—April. Middle Car. and Geo. 2—3 feet.

ORDER XLV.—CALYCANTHA'CEÆ. Lind.

Sepals and *petals* confounded; æstivation imbricate, formed at the base into an urceolate tube; segments colored, petal-like. *Stamens* numerous, inserted into the tube of the calyx. *Anthers* adnate, extrorse. *Seeds* numerous, contained in an enlarged, ventricose calyx.

GENUS I.—CALYCAN'THUS. L. 11—12.

(From the Greek *kalux*, a calyx, and *anthos*, a flower, the calyx being confounded with the corolla.)

Lobes of the calyx in several series, lanceolate, colored, more or less fleshy. *Stamens* numerous, outer ones fertile. *Flowers* purple, odorous when bruised.

Carolina Allspice. Sweet Shrub.

1. C. FLOR'IDUS, (L.) *Stem* terete, glabrous; branches opposite, virgate, young ones pubescent. *Leaves* ovate or ovate-lanceolate, opposite, entire, rugose, slightly pubescent. *Flowers* terminal; perianth many-leaved; leaves in many irregular whorls, linear or lanceolate. *Stamens* 10—15; filaments short, the leaves of the inner whorl of the perianth often having abortive anthers. *Fruit* an achenium, 15—20, inclosed in the enlarged cavity formed by the floral organs combined.—♃. March—May. Rich lands. 3—6 feet.

The odor of the flowers resembles that of ripe strawberries. The oil is too volatile to be collected by distillation. The bark yields a volatile oil, of pleasant odor, and possessing medicinal qualities.

ORDER XLVI.—MELASTOMA'CEÆ.

Sepals 4, combined into an urceolate tube, cohering to the ovary. *Petals* 4, alternate with the segments of the calyx, inserted into its throat; æstivation twisted. *Stamens* 4—8. *Anthers* adnate, declined. *Ovary* 4-celled, with central placentæ; ovules numerous. *Style* 1. *Fruit* capsular. *Seeds* numerous, minute, anatropous. Herbs, with opposite, ribbed leaves.

GENUS I.—RHEX'IA. L. 8—1.

(From the Greek *rhexis*, a rupture; supposed to cure wounds by its astringent qualities.)

Tube of the calyx ventricose at the base, narrowed above the ovary. *Petals* obovate or roundish. *Anthers* 1-celled, with a thick connectivum. *Style* declined. *Stigma* obtuse. *Leaves* generally sessile, 3-nerved.

1. R. Maria'na, (L.) *Stem* hirsute, terete, furrowed. *Leaves* lanceolate, attenuate at the base, hispid, serrate, ciliate. *Flowers* axillary or terminal. *Calyx* hispid. *Petals* large, obliquely obovate, often hispid. *Anthers* long, linear, opening at the summit. *Style* longer than the stamens.—Purple. 4. June—Sept. In moist soils. 1—2 feet.

2. R. angustifo'lia, (Nutt.) *Stem* hirsute, nearly terete, much branched. *Leaves* linear or lanceolate, somewhat clustered, attenuate at the base, slightly hispid, setaceously ciliate, serrulate. *Flowers* numerous, smaller than the preceding. *Calyx* glabrous.—Pale purple or nearly white. 4. Damp soils. 1—2 feet. *R. lanceolata*, Walt.

3. R. Virgin'ica, (L.) *Stem* square, with the angles winged, hispid, branching. *Leaves* sessile, oval, lanceolate, acute, hispid above and on the ribs beneath, sometimes 5—7-ribbed. *Flowers* numerous, axillary, and terminal. *Calyx* hispid. *Petals* obovate, hispid externally.—Purple. 4. July—Sept. In swamps. 2—3 feet. *Deer Grass.*

4. R. stric'ta, (Pursh.) *Stem* glabrous, square ; angles winged, bearded at the nodes. *Leaves* sessile, ovate, lanceolate, acuminate, setaceously serrulate, often hispid above. *Flowers* in dichotomous corymbs. *Calyx* glabrous.—Purple. 4. In wet pine-barrens. Aug.—Sept. 3—4 feet.

5. R. glabel'la, (Mich.) *Stem* glabrous, slightly furrowed, terete, simple. *Leaves* lanceolate, entire, or with few serratures at the summit. *Flowers* large. *Calyx* with glandular hairs. *Petals* large, glandular externally before their expansion.—Purple. 4. June—Aug. Damp woods. 2—5 feet. *Deer Grass.*

6. R. cilio'sa, (Mich.) *Stem* simple, quadrangular, glabrous. *Leaves* slightly petioled, ovate, lanceolate, serrulate, ciliate, hispid above. *Flowers* in a loose dichotomous panicle, with an involucre formed by the upper pair of leaves. *Calyx* glabrous. *Petals* nearly round.—Purple. 4. June—Aug. Pine-barrens. 1—2 feet.

7. R. serrula'ta, (Nutt.) *Stem* small, simple, quadrangular, glabrous. *Leaves* small, ovate, or oval, glabrous, serrulate, and ciliate. *Flowers* 1—3, together. *Calyx* glandular, hispid.—Purple. 4. June—July. Swamps. 6—10 inches.

8. R. lu'tea, (Walt.) *Stem* hirsute, square, branching, hispid. *Leaves* linear, lanceolate, sometimes cuneate, entire. *Flowers* small. *Calyx* smooth and shining, or with a few scattered bristles. *Petals* setaceously mucronate.—Yellow. 4. Damp pine-barrens. June—Aug. 12—18 inches.

Order XLVII.—LYTHRA'CEÆ.

Calyx 4-lobed. *Petals* none or four. *Stamens* inserted into the tube of the calyx, generally in number equal to the lobes. *Anthers* short, introrse. *Ovary* 2—4-celled, inclosed in the calyx ; ovules numerous ; placentæ central. *Capsule* membranaceous, sometimes 1-celled. *Seeds* numerous, anatropous. *Cotyledons* foliaceous. Herbs, with opposite leaves, without stipules.

ANALYSIS.

1. Calyx with accessory teeth between the lobes 2
   Calyx with no accessory teeth ..... *Hypobrichia*, 1

2. Calyx 6-toothed, ventricose ..... *Cuphea*,
Calyx with less than 6 teeth, not ventricose 3
3. Calyx 4—6 teeth, cylindrical ..... *Lythrum*, 3
Calyx campanulate 4
4. Calyx 4-lobed ..... *Ammannia*, 2
Calyx with 5 teeth ..... *Decodon*, 4

Genus I.—HYPOBRICH'IA. Peplis, 4—1.

Calyx 4-lobed and sometimes with intermediate segments, campanulate, apetalous. *Stamens* 2—4. *Ovary* 2-celled, globose. *Stigma* 2-lobed, nearly sessile. *Capsule* 2-celled, membranaceous, dehiscing irregularly. *Seeds* numerous. *Flowers* minute, axillary. An aquatic plant, with opposite, linear leaves.

1. H. Nuttal'lii, (L.) *Stems* leafy, immersed. *Leaves* numerous, linear, acute, the uppermost shorter and broader, obtuse. *Flowers* very small. *Stamens* 2—4, shorter than the calyx.—☺. July—Aug. In still waters. 12—20 inches. *Water Purslane.*

Genus II.—AMMAN'NIA. Houst. 4—1.

(In honor of John Ammann.)

Calyx 4-lobed, with 4 intermediate lobes produced in the sinuses. *Petals* 4 or none. *Stamens* generally 4, sometimes 8. *Ovary* 2—4-celled. *Capsule* included in the calyx. *Seeds* numerous. *Stems* square; leaves opposite. *Flowers* axillary, with small petals. Herbaceous, annual plants. Growing in wet places.

1. A. latifo'lia, (L.) *Stem* erect, branching. *Leaves* linear, lanceolate, dilated at the base, sessile. *Flowers* 1—5 in each axil. *Calyx* angled, with 4 short, intermediate lobes. *Petals* 4. *Stamens* 4. *Capsule* 4-celled.—Purple. ☺. July—Aug. Near Macon. 10—20 in.

2. A. ramos'ior, (Mich.) *Stem* erect, somewhat columnar, succulent, glabrous. *Leaves* nearly sessile, narrow, lanceolate, more or less cordate. *Flowers* axillary, the lower ones several in each axil, the upper solitary. *Petals* small. *Stamens* 4. *Capsule* globose, furrowed. *Seeds* numerous.—Pale purple. ☺. Aug.—Sept. Wet places. 1—2 feet.

3. A. hu'milis, (Mich.) *Stem* erect, quadrangular, glabrous, sometimes branched. *Leaves* lanceolate, obtuse, tapering at the base. *Flowers* solitary, axillary. *Calyx* with 4 short, intermediate segments. *Petals* 4, obovate. *Stigma* capitate, nearly sessile. *Capsule* 4-celled. *Seeds* numerous.—White. ☺. On the coast. Sept.—Oct. 6—10 in.

Genus III.—LY'THRUM. L. 11—1.

(From the Greek *luthron*, black blood, from the purple color of the flowers.)

Calyx cylindrical, with 4—6 short teeth, and generally with as many intermediate processes. *Petals* 4—6. *Stamens* equal, or twice as many in number as the petals, inserted into the

calyx. *Style* filiform. *Capsule* 2-celled, many-seeded, inclosed in the calyx. Herbaceous, glabrous plants, with entire leaves.

1. L. LANCEOLA'TUM, (Ell.) *Stem* erect, quadrangular, slightly margined; branches long near the summit, slender, glabrous. *Leaves* lanceolate, acute, sessile, opposite on the stem, alternate, and crowded on the branches. *Flowers* solitary, axillary. *Calyx* furrowed. *Petals* 6, oblong, double the length of the calyx. *Stamens* 6. *Capsule* oblong.—Purple. 4. July—Aug. Ditches, swamps. 3—4 feet.

2. L. ALA'TUM, (Pursh.) *Stem* glabrous, quadrangular, slightly winged. *Leaves* opposite, cordate, ovate, on short petioles. *Flowers* axillary, solitary. *Calyx* striate. *Stigma* capitate. *Capsule* cylindrical.—Bright purple. 4. June—July. Lower Georgia. 3—4 feet.

3. L. LINEA'RE, (L.) *Stem* glabrous, slender, virgate, branched at the summit, angular, margined. *Leaves* linear, acute, generally opposite, upper ones smallest. *Flowers* axillary, solitary, small. *Calyx* somewhat striate. *Petals* 6. *Stamens* 6.—Nearly white. 4. July—Aug. On the coast. 3—4 feet.

GENUS IV.—DEC'ODON. Gmel. 10—1.

(From the Greek *dekas*, ten, and *odous*, a tooth, from the ten teeth of the calyx.)

Calyx short, campanulate, with 5 erect teeth and 5 subulate, spreading processes. *Petals* 5. *Stamens* 10, with the alternate ones very long. *Stigma* small, on a filiform style. *Capsule* globose, 3-celled. *Seeds* numerous, minute. Perennial plant, with opposite, entire leaves and axillary flowers.

1. D. VERTICILLA'TUM, (Ell.) *Stem* recurved, pubescent. *Leaves* lanceolate, acute, entire; a little hairy on the upper surface, tomentose on the under. *Flowers* 3 or more, at the summit of a short peduncle, rather large, showy.—Purple. 4. Aug.—Sept. In damp soils. 3—4 feet.

GENUS V.—CU'PHEA. Jacq. 11—1.

(From the Greek *kuphos*, curved, from the shape of the capsule.)

Calyx tubular, ventricose, 6-toothed, and generally with as many intermediate processes. *Petals* 6, unequal. *Stamens* 12, unequal. *Style* filiform. *Capsule* membranaceous, 1—2-celled. *Seeds* orbicular, compressed. Herbaceous plants, with opposite leaves; calyx colored.

1. C. VISCOSIS'SIMA, (Jacq.) *Plant* viscid, pubescent. *Stem* erect, branching. *Leaves* opposite, ovate-lanceolate, scabrous, on slender petioles. *Flowers* solitary, on short peduncles. *Calyx* ribbed, gibbous at the base, viscid. *Petals* unguiculate. *Stamens* 12. *Capsule* oblong. *Seeds* few; capsule opening before the seeds are ripe.—Violet. ☺. July—Aug. Mountains. 12—15 inches.

Genus VI.—LAGERSTRŒ'MIA. L.

(In honor of the Marquis Lagerstrœm, a Swedish traveler.)

Calyx 6-parted, with the bracts at the base. *Petals* 6, unguiculate. *Stamens* numerous. *Capsule* 3—6-celled.

1. L. In'dica, (L.) A shrub, branches somewhat 4-winged. *Leaves* opposite, entire, roundish-ovate, obtuse, shining on the upper surface. *Panicle* terminal, many-flowered. *Petals* curled, on long claws.—Purple. ♄. China and Japan. An ornamental shrub. 6—12 feet.

Order XLVIII.—RHIZOPHORA'CEÆ.

Sepals united into a 4 or many lobed calyx. *Petals* inserted into the calyx and equaling the number of lobes. *Stamens* equal to, or several times the number of petals. *Ovary* united to the tube of the calyx, 1—2-celled. *Fruit* 1-celled, indehiscent. *Seed* solitary, pendulous.

Genus I.—RHIZOPH'ORA. L. 12—1.

(From the Greek *rhiza*, a root, and *phoreo*, to bear, from the branches throwing out roots.)

Tube of the calyx obovate. *Petals* oblong, emarginate, coriaceous. *Stamens* twice as many as the petals. *Anthers* nearly sessile. *Fruit* ovate, longer than the tube of the calyx, to which it adheres. *Trees.*

1. R. Man'gle, (L.) *Leaves* obovate-oblong. *Peduncles* 2—3-flowered, axillary.—Yellow. ♄. Lou. and Flor. *Mangrove.*

Order L.—ONAGRA'CEÆ.

Sepals united into a tubular calyx, the limb generally divided into 4 segments. *Petals* equal in number to the segments, sometimes wanting. *Stamens* inserted with the petals, and generally equaling them in number. *Anthers* introrse. *Pollen* triangular. *Ovary* cohering with the tube of the calyx, 1—2—4-celled. *Style* elongated. *Stigma* capitate or 4-lobed. *Fruit* usually capsular. *Seeds* indefinite, anatropous; albumen none; embryo straight.

ANALYSIS.

1. Calyx with 4 or more teeth or lobes 2
   Calyx with 3 lobes ..... *Proserpinaca*, 6
2. Flowers monœcious ..... *Myriophyllum*, 7
   Flowers perfect 3
3. Stamens 4 ..... *Ludwigia*, 5
   Stamens more than 4 4
4. Flowers purple ..... *Epilobium*, 1
   Flowers white or reddish ..... *Gaura*, 3
   Flowers yellow 5
5. Calyx tube prolonged beyond the ovary ..... *Œnothera*, 2
   Calyx tube not prolonged beyond the ovary ..... *Jussiæa*, 4

Genus I.—EPILO'BIUM. L. 8—1.

(From the Greek *epi*, upon, and *lobos*, a pod, the flower being seated on the top of the pod.)

Calyx campanulate; segments 4, spreading. *Petals* 4. *Stamens* 8, alternate ones longest. *Anthers* elliptical, attached near the middle. *Stigma* clavate. *Capsule* quadrangular, 4-celled. *Seeds* numerous, crowned with a coma. Perennial herbs.

1. E. colora'tum, (Muhl.) *Stem* branching, glabrous, nearly terete. *Leaves* opposite or alternate, lanceolate, serrulate, on short petioles. *Flowers* in terminal racemes, small. *Petals* 2-cleft. *Capsules* on short pedicels, slightly pubescent, linear, 4-angled. *Seed* oblong.—Purple. ♃. July—Aug. Mountains. 1—3 feet.

Genus II.—ŒNOTHE'RA. L. 8—1.

(From the Greek *œnos*, wine, and *thera*, a catching: the roots of the *Œ. biennis* were formerly eaten as an incentive to wine-drinking; hence the name of the genus as wine-catching.)

Calyx tubular, 4-cleft; segments reflexed. *Petals* 4, equal, obovate. *Stamens* 8. *Ovary* 4-celled; ovules numerous. *Stigma* 4-cleft. *Capsule* 4-valved, many-seeded. Herbaceous plants, with alternate leaves and axillary or terminal flowers.

1. Œ. bien'nis, (L.) *Stem* herbaceous, erect, terete, generally simple, hirsute. *Leaves* alternate, pubescent, sessile, ovate-lanceolate, denticulate. *Flowers* in terminal, leafy spikes. *Calyx* longer than the ovary, thickened at the summit; segments hairy on the outside, reflexed. *Stamens* slightly declined. *Petals* obovate, emarginate. *Capsule* nearly cylindrical. *Seeds* numerous.—Yellow. ♃. Sept.—Oct. Common. 3—8 feet. *Evening Primrose.*

2. Œ. murica'ta, (Murr.) Resembles the Œ. biennis, but with smaller flowers. *Stem* purplish, muricate. *Leaves* lanceolate. *Petals* a little longer than the stamens. *Ovaries* strigose-hirsute.

3. Œ. grandiflo'ra, (Ait.) *Stem* nearly glabrous, branching. *Leaves* ovate-lanceolate, glabrous, sometimes pubescent. *Flowers* axillary, large; tube of the calyx very long. *Petals* longer than the stamens.—Yellow. ☉. Through the summer. Cultivated grounds. 2—3 feet.

4. Œ. sinua'ta, (L.) *Stem* diffuse, pubescent, ascending or decumbent, simple or branching from the base. *Leaves* sinuately toothed, oblong, often pinnatifid. *Flowers* axillary, solitary, sessile. *Petals* nearly obcordate. *Calyx* villous. *Capsules* cylindrical, furrowed.—Yellow, becoming rose-color. ♃. May—June. Dry pastures. 1—2 feet.

5. Œ. frutico'sa, (L.) *Stem* pubescent or nearly glabrous, branching from the base, divaricate. *Leaves* sessile, lanceolate, denticulate, acute, marked with minute linear dots. *Flowers* large, in terminal racemes. *Petals* broadly obcordate, longer than the segments of the calyx. *Capsules* oblong, clavate, pedicellate, angled.—Pale yellow. ♃. July—Aug. Middle Geo. and Car. 1—2 feet.

6. Œ. LINEA'RIS, (Mich.) *Stem* pubescent, slender, generally branched. *Leaves* linear, entire, obtuse, crowded near the summit. *Flowers* in terminal corymbs. *Petals* longer than the stamens. *Capsules* clavate, tapering at the base into a pedicel.—Bright yellow. ☺ or 4. April—May. Common in dry soils. 1—2 feet.

7. Œ. GLAU'CA, (Mich.) *Stem* glabrous, somewhat glaucous, erect, branching above. *Leaves* sessile, ovate or oblong-ovate, denticulate. *Flowers* very showy, in short, leafy corymbs. *Petals* emarginate, broadly obovate, erosely crenulate at the summit, much longer than the segments of the calyx. *Capsules* winged, pedicellate, ovoid.—Bright yellow. 4. May—July. Carolina. 2—3 feet.

8. Œ. RIPA'RIA, (Nutt.) *Stem* slightly pubescent, slender. *Leaves* linear-lanceolate, elongated, attenuate, entire, remotely denticulate. *Flowers* in leafy, elongated racemes; tube of the calyx longer than the ovary; segments of the calyx acuminate. *Petals* obcordate. *Capsules* oblong, clavate, 4-winged, with 4 intermediate ribs.—Yellow. ♂. June —July. In damp soils. 2—3 feet

GENUS III.—GAU'RA. L. 8—1.

(From the Greek *gauros*, superb, alluding to the elegance of the flowers of some of the species.)

Calyx 4-cleft, tubular, prolonged beyond the ovary, deciduous; segments reflexed. *Petals* 4, unguiculate. *Stamens* 8, somewhat declined. *Anthers* attached near the middle. *Ovary* 4-celled, with 1—2 suspended ovules in each cell. *Style* filiform, declined. *Fruit* somewhat ligneous, indehiscent; by abortion 1-celled, 1—4-seeded, 4-angled. *Flowers* in terminal spikes or racemes. Perennial plants, with alternate leaves.

1. G. ANGUSTIFO'LIA, (Mich.) *Stem* terete, pubescent. *Leaves* clustered, sessile, linear, repand, undulate, denticulate, somewhat hairy. *Flowers* in terminal panicles, formed of slender racemes. *Calyx* with reflexed segments; segments long, linear. *Petals* inserted near the summit of the calyx, spatulate, obtuse, shorter than the segments of the calyx. *Fruit* ovate, with acute or winged angles.—White. 4. July —Aug. Common. 2—3 feet.

2. G. BIEN'NIS, (L.) *Stem* villous-pubescent, branching. *Leaves* lanceolate, acute, denticulate, or entire, pubescent, sometimes glabrous above when old. *Flowers* crowded in the terminal spikes; segments of the calyx rather longer than the petals. *Petals* spatulate, larger than the preceding. *Fruit* oval-oblong, acute at each end, with 4 conspicuous ribs.—White or red. ♂. July—Aug. Upper districts. 3—5 feet.

3. G. FILIP'ES, (Spach.) *Stem* suffructicose at the base, branching above. *Leaves* linear or oblong-linear, acute at the base, often in the axils, remotely sinuately toothed, often almost pinnatifid, mucronate *Flowers* in panicles, on very slender branches. *Calyx* hairy, with segments exceeding in length the petals. *Petals* spatulate, oblong-ovate *Fruit* clavate, on a filiform pedicel, 4-angled.—White or reddish. 4 July—Aug. In dry soils. 2—4 feet.

GENUS IV.—JUSSIÆ'A. L. 10—1.

(In honor of A. de Jussieu, demonstrator of plants in the Royal Garden at Paris.)

Calyx 4—6-parted; tube prismatic or cylindrical, not extended beyond the ovary. *Petals* 4—6, spreading. *Stamens* double the number of petals. *Capsule* 4—6-celled, oblong, ribbed. *Seeds* numerous. *Leaves* alternate. *Flowers* axillary. Herbaceous plants, growing in wet places.

1. J. GRANDIFLO'RA, (Mich.) *Root* creeping. *Stem* erect, ascending, little branched, villous when young. *Leaves* lanceolate, entire, acute at each end, nearly sessile, lower ones spatulate. *Flowers* solitary, axillary, nodding before their expansion. *Calyx* villous, with very acute segments. *Petals* obovate, emarginate, double the length of the segments. *Stamens* 10, unequal. *Ovary* 5-angled.—Yellow. 4. May—Aug. Low country. 2—3 feet.

2. J. LEPTOCAR'PA, (Nutt.) *Stem* hirsute, erect, simple or somewhat branched. *Leaves* lanceolate, almost sessile. *Flowers* axillary, on short pedicels. *Calyx* usually with 6 acuminate, hairy lobes. *Petals* as long as the calyx. *Stamens* 10—12. *Capsules* linear, nearly glabrous when mature.—Yellow. ☺. June—Aug. Southern Geo. 1—2 feet.

3. J. DECUR'RENS, (D. C.) (*Ludwigia decurrens of Elliott.*) *Stem* erect, glabrous, branching, winged; branches slender. *Leaves* ovate, lanceolate, decurrent, closely sessile, shining, with 2 glands at the base. *Flowers* on square, winged peduncles, with 2 cordate glands in the middle; segments of the calyx 4, acuminate, 5-nerved. *Petals* obovate, as long as the segments, caducous. *Stamens* 8. *Capsules* 4-seeded, winged, on short pedicels.—Yellow. 4. July—Sept. Damp soils. Very common. 2—3 feet.

GENUS V.—LUDWIG'IA. L. 4—1.

(In honor of Professor Ludwig, of Leipsic.)

Calyx 4-parted; tube angled or cylindrical. *Petals* 4 or none. *Stamens* 4. Apex of the ovary generally flat. *Stigma* capitate. *Capsule* quadrangular, 4-celled, many-seeded. *Flowers* axillary or spicate. Perennial plants, growing in wet places.

1. L. ALTERNIFO'LIA, (L.) *Stem* erect, branching, slightly angled, slightly scabrous. *Leaves* alternate, lanceolate, sessile, tapering at each extremity. *Flowers* axillary, solitary, on short peduncles; segments of the calyx ovate, acuminate, spreading, 5-nerved. *Petals* caducous, as long as the calyx. *Capsule* with winged angles, cubical; wings ciliate. —Yellow. 4. July—Sept. Low country. 3—4 feet.

2. L. PILO'SA, (Walt.) *Stem* hairy or hirsute, erect, branching. *Leaves* ovate, obtuse; upper ones lanceolate or oblong-linear, sessile, somewhat decurrent. *Flowers* axillary, on short peduncles, large; segments of the calyx ovate, lanceolate, spreading. *Capsule* villous, nearly cubical; angles winged.—Yellow. 4. Aug.—Oct. Wet clay soils. 1—2 feet.

3. L. VIRGA'TA, (Mich.) *Stem* erect, virgate, slightly angled, pubescent, sometimes branched. *Leaves* ovate or oblong, the upper linear, obtuse, sessile, pubescent. *Flowers* axillary, large, on slender pedicels; lobes of the calyx ovate, reflexed. *Petals* larger than the segments. *Capsule* cubical, with winged angles.—Yellow. ♃. May—Sept. In dry places. 2—4 feet.

4. L. LINEA'RIS, (Walt.) *Stem* erect, branching, slender, glabrous, angled near the summit. *Leaves* linear, acute at each end. *Flowers* axillary, solitary, sessile; segments of the calyx triangular, ovate. *Petals* oblong-ovate, sometimes wanting.—Pale yellow. ♃. July—Sept. In shallow water. 10—20 inches.

5. L. LINIFO'LIA, (Poir.) *Stem* erect, glabrous, branching from the base, slender, angled above. *Leaves* linear, tapering at the base. *Flowers* axillary, sessile, larger than the preceding; lobes of the calyx ovate-lanceolate. *Capsule* cylindrical, slender.—Yellow. ♃. July—Aug. Middle Geo. 6—18 inches.

6. L. CYLIN'DRICA, (Ell.) *Stem* erect, branching, slightly angled, glabrous. *Leaves* slightly denticulate, lanceolate, tapering at each extremity, slightly decurrent. *Flowers* small, solitary or clustered, apetalous, sessile; segments of the calyx short, serrulate. *Capsule* cylindrical, pubescent, with 4 furrows.—Yellow. ♃. July—Sept. Southern Geo. 2—3 feet.

7. L. MOL'LIS, (Mich.) *Stem* erect, much branched, pubescent. *Leaves* lanceolate, pubescent, acute at each extremity. *Flowers* generally clustered, axillary, sessile; segments of the calyx acuminate, triangular, ovate. *Petals* minute or none. *Capsule* subglobose, villous, 4-sided.—Yellow. ♃. July—Sept. In swamps. 2—3 feet. *L. pilosa*, Walt.

8. L. ALA'TA, (Ell.) *Stem* erect, glabrous, sparingly branched, winged. *Leaves* cuneate, decurrent at the base; lower ones lanceolate or oval. *Flowers* axillary, solitary, sessile, apetalous; segments of the calyx broad, triangular, ovate. *Capsules* cubical, slightly winged, small.—Yellow. ♃. July—Sept. In swamps. Southern Car. and Geo. 1—3 feet.

9. L. SPHÆROCAR'PA, (Ell.) *Stem* erect, slightly angled, branching, glabrous or minutely pubescent. *Leaves* linear-lanceolate, acute, attenuate at the base. *Flowers* axillary, generally solitary, sessile, commonly apetalous; segments of the calyx triangular-ovate. *Capsule* small, globose, pubescent.—Yellow. ♃. July—Sept. Swampy grounds. Southern Car. and Geo. 1—2 feet.

10. L. MICROCAR'PA, (Mich.) *Stem* decumbent, slightly winged, branching, glabrous, ascending. *Leaves* obovate, spatulate, acute, glabrous, obscurely denticulate. *Flowers* minute, axillary, sessile, apetalous. *Capsule* very small, 4-furrowed.—☺. Damp places. Lower Car. and Geo. 8—12 inches.

11. L. CAPITA'TA, (Mich.) *Stem* erect, glabrous, slender, somewhat angled. *Leaves* narrow-lanceolate, obtuse at the base, sessile, acute. *Flowers* in a crowded, terminal head or spike, sessile. *Petals* small or none; segments of the calyx broad, triangular-ovate. *Capsule* oblong, quadrangular, slightly winged.—Yellow. ♃. Aug.—Oct. Damp soils. Middle Geo. 12—15 inches.

12. L. PALUS'TRIS, (Ell.) *Stem* procumbent, glabrous, creeping, branching, succulent. *Leaves* opposite, ovate-spatulate, entire, tapering at the

base into a slender petiole. *Flowers* axillary, sessile; segments of the calyx very short.—Red. ♃. Through the summer. In water.

13. L. NA'TANS, (Ell.) *Stem* glabrous, somewhat fleshy, creeping or floating. *Leaves* opposite, ovate-spatulate, tapering into a petiole; lower ones nearly sessile. *Flowers* axillary, sessile; segments of the calyx triangular-ovate. *Petals* sometimes wanting. *Capsule* quadrangular, attenuate at the base.—Yellow. ♃. July—Oct. In swamps. Middle Car. and Geo.

14. L. PEDUNCULO'SA, (Mich.) *Stem* creeping, glabrous, branching. *Leaves* opposite, sessile, lanceolate, entire; upper surface glabrous, the under sprinkled with hairs. *Flowers* axillary, solitary, on long peduncles. *Petals* obovate, entire, caducous; segments of the calyx linear-lanceolate, acuminate, spreading. *Capsule* obconic, pubescent.—Yellow. ♃. May—June. In wet places. Stem 3—10 inches.

GENUS VI.—PROSERPINA'CA. L. 3—3.

(From *proserpo*, to creep; creeping plants.)

Calyx 3-parted; tube 3-sided. *Petals* 3 or none. *Stamens* 3. *Stigmas* papillose. *Fruit* 3-sided, 3-celled. *Stems* creeping. *Leaves* alternate. *Flowers* axillary. Aquatic herbs.

1. P. PALUS'TRIS, (L.) *Root* fibrous. *Stem* herbaceous, procumbent, columnar, branching, glabrous, colored. *Leaves* sessile, lanceolate, sharply serrate; the lower ones pectinate or pinnatifid, glabrous. *Flowers* 1—3, axillary, nearly sessile; segments of the calyx lanceolate, persistent. *Fruit* triquetrous.—♃. April. In shallow waters.

2. P. PECTINA'CEA, (Lam.) *Stem* herbaceous, erect, sometimes branching, angled near the summit. *Leaves* glabrous, pectinate; segments linear-subulate. *Flowers* 1—3, nearly sessile. *Nut* triquetrous, with obtuse angles. ♃. May—April. In shallow water. 2—8 inches.

GENUS VII.—MYRIOPHYL'LUM. Vaill. 19—12.

(From the Greek *murios*, a myriad, and *phullon*, a leaf, in allusion to its numerous leaves.)

Flowers perfect or monœcious. *Calyx* 4-parted. *Petals* 4 or none. *Stamens* 4—8. *Ovary* 4-celled *Fruit* of 4 indehiscent carpels, cohering by the inner angles, adhering to the tube of the calyx. Aquatic plants. The submersed leaves pinnate, with filiform segments. *Flowers* sessile, axillary, the upper staminate, the middle perfect, the lower fertile.

1. M. VERTICILLA'TUM, (L.) *Stem* long, branching. *Leaves* verticillate; the upper pectinate, pinnatifid, the lower pinnate, with capillary segments. *Flowers* axillary, octandrous.—♃. July—Sept. In ponds and streams. *Water Milfoil.*

2. M. HETEROPHYL'LUM, (Mich.) *Stem* thick, branching, terete, floating; the upper leaves oval, acutely serrate; submersed leaves numerous, verticillate, pinnate, with setaceous segments. *Flowers* hexandrous, in irregular whorls. *Calyx* with minute lobes. *Petals* minute. *Stamens* 4—6. *Carpels* roughened, cohering at the axis.—Purple. ♃. June--Sept. In ponds and streams. 1—2 feet.

3. M. SCABRA'TUM, (Mich.) *Stem* terete, floating, taking roots at the lower joints. *Leaves* verticillate; the upper linear, pinnatifid, the lower setaceous. *Flowers* verticillate, small, sessile. *Stamens* 4—6. *Carpels* 2, ridged on the back.—Pale purple. ♃. April—June. Shallow ponds. 10—12 inches.

ORDER LI.—LOASA'CEÆ.

Calyx 5-lobed. *Petals* 5, sometimes 10, the inner ones usually smaller. *Stamens* numerous, the outer ones often petaloid. *Ovary* inferior, 1-celled. *Fruit* a capsule, 1-celled, about 6-seeded. *Seeds* anatropous.

GENUS I.—MENTZE'LIA. L. 11—1.

Genus same as the order.

1. M. FLORIDA'NA, (Nutt.) Herbaceous plant, covered with rigid, barbed hairs. *Leaves* deltoid-ovate, acute, unequally toothed, truncate, and 2-lobed at the base. *Petals* cuneate-oval, a little longer than the stamens. *Capsule* clavate. *Seeds* ovate, striate.—Yellow. East Florida.

ORDER LII.—TURNERA'CEÆ.

Sepals 5, united into a funnel-shaped tube; segments equal. *Petals* 5, equal, inserted on the calyx. *Stamens* 5, alternate with the petals. *Anthers* introrse. *Ovary* 1-celled, with 3 parietal placentæ. *Ovules* numerous. *Styles* 3. *Capsule* 3-valved, with loculicidal dehiscence. *Seeds* numerous. Herbaceous plants. *Leaves* simple, alternate.

GENUS I.—TUR'NERA. Plum. 5—3.

(In memory of Wm. Turner.)

Petals longer than the calyx. *Stigmas* many-cleft.

1. T. CISTOI'DES, (L.) *Stem* simple, hirsute, with bristly hairs. *Leaves* alternate, oval, obtuse, crenate, hairy, nearly sessile. *Flowers* solitary, axillary; peduncles articulated toward the summit. *Petals* obovate. *Anthers* sagittate. *Capsule* globose, villous. *Seeds* reniform.—Yellow. ♃. June—Sept. Barren soils. Georgia, Florida. 12—18 inches.

ORDER LIII.—PASSIFLORA'CEÆ.

Sepals 4—5, united at the base. *Petals* 4—5, inserted into the throat of the calyx, sometimes wanting. *Stamens* 4—5, monadelphous. *Anthers* introrse. *Ovary* stipitate, 1-celled, with 3—4 parietal placentæ. *Styles* 3—4, clavate, a filamentous crown inserted into the calyx within the petals. *Fruit* fleshy, indehiscent. *Seeds* numerous, anatropous. Climbing herbaceous plants, with alternate leaves.

Genus I.—PASSIFLO'RA. L. 15—5.

(From *passio*, passion, and *flos*, a flower; some fancied resemblance to the crown of thorns and other appendages of the passion of our Saviour.)

Calyx 5-parted, with a campanulate tube with a filamentous crown inserted into the throat. *Petals* 5. *Stamens* 5. *Anthers* large. *Stigmas* 3, clavate. *Fruit* pulpy. *Flowers* axillary, with a filamentous crown.

1. P. INCARNA'TA, (L.) *Stem* climbing, herbaceous. *Leaves* 3-lobed, alternate; lobes oblong, acute, pubescent along the veins. *Petioles* with 2 glands near the summit. *Flowers* axillary, solitary, on a long jointed peduncle; tendrils axillary. *Calyx* 5-parted, pubescent. *Petals* oval-oblong; crown triple. *Fruit* oval, glabrous, eatable.—White. 2f. May—July. Dry soils. 20—30 feet. *May Pop.*

2. P. LU'TEA, (L.) *Stem* herbaceous, slender, climbing, slightly hairy. *Leaves* somewhat cordate at the base, obtusely 3-lobed at the summit, glabrous. *Flowers* by pairs, on axillary peduncles. *Petals* narrow. *Fruit* dark purple.—Greenish-yellow. 2f. May—July. Common. 3—10 feet.

Order LIV.—CUCURBITA'CEÆ.

Calyx 5-toothed, the limb sometimes obsolete. *Petals* 5, distinct. *Stamens* 5, usually diadelphous or triadelphous. *Anthers* long and sinuous. *Ovary* cohering to the calyx. *Fruit* fleshy. *Seeds* anatropous; albumen none; cotyledons foliaceous. Herbaceous plants, climbing by stipular tendrils. *Leaves* alternate. *Flowers* axillary.

Genus I.—BRYO'NIA. L. 19—15.

(From the Greek *bruo*, to sprout up, alluding to its rapid growth.)

Flowers monœcious. *Calyx* with 5 short teeth. *Petals* 5. *Stamens* 5, triadelphous. *Style* generally 3-cleft. *Fruit* an oval berry, few-seeded.

1. B. BOYKIN'II, (T. & G.) *Stem* climbing, pubescent; tendrils usually simple. *Leaves* cordate, 3-lobed, with the middle one longest, acuminate, denticulate, the lateral angled or 2-lobed. Sterile and fertile flowers usually together, on short pedicels. *Fruit* crimson, becoming yellow. *Seeds* with 2 lateral teeth. Greenish-white. 2f. June—July. Along streams. 15—20 feet.

Genus II.—MELOTH'RIA. L. 19—15.

(The name of a plant, given by Theophrastus.)

Flowers monœcious. *Calyx* 3—5-toothed. *Petals* 5, forming a campanulate corolla; perfect flowers sometimes apetalous. *Stamens* 5, triadelphous. *Anthers* contorted. *Style* 1. *Stigmas* 3, dilated, with a cup-shaped disk surrounding the base of the style. *Fruit* a small many-seeded berry.

1. M. PEN'DULA, (L.) *Stem* running over small shrubs, branching. *Leaves* somewhat reniform; repand toothed, 5-angled or 5-lobed, middle lobe longest, mucronate, slightly hispid. *Flowers* axillary, the sterile in racemes, the fertile solitary; segments of the calyx subulate. *Corolla* with a 5-lobed border. *Stamens* short. *Fruit* small, 3-celled, many-seeded. Yellowish. 2f. June—Aug. In rich soils.

GENUS III.—SI''CYOS. L. 19—15.

(From the Greek *sicuos*, a cucumber, from its resemblance.)

Flowers monœcious. *Calyx* 5-toothed, flattish; teeth subulate. *Petals* 5, ovate, united, forming a rotate corolla. *Stamens* 5, cohering into a tube. *Anthers* contorted. *Calyx* in the fertile flowers campanulate. *Petals* forming a campanulate corolla. *Ovary* 1-celled. *Ovule* 1. *Style* 1. *Stigmas* 3. *Fruit* ovate, usually hispid. Sterile and fertile flowers together, the former in racemes, the latter in clusters. *Petals* with green veins; tendrils compound.

1. S. ANGULA'TUS, (L.) A small, procumbent vine, viscidly pubescent. *Leaves* alternate, cordate, 5-angled, toothed, scabrous, palmately veined tendrils 3—5-cleft. Sterile flowers in racemose corymbs, on long peduncles. *Fruit* viscidly pubescent, with introrsely scabrous bristles.—White. ☺. June—Sept. Upper districts of Car. and Geo.

GENUS IV.—CUCUR'BITA. L. 19—15.

(From *cucurbita*, a vessel.)

Flowers monœcious. *Calyx* campanulate, 5-toothed; segments subulate or rather broad. *Petals* obovate, inserted within the margin of the calyx. *Stamens* 5, triadelphous. *Anthers* long, tortuous. *Fruit* large, 3—5-celled. *Seeds* numerous, compressed. Fertile flowers, with 3 nearly sessile, thick stigmas. *Lagenaria vulgaris* (*lagena*, a bottle), D. C.

1. C. LAGENA'RIA, (L.) A large vine, tomentose. *Leaves* cordate, nearly circular, pubescent, with 2 glands at the base; tendrils 3—4-cleft. *Flowers* solitary, axillary. *Petals* spreading. *Fruit* varying in form; exterior coat ligneous.—White. ☺. Through the summer. Rich soils. *Calabash or Gourd.*

2. C. PE'PO. Running vine. *Leaves* cordate, obtuse, sub-5-lobed, denticulate. *Fruit* round or nearly so, more or less ribbed, smooth.—Asia. *Pumpkin.*

3. C. CITRUL'LUS. *Leaves* 5-lobed; lobes sinuate, pinnatifid, obtuse. *Fruit* more or less oval, smooth, often marked with various stripes, 3—6-celled, fleshy at the center.—Southern Asia and Africa. *Watermelon.*

The various kinds of *Squash* belong to this genus.

GENUS V.—MOMOR'DICA. L. 19—15.

(From *mordio*, to bite, the seeds appearing as if bitten.)

Flowers monœcious or filiform. *Stamens* triadelphous. *Style* trifid. *Fruit* a pepo, muricate, bursting elastically when mature. *Seeds* inclosed in a fleshy arillus.

1. M. BALSA'MIA, (L.) A running annual plant. *Leaves* palmately 5-lobed, toothed, glabrous, shining. *Fruit* attenuated at both ends, angular, tuberculated, orange-colored when ripe, splitting irregularly. Highly esteemed in the East for curing wounds; hence its common name, Balsam.—Yellow. East Indies.

Balsam Apple. Balsam Cucumber.

2. M. CHARAN'TIA, (L.) *Stem* pubescent. *Leaves* 5—7-lobed, dentate or sinuately toothed. *Ovary* slender, more or less tuberculate; seeds with a notched margin.—Tampa Bay, Florida.

GENUS VI.—CU'CUMIS. L. 19—15.

(Origin doubtful.)

Flowers monœcious or perfect. *Calyx* campanulate; segments subulate. *Stamens* 5, triadelphous. *Pepo* indehiscent, 3—6-celled. *Cucumber. Muskmelon.*

1. C. ME'LO, (L.) *Stem* running, scabrous, cirriferous. *Leaves* round ish, angular. Staminate flowers with the calyx ventricose at the base. *Fruit* ovate or globose, 8—12-furrowed. *Flesh* sweet.—Numerous varieties in cultivation. *Muskmelon. Cantelope. Nutmeg Melon.*

2. C. SATI'VUS, (L.) *Stem* rough, cirriferous. *Leaves* cordate, obscurely 5-lobed, petiolate. *Flowers* usually by threes. *Calyx* campanulate. *Fruit* varying much in form, smooth or prickly, usually shining. —Great variety in cultivation. East Indies. *Cucumber.*

ORDER LV.—GROSSULA'CEÆ.

Calyx superior, 4—5-cleft, tubular, campanulate. *Petals* usually 5, distinct, small, inserted into the throat of the calyx. *Stamens* 5. *Ovary* inferior, 1-celled. *Styles* 2. *Fruit* a berry, 1-celled, usually many-seeded. *Seeds* anatropous; albumen fleshy; embryo minute. Shrubs.

GENUS I.—RI'BES. L. 5—1.

(An Arabian name of an acid plant.)

Genus same as the order.

1. R. ROTUNDIFO'LIUM, (Mich.) *Stems* not prickly; subaxillary spines short, usually solitary. *Leaves* roundish, 5-lobed, nearly glabrous, shining above; lobes obtuse, incisely toothed. *Peduncles* slender, 1—2-flowered. *Petals* spatulate, unguiculate. *Fruit* small, smooth.—Mountains. N. C. *Gooseberry.*

A species is found in the neighborhood of Stone Mountain, Georgia, of which a stem was given me. *Leaves* broad-cordate, glabrous; upper ones distinctly 3-lobed, obscurely 5-lobed; lower ones 5-lobed; lobes crenate, toothed; subaxillary spines 3 on the lower part of the stem, 1 or 2 toward the summit. *Branches* long, slender, white toward the summit.

Order LVI.—CACTA'CEÆ. Juss.

Sepals numerous, indefinite, confounded with the petals, imbricate. *Petals* numerous, indefinite, arising from the orifice of the calyx. *Stamens* numerous, indefinite, with long, filiform filaments, and versatile, ovate anthers. *Ovary* 1-celled, cohering to the calyx, with parietal placentæ, fleshy. *Fruit* 1-celled, many-seeded, succulent. *Seeds* anatropous, with no albumen. Succulent plants, generally destitute of leaves. *Flowers* sessile.

Genus I.—OPUN'TIA. Tourn. 11—1. (*Cactus, L.*)

(From Opus, a city of Locris.)

Sepals numerous, adhering to the ovary. *Petals* numerous, obovate, spreading. *Stamens* numerous, shorter than the petals. *Stigmas* numerous, thick. *Berry* 1-celled, tuberculate, many-seeded.

1. C. VULGA'RIS, (Mill.) *Stem* prostrate, creeping; joints compressed, obovate; spines setaceous. *Flowers* sessile on the margins of the articulations. *Fruit* obovate, pulpy. *Seeds* numerous, imbedded in a crimson pulp.—Yellow. ♃. Through the summer. Common.

Order LVII.—SURIANA'CEÆ.

Sepals 5, persistent. *Petals* 5, inserted into the bottom of the calyx. *Stamens* 5, sometimes with 5 abortive ones. *Torus* fleshy. *Ovaries* 5, each with a long style; ovules in pairs, erect. *Fruit* 5 coriaceous carpels. *Seeds* solitary, uncinate. Shrubs.

Genus I.—SURIA'NA. Plum. 5—5.

Genus same as the order.

1. S. MARITI'MA, (L.) *Leaves* simple, oblong-spatulate, pubescent, crowded at the tops of the branches. *Flowers* bracteate.—Yellow. ♄. Sea-coast of Southern Florida.

Order LVIII.—CRASSULA'CEÆ.

Calyx 4—5-cleft, persistent. *Petals* 4—5, with as many hypogynous scales at the base of the ovary. *Ovaries* 5, generally distinct; ovules numerous. *Carpels* many-seeded, opening by the inner suture. *Seeds* anatropous. More or less succulent plants.

Genus I.—SE'DUM. L. 10—5.

(From *sedeo*, to sit; manner of growth, sitting upon rocks.)

Calyx 5-cleft, inferior. *Corolla* 4—5-petaled. *Stamens* 10. *Styles* 5. *Capsules* 5, with 5 nectariferous scales at the base of the germ.

1. S. TELEPHIOI'DES, (Mich.) *Stem* erect, branching. *Leaves* broad-lanceolate, alternate at the base, glabrous, toothed. *Flowers* in terminal corymbs, dense. *Stamens* 10. *Petals* ovate-lanceolate.—Pale purple. ♃. June—Aug. Mountains. 1 foot. *Live Forever.*

2. S. TERNA'TUM, (Mich.) *Stem* creeping, branching from the base. *Leaves* flat, glabrous, entire; the lower ones verticillate by threes, broad, cuneiform, obovate; the upper ones sessile, oval, or lanceolate. *Flowers* in a 3-spiked cyme. *Stamens* 8, with the exception of the terminal ones, which have 10. *Petals* linear-lanceolate, acute.—White. ♃. May—June. Mountains. *Stone-crop.*

3. S. PULCHEL'LUM, (Mich.) *Stem* glabrous, assurgent. *Leaves* linear, flattish, obtuse, scattered, sessile, numerous. *Flowers* in a many-spiked cyme, crowded, unilateral, sessile, octandrous; terminal one commonly decandrous. *Sepals* lanceolate, obtuse. *Petals* lanceolate, acute.—Purple or rose-color. ♃. May—June. Mountains. 4—12 inches.

GENUS II.—DIAMOR'PHA. Nutt. 8—4.

(From the Greek *diamorphoo*, to deform, from the irregular form of the fruit in reference to the order.)

Sepals 4, united at the base, obtuse. *Petals* 4, concave. *Stamens* 8, with purple, nearly round anthers. *Carpels* 4, with minute, obcordate scales at their base. *Seeds* 4—8. A succulent, biennial herb, branching from the base.

1. D. PUSIL'LA, (Nutt.) *Leaves* alternate, oblong, nearly terete. *Flowers* small, in corymbose cymes. *Fruit* not dehiscing by either suture.—White. ♂. March. On flat rocks. Upper part of Geo.

GENUS III.—PENTHO'RUM. Gron. 10—5.

(From the Greek *pente*, five, and *horos*, a boundary, in reference to the five beaks by which the capsule is bounded.)

Calyx 5-cleft. *Petals* 5 or none. *Stamens* 10. *Carpels* 5, united into a 5-angled, 5-celled capsule, with 5 diverging beaks. *Seeds* minute, numerous. Perennial plants, with alternate, serrate leaves.

1. P. SEDOI'DES, (L.) *Stem* branching, terete at the base, angled above. *Leaves* lanceolate, nearly sessile, glabrous, doubly serrate. *Flowers* in paniculate spikes; calyx with ovate, serrate segments. *Seeds* elliptical.—Greenish-yellow. ♃. July—Sept. Wet places. 1—2 feet. *Virginia Stone-crop.*

ORDER LIX.—SAXIFRAGA'CEÆ.

Sepals 4—5, united or distinct. *Petals* as many as the sepals. *Stamens* usually as many as the petals, inserted with the petals into the calyx. *Ovary* of 2—5 carpels, either free from or cohering to the calyx, 1-celled, with parietal placentæ, or with as many cells as carpels, with central placentæ; ovules usually numerous. *Fruit* a capsule, and generally with a septicidal

dehiscence. *Seeds* anatropous, numerous, and small. *Embryo* straight.

ANALYSIS.

1. Stems herbaceous 2
   Stems woody 7
2. Petals none ..... *Chrysosplenium*, 5
   Petals present 3
3. Leaves compound ..... *Astilbe*, 4
   Leaves simple 4
4. Stamens 5 5
   Stamens 10 ..... *Saxifraga*, 1
5. Capsule 2—3-celled .. .. *Boykinia*, 2
   Capsule 1-celled 6
6. Styles 2 ..... *Heuchera*, 3
   Styles 3 ..... *Lepuropetalon*, 6
7. Climbing plants ..... *Decumaria*, 9
   Shrubs or small trees 8
8. Style 1 ..... *Itea*, 7
   Styles 2 ..... *Hydrangea*, 8
   Styles 4 ..... *Philadelphus*, 10

Genus I.—SAXIF'RAGA. L. 10—2.

(From *saxum*, a stone, and *frango*, to break, from the supposed virtues of some of the species in curing the stone.)

Sepals 5, more or less united. *Carpels* 2-beaked, 2-celled, many-seeded, free or attached to the calyx, opening by a hole between the beaks.

1. S. LEUCANTHEMIFO'LIA, (Lap.) *Stem* with viscous hairs. *Leaves* spatulate, oval, attenuate into a long marginal petiole, with acute and large teeth. *Flowers* in a long, diffuse, much-branched panicle. *Calyx* reflexed, persistent. *Petals* unequal.—White, variegated with pink and yellow. 2f. June—Sept. Upper districts of Car. and Geo. 10—20 *in.*

2. S. VIRGINIEN'SIS, (Mich.) *Stem* pubescent. *Leaves* oblong, ovate, or spatulate, obovate, attenuate into a broad petiole. *Flowers* in dense, cymose clusters. *Calyx* with erect segments, obtuse. *Petals* oblong, obtuse. *Carpels* united by the base to the calyx.—White, tinged with purple. 2f. Mountains. 4—12 inches.

Genus II.—BOYKIN'IA. Nutt. 5—2.

(In honor of Dr Boykin, of Georgia.)

Calyx turbinate or urceolate, cohering to the ovary, 5-cleft; segments acute, triangular. *Petals* 5, entire. *Stamens* 5. *Styles* 2—3, short. *Capsule* 2—3-celled, with central placentæ, many-seeded, 2-beaked, dehiscent by pores between the beaks. Perennial plants, with alternate, lobed, and palmately round leaves. *Flowers* in corymbose cymes, small.

1. B. ACONITIFO'LIA, (Nutt.) *Stem* glandular. *Leaves* 5—7-lobed, glabrous; cyme fastigiate, viscid. *Flowers* secund; teeth of the calyx broadly triangular, 3-nerved.—*Petals* longer than the calyx, obovate sometimes wanting.—White. 2f. June—July. Mountains.

Genus III.—HEUCHE'RA. L. 5—2.

(In honor of Professor Heucher, of Wittemberg.)

Calyx 5-parted, campanulate, with obtuse segments. *Petals* 5, entire. *Stamens* 5. *Styles* 2. *Capsule* 1-celled, many-seeded, 2-beaked, dehiscent between the beaks. *Seeds* oval, hispid. Perennial herbs, with numerous, palmately veined, radical leaves, on long petioles.

1. H. America'na, (L.) *Stem* somewhat viscid, generally naked. *Leaves* 7—9-lobed; lobes rounded, obtuse, dentate; teeth mucronate, ciliate. *Flowers* numerous, in loose, elongated panicles, bracteate. *Petals* spatulate, small. *Seeds* small, numerous.—White. 4. April —May. Rich, damp soils. Common. 1—2 feet. *Alum-root.*

2. H. caules'cens, (Pursh.) *Scape* hairy at the base, 2-leaved or naked. *Leaves* cordate, 5—7-lobed; lobes acute, glabrous, unequally toothed, ciliate. *Flowers* in slender, loose panicles. *Petals* linear-spatulate, about the length of the stamens; segments of the calyx short, hairy.—White. 4. May—June. Mountains.

3. H. his'pida, (Pursh.) *Scape* glabrous, 1—2-leaved. *Leaves* obtusely 5—7-lobed, with broad, mucronate teeth, hispidly ciliate; upper surface hispid, lower glabrous. *Flowers* few. *Petals* unguiculate, broadly spatulate. *Stamens* exserted.—Violet-purple. 4. May—June. Mountains.

Genus IV.—ASTIL'BE. 10—2. (*Tiarella of Elliott.*)

(From *a*, privative, and *stilbe*, brightness; opake plants.)

Calyx campanulate, 5-parted, persistent. *Petals* 5, inserted on the calyx, spatulate, marcescent. *Stamens* 10, exserted. *Anthers* cordate, 2-celled, on subulate filaments. *Capsule* 2-celled, dehiscing longitudinally along the inside of the carpels, which separate after maturity. Perennial plants, with compound leaves; leaflets serrate. *Flowers* in crowded panicles, bracteate.

1. A. decan'dra, (Don.) *Stem* herbaceous, angular, branching. *Leaves* biternate; leaflets cordate, oblique, lobed; lobes serrate; lower surface and petioles glandular, pubescent. *Flowers* in axillary and terminal panicles; segments of the calyx ovate. *Petals* linear-spatulate, longer than the calyx. *Carpels* united at the base.—Yellowish-white. 4. June—Aug. Mountains.

Genus V.—CHRYSOSPLE'NIUM. Tourn. 8—2.

(From the Greek *chrusos*, gold, and *splen*, the spleen, in reference to the color of the flowers and supposed effect on the spleen.)

Calyx 4-cleft; segments obtuse, colored within. *Petals* none. *Stamens* 8—10; filaments short, subulate. *Anthers* reniform, 2-celled. *Styles* 2. *Capsule* 1-celled, with 2 parietal placentæ, cohering to the tube of the calyx. *Seeds* numerous. Herbaceous plants, with fleshy, crenate leaves.

1. C. AMERICA'NUM, (Schwein.) *Stem* slender, decumbent, dichotomous above. *Leaves* roundish-ovate, crenate; the upper ones alternate, the lower ones opposite. *Flowers* sessile, scattered. *Seeds* hispid, reddish-brown.—Yellowish-green. 4. April—May. Mountains. *Water Carpet. Golden Saxifrage.*

GENUS VI.—LEPUROPET'ALON. Ell. 5—3.

(From the Greek *lepurion*, a little scale, and *petalon*, a petal.)

Calyx 5-parted, with ovate, obtuse lobes; tube turbinate, cohering to the lower portion of the ovary. *Petals* 5, minute, spatulate, persistent. *Stamens* 5, with short filaments. *Capsule* 1-celled, many-seeded, globose. *Seeds* numerous. A small, annual herb, growing in tufts. *Leaves* alternate, spatulate, entire, marked with brownish dots. *Flowers* terminal.

1. L. SPATHULA'TUM, (Ell.) *Stem* glabrous, somewhat succulent, slightly angled, branching from the base. *Flowers* large for the size of the plant. *Calyx* persistent; segments ovate. *Petals* scale-like, ovate. *Capsule* 3-valved at the summit.—White. ☉. March—April. Close soils. 1 inch.

GENUS VII.—ITE'A. L. 5—1.

(From *itea*, the Greek name.)

Calyx campanulate, 5-cleft, with subulate segments. *Petals* 5, inserted into the tube of the calyx, linear-lanceolate, with incurved points. *Stamens* 5, alternate with the petals. *Style* 1. *Stigma* capitate, 2-lobed. *Capsule* 2-celled, with a central placenta.

1. I. VIRGIN'ICA, (L.) A shrub with flexible, pubescent branches. *Leaves* alternate, lanceolate, acuminate, serrulate, on short petioles. *Petals* pubescent on the inside. *Style* furrowed. *Flowers* in terminal, simple racemes. *Seeds* numerous.—White. 4. April—May. Wet soils. Common. 3—6 feet.

GENUS VIII.—HYDRAN'GEA. Gron. 10—2.

(From the Greek *hudor*, water, and *angeion*, a vine; suggested by the capsules of some of the species resembling a cup and growing in water.)

Calyx 5-toothed. *Flowers* fertile or sterile; calyx of the sterile flowers membranaceous, colored, flat, dilated; the remaining organs rudimentary or none; tube of the calyx in fertile flowers, hemispherical, cohering to the ovary, ribbed. *Petals* 5, ovate, sessile. *Stamens* double the number of the petals. *Styles* 2. *Capsule* 2-celled, dehiscing by an aperture between the styles. *Seeds* numerous. Shrubs, with opposite leaves, with cymose flowers.

1. H. ARBORES'CENS, (L.) *Stem* with opposite branches, pubescent when young. *Leaves* oblong-ovate, acuminate, dentate, nearly glabrous. *Flowers* in fastigiate cymes, generally fertile.—White. ♄. May—June. Mountains. 6—8 feet.

2. H. CORDA'TA, (Pursh.) Resembling the preceding species. *Leaves* broad-ovate, slightly cordate at the base, acuminate, coarsely toothed, glabrous underneath. *Flowers* generally in radiate cymes.—White. ♄. May—June. Mountains. 6—8 feet.

3. H. NIV'EA, (Mich.) *Leaves* ovate, cordate, acuminate, serrate, pubescent along the veins on the upper surface, silvery, tomentose beneath. *Flowers* in terminal, radiate cymes, with few sterile florets in the circumference; by cultivation all become sterile.—White. ♄. May—June. Upper Car. and Middle and Upper Geo. 6—8 feet.

4. H. QUERCIFO'LIA, (Bar.) A showy shrub. *Leaves* deeply 3—5-lobed, serrate, tomentose beneath. *Flowers* in paniculate, radiate cymes; sterile flowers large, numerous.—White, becoming purple. ♄. May—June. Middle Geo. Common on the banks of the Ocmulgee and Flint rivers.

GENUS IX.—DECUMA'RIA. L. 11—1.

(From *decuma*, a tenth, in reference to the tenfold structure of some of the flowers.)

Calyx 8—12-cleft; tube campanulate, adhering to the ovary. *Petals* 8—12, narrow, oblong, with margins somewhat induplicate. *Stamens* three times the number of the petals. *Capsule* 5—10-celled, ribbed, opening between the ribs; placentæ central. *Seeds* numerous. A shrub, with opposite leaves. *Flowers* in compound cymes, fragrant.

1. D. BAR'BARA, (L.) *Stem* climbing, by rootlets, large trees. *Leaves* broadly ovate, slightly serrate, acute at each end or obtuse at the base. *Flowers* in corymbose panicles.—White. ♄. July. In Middle Geo. 20—40 feet.

GENUS X.—PHILADEL'PHUS. L. 11—1.

(The Greek name of a plant, given by Aristotle.)

Calyx 4—5-parted, persistent; tube adhering to the ovary. *Petals* 4—5, broadly obovate. *Stamens* numerous. *Styles* 4, more or less united. *Capsule* 4—5-celled, with a loculicidal dehiscence. *Seeds* numerous. Shrubs, with opposite leaves.

1. P. INO'DORUS, (L.) *Stem* glabrous. *Leaves* ovate, acuminate, 3-nerved, nearly entire. *Flowers* at the extremity of the branches, 1—3; segments of the calyx acute. *Petals* large.—White. ♄. May. Middle Geo., near Culloden. 5—7 feet. *Syringa.*

2. P. GRANDIFLO'RUS, (Willd.) A shrub, with long, flexible branches, slightly angled. *Leaves* ovate, acuminate, denticulate, 3-nerved. *Flowers* at the extremity of the branches, 1—3, large; segments of the calyx ovate, lanceolate, acuminate. *Petals* large, twice as long as the stamens.—White. ♄. April—May. Middle Geo. Common. 6—10 feet.

ORDER LX.—HAMAMELA'CEÆ.

Calyx 4—5-cleft, or with 5—7 obscure teeth, or truncate; the tube somewhat adhering to the ovary. *Petals* 4—5, linear, spiral at the apex, sometimes none. *Stamens* twice the

number of the petals or indefinite. *Capsule* ligneous, 2-beaked, 2-celled, dehiscent at the summit. *Seeds* anatropous. Shrubs, with alternate leaves, feather-veined.

Genus I.—HAMAME'LIS. L. 4—1.

(Origin uncertain.)

Calyx 4-parted, with 2—3 bracts at the base. *Petals* 4, marcescent. *Stamens* 4 that are fertile and 4 sterile, the latter opposite the petals. *Styles* 2. *Capsule* bony, cohering at the base to the calyx, 2-celled. *Seeds* 1 in each cell, shining.

1. H. Virgin'ica, (L.) *Stem* with flexuous branches. *Leaves* obovate, cordate, acutely toothed, slightly scabrous; margins undulate, on short petioles. *Flowers* axillary, in clusters.—Yellow. ♄. Oct.—Nov. Common. 8—12 feet. *Witch Hazel.*

Genus II.—FOTHERGIL'LA. L. 11—2.

(In honor of Dr. Fothergill.)

Calyx 5—7-toothed or truncate, campanulate. *Petals* none. *Stamens* numerous, inserted on the margin of the calyx. *Ovary* cohering to the base of the calyx. *Styles* 2, filiform, distinct. *Capsule* 2-lobed, opening at the top, 2-celled. *Seed* 1 in each cell, bony. *Flowers* in terminal, amentaceous spikes.

1. F. alnifo'lia, (L.) A shrub, with virgate branches. *Leaves* oval, acute, or obtuse, crenate near the summit, pubescent underneath. *Flowers* with imbricated bracts, each inclosing a single flower. *Stamens* numerous, long, white or tinged with pink.—White. ♄. March—April. Margin of swamps. 2—4 feet.

Order LXI.—UMBELLIF'ERÆ.

Calyx adhering to the ovary. *Limb* 5-toothed or entire. *Petals* 5, usually inflexed at the point. *Stamens* 5, alternate with the petals. *Ovary* consisting of 2 united carpels, covered by the coherent calyx, 2-celled, an ovule in each cell. *Styles* 2. *Fruit* consisting of 2 carpels, adhering to a common axis, indehiscent, marked with 5 longitudinal ribs. *Seeds* anatropous; embryo minute. Herbaceous plants, usually with fistular stems. *Leaves* usually compound, with sheathing petioles. *Flowers* in umbels.

ANALYSIS.

1. Flowers in heads ..... *Eryngium*, 4
   Flowers in umbels 2
2. Umbels simple 3
   Umbels compound 4
3. Leaves peltate or cordate ..... *Hydrocotyle*, 1
   Leaves linear ..... *Crantzia*, 2
   Leaves digitately divided ..... *Sanicula*, 3

4. Flowers yellow or greenish 5
Flowers white or blue 7

5. Leaves pinnately divided ..... *Pastinaca*, 19. *Daucus*, 22
Leaves ternately divided 6

6. Seed nearly terete ..... *Thaspium*, 13
Seed flat on one side, convex on the other ..... *Zizia*, 12

7. Seeds compressed 8
Seeds scarcely compressed 18

8. Seeds compressed on the sides 9
Seeds compressed on the back 16

9. Leaves 3-parted ..... *Cryptotænia*, 11
Leaves triternate or quinnate ..... *Cicuta*, 8
Leaves dissected, pinnate, or ternate 10

10. Leaves bipinnate, segments pinnatifid ..... *Chærophyllum*, 23
Leaves dissected, pinnate, or ternate 11

11. Leaves much dissected 15
Leaves pinnate or ternate 12

12. Leaves ternate 13
Leaves pinnate 14

13. Involucre none ..... *Helosciadium*, 5
Involucre 2—4-leaved ..... *Neurophyllum*, 10

14. Involucre 1—3-leaved ..... *Helosciadium*, 5
Involucre 5—6-leaved ..... *Sium*, 9

15. Involucre with parted leaflets ..... *Discopleura*, 6
Involucre none ..... *Leptocaulis*, 7

16. Leaves simple, terete ..... *Tiedmannia*, 17
Leaves compound 17

17. Petioles inflated, 3-parted ..... *Archangelica*, 16
Petioles simple ..... *Archemora*, 18

18. Seeds linear ..... *Osmorrhiza*, 24
Seeds ovate-oblong ..... *Ligusticum*, 15

Tribe I.—HYDROCOTYLE'Æ.

Fruit laterally compressed. *Seeds* flat on the face. *Vittæ* 2 or none. *Umbels* simple.

Genus I.—HYDROCOT'YLE. Tourn. 5—2.

(From the Greek *hudor*, water, and *cotule*, a cavity, from the locality of the plants in the water, and the cup-like appearance the leaves sometimes assume.)

Margin of the calyx obsolete. *Petals* entire, ovate, acute. *Fruit* flattened laterally, 5-ribbed. Herbaceous plants, aquatic, creeping stems and peltate or cordate leaves. *Flowers* in simple umbels. *Involucre* 4-leaved.

1. H. America'na, (L.) *Stem* glabrous. *Leaves* orbicular, reniform, slightly 7-lobed, crenate. *Flowers* few, sessile, in axillary umbels.—White or greenish. ♃. May—June. Mountains. 2—3 inches.

2. H. interrup'ta, (Muhl.) *Stem* terete, glabrous, creeping, branching. *Leaves* peltate, orbicular, doubly crenate. *Flowers* in small, nearly sessile, capitate umbels, 4—8-flowered. *Fruit* broad.—White. ♃. Through the summer. In wet soils. 3—4 inches.

3. H. umbella'ta, (L.) *Stem* glabrous, creeping or floating. *Leaves* peltate, crenate, emarginate at the base. *Umbels* many-flowered, on long peduncles. *Fruit* somewhat tumid. *Calyx* slightly toothed.—White. ♃. Through the summer. Grows in bogs. 4—6 inches.

4. H. REPAN'DA, (Pers.) *Stem* creeping. *Leaves* cordate, rounded, repandly toothed, hairy when young. *Flowers* in capitate umbels, 3—4-flowered. *Fruit* reniform, 4-ribbed on each side; involucre 2 concave bracts.—White. 2f. Through the summer. Damp soils.

5. H. RANUNCULOI'DES, (L.) *Stem* creeping or floating, glabrous *Leaves* reniform, 3—5-lobed, crenate. *Umbels* 5—10-flowered, on peduncles shorter than the petioles. *Fruit* orbicular, smooth, obscurely 2-ribbed on each side.—White. 2f. July—Aug. Around ponds.

GENUS II.—CRANT'ZIA. Nutt. 5—2.

(In honor of Crantz, an Austrian.)

Calyx with a subglobose tube; margin obsolete. *Petals* roundish, entire, obtuse. *Fruit* subglobose, nearly orbicular. *Carpels* unequal, small, glabrous. *Umbels* few-flowered, simple. Creeping plant, with linear, entire, succulent leaves.

1. C. LINEA'TA, (Nutt.) (*Hydrocotyle lineata of Elliott.*) *Leaves* erect, 1—2 inches long, marked with transverse lines, cuneate, linear, obtuse. *Umbels* 8—12-flowered. *Involucre* 5—6-leaved.—White. 2f. April —May. Low country.

TRIBE II.—SANICULE'Æ.

Seed flat on the face. *Umbels* simple. *Vittæ* usually none. *Fruit* ovate, globose.

GENUS III.—SANIC'ULA. Tourn. 5—2.

(From *sano*, to heal.)

Calyx with 5 somewhat foliaceous teeth. *Petals* obovate, erect, with a long inflexed point. *Carpels* clothed with hooked bristles, without ribs. *Seeds* hemispherical. Radical leaves on long petioles.

1. S. MARILAN'DICA, (L.) *Stem* terete, glabrous, dichotomously branched toward the summit. *Leaves* digitately 5-parted; segments incisely serrate, the middle lobe distinct to the base, lateral ones slightly confluent at the base. *Flowers* in somewhat capitate umbels, a part sterile; fertile ones nearly sessile; tube of the calyx echinate. *Fruit* oval. *Seed* flat on one side.—White. 2f. May—Aug. Damp soils. Common.

GENUS IV.—ERYN'GIUM. Tourn. 5—2.

(Fom the Greek *ereugo*, to belch; supposed to be a cure for flatulency.)

Flowers capitate. *Calyx* with a roughened tube, with somewhat foliaceous lobes. *Petals* oblong, ovate, emarginate, with a long inflexed point. *Fruit* obovate, crowned. *Carpels* semiterete. *Flowers* bracteate, the lower large, the others intermixed with the flowers, small, scale-like.

1. E. AQUAT'ICUM, (L.) *Stem* glabrous, fistular, small. *Leaves* broadly linear, remotely ciliate, with soft spines; floral leaves undivided, equal,

ovate, acuminate. *Flowers* in heads. *Petals* chaffy.—White. 2f. June —July. Damp soils. *Button Snake-root.*

2. E. VIRGINI'NUM, (Lam.) *Stem* glabrous, fistular, branched, thickened at the joints. *Leaves* long, lanceolate, incisely serrate, tapering at each extremity, with prominent midrib. *Flowers* in numerous heads. *Involucre* long, subulate, sessile, whitish on the under surface.—White. 2f. June. Damp soils. 4—6 feet.

3. E. AROMAT'ICUM, (Bald.) *Stem* branching toward the summit, leafy, many from each root. *Leaves* pinnately parted, crowded on the stem, bristly, with a silvery, cartilaginous margin. *Flowers* in numerous heads, on long peduncles. *Involucre* 5-leaved; leaves 3-cleft.—White. 2f. Aug.—Nov. Pine-barrens. Florida.

4. E. VIRGA'TUM, (Lam.) *Stem* erect or decumbent, glabrous, fistular. *Leaves* spatulate, ovate, membranaceous; cauline ones on short petioles, toothed or sharply serrate. *Involucre* 6—8 leaves, longer than the head; chaff bicuspidate. *Flowers* in heads, in the angles of the branches near the summit.—Pale blue. 2f. July—Sept. In pine barrens. 1—3 feet.

5. E. BALDWIN'II, (Spreng.) *Stem* prostrate, often creeping, branching, filiform. *Leaves* oval or ovate, petiolate, entire or somewhat lobed, remotely toothed; upper ones usually sessile, 3-cleft, with narrow, entire, lateral segments; middle segment entire or 2—3-toothed. *Flowers* in small heads, on axillary peduncles, with the involucre shorter than the heads.—White. 2f. June—July. Southern Geo.

TRIBE III.—AMMIN'EÆ.

Fruit compressed laterally, with primary ribs only. *Umbels* compound.

GENUS V.—HELOSCIA'DIUM. Koch. 5—2.

(From the Greek *helos*, a marsh, and *skiadion*, an umbel.)

Calyx with an obsolete or 5-toothed margin. *Petals* ovate, entire. *Carpels* with 5 prominent ribs. *Fruit* compressed laterally, ovate-oblong. Herbaceous plants, with compound or many-parted leaves.

1. H. NODIFLO'RUM, (Koch.) (*Sium nodiflorum of Ell.*) *Stem* procumbent, striate. *Leaves* pinnate; segments oblong, serrate; upper ones sometimes ternate, with acute leaflets. *Flowers* in umbels, opposite the leaves, generally destitute of an involucre, sessile or on short peduncles. *Petals* expanding, acuminate.—White. ☺. April—June. About Charleston. In wet places. 2 feet.

2. H. LEPTOPHYL'LUM, (D C.) *Stem* glabrous, slender, erect or diffuse. *Leaves* ternate, with linear segments; cauline ones sessile or nearly so. *Umbels* opposite the leaves, subsessile. *Involucre* none. *Fruit* small, glabrous.—White. June—July. Lou. 6—24 inches.

GENUS VI.—DISCOPLEU'RA. D. C. 5—2. *Ammi*, Ell.

(From the Greek *diskos*, a disk, and *pleura*, a rib.)

Calyx with subulate teeth, persistent. *Petals* ovate, entire,

with a minute inflexed point. *Fruit* ovate. *Carpels* 3-ribbed. *Seeds* somewhat terete. Annual, glabrous plants, with dissected leaves.

1. D. CAPILLA'CEA, (D. C.) *Stem* geniculate, slightly angled and furrowed, glabrous. *Leaves* alternate, ternately dissected; segments capillary, spreading. *Flowers* in compound umbels. *Involucre* many-leaved, shorter than the rays of the umbel; involucel many-leaved, linear, unequal. *Petals* ovate, acute. *Anthers* purple. *Seeds* flat on one side, furrowed on the other.—White. ☺. May—June. 1—2 feet.

2. D. COSTA'TA, (D. C.) *Stem* branching toward the summit, slightly angled, glabrous. *Leaves* very compound; leaflets parted to the base, somewhat verticillate. *Umbels* terminal, large, 10—12-leaved, dissected; involucel many-leaved, as long as the pedicels. *Petals* acuminate. *Seeds* glabrous, ribbed.—White. ☺. Oct.—Nov. Swamps on the Ogeechee. 4—5 feet.

3. D. NUTTAL'LII, (D. C.) *Stem* erect, branching toward the summit. *Umbels* large; involucre half the length of the rays. *Leaves* with somewhat verticillate segments.—White. ☺. Florida.

GENUS VII.—LEPTOCAU'LIS. Nutt. 5—2. *Sison*, Ell.

(From the Greek *leptos*, slender, and *kaulos*, stem.)

Margin of the calyx obsolete. *Petals* oval, entire. *Fruit* laterally compressed, ovate. *Capsules* slightly ribbed. *Seed* flat on one side, convex on the other. Herbaceous plants, with glabrous, terete, slender stems. *Leaves* dissected with linear segments. *Umbels* opposite the leaves and terminal. *Involucre* none; involucel few-leaved.

1. L. DIVARICA'TUS, (D. C.) *Fruit* muricated, with short, somewhat appressed scales. *Leaves* alternate, divided with linear segments. *Umbel* with 5—6 unequal rays; middle one frequently sessile; involucel 3-leaved. *Petals* oval, flat.—White. ☺. March—April. Sandy pastures. 1—2 feet.

GENUS VIII.—CICU'TA. L. 5—2.

(Origin doubtful.)

Margin of the calyx 5-toothed, somewhat foliaceous. *Petals* obcordate, with an inflexed point. *Fruit* laterally compressed *Carpels* ribbed. *Seed* terete. *Involucre* few-leaved or none; involucels many-leaved. Aquatic, perennial, glabrous herbs, with fistulous stems.

1. C. MACULA'TA, (L.) *Stem* striped with green and purple, slightly geniculate. *Leaves* triternate or quinate; leaflets ovate-lanceolate, with acuminate serratures, somewhat scabrous on the under surface; petioles of the lower leaves long, sheathing, with membranaceous wings; segments of the calyx expanding. *Petals* with long, inflected points.—White. ♃. July—Aug. Common. 2—5 feet.

Water Hemlock. Spotted Cow-bane. Beaver Poison. Musquash.

Genus IX.—SI'UM. L. 5—2.

(From a Celtic word meaning water.)

Margin of the calyx 5-toothed. *Petals* obovate, with an inflexed point. *Fruit* subglobose, laterally compressed. *Carpels* ribbed. *Seeds* nearly terete. *Flowers* in many-rayed umbels. Perennial herbs, with pinnately divided leaves.

1. S. LINEA'RE, (Mich.) *Stem* angular; segments of the leaves linear-lanceolate, serrate. *Involucre* 5—6-leaved. *Umbels* with about 20 rays. *Petals* with an obtuse, inflexed point. *Fruit* strongly ribbed, obovate.—White. 2. June—July. Florida. 2—5 feet.
Water Parsnep.

Genus X.—NEUROPHYL'LUM. T. & G. 5—2.

(From the Greek *neuron*, a nerve, and *phullon*, a leaf.)

Margin of the calyx 5-toothed, persistent. *Petals* obovate, with an inflexed point. *Fruit* ovate, laterally compressed, minutely ribbed. *Seed* nearly flat on one side, convex on the other.

1. N. LONGIFO'LIUM, (T. & G.) *Stem* glabrous, slender, striate above. *Leaves* ternately divided, with long, linear, entire segments, the upper ones undivided; rays of the umbel 10, slender. *Involucre* 2—4-leaved; involucels 5—6-leaved.—White. 2. Sept. Near Macon, Geo. 3—4 feet.

Genus XI.—CRYPTOTÆ'NIA. D. C. 5—2. *Chærophilum*, Ell.

(From the Greek *kruptos*, hidden, and *tainia*, vitta; the vittæ of the mericarps are invisible unless cut.)

Margin of the calyx obsolete. *Petals* obcordate, with an inflexed, narrow point. *Fruit* linear-oblong. *Carpels* obtusely ribbed. *Seed* teretely convex on one side, the other slightly concave. Perennial herbs, with ternate leaves.

1. C. CANADEN'SIS, (D. C.) *Stem* erect, glabrous, with many branches; leaflets ovate, acute, sometimes notched; radical ones 2—3-lobed, serrate. *Umbels* numerous; rays unequal. *Involucre* none; involucels few-leaved, small, subulate, with abortive flowers in each umbel. *Seeds* acuminate, pointed with persistent styles.—White. 2. June—Sept. In shady, rich soils. 2—3 feet.

Genus XII.—ZIZ'IA. Koch. 5—2. *Smyrnium*, Ell.

(In honor of Zizi, a German botanist.)

Margin of the calyx obsolete or 5-toothed. *Petals* oblong, with an inflexed point. *Fruit* compressed, roundish, or oval. *Carpels* ribbed. *Seed* convex on one side, flat on the other. *Leaves* ternately divided. Perennial herbs.

1. Z. AU'REA, (Koch.) *Stem* erect, glabrous, terete. *Leaves* biternate; segments oblong-lanceolate, serrate; terminal one alternate at

the base, serrulate, glabrous. *Umbel* 10—15-rayed; involucel of 2—3 very small leaflets. *Fruit* elliptical, nearly black when mature.—Yellow. ♃. May. Common. 1—2 feet.

2. Z. INTEGER'RIMA, (D. C.) *Stem* glabrous and slightly glaucous. *Leaves* 2—3, ternately divided; terminal leaflet usually 2—3-lobed; segments oblong-ovate, entire. *Umbels* on slender peduncles, with long, slender rays. *Involucels* of 1—3 subulate leaflets. *Fruit* roundish-ovate with prominent ribs.—Yellow. ♃. May—June. Common. 1—2 feet.

TRIBE IV.—SESELIN'EÆ.

Umbels compound. *Fruit* with primary ribs only; transverse section orbicular.

GENUS XIII.—THAS'PIUM. Nutt. 5—2.

(From the Isle of Thaspia.)

Limb of the calyx toothed or nearly obsolete. *Petals* elliptical, with an attenuated, inflexed point. *Fruit* elliptical. *Carpels* convex, ribbed. *Seed* nearly terete. Perennial plants, with ternate or biternate leaves. *Flowers* in terminal umbels or opposite the leaves. *Involucre* none; involucels lateral, 3-leaved.

1. T. CORDA'TUM, (T. & G.) *Stem* terete, usually glabrous. Radical leaves nearly orbicular, cordate, toothed; cauline ones ternate; segments ovate, serrate. *Carpels* with winged ribs.—Yellowish, white, or purple. ♃. May—June. On high lands. 1—2 feet.

Smyrnium cordatum, Walt.

2. T. BARBINO'DE, (Nutt.) *Stem* pubescent at the nodes. *Leaves* biternate or triternate; segments cuneate, ovate, unequally serrate. *Umbels* terminal and opposite to the leaves. *Fruit* elliptical or ovate, some of the ribs only winged.—Deep yellow. ♃. June. Banks of rivers. 1—2 feet.

GENUS XIV.—CYNOSCIA'DIUM. D. C. 5—2.

(From the Greek *kuon*, a dog, and *skiadion*, an umbel.)

Calyx with subulate teeth, persistent. *Petals* ovate or nearly orbicular, entire. *Fruit* ovate; carpels with 5 thick ribs.

1. C. DIGITA'TUM, (D. C.) *Stem* angular, slender. *Leaves* digitate; lower ones 5-parted; upper ones 3-parted; radical ones often entire. *Petals* ovate, with an inflexed point. *Fruit* contracted toward the summit.—White. ☺. Louisiana.

GENUS XV.—LIGUS'TICUM. L. 5—2.

(From Liguria, in which one of the species grows abundantly.)

Limb of the calyx toothed or obsolete. *Petals* unguiculate, obovate, emarginate, with an inflexed point. *Fruit* slightly compressed or nearly terete. *Carpels* ribbed, somewhat winged.

Seeds somewhat semi-terete. *Leaves* ternate or 2—3 ternate. *Involucre* composed of a few short, subulate leaflets; involucels nearly the same.

1. L. ACTÆIFO'LIUM, (Mich.) (*Angelica lucida of Elliott*) *Root* large, with a strong odor; a favorite food for hogs. *Leaves* triternately divided; segments ovate, with deep serratures. *Umbels* numerous, forming loose, naked, somewhat verticillate panicles, all but the terminal one abortive. *Fruit* ovate-oblong.—White. 2f. July. Middle Geo. 3—6 feet. *Lovage. White-root.*

TRIBE V.—ANGELICE'Æ.

Fruit with a double-winged margin. *Umbels* compound. *Seeds* convex on the back.

GENUS XVI.—ARCHANGEL'ICA. Raf. 5—2.

(From the Greek *arche*, original, and *angelica*.)

Limb of the calyx 5-toothed. *Petals* ovate, entire, with an incurved point. *Fruit* compressed on the back. *Carpels* with 3 dorsal ribs, with 2 marginal wings. Perennial herbs. *Leaves* bipinnately divided; petioles dilated at the base. *Involucre* almost wanting; involucels many-leaved.

1. A. HIRSU'TA, (T. & G.) (*Angelica triquinata of Elliott.*) *Stem* pubescent near the summit. *Leaves* pinnate; segments ovate-oblong, serrate, the upper connate. *Umbels* on long peduncles, densely pubescent; rays rather long, spreading; involucels 6—10-leaved, sometimes unilateral. *Fruit* slightly winged, oblong.—White or greenish. 2f. July—Aug. So. Car. and Geo. 2—5 feet.

2. A. DENTA'TA, (Chap.) *Stem* slender, glabrous, finely striate. Lower leaves ternately divided; petioles long and slender; segments ovate-lanceolate, coarsely toothed, cuneate; upper leaves with narrow segments and pinnatifid, toothed. *Involucel* 4—6-leaved. *Petals* broadly ovate; wings of the seed thin.—Middle Florida.

TRIBE VI.—PEUCEDA'NEÆ.

Fruit compressed on the back, with an entire, marginal wing. *Umbels* compound.

GENUS XVII.—TIEDMAN'NIA. D. C. 5—2.

(In honor of Prof. Tiedmann, of Heidelberg.)

Limb of the calyx 5-toothed. *Petals* ovate, with a narrow, inflexed point. *Fruit* compressed on the back, obovate. *Carpels* ribbed; lateral ones dilated into a broad margin. *Seeds* flat. A biennial plant.

1. T. TERETIFO'LIA, (D. C.) *Stem* fistulous, erect, branching above. *Leaves* simple, terete, 4—8 inches long, divided by numerous transverse partitions. *Involucre* many-leaved, subulate, persistent; involucel sim-

ilar, but smaller. *Flowers* sessile; filaments red near the summit. *Seeds* compressed.—White. ♂. Aug.—Sept. Middle Geo. 3—6 feet.

GENUS XVIII.—ARCHE'MORA. D. C. 5—2.

(From Archemous, son of Lycurgus.)

Limb of the calyx 5-toothed. *Petals* obcordate, with an inflexed point. *Fruit* somewhat elliptic, lenticularly compressed. *Carpels* ribbed; lateral ones dilated. *Involucre* wanting or few-leaved; involucels many-leaved. Perennial, aquatic herbs.

1. A. RIG'IDA, (D. C.) *Stem* erect, rigid, terete, striate, fistulous. *Leaves* pinnately divided; segments ovate, oblong, remotely toothed or entire, with a cartilaginous margin. *Umbel* of many slender rays. *Fruit* with the dorsal ribs greenish; lateral ones with a membranaceous margin.—White. 2f. Sept. Georgia—Florida. 3—5 feet.

2. A. TERNA'TA, (Nutt.) *Stem* striate, slender. *Leaves* ternately divided, on long petioles; segments linear, acute, entire, alternate. *Involucre* nearly wanting; involucel 5—6-leaved. *Fruit* oblong, elliptic, surrounded with a thick, winged margin.—White. 2f. Middle Car. and Geo. 2—3 feet.

GENUS XIX.—PASTINA'CA. Tourn. 5—2.

(From *pastinum*, a forked tool, which the roots resemble.)

Calyx teeth obsolete or minute. *Petals* nearly orbicular, entire. *Fruit* much compressed, with a flat margin.

1. P. SATI'VA, (L.) *Stem* glabrous. *Root* fusiform. *Leaves* pinnate; leaflets glabrous, ovate-oblong, obtuse, unequally toothed and serrate, incised at the base, terminal one 3-lobed.—Yellow. Europe. *Parsnep.*

GENUS XX.—POLYTÆ'NIA. D. C. 5—2.

(From the Greek *polus*, many, and *tainia*, vitta.)

Calyx 5-toothed. *Petals* oblong, with the apex emarginate, inflexed. *Fruit* oval, glabrous, compressed on the back, with a broad margin.

1. P. NUTTAL'LIA, (D. C.) *Stem* glabrous, sulcate, leafy. *Leaves* on long petioles, bipinnate; segments incised or toothed; upper ones only 3-cleft. Rays of the umbel 12—20.—Yellow. Lou. 2—3 feet.

TRIBE VII.—CUMINE'Æ.

Fruit contracted at the sides. *Carpels* with 5 primary ribs and 4 secondary ones. *Umbels* compound.

GENUS XXI.—TREPOCAR'PUS. Nutt. 5—2.

(From the Greek *trepo*, to turn, and *karpos*, fruit.)

Calyx 5-toothed; teeth subulate. *Petals* obcordate. *Fruit* linear-oblong, 8-angled, straight.

1. T. Æthu'se, (Nutt.) *Stem* glabrous. *Leaves* many-parted; leaflets thin, those of the stem linear. *Umbels* opposite the leaves, 3—5 rays.—White. ☺. Lou. 2 feet.

Tribe VIII.—DAUCIN'EÆ.

Fruit with 5 primary bristly ribs and 4 more prominent secondary ones, prickly. *Umbels* compound.

Genus XXII.—DAU'CUS. Tourn. 5—2.

(A name given by Dioscorides.)

Margin of the calyx 5-toothed. *Petals* obovate, emarginate, with an inflexed point; the exterior ones often larger and deeply 2-cleft. *Fruit* compressed, ovate, or oblong. *Carpels* with 5 filiform, bristly ribs. Biennial plants, with pinnately divided leaves.

1. D. caro'ta, (L.) *Root* fusiform. *Stem* hispid, branching. *Leaves* 2—3, pinnatifid; segments pinnatifid, with lanceolate, cuspidate lobes. *Involucre* consisting of pinnatifid leaves, about the length of the umbel. *Umbels* concave, the central one of each secondary one abortive.—Yellow. ♂. Naturalized. *Carrot*

2. D. pusil'lus, (Mich.) *Stem* retrorsely hispid. *Leaves* bipinnate, with pinnatifid segments, with narrow, linear lobes; leaves of the involucre bipinnatifid. *Seeds* muricate, with 8 crested ribs.—Greenish-yellow. ♂. May—July. Common in middle Geo. 1—2 feet.

Genus XXIII.—CHÆROPHYL'LUM. L. 5—2.

(From the Greek *chairo*, to rejoice, and *phullon*, a leaf, alluding to the smell of the leaf.)

Limb of the calyx obsolete. *Petals* cordate, emarginate, with an inflexed point. *Fruit* compressed. *Carpels* ribbed. *Seed* convex. *Leaves* compound, with toothed or many-cleft segments. *Involucel* many-leaved.

1. C. procum'bens, (Lam.) *Stem* decumbent, glabrous, small. *Leaves* alternate, bipinnately divided; segments pinnatifid; divisions lanceolate, mucronate. *Involucre* none. *Umbels* usually sessile, opposite the leaves, consisting of 2—4 rays; involucels 4—5-leaved. *Fruit* oblong, striate, pointed at the summit.—White. ☺. April—May. Shady places. 6—18 inches.

Genus XXIV.—OSMORRHI'ZA. Raf. 5—2.

(From the Greek *osme*, scent, and *rhiza*, a root.)

Margin of the calyx obsolete. *Petals* oblong, with an incurved, cuspidate point. *Fruit* long, alternate, smooth. *Carpels* ribbed. *Seed* terete. Perennial plants, with fusiform roots.

1. O. brevisty'lis, (D. C.) *Stem* pubescent when young, glabrous in shady places, erect. *Leaves* biternate; segments oblong, serrate, sprin-

kled with hairs. *Umbels* opposite the leaves. *Styles* conical, short. *Fruit* tapering at the summit.—White. 2f. May—June. Moist woods. 1—2 feet.

Order LXII.—ARALIA'CEÆ.

Calyx obscurely 5-toothed, adhering to the ovary. *Petals* 5; æstivation valvate. *Stamens* equal in number to the petals, and alternate with them; filaments short. *Ovary* 2—3-celled, with a solitary ovule in each cell. *Styles* 2, erect or spreading. *Fruit* drupaceous, 2—3-celled. *Seed* anatropous. Herbaceous plants, with compound leaves. *Flowers* umbellate.

Genus I.—ARA'LIA. L. 5—5.

(Meaning unknown.)

Flowers usually perfect. *Calyx* entire or 5-toothed, superior. *Petals* 5, spreading. *Stamens* 5, alternate with the petals, short. *Styles* 5. *Fruit* baccate, 5-lobed, 5-celled, with a solitary suspended seed in each cell. Herbs and shrubs; when the latter, prickly.

1. A. racemo'sa, (L.) *Stem* much branched, glabrous. *Leaves* compound, 3-parted, with the divisions 3—5-leaved; leaflets glabrous, ovate, acuminate, acutely serrate, frequently cordate. *Petioles* pubescent. *Flowers* in umbels, disposed in racemose panicles, small, greenish-white.—2f. July. Mountains. 3—5 feet. *Spikenard.*

2. A. spino'sa, (L.) A shrub or small tree. *Stem* usually prickly, scarcely branched. *Leaves* crowded at the summit of the stem, bipinnate; leaflets ovate, acuminate. *Petioles* often 2—3 feet long. *Leaves* obscurely serrate; upper surface a few stiff hairs, under surface glaucous. *Flowers* in umbels, arranged in a large racemose panicle. *Styles* 5, connivent at first, then spreading. *Petals* oval, reflexed, caducous. *Styles* 5, short.—White. ♄. June—Aug. Common. 5—40 feet. *Hercules' Club. Prickly Ash. Angelica Tree.*

3. A. nudicau'lis, (L.) *Stem* short or none. *Leaf* 1, radical, with the petiole elongated, 3-cleft; each division pinnately 5-foliate; leaflets oblong-ovate, acuminate, serrate. *Flowers* in 3 umbels, without an involucre.—Greenish-white. June—July. Mountains. 12—18 inches. *Sarsaparilla.*

Genus II.—PA'NAX. L. 5—2.

(From the Greek *pan*, all, and *akos*, a remedy; that is, a remedy for all diseases.)

Limb of the calyx very short. *Fruit* orbicular or didymous. Perennial herbs, with sheathing petioles.

1. P. quinquefo'lium. (L.) *Root* fusiform, wrinkled, somewhat branching, aromatic. *Leaves* verticillate at the summit of the stem, compounded of 5—7 leaflets; leaflets petiolate, obovate, acuminate. *Umbels* solitary, simple, on long peduncles. *Styles* 2. *Fruit* 2-celled, red.—Yellowish-green. 2f. July. Mountains. 10—12 inches. *Ginseng.*

2. P. TRIFO'LIUM, (L.) *Stem* herbaceous, glabrous. *Root* nearly globose, pungent to the taste. *Leaves* as in the preceding; leaflets 3—5, lanceolate, without petioles. *Flowers* sometimes dicœcious. *Styles* 3. *Fruit* 3-celled.—Yellowish-green. 2. April. Mountains.
Dwarf Ginseng. Ground-nut.

ORDER LXIII.—CORNA'CEÆ.

Calyx 4-toothed, minute, adhering to the ovary. *Petals* 4, distinct, oblong, spreading, inserted with the calyx into an epigynous disk; æstivation valvate. *Drupes* baccate, with a 1—2-celled nucleus, crowned with the calyx. *Seeds* anatropous. *Flowers* in cymes. Trees or shrubs, with an astringent bark.

GENUS I.—COR'NUS. Tourn. 4—1.

(From *cornus*, a horn, in allusion to the hardness of the wood.)

Stamens 4—5, with filiform filaments. *Style* sub-clavate. *Leaves* entire, covered with appressed hairs. *Dogwood.*

1. C. PANICULA'TA, (L'Her.) A shrub, with erect, glabrous branches. *Leaves* ovate or lanceolate, acuminate, hairy beneath. *Flowers* in compact paniculate cymes. *Petals* lanceolate. *Drupes* globose, depressed, white or bluish-white.—White. ♄. May—June. 4—6 feet.

2. C. STRIC'TA, (Lam.) A shrub, with opposite branches, glabrous, red; branchlets quadrangular. *Leaves* ovate-lanceolate, acuminate, entire, nearly glabrous. *Flowers* in loose cymes. *Petals* ovate-lanceolate, acute. *Anthers* blue. *Fruit* sub-globose, pale blue, with white pulp.—White. ♄. April. Common in swamps. 8—15 feet.

3. C. ASPERIFO'LIA, (Mich.) A shrub, with erect pubescent branches. *Leaves* oval, lanceolate, acuminate, scabrous above, tomentose beneath. *Flowers* in fastigiate cymes, pubescent. *Petals* oblong-lanceolate, pubescent. *Anthers* blue or purple.—White. ♄. June. In dry, sandy soils. 4—10 feet.

4. C. SERI'CEA, (L.) A shrub, with expanded branches. *Leaves* ovate, acuminate, glabrous above, silky pubescent beneath. *Flowers* in depressed woolly cymes; teeth of the calyx lanceolate. *Petals* lanceolate, obtuse. *Drupes* pale blue.—Yellowish-white. ♄. June. Mountains. 5—10 feet.

5. C. FLOR'IDA, (L.) A tree, with expanding branches, with hard, close-grained wood, used in manufactures. *Leaves* opposite, ovate, lanceolate, acuminate, entire, whitish beneath, pubescent when young. *Flowers* in terminal heads. *Involucre* conspicuous, 4-leaved. *Leaves* obcordate, nerved, white. *Calyx* tubular, 4-cleft. *Petals* 4, linear, lanceolate. *Drupe* red.—Yellowish. ♄. March—April. In rich soils. *Dogwood.*

ORDER LXIV.—LORANTHA'CEÆ.

Calyx attached to the ovary in fertile flowers; in perfect flowers double. *Corolla* 3—4—8 petals, distinct or adhering to the base; æstivation valvate. *Stamens* equal in number to the petals and opposite them, or as many as the segments of

the calyx when the corolla is wanting and inserted upon them. *Ovary* 1-celled. *Fruit* baccate, 1-celled, 1-seeded. *Seed* anatropous; cotyledons sometimes united. *Flowers* dicœcious. Parasitical, evergreen plants, with fleshy, coriaceous leaves.

GENUS I.—VIS'CUM. Tourn. 20—4.

(From *viscus*, sticky, on account of the sticky nature of the seeds.)

Sterile florets with a coriaceous, 3—4-parted calyx; segments triangular, erect. *Anthers* many-celled, opening by pores. Fertile flowers, with the limb of the calyx obsolete. *Petals* 4, coriaceous. *Stigma* sessile. *Fruit* pulpy; branches terete. *Mistletoe.*

1. V. FLAVES'CENS, (Pursh.) A small shrub, growing parasitically on the branches of most trees; branches opposite or verticillate. *Leaves* cuneate, obovate, nearly sessile, 3-nerved, obtuse. *Flowers* in spikes. *Fruit* yellowish-white, pellucid.—Yellowish. ♄. April—May. Common.

MONOPETALÆ.

Flowers in which the petals are firmly united, forming a tube of greater or less length. There are a few cases in which the petals are separate, or nearly so.

ORDER LXV.—CAPRIFOLIA'CEÆ. (*Honeysuckle Family.*)

Calyx superior, 4—5-toothed, generally bracteate. *Corolla* superior, lobed, sometimes irregular, with the segments alternating with those of the calyx. *Stamens* 4—5. *Ovary* 1—5-celled, cohering with the calyx. *Ovules* pendulous, few. *Style* 1, exserted. *Stigmas* 1—3. *Fruit* indehiscent, generally fleshy, crowned by the limb of the calyx, 1—5-celled. *Seeds* 1—2, or several in each cell. Shrubs with opposite leaves, exstipulate.

GENUS I.—SYMPHORICAR'PUS. Dill. 5—1. (*Symphoria*, Pers.)

(From *sumphoreo*, to bear together, and *karpos*, fruit.)

Calyx 5-toothed. *Corolla* with 5 nearly equal segments. *Stamens* 5. *Fruit* 4-celled, 4-seeded, sometimes 2-celled by abortion.

1. S. VULGA'RIS, (Mich.) A small shrub. *Leaves* broad-lanceolate, entire, nearly sessile. *Flowers* small, numerous, clustered, axillary. *Fruit* purple, crowned by the calyx.—Red and yellow. ♃. July—Sept. Mountains. 3—4 feet. *Indian Currant.*

GENUS II.—DIERVIL'LA. Tourn. 5—1.

(In honor of M. Dierville, who sent the species to Europe.)

Calyx oblong, 5-cleft. *Corolla* funnel-form, with 5 unequal segments. *Stamens* 5. *Style* 1. *Capsule* 2—4-celled, many-seeded.

1. D. CANADEN'SIS, (Muhl.) A small shrub. *Leaves* ovate, serrate, acuminate, on short petioles, glabrous; peduncles axillary and terminal, 3-flowered. *Corolla* small.—Yellow. ♄. June—July. Mountains.
D. trifida, Mœnch. *Bush-Honeysuckle.*

GENUS III.—CAPRIFO'LIUM. Romer, 5—1. (*Lonicera*, L.)

(From *caper*, a goat, and *folium*, a leaf.)

Calyx 5-toothed, very small. *Corolla* campanulate, 5-cleft, often irregular, with a long tube. *Stamens* 5. *Style* 1, filiform. *Fruit* 3-celled, few-seeded. *Leaves* entire, often connate.

1. C. SEMPERVI'RENS, (Mich.) *Stem* twining, running over trees *Leaves* oblong, oval, smooth on the upper surface, glaucous, and somewhat hairy on the under, the lower ones petiolate, the upper connate. *Flowers* in verticillate spikes. *Calyx* very small, persistent. *Corolla* funnel-form, with 5 acute segments. *Stamens* inserted into the tube near the summit. *Fruit* red, with 4 seeds in each cell.—Bright red. ♄. April—Oct. In damp soils.
English Honeysuckle. Woodbine. Lonicera sempervirens, Ait.

2. C. FLA'VUM, (Ell.) *Stem* twining, running over shrubs. *Leaves* oval, slightly cordate, glabrous, obtuse, deciduous, glaucous underneath, connate at the base. *Flowers* in terminal, verticillate spikes. *Corolla* ringent, the upper lip broad, 4-cleft, reflexed, lower one entire, reflexed; tube hairy within.—Yellow, or orange. 2. March—April. Upper dist. Car. *Lonicera flava*, Sims.

3. C. GRA'TUM, (Pursh.) *Stem* twining. *Leaves* perennial, obovate, mucronate, pale underneath, upper ones connate. *Flowers* in verticillate spikes. *Corolla* ringent, with a long tube.—Scarlet. 2. June—Sept. Mountains. *Lonicera grata*, Ait

4. C. PARVIFLO'RUM, (Pursh.) *Stem* twining. *Leaves* deciduous, connate, glaucous beneath. *Flowers* nearly capitate, with large, perfoliate bracts. *Corolla* ringent, gibbous at the base.—Yellow. 2. June—July. Mountains. *Lonicera parviflora*, Lam.

GENUS IV.—TRIOS'TEUM. L. 5—1.

(From *treis*, three, and *osteon*, a bone, having three bony seeds.)

Calyx 5-cleft, with linear-lanceolate lobes, as long as the corolla. *Corolla* tubular, nearly equally 5-lobed, gibbous at the base. *Stamens* 5. *Style* 1. *Berry* 3-celled, 3-seeded, crowned by the calyx.

1. T. PERFOLIA'TUM, (L.) *Stem* erect, pubescent. *Leaves* connate, spatulate, lanceolate, scabrous above, tomentose beneath, acuminate. *Flowers* axillary, verticillate, sessile. *Calyx* persistent, with linear seg-

ments. *Fruit* a dry purple berry, crowned with the calyx.—Purple. 4. June—Aug. Upper dist. Car. 2—3 feet.

Horse Gentian. Feverwort.

2. T. ANGUSTIFO'LIUM, (L.) *Stem* erect, hairy. *Leaves* scarcely connate. *Flowers* solitary, on short opposite peduncles.—Yellow. 4. June—July. Mountains. 2—3 feet. *Dr. Tinker's Weed.*

GENUS V.—VIBUR'NUM. L. 5—3.

(The Latin name.)

Calyx 5-toothed, persistent. *Corolla* campanulate, or rotate, 5-lobed. *Stamens* 5. *Stigmas* 3. *Style* none. *Fruit* an ovate, 1-seeded berry, crowned by the calyx.

1. V. ACERIFO'LIUM, (L.) A small shrub. *Leaves* slightly cordate, 3-lobed, acuminate, sharply serrate, pubescent beneath; petioles hairy. *Flowers* in cymes, on long peduncles. *Fruit* oval, compressed, black.—White. ♄. May—June. Mountains. 4—6 feet. *Arrow-wood.*

2. V. DENTA'TUM, (L.) A shrub, nearly glabrous. *Leaves* orbicular, ovate, on long petioles, with large serratures, plaited. *Flowers* in large terminal cymes. *Fruit* nearly globose, blue, small.—White. ♄. March—April. Common. 8—15 feet. *Arrow-wood.*

3. V. LENTA'GO, (L.) A shrub, glabrous. *Leaves* broad-ovate, acuminate, sharply serrate, sometimes slightly cordate or oval. *Fruit* black.—White. ♄. June. Banks of streams. 10—20 feet.

4. V. PRUNIFO'LIUM, (L.) A shrub, with glabrous, virgate branches. *Leaves* obovate, acute, sometimes nearly orbicular or oval, glabrous, sharply serrate. *Flowers* in large cymes, lateral. *Fruit* oval, dark-blue.—White. ♄. April—May. Common. *Black haw. Sloe.*

5. V. NU'DUM, (L.) A shrub, with virgate branches, the old ones glabrous, the young clothed with a ferruginous pubescence. *Leaves* opposite, oval, glabrous on the upper surface, with veins beneath, pubescent; petioles margined. *Flowers* in naked, terminal cymes, on jointed peduncles. *Calyx* white. *Corolla* with obtuse segments. *Fruit* blue.—White. ♄. April—May. Common. 4—12 feet.

6. V. OBOVA'TUM, (Walt.) A shrub, with virgate branches. *Leaves* obovate, cuneate, crenulate, dentate, or entire, crowded near the summit, the lower leaves broader than the upper. *Flowers* in sessile cymes. *Fruit* nearly globular, black.—White. ♄. April—May. Common in middle Car. and Geo. 4—8 feet.

7. V. CASSINOI'DES, (L.) A shrub, glabrous. *Leaves* ovate-lanceolate, the lower ones obovate, the upper lanceolate, the intermediate ovate, margin slightly revolute; petioles keeled, without glands. *Berries* nearly black, in other respects resembles the preceding species.

8. V. LÆVIGA'TUM, (Ait.) A small shrub, much branched; branches sprinkled with a brown dust. *Leaves* small, lanceolate, cuneate, nearly sessile, upper ones dentate, shining on the upper surface, the under dotted with brown dust. *Flowers* in small cymes, nearly sessile.—White. ♄. March—April. Low country. 2—4 feet.

9. V. NIT'IDUM, (Pursh.) A low, glabrous shrub, with quadrangular branches. *Leaves* linear-lanceolate, shining on the upper surface, en

tire, or slightly serrate.—White. ♄. April—May. Low country. 2—3 feet.

GENUS VI.—SAMBU'CUS. Tourn. 5—3.

(From *sambuke*, a musical instrument made from the wood.)

Calyx 5-parted. *Corolla* 5-cleft. *Stamens* 5. *Stigmas* 3. *Fruit* a globose, 3-seeded berry.

1. S. CANADEN'SIS, (L.) A shrub, thickened at the joints with glabrous branches. *Leaves* generally bipinnate; leaflets oblong-oval, acutely serrate, acuminate, glabrous, shining. *Calyx* small. *Corolla* rotate, with revolute, oval segments. *Flowers* in axillary cymes. *Fruit* globose, black.—White. ♄. April—May. Wet grounds. Common. 8—15 feet. *Elder.*

ORDER LXVI.—RUBIA'CEÆ. (*Peruvian-bark Family.*)

Calyx superior, or sometimes nearly inferior, mostly 4—5-toothed, occasionally obsolete. *Corolla* inserted in the calyx, 4—5-lobed. *Stamens* 4—5, inserted into the corolla. *Ovary* 2—3-celled, 1—many ovules. *Fruit* various. Trees, shrubs, or herbaceous plants, with opposite or verticillate, stipulate leaves. [This order includes the orders *Stellatæ* and *Cinchonaceæ*.]

ANALYSIS.

1. Leaves in whorls 2
   Leaves opposite 3
2. Corolla rotate, small ..... *Galium*, 1
   Corolla campanulate ..... *Rubia*, 2
3. Shrubs 4
   Herbaceous plants 5
4. Stamens 4 ..... *Cephalanthus*, 5
   Stamens 5 ..... *Mitchella*, 6. *Pinckneya*, 8
5. Stamens 5 ..... *Mitreola*, 9
   Stamens 4 6
6. Evergreen, creeping plants ..... *Mitchella*, 6
   Not evergreen plants 7
7. Calyx 2-leaved ..... *Diodia*, 4
   Calyx 4-leaved or 4-parted 8
8. Corolla rotate ..... *Polypremum*, 10
   Corolla not rotate 9
9. Fruit many-seeded ..... *Hedyotis*, 7
   Fruit few-seeded ..... *Spermacoce*, 3

SUB-ORDER I.—STELLA'TEÆ.

Leaves whorled. *Ovary* inferior. Herbaceous plants.

GENUS I.—GA'LIUM. L. 4—1.

(From *gala*, milk, which some species curdle.)

Calyx with the tube ovate-globose, or oblong; limb nearly wanting. *Corolla* rotate, 4-parted. *Stamens* 4. *Style* 2-cleft. *Fruit* didymous.

1. G. TRIF'IDUM, (L.) *Stem* procumbent, assurgent, much branched, with the angles retrorsely aculeate. *Leaves* 4—6 in a whorl, linear, obtuse, scabrous on the margin and midrib. *Flowers* axillary, 1—3 in each whorl. *Fruit* purple, smooth.—White. ♃. April—July. Damp soils.

2. G. LATIFO'LIUM, (Mich.) *Stem* erect, glabrous. *Leaves* by fours, narrowed at the base, flat, oval, with hispid margins, acute. *Flowers* on divaricate peduncles. *Fruit* frequently 1-seeded from the abortion of the other, smooth.—Purple. ♃. June—July. Mountains.

3. G. UNIFLO'RUM, (Mich.) *Stem* procumbent, assurgent, smooth, sparingly branched. *Leaves* generally by fours, linear, acute, with revolute margins, somewhat scabrous; peduncles usually solitary, with a whorl of small leaves in the middle. *Fruit* purple, smooth.—White. ♃. May—July. In rich shaded grounds. 12 inches.

4. G. HISPIDU'LUM, (Mich.) *Stem* procumbent, much branched, pubescent, rough. *Leaves* by fours, lanceolate, scabrous, dotted. *Flowers* axillary, terminal, on simple or compound peduncles. *Corolla* hairy. *Fruit* purple, scabrous, with short rigid hairs.—White. ♃. May—Oct. Sandy soils. Common.

5. G. PILO'SUM, (Ait.) *Stem* scabrous, with the angles hairy, branches axillary, expanding. *Leaves* by fours, oval, entire, ciliate, sprinkled with hairs; peduncles dichotomous, axillary, solitary or by threes. *Fruit* hispid, white.—Purple. ♃. May—Sept. In dry soils.

6. G. CUSPIDA'TUM, (Muhl.) *Stem* prostrate, small, glabrous. *Leaves* by sixes, attenuate at the base, very acute at the summit, somewhat hairy, slightly ciliate; peduncles trifid. *Fruit* villous, with white hooked hairs.—White. ♃. June—Aug. Damp shaded soils.
G. triflorum, Mich.

7. G. CIRCÆ'ZANS, (Mich.) *Stem* erect, glabrous, sparingly branched. *Leaves* by fours, ovate, obtuse, ciliate. *Flowers* alternate, usually solitary, peduncles short. *Fruit* hispid, with hooked hairs, nodding.—White. ♃. June—Aug. In shaded rich soils. *Wild Liquorice.*

GENUS II.—RU'BIA. Tourn. 4—1.

(From *ruber*, red, from the dye obtained from its roots.)

Calyx 4-toothed. *Corolla* campanulate, 4—5-cleft. *Stamens* 4—5. *Berries* 2, roundish and smooth, single-seeded. *Nuttall.*

1. R. BROWN'II. *Stem* hispid, decumbent. *Leaves* by fours, oval, peduncles solitary, single-flowered. *Flowers* yellow. *Berries* purple, smooth.—In shady woods from Car. to Florida. *Pursh.* *Madder.*

SUB-ORDER II.—CINCHO'NEÆ.

Leaves opposite, with stipules between them. *Ovary* mostly inferior.

GENUS III.—SPERMACO'CE. Dill. 4—1.

(From *sperma*, a seed, and *akoke*, a point, in allusion to the capsule being crowned by the calyx points.)

Calyx 4-leaved. *Corolla* funnel-shaped, with a 4-parted limb. *Capsules* 2-celled, with 1 seed in each cell.

1. S. GLA'BRA, (Mich.) *Stem* procumbent, glabrous. *Leaves* lanceolate. *Flowers* numerous, in whorls. *Calyx* 4-toothed; corolla campanulate, funnel-form, woolly in the throat.—♃. S. Western States. 1—2 feet.

2. S. CHAPMAN'II, (T. & G.) *Stem* slightly angled, glabrous, with elevated lines. *Leaves* oblong-lanceolate, acute, scabrous above. *Stipules* 5—6 bristles. *Flowers* numerous, axillary; corolla 3 times as long as the calyx; stamens exserted. *Capsule* oblong.—Mid. Flor.

3. S. TEN'UIOR. *Stem* erect, glabrous. *Leaves* lanceolate, scabrous on the upper surface. *Flowers* verticillate. *Stamens* included. *Seeds* hirsute.—Florida.

4. S. DIODI'NA, (Mich.) *Stem* procumbent, terete, sometimes branching, hirsute. *Leaves* linear-lanceolate, sessile, finely serrulate, hairy, a membranaceous stipule, embracing the base of the leaves, with setaceous segments. *Flowers* axillary, sessile, clustered, or solitary. *Calyx* 4-leaved. *Corolla* hairy, with a 4-parted limb. *Carpels* 2, connate, crowned with the calyx, each 1-seeded.—White. ☺. July—Sept. Poor soils. Common. *Diodia teres*, Walt.

5. S. INVOLUCRA'TA, (Pursh.) *Stem* hirsute. *Leaves* ovate-lanceolate, acuminate, somewhat oblique; stipules with many setaceous segments. *Flowers* in terminal heads, surrounded with an involucre; tube long.—White. ☺. June—July. Carolina.

GENUS IV.—DIO'DIA. L. 4—1.

(From *diodos*, a passage; growing by the way-side.)

Calyx 2-leaved. *Corolla* funnel-shaped. *Capsule* 2-celled, 1 seed in each cell.

1. D. VIRGINIA'NA, (L.) *Stem* glabrous, procumbent, slender, nearly terete, purple, narrow-lanceolate. *Corolla* glabrous. *Fruit* oblong, glabrous.—White. ♃. May—August. Near Columbia, S. C.

2. D. TETRAGO'NA, (Walt.) *Stem* procumbent, creeping, slightly angled, hairy at the joints. *Leaves* opposite, oval, or cordate-ovate, joined by stipules; stipules with subulate, ciliate segments. *Flowers* axillary. *Calyx* 2-leaved, subulate, persistent. *Corolla* pubescent within. *Fruit* composed of 2 connate carpels, each containing 1 seed.—White. ♃. May—Oct. Damp soils, very common.

3. D. HIRSU'TA, (Pursh.) *Stem* hirsute, slender, procumbent. *Leaves* narrow-lanceolate, the whole plant hispid. In other respects it resembles the preceding species.

GENUS V.—CEPHALAN'THUS. L. 4—1.

(From *kephale*, a head, and *anthos*, a flower; the flowers in heads.)

Flowers in globose heads. *Calyx* superior, small, 4-cleft. *Corolla* tubular, 4-cleft. *Stamens* 4. *Style* exserted. *Capsule* 2-celled, 2-seeded.

1. C. OCCIDENTA'LIS, (L.) A shrub, much branched. *Leaves* opposite and ternate, ovate-lanceolate, entire, upper surface glabrous, lower pubescent on the veins; petioles short, winged. *Flowers* axillary and terminal; peduncles pubescent. *Corolla* hairy within, with 4 obtuse

segments. *Anthers* sagittate. *Capsule* angled; receptacle globose.—White. ♄. July. In wet places. Common. 6—15 feet.
Button-wood.

GENUS VI.—MITCHEL'LA. L. 4—1.

(In honor of John Mitchell, of Virginia.)

Calyx 4-toothed. *Corolla* superior, in pairs upon the same germ. *Stamens* 4. *Style* 1. *Fruit* didymous, 4-seeded.

1. M. RE'PENS, (L.) *Stem* creeping, branching, glabrous, rooting at the joints. *Leaves* ovate, or nearly cordate, entire, glabrous, deep green, with whitish veins, evergreen. *Flowers* axillary, solitary, on short peduncles. *Corolla* hairy on the inside, fragrant. *Fruit* red, eatable.—White. ♃. Early spring. Rich soils. *Partridge Berry.*

GENUS VII.—HEDY'OTIS. L. 4—1.

(From *hedus*, sweet, and *ous*, an ear, alluding to the sweet-scented, ear-like leaves.)

Calyx 4-parted, persistent. *Corolla* funnel-form; limb 4-cleft. *Stamens* 4. *Stigmas* 2. *Capsule* 2-celled, many-seeded, inferior.

1. H. CŒRU'LEA, (Hook.) (*Houstonia cærulea*, L.) *Stem* erect, slender, square, sparingly branched. *Leaves* of the root spatulate, those of the stem lanceolate. *Flowers* on axillary, long peduncles, each one-flowered.—White. ♃. May—Aug. Common in mid. Car. and Geo. 4—6 inches.

2. H. SERPYLLIFO'LIA, (T. & G.) (*Houstonia serpyllifolia*, Mich.) *Stem* procumbent, cespitose, filiform. *Leaves* spatulate, obtuse. *Flowers* on terminal peduncles, each 1-flowered.

3. H. ROTUNDIFO'LIA, (T. & G.) (*Houstonia rotundifolia*, Mich.) *Stem* prostrate, rooting at the joints, glabrous. *Leaves* ovate, narrowed at the base, slightly ciliate. *Flowers* on axillary peduncles, each 1-flowered. *Corolla* salver-form, pubescent within; tube long; segments lanceolate. *Capsule* emarginate.—White. ♃. Through the summer. On the sea-coast.

4. H. PURPU'REA, (T. & G.) (*Houstonia purpurea*, L.) *Stem* erect, much branched, glabrous, hairy at the joints, and with the angles ciliate. *Leaves* sessile, ovate-lanceolate, obtuse at the base; nerves pubescent. *Flowers* in terminal corymbs. *Calyx* pubescent, with ciliate segments.—Purple. ♃. June—Aug. Abundant on the Ocmulgee, near Macon. 10—15 inches.

5. H. LONGIFO'LIA, (Hook.) (*Houstonia longifolia*, Gært.) *Stem* erect, square, branching, glabrous. *Leaves* sessile, lanceolate, attenuate. *Flowers* in corymbs, on very short peduncles.—Purple. ♃. June—Aug. Mid. and upper dist. 8—16 inches.

6. H. STENOPHYL'LA, (T. & G.) *Stem* glabrous, suffructicose, erect, branched. *Leaves* narrow, linear, often smaller ones in the axils. *Flowers* numerous, in many-divided cymules, central flower nearly sessile, throat of the corolla villous. *Capsule* small.—Pale purple. ☉. Common on banks of streams. June—July. 10—18 inches.

7. H. BOS'CII, (D. C.) *Stem* much branched, glabrous, branches slender. *Leaves* linear, acute. *Flowers* on short pedicels, corolla nearly

rotate. *Fruit* roundish.—Purple. ☺. Marshy places. July—Sept. 6—10 inches.

8. H. GLOMERA'TA, (Ell.) *Stem* procumbent, assurgent, pubescent, branched. *Leaves* opposite, lanceolate, cuneate, sessile, entire, connected by stipules, with 2 or more subulate teeth. *Flowers* in clusters, whorled, axillary and terminal. *Calyx* persistent, hispid, with 1—3 bracts at the base. *Corolla* with a very short tube. *Stamens* short, inserted into the tube of the corolla. *Capsule* globose. *Seeds* 3-angled, attached to a central placentæ.—White. 4. June—Oct. Damp soils. Common. 10—18 inches.

GENUS VIII.—PINCKNE'YA. Mich. 5—1.

(In honor of Mr. Pinckney.)

Calyx superior, 5-parted, persistent, somewhat colored. *Corolla* with a 5-cleft border. *Stamens* 5. *Style* 1. *Capsule* 2-celled.

1. P. PU'BENS, (Mich.) A large shrub, with numerous stems from each root; young branches tomentose. *Leaves* opposite, lanceolate, entire, shining on the upper surface, with a few hairs, tomentose on the lower; petiole tomentose. *Flowers* in axillary and terminal panicles; segments of the calyx sometimes equal, at others one or two of them resembling bracts. *Corolla* tomentose, with a somewhat greenish tube; segments oval. *Capsule* nearly globose. *Seeds* flat.—Purple. ♄. May—June. Wet soils. 15—20 feet.

SUB-ORDER III.—LOGANIA'CEÆ.

Leaves opposite. *Ovary* superior. Herbs or shrubs.

GENUS IX.—MITRE'OLA. L. 5—1. (*Ophiorhiza*, L.)

Calyx tubular, 5-cleft. *Corolla* funnel-shaped. *Stamens* 5. *Stigmas* 2. *Fruit* 2-lobed.

1. M. PETIOLA'TA, (T. & G.) *Stem* erect, somewhat branched, nearly square, scabrous toward the summit. *Leaves* ovate, opposite, appressed. *Flowers* in secund spikes, erect at first, afterward recurved; throat of the corolla closed by jointed hairs, segments expanding, tube short. *Fruit* consisting of 2 carpels united at the base and apex. *Seeds* numerous. [Sent to me by Wm. S. Rockwell, Esq., of Baldwin county.] —White. ☺. July—Aug. Wet places. 12—18 inches.

2. M. SESSILIFO'LIA, (T. & G.) *Stem* erect, 4-angled, 4-furrowed, glabrous. *Leaves* lanceolate, attenuate at the base, scabrous on the upper surface. Tube of the corolla as long as the calyx, purple, segments white. —Purple and white. ☺. Aug.—Sept. Wet soils. Common. 12—18 in.

GENUS X.—POLYPRE'MUM. Tourn. 4—1.

(From *polus*, many, and *premnon*, a stalk.)

Calyx 4-parted, persistent. *Corolla* rotate, 4-cleft, with the throat hairy. *Stamens* 4, very short. *Style* 1, slender. *Capsule* compressed, 2-celled.

1. P. PROCUM'BENS, (L.) *Stem* procumbent, furrowed, dichotomously branched. *Leaves* sessile, linear, opposite, connected by a stipular membrane. *Flowers* terminal, and in the divisions of the branches sessile, 2—4 leafy bracts at the base of the calyx; segments of the calyx subulate, serrulate. *Seed* angular.—White. 2ℓ. May—Sept. Very common. 6—12 inches.

ORDER LXVII.—VALERIANA'CEÆ.

Calyx a border, 3—4-toothed, or pappus-like. *Corolla* tubular, rather irregular, with the border 5-parted, inserted on the top of the ovary, slightly calcarate at the base. *Stamens* 1—5, but usually 3. *Style* 1. *Ovary* 1—3-celled, with only 1 fertile; ovule suspended. *Fruit* dry, indehiscent, with two empty cells, and one with a single seed. Herbaceous, rather succulent plants, with opposite, or whorled leaves. *Flowers* in crowded corymbs.

GENUS I.—FE'DIA. Mœnch. 3—1.

(From *pheidō*, harmlessness; others from *fedus*, a kid.)

Genus same as the Order.

1. F. RADIA'TA, (L.) *Stem* erect, winged or furrowed by the decurrent leaves and midribs, pubescent on the angles and wings. *Leaves* opposite; lower ones somewhat spatulate, upper ones sessile, broad-lanceolate, rather obtuse, finely ciliate, irregularly dentate, sometimes nearly panduriform. *Flowers* terminal; in dichotomous corymbs, with a flower in each division, crowded, each corymb having the appearance of only 4 flowers, with a several-leaved involucre; corolla slightly irregular at the summit, slightly calcarate near the base.—White. March—May. On the Ocmulgee above Macon. 10—15 inches.

ORDER LXVIII.—COMPOS'ITÆ.

Calyx united to the ovary, with the limb either wanting, or membranous, or divided into hair-like segments called *pappus*. *Corolla* ligulate, or tubular. *Stamens* 5, alternate with the teeth of the corolla. *Anthers* cohering into a cylinder. *Ovary* inferior, 1-celled. *Style* simple. *Stigmas* 2, distinct or united. *Fruit* an indehiscent dry pericarp, crowned with the limb of the calyx. *Seeds* solitary, erect; albumen none. *Flowers* collected into dense heads, surrounded by an involucre.

The obvious characteristics of this order are its compound flowers, and the union of the anthers. Herbs or shrubs. *Leaves* without stipules.

ANALYSIS.

1. Flowers of the disk tubular		2
Flowers bilabiate	*Chaptalia*, 82	
Flowers ligulate		77
2. Heads radiate		3
Heads discoid		50
3. Flowers yellow		4
Flowers not yellow		37

4. Leaves alternate 5
Leaves, the lower ones opposite or whorled 22

5. Receptacle naked 6
Receptacle chaffy 15

6. Pappus pilose or bristly 7
Pappus consisting of scales 13

7. Pappus different in the ray and disk florets ..... *Heterotheca*, 25
Pappus similar in the ray and disk florets 8

8. Involucre consisting of a single series of scales ..... *Senecio*, 77
Involucre consisting of more than one series 9

9. Ray florets few, inconspicuous 10
Ray florets conspicuous 11

10. Lower leaves cordate ..... *Brachychæta*, 20
Lower leaves not cordate ..... *Solidago*, 21

11. Achenia glabrous ..... *Prionopsis*, 24
Achenia hairy or villous 12

12. Pappus simple, of a single series ..... *Isopappus*, 23
Pappus double, the exterior chaffy ..... *Chrysopsis*, 26

13. Rays pistillate ..... *Helenium*, 62
Rays neutral 14

14. Pappus awned ..... *Gaillardia*, 59
Pappus not awned ..... *Leptopoda*, 63

15. Pappus none, or rudimentary 20
Pappus consisting of scales, teeth, or awns 16

16. Leaves sessile, entire 17
Leaves petiolate, entire ..... *Coreopsis*, 53
Leaves more or less divided 19

17. Scales of the involucre in 4 series ..... *Baldwinia*, 64
Scales of the involucre in 1 or 2 series 18

18. Achenia glabrous ..... *Helianthus*, 50. *Helianthella*, 51
Achenia silky ..... *Actinospermum*, 65

19. The inner scales of the involucre smallest ..... *Silphium*, 35
The inner scales the largest ..... *Berlandiera*, 36

20. Receptacle conical ..... *Rudbeckia*, 47
Receptacle elongated 21

21. Leaves pinnately divided ..... *Lepachys*, 48
Leaves not divided ..... *Dracopis*, 49

22. Pappus none 23
Pappus present 26

23. Leaves lobed or cleft ..... *Polymnia*, 33
Leaves not divided 24

24. Leaves petiolate 25
Leaves not petiolate ..... *Tetragonotheca*, 44

25. Achenia of the disk quadrangular ..... *Heliopsis*, 43
Achenia not quadrangular ..... *Spilanthes*, 55—*Acmella*.

26. Receptacle naked ..... *Arnica*, 78
Receptacle chaffy 27

27. Pappus consisting of many scales ..... *Halea*, 45
Pappus consisting of awns or teeth 28

28. Shrubby plants ..... *Borrichia—Buphthalmum*, 51
Herbaceous plants 29

29. Rays pistillate, disk sterile 30
Rays neutral or pistillate, disk perfect 31

30. Low plants ..... *Chrysogonum*, 34
Tall plants ..... *Silphium*, 35

31. Rays sterile 33
Rays fertile 32

32. Receptacle flat, rays few ..... *Verbesina*, 56
Receptacle convex, rays numerous ..... *Ximenesia*, 57

33. Ray florets inconspicuous ..... *Bidens*, 54
Ray florets conspicuous 34

34. Achenia 4-sided ..... *Helianthus*, 50
Achenia not 4-sided 35

35. Achenia compressed 36
Achenia obcompressed ..... *Coreopsis*, 53

36. Stem winged ..... *Actinomeris*, 52
Stem not winged ..... *Bidens*, 54

37. Leaves opposite 38
Leaves alternate 39

38. Pappus none ..... *Eclipta*, 32
Pappus 1-awn ..... *Zinnia*, 42

39. Receptacle naked 40
Receptacle chaffy 47

40. Pappus none ..... *Leucanthemum*, 69
Pappus present 41

41. Pappus pilose or bristly 42
Pappus consisting of scales ..... *Palafoxia*, 60—*Polypteris*.

42. Pappus double ..... *Diplopappus*, 18
Pappus simple 43

43. Rays sterile ..... *Galatella*, 14
Rays fertile 44

44. Pappus of the ray and disk similar 45
Pappus of the ray and disk dissimilar ..... *Boltonia*, 19

45. Achenia usually glabrous, compressed ..... *Aster*, 16
Achenia usually pubescent 46

46. Achenia obconic, silky ..... *Sericocarpus*, 15
Achenia pubescent, compressed ..... *Erigeron*, 17

47. Rays neutral 48
Rays pistillate 49

48. Leaves undivided ..... *Echinacea*, 46
Leaves divided ..... *Maruta*, 67—*Anthemis*.

49. Pappus none ..... *Parthenium*, 37
Pappus none ..... *Achillea*, 68

50. Heads homogamous 51
Heads not homogamous 69

51. Leaves alternate 52
Leaves opposite or verticillate 61

52. Receptacle naked 54
Receptacle chaffy 53
Receptacle bristly ..... *Cirsium*, 81

53. Pappus setose ..... *Carphophorus*, 7
Pappus scaly ..... *Marshallia*, 66

54. Pappus consisting of 4 or 5 scales ..... *Stokesia*, 2
Pappus consisting of 12—20 scales ..... *Hymenopappus*, 61
Pappus capillary or setose 55

55. Scales of the involucre in a single series 56
Scales of the involucre in more than one series 57

56. Heads white, brownish, or rose color ..... *Cacalia*, 76
Heads yellow ..... *Senecio*, 77

57. Heads paniculate ..... *Eupatorium*, 11
Heads in spikes or racemes ..... *Liatris*, 8
Heads more or less corymbose 58

58. Corolla expanded at the base ..... *Kuhnia*, 9
Corolla expanded at the summit 59
Corolla nearly straight ..... *Eupatorium*, 11

59. Corolla palmately divided ..... *Elephantopus*, 3
Corolla not palmately divided 60

60 Achenia oblong, with double pappus ..... *Vernonia*, 1
Achenia obconic, hairy ..... *Biglovia*, 22
Achenia 10-striate ..... *Brickellia*, 10

61. Receptacle chaffy ..... *Melanthera*, 41
Receptacle naked 62

62. Pappus coroniform ..... *Cœlestina*, 4
Pappus not coroniform 63

63. Pappus consisting of scales 64
Pappus capillary or setose 65

64. Flowers blue or white ..... *Ageratum*, 5
Flowers purple ..... *Sclerolepis—Sparganophorus*, 6

65. Achenia striate or ribbed 66
Achenia angled 67

66. Pappus plumose ..... *Kuhnia*, 9
Pappus scabrous ..... *Brickellia*, 10

67. Receptacle conic ..... *Conoclinium*, 13
Receptacle flat 68

68. Scales of the involucre numerous ..... *Eupatorium*, 11
Scales of the involucre few ..... *Mikania*, 12

69. Heads monœcious, fertile flowers petalous ..... *Conyza*, 27
Heads monœcious, fertile flowers apetalous ..... *Soliva—Gymnostylis*, 72
Heads heterogamous 70
Heads heterocephalous 75
Heads diœcious 76

70. Receptacle chaffy ..... *Iva*, 38
Receptacle hirsute ..... *Pterocaulon*, 30
Receptacle setose or naked 71

71. Receptacle setose 72
Receptacle naked 73

72. Flowers purple ..... *Centaurea*, 79
Flowers yellow ..... *Cnicus*, 80

73. Flowers yellow, with divided leaves ..... *Artemisia*, 71
Flowers purple ..... *Pluchea*, 29
Flowers white 74

74. Scales of the involucre in one series ..... *Erechtites*, 75
Scales of the involucre imbricate ..... *Gnaphalium*, 73

75. Fertile heads 1-flowered ..... *Ambrosia*, 39
Fertile heads 2-flowered ..... *Xanthium*, 40

76. Shrubs ..... *Baccharis*, 28
Herbs ..... *Antennaria*, 74

77. Pappus none ..... *Apogon*, 83
Pappus present 78

78. Pappus capillary 80
Pappus not capillary 79

79. Pappus few scales and bristles ..... *Krigia*, 84
Pappus numerous scales and bristles ..... *Cynthia*, 85

80. Achenia beaked 84
Achenia not beaked 81

81. Flowers yellow 83
Flowers not yellow 82

82. Flowers usually nodding ..... *Nabalus—Prenanthes*, 87
Flowers erect ..... *Lygodesmia*, 88

83. Achenia flattened ..... *Sonchus*, 93
Achenia not flattened ..... *Hieracium*, 86

84. Flowers blue ..... *Mulgedium*, 92
Flowers not blue 85

85. Heads paniculate, numerous ..... *Lactuca*, 91
Heads solitary or very few 86

86. Heads on a fistulous, naked scape ..... *Taraxicum*, 89
Stem simple ..... *Pyrrhopappus*, 90

Sub-order I.—TUBULIFLO'RÆ.

Perfect flowers tubular, usually regularly 5-cleft.

Tribe I.—VERNONIA'CEÆ.

Flowers discoid. *Style* divided, with the branches elongated, subulate, hispid. *Corolla* 5-cleft, regular, or with the limb somewhat palmately divided or bilabiate. *Flowers* blue or purple.

Genus I.—VERNO'NIA. Schreb.

(In honor of Wm. Vernon.)

Involucre ovate, imbricate. *Florets* all perfect and tubular. *Receptacle* naked. *Stigma* bifid; pappus mostly double, the exterior chaffy, the interior capillary. *Flowers* purple.

1. V. oligophyl'la, (Mich.) *Stem* erect, simple, branching toward the summit, pubescent, scabrous. Radical leaves oval, coarsely dentate, acute; cauline ones crowded toward the base, scattered toward the summit, toothed or serrate, scabrous above, pubescent beneath. *Flowers* in paniculate corymbs; scales of the involucre ciliate, pubescent, ovate-lanceolate. *Seeds* oblong, hairy.—Purple. 2. June—July. Damp pine-barrens. 2—3 feet. *Black-root.*

2. V. scaber'rima, (Nutt.) *Stem* simple, slender, pubescent toward the base, nearly glabrous toward the summit. *Leaves* crowded on the lower part of the stem, sessile, linear-lanceolate, scabrous, and hairy on both surfaces; margins revolute, denticulate. *Flowers* in terminal corymbs; involucrum with lanceolate, ciliate scales, with a subulate point. *Seeds* striate, hairy.—Purple. 2. June—Aug. Pine-barrens. 2—3 feet.

3. V. angustifo'lia, (Mich.) *Stem* simple, erect, scabrous. *Leaves* long-linear, numerous, entire, or slightly denticulate; margins revolute, pubescent beneath. *Flowers* in terminal corymbs; involucre with ovate, lanceolate scales, terminated by a subulate point. *Seeds* striate, hairy.—Purple. 2. June—Aug. Common. 3—4 feet.

4. V. Noveboracen'sis, (Willd.) *Stem* erect, pubescent, branching toward the summit. *Leaves* numerous, narrow, lanceolate, long; upper surface glabrous, the lower pubescent. *Flowers* in large fastigiate corymbs; involucre hemispherical, with ovate-lanceolate scales, terminated by a long subulate point. *Seeds* striate, somewhat hairy; exterior pappus subulate.—Purple. 2. July—September. Moist rich lands. 5—10 feet.

5. V. tomento'sa, (Ell.) *Stem* erect, slender, tomentose toward the summit. *Leaves* narrow-lanceolate, long, acutely serrate; upper surface scabrous, lower tomentose. *Flowers* in fastigiate corymbs; involucre with ovate-lanceolate scales, with a long filiform point, hairy.—Purple. 2. July—August. Wet soils. 3—6 feet.

6. V. præal'ta. *Stem* erect, angled, branching toward the summit, pubescent. *Leaves* numerous, lanceolate-serrate, somewhat scabrous, pubescent beneath. *Flowers* in fastigiate corymbs; involucre with ovate, acute scales, unarmed.—Purple. 2. Aug. Upper districts of Car. and Geo. 4—8 feet.

7. V. ALTIS'SIMA, (Nutt.) *Stem* erect, glabrous. *Leaves* lanceolate, serrate, slightly scabrous. *Flowers* in small, terminal corymbs; involucre small, with ovate, ciliate, appressed scales, slightly mucronate. *Seeds* striate.—Purple. 4. Aug.—Oct. Geo. Damp places. 6—10 feet. *V. fasciculata*, Mich.

8. V. OVALIFO'LIA, (T. & G.) *Stem* simple, pubescent. *Leaves* oval, acute, serrate, glabrous; heads numerous, about 20-flowered; scales of the involucre ovate, appressed. *Achenia* a little hairy; pappus purple.—Purple. 4. Middle Florida. 3—4 feet.

GENUS II.—STOKE'SIA. L'Her.

(In honor of John Stokes.)

Involucre leafy, imbricate. *Corolla* radiate. *Florets* of the ray funnel-form, irregular, all perfect. *Receptacle* naked; pappus consisting of 4 bristles. *Achenia* 4-sided, glabrous.

1. S. CYA'NEA, (L'Her.) *Stem* herbaceous, leafy. *Leaves* lanceolate. *Flowers* solitary, large, ornamental; florets all perfect.—Blue or purple. 4. May. Carolina and Georgia.

GENUS III.—ELEPHANTO'PUS. L.

(From *elephas*, an elephant, and *pous*, a foot, from the shape of the leaf of some species.)

Involucre 4-flowered; florets all ligulate, perfect. *Pappus* bristly, consisting of 5 awns. *Receptacle* naked. *Achenia* hairy.

1. E. CAROLINIA'NUS, (Willd.) *Stem* leafy, erect, terete, branching toward the summit, villous. *Leaves* oblong, attenuate at the base, hairy, slightly scabrous. *Flowers* in sessile, terminal clusters, with 3 unequal cordate bracts at the base of each capitulum; involucre 9—10-leaved, the interior longest, hairy on the outside. *Corolla* ligulate at the summit, tubular toward the base, 4-cleft. *Seed* oblong.—Purple. 4. July—Sept. Common.

2. E. NUDICAU'LIS, (Ell.) *Stem* erect, branching toward the summit, scabrous and hispid, usually purple, generally destitute of leaves; radical leaves large, oval-lanceolate, serrate, scabrous on the upper surface and villous beneath; bracts tomentose; involucre with rigid leaves.—Purple. 4. Aug.—Sept. Common. *E. tomentosus*, L.

TRIBE II.—EUPATORIA'CEÆ.

Flowers discoid. *Style* divided; branches elongated, obtuse, or clavate, papillose externally toward the summit. *Corolla* regular, 5-cleft, blue or purple, seldom white.

GENUS IV.—CŒLESTI'NA.

(From *cœlestis*, heavenly, in allusion to its blue color.)

Heads many-flowered, homogamous. *Involucre* cylindrical, hemispherical, many-leaved, sub-imbricate. *Receptacle* convex.

Corolla tubular, 5-parted. *Achenia* 5-angled; pappus coroniform, usually toothed. Herbaceous plants, with opposite leaves.

1. C. MARIT'IMA, (T. & G.) *Stem* decumbent, branching, terete. *Leaves* ovate, serrate, petiolate; heads in dense corymbs, pedicellate.—Blue. Florida.

GENUS V.—AGER'ATUM. L.

(From privative *a*, without, and *geras*, old age; retains its color.)

Heads many-flowered, homogamous, sub-globose. *Involucre* many-leaved, imbricate. *Leaves* linear, acuminate. *Receptacle* naked. *Corolla* tubular, 5-parted; pappus paleaceous, 5 scales. *Achenia* 5-angled, tapering at the base. Herbaceous plants, with opposite leaves.

1. A. CONYZOI'DES, (L.) *Stem* branching. *Leaves* varying from ovate to cordate, on long petioles; pappus terminated by arms as long as the corolla.—Blue or white. ☺. Low country of Geo.

GENUS VI.—SPARGANOPH'ORUS. Mich. (*Sclerolepis*, Cass.)

(From *sparganon*, a fillet, and *phero*, I bear; the seed is crowned.)

Involucre imbricate, sub-globose, pubescent, with the leaves recurved at the summit. *Ray florets* wanting, those of the disk perfect. *Receptacle* naked. *Seed* glabrous, pentangular. *Pappus* membranaceous, 5-cleft.

1. S. VERTICILLA'TUS, (Mich.) *Stem* pubescent, simple. *Leaves* linear, glabrous, verticillate, generally 6 in a whorl. *Flowers* generally terminal and solitary. *Involucre* with lanceolate, colored leaves.—Purple. ♃. July—Aug. Pine-barrens. Mid. Car. and Geo. 10—16 inches.

GENUS VII.—CARPHEPH'ORUS. Cass. (*Liatris.*)

(From *karphe*, chaff, and *phero*, I bear, in allusion to its chaffy receptacle.)

Heads many-flowered; scales of the involucre in 3 series, imbricate. *Receptacle* chaffy. *Corolla* tubular, 5-cleft. *Stigma* clavate. *Achenia* nearly terete, 10-ribbed; pappus one or several series of unequal bristles. *Flowers* purple. Herbaceous plants, with simple stem, corymbose flowers, and entire leaves. A genus made up of species formerly belonging to Liatris.

1. C. PSEU'DO-LIA'TRIS, (Cass.) *Stem* virgate, tomentose. *Leaves* subulate, rigid, sessile, numerous, appressed; heads few; pedicels leafy beneath the flowers.—Purple. ♃. Alabama. 18—24 inches.

2. C. TOMENTO'SUS, (T. & G.) (*Liatris Walteri*, Ell.) *Stem* simple, glabrous at the base, hairy near the summit. Radical leaves lanceolate, attenuate at the base, glabrous; cauline ones smaller, diminishing in size toward the summit, sessile, hairy. *Flowers* in corymbs; involucre with many florets; scales colored, tomentose. *Seeds* hairy; pappus colored; chaff linear.—Purple. ♃. Sept.—Oct. Southern Geo.

3. C. BELLIDIFO'LIUS, (T. & G.) *Stems* several from the same root, paniculately branched, low, nearly glabrous. Radical leaves spatulate,

3-nerved, cauline, sub-linear; pappus plumose; scales of the involucre in about 3 series, the outer ones expanding.—Purple. 2f. N. C. 8—17 inches.

4. C. CORYMBO'SUS, (T. & G.) *Stem* erect, branching near the summit; branches hirsute, tomentose. Radical leaves cuneate-lanceolate, tomentose; cauline leaves oblong, sessile. *Flowers* in terminal corymbs; involucre with about 20 florets; scales hairy at the base, with a membranaceous margin; pappus colored; chaff linear.—Purple. 2f. Sept. —Oct. Wet places. 2—3 feet. *Liatris tomentosa*, Ell.

GENUS VIII.—LIA'TRIS. Schreb.

(Probably from *liazo*, I come forth, from the early appearance of its leaves.)

Involucre imbricate, oblong; florets perfect. *Receptacle* naked. *Corolla* tubular, 5-lobed; branches of the style much exserted; pappus plumose, persistent, generally colored. *Fruit* pubescent, striate, obconic. *Anthers* entire at the base. *Style* bifid. *Flowers* usually purple, all tubular. Perennial, herbaceous plants, with alternate, entire leaves.

a. Flowers in spikes or racemes. Root tuberous. Leaves linear or grass-like.

1. L. SPICA'TA, (Willd.) *Stem* simple, glabrous, leafy. *Leaves* linear-lanceolate, glabrous, acute, dotted, somewhat ciliate at the base; upper ones very short. *Flowers* in terminal spikes, with bracteal leaves; involucre cylindrical; scales oblong, shorter than the flowers; outer scales shortest. Generally 8 florets in a capitulum, longer than the involucre. *Seeds* hairy, furrowed.—Purple. 2f. Aug.—Oct. Pine-barrens. 2—4 feet. *Gay-feather. Button Snakeroot.*

2. L. GRAMINIFO'LIA, (Walt.) *Stem* simple, glabrous or slightly hairy. *Leaves* linear, long, with the midrib hairy and the margin scabrous. *Flowers* in a terminal spike, with bracts as long as the involucre; involucre cylindrical, with about 6 florets; scales pubescent along the margin, mucronate. *Corolla* covered with glandular dots. *Seeds* hairy; pappus uncolored.—Purple. 2f. Sept.—Oct. In pine-barrens. 2—4 ft.

3. L. BOYKIN'II, (T. & G.) *Stem* slender, erect, nearly glabrous. *Leaves* linear, punctate; lower ones long, upper short and setaceous. *Spike* virgate; heads 3—5-flowered; scales of the involucre glabrous; pappus plumose. *Achenia* villous.—Pale purple. Aug.—Sept. Western Geo. 1—2 feet.

4. L. TENUIFO'LIA, (Nutt.) *Stem* simple, slender, glabrous. Lower leaves crowded, narrow, or linear, slightly hairy at the base; upper leaves setaceous, scattered. *Flowers* in long racemes, with leafy pedicels; involucre oblong, about 5-flowered; scales membranaceous along the margins. *Corolla* with glandular dots. *Seeds* hairy; pappus not colored.—Purple. 2f. Aug.—Oct. Dry pine-barrens. 2—4 feet.

5. L. CYLINDRA'CEA, (Mich.) *Stem* slender, glabrous. *Leaves* linear, long, narrow, glabrous; upper ones pubescent along the margin, lower ones alternate at the base. *Flowers* few, in a terminal spike; involucre cylindrical, containing 14—20 florets; scales oblong, abruptly acuminate, pubescent along the margin. *Corolla* glandular; pappus plumose.—Purple. 2f. Aug.—Sept. Dry, sandy soils. Mid. Geo. 1—2 ft.

6. L. HETEROPHYL'LA, (Br.) *Stem* simple, glabrous. *Leaves* lanceolate, glabrous; upper ones smaller, linear-lanceolate. *Flowers* in spiked heads, squarrose; scales of the involucre lanceolate, acute, naked. —Purple. 2f. Aug.—Oct. So. Car. and Geo. 2—3 feet.

7. L. PILO'SA, (L.) *Stem* simple, pubescent, streaked. *Leaves* linear, the lower linear-lanceolate, pubescent, fringed near the base. *Flowers* in long, leafy racemes; the lower peduncles compound; involucre oblong, with 10—14 florets; scales fringed. *Seeds* hairy; pappus not colored.—Purple. 2f. Aug.—Oct. Pine-barrens of Car. and Geo.

8. L. GRA'CILIS, (Pursh.) *Stem* slender, pubescent, streaked. *Leaves* linear, glabrous, slightly fringed at the base; upper leaves much smaller than the lower. *Flowers* in terminal racemes; peduncles hairy, with a few scales; involucre generally with 7 florets; scales obovate, dotted, ciliate, colored at the summit. *Seeds* hairy; pappus colored.—Purple. 2f. Sept.—Oct. Dry pine-barrens. 2—3 feet.

9. L. SECUN'DA, (Ell.) *Stem* reclining, usually curved, pubescent. Lower leaves linear-lanceolate, somewhat fringed at the base. *Flowers* in long, terminal racemes, secund; peduncles with 1—2 subulate scales; involucre with 4—5 florets, generally 10-leaved. *Leaves* glabrous, pubescent along the margin. *Seeds* hairy; pappus slightly plumose.—Purple. 2f. Aug.—Sept. Dry sand-hills. Middle Car. and Geo. 2—3 feet.

10. L. RESINO'SA, (Nutt.) *Stem* glabrous. Radical leaves long; cauline leaves numerous, crowded, all linear. *Flowers* in spikes, bracteolate; involucre with obtuse scales, resinous, becoming hoary. *Seed* villous.—Purple. 2f. Aug.—Sept. Pine-forests of Car. 1—2 feet.

11. L. EL'EGANS, (L.) *Stem* erect, very pubescent. *Leaves* linear-lanceolate, scabrous beneath, cartilaginous along the margins. *Flowers* in a compact cylindrical raceme; peduncles with small leaves; involucre with 5 florets. *Leaves* about 12, lanceolate, villous; interior ones colored. *Seeds* villous; pappus colored.—Purple. 2f. Aug.—Sept. Dry soils. 3—5 feet.

12. L. SCARIO'SA, (L.) *Stem* erect, hairy. *Leaves* lanceolate, scabrous along the margin, pubescent; lower ones very long, attenuate at the base. *Flowers* in a terminal raceme; peduncles short, pubescent; involucre with 14 florets; scales with scarious margins, slightly colored at the summit. *Seeds* hairy; pappus colored.—Purple. 2f. Aug.—Oct. Dry soils. Common. 2—4 feet.

13. L. SPHÆROI'DEA, (Mich.) *Stem* erect, pubescent. *Leaves* lanceolate, acute, slightly coriaceous, glabrous, the lower broader than the upper ones. *Flowers* in terminal racemes; involucre nearly globular, with many florets; scales obtuse, colored, sometimes fimbriate, dotted. *Seeds* hairy; pappus slightly plumose.—Purple. 2f. Aug.—Oct. Middle and upper districts of Car. and Geo.

14. L. SQUARRO'SA, (L.) *Stem* erect, pubescent, leafy. *Leaves* long, linear, rigid; lower ones 3—5-nerved, radical ones very long, glabrous, the upper ones frequently ciliate. *Flowers* few, in a terminal raceme; involucre cylindrical, with ovate, ciliate scales, with expanding points. *Corolla* deeply cleft; segments hairy. *Seeds* hairy; pappus colored.—Purple. 2f. Sept.—Oct. Dry pine-barrens.

Blazing Star. Rattlesnake's Master.

15. L. PAUCIFLO'RA, (Pursh.) *Stem* simple, glabrous. *Leaves* linear

Flowers in leafy, virgate panicles, with the branches few-flowered; involucre sessile, secund, 3—5-flowered; scales erect, lanceolate-acute, glabrous. *Elliott.*

b. Suffructicose.

16. L. FRUCTICO'SA, (Nutt.) *Leaves* obovate, glabrous, branching; lower leaves opposite, upper alternate, cuneate, oblong, entire. *Branches* corymbose, naked toward the summit; involucre campanulate, about 5-flowered; scales imbricate, in about 3 series; outer shortest. *Achenia* pubescent.—2f. East Florida.

c. Root a rhizoma. Leaves dilated.

17. L. PANICULA'TA, (Willd.) *Stem* erect, hairy, viscid, colored, and branching toward the summit. Radical leaves spatulate, lanceolate, dentate, glabrous; cauline leaves sessile, nerved, ovate-lanceolate, hairy. *Flowers* in terminal panicles; branches 4—6-flowered; involucre 4—5 florets, 6—8-leaved. *Corolla* viscid. *Seeds* hairy; pappus purple.—Purple. 2f. Sept.—Oct. Pine-barrens. 1—2 feet.

18. L. ODORATIS'SIMA, (Willd.) *Stem* erect, simple, glabrous, striate, purple. *Leaves* ovate or lanceolate; radical ones spatulate, somewhat dentate; cauline ones clasping. *Flowers* in corymbose panicles; involucre usually with 7 florets, 10—12-leaved. *Leaves* appressed, glabrous. *Seeds* hairy; pappus colored.—Purple. 2f. Sept.—Oct. 3—4 feet. *Vanilla-plant.*

The root of the *Liatris spicata* is said to possess powerful diuretic properties, and is used in the form of a decoction, as a gargle for sore throat.

The *L. scariosa* and *squarrosa* are said to be an antidote to the poison of the rattlesnake, and are used to cure the bite of this animal: the former is known by our plantation negroes as the rattlesnake's master.

GENUS IX.—KUHN'IA. L.

(In honor of Adam Kuhn, a pupil of Linnæus.)

Involucre cylindrical, imbricate, 10—25-flowered; florets all perfect, tubular. *Receptacle* naked; pappus plumose, sessile. *Seed* pubescent, striate.

1. K. EUPATORIOI'DES, (L.) *Stem* glabrous, branching, the young branches very pubescent. *Leaves* broad-lanceolate, irregularly serrate, petiolate, slightly scabrous on the upper surface, pubescent beneath, spotted. *Flowers* in panicles, terminal; involucre about 10-flowered, with linear, pubescent leaves, the outer ones small. *Seeds* pubescent.—White. 2f. Sept.—Oct. Middle and Western Geo. and Ala. 2—3 ft.

2. K. CRITONIA, (Ell.) *Stem* pubescent, slender, striate. *Leaves* lanceolate or linear, petiolate, entire, with the margin revolute when young, dotted beneath. *Flowers* in terminal, divaricate panicles; involucre imbricate, with 8—10 flowers. *Leaves* linear, pubescent; outer ones reflexed at the summit. *Seed* cylindrical; pappus of numerous plumose rays.—White. 2f. Sept.—Oct. In dry soils. Common. 2—3 feet.

GENUS X.—BRICKEL'LIA. Ell.

(In honor of Dr. Brickell, of Savannah.)

Heads many-flowered. *Involucre* campanulate, imbricate. *Receptacle* naked, flat, or slightly convex. *Achenia* 10, striate,

elongated; pappus setaceous, pale purple, persistent. *Flowers* pale purple. Herbaceous plant, with opposite, 3-nerved leaves and corymbose heads.

1. B. CORDIFO'LIA, (Ell.) *Stem* simple, pubescent, corymbose at the summit. *Leaves* opposite, cordate, dentate, finely pubescent; branches of the style much exserted.—Pale purple. 2f. Western Geo. and Florida. 3 feet.

GENUS XI.—EUPATO'RIUM. Tourn.

(From Eupator, King of Pontus.)

Involucre cylindrical, imbricate, campanulate, scales. *Florets* all perfect, tubular, 5-toothed. *Style* long, deeply cleft. *Receptacle* naked. *Seed* glabrous, 5-striate or angled. *Pappus* plumose, usually scabrous.

a. Involucre 3—5-flowered.

1. E. FŒNICULA'CEUM, (L.) *Stem* striate, finely pubescent, with paniculate branches; lower leaves compoundly pinnate, with filiform segments, glabrous, furrowed on the upper surface; the upper ones setaceous, in clusters. *Flowers* in compound erect panicles, very small and very numerous; involucre with 5 interior equal leaves, and 5 small exterior ones, all pubescent. *Seeds* cylindrical; receptacle naked.—Yellowish-white. 2f. Sept.—Oct. Very abundant. 3—10 feet.

2. E. CORONOPIFO'LIUM, (L.) *Stem* erect, pubescent, paniculately branched; lower leaves pinnatifid, with 5—7 linear-lanceolate segments, denticulate; upper leaves linear, clustered, all pubescent. *Flowers* in compound panicles; involucre with 8—10 unequal, pubescent leaves. *Seed* glabrous, pappus scabrous.—White. 2f. Sept.—Oct. Poor soils. Common. 3—4 feet.

3. E. PINNATIF'IDUM, (Ell.) *Stem* erect, striate, pubescent, branching, with the branches pubescent; lower leaves pinnatifid, verticillate, with linear segments, pubescent; upper leaves generally alternate. *Flowers* in fastigiate corymbs; involucre 8—10-leaved, with glandular dots on the back. *Seed* oblong, deeply striate; pappus scabrous.—White. 2f Sept.—Oct. Damp soils. 3—4 feet.

4. E. LINEARIFO'LIUM, (Walt.) *Stem* usually procumbent, very pubescent toward the summit, branching. *Leaves* sessile, pubescent, linear-lanceolate, with clusters of small leaves at the axil. *Flowers* in irregular corymbs; involucre with 10 linear villous leaves, glandular on the outer surface. *Seed* deeply striate, pappus scabrous.—White. 2f. Aug.—Sept. Dry soils. Common. 1—2 feet.

5. E. HYSSOPIFO'LIUM, (L.) *Stem* erect, pubescent. *Leaves* sessile, the lower ones linear-lanceolate, opposite, somewhat toothed, upper ones alternate, pubescent, with clusters of small leaves in the axils. *Flowers* in terminal corymbs; involucre 10-leaved, sprinkled with glandular dots, purplish at the summit. *Seed* furrowed, glandular; pappus scabrous.—White. 2f. Sept.—Oct. Very common. 2—3 ft.

6. E. GLAUCES'CENS, (Ell.) *Stem* erect, pubescent. *Leaves* broad-lanceolate, slightly serrate toward the summit, 3-nerved, pubescent, with a pair of small leaves in the axil. Leaves of the branches usually alternate, small, glaucous. *Flowers* in corymbs; involucre with 8—10

lanceolate leaves, pappus scabrous.—White. 2f. Aug.—Sept. Rich soils. Mid. and upper Car. and Geo. 2—3 feet.

7. E. SESSIFO'LIUM, (L.) *Stem* somewhat angled. *Leaves* sessile, amplexicaul, rounded at the base, dotted beneath, opposite, serrate. *Flowers* in terminal corymbs; peduncles pubescent.—White. 2f. Aug.—Sept. Mountains. 2—3 feet.

8. E. TRUNCA'TUM, (Muhl.) *Stem* erect, pubescent, particularly toward the summit. *Leaves* sessile, amplexicaul, lanceolate-serrate, glabrous on the upper surface, pubescent along the veins, beneath dotted, truncate at the base; involucre pubescent.—White. 2f. Aug.—Sept. Mountains. 2—3 feet.

9. E. AL'BUM, (L.) *Stem* erect, striate, villous; lower leaves opposite, the upper alternate, all pubescent, coarsely toothed, sessile, lanceolate. *Flowers* in fastigiate corymbs; involucre 10-leaved, the 5 interior long, white, with glandular dots. *Seed* furrowed, pappus scabrous.—White. 2f. Aug.—Sept. Poor soils. Common. 2—3 feet.

10. E. PARVIFLO'RUM, (Ell.) *Stem* erect, pubescent. *Leaves* sessile, lower ones opposite, upper ones alternate, lanceolate, serrate toward the apex, entire and alternate at the base. *Flowers* in terminal corymbs; involucre with the interior leaves ligulate, the exterior small, all pubescent, dotted. *Seeds* angled.—White. 2f. Sept.—Oct. Southern Georgia. 1—2 feet.

11. E. SCAB'RIDUM, (Ell.) *Stem* pubescent, with the lower branches brachiate, the upper ones alternate. *Leaves* sessile, ovate-lanceolate, opposite, serrate toward the summit, acute, and entire at the base. *Flowers* in corymbs; involucre with acute lanceolate leaves, dotted. *Seed* angled.—White. 2f. Aug.—Oct. Dry soils. Common. 2—5 ft.

12. E. ROTUNDIFO'LIUM, (L.) *Stem* pubescent. *Leaves* sessile, decussate, deltoid, obtusely serrate, slightly scabrous, glaucous. *Flowers* in fastigiate corymbs; involucre with pubescent, acute scales. *Seed* angled; pappus scabrous.—White. 2f. July—Sept. Dry pine-barrens. 2—3 feet. *Wild-horehound.*

13. E. VERBENÆFO'LIUM, (Mich.) *Stem* erect, pubescent. *Leaves* sessile, decussate, coarsely toothed, dotted, hairy on the under surface, somewhat deltoid. *Flowers* in corymbs; involucre with hairy, lanceolate leaves. *Seed* angled; pappus scabrous.—White. 2f. Aug.—Sept. Damp soils. 2—3 feet. *E. tenuifolium*, Willd.

14. E. PUBES'CENS, (Muhl.) *Stem* erect, pubescent, lower branches opposite, upper alternate. *Leaves* sessile, ovate, alternate at the summit, obtuse at the base, slightly scabrous; the lower doubly serrate and opposite, the upper slightly serrate and alternate. *Flowers* in fastigiate corymbs; involucre with hairy, linear-lanceolate leaves. *Seed* angled; pappus scabrous.—White. 2f. Aug.—Oct. Sandy woods. 2—3 ft.

15. E. CUNEIFO'LIUM, (Willd.) *Stem* erect, pubescent. *Leaves* obovate, lanceolate, petiolate; lower ones obtusely serrate, the upper with few serratures toward the apex. *Flowers* in corymbs. *Involucre* 8—10-leaved.—White. 2f. Aug.—Sept. 10—12 inches.

b. Involucre many-flowered.

16. E. PERFOLIA'TUM, (L.) *Stem* erect, striate, villous, covered with glandular dots; lower leaves perfoliate, tapering from the base to the summit, serrate, pubescent on the upper surface, tomentose beneath.

the upper leaves distinct, truncate at the base. *Flowers* in large corymbs; involucre many-leaved, with acute, linear-lanceolate, pubescent leaves. *Seed* angular.—White. 2f. Sept.—Oct. At Barhamville, near Columbia. 3—6 feet. *Boneset.*

17. E. CEANOTHIFO'LIUM, (Muhl.) *Stem* erect, glabrous, or slightly pubescent. *Leaves* opposite, on short petioles, ovate-lanceolate, acuminate, toothed, slightly scabrous, obtuse at the base. *Flowers* in terminal corymbs; involucre with 10 nearly equal leaves, pubescent. *Seeds* angled; pappus plumose.—White. 2f. Sept.—Oct. In rich soils, low country. 2—3 feet.

18. E. AGERATOI'DES, (Ell.) *Stem* erect, glabrous. *Leaves* usually opposite, ovate-lanceolate, acuminate, coarsely toothed, glabrous, on rather long petioles. *Flowers* in corymbs; involucre with 10 nearly equal leaves. *Seeds* angled; pappus slightly scabrous.—White. 2f. Sept. —Oct. On the seacoast. 2—3 feet.

19. E. AROMAT'ICUM, (L.) *Stem* erect, terete, finely pubescent. *Leaves* opposite, cordate, ovate, acute, coarsely toothed, finely pubescent beneath. *Flowers* in terminal corymbs; involucre with 10 nearly equal leaves. *Seed* angled.—White. 2f. Fragrant. Aug.—Oct. Dry rich soils. 2—3 feet.

20. E. SEROTI'NUM, (Mich.) *Stem* erect, almost tomentose. *Leaves* ovate-lanceolate, large, tapering toward the summit; the lower ones opposite, the upper alternate, on rather long petioles. *Flowers* numerous, in fastigiate corymbs; involucre with 10 linear, villous leaves. *Seeds* angled; pappus scabrous.—White. 2f. Sept.—Oct. On the seacoast. 5—6 feet.

21. E. INCARNA'TUM, (Walt.) *Stem* erect, very finely pubescent. *Leaves* opposite, on long petioles, cordate, deltoid, obtusely toothed. *Flowers* in terminal corymbs; involucre with 15—20 nearly equal scales, slightly pubescent. *Seed* angled; pappus pilose.—Purple. Oct.—Nov. In rich soils. 2—3 feet.

c. Involucre with the scales scarious. Leaves verticillate.

22. E. TERNIFO'LIUM, (Ell.) *Stem* erect, striate, pubescent. *Leaves* usually ternate, petiolate, ovate, acuminate, pubescent beneath, toothed, dotted on the under surface. *Flowers* in terminal corymbs; involucre with about 15 linear-lanceolate leaves, the exterior ones shorter and broader. *Seed* angled; pappus pilose.—Light-purple. 2f. Sept. —Oct. Damp soils. 3—4 feet.

23. E. PURPU'REUM, (L.) *Stem* erect, glabrous, or nearly so, tinged with purple. *Leaves* 4—6 in a whorl, oval, lanceolate, petiolate, serrate, somewhat pubescent on the under surface, dotted. *Flowers* in large, terminal corymbs; involucre generally 5-flowered, with the leaves slightly pubescent. *Seed* angled; pappus pilose.—Pale purple. 2f. Sept.—Oct. Moist soils. 4—8 feet.

24. E. MACULA'TUM, (L.) *Stem* erect, furrowed, with purple dots. *Leaves* 4—5 in a whorl, ovate, lanceolate, acute at each end, pubescent beneath, unequally serrate. *Flowers* in terminal corymbs; involucre 5—8-flowered. *Seed* angled.—Pale purple. 2f. Aug.—Sept. Moist soils. 4—5 feet.

25. E. VERTICILLA'TUM, (L.) *Stem* erect, glabrous or pubescent toward the summit, tinged with purple. *Leaves* 3—4 in a whorl, ovate-

lanceolate, coarsely serrate, glabrous, doted on the under surface. *Flowers* in terminal corymbs; involucre with 10—12 ovate, obtuse leaves. *Seeds* angled; pappus scabrous.—Purple. 2f. Sept.—Oct. Middle and upper Car. and Geo. 4—6 feet.

Many of the species of Eupatorium possess decided medical properties. The E. perfoliatum is a well-known domestic medicine, and has been used with much success in arresting disease in its incipient state. It is a tonic and diaphoretic, and in large doses an emetic.

Genus XII.—MIKA'NIA. Willd.

(In honor of Prof. James Mikan.)

Involucre 4—6-leaved, equal, with 4—6 florets. *Corolla* 5-toothed, dilated. *Receptacle* naked; florets all perfect, tubular. *Style* long, deeply cleft. *Pappus* pilose. *Achenia* angled. Twining plants.

1. M. scan'dens, (Willd.) *Stem* twining, glabrous. *Leaves* cordate, acuminate, repand toothed, with unequal divaricate lobes. *Flowers* in axillary corymbs.—Bluish-white. 2f. July—Sept. Margins of rivulets. Common. 10—15 feet. *Climbing Thoroughwort.*

2. M. pubes'cens, (Muhl.) *Stem* twining, pubescent; striate. *Leaves* cordate, acuminate, angularly toothed, somewhat hastate at the base. *Flowers* in axillary and terminal paniculate corymbs; involucre 5-leaved, one smaller than the rest, hairy. *Flowers* fragrant. *Seed* oblong, striate; receptacle dotted.—Pale purple. 2f. July—August. Common. 15—20 feet.

Genus XIII.—CONOCLIN'IUM. D. C. (*Eupatorium cœlestinum*, L.)

(From *konos*, a cone, and *klino*, a bud, in allusion to the receptacle, which is conic.)

Heads many-flowered *Involucre* campanulate, scales in 2—3 series, linear, acute. *Receptacle* naked, conical. *Corolla* 5-cleft. *Pappus* pilose, scabrous, in one series. *Achenia* angled, glabrous. Herbaceous plants with opposite, toothed leaves. Heads in terminal crowded corymbs.

1. C. cœlestinum, (L.) *Stem* pubescent. *Leaves* opposite, cordate-ovate, on short petioles, deltoid, slightly scabrous, obtusely toothed. *Flowers* in fastigiate corymbs; involucre with numerous linear, pubescent leaves. *Seed* angled; pappus scabrous. *Receptacle* conic.—Light blue, with red dots. Fragrant. 2f. Sept.—Oct. Rich shaded soils. 2—3 feet.

Tribe III.—ASTEROI'DEÆ.

Capitula heterogamous, rarely homogamous or diœcious. Staminate flowers tubular, regularly toothed. *Style* with the branches flat, linear or lanceolate, pubescent externally at the base.

Genus XIV.—GALATEL'LA. Cass. (*Aster hyssopifolia*, Nees.)

(From *gala*, milk.)

Heads many-flowered, heterogamous; ray florets neutral, those of the disk perfect. *Involucre* shorter than the disk, with

the scale imbricate. *Receptacle* alveolate. *Corolla* of the disk deeply 5-cleft. *Achenia* hirsute or villous. *Pappus* setaceous, in many series. Herbaceous plants, with alternate, entire leaves, and fastigiate branches.

1. G. HYSSOPIFO'LIA, (Nees.) *Stem* erect, glabrous, striate, with fastigiate branches. *Leaves* linear-lanceolate, 3-nerved, acute, with scabrous margins. *Flowers* in terminal fastigiate corymbs; involucre ovate, the interior scales obtuse, the exterior acute, florets of the ray from 3—10. —White, tinged with purple. 2f. Aug.—Oct. Common. Middle Car. and Geo. 1—2 feet.

GENUS XV.—SERICOCAR'PUS. Nees. (*Aster solidaginoides*, Mich., *A. conyzoides*, Willd., *A. tortifolius*, Mich.)

(From *serikos*, silky, and *karpos*, fruit.)

Involucre obovate, oblong, with scales in several series, the tips herbaceous and spreading. *Receptacle* alveolate. *Achenia* obpyramidal, short, densely silky. *Pappus* simple, rigid. Herbaceous plants, with alternate sessile leaves, and corymbose flowers and branches, and white flowers.

1. S. SOLIDAGIN'EUS, (Nees.) *Stem* glabrous, slightly angled. *Leaves* linear-lanceolate, sessile, entire, scabrous on the margin. *Flowers* sessile, in small clusters on corymbose fastigiate branches; involucre cylindrical, with obtuse reflexed scales. *Seeds* oblong, silky, pubescent, angled.—White. 2f. July—September. Rich soils. Common.

2. S. CONYZOI'DES, (Nees.) *Stem* simple, striate, slightly pubescent, or somewhat rigid. *Leaves* sessile, the lower ones cuneate-lanceolate, serrate, ciliate, and scabrous along the margins, upper ones entire, lanceolate. *Flowers* in sessile clusters, on fastigiate corymbose branches; involucre cylindrical, with oblong ciliate scales; ray florets sometimes 6, 2—3-cleft at the summit. *Seeds* villous; pappus scabrous.—White, tinged with purple. 2f. June—Aug. Middle upper dist. Car. and Geo.

3. S. TORTIFO'LIUS, (Nees.) *Stem* pubescent, branching toward the summit. *Leaves* sessile, tortuous, obovate, acute or obtuse, entire, pubescent. *Flowers* in sessile clusters, on fastigiate corymbose branches; involucre cylindrical, with appressed linear-lanceolate scales; ray florets 2-cleft. *Seeds* oblong, pubescent.—White. 2f. Low country. 2 feet.

GENUS XVI.—AS'TER. L.

(From *aster*, a star.)

Involucre imbricate, with the lower scales generally expanding, florets of the ray usually more than 10, never yellow; those of the disk hispid. *Receptacle* naked; pappus simple, pilose.

a. Leaves entire, florets of the ray generally numerous. Seeds silky, pubescent.

1 A. FLEXUO'SUS, (Mich.) *Stem* procumbent, assurgent, glabrous. *Leaves* subulate, linear, sessile, 3-nerved, somewhat fleshy, very long.

Flowers terminal, on scattered branches; involucre with numerous linear-lanceolate scales, tinged with purple; ray florets 3-toothed, generally 20. *Seed* angled, oblong.—Pale purple. 4. Sept.—Oct. On the seacoast. 2—3 feet.

2. A. CHAPMAN'II, (T. & G.) *Stem* glabrous, simple, or branched at the base, slender, corymbose at the summit, branches terminated by single heads. *Leaves* numerous, linear, subulate, appressed. Rays elongated, 20 or more; achenia oblong, compressed, glabrous.—Flor.

3. A. PALUDO'SUS, (L.) *Stem* pubescent near the summit. *Leaves* sessile, subulate, acute, glabrous beneath, scabrous on the upper surface and margins, sometimes ciliate. *Flowers* solitary, large, on naked peduncles; involucre squarrose, the lower scales leaf-like, reflexed; ray florets long, numerous. *Seeds* glabrous, angled.—Purple. 4. Oct.—Nov. Pine-barrens. Common.

4. A. GRANDIFLO'RUS, (L.) *Stem* pubescent toward the summit. *Leaves* scabrous, linear, sessile, rigid, reflexed, with the margin ciliate. *Flowers* solitary at the extremities of the branches; scales of the involucre linear-lanceolate, reflexed; ray florets numerous, large. *Seeds* scarcely pubescent.—Purple. Oct.—Nov. Sandy woods. 2—3 feet.

5. A. EXI'LIS, (Ell.) *Stem* erect, slender, with corymbose branches. *Leaves* long, linear, slightly scabrous, diminishing in size toward the summit. *Flowers* on the upper branches in racemes; involucre with glabrous, linear-lanceolate scales; ray florets numerous, narrow.—Purple. 4. Sept.—Oct. Damp soils. 4—5 feet.

6. A. SUBULA'TUS, (Mich.) *Stem* erect, glabrous, much branched. *Leaves* long, linear, subulate, appressed. *Flowers* numerous, on terminal peduncles; involucre cylindrical, with the summit of the scales slightly reflexed; ray florets numerous, 3-cleft, short.—Purple. 4. Sept.—Oct. Seacoast. 2—3 feet. *A. linifolius*, L.

7. A. FOLIOLO'SUS, (Ait.) *Stem* erect, branching, glabrous. *Leaves* sessile, linear-lanceolate, appressed, with scabrous margins, those of the branches minute and numerous. *Flowers* in compound panicles; involucre with acute appressed scales, hairy, or ciliate at the summit; ray florets numerous, linear-lanceolate. *Seed* glabrous.—Purple. 4. Sept. —Oct. In dry soils. Common. 2—3 feet. In part, *A. dumosus*, L.

8. A. SPARSIFLO'RUS, (Ait.) *Stem* slender, erect, with expanding branches, glabrous. *Leaves* linear, reflexed, entire. *Flowers* solitary, at the extremity of the branches; involucre with acute, appressed scales. —Purple. 4. Aug.—Sept. Low country. 2—3 feet.

9. A. TENUIFO'LIUS, (L.) *Stem* erect, glabrous near the base, branching. *Leaves* numerous, linear-lanceolate, tapering at each end, slightly scabrous along the margins, upper ones minute. *Flowers* in racemes, on short peduncles; involucre with appressed linear acute scales; ray florets numerous, narrow. *Seed* oblong.—Purple. 4. Oct.—Nov. Mid. upper dist. Car. and Geo.

10. A. DUMO'SUS, (L.) *Stem* erect, glabrous, much less branched than the preceding species. *Leaves* linear-lanceolate, entire, with the margins slightly scabrous. *Flowers* solitary, terminal at the summit of the paniculate branches; involucre with acute glabrous, linear-lanceolate scales; ray florets numerous, narrow. *Seeds* scarcely pubescent. —Purple. 4. Sept.—Oct. In damp, rich soils. 1—2 feet.

11. A. ERICOI'DES, (Willd.) *Stem* erect, slender, with numerous expanding branches. *Leaves* of the stem linear, glabrous, acute at each end, those of the branches subulate, numerous, very small. *Flowers* in racemes, on short peduncles; involucre with lanceolate scales; ray florets numerous, linear.—Purple. 2f. Oct.—Nov. Barren soils. Common. 2—3 feet.

12. A. RACEMO'SUS, (Ell.) *Stem* diffuse, with slender, slightly pubescent branches. *Leaves* linear-lanceolate, with the margins scabrous, pubescent beneath, those of the branches very small. *Flowers* in simple racemes at the summit of the branches; involucre with linear-lanceolate scales; ray florets numerous, linear.—Purple. 2f. Sept.—Oct. On the coast. 1—2 feet.

13. A. MULTIFLO'RUS, (L.) *Stem* diffusely branched, almost hispid. *Leaves* linear, acute, pubescent, and fringed along the margin. *Flowers* in terminal racemes, somewhat secund; involucre with ciliate, obovate scales, squarrose.—Almost white. 2f. Aug.—Sept. In open fields. Common. 2—3 feet.

14. A. ADNA'TUS, (Nutt.) *Stems* minutely hispid, branches virgate. *Leaves* small, appressed, joined to the stem, except the tips.—Pale purple. Mid. Car. and Geo. Oct.—Nov. 18—24 inches.

15. A. SQUARRO'SUS, (Walt.) *Stem* procumbent, branching, hispid, hairy. *Leaves* small, numerous, ovate, reflexed, hispid along the margin, scabrous. *Flowers* terminal, in a loose panicle; involucre with lanceolate hairy scales; ray florets numerous, 3-toothed, rather large. —Blue. 2f. Sept.—Oct. Dry soils. Common. 2—3 feet.

16. A. CONCO'LOR, (L.) *Stem* erect, pubescent, sparingly branched toward the summit. *Leaves* pubescent, almost tomentose, oblong-lanceolate. *Flowers* in terminal racemes; involucre with lanceolate, silky scales; ray florets linear-lanceolate.—Blue. 2f. Sept.—Oct. Dry soils. Common. 2—3 feet.

17. A. RETICULA'TUS, (Pursh.) *Stem* erect, tomentose, branching toward the summit. *Leaves* sessile, oblong-lanceolate, acute, margins revolute, tomentose, 3-nerved. *Flowers* in racemes; involucre with acute scales.—White. 2f. Aug.—Oct. Car. and Geo. 2—3 feet.

18. A. NOVÆ AN'GLIÆ, (L.) *Stem* erect, with diffuse, spreading branches, hairy. *Leaves* narrow, lanceolate, amplexicaul, auriculate at the base, hairy, and scabrous along the margin. *Flowers* in terminal panicles; involucre with lanceolate scales, somewhat hispid; ray florets numerous, narrow.—Purple. 2f. Sept.—Oct. Western Geo. 4—10 feet.

19. A. CYA'NEUS, (Ell.) *Stem* glabrous, young branches slightly pubescent, expanding. *Leaves* linear-lanceolate, somewhat scabrous, slightly amplexicaul. *Flowers* in paniculate racemes; involucre with appressed linear-lanceolate scales; ray florets numerous, narrow. *Seed* pubescent.—Purple. 2f. Sept.—Oct. Middle Car. and Geo. 3—4 feet. *A. concinus*, Willd.

20. A. VIRGA'TUS, (Ell.) *Stem* erect, glabrous, with long erect virgate branches, slightly pubescent at the summit. *Leaves* linear-lanceolate, amplexicaul, long, glabrous, margins slightly scabrous. *Flowers* in terminal racemes; involucre with the scale slightly squarrose, slightly mucronate; ray florets small. *Seeds* scarcely pubescent.—Purple. 2f. Sept.—Oct. Middle Geo. 3—4 feet.

21 A. Carolinia'nus, (Walt.) *Stem* shrubby, flexuous and decumbent, much branched, pubescent. *Leaves* oblong-lanceolate, sessile, attenuate at each end, pubescent, dilated and amplexicaul at the stem. *Flowers* large, numerous, solitary, on short peduncles; involucre with pubescent scales; ray florets numerous.—Purple. ♄. Oct.—Nov. In swamps. 8—12 feet.

b. Leaves serrate. Flowers in corymbs.

22. A. surculo'sus, (Mich.) *Stem* erect, simple, pubescent toward the summit. *Leaves* sessile, lanceolate, glabrous, ciliate when young, slightly serrate; upper leaves generally entire. *Flowers* large, in terminal corymbs; involucre with oblong, ovate, pubescent scales, reflexed; ray florets numerous, large. *Seeds* nearly glabrous.—Purple. 2f. Oct.—Nov. Car. and Geo. 6—11 inches.

23. A. Curtis'ii, (T. & G.) *Stem* smooth, glabrous, simple, leafy, corymbose or racemose at the summit; branches short, bearing a single or few heads. *Leaves* lanceolate, sessile, serrate; involucre hemispherical, scales unequal, imbricate, coriaceous, rays large, 20 or more. *Achenia* glabrous.—Blue or purple. 2f. N. Car. 2—3 feet.

24. A. puni'ceus, (Ell.) *Stem* erect, glabrous, shining, branches striate, pubescent. *Leaves* spatulate, sessile, clasping, serrate, scabrous on the upper surface, large. *Flowers* in corymbose panicles, large; involucre with ciliate, linear reflexed scales; ray florets numerous, linear-lanceolate.—Purple. 2f. Oct.—Nov. On the banks of rivers in Sou. Geo. 2—3 feet. *A. Elliottii*, T. & G.

25. A. dracunculoi'des, (Willd.) *Stem* erect, with corymbose branches marked with a hairy line. *Leaves* linear, or linear-lanceolate, acuminate, serrate in the middle, upper ones entire. *Flowers* small, in corymbs; involucre with lanceolate expanding scales.—Nearly white. 2f. Sept.—Nov. In low grounds. Upper Car.

c. Leaves serrate.

26. A. jun'ceus, (Ait.) *Stem* erect, with long, slender branches, slightly pubescent. *Leaves* sessile, linear-lanceolate, serrate, glabrous, upper ones entire. *Flowers* in racemes; involucre with linear-lanceolate scales, nearly glabrous; ray florets small, narrow.—Purple. 2f. Sept.—Oct. Damp soils. 2—4 feet.

27. A. diver'gens, (Ait.) *Stem* erect, pubescent toward the summit, branching. *Leaves* broad-lanceolate, serrate, glabrous, upper ones entire. *Flowers* in crowded racemes; involucre with linear-lanceolate, glabrous scales.—White, tinged with purple. 2f. Sept.—Oct. Common. 3—4 feet. *A. miser*, L.

28. A. tradescan'ti, (L.) *Stem* erect, glabrous, with numerous virgate branches. *Leaves* lanceolate, serrate, attenuate at each end, upper ones small, entire. *Flowers* numerous, in compound racemes; involucre with linear-lanceolate scales; ray florets numerous, narrow.—Purple. 2f. Sept.—Oct. Near the mountains. 3—4 feet.

29. A. versico'lor, (Willd.) *Stem* erect, branching, glabrous. *Leaves* broad, lanceolate, amplexicaul, glabrous, serrate in the middle, upper ones entire. *Flowers* clustered toward the summit of the branches; involucre with loose, lanceolate scales.—White or purple. Sept.—Oct. In damp soils. 2—3 feet.

30. A. LÆVIGA'TUS, (Pursh.) *Stem* glabrous, much branched. *Leaves* broad, lanceolate, glabrous, slightly serrate, somewhat amplexicaul, the upper ones narrower and entire. *Flowers* large, in racemose panicles; involucre with linear-lanceolate scales; ray florets numerous, linear. *Seed* pubescent.—Purple. 4. Sept.—Oct. Damp rich soils. 2—4 feet. *A. Novi-Belgii*, L.

31. A. AMPLEXICAU'LIS, (L.) *Stem* erect, glabrous, somewhat branched. *Leaves* oblong, lanceolate, acute, amplexicaul, cordate, serrate, glabrous, the lower more attenuate and less cordate at the base. *Flowers* in terminal panicles; involucre with thick, glabrous, lanceolate scales; ray florets numerous, narrow. *Seed* nearly glabrous.—Purple. 4. Sept.—Oct. In dry soils. 2—3 feet.

d. Leaves cordate, generally serrate.

32. A. UNDULA'TUS, (L.) *Stem* erect, scabrous, branching. *Leaves* oblong, cordate, amplexicaul, scabrous, somewhat undulate, dentate near the summit. *Flowers* in loose, terminal panicles; involucre with pubescent, linear-lanceolate scales; ray florets numerous. *Seeds* hairy. —Purple. 4. Sept.—Oct. In dry soils. 2—3 ft. *A. patens*, Ait.

33. A. DIVERSIFO'LIUS, (Mich.) *Stem* erect, pubescent, scabrous, much branched toward the summit. *Leaves* entire or slightly toothed, petioles of the lower leaves winged, amplexicaul, those of the branches small, pubescent underneath, scabrous above. *Flowers* in terminal panicles; involucre with numerous, ciliate, pubescent scales. *Seeds* slightly angled, hairy.—Purple. 4. Sept.—Oct. Common. 2—3 feet. *A. undulatus.*

34. A. SAGITTIFO'LIUS, (Ell.) *Stem* erect, glabrous, much branched. Radical leaves oblong-lanceolate, cordate and sagittate at the base, unequally serrate, glabrous, petiolate; cauline leaves acuminate, on winged petioles, upper ones oblong, lanceolate, sessile. *Flowers* in racemes; peduncles leafy, involucre with lanceolate scales.—Purple. 4. Sept. —Oct. Upper district of Carolina. 2—3 feet

35. A. SCA'BER, (Ell.) *Stem* erect, striate, scabrous, somewhat hairy. Radical leaves on long petioles, cordate, with round lobes, acute at the apex; cauline leaves ovate-lanceolate, or linear-lanceolate, attenuate at the apex, rigid, scabrous. *Flowers* in long, terminal panicles; involucre with acute, appressed scales, pubescent; ray florets oval, numerous. *Seed* angled, hairy.—Purple. 4. Sept.—Oct. In dry soils. 2—3 feet.

36. A. PANICULA'TUS, (Muhl.) *Stem* erect, striate, glabrous, much branched, young branches pubescent. *Leaves* ovate-lanceolate, acute, slightly pubescent along the margins and veins, petiolate. *Flowers* in compact, racemose panicles; involucre with numerous, subulate scales; ray florets narrow, about 12. *Seeds* glabrous.—Purple. 4. Sept. —Oct. In rich soils. 3—4 feet. *A. sagittifolius*, Willd.

37. A. CORDIFO'LIUS, (L.) *Stem* erect, with pubescent branches. Radical leaves cordate, attenuate at the apex, serrate, on slightly winged petioles, pubescent beneath. *Flowers* in racemose panicles, numerous; involucre with linear-lanceolate scales, slightly appressed; ray florets narrow, about 12. *Seed* glabrous.—White, tinged with purple. 4. Sept.—Nov. Upper dist. Car. and Geo.

38. A. CORYMBO'SUS, (Ait.) *Stem* erect, glabrous, with slightly pubes-

cent branches. *Leaves* ovate, cordate, the upper spatulate, lanceolate, glabrous, acutely serrate. *Flowers* in fastigiate corymbs; involucre with pubescent, ovate-lanceolate scales; ray florets narrow, about 12. *Seeds* glabrous.—White, tinged with purple. 2f. Sept.—Oct. Upper dist. Car. and Geo. 2—3 feet.

39. A. AZURE'US, (Lind.) *Stem* erect, scabrous, branches rigid, slender, racemose. *Leaves* scabrous, lowest cordate, slightly serrate, higher ones ovate-lanceolate, all on long petioles, the upper ones lanceolate-linear, sessile, usually entire, those of the branches subulate, numerous, appressed; involucre obconic, scales closely imbricated. *Achenia* nearly glabrous.—Western and Southwestern States. Aug.—Oct. 1—3 ft.

40. A. SHORT'II, (Hook.) *Stem* slender, nearly glabrous. *Leaves* more or less cordate, lanceolate or ovate-lanceolate, acute, glabrous above, minutely pubescent beneath, mostly entire; involucre campanulate, scales closely imbricate. *Achenia* glabrous. *Heads* racemose, numerous, crowded, showy.—Violet-blue. Mountains. Sept.—Oct. 2—4 ft.

41. A. ASPERU'LUS, (T. & G.) *Stem* simple, racemose, paniculate at the summit, scabrous, pubescent. Radical leaves subcordate, oblong-ovate, slightly serrate, on slender petioles; cauline ones oblong or spatulate, sessile, rameal ones minute, scattered. *Heads* small, paniculate; involucre nearly hemispherical, scales oblong, closely imbricated; achenia minutely pubescent.—Blue or purple. Geo. 1—2 feet.

42. A. BALDWIN'II, (T. & G.) Plant minutely hispid, pubescent. *Stem* paniculately branched. *Leaves* sessile, rigid, entire, scabrous above, oblong-linear; those of the branches short, erect, acuminate, mucronate. Scales of the involucre linear, acute, minutely pubescent, loosely imbricated. *Achenia* slightly pubescent.—Blue or purple. Georgia. Dry soils. 1—3 feet.

43. A. MIRAB'ILIS, (T. & G.) *Stem* simple, corymbose, paniculate at the summit, scabrous, pubescent. *Leaves* ovate, serrate, the lower ones petiolate, the upper sessile, those of the branches small, roundish; involucre hemispherical, scales imbricate, oblong-linear; rays numerous, large. *Achenia* slender, striate.—Blue or violet. Columbia, S. C. 1—2 feet.

GENUS XVII.—ERIG'ERON. L.

(From *er*, spring, and *ger*, old, from their early fading.)

Heads many-flowered; ray florets numerous, pistillate; those of the disk tubular, perfect; scales of the involucre narrow, mostly in a single series. *Receptacle* flat, naked. *Achenia* compressed. *Pappus* usually in a single series of scabrous bristles. *Heads* solitary.

1. E. NUDICAU'LE, (Mich.) *Stem* erect, pubescent and scabrous near the summit. Radical leaves spatulate-lanceolate, acute, irregularly toothed, glabrous; cauline ones smaller, ciliate near the base. *Flowers* in small terminal corymbs; involucre with acute subulate leaves, pubescent near the base; ray florets numerous, somewhat 3-toothed at the summit; disk florets numerous, greenish-yellow, 5-toothed. *Seed* hispid; receptacle flat, dotted.—White. 2f. Through the summer. Common. 1—2 feet. *E. vernum*, T. & G.

2. E. BELLIDIFO'LIUM, (L.) *Stem* hirsute, very hairy. Radical leaves

obovate, slightly serrate; cauline leaves sessile, scattered, oblong-lanceolate, the lower ones similar to the radical. *Flowers* 3—5, terminal, central one the largest; involucre leaves in a double series, linear-lanceolate; ray florets linear; disk florets yellowish. *Seed* compressed, nearly glabrous; receptacle somewhat convex, dotted.—Pale blue. 2f. March—April. Common. 1—2 feet. *Robin's Plantain.*

3. E. STRIGO'SUM, (Muhl.) *Stem* pubescent, slightly scabrous. Radical leaves linear-lanceolate, denticulate; cauline ones long, linear, entire. *Flowers* in a terminal panicle; involucre with subulate leaves, pubescent; ray florets 2—3-cleft at the summit. *Seeds* hispid; exterior pappus minute scales, interior wanting, or a few pilose rays; disk florets yellow.—White. 2f. May—Aug. Common in sandy pastures. 2—3 feet.

4. E. AMBIG'UUM, (Nutt.) *Stem* erect, pubescent, somewhat scabrous. *Leaves* linear, lower ones serrulate. *Flowers* usually in pairs, axillary and terminal; involucre hemispherical.—Yellow. 2f. July—Aug. Middle Geo. 1—2 feet.

5. E. PHILADEL'PHICUM, (L.) *Stem* pubescent, slightly furrowed. Radical leaves cuneate, obovate, sometimes incisely toothed; cauline leaves oblong-lanceolate, amplexicaul, entire. *Flowers* in loose corymbs; ray florets capillary, numerous; involucre many-leaved, with the leaves arranged in two series, subulate.—White or pale purple. 2f. Feb.—June. Common. 1—2 feet.

6. E. QUERCIFO'LIUM, (Lam.) *Stem* pubescent. Radical leaves lyrate and coarsely toothed; cauline ones entire. *Flowers* few, terminal; ray florets numerous; involucre with numerous subulate leaves.—Pale blue or white. 2f. July—Aug. Middle Car. 8—12 inches.

7. E. CANADEN'SE, (L.) *Stem* hispid, paniculately branched. *Leaves* linear-lanceolate, narrow, ciliate. *Flowers* in racemose panicles; involucre cylindrical, with acute linear leaves; ray florets numerous, short, capillary; disk florets 4-cleft. *Seeds* somewhat hairy; pappus simple, pilose.—White. ☺. June—Sept. Common. 1—8 feet.

8. E. PUSIL'LUM, (Nutt.) *Stem* glabrous, slender. *Leaves* linear-lanceolate, entire, with scabrous margins. *Flowers* in simple panicles, with divaricate branches; involucre with narrow, acute leaves; ray florets numerous, capillary; pappus simple.—White. ☺. July—Sept. Common. 6—8 inches.

The two preceding species, we think, ought certainly to constitute a distinct genus, and we might add several varieties of these, differing from each other in a greater or less degree.

GENUS XVIII.—DIPLOPAP'PUS. Cass. (*Aster of Ell.*)

(From *diploos*, double, and *pappus*.)

Heads many-flowered; rays 8—12; disk tubular, perfect; scales of the involucre imbricate, subulate, lanceolate. *Receptacle* flat. *Pappus* double; interior of scabrous bristles, exterior very short.

1. D. LINARIIFO'LIUS, (Hook.) (*Chrysopsis linariifolia*, Nutt.) *Stem* erect, pubescent when young. *Leaves* numerous, linear, mucronate, scabrous, rigid. *Flowers* in umbellate corymbs, with one at the extremity of each branch; involucre imbricate; scales numerous, linear

lanceolate, fringed; ray florets linear-lanceolate, 3-cleft. *Seed* oblong, villous; pappus double, consisting of long and short hairs.—Pale purple and yellow. 4. Sept.—Oct. Dry soils. Common.

2. D. DICHOT'OMUS, (Hook.) *Stem* pubescent, dichotomously divided toward the summit. *Leaves* sessile, oblong-oval, obtuse, pubescent. *Flowers* in corymbs, on long, naked peduncles; involucre with linear-lanceolate scales, pubescent, short. *Seeds* hairy; pappus double.—White, tinged with purple. 4. Oct. On the sea-coast. 2 feet.

3. D. CORNIFO'LIUS, (Darl.) (*Chrysopsis humilis*, Nutt.) *Stem* erect, pubescent. *Leaves* lanceolate or somewhat rhomboidal, acuminate, glabrous, hispid along the margin and veins. *Flowers* in dichotomous corymbs; involucre with lanceolate, hairy scales; ray florets generally 8. *Seeds* glabrous.—White. 4. Sept.—Oct. Mountains. 1—2 feet.

4. D. AMYGDALI'NUS, (T. & G.) (*Chrysopsis amygdalina*, Nutt.) *Stem* striate, simple, branching, and finely pubescent toward the summit. *Leaves* lanceolate, acuminate, slightly pubescent, and scabrous on the upper surface. *Flowers* in terminal corymbs; involucre with short, lanceolate, pubescent scales; ray florets generally 12, narrow. *Seeds* pubescent.—White. 4. Aug.—Sept. On the borders of swamps. Middle Car. and Geo. 2 feet.

5. D. OBOVA'TUS, (T. & G.) (*Chrysopsis obovata*, Nutt.) *Stem* erect, pubescent, somewhat viscid when young, branching toward the summit. *Leaves* sessile, oval, mucronate, tomentose beneath, somewhat rugose. *Flowers* in paniculate corymbs; involucre with short, appressed scales; ray florets 10—13, 3-toothed. *Seed* hispid.—White. 4. May—June. Damp soils. 2—3 feet.

GENUS XIX.—BOLTO'NIA. L'Her.

(In honor of James Bolton.)

Involucre imbricate; ray florets numerous, pistillate; those of the disk perfect. *Receptacle* conic, dotted. *Seeds* flat, margined. *Pappus* awned, with two opposite ones larger than the rest.

1. B. ASTEROI'DES, (L'Her.) *Stem* erect, somewhat striate, glabrous. *Leaves* alternate, sessile, entire, lanceolate, glabrous, with scabrous margins. *Flowers* in panicles, on long peduncles; involucre with subulate scales; ray florets entire, linear; those of the disk yellow. *Seeds* compressed.—White or reddish. 4. Aug.—Sept. On the margins of swamps. Middle Car. and Geo. 1—2 feet.

2. B. GLASTIFO'LIA, (L'Her.) *Stem* erect, branching, slightly angled, glabrous. *Leaves* long, lanceolate, serrate, acute, with cartilaginous margins; lower ones somewhat toothed. *Flowers* solitary, on short peduncles; involucre with glabrous, subulate leaves, with the margins slightly serrulate; ray florets numerous; those of the disk numerous, yellow. *Seeds* pubescent, winged, obcordate; pappus consisting of scabrous bristles, unequal.—White or reddish. 4. July—Aug. Middle and Southern Geo. 2—3 feet.

3. B. DIFFU'SA. *Stem* diffusely branched. *Leaves* lanceolate, sessile, entire; those of the branches linear, of the branchlets subulate. *Achenia* obovate, narrowly winged; pappus of several short bristles and 2

subulate awns.—White. Sept.—Oct. Western Geo. and Ala. 2—7 feet.

Genus XX.—BRACHYCHÆTA. T. & G.

(From, we presume, *brakus*, short, and *chaite*, hair, in allusion to its stem.)

Heads few-flowered. *Involucre* cylindrical, imbricate; outer ones the shortest. *Receptacle* naked; disk florets about as long as the ray florets. *Pappus* consisting of short, scabrous bristles, in one series. *Achenia* obconic. Herbaceous plants, with alternate serrate leaves.

1. B. corda'ta, (T. & G.) *Stem* pubescent, simple or paniculately branched at the summit. *Leaves* cordate at the base of the stem, becoming less so toward the summit, finely veined. *Flowers* in a unilateral raceme or spike.—Yellow. 2f. N. Car. and Northern Geo. 2—4 feet.

Genus XXI.—SOLIDA'GO. L.

(From *solido*, I make firm.)

Involucre imbricate, with appressed scales; florets of the ray usually 5, pistillate; those of the disk perfect. *Receptacle* naked, punctate. *Pappus* pilose, simple.

1. S. discoi'deus, (Ell.) *Stem* erect, usually villous, with few erect, virgate branches. *Leaves* spatulate, coarsely serrate, acute, pubescent. *Flowers* in long, virgate panicles; involucre with villous, subulate scales; ray florets wanting; those of the disk deeply 5-cleft, 12—15. *Seed* glabrous.—Purple. 2f. Sept.—Oct. In rich, high lands. Northern Geo. 3—4 feet.

2. S. Canaden'sis, (L.) *Stem* erect, villous. *Leaves* lanceolate, serrate, 3-nerved, scabrous on the upper surface, pubescent beneath. *Flowers* in long, recurved racemes, secund; involucre with 12—16 oblong, appressed scales; ray florets very short.—Yellow. 2f. Sept.—Oct. Mountains of Car. *Golden Rod.*

3. S. pu'bens, (Rev. M. A. Curtis.) *Stem* virgate, nearly terete, pubescent, tomentose-villous above. *Leaves* oval-lanceolate, sessile, serrate, nearly glabrous above, pubescent on the veins beneath. *Heads* in small axillary clusters; involucre villous; rays small, 4—7; disk florets as many. *Achenia* canescent.—Aug.—Sept. N. C. 2—3 feet.

4. S. Buckley'i, (T. & G.) *Stem* villous, leafy. *Leaves* oblong, sessile, villous on the under surface, coarsely serrate. *Heads* in small axillary clusters; scales of the involucre nearly glabrous; rays 4—6; disk florets 9—12. *Achenia* glabrous.—Yellow. Oct. Ala. 2—3 feet.

5. S. proce'ra, (Ait.) *Stem* erect, villous. *Leaves* lanceolate, 3-nerved, acute at each end, finely serrate, scabrous on the upper surface, finely villous beneath. *Flowers* in erect racemes, paniculate; involucre with linear-lanceolate scales; ray florets small.—Yellow. 2f. Sept.—Oct. Middle Geo. 3—5 feet.

6. S. rugo'sa, (Willd.) *Stem* erect, hispid, branching toward the summit. Lower leaves sessile, lanceolate, serrate, scabrous, hairy un-

derneath; upper leaves ovate, sparingly serrate. *Flowers* in expanding, paniculate racemes; racemes secund, recurved; involucre with linear, lanceolate scales; ray florets small.—Yellow. 2f. Sept.—Oct. Rich soils. Variable in its characters. 3—7 feet. *S. altissima*, L.

7. S. AS'PERA, (Ait.) *Stem* erect, hairy, terete, slightly scabrous. *Leaves* sessile, ovate-lanceolate, or somewhat elliptic, scabrous on the upper surface, hairy beneath, serrate. *Flowers* in paniculate, recurved racemes; involucre with linear-lanceolate scales; ray florets small.—Yellow. 2f. Sept.—Oct. Middle Car. and Geo. 3—5 feet. *S. altissima*, L.

8. S. CURTIS'II, (T. & G.) *Stem* virgate, simple, nearly glabrous, leafy to the summit, striate, angled. *Leaves* long-lanceolate, mostly glabrous, serrate, sessile, acuminate. *Heads* in dense axillary clusters; involucre minutely pubescent; exterior scales short; rays 4—6; disk as many. *Achenia* minutely pubescent.—Yellow. Mountains of N. C. 3—5 feet.

9. S. ALTIS'SIMA, (L.) *Stem* erect, hispid, stout, much branched at the summit. *Leaves* lanceolate, sessile, acute; lower ones deeply serrate, very scabrous, rugose. *Flowers* in large, paniculate racemes; racemes recurved. Perhaps a variety of the rugosa.—Yellow. 2f. Aug.—Sept. Common. 3—7 feet.

10. S. VILLO'SA, (Pursh.) *Stem* erect, villous, with many recurved branches near the summit. *Leaves* sessile, the lower ones oblong-lanceolate, serrulate, with a few hairs along the veins; the upper ones entire, ovate-lanceolate, with several small leaves in the axils. *Flowers* in a terminal panicle; racemes recurved, secund: involucre with linear scales; ray florets small.—Yellow. 2f. Sept.—Oct. Common. 3—5 feet. *S. pilosa*, Walt.

11. S. NEMORA'LIS, (Ait.) *Stem* erect, tomentose, sparingly branched. *Leaves* lanceolate, alternate at the base of the stem, slightly hispid, with axillary clusters of small leaves; those of the root serrate, somewhat cuneate. *Flowers* in paniculate racemes, secund; involucre with linear-lanceolate scales, pubescent along the margins.—Yellow. 2f. Sept.—Oct. In dry soils. Common. 2—3 feet.

12. S. ULMIFO'LIA, (Mich.) *Stem* erect, villous when young, tomentose, striate, with numerous recurved branches. Cauline leaves oblong-lanceolate, serrate, acute, scabrous on the upper surface, hairy beneath. *Flowers* in paniculate racemes; racemes secund and recurved; involucre with narrow, oblong scales; ray florets short. *Seed* pubescent.—Yellow. 2f. Sept.—Oct. In rich soils. *S. Drummondii*, T. & G.

13. S. VER'NA, (Rev. M. A. Curtis.) *Stem* erect, paniculate at the summit, cinerous-pubescent. Lower leaves ovate or oval, finely serrate, narrowed into winged petiole; upper ones sessile, mostly entire, few. *Heads* loosely racemose, many-flowered.—Yellow. N. C., near Wilmington. 2—3 feet.

14. S. ARGU'TA, (Ait.) *Stem* erect, glabrous, striate, with long virgate branches. Radical leaves spatulate, acutely serrate, with a long, attenuated base; cauline leaves elliptic, serrate; those of the branches entire, 3-nerved. *Flowers* in long, paniculate racemes; involucre with linear-lanceolate scales.—Yellow. 2f. Sept. Shaded soils.

15. S. SPITHA'MÆA, (Rev. M. A. Curtis.) *Stems* growing in tufts, villous, pubescent, leafy. *Leaves* oval or oblong-lanceolate, ciliate, nearly

glabrous, serrate above the middle. *Heads* many-flowered; rays small. —N. C., Roan Mountain. 8—10 inches.

16. S. CINERAS'CENS, (Schw.) *Stem* erect, pubescent, slender, with numerous slender, expanding branches toward the summit. *Leaves* long, linear-lanceolate; radical ones with a long, tapering base, slightly serrate; cauline ones small, and scattered toward the summit. *Flowers* in paniculate racemes; racemes secund, with the pedicels often 3-flowered.—Yellow. 2f. Sept.—Oct. Middle Geo.

17. S. JUN'CEA, (L.) *Stem* erect, slender, glabrous, sometimes pubescent; branches pubescent when young. *Leaves* long-lanceolate, glabrous, or pubescent, with scabrous margins; the lower ones serrate, obscurely 3-veined. *Flowers* in loose, terminal, paniculate racemes; racemes secund, recurved; involucre with oval, slightly pubescent scales. —Yellow. 2f. Sept.—Oct. Upper districts of Car. and Geo.
S. Boottii, Hook.

18. S. ELLIP'TICA, (Ell.) *Stem* erect, glabrous, with numerous recurved branches toward the summit. *Leaves* oval-lanceolate or elliptic, serrate, glabrous, with scabrous margins. *Flowers* in paniculate racemes; racemes secund, expanding, leafy; involucre with acute, linear scales, glabrous; rays 8—10; disk 5—7.—Yellow. 2f. Sept.—Oct. In rich soils. Low country. *S. Elliottii*, T. & G.

19. S. ODO'RA, (Ait.) *Stem* erect, pubescent toward the summit, branching. *Leaves* sessile, linear-lanceolate, glabrous, entire, with scabrous margins. *Flowers* in paniculate racemes; racemes recurved; involucre with linear-lanceolate scales.—Yellow. 2f. Sept.—Oct. Mountains.

20. S. RETROR'SA, (Mich.) *Stem* erect, glabrous or pubescent toward the summit. *Leaves* linear, sessile, tapering at the summit, glabrous, reflexed, scabrous along the margin. *Flowers* in paniculate racemes; racemes recurved; involucre with ciliate-lanceolate scales; ray florets 3; of the disk 3—4.—Yellow. 2f. Aug.—Oct. Very common.

21. S. TORTIFO'LIA, (Ell.) *Stem* erect, pubescent toward the summit. *Leaves* linear-lanceolate, slightly serrate, obscurely 3-veined, usually twisted. *Flowers* in compact, paniculate racemes, recurved; involucre with linear-lanceolate scales; ray florets 3—5.—Yellow. 2f. Aug.—Oct. Very common. 2—3 feet.

22. S. PYRAMIDA'TA, (Mich.) *Stem* erect, terete, hispid. *Leaves* oblong, ovate; margin serrulate, scabrous, somewhat amplexicaul; mid rib pubescent. *Flowers* in paniculate, filiform racemes: racemes secund, recurved, pubescent. *Corolla* small, ligulate, minute. *Seed* smooth.—Yellow. 2f. Aug.—Sept. Pine-barrens. 4—6 feet.

23. S. GRACIL'LIMA, (T. & G.) *Stem* virgate, glabrous, branched toward the summit; branches long and slender, leafy. *Leaves* spatulate, linear, entire, sometimes the lower serrate. *Heads* obconic, in secund racemes, 10—15 florets; rays mostly wanting. *Achenia* pubescent.—Middle Florida. 2—3 feet.

24. S. CORYMBO'SA, (Ell.) *Stem* erect, branching near the summit, glabrous, with the young branches hirsute. Radical leaves long, indented along the margin, oblong-lanceolate, somewhat fleshy; the upper entire, ciliate along the margin. *Flowers* in corymbose racemes, lower branches recurved; involucre with pubescent, ciliate scales; ray florets

10. *Seed* glabrous.—Yellow. 2f. Sept.—Oct. Middle Geo. 4—6 feet.

25. S. SEMPERVI'RENS, (L.) *Stem* erect, glabrous, with recurved branches toward the summit. *Leaves* linear-lanceolate, long, acute, scabrous along the margin, entire. *Flowers* in axillary racemes, small; involucre with linear-lanceolate scales; ray florets generally 5.—Yellow. 2f. Sept.—Oct. In rich soils. Common. 3—6 feet.

a. Racemes erect.

26. S. LIMONIFO'LIA, (Pers.) *Stem* oblique, glabrous, usually colored. *Leaves* sessile, lanceolate, somewhat fleshy, entire, glabrous. *Flowers* in erect, paniculate racemes; involucre with linear, acute scales; ray florets 7—10. *Seed* pubescent.—Yellow. 2f. Aug.—Oct. On the sea-coast. 3—5 feet.

27. S. AMPLEXICAU'LIS, (Mar.) *Stem* velvety pubescent, loosely branched. *Leaves* ovate or oblong, serrate; lower ones acuminate, clasping the stem, pubescent beneath; upper ones ovate-lanceolate. *Heads* small, in paniculate, secund racemes; ray florets 1—2; disk 5—8. *Achenia* pubescent.—Florida. 2—4 feet.

28. S. BRACHYPHYL'LA, (Chap.) *Stem* scabrous, pubescent, leafy. *Leaves* spatulate, oval, or ovate, glabrous; lower ones serrate. *Branches* in virgate panicles. *Heads* racemose, secund; ray florets none; disk 5—6. *Achenia* canescent.—Geo. and Flor. 4—6 feet.

29. S. SPECIO'SA, (Nutt.) *Stem* erect, slightly furrowed, glabrous, with virgate branches, pubescent when young. *Leaves* broad-lanceolate, coriaceous; upper ones entire, the lower slightly serrate. *Flowers* in numerous erect racemes; involucre with oblong, obtuse scales; ray florets 5. *Seed* glabrous.—Yellow. 2f. Sept.—Oct. Middle Geo. 3—8 feet.

30. S. PUBES'CENS, (Ell.) *Stem* erect, pubescent, with numerous erect branches. *Leaves* long, lanceolate; the upper ones generally entire, pubescent; the lower serrate, slightly scabrous, spatulate. *Flowers* in paniculate racemes; involucre with pubescent, subulate scales; ray florets 7—10. *Seeds* pubescent.—Yellow. 2f. Oct. Damp soils. Middle Geo. 3—5 feet. *S. puberula*, Nutt.

31. S. PAUCIFLOSCULO'SA, (Mich.) *Stem* erect, somewhat shrubby, glabrous. *Leaves* lanceolate, obtuse. *Flowers* in compound panicles; involucre oblong, 5-flowered; ray floret 1.—Yellow. 2f. Aug.—Oct. In pine-barrens, on the coast.

32. S. BICO'LOR, (L.) *Stem* erect, pubescent. *Leaves* oblong-lanceolate; the lower ones serrate, attenuate at the base, pubescent. *Flowers* in compact racemes; involucre with obtuse, linear-lanceolate scales; ray florets 5—8.—Nearly white. 2f. Sept.—Oct. Dry pastures. 2—3 feet.

33. S. PETIOLA'RIS, (Ait.) *Stem* erect, striate, villous. *Leaves* oval-lanceolate, pubescent; upper ones nearly sessile; the lower attenuate, with a sheath-like petiole, serrate. *Flowers* in long, terminal racemes; involucre with oblong, pubescent scales; ray florets 6—8. *Seed* glabrous.—Yellow. 2f. Aug.—Sept. Mountains. 2—3 feet.

34. S. STRI'CTA, (Ait.) *Stem* erect, glabrous. *Leaves* lanceolate, entire, glabrous, with scabrous margins; radical ones serrate. *Flowers* in

erect, paniculate racemes.—Yellow. 2f. Aug.—Sept. In sandy woods. 2 feet.

35. S. GIGAN'TEA, (Ait.) *Stem* stout, smooth. *Leaves* lanceolate, acuminate, glabrous, sharply serrate. *Flowers* in racemose panicles; heads large; ray florets conspicuous. *Achenia* pubescent.—Yellow. Ala. and North and West. 3—7 feet.

36. S. VIRGA'TA, (Mich.) *Stem* erect, striate, slender toward the summit, nearly glabrous. Radical leaves very long, spatulate-lanceolate; cauline ones diminishing toward the summit, oblong-lanceolate, somewhat fleshy, scabrous along the margins, appressed; involucre with linear-lanceolate pubescent scales; ray florets 5—7. *Seed* hairy.—Yellow. 2f. June—Oct. Damp soils. 2—4 feet.

37. S. PULVERULEN'TA, (Nutt.) *Stem* erect, slender toward the summit, reddish, covered with a pulverulent pubescence. *Leaves* sessile; the lower ones acute, serrate, elliptic; the upper entire, with scabrous margins, obovate. *Flowers* in erect racemes; ray florets long—Yellow. 2f. Aug.—Sept. Low country. 3—4 feet.

38. S. EREC'TA, (Pursh.) *Stem* erect, simple, somewhat pubescent toward the summit. *Leaves* lanceolate, glabrous, acute at each end; the lower ones somewhat petiolate. *Flowers* in short, erect, axillary, and terminal racemes; involucre with linear scales; ray florets 7—10. *Seed* glabrous.—Pale yellow. 2f. Sept.—Oct. Damp soils. 2—3 feet. *S. speciosa.*

39. S. CÆ'SIA, (L.) *Stem* erect, glabrous, with numerous slender, expanding branches, slightly tinged with purple. *Leaves* sessile, lanceolate, acuminate, finely serrate, with the margins slightly scabrous. *Flowers* in erect racemes; involucre with linear scales; ray florets generally 5. *Seed* nearly glabrous.—Yellow. 2f. Sept.—Oct. Upper districts of Car. and Geo. 2—3 feet.

40. S. FLEXICAU'LIS, (Ait.) *Stem* slender, flexuous, glabrous, angled. *Leaves* ovate-lanceolate, acuminate, serrate, glabrous, attenuate at the base. *Flowers* in erect, axillary racemes; involucre with linear scales; ray florets generally 5; disk 7—8. *Seed* hairy.—Yellow. 2f. Sept. —Oct. Upper district of Car. and Geo. 2—3 feet. *S. latifolia*, L.

41. S. GLOMERA'TA, (Mich.) *Stem* simple, small. *Leaves* glabrous, oblong-lanceolate, serrate; lower ones broad, acuminate. *Flowers* in simple racemes, composed of axillary heads, the upper ones clustered; involucre swollen, many-flowered.—Yellow. 2f. Aug.—Sept. Mountains.

42. S. SQUARRO'SA, (Muhl.) *Stem* erect, pubescent, striate, branching. *Leaves* lanceolate, acute, serrate toward the apex, pubescent beneath; the lower ones tapering at the base into a petiole. *Flowers* in compound, erect racemes, large; involucre with reflexed, linear scales; ray florets generally 10, the disk numerous. *Seed* glabrous.—Yellow. 2f. Sept.—Oct. Sandy soils. 3—5 feet.

43. S. ANGUSTIFO'LIA, (Ell.) *Stem* erect, glabrous, with numerous erect branches, generally colored. *Leaves* sessile, subulate, entire, nearly linear, somewhat scabrous along the margins, sometimes with axillary clusters of setaceous leaves. *Flowers* in erect, paniculate racemes; involucre with glabrous, linear-lanceolate scales; ray florets 7—10.—Yellow. 2f. Sept.—Oct. Rich soils. On the sea-coast. 2—3 feet.

44. S. SALICI'NA, (Ell.) *Stem* erect, slender, pubescent when young, nearly glabrous when old, with long, erect, virgate branches. *Leaves* sessile; the lower ones long, narrow-lanceolate, scabrous on the upper surface, glabrous on the under; upper leaves smaller. *Flowers* in long, slender racemes; involucre with oblong scales; ray florets slender, generally 5.—Yellow. 4. Sept.—Oct. Middle Geo. 4—5 feet.
S. patula, Muhl.

45. S. ELA'TA, (Pursh.) *Stem* erect, terete, pubescent, with erect, tomentose branches. *Leaves* sessile, oval-lanceolate, acute, tomentose beneath, nearly entire. *Flowers* in erect, paniculate racemes; involucre with pubescent, linear-lanceolate scales; ray florets 7—10. *Seed* glabrous.—Yellow. 4. Sept.—Oct. Middle Geo. 2—3 feet.
S. petiolaris.

46. S. RIG'IDA, (L.) *Stem* erect, slightly angled, tomentose when young; branches numerous, fastigiate. *Leaves* ovate, sessile, pubescent, scabrous; upper ones entire, the lower serrate. *Flowers* clustered near the summit of the branches, large; involucre with oblong, pubescent scales; ray florets 7—10, those of the disk numerous. *Seed* glabrous.—Yellow. 4. Sept.—Oct. Mountains. 3—4 feet.

47. S. GRAMINIFO'LIA, (Ell.) *Stem* angled, slightly furrowed; branches numerous, expanding; angles pubescent. *Leaves* linear, numerous, obscurely veined, pubescent along the veins on the under surface. *Flowers* in fastigiate, terminal corymbs; involucre with numerous, viscid, linear-lanceolate scales; ray florets 10, short. *Seeds* villous.—Yellow. 4. Sept.—Oct. Damp rich soils. 2—3 ft. *S. lanceolata*, L.

48. S. TENUIFO'LIA, (Pursh.) *Stem* erect, angled, scabrous, with fastigiate branches. *Leaves* linear, expanding, obscurely veined, scabrous, clusters of small leaves in the axils. *Flowers* in fastigiate, terminal corymbs; involucre with viscid scales; ray florets about 10, very short. *Seed* villous.—Yellow. 4. Sept.—Oct. In dry pastures. Very common. 3—4 feet.

GENUS XXII.—BIGELO'VIA. D. C.

(In honor of Dr. Bigelow, of Boston.)

Heads few-flowered, the florets all perfect, tubular. *Involucre* oblong, scales few, erect. *Receptacle* naked, narrow, with a setaceous scale among the central flowers, equaling the achenia. *Achenia* oblong, pubescent. *Pappus* pilose, in one series. Herbaceous plants, with alternate entire leaves. Heads in corymbs, flowers yellow.

1. B. NUDA'TA, (D. C.) *Stem* erect, glabrous, branching near the summit. Radical leaves spatulate, lanceolate, acute, 3-nerved, entire, glabrous; cauline leaves with the upper ones small and linear. *Flowers* in a compound fastigiate corymb; involucre with appressed linear leaflets, colored, containing 3—4 flowers. *Style* about the length of the stamens, 2-cleft; pappus unequal.—Yellow. 4. Oct.—Nov. Common. 1—2 feet.
Chrysocoma nudata, Mich.

GENUS XXIII.—ISOPAP'PUS. T. & G.

(From *isos*, equal, and *pappus*, from the equality of the pappus bristles.)

Heads many-flowered; rays 5—12, ligulate, pistillate; disk

florets perfect. Scales of the involucre lanceolate, subulate, imbricate, appressed. *Achenia* villous, terete, linear. Hirsute herbs. *Leaves* alternate, crowded, sessile.

1. I. DIVARICA'TUS. *Stem* erect, slender, hispid, scabrous, branching toward the summit. *Leaves* linear-lanceolate, acute, ciliate, serrate, hispid, the lower ones attenuate at the base. *Flowers* in long divaricate panicles; involucre many-leaved, scales pubescent on the back, linear-lanceolate. *Seed* hispid; pappus reddish-brown, the exterior wanting. —Yellow. 2ℓ. Aug.—Oct. Southern Georgia. 1—2 feet.

GENUS XXIV.—PRIONOP'SIS. Nutt.

(From *prion*, a saw, and *opsis*, resemblance, in allusion to the teeth of the leaf.)

Heads many-flowered, hemispherical, ray florets in a single series, numerous, pistillate, disk perfect. Scales of the involucre numerous, imbricate, squarrose, with the exterior ones squarrose. *Receptacle* alveolate, flat. *Achenia* short, glabrous, striate. *Pappus* deciduous, consisting of unequal, scabrous bristles, some longer than the corolla of the disk. Herbaceous plants, with alternate, serrate leaves. *Flowers* yellow.

1. P. CHAPMAN'II, (T. & G.) *Stem* simple, virgate, hirsute-pubescent. *Leaves* numerous, lanceolate or linear, glabrous, setaceously serrate.— Yellow. 2ℓ. Middle Florida. 1—2 feet.

GENUS XXV.—HETEROTH'ECA. Cass.

(From *hetero*, different, and *theka*, envelope.)

Heads many-flowered, those of the ray pistillate in one series, those of the disk perfect. Scales of the involucre in a few series, linear, appressed, with spreading points. *Receptacle* plain, alveolate. *Achenia* of the ray oblong, smooth, without pappus, those of the disk cuneate, villous. Pappus of the disk double, the exterior of short chaffy bristles, the interior of capillary bristles. Herbaceous plants, hirsute or strigose, paniculately branched. *Flowers* yellow, pappus colored.

1. H. SCA'BRA, (D. C.) *Stem* branching from the base, scabrous, divaricate, glandular, hairy. Radical leaves oval, on petioles, dilated at the base, coarsely toothed, cauline ones cordate-ovate, acute, amplexicaul, all scabrous. *Flowers* in compound terminal panicles; involucre cylindrical; leaflets numerous, acute, linear, viscid; ray florets lanceolate, nerved; exterior pappus a marginal ring, the interior wanting.—Yellow. 2ℓ. October. On the seacoast. 2—3 feet.

GENUS XXVI.—CHRYSOP'SIS. Nutt.

(From *chrusos*, gold, and *opsis*, like.)

Involucre imbricate; ray florets pistillate, those of the disk perfect. *Anthers* naked at the base; pappus double, the outer chaffy and minute, the inner pilose and scabrous, many-rayed. *Seeds* obovate, villous. *Receptacle* naked.

1. C. ARGENTE'A, (Nutt.) *Stem* branching toward the summit, silky *Leaves* lanceolate, long, linear, entire, somewhat rigid, covered with a silky pubescence. *Flowers* in terminal corymbs; involucre pubescent, imbricate; leaflets subulate, acute; ray florets 10—11, those of the disk numerous. *Seeds* oblong, villous or hispid; pappus colored.—Yellow. 2f. July—Oct. Dry soils.

2. C. GRAMINIFO'LIA, (Nutt.) *Stem* erect, silky, leafy toward the summit. *Leaves* entire, lanceolate, linear, covered with a silky pubescence. *Flowers* in compound corymbs. *Stamens* at first yellow, afterward white. *Seed* oblong; pappus colored, but lighter than the preceding.—Yellow. 2f. July—Oct. Sandy soils. Common. 1—2 feet.

3. C. OLIGAN'THA, (Chap.) *Stem* simple, slender, leafy and silky below the middle, glandular and naked above. *Leaves* lanceolate or spatulate, silky pubescent, entire. *Heads* on elongated peduncles, 2—4; involucre campanulate, glandular; achenia linear, villous.—Middle Florida. April—May. 1—1½ foot.

4. C. PINIFO'LIA, (Ell.) *Stem* glabrous, rigid. *Leaves* numerous, crowded, linear, rigid, those of the branches small, linear. *Flowers* in terminal corymbs; involucre imbricate, with linear-lanceolate scales, woolly at the point. *Anthers* white, conspicuous. *Seeds* long, hairy, hispid; exterior pappus subulate, whitish, the interior scabrous, brown. —Yellow. Sept.—Oct. Sandhills, middle Geo. 18—20 inches.

5. C. MARIA'NA, (Nutt.) *Stem* erect, hairy, simple. *Leaves* oblong-lanceolate, serrate, acute, the upper ones sessile, the lower ones spatulate, hairy on the under surface. *Flowers* in a simple corymb; involucre many-leaved, viscidly and glandular pubescent. *Anthers* 2-cleft at the base, with the apex white. *Seed* oblong, villous; pappus scarcely colored.—Yellow. 2f. Aug.—Oct. Dry sandy soils. 1—2 feet.

6. C. TRICHOPHYL'LA, (Nutt.) *Stem* hairy, erect. *Leaves* oblong, sessile, obtuse, lower ones attenuate at the base, woolly. *Flowers* in simple corymbs; involucre many-leaved; leaflets narrow, glandular; florets of the ray narrow, long. *Seed* oblong, almost hispid; pappus colored. —Yellow. 2f. Aug.—Sept. Dry soils. 12—18 inches.

7. C. GOSSYPI'NA, (Nutt.) *Stem* covered with a white woolly tomentum, hoary. *Leaves* oblong, spatulate, sessile, obtuse, entire. *Flowers* in simple corymbs; involucre many-leaved, woolly; ray florets numerous. *Anthers* white at the summit. *Seed* viscid, the exterior pappus white, the interior brownish.—Yellow. 2f. Aug.—Oct. Pine lands, middle Geo.

8. C. DENTA'TA, (Ell.) *Stem* woolly. *Leaves* tomentose, cuneate, obovate, obtuse, deeply-toothed, the lower ones with a long tapering base, obtusely-toothed toward the apex, upper leaves entire, sessile, amplexicaul. *Flowers* in simple corymbs; involucre with subulate woolly leaves; ray florets numerous, nerved. *Seed* hispid, exterior pappus white, interior brown.—Yellow. 2f. Aug.—Oct. Middle Georgia. 1—2 feet.

GENUS XXVII.—CONY'ZA. L.

(From *konis*, dust, from the use made of its powder.)

Heads many-flowered, with all the flowers tubular, those of the margin pistillate, those of the center perfect or staminate. *Seeds* of the involucre in many series. *Achenia* compressed,

alternate at the base. *Pappus* in 1 series of capillary bristles. Herbaceous plants with alternate variously incised leaves. *Flowers* white.

1. C. SINUA'TA, (Ell.) *Stem* hairy, somewhat scabrous; lower leaves sinuate-lobed, the upper linear, entire. *Heads* paniculate.—White. 4. Charleston.

GENUS XXVIII.—BAC'CHARIS. L. (From *Bacchus.*)

Involucre imbricate, cylindric; scales sub-coriaceous, ovate. *Receptacle* naked; florets tubular, monœcious, with sterile and fertile intermixed. Staminate florets with exserted anthers, unawned at the base; pappus slightly plumose. Fertile florets with capillary pappus. *Achenia* ribbed.

1. B. ANGUSTIFO'LIA, (Mich.) A shrub. *Stem* erect, glabrous, branching, young branches angled, dotted. *Leaves* sessile, entire, linear, obscurely 3-nerved. *Flowers* in compound panicles, generally axillary, solitary; involucre slightly ventricose, with glabrous, ovate, lanceolate leaflets; sterile florets tubular, white, with a short, undivided style; fertile florets 5-cleft. *Stamens* wanting. *Style* 2-cleft. *Seeds* striate, cylindric.—White. ♄. Sept.—Oct. On the coast. 6—10 feet.

2. B. HALIMIFO'LIA, (L.) A shrub, with erect branches, glabrous young branches angled. *Leaves* sessile, obovate, cuneate, dentate toward the summit, upper ones usually entire, covered with whitish scales or dust. *Flowers* in leafy, compound panicles, axillary and terminal. *Style* of the fertile florets 2-cleft, rather shorter than the stamens. *Seeds* striate, oblong.—White. ♄. Sept.—Oct. Low country. 6—12 feet.

3. B. SESSILIFLO'RA, (Mich.) A shrub, with angular, erect, virgate branches, glabrous. *Leaves* nearly sessile, obovate, cuneate, dentate toward the summit. *Flowers* sessile, axillary, scattered; involucre with obtuse scales, reddish at the summit.—White. ♄. Sept.—Oct. On the seacoast. 3—5 feet. *B. glomeruliflora*, Pers.

GENUS XXIX.—PLU'CHEA. Cass.

(From a French botanist, N. Pluche.)

Heads many-flowered, all tubular, those of the margin pistillate and fertile, those of the center staminate or perfect, but sterile. *Involucre* with the scales in many series. *Receptacle* flat. *Anthers* bicaudate. *Achenia* cylindrical. *Pappus* in one series, pilose. Herbaceous plants, with alternate leaves and heads in corymbs.

1. P. BIFRONS', (D. C.) *Stem* pubescent. *Leaves* clasping at the base, somewhat cordate, oval or lanceolate, oblong, serrulate, sprinkled with resinous dots. *Heads* in corymbs.—Purple. 4. Car.—Flor. Low country. 2—3 feet.

2. P. FŒT'IDA, (D. C.) *Stem* pubescent. *Leaves* petiolate, oval-lanceolate, acuminate, feather-veined, serrate. *Heads* in paniculate, compound corymbs. Fetid.—4. Penn.—Ala. 2—4 feet.

3. P. CAMPHORA'TA, (Ell.) *Stem* herbaceous, succulent, slightly pubescent. *Leaves* ovate-lanceolate, acute, denticulate. *Flowers* in axillary terminal corymbs, shorter than the leaves; scales of the involucre acute, as long as the florets. This plant, when bruised, gives out a strong, disagreeable odor.—Purple. 2f. Aug.—Sept. Salt marshes. *Marsh Flea-bane.*

4. P. MARYLAND'ICA, (Mich.) *Stem* erect, rather succulent. *Leaves* ovate-lanceolate, denticulate, pubescent. *Flowers* in corymbs, scales of the involucre linear or ovate. *Seeds* minute; pappus short, consisting of 20—30 rays.—Purple. ☉. July—Aug. On the coast of Car. and Geo.

GENUS XXX.—PTEROCAU'LON. Ell.

(From *pteron*, a ring, and *kaulon*, a stem.)

Involucre imbricate, leaflets somewhat obovate, acute, appressed, tomentose. *Flowers* pistillate and perfect, intermingled, the pistillate ones slender, with the border 3-toothed; the perfect ones with the border 5-cleft. *Anthers* very short. *Style* 2-cleft. *Stigmas* glandular.

1. P. PYCNOSTA'CHYUM, (Ell.) *Stem* erect, simple, winged, densely tomentose, white. *Leaves* lanceolate, sessile, decurrent, dentate, white, tomentose beneath. *Flowers* in compact spikes; involucre densely tomentose. *Seeds* angled, pubescent; receptacle naked.—White. 2f. May—Aug. Dry sandy soils. 1—2 feet.

GENUS XXXI.—BUPHTHAL'MUM. L. (*Borrichia*, Adans.)

(From *bous*, a bull, *ophthalmos*, the eye, from the resemblance of its flowers.)

Involucre many-leaved; florets of the disk 5-cleft, perfect, numerous, those of the ray pistillate. *Seeds* winged. *Pappus* 4-toothed, or an obsolete margin. *Receptacle* chaffy.

1. B. FRUTES'CENS, (L.) *Stem* erect, glabrous, branching, pubescent toward the summit. *Leaves* opposite, sessile, cuneate, lanceolate, glaucous, sparingly toothed at the base. *Flowers* solitary, terminal; involucre many-leaved, imbricate. *Leaves* mucronate, expanding; ray florets lanceolate, 10—12; seeds of the ray triangular; pappus 4-toothed; chaff pubescent, with a stiff point.—Yellow. ♄ or 2f. June—Oct. On the seacoast.

2. B. ANGUSTIFO'LIUM, (Pursh.) *Stem* erect, branching. *Leaves* alternate, linear, entire, glabrous; involucre with acute, lanceolate leaves. —Yellow. ♄ or 2f. July—Sept. Southern Geo. and Flor.

GENUS XXXII.—ECLIP'TA. L.

(From *ekleipo*, deficient, from its wingless seeds.)

Involucre many-leaved, the leaves nearly equal; florets of the disk perfect, 4-cleft, those of the ray pistillate; pappus wanting; receptacle bristly.

1. E. EREC'TA, (L.) *Stem* erect, strigose; dichotomous. *Leaves* opposite, lanceolate, serrate, or entire, attenuate at the base, 3-nerved.

sessile. *Flowers* on long peduncles, in pairs; involucre with ovate, acuminate leaves.—White. ☺. June—July. Gravelly soils.

2. E. PROCUM'BENS. *Stem* procumbent, assurgent, terete, with numerous opposite branches, with appressed hairs. *Leaves* sessile, opposite, lanceolate, narrowed at the base, 3-nerved; involucre with acute lanceolate leaves. *Flowers* on peduncles, generally in pairs; involucre with 8—10 leaves, lanceolate, ciliate, unequal; ray florets numerous, 2 toothed.—White. ☺. June—Oct. Damp soils. Common. 12—18 inches.

3. E. BRACHYPO'DA. *Stem* prostrate, divaricately branched. *Leaves* lanceolate, slightly serrulate. *Flowers* on short peduncles, solitary or in pairs; involucre with oval-lanceolate leaves; florets 4—5-cleft.—White. ☺. July—Sept. Sandy soils.

TRIBE IV.—SENECIOI'DEÆ.

Style cylindrical at the apex; in perfect flowers bifid, branches elongated, linear, pencillate, or truncate at the apex; produced beyond the pencil into a short cone, or an elongated appendix, narrow and hispid. *Corolla* of the disk regular, pellucid.

GENUS XXXIII.—POLYM'NIA. L.

(Named from one of the Muses.)

Involucre double, the exterior usually 5-leaved, the interior 10-leaved. Ray florets pistillate, those of the disk staminate. *Receptacle* chaffy. *Pappus* none.

1. P. CANADEN'SIS, (L.) *Stem* erect, viscid, villous, somewhat scabrous. Lower leaves deeply lobed, or pinnatifid, the upper ones entire or 3-lobed, all finely serrate, somewhat ovate, slightly scabrous. *Flowers* in terminal panicles; involucre viscid and villous; ray florets 10, small. —Yellow. 4. July—Sept. Mountains. 2—4 feet.

2. P. UVEDA'LIA, (L). *Stem* erect, villous, terete, scabrous. *Leaves* opposite, 3—5-lobed or ternate; leaflets or lobes tomentose, ovate, scabrous, petiole winged. *Flowers* in a terminal panicle, with opposite or ternate branches; involucre with the exterior scales largest, ciliate, ovate; the interior lanceolate, villous; ray florets 10, 3 toothed at the summit. *Seeds* globose, somewhat compressed, glabrous.—Yellow. 4. June—Aug. Common. 3—5 feet.

GENUS XXXIV.—CHRYSOG'ONUM. L.

(From *chrusos*, golden, and *gone*, joint, the flowers being at the joint.)

Involucre 5-leaved, oblong, villous. Ray florets pistillate, those of the disk staminate. *Receptacle* chaffy. *Seed* enfolded in a 4-leaved calyx. *Pappus* 1-leaved, pubescent at the summit.

1. C. VIRGINIA'NUM, (L.) *Stem* decumbent, villous. *Leaves* opposite, oblong, lanceolate-oval, crenately dentate, attenuate at the base into a long petiole, villous. *Flowers* solitary; involucre villous; ray florets 5, broad. *Seeds* compressed, somewhat pubescent.—Yellow. 4. April -June. Common. 4—12 inches.

Genus XXXV.—SILPH'IUM. L.

(From *silphion*, a name of an ancient plant, transferred to this genus.)

Involucre leafy, squarrose. Ray florets pistillate, those of the disk staminate. *Seed* compressed, obcordate, emarginate, 2-toothed. *Receptacle* chaffy.

1. S. LACINIA'TUM, (L.) *Stem* hispid, simple, nearly glabrous toward the base. *Leaves* alternate, about 2 feet long and 1 wide, pinnatifid, the segments toothed and sinuate, scabrous. *Involucre* consisting of 10 leaves, subulate. *Ray florets* numerous, about as long as the involucre. *Pappus* 2 small awns.—Yellow. 4. Aug.—Sept. Western Georgia and Alabama. 8—12 feet.

2. S. PINNATIFI'DUM, (Ell.) *Stem* glabrous. *Leaves* large, pinnatifid, sinuate; segments usually acute, upper surface glabrous, the under slightly scabrous. *Flowers* in panicles, large; involucre glabrous, with the exterior leaves orbicular, the interior oval.—Yellow. 4. July. Western Geo. and Ala. 4—6 feet.

3. S. COMPOS'ITUM, (Mich.) *Stem* glabrous. *Leaves* irregularly lobed, sinuate, sometimes pinnatifid, glabrous above, somewhat hairy beneath. *Flowers* in terminal panicles; involucre with the leaves slightly ciliate. —Yellow. 4. May—Aug. Pine-barrens. 2—3 feet.

4. S. TEREBINTHINA'CEUM, (L.) *Stem* erect, glabrous. Radical leaves cordate or nearly orbicular, or reniform, sometimes lobed and dentate; cauline ones alternate, serrate, scabrous, ovate. *Flowers* numerous, in corymbose panicles; exterior leaves of the involucre ovate, acute, the interior obtuse; ray florets 10—12.—Yellow. 4. July—Aug. Mountains. 4—5 feet.

5. S. TRIFOLIA'TUM, (L.) *Stem* glabrous, somewhat hexagonal, usually purple. *Leaves* ovate-lanceolate, serrulate, slightly scabrous on the upper surface, glabrous beneath, the upper ones nearly sessile, the lower ternate. *Flowers* in terminal corymbs; involucre with ovate, ciliate, loosely appressed leaves; ray florets about 14.—Yellow. 4. Aug.—Oct. Mountains. 4—5 feet.

6. S. TERNA'TUM. *Stem* terete, or slightly angled, glabrous. *Leaves* verticillate, by threes, lanceolate, acute, denticulate or serrate, slightly scabrous on the upper surface, pubescent along the veins beneath. *Flowers* in terminal corymbs; involucre ciliate, with ovate, loosely appressed leaves; ray florets 12—14, long.—Yellow. 4. Aug.—Oct. Mountains. 4—6 feet.

7. S. ATROPURPU'REUM. *Stem* erect, terete, purple, glabrous. *Leaves* mostly verticillate, by fours, numerous, the lower ones alternate, and the uppermost scattered, the intermediate ones sometimes by threes; all lanceolate, scabrous, dentate, on ciliate petioles; midrib purple. *Flowers* in dichotomous panicles; involucre ciliate, with ovate scales; ray florets long, narrow.—Yellow. 4. Aug.—Sept. Upper districts. 4—5 feet.

8. S. DENTA'TUM, (Ell.) *Stem* erect, purple, glabrous. *Leaves* broad-lanceolate, sinuate, toothed, hairy, scabrous, the lower ones opposite, upper ones alternate, sessile. *Flowers* in terminal corymbs; involucre ciliate, with broad-ovate leaves; ray florets about 10, oval.—Yellow. 4. Aug.—Sept. Common, near Culloden. 2—3 ft.

9. S. ASTERIS'CUS, (L.) *Stem* erect, terete, hispid. *Leaves* lanceolate, acute, serrate, scabrous; the lower ones opposite, petiolate, the upper ones alternate, sessile. *Involucre* ciliate, with ovate leaves. Ray florets 8—10.—Yellow. 2f. June—Aug. Sandy soils. Common. 2—3 ft.

10. S. LÆVIGA'TUM, (Pursh.) *Stem* quadrangular, glabrous. Radical leaves lanceolate, oblong; the lower cauline ones oval-lanceolate, on short petioles, which are connate at the base; the upper ones sessile, ovate, the highest cordate, glabrous. *Flowers* in corymbs; involucre with ciliate leaves, the inner ones largest.—Yellow. 2f. Aug.—Sept. Middle Geo. 2—3 feet.

11. S. SCABER'RIMUM, (Ell.) *Stem* angled when young, becoming te rete when old, scabrous toward the summit. *Leaves* on short petioles, connate at the base, ovate, serrate, rigid, scabrous. *Flowers* in corymbs; involucre with ovate, ciliate leaves, exterior ones smallest. *Seed* nearly circular, winged.—Yellow. 2f. Aug.—Sept. Middle and western Geo. 3—4 feet.

12. S. INTEGRIFO'LIUM, (Mich.) *Stem* quadrangular, hispid. *Leaves* opposite, sessile, oblong, entire, scabrous on the upper surface. *Flowers* few, on short peduncles; involucre with oblong, ovate leaves.—Yellow. 2f. Aug.—Sept. Mountains. 3—4 feet.

13. S. PERFOLIA'TUM, (L.) *Stem* glabrous, quadrangular. *Leaves* opposite, connate, serrate, ovate, the upper ones perfoliate, broad. *Flowers* on axillary peduncles; involucre squarrose; ray florets 24.—Yellow. 2f. July—Sept. Mountains. 4—6 feet.

14. S. CONNA'TUM. *Stem* erect, terete, hispid, with reflexed hairs. *Leaves* opposite, perfoliate, scabrous, serrate. *Flowers* in terminal panicles; involucre squarrose, with ovate leaves, reflexed at the summit; ray florets 12.—Yellow. 2f. Aug.—Sept. Middle and western Geo. 4—5 feet.

GENUS XXXVI.—BERLANDIE'RA. D. C.

(In honor of Berlandier.)

Heads many-flowered, with the ray florets in one series, pistillate; those of the disk tubular, hermaphrodite, but sterile. Scales of the involucre in 3 series, the exterior smallest, the innermost the largest. *Achenia* in a single series, flat-obovate, plain at the summit, each more or less attached to the scales of the involucre. *Pappus* of two minute teeth. Herbaceous plants with alternate sessile leaves more or less pubescent.

1. B. TEXA'NA, (D. C.) *Stem* herbaceous, branches and peduncles hirsute, with purplish hairs. *Leaves* oblong-ovate, cordate, simply or doubly crenate, minutely hispid, scabrous above, corruscently pubescent or hairy beneath; the lowest petioled.—Louisiana.

2. B. TOMENTO'SA, (T. & G.) (*Silphium pumilum*, Pursh.) *Stem* erect or procumbent, terete, tomentose. *Leaves* alternate, oblong, irregularly dentate, acute, petiolate, pubescent on the upper surface, tomentose beneath. *Flowers* in irregular corymbs; involucre tomentose, with the leaves ovate, 8—10; ray florets 8—10, tomentose on the under surface.—Yellow. 2f. July—Aug. Pine-barrens. Mid. Car. and Geo 2—3 feet.

3. B. SUBACAU'LIS, (Nutt.) Minutely strigose, pubescent at first. *Leaves* radical, deeply sinuate, bipinnatifid, often lyrate, somewhat petioled; scapes bearing a single head. Torr. & Gray.

GENUS XXXVII.—PARTHE'NIUM. L.

(From *parthenos*, a virgin.)

Involucre 5-leaved, villous. *Ray florets* small, pistillate, those of the disk staminate. *Receptacle* flat, chaffy. *Seed* obovate. *Pappus* none.

1. P. INTEGRIFO'LIUM, (L.) *Stem* erect, slightly scabrous, striate. *Leaves* alternate, ovate-lanceolate, unequally toothed, sessile, scabrous, the upper ones amplexicaul. *Flowers* in terminal corymbs; ray florets 5, small, the exterior chaff, broad.—White or yellowish. ♃. June—Sept. Upper and middle Car. and Geo. 1—2 feet.

2. P. HYSTEROPHO'RUS, (L.) *Stem* hirsute, diffusely branched or decumbent. *Leaves* bipinnatifid, the uppermost linear, undivided. *Heads* small, paniculate.—Florida.

GENUS XXXVIII.—I'VA. L.

(Origin of the name unknown.)

Involucre 5—10-leaved. *Ray florets* pistillate, those of the disk staminate. *Anthers* not united. *Receptacle* bristly. *Seed* obovate. *Pappus* none.

1. I. FRUTES'CENS, (L.) A shrub, with numerous opposite branches, slightly furrowed, somewhat scabrous and pubescent when young. *Leaves* opposite, lanceolate, attenuate at the base, deeply serrate, scabrous, of a greenish hue. *Flowers* axillary, forming terminal panicles; involucre viscidly pubescent, 5-leaved, leaves nearly round. *Ray florets* 5, those of the disk 6—7.—Pale purple. ♄. July—Sept. On the seacoast. 3—8 feet. *Marsh Elder.*

2. I. IMBRICA'TA, (Walt.) *Stem* herbaceous, terete, slightly angled toward the summit, glabrous, becoming purple. *Leaves* sessile, linear-lanceolate, cuneate, succulent, the upper ones usually alternate and entire, the lower frequently opposite and toothed. *Flowers* axillary, pendulous; involucre with 6—9 fleshy leaves, with the margins lacerate. *Ray florets* 2, those of the disk numerous.—White. ♃. July—Oct. On the seacoast.

GENUS XXXIX.—AMBRO'SIA. Tourn.

(From *ambrosia*, food of the gods.)

Flowers numerous, staminate florets with the involucre hemispherical, 1-leaved, many-flowered. *Anthers* approximate, but not united. *Receptacle* naked, pistillate florets, with the involucre 1-leaved, entire, or 5-toothed, 1-flowered. *Corolla* none. *Styles* 2. *Fruit* a nut formed from the indurated calyx, 1-seeded.

1. A. TRIF'IDA, (L.) *Stem* erect, rough, hirsute. *Leaves* usually opposite, 3-lobed, serrate, the lobes oval-lanceolate, acuminate, hairy, serrate. *Flowers* in small axillary and terminal spikes, forming a large

panicle; staminate florets numerous, solitary at the summit of the spike; pistillate ones in small clusters at the base. Involucre of the staminate florets 5—8-lobed, hairy. *Corolla* tubular. Involucre of the fertile florets persistent, 5-lobed. *Fruit* with 6 spines.—White. ☉. Aug.—Sept. Common. 4—6 feet. *Bitter-weed.*

2. A. ELA'TIOR, (L.) *Stem* virgate, pubescent when young. *Leaves* bipinnatifid, nearly glabrous; petioles ciliate. *Flowers* in paniculate racemes. Involucre of the staminate florets globular, somewhat hairy; fertile florets in small clusters. *Nut* with 6 short spines.—White. ☉. July—Sept. Middle, upper Car. and Geo. 4—8 feet. *Hog-weed. Roman Wormwood.*

3. A. ARTEMISIÆFO'LIA, (L.) *Stem* erect, slightly pubescent, fastigiately branched. *Leaves* toward the base bipinnatifid, opposite; those toward the summit pinnatifid, opposite, nearly glabrous on the upper surface, pubescent beneath. *Racemes* terminal by threes. Involucre of the staminate florets globular; fertile florets axillary, sessile; spines short. —White. ☉. Aug.—Sept. Mountains. 4—6 feet.

4. A. PANICULA'TA, (Mich.) *Stem* erect, paniculately branched, villous. *Leaves* alternate toward the base, bipinnatifid toward the summit; segments all lanceolate-acute, pubescent. *Flowers* in terminal and axillary racemes, the upper staminate, the lower fertile. Involucre of the staminate florets 10-toothed, 10-flowered. *Fruit* muricate, clustered, small, obovate.—White. ☉. July—Sept. Cultivated grounds, very common. 2—6 feet.

GENUS XL.—XAN'THIUM. Tourn.

(From *xanthos*, yellow, from the color said to be produced on the hair by this plant.)

Flowers monœcious. Staminate florets, involucre imbricate. *Anthers* approximate, not united. *Receptacle* chaffy. Fertile florets. *Involucre* 2-leaved, 2-flowered. *Corolla* none. *Drupe* dry, muricate, 2-cleft. *Nut* 2-celled.

1. X. STRUMA'RIUM, (L.) *Stem* erect, pubescent, scabrous, angled. *Leaves* alternate, cordate, usually 3-lobed, serrate, pubescent, very large, on long petioles. *Pistillate florets* in axillary racemes; involucre consisting of subulate leaves. *Chaff* subulate. *Fertile florets* at the base of each raceme; involucre 10-leaved, 2-flowered. *Fruit* elliptic, pubescent, armed with hooked bristles.—White. ☉. July—Oct. Very common. 3—6 feet. *Cockle Bur. Clott Bur. Sheep Bur.*

2. X. ECHINA'TUM, (L.) *Stem* rough, spotted. *Leaves* broad, subcordate, irregularly toothed, obscurely lobed. *Involucre* oval, with rigid prickles.—Near salt water. Mass.—Car. Aug.—Oct. 1—2 feet.

3. X. SPINO'SUM, (L.) *Stem* pubescent, terete, with ternate spines from each side of the petiole. *Leaves* alternate, 3-lobed, ovate-lanceolate, pubescent on the upper surface, tomentose beneath. *Staminate florets* solitary, at the base of each spine; involucre many-leaved. *Fertile florets* axillary, solitary. *Fruit* armed with short prickles. *Fruit* 2-celled.—White. ☉. July—Oct. Common along the coast. 3—5 feet. *Prickly Clotweed.*

Genus XLI.—MELAN'THERA. Rohr.

(From *melas*, black, and *anthera*, the anther.)

Involcure many-leaved. *Leaves* in a double series, equal, oblong-lanceolate. *Florets* all perfect. *Seeds* quadrangular, compressed. *Pappus* consisting of a few bristles. *Receptacle* chaffy, convex.

1. M. HASTA'TA, (Mich.) *Stem* erect, quadrangular, furrowed, scabrous, branching. *Leaves* hastate, 3-lobed, decussate, lanceolate, dentate, scabrous, and somewhat hispid, petiolate. *Flowers* solitary, on peduncles, usually in pairs; involucre hispid. *Corolla* tubular, 5-cleft. *Seed* slightly winged at the angles; chaff leaf-like.—White. 2. Aug. —Sept. Rich soils. 4—6 feet.

2. M. DELTOID'EA, (Mich.) *Stem* quadrangular. *Leaves* opposite, ovate-deltoid, evanescent. Scales of the involucre ovate.—Florida.

Genus XLII.—ZIN'NIA. L.

(In honor of Godfrey Zinn, a German.)

Heads many-flowered; ray florets pistillate, those of the disk perfect. *Receptacle* conical, chaffy. *Rays* obovate, coriaceous, lobes of the disk villous. *Achenia* of the ray 3-sided, mostly destitute of pappus. Herbaceous plants, with opposite, entire, and sessile leaves. Heads solitary.

1. Z. MULTIFLO'RA, (L.) *Stem* erect, hirsute. *Leaves* ovate-lanceolate, peduncles larger than the leaves, with the apex hollow and inflated.—Yellow or purple. Car. and Ala.

Genus XLIII.—HELIOP'SIS. Pers.

(From *helios*, the sun, and *opsis*, appearance; from its resemblance to the sun-flower.)

Involucre imbricate, many-leaved; ray florets pistillate, those of the disk perfect. *Receptacle* conic. *Seed* quadrangular *Pappus* wanting.

1. H. LÆ'VIS, (Pers.) *Stem* erect, glabrous, dichotomously branched. *Leaves* opposite, ovate-lanceolate, serrate, 3-nerved, glabrous. *Flowers* terminal, and in the angles of the stem, on long peduncles. Leaves of the involucre oblong. *Seed* naked; receptacle convex.—Yellow. 2. May—June. Sandy soils. 2—4 feet.

Genus XLIV.—TETRAGONOTHE'CA. Dill.

(From *tetra*, four, *gonia*, angle, and *theka*, a capsule.)

Involucre gamosepalous, deeply 4-parted, 4-angled, with broad hairy segments. *Receptacle* chaffy. *Seed* obovate, pubescent at the summit. *Pappus* wanting.

1. T. HELIANTHOI'DES, (L.) *Stem* erect, branching, scabrous, somewhat hispid. *Leaves* opposite, sessile, spatulate, lanceolate, dentate, hairy. *Flowers* axillary and terminal; segments of the involucre ovate-lanceo-

late, with reflexed margins; ray florets 6—8, large, of the disk numerous. *Seeds* slightly angled; scales of the receptacle covered with glandular dots.—Yellow. 4. May—June. Sandy soils. 1—2 feet.

Genus XLV.—HA'LEA. T. & G.

(In honor of Dr. Joseph Hale, of Louisiana.)

Heads many-flowered; the ray florets pistillate, those of the disk perfect. *Involucre* double, the outer of 4—5 ovate foliaceous scales, the inner of numerous chaffy scales. *Achenia* 4-sided, pubescent, with a short scaly pappus.

1. H. Ludovicia'na, (T. & G.) *Stem* striate, quadrangular below. *Leaves* opposite, sessile, sometimes verticillate by threes, toothed, the leaves oval-oblong, the upper ovate, or ovate-oblong, connate, perfoliate.—Louisiana. 2—4 feet.

Genus XLVI.—ECHINA'CEA.

Heads many-flowered; ray florets in a single series, much elongated, sterile, those of the disk perfect and tubular. Scales of the involucre ciliate, imbricate. *Receptacle* conic. *Achenia* 4-sided, ob-pyramidal. *Pappus* coroniform, unequally toothed. *Rays* 2—3-toothed at the apex.

E. purpu'rea, (Mœnch.) (*Rudbeckia purpurea*, L.) *Stem* somewhat branched, smooth, or a little roughened. *Leaves* ovate-lanceolate, scabrous, tapering toward the base; those toward the upper part of the stem narrower, all coarsely serrate. *Flowers* terminal; involucre many-leaved, imbricate, ciliate, in several series, squarrose; ray florets long, narrow, 2-cleft, reflexed. *Seed* angled, enlarged at the summit. *Chaff* of the receptacle with rigid points, longer than the florets.—Purple. 4. Aug.—Oct. Upper Car. and Geo. 4—5 feet.

2. E. angustifo'lia, (D. C.) *Stem* hispid, naked above. *Leaves* lanceolate, hairy, hispid, entire, 3-nerved.—Alabama. 1—3 feet.

3. E. atroru'bens, (Nutt.) *Stem* slender, glabrous, terete. *Leaves* linear-lanceolate, entire, tapering into long petioles; rays dark-red.—Georgia and Florida.

Genus XLVII.—RUDBECK'IA. L.

(In honor of Prof. Rudbeck, of Sweden, predecessor of Linnæus.)

Involucre in a double series, nearly equal. *Ray florets* neutral, the disk perfect. *Receptacle* conic, chaffy. *Pappus* a 4-toothed margin.

1. R. pinna'ta, (Mich.) *Stem* hispid, furrowed. *Leaves* pinnate, lower segments sometimes 2-parted. *Flowers* large, showy; involucre with the leaves nearly equal; ray florets long, reflexed, those of the disk purple.—Yellow. 4. July—Oct. Upper districts of Car. and Geo. 4—5 feet.

2. R. ful'gida, (L.) *Stem* hispid, with long, virgate, 1-flowered branches. *Leaves* numerous, oblong-lanceolate, alternate, sessile, hispid, tapering at the base; involucre hispid, exterior leaves largest, some-

what foliaceous; ray florets 12—14, 2-cleft; pappus, a slight margin. *Chaff* glabrous.—Yellow. Aug.—Oct. Mountains. 2—3 feet.

3. R. TRILO'BA, (L.) *Stem* hairy, hispid, paniculately branched, branches leafy, divaricate. *Leaves* lanceolate, acuminate at each end, serrate, the lower ones 3-lobed, hairy, upper ones lanceolate, serrate, sessile. *Flowers* numerous at the extremities of the branches; involucre with reflexed leaves; ray florets lanceolate, reflexed, about 8; pappus a 4-toothed margin.—Yellow. 2f. Aug.—Sept. Dry soils. 4—5 feet.

4. R. MOL'LIS, (Ell.) *Stem* erect, branching, covered with a hispid pubescence. *Leaves* alternate, ovate-lanceolate, sessile, dentate, slightly cordate, pubescent. *Flowers* at the extremities of the branches; involucre hairy, with reflexed leaves; ray florets 12—20; pappus nearly wanting.—Yellow. 2f. Aug.—Oct. Western Geo. 2—3 feet.

5. R. HELIOPSI'DIS, (T. & G.) *Stem* erect, simple, somewhat pubescent, few branches at the summit. *Leaves* ovate or oval, slightly serrate, 5-nerved, glabrous, or slightly pubescent; involucre minutely pubescent, scales somewhat spatulate. Florets of the disk brownish-purple. Achenia of the rays 3-angled, of the disk 4-angled.—Pale yellow. In wet places. Ala. and Geo. Aug.—Sept. 1—2 feet.

6. R. DIGITA'TA, (L.) *Stem* erect, glabrous, branching, lower leaves pinnate, with pinnatifid segments; the upper ones simple, pinnate, the highest 3-cleft. *Involucre* shorter than the disk, somewhat pubescent, with ovate-lanceolate leaves. *Pappus* a 4-toothed margin. *Chaff* tomentose at the summit.—Yellow. 2f. August—Oct. Mountains. 5—8 feet.

7. R. LACINIA'TA, (L.) *Stem* erect, glabrous, branching. *Leaves* scabrous, the lower ones pinnate, with 3-lobed segments, coarsely toothed, sometimes laciniate, upper leaves nearly sessile, ovate or 3-cleft, sometimes dentate. *Flowers* in terminal panicles; involucre shorter than the disk, with small ovate-lanceolate leaves; ray florets about 6, dilated at the summit, 3-toothed; pappus a crenate margin; chaff tomentose.—Yellow. 2f. Aug.—Sept. In moist places. Middle Georgia. 4—6 feet.

8. R. HETEROPHYL'LA, (T. & G.) *Stem* erect, cinerous-pubescent. *Leaves* 3—5-parted, the terminal divisions cuneiform, and mostly 3-cleft, upper leaves simple, ovate, serrate. *Achenia* prismatic.—Mid. Flor.

9. R. NIT'IDA, (Nutt.) *Stem* erect, simple, glabrous. *Leaves* oval-oblong and lanceolate, coriaceous, often toothed; lower leaves petiolate, upper clasping. *Heads* large, showy.—Geo. and Flor. 3—5 feet.

10. R. LÆVIGA'TA, (Pursh.) *Stem* glabrous. *Leaves* ovate-lanceolate, somewhat coriaceous, shining. Radical leaves ovate-spatulate, dentate. *Flowers* on long, naked peduncles; involucre with long lanceolate leaves; ray florets rather short.—Pale yellow. 2f. July—Aug. Pine-barrens. 2—3 feet.

11. R. DISCO'LOR, (Pursh.) *Stem* pubescent, branching. *Leaves* alternate, sessile, strigose, pubescent, lanceolate, entire, or finely denticulate. *Flowers* terminal; involucre somewhat pubescent; ray florets 12—14, hairy on the outer surface; pappus a minute margin; chaff purple, fringed at the summit.—Yellow. 2f. Aug.—Sept. Middle and western Georgia. 2—3 feet.

12. R. SPATHULA'TA, (Mich.) *Stem* pubescent, slender. *Leaves* entire, obovate-spatulate. *Flowers* solitary, terminal; involucre imbricate,

expanding; ray florets 3-toothed.—Yellow. 4. July—Aug. Mountains. 10—18 inches.

13. R. HIR'TA, (L.) *Stem* hirsute, sparingly branched. *Leaves* alternate, sessile, spatulate, lanceolate, hirsute, upper ones narrower. *Flowers* solitary, terminal; involucre many-leaved, hairy; exterior leaves the largest; pappus wanting; chaff fringed at the summit.—Yellow. 4. June—Sept. Sandy soils. Common. 2—3 feet.

14. R. ARISTA'TA, (Pursh.) *Stem* erect, corymbosely branched. *Leaves* serrate, lanceolate, hispid. *Flowers* at the extremities of the branches; involucre many-leaved, disk nearly hemispherical; pappus subulate.—Yellow. 4.

GENUS XLVIII.—LEPACHYS. Raf.

(From *lepis*, a scale, and *pachus*, thick.)

Heads many-flowered; ray florets in a single series, neutral; those of the disk perfect. Scales of the involucre linear, spreading, few. *Receptacle* elongated; chaff truncated, thickened at the summit, partly inclosing the achenia. *Achenia* of the ray 5-angled, hairy, abortive; of the disk compressed, with a wing-like margin on one or both sides.

1. L. PINNA'TA, (T. & G.) (*Rudbeckia tomentosa*, Ell.) *Stem* erect, pubescent, slightly furrowed, much branched, branches erect, virgate. *Leaves* alternate, lanceolate, acute, scabrous, tomentose, the lower ones somewhat trifoliate, upper leaves entire. *Flowers* at the extremities of the branches; involucre tomentose, with nearly subulate reflexed leaves; ray florets about 8; pappus almost wanting.—Yellow. 4. Sept.—Oct. Middle and western Geo. 3—4 feet.

GENUS XLIX.—DRACO'PIS. Cass.

(From *drakon*, a dragon, and *opsis*, like.)

Heads many-flowered; ray florets neutral, those of the disk perfect. Scales of the involucre in 2 series, the exterior largest, the inner very small. *Receptacle* cylindrical, pointed. *Chaff* linear. *Achenia* terete. *Pappus* none.

1. D. AMPLEXICAU'LIS, (Cass.) *Stem* branching, glabrous, striate; upper leaves cordate, clasping, entire, lower ones serrate. *Heads* solitary.—Yellow. Louisiana.

GENUS L.—HELIAN'THUS. L.

(From *helios*, the sun, and *anthos*, a flower.)

Involucre imbricate, leafy, generally squarrose; ray florets neutral, those of the disk perfect. *Receptacle* chaffy. *Pappus* 2-leaved, caducous.

a. Florets of the disk dark purple.

1. H. DEB'ILIS, (Nutt.) *Stem* decumbent, slender, branching. *Leaves* mostly alternate, ovate, serrulate. *Heads* terminal, on slender peduncles; achenia pubescent; pappus 2 chaffy awns.—⊙. E. Florida and Louisiana. 1—2 feet.

2. H. ANGUSTIFO'LIUS, (L.) *Stem* pubescent, slender, sparingly branched. *Leaves* narrow-lanceolate, with revolute margins, scabrous on the upper surface, pubescent beneath, lower ones opposite, upper ones alternate. *Flowers* terminal; ray florets about 12; pappus setaceous, ciliate.—Yellow. ♃. Aug.—Oct. N. Jer.—Flor. 2—3 feet.

3. H. RAD'ULA, (T. & G.) *Stem* erect, simple, hirsute, bearing a single head. *Leaves* opposite, obovate, or spatulate, entire, hispid, sessile, or nearly so. Scales of the involucre lanceolate, purple; pappus 1—2 awns. *Achenia* compressed; rays 7—10.—☺. Geo., Ala., and Flor. Aug.—Sept. 1—3 feet.

4. H. HETEROPHYL'LUS, (Nutt.) *Stem* slender, simple, hispid below. *Leaves* hispid, lower ones oval or elliptical, upper lanceolate or linear; all nearly sessile. *Heads* large; rays 14—18.—☺. N. Car. and Flor. Dry soil. 1—2 feet.

5. H. ATRORU'BENS, (L.) *Stem* hispid, naked toward the summit, paniculately branched. *Leaves* opposite, spatulate, acute, crenate, scabrous on the upper surface, pubescent beneath, those toward the base very long, upper ones small, sessile. *Flowers* in terminal panicles; involucre many-leaved, ciliate; ray florets lanceolate, nerved. *Seed* compressed: pappus 2 long deciduous awns; receptacle convex, with the chaff 3-cleft at the summit.—Yellow. ♃. Sept.—Oct. Dry soils. Common. 3—4 feet.

6. H. SCABER'RIMUS, (Ell.) *Stem* scabrous, slightly branched. *Leaves* opposite, lanceolate, scabrous, nearly entire, whitish. *Flowers* few; involucre with ciliate leaves; ray florets from 16—26; pappus subulate.—Yellow. Sept.—Oct. Western Geo.

7. H. TRICUS'PIS, (Ell.) *Stem* scabrous. *Leaves* opposite, ovate-lanceolate, scabrous, whitish on the upper surface, brownish beneath, with revolute margins. *Flowers* terminal; involucre with subulate leaves; ray florets 14—16; pappus subulate.—Yellow. ♃. Sept.—Oct. Western Georgia. 3—4 feet.

8. H. MOL'LIS. (Willd.) *Stem* glabrous toward the base, scabrous at the summit, purple. *Leaves* ovate-lanceolate, acute, serrate, pubescent beneath, lower ones opposite, the upper alternate. *Flowers* in a terminal panicle; involucre with numerous, pubescent, ciliate leaves; ray florets about 10, hairy; pappus acuminate, pubescent.—Yellow. ♃. July—Aug. Common. 3—6 feet.

9. H. GIGAN'TEUS, (L.) *Stem* somewhat scabrous toward the summit, branching. *Leaves* alternate, lanceolate, serrate, scabrous, tapering at each end, on short petioles, ciliate at the base. *Flowers* in terminal panicles; involucre many-leaved, fringed; ray florets 12—14; pappus subulate.—Yellow. ♃. Aug.—Oct. Mountains. 5—8 feet.

10. H. TOMENTO'SUS, (Ell.) *Stem* pubescent, scabrous, branched. *Leaves* long, ovate-lanceolate, tapering toward the summit, serrulate, scabrous on the upper surface, tomentose beneath, upper leaves alternate. *Flowers* terminal; involucre with long, ciliate leaves, summits hispid; ray florets 10—14; pappus subulate; chaff 3-cleft, hairy toward the summit.—Yellow. ♃. Aug.—Oct. Western Geo. 4—6 ft.

11. H. SPATHULA'TUS, (Ell.) *Stem* striate, scabrous toward the summit, sparingly branched. *Leaves* opposite, ovate, spatulate, tapering toward the summit, on short petioles, pubescent beneath. *Flowers* at the extremities of the branches; involucre with subulate leaves; ray florets

pubescent, 10—12; pappus subulate, chaff hispid.—Yellow. 2f. Aug. —Oct. Middle and Western Geo. 4—6 feet.

12. H. DORONICOI'DES, (Lam.) *Stem* branching, hirsute above, glabrous below. *Leaves* ovate, or ovate lanceolate, serrate, acuminate, pubescent beneath, nearly or quite sessile, usually opposite. *Heads* large, chaff hairy at the summit.—Wet places. 5—8 feet.

13. H. STRUMO'SUS, (L.) *Stem* erect, slender, glabrous, sparingly branched. *Leaves* opposite, narrow, tapering toward the summit, long, pubescent beneath. *Flowers* few, terminal, small for this genus; involucre shorter than the disk, with fringed leaves; ray florets about 6; pappus setaceous; chaff pubescent.—Yellow. 2f. Aug.—Sept. 3—4 ft.

b. Florets of the disk yellowish.

14. H. HIRSU'TUS, (Raf.) *Stem* simple, or dichotomously branched above, hirsute, glaucous. *Leaves* opposite, on short petioles, ovate-lanceolate, broad or narrow, entire, or slightly serrate, acuminate, scabrous, pubescent above, hirsute, pubescent beneath, 3-nerved. *Heads* few, 12-rayed; leaves of the involucre spreading, recurved, narrow-lanceolate, longer than the disk.—Yellow. 2f. July—Aug. Dry woods. Middle Georgia.

A very variable species, especially in regard to the leaves, varying from a broad ovate-lanceolate leaf, 6 inches long 2 wide, to a very narrow lanceolate leaf 2 inches long and 4 lines wide. The lower leaves often the smallest and narrowest, increasing in breadth upward.—*H. diversifolius*, Ell. γ *H. trachyphyllus*, T. & G. δ *H. stenophyllus*, T. & G.

15. H. TRUNCA'TUS, (Schw.) *Stem* glabrous, slender, simple, or divided at the base. *Leaves* opposite, rounded at the base, ovate, serrate, tapering toward the summit, hairy, sessile. *Flowers* terminal; involucre with the leaves somewhat hispid on the inner surface; ray florets 10—12; pappus subulate; chaff of the receptacle pubescent.—Yellow. 2f. Aug.—Oct. Western Georgia. 2—3 feet. *H. divaricatus*, L.

16. H. DIVARICA'TUS, (Ell.) *Stem* glabrous, branching. *Leaves* ovate-lanceolate, serrulate, tapering toward the summit, scabrous on the upper surface, pubescent beneath. *Flowers* numerous, small, in terminal panicles; involucre with acute ciliate leaves; ray florets 5—10; pappus consisting of 2 hairy awns.—Yellow. 2f. Aug.—Sept. 5—6 feet. *H. microcephalus*, T. & G.

17. H. SCHWEINIT'ZII, (T. & G.) *Stem* erect, pubescent, branching. *Leaves* narrow-lanceolate, sparingly serrulate, almost sessile, scabrous above, tomentose beneath. *Heads* on slender canescent peduncles; scales of the involucre hairy; rays 8; pappus short.—N. Car. 3—6 ft.

18. H. LONGIFO'LIUS, (Pursh.) *Stem* glabrous, tinged with purple, paniculately branched. *Leaves* long-lanceolate, nearly sessile, glabrous, the upper ones entire, the lower ones serrate and connate. *Flowers* at the extremities of the branches in corymbs; involucre with nearly glabrous leaves; ray florets about 10; pappus subulate; chaff of the receptacle 3-toothed.—Yellow. 2f. Sept.—Oct. In damp soils Western Geo. 3—4 feet.

19. H. HISPIDU'LUS, (Ell.) *Stem* erect, scabrous. *Leaves* opposite, ovate-lanceolate, tapering toward the summit, serrulate, slightly hispid beneath; involucre with scabrous, ciliate leaves; pappus subulate, pubescent; chaff 3-toothed.—Yellow. June—Sept. Mid. Geo. 3—4 feet.

20. H. SPARSIFO'LIUS, (Ell.) *Stem* scabrous, with long slender branches, nearly glabrous. *Leaves* opposite, ovate, coarsely toothed, hispid, scabrous, the upper ones nearly sessile. *Flowers* in loose panicles; involucre with the leaves finely ciliate; ray florets about 14; pappus subulate.—Yellow. 4. Aug.—Oct. Western Geo.

21. H. PUBES'CENS, (L.) *Stem* erect, pubescent, hoary, nearly simple. *Leaves* sessile, opposite, cordate-ovate, pubescent, with scabrous margins. *Flowers* at the extremities of the branches; involucre with villous, nearly subulate scales; ray florets lanceolate, 14—16. *Seed* compressed; pappus 2 subulate scales, ciliate.—Yellow. 4. Aug.—Sept. Middle Georgia. 2—3 feet.

22. H. TENUIFO'LIUS, (Ell.) *Stem* erect, glabrous. *Leaves* opposite, on rather long petioles, ovate-lanceolate, somewhat tapering at the base, coarsely serrate, slightly scabrous on the upper surface, and slightly pubescent beneath. *Flowers* few, terminal; involucre as long as the disk, with ciliate leaves; ray florets about 10; pappus subulate. —Yellow. 4. Aug.—Oct. Western Georgia.

23. H. TRACHELIFO'LIUS, (L.) *Stem* scabrous, branching. *Leaves* ovate-lanceolate, serrate, attenuate at the base, scabrous, tomentose beneath, whitish above. *Flowers* in terminal panicles; involucre with subulate ciliate leaves; ray florets 10—12; pappus subulate; chaff hairy at the summit.—Yellow. 4. Sept.—Oct. Mountains. 3—4 feet.

24. H. DECAPET'ALUS, (L.) *Stem* pubescent, scabrous, branched. *Leaves* ovate, somewhat spatulate, serrate, scabrous above, pubescent beneath, upper ones alternate. *Flowers* in large panicles; involucre with long ciliate leaves; ray florets 10—12, long; pappus subulate, pubescent.—Yellow. 4. Aug.—Oct. Middle Geo. 3—4 feet.

25. H. MULTIFLO'RUS, (L.) *Stem* scabrous. *Leaves* scabrous, the lower ones cordate, the upper ovate; involucre many-leaved, smooth; ray florets numerous.—Yellow. 4. July—Sept. Mountains. 2—3 feet.

26. H. ALTIS'SIMUS, (L.) *Stem* glabrous, purple. *Leaves* alternate, ovate-lanceolate, serrate, scabrous, tapering toward the summit, on short fringed petioles; ray florets about 16; involucre with ciliate lanceolate leaves; chaff green.—Yellow. 4. July—Sept. Mountains. 6—8 feet.

27. H. TUBERO'SUS, (L.) *Stem* erect, scabrous, branching. *Leaves* ovate and cordate ovate, alternate, scabrous, serrate, the lower ones opposite; involucre with ciliate, linear-lanceolate scales; rays 12—15; pappus 1—4 subulate scales or chaffy awns. *Roots* bearing tubers, used as pickles.—From Brazil. *Artichoke* or *Jerusalem Artichoke.*

GENUS LI.—HELIANTHEL'LA. T. & G.

(Diminutive of Helianthus.)

Heads many-flowered; ray florets neutral; those of the disk perfect; scales of the involucre loose, somewhat foliaceous. *Ovary* compressed, with the margins winged more or less, and produced into a varying appendage.

1. H. GRANDIFLO'RA. (T. & G.) *Stem* pubescent, simple. *Leaves* lance-linear, hispid; ray florets about 20; chaff 3-toothed. *Achenia* oval, compressed.—3—4 feet. East Florida.

2. H. TENUIFO'LIA, (T. & G.) *Stem* scabrous. *Leaves* linear; rays 10—12; chaff 3-lobed. *Achenia* quadrangular, glabrous.—Sand-hills. Middle Florida.

GENUS LII.—ACTINOME'RIS. Nutt.

(From *aktin*, a ray, and *meris*, a part, alluding to the few rays.)

Involucre many-leaved, with leaves nearly equal; ray florets 4—12, neutral; those of the disk perfect. *Receptacle* chaffy. *Seed* compressed, margined, inclosed by the chaff; pappus 2-awned.

1. A. HELIANTHOI'DES, (Nutt.) *Stem* erect, winged, hirsute, pubescent. *Leaves* lanceolate, serrate, acute, scabrous, villous beneath. *Flowers* in terminal corymbs; involucre with leaves arranged in two series, ovate-lanceolate, hispid; ray florets 10—12; those of the disk numerous, slightly winged, hairy.—Yellow. 2f. June—July. Middle Geo. 3 4 feet.

2. A. AL'BA. *Stem* smooth and glabrous, or scabrous puberulent toward the summit. *Leaves* scabrous, serrate, narrow-lanceolate, upper ones often decurrent. *Heads* corymbose; scales of the involucre shorter than the disk; rays none; pappus two slender awns.—White. Common. Aug.—Oct. 3—10 feet.

3. A. SQUARRO'SA, (Nutt.) *Stem* erect, winged, glabrous when old, or pubescent toward the summit. *Leaves* lanceolate, serrate, scabrous, on short petioles. *Flowers* in leafy panicles; scales of the involucre expanding, arranged in 1—2 series; ray florets about 4 beneath, lanceolate. *Seed* slightly winged, somewhat hairy.—Yellow. 2f. Aug.—Oct. Middle and low country of Car. and Geo. 3—7 feet.

4. A. NUDICAU'LIS, (Nutt.) (*Helianthus aristatus*, Ell.) *Stem* scabrous, with slender branches. *Leaves* oval-lanceolate, toothed, sessile, acute; upper ones alternate, the lower opposite. *Flowers* in terminal corymbs; involucre pubescent; ray florets small; pappus consisting of two persistent awns.—Yellow. 2f. Sept.—Oct. Western Geo. 2—3 feet.

GENUS LIII.—COREOP'SIS. L.

(From *koris*, a bug, and *opsis*, resemblance, from the form of the achenia.)

Involucre double, each many-leaved; the exterior equal, the inner one sub-coriaceous and colored. *Receptacle* chaffy, with flat scales. *Seeds* compressed, emarginate; pappus consisting of 2 awns; ray florets neutral; those of the disk perfect.

a. Leaves opposite, entire.

1. C. LANCEOLA'TA, (L.) *Stem* procumbent, glabrous toward the summit, branching at the base. *Leaves* sessile, entire, linear-lanceolate, ciliate toward the base. *Flowers* solitary and terminal, on long, naked branches; involucre with the leaves about equal in both series; ray florets toothed at the summit, about 8. *Seed* compressed, winged; pappus two subulate, hairy awns; chaff narrow.—Yellow. 2f. April—May. Damp soils. 1—2 feet.

2. C. CRASSIFO'LIA, (Ait.) (*C. lanceolata*, L.) *Stem* pubescent, striate,

branched at the base. *Leaves* opposite, oblong; the lower ones alternate at the base, hirsute. *Flowers* terminal; involucre glabrous; ray florets toothed, about 8.—Yellow. 4. June—July. Pine-barrens. Common. 1—2 feet.

3. C. LATIFO'LIA, (Mich.) *Stem* glabrous, smooth. *Leaves* opposite, undivided, ovate or ovate-oblong, dentate or serrate; teeth mucronate. *Heads* in corymbs; scales of the involucre linear, the outer spreading; rays large, 5—6.—Yellow. Aug. Mountains. 4—6 feet.

4. C. ARGU'TA, (Pursh.) *Stem* glabrous. *Leaves* lanceolate-ovate, acuminate, serrate. *Flowers* on axillary and terminal peduncles, dichotomously divided.—Yellow. 4. Carolina.

5. C. ŒMLE'RI, (Ell.) (*C. integrifolia*, Poir.) *Stem* glabrous, angular. *Leaves* sessile, glabrous, acute at each end, clasping, and somewhat connate. *Flowers* opposite, axillary; the upper ones in corymbs; the exterior involucre smaller than the interior; ray florets about 8, entire. *Seeds* compressed, margined.—Yellow. 4. July—Aug. Upper Car.

6. C. ROSE'A, (Nutt.) *Stem* glabrous, simple or branching. *Leaves* opposite, connate, linear, entire. *Flowers* on axillary and terminal peduncles; exterior involucre small; ray florets about 8. *Seed* entire.—Pale red. 4. Aug.—Sept. In damp pine-barrens. Common. 10—12 inches.

b. Leaves opposite, divided.

7. C. AURICULA'TA, (L.) *Stem* pubescent or nearly glabrous. *Leaves* sessile, entire, oblong-lanceolate, finely pubescent, the lower ones divided, with 2 small lateral lobes at the base. *Flowers* axillary and terminal; exterior involucre equal to the interior; ray florets about 8, toothed.—Yellow. 4 Aug.—Oct. 3—4 feet.

8. C. DIVERSIFO'LIA, (Ell.) *Stem* pubescent, dichotomously divided. Lower leaves trifoliate, the leaflets obovate or nearly orbicular; the upper ones spatulate-lanceolate, all entire, sprinkled with glandular hairs. *Flowers* on long peduncles; exterior involucre equal to the interior. *Seed* nearly round.—Yellow. 4. May—July. Middle Car. and Geo.

9. C. SENIFO'LIA, (Mich.) *Stem* pubescent, branching toward the summit, angled. *Leaves* sessile, opposite, trifoliate; leaflets pubescent, lanceolate. *Flowers* in terminal corymbs; exterior involucre equal to the interior, both pubescent; ray florets pubescent on the outer surface, about 8.—Yellow. 4. June—Aug. Pine lands. 2—3 feet.

10. C. TINCTO'RIA, (Nutt.) *Stem* glabrous. *Leaves* opposite, pinnately divided; lobes linear, entire; rays 3-lobed, twice the length of the involucre. *Achenia* oblong, wingless. A cultivated plant.—Yellow and purple. July—Oct. Lou. and Texas. 1—3 feet.

11. C. VERTICILLA'TA, (Ehr.) (*C. delphinifolia*, Lam.) *Stem* erect, angled striate, glabrous, branching near the summit. *Leaves* opposite, trifoliate, sessile; middle leaflet frequently 3-parted; leaflets linear-lanceolate, entire. *Flowers* in corymbs; exterior involucre usually 10-leaved, interior 8; ray florets 8. *Seed* compressed; chaff filiform, dilated at the summit.—Yellow. 4. June—Aug. Dry soils. 2—3 feet.

12. C. ANGUSTIFO'LIA, (Ait.) *Stem* simple, corymbose at the summit, glabrous, angled, slender. *Leaves* entire, opposite or alternate, linear or lanceolate, narrowed toward the base; rays obovate, tapering at the

base, 3-lobed. *Achenia* elliptic, winged; pappus 2 short awns; disk dark purple.—Yellow. June—Sept. Pine-barrens. N. C., Florida, and Texas. 1—3 feet.

13. C. TENUIFO'LIA, (Ehr.) (*C. verticillata*, L.) *Stem* glabrous, slightly angled, branching toward the summit. *Leaves* trifoliate, sessile; leaflets many-parted, with linear, entire segments. *Flowers* in corymbs; exterior involucre with about 8 lanceolate leaves.—Yellow. 2f. July —Aug. Upper Car. 2—3 feet.

14. C. TRICHOSPER'MA, (Mich.) *Stem* glabrous, branching, angular. *Leaves* opposite, pinnate; leaflets serrate. *Flowers* in corymbs; exterior involucre with 8 ciliate leaves; ray florets 8, entire; chaff linear-lanceolate.—Yellow. 2f. Aug.—Oct. Swamps. Upper Car. 2—3 feet.
Tickseed. Sunflower.

15. C. MI'TIS, (Mich.) (*C. Aurea*, Ait.) *Stem* obtusely angled, glabrous, much branched. *Leaves* decussate, bipinnatifid; segments linear-serrulate, slightly scabrous. *Flowers* in terminal panicles; exterior involucre with serrulate, linear leaves; interior pubescent at the base; ray florets 8, obovate.—Yellow. 2f. Aug.—Sept. Wet grounds. 3—4 feet.

16. C. ARISTA'TA, (Mich.) *Stem* pubescent. *Leaves* quinnate; leaflets pinnate, serrate. *Flowers* large; florets of the ray entire, broad, oval. *Seed* cuneate, obovate, 2-awned; awns very long, divaricate.—Yellow 2f. Aug.—Sept.

17. C. PUBES'CENS, (Ell.) *Stem* pubescent, obtusely angled, sparingly branched. *Leaves* quinnate, pinnate; leaflets lanceolate, obtuse, entire the lateral ones small. *Flowers* terminal, on long branches; exterior involucre about equal to the interior; ray florets 8, broader at the summit. *Seed* slightly winged.—Yellow. 2f. Aug.—Sept. Western Geo. 2—3 feet.

18. C. TRIP'TERIS, (L.) *Stem* glabrous, branching toward the summit, fistular. *Leaves* opposite, the upper ones trifoliate; leaflets lanceolate, glabrous, entire, scabrous along the margin; radical leaves pinnate; exterior involucre not as long as the interior; ray florets entire, 8. *Seed* slightly winged.—Yellow. 2f. Aug.—Oct. Western Geo. 4—6 ft.

19. C. NUDA'TA, (Nutt.) *Stem* erect, glabrous, striate, dichotomously divided toward the summit. *Leaves* subulate, linear, glabrous, those near the summit smaller. *Flowers* terminal; exterior involucre minute. —Red. 2f. July—Aug. Southern Geo. 2—3 feet.

c. Leaves alternate.

20. C. GLADIA'TA, (Walt.) *Stem* glabrous, striate, dichotomously divided toward the summit. *Leaves* narrow, lanceolate, entire, succulent; radical ones on long petioles. *Flowers* terminal; exterior involucre smaller than the interior, expanding; ray florets 3-lobed at the summit, 8. *Seed* with serrulate wings; pappus pilose; chaff purple.—Yellow. 2f. Aug.—Sept. Damp pine-barrens. 2—3 feet

Genus LIV.—BI'DENS. L.

(From *bidens*, two teeth, from the two awns of the fruit.)

Involucre double, the outer unequal; ray florets neutral when present, frequently wanting; those of the disk perfect. *Receptacle* flat, chaffy; pappus consisting of 4 retrorsely scabrous awns. *Seed* quadrangular.

1. B. chrysanthemoi'des, (Mich.) *Stem* glabrous below, somewhat pubescent toward the summit, with opposite branches. *Leaves* sessile, opposite, oblong-lanceolate, serrate, glabrous, somewhat connate; involucre double, the exterior one consisting of about 8 unequal, foliaceous leaves; the interior of about the same number of equal, membranaceous leaves; ray florets lanceolate, 8. *Seed* compressed, oblong; pappus consisting of 2 awns which are distinct, and 2 others very minute; receptacle convex.—Yellow. 2. Oct.—Nov. In wet, cultivated lands. 2—3 feet.

2. B. connata, (Muhl.) *Stem* glabrous, with opposite branches. *Leaves* opposite, lanceolate, toothed, glabrous, attenuate at the base; the lower ones ternate, the upper ones simple, all sessile. *Flowers* solitary, on opposite peduncles; the exterior involucre foliaceous, the interior chaffy; ray florets none.—Yellow. 2. July—Oct. Middle Car. and Geo. 2—3 feet.

3. B. frondo'sa, (L.) *Stem* slightly pubescent, branching. *Leaves* lanceolate; the lower ones pinnate, the upper ternate and simple, slightly pubescent. *Flowers* solitary, on opposite and terminal peduncles; exterior involucre with unequal, ciliate scales; the exterior chaffy; ray florets none.—Yellow. 2. June—Sept. Damp soils. Common.

4. B. bipinna'ta, (L.) *Stem* glabrous, obtusely angled, with opposite branches. *Leaves* opposite, decussate, bipinnate; leaflets lanceolate, pinnatifid, slightly pubescent along the margin. *Flowers* on long, usually terminal, peduncles; exterior involucre with linear-lanceolate leaves; interior leaves ciliate toward the summit. *Seed* slightly angled. —Yellow. 2. July—Oct. Common. 2—4 feet.

Genus LV.—ACMEL'LA. L. (*Spilanthes*, Jacq.)

(From *akme*, a point.)

Involucre consisting of 12 leaves, arranged in a double series, pubescent, equal; florets of the ray pistillate, of the disk perfect. *Seed* quadrangular, compressed. *Receptacle* chaffy, with yellow scales.

1. A. re'pens, (Pers.) *Stem* procumbent, rooting at the lower joints, pubescent. *Leaves* opposite, ovate-lanceolate, attenuate at the base, slightly pubescent. *Flowers* solitary, on axillary and terminal peduncles. *Leaves* of the involucre ovate-lanceolate, acute; ray florets about 12. *Seed* oblong, naked, truncate at the summit.—Yellow. 2. Sept —Oct. Wet soils. 1—2 feet.

2. A. Nuttall'ii, (T. & G.) *Stem* pubescent, diffusely branched. *Leaves* ovate or oblong-ovate, coarsely serrate. *Achenia* with ciliate margins.—Lou.

Genus LVI.—VERBESI'NA. L.

(Name altered from Verbena.)

Involucre many-leaved, in a double series; ray florets pistillate, about 5; disk florets perfect. *Receptacle* chaffy; pappus 2-awned.

1. V. Virgin'ica, (L.) *Stem* erect, irregularly winged, pubescent, slightly furrowed. *Leaves* alternate, broad-lanceolate, acute, attenuate at the base, dentate, pubescent and scabrous on the upper surface, tomentose beneath. *Flowers* in terminal corymbs; involucre imbricate, pubescent, shorter than the disk; ray florets about 3, of the disk about 15. *Seed* hairy, compressed; chaff hairy.—White. 2f. Aug.—Sept. Middle Car. and Geo. 3—6 feet.

2. V. sinua'ta, (Ell.) *Stem* erect, pubescent, winged toward the base, striate. *Leaves* alternate, sessile, spatulate, or ovate; those on the middle of the stem sinuate, with acute lobes, scabrous on the upper surface, pubescent beneath; involucre pubescent, shorter than the disk; ray florets 3—5. *Seed* winged, cuneate.—White. 2f. Oct.—Nov. On the sea-coast. 4—6 feet.

3. V. siegesbeck'ia, (Mich.) *Stem* erect, pubescent, 4 winged branches, bracteate. *Leaves* opposite, ovate, acuminate, denticulate, pubescent, alternate at the base. *Flowers* in fastigiate corymbs; involucre pubescent; ray florets 1—3, 3-toothed. *Seed* hispid, obovate; chaff pubescent.—Yellow. 2f. June—Aug. Common. 4—6 feet.

Genus LVII.—XIMENE'SIA. Cav.

(Dedicated to Ximenes.)

Heads many-flowered; ray florets in a single series, pistillate; disk florets perfect; scales of the involucre in 2 series. *Receptacle* flat, chaffy; chaff embracing the achenia. *Achenia* flat, 2-awned.

1. X. encelioi'des, (Cav.) *Stem* erect, canescent. *Leaves* opposite, or sometimes alternate, cordate-ovate, serrate; petiole dilated at the base.—Yellow. Probably introduced.

Sub-tribe III.

Genus LVIII.—FLAVE'RIA. Juss.

(From *flavus*, yellow.)

Heads few-flowered, in glomerate fascicles, discoid, or with 1 ray floret. *Involucre* oblong, with 3—4 scales, the outer ones broadest. *Receptacle* naked. *Achenia* oblong, striate, glabrous.

1. F. linea'ris, (Laga.) *Stem* glabrous or slightly pubescent, suffrucicose. *Leaves* opposite, sessile, entire or toothed, linear, somewhat fleshy.—Pale yellow. Coast of East Florida.

Sub-tribe IV.—HELENIE'Æ.

Capitula usually heterogamous and radiate, with the rays in one series; flowers of the disk perfect. *Anthers* usually blackish. *Pappus* chaffy, rarely none. *Leaves* mostly alternate, rarely opposite.

Genus LIX.—GAILLAR'DIA. Fou.

(In honor of Mr. Gaillard.)

Involucre many-leaved. *Leaves* in two series, with a foliaceous appendix. *Receptacle* convex, hairy; ray florets neutral, 3-parted; disk florets perfect. *Pappus* chaffy, awned. *Seeds* oblong, villous.

1. G. lanceola'ta, (Mich.) *Stem* erect, pubescent, slightly branched. *Leaves* alternate, linear-lanceolate, sessile, with a few serratures, ciliate. *Flowers* solitary, terminal; florets of the ray dilated at the summit, 3-cleft; pappus 8 or 9 leaved; leaves terminated by a long awn.—Yellowish or purple. 2f. May—Aug. Middle Geo. Pine-barrens. 1—2 feet.

2. G. pulchel'la, (Fou.) *Stem* branching, hirsute. *Leaves* lanceolate; the lower ones petioled, toothed; the upper entire, acuminate; involucre very hirsute; corolla of the disk with subulate teeth; chaff of the pappus with long awns.—Lou.

Genus LX.—POLYP'TERIS, Nutt., or PALAFOX'IA, Laga.

(From *polus*, many, and *pteron*, a wing.)

Involucre many-leaved, oblong, membranaceous; florets all perfect, tubular. *Seed* quadrangular. *Pappus* chaffy.

1. P. integrifo'lia, (Nutt.) *Stem* erect, slightly scabrous, branching toward the summit. *Leaves* alternate, linear-lanceolate, entire; involucre 8—12-leaved; florets numerous, with a 5-cleft border. *Seed* somewhat scabrous, tapering at the base; pappus consisting of 9 membranaceous scales.—Southern Geo. 3—4 feet.

Genus LXI.—HYMENOPAP'PUS. L'Her.

(From *humen*, a membrane, and *pappus*, a pappus.)

Involucre many-leaved. *Leaves* obovate, nearly round, colored, expanding. *Seed* conical, somewhat pubescent. *Pappus* chaffy, consisting of short, obtuse, denticulate scales. *Receptacle* naked.

1. H. scabiosæ'us, (L'Her.) *Stem* erect, angular, woolly, tomentose. *Leaves* alternate, long, pinnatifid, with remote segments, linear, dentate; the upper ones with entire segments, all tomentose beneath. *Flowers* in terminal corymbs; involucre tomentose, the interior leaves large, colored; florets all perfect, tubular.—White. 2f. April—May. Near Macon. 2—3 feet.

Genus LXII.—HELE'NIUM. L.

(Named from Helen, the celebrated Grecian.)

Involucre gamosepalous, many-parted; florets of the ray pistillate, of the disk perfect. *Pappus* chaffy, 5-awned. *Receptacle* globose, naked.

1. H. AUTUMNA'LE, (L.) *Stem* erect, branching toward the summit, glabrous, winged by the decurrent leaves. *Leaves* sessile, alternate, lanceolate, doubly serrate, glabrous. *Flowers* in small corymbs; involucre 8-parted, with subulate segments, longer than the disk; ray florets about 10, 3-toothed at the summit. *Seed* angular, larger at the summit; scales of the pappus lacerate, mucronate.—Yellow. 2f. Oct. —Nov. In wet soils. 2—3 feet.

2. H. PAVIFLO'RUM, (Nutt.) *Stem* branched, glabrous, slightly angular. *Leaves* lanceolate, sub-serrulate; scales of the involucre filiform; rays 5-toothed; pappus awned. *Heads* solitary or in pairs.—Geo.

3. H. TENUIFO'LIUM, (Nutt.) *Stem* much branched. *Leaves* crowded, narrow, linear, entire.—Miss.

4. H. QUADRIDENTA'TUM, (Lab.) *Stem* erect, pubescent, slightly winged by the decurrent leaves. *Leaves* narrow-lanceolate, entire, pubescent. *Flowers* solitary and terminal; ray florets obovate, 3—4-toothed. *Seeds* hispid; pappus consisting of 6 mucronate scales; receptacle oblong.—Yellow. 2f. Sept.—Oct. Swampy lands. 2—3 feet.

Genus LXIII.—LEPTOP'ODA. Nutt.

(From *leptos*, slender, and *pous*, foot or support, from its slender stem.)

Involucre many-leaved, in double series; ray florets neutral, dilated at the summit, 3-cleft; those of the disk perfect. *Receptacle* convex, naked. *Seed* cylindrical. *Pappus* membranaceous, 8—12-leaved.

1. L. HELE'NIUM, (Nutt.) (*L. decurrens*, Mac.) *Stem* glabrous, simple, striate, solid. *Leaves* decurrent, somewhat denticulate. *Flowers* solitary, terminal; involucre with the interior leaves subulate, pubescent at the summit; ray florets somewhat pubescent. *Seed* glabrous; pappus awned, fimbriate.—Yellow. 2f. March—April. Middle Geo. 1—2 feet.

2. L. INCI'SA, (T. & G.) *Stem* glabrous. *Leaves* lanceolate, obtuse, sessile, not decurrent, pinnatifid or incised; rays in 2 or 3 series. *Achenia* glabrous, striate.—Geo.

3. L. FIMBRIA'TA, (T. & G.) *Stem* glabrous. *Leaves* lanceolate-acute, usually decurrent; radical ones oblanceolate; scales of the pappus deeply fimbriate.—Florida. 1—2 feet.

4. L. PUBER'ULA, (Mac.) *Stem* simple, viscidly pubescent, striate, fistular. Radical leaves obovate or linear-lanceolate, slightly serrate; cauline leaves alternate, linear-lanceolate, glabrous, notched, and toothed. *Flowers* terminal, solitary; involucre with the outer leaves subulate, pubescent, longer than the interior; ray florets numerous. *Seeds* hairy; pappus fimbriate.—Yellow. 2f. April—May. In damp soils. Car. and Geo. 2—3 feet.

5. L. BREVIFO'LIA, (Nutt.) *Stem* glabrous below, pubescent at the summit. *Leaves* entire; the lower ones spatulate, upper ones lanceolate, decurrent.—North Carolina and Alabama.

6. L. BRACHYPO'DA, (T. & G.) *Stem* leafy, pubescent, or glabrous below, corymbose at the summit. *Leaves* lanceolate, entire or denticulate, decurrent; scales of the involucre shorter than the disk. *Achenia* hairy on the angles.—Yellow. Damp soils. N. Car. and Flor. 1—3 feet.

GENUS LXIV.—BALDWIN'IA. Nutt.

(In honor of Dr. Baldwin.)

Involucre many-leaved, imbricate, squarrose; ray florets neutral, those of the disk perfect. *Receptacle* convex, pitted. *Seeds* immersed in the receptacle. *Pappus* membranaceous, consisting of 10 acute leaves.

1. B. UNIFLO'RA, (Nutt.) *Stem* simple, slightly angled, pubescent. *Leaves* obovate, tapering at the base, narrow, entire, pubescent when young; involucre squarrose, with the leaflets ovate, the interior mucronate; ray florets numerous, pubescent, 3-toothed at the summit. *Seed* hairy, enlarged toward the summit; pappus consisting of acute, membranaceous scales.—Yellow. 2f. July—Sept. Damp soils. Middle Car. and Geo. 1—2 feet.

GENUS LXV.—ACTINOSPER'MUM. Ell.

(From *aktin*, a ray, and *sperma*, a seed.)

Heads many-flowered; ray florets 8—10, neutral; those of the disk perfect. *Involucre* shorter than the disk; scales in 2 series, somewhat foliaceous. *Receptacle* with subulate chaff, united together. *Achenia* turbinate, silky, 12-radiate at the summit.

1. A. ANGUSTIFO'LIUM, (T. & G.) (*Baldwinia multiflora*, Nutt.) *Stem* glabrous, much branched, terete. *Leaves* linear, glabrous, sessile, alternate. *Flowers* at the extremities of the branches; involucre imbricate, many-leaved, glandular, oval; ray florets small. *Seed* enlarged at the summit, pubescent; pappus with numerous scales, expanding, obtuse.—Yellow. 2f. Sept.—Oct. Middle and Southern Geo. 2—3 feet.

GENUS LXVI.—MARSHAL'LIA. Schreb.

(In honor of Humphrey Marshall.)

Involucre imbricate; florets all perfect, tubular. *Receptacle* chaffy. *Pappus* consisting of 5 membranaceous scales.

1. M. LATIFO'LIA, (Pursh.) *Stem* leafy, branched above, glabrous. *Leaves* sessile, ovate-lanceolate; involucre with acute, rigid scales; pappus tawny.—Purple. May—June. Mountains. 1 foot.

2. M. LANCEOLA'TA, (Pursh.) *Stem* erect, simple, striate, pubescent toward the summit. Radical leaves obovate; cauline ones lanceolate, all glabrous, entire, attenuate at the base, dilated at the stem, and clasping it. *Flowers* terminal; involucre many-leaved, with membra-

naceous margins; florets numerous, covered externally with a glandular pubescence. *Seeds* angular, striate; receptacle flat.—Pale purple. 2f. April—May. Middle and upper districts of Car. and Geo. 1—2 feet.

3. M. ANGUSTIFO'LIA, (Pursh.) *Stem* erect, branching, angular, glabrous, or slightly pubescent toward the summit. *Leaves* long, narrow-lanceolate, glabrous; the upper ones linear. *Flowers* solitary, terminal; involucre with numerous subulate leaves. *Corolla* pubescent without. *Seed* angular.—Pale purple. 2f. May—June. In pine-barrens. 1—2 feet.

SUB-TRIBE VI.—ANTHEMIDE'Æ.

Heads mostly heterogamous; ray florets pistillate, ligulate, or tubular; disk florets usually perfect. *Pappus* small or none.

GENUS LXVII.—AN'THEMIS. L. (*Maruta*, Cass.)

(From *anthemon*, a flower, in allusion to the great number of flowers.)

Involucre hemispherical, many-leaved, with leaves nearly equal; ray florets pistillate; disk florets perfect. *Receptacle* chaffy, with the chaff rigid and acuminate. *Seed* naked. *Pappus* wanting or none.

1. A. COT'ULA, (L.) *Stem* erect, pubescent, slightly angled, much branched. *Leaves* bipinnate, with subulate, 3-parted segments. *Flowers* in terminal corymbs; involucre many-leaved, pubescent; ray florets 10—12. *Seed* slightly angular; receptacle conic, with subulate chaff. —White. ☺. May—June. Moist soils. Very common. 1—2 feet. (*Marutu cotula*, D. C.) *May-weed.*

GENUS LXVIII.—ACHILLE'A. L.

(Named after Achilles, a pupil of Chiron.)

Involucre ovate, imbricate, many-leaved; ray florets pistillate, those of the disk perfect. *Receptacle* chaffy. *Pappus* none.

1. A. MILLEFO'LIUM, (L.) *Stem* erect, pubescent, furrowed, branched at the top. *Leaves* bipinnate, with the segments linear, acute, glabrous. *Flowers* in dense, terminal corymbs; involucre with the leaves ovate-lanceolate, pubescent; ray florets 4—5.—White or pale red. 2f. July —Aug. 1—2 feet. *Yarrow.*

GENUS LXIX.—LEUCAN'THEMUM. Tourn.

(From *leukos*, white, and *anthemon*, a flower.)

Heads many-flowered; ray florets numerous, pistillate. *Involucre* imbricate, broad. *Receptacle* flat or convex, naked. *Achenia* of the disk and ray similar. *Pappus* none.

1. L. VULGA'RE. *Stem* erect. *Leaves* laciniate toothed; the cauline ones clasping, the radical ones spatulate.—White. 10—18 inches. *Daisy*

Genus LXX.—TANACE'TUM. L.

(Name uncertain, said to be altered from Athanasia.)

Heads discoid, homogamous; florets tubular and perfect, or heterogamous, with the lateral ones pistillate. *Receptacle* naked, convex. *Achenia* glabrous, angled.

1. T. VULGA'RE, (L.) *Stem* erect, glabrous, suffructicose. *Leaves* bipinnately divided, incisely serrate. *Heads* in corymbs.—Yellow. June —Aug. Naturalized. *Tansey.*

Genus LXXI.—ARTEMI'SIA. L.

(Dedicated to the goddess Artemis.)

Involucre imbricate, with the leaves round, connivent; ray florets none. *Receptacle* naked. *Pappus* none.

1. A. CAUDA'TA, (Mich.) *Stem* erect, simple, glabrous, paniculately branched. Radical and lower cauline leaves sub-bipinnate, pubescent; upper ones sub-pinnate; segments sub-setaceous, convex, alternate, divaricate. *Flowers* erect, pedicillate, globose, in dense panicles.—Yellow. ♃. July—Aug. On the sea-shore. 2—6 feet. *Wormwood.*

Genus LXXII.—SOL'IVA. Ruiz & Pav.

(In honor of Salvator Soliva.)

Involucre many-leaved. *Flowers* of the circumference sterile, of the center fertile; fertile flowers apetalous. *Stamens* none; sterile florets with the corolla funnel-shaped, slender. *Seeds* compressed. *Pappus* a winged margin, toothed. *Receptacle* naked. *Gimnostyles.*

1. G. STOLONIF'ERA, (Nutt.) *Stem* glabrous, creeping. *Leaves* pinnatifid, with linear and sometimes toothed segments, somewhat succulent, sprinkled with a soft pubescence, tapering into a long base, all radical. *Flowers* sessile at the root; involucre with oblong, hairy leaflets, in a single series. *Seed* terminated by the persistent style, enlarged at the summit.—♃. Feb.—May. Damp soils. Low country.

Sub-tribe VII.—GNAPHA'LEÆ.

Heads discoid, homogamous or heterogamous; florets all tubular. *Pappus* capillary or setaceous, sometimes none.

Genus LXXIII.—GNAPHA'LIUM. L.

(From *gnaphalon*, soft down.)

Involucre imbricate, with scales oblong, membranaceous, usually colored. Pistillate and perfect florets intermingled. Pistillate florets slender, 5-toothed. *Stamens* none. Perfect florets, stamens as long as the corolla. *Seeds* glabrous; pappus pilose. *Receptacle* naked.

1. G. POLYCEPH'ALUM, (Mich.) *Stem* erect, branching toward the summit, white, tomentose. *Leaves* sessile, linear-lanceolate, slightly undulate, glabrous above, tomentose and white beneath. *Flowers* in terminal corymbs; involucre conical, leaflets oblong, tomentose at the base. *Seeds* cylindrical glabrous; pappus pilose.—White. ☺. Sept. —Oct. Very common. 1—2 feet.

2. G. PURPU'REUM, (L.) *Stem* erect or decumbent, simple, tomentose. *Leaves* linear-spatulate, tomentose beneath, slightly mucronate, undulate. *Flowers* in sessile, axillary clusters; involucre with the leaflets ovate, glabrous, inner ones tinged with purple. *Seed* oblong, scabrous. —Purple. 2. March—May. Common. 1—12 inches.

GENUS LXXIV.—ANTENNA'RIA. Gært.

(From the resemblance of the pappus to the *antennæ* of insects.)

Involucre many-leaved, imbricate; scales oblong, scarious, colored. *Flowers* dicœcious. *Seeds* glabrous. *Pappus* plumose. *Receptacle* naked.

1. A. MARGARITA'CEA, (R. Br.) *Stem* erect, branching near the summit. *Leaves* linear-lanceolate, tapering, acute, tomentose beneath, entire. *Flowers* in fastigiate corymbs; involucre many-leaved, with ovate, obtuse, white scales.—Yellow. 2. Aug.—Sept. Mountains. 1—2 feet.

2. A. PLANTAGINIFO'LIA, (Hook.) *Stem* simple, with procumbent shoots, white, tomentose. Radical leaves spatulate, ovate, entire, nerved, tomentose beneath; cauline ones spatulate, lanceolate. *Flowers* in small, terminal corymbs; involucre with the inner scales long, obtuse, colored. —Reddish-white. 2. May—June. Car. and Geo.

SUB-TRIBE VIII.—SENECIO'NEÆ.

Heads homogamous or heterogamous, discoid or radiate; rays in a single series. *Pappus* capillary.

GENUS LXXV.—ERECHTITES. Raf.

(Probably named after Erectheus.)

Heads many-flowered, discoid, with the marginal flowers pistillate, the center ones perfect. *Involucre* cylindrical. *Scales* in one series, linear. *Receptacle* naked. *Achenia* oblong, striate. *Pappus* setaceous, abundant. Herbaceous plants, with alternate simple leaves.

1. E. HIERACIFO'LIA, (Raf.) (*Senecio hieracifolius*, L.) *Stem* erect, pubescent, branching toward the summit, succulent. *Leaves* alternate, oblong, sessile, unequally notched, or pinnatifid, with acute lobes, glabrous. *Flowers* in compound terminal panicles; involucre with glabrous leaves, ventricose, with irregular setaceous leaflets at the base. *Seeds* slightly pubescent; pappus bristly.—Yellowish-white. ☺. June —Sept. Rich soils. Middle Geo. 4—8 feet. *Fire-weed.*

Genus LXXVI.—CACA'LIA. L.

(An ancient name.)

Involucre cylindric, oblong, scaly at the base; florets all perfect, tubular. *Receptacle* naked. *Pappus* pilose.

1. C. suaveo'lens. (*Senecio suaveolens.*) *Stem* erect, glabrous. *Leaves* ovate-hastate, serrate, mucronate, petioles winged, colored. *Flowers* in erect corymbs; involucre many-leaved, slightly pubescent at the summit, with irregular subulate scales at the base; disk florets numerous. *Seed* striate; pappus pilose.—Yellow. ♃. Aug.—Oct. Middle Car. and Geo. 3—5 feet.

2. C. atriplicifo'lia, (L.) *Stem* erect, branching, glabrous, slightly glaucous. *Leaves* cordate, somewhat reniform, glabrous, toothed, upper ones lanceolate-ovate, glaucous beneath. *Flowers* in terminal corymbs; involucre with 5 equal linear leaves, 5-flowered. *Seed* oblong, ovate, glabrous; pappus scabrous; receptacle with an irregular mass in the center, 3-cleft at the summit.—White, tinged with purple. ♃. July—Sept. In rich soils in Car. and Geo. 3—8 feet.

3. C. ova'ta, (Ell.) *Stem* erect, branching at the summit. *Leaves* ovate, obtusely toothed, 7-nerved, glaucous beneath. *Flowers* in fastigiate corymbs; involucre composed of 5 equal linear leaves. *Seed* glabrous; pappus pilose; receptacle naked, with an irregular projection in the center.—White. ♃. Sept.—Oct. West Georgia and Alabama. 3—4 feet.

4. C. lanceola'ta, (Nutt.) *Stem* erect, branching toward the summit. *Leaves* long, narrow, lanceolate, remotely dentate, 7-nerved, glaucous beneath. *Flowers* in terminal corymbs; involucre with 5 linear-lanceolate leaves, with membranaceous margins. *Seed* glabrous, striate; pappus pilose; receptacle small, with a projection in the center.—White. ♃. Aug.—Sept. Middle Geo. 4—6 feet.

5. C. diversifo'lia, (T. & G.) *Stem* angled. *Leaves* not glaucous, somewhat 3-nerved, the lower ones ovate, somewhat cordate, obtusely toothed, upper leaves 3—5-lobed, somewhat hastate.—Flor. Swamps.

Genus LXXVII.—SENE'CIO. L.

(From *senex*, an old man, in allusion to the hoary appearance of some species.)

Involucre cylindrical, scaly at the base; scales withered at the point. Florets of the disk perfect, of the ray pistillate. *Receptacle* naked. *Pappus* pilose, abundant.

1. S. loba'tus, (Pers.) *Stem* erect, glabrous, angled, fistulous, succulent. *Leaves* pinnatifid, sessile, with spatulate lobes, dentate, glabrous. *Flowers* in corymbose panicles; involucre with linear leaves; ray florets about 12, 3-toothed at the summit. *Seed* striate; pappus bristly.—Yellow. ☺. Jan.—May. Common. 1—3 feet. *Butter-weed.*

2. S. au'reus, (L.) *Stem* erect, glabrous, slender, sometimes pubescent near the base. Radical leaves cordate, or nearly orbicular, serrate, glabrous, supported on long petioles; cauline leaves, the upper ones amplexicaul, pinnatifid, small, lower ones nearly orbicular. *Flow-*

ers in terminal umbels. *Seed* striate; pappus bristly.—Yellow. 4. June—July. Mountains. 2—3 feet.

3. S. OBOVA'TUS, (Muhl.) *Stem* simple, glabrous. Radical leaves obovate, or nearly orbicular, crenate, with an attenuated base; cauline leaves much smaller, sessile, pinnatifid, tomentose at the base. *Flowers* in terminal panicles; involucre many-leaved, glabrous; ray florets 10—12, those of the disk numerous. *Seed* striate; pappus pilose.—Yellow. 4. June—July. Middle Carolina. 12—18 inches.

4. S. TOMENTO'SUS, (Mich.) *Stem* tomentose or woolly. Radical leaves oblong, oval, serrulate, on long petioles; cauline ones oval-lanceolate, more or less divided. *Flowers* in terminal umbels; involucre many-leaved, tomentose at the base; ray florets 12—15, nerved, slightly 3-toothed; pappus setaceous.—White. 4. April—May. Middle Carolina. 2—3 feet.

5. S. MILLEFO'LIUM, (T. & G.) *Stem* striate, lanuginous when young, cæspitose. *Leaves* bipinnately divided, segments parted, linear, mostly radical, somewhat fleshy. *Heads* in dense corymbs.—June. 12—18 in.

6. S. BALSAM'ITA. *Stem* erect, simple, slender, glabrous. Radical leaves oblong or ovate, serrate, glabrous, on long petioles; cauline ones pinnatifid, toothed. *Flowers* in terminal umbels; involucre many-leaved, membranaceous along the margins; ray florets 10—12-cleft. *Seed* striate; pappus bristly.—Yellow. 4. April—May. Pine-barrens. 1—2 feet.

7. S. FASTIGIA'TUS, (Schw.) *Stem* erect, glabrous. Radical leaves oblong-ovate, somewhat acute, dentate, glabrous; cauline ones pinnatifid, with the segments notched and toothed, the terminal segment ovate; involucre with subulate leaflets. *Seed* striate; pappus abundant, setaceous.—Yellow. 4. May—June. Middle Car. 2—3 feet.

GENUS LXXVIII.—AR'NICA. L.

(From *arnikis*, a lamb's skin, from the resemblance of the leaves.)

Involucre hemispherical; leaflets equal, longer than the disk; receptacle naked; pappus simple; florets of the ray often with 5 filaments, destitute of anthers.

1. A. NUDICAU'LIS, (Ell.) *Stem* simple, hirsute, somewhat viscid. Radical leaves opposite, sessile, somewhat viscid, decussate, dentate; stem nearly leafless, or with 1—2 pair of ovate sessile leaves. *Flowers* in terminal racemes, on small branches at the summit of the stem; leaves of the involucre hirsute, in a single series. *Style* 2-cleft. *Seed* obovate, striate; pappus pilose.—Yellow. 4. April—May. Damp pine-barrens. Common. 1—2 feet. *Leopard's-bane.*

TRIBE V.—CYNA'REÆ.

Heads sometimes dicœcious, mostly homogamous or heterogamous, discoid.

GENUS LXXIX.—CENTAU'REA. L.

(From the *Centaur*, Chiron.)

Involucre scaly; scales lanceolate, imbricate. *Receptacle*

bristly. Florets of the ray pistillate, funnel-shaped, irregular; those of the disk staminate. *Pappus* consisting of three series, the exterior a toothed margin, the middle one composed of 10 or 12 awns, the interior one short, hairy.

1. C. AMERICA'NA, (Nutt.) *Stem* erect, striate, somewhat branched. *Leaves* glabrous, sessile, oblong-ovate, repand toothed, the upper lanceolate; scales of the involucre with pectinate appendages. *Heads* large, showy.—Pale purple. Cultivated. Louisiana, Texas. 2—3 feet.

GENUS LXXX.—CNI'CUS. Vaill.

(From *knizo*, to prick.)

Heads many-flowered; florets of the disk and ray similar. *Scales* of the involucre coriaceous, produced into long, hard, spiny, pinnate appendages. *Receptacle* flat, covered with capillary bristles. *Achenia* longitudinally striate. *Pappus* triple.

1. C. BENEDIC'TUS. *Stem* villous, branching. *Leaves* subpinnatifid, clasping, decurrent. *Flowers* yellow.—☺. Louisiana.

GENUS LXXXI.—CIR'SIUM. Tourn. (*Cnicus.*)

(From *kirsos*, a swelled vein, for which the thistle was supposed to be a remedy.)

Involucre ventricose, imbricate, with spinose scales. *Florets* perfect. *Receptacle* hairy. *Pappus* plumose, or pilose.

1. C. DISCO'LOR, (Spren.) *Stem* erect, hairy. *Leaves* sessile, pinnatifid; segments 2-lobed, spinous, hairy on the upper surface, tomentose beneath. *Flowers* solitary, terminal, on leafy branches; scales of the involucre ovate, terminated by a long spine. *Seed* smooth; pappus plumose.—Purple. 2. June—July. Upper dist. Car. and Geo.

2. C. ALTIS'SIMUM, (Spren.) *Stem* erect, branching. *Leaves* sessile, oblong-lanceolate, scabrous, tomentose beneath, dentate, ciliate, radical ones pinnatifid. *Flowers* terminal; involucre cylindrical, ovate; scales ovate, spinous, appressed, pale; receptacle villous.—Purple. 2. July—Sept. Upper dist. Car. and Geo. 2—3 feet.

3. C. VIRGINIA'NUM, (Mich.) *Stem* simple, angled, tomentose toward the summit. *Leaves* sessile, narrow-lanceolate, with spiny teeth, acute, slightly hairy on the upper surface, tomentose beneath. *Flowers* solitary, terminal; involucre ventricose; scales appressed, carinate, ovate. *Seeds* slightly angled, oblong; pappus plumose; receptacle bristly.—Purple. 2. June—Sept. Pine-barrens. Common. 2—3 feet.

4. C. MU'TICUM, (Mich.) *Stem* erect, slender, branching. *Leaves* pinnatifid, woolly, tomentose beneath; segments with spines, somewhat bracteolate, occasionally 3-lobed, pale, acute; branches naked, 1-flowered; involucre globose; scales without spines, lanuginous.—Purple. 2. July—Sept. Mountains. 2—6 feet. *Cnicus muticus*, Pursh.

5. C. GLA'BER. (*C. muticum*, Mich.) *Stem* erect, furrowed, sprinkled with hairs, branching. *Leaves* sessile, pinnatifid, very long, hairy along the veins, spiny along the margins and angles; segments 3—5-lobed. *Flowers* in panicles. *Peduncles* slender, slightly hairy; scales of the involu-

cre viscid, with a short spine. *Seeds* glabrous; pappus plumose; receptacle bristly.—Purple. 2f. May—Aug. In cultivated lands. 4—6 feet.

6. C. Lecon'tei, (T. & G.) *Stem* slender, angled, terminated by a single head. *Leaves* linear-lanceolate, with few spinous teeth, under side woolly, upper glabrous, decurrent; scales of the involucre appressed, outer ones mucronate, inner ones longest and subulate-acuminate.—Pine woods. 2 feet.

7. H. horrid'ulum, (Mich.) *Stem* erect, simple, woolly. *Leaves* sessile, pinnatifid, crowded near the base; segments lobed, dentate, spinous, hairy on the upper surface, woolly beneath. *Flowers* solitary, axillary and terminal, on short peduncles. *Bracts* numerous, spinous; spines arranged in pairs. *Involucre* ventricose; scales lanceolate, slightly hairy. *Seeds* shining; pappus plumose.—Purple. 2f. March—April. Poor soils. Common.

8. C. repan'dum, (Mich.) *Stem* erect, sometimes branching, but usually simple, woolly. *Leaves* oblong, narrow, amplexicaul, repand, sinuate, fringed with spines, woolly beneath; branches 1-flowered, leafy. *Involucre* with ovate-lanceolate scales, erect, spinous, slightly woolly; receptacle bristly; pappus plumose.—Purple. 2f. June—July. 2—3 ft.

Sub-order II.—LABIATIFLO'RÆ.

Corolla mostly bilabiate, lower lip usually 3-lobed, the upper 2-lobed or 2-toothed.

Genus LXXXII.—CHAPTAL'IA. Vent.

(In honor of the French chemist Chaptal.)

Involucre imbricate; florets of the ray in a double series, the inner series pistillate, with long styles; disk florets staminate, bilabiate. *Receptacle* naked. *Seed* oblong, striate, glabrous. *Pappus* pilose.

1. C. tomento'sa, (Vent.) *Root* tuberous; scapes several from each root, tomentose, 1-flowered. *Leaves* oblong-lanceolate, retrorsely dentate, white, tomentose beneath. *Flowers* solitary, nodding, leaves of the calyx linear-lanceolate, tomentose; ray florets 16—20 in the outer series.—White and purple. 2f. March—April. Damp pine-barrens. 12—18 inches.

Sub-order III.—LIGULIFLO'RÆ.

Flowers all ligulate and perfect, arranged in a radiate manner.

Tribe VI.—CICHORA'CEÆ.

Plants with a milky juice. *Leaves* alternate.

Genus LXXXIII.—APO'GON. Ell.

(From *a*, without, and *pagon*, a beard.)

Heads few-flowered, 10—12. *Involucre* 8-leaved, in a double series. *Receptacle* naked, flat. *Achenia* lanceolate, transversely striate. *Pappus* none.

1. A. HU'MILIS, (Ell.) *Stem* branching, glabrous. *Leaves* sessile, ligulate, entire. *Flowers* terminal.—Yellow. April. 6—12 inches.

Genus LXXXIV.—KRI'GIA. Schreb.

(In honor of David Krieg.)

Involucrum many-leaved, simple; receptacle naked, pitted; pappus double, exterior one chaffy, short, the interior pilose, rough. *Stigmas* linear-ligulate.

1. K. VIRGIN'ICA, (Willd.) A very small plant, glaucous, the primary leaves nearly round, entire, the rest lyrate, nearly glabrous. *Scapes* glabrous, 1-flowered, becoming elongated by age; involucrum glabrous.—Bright yellow. ☺. April—May. Sandy soils. Near Columbia.
Dwarf Dandelion.

2. K. CAROLINIA'NA, (Nutt.) *Scapes* hairy, glandular, long. *Leaves* runcinate, pinnatifid, or lanceolate, lateral lobes acute, much smaller than the terminal one, sometimes dentate, sprinkled with jointed hairs; involucrum 10—20-parted, with linear-lanceolate segments, glabrous. *Corolla* slightly hairy at the base. *Seeds* obconic, striate; pappus composed of 5 nearly round scales, and 5 scabrous bristles.—Bright yellow. ♃. Feb.—April. Sandy soils. Common.

Genus LXXXV.—CYN'THIA. Don.

(Probably named from Mount Cynthus.)

Heads many-flowered. *Involucre* many-leaved, scales in 2 series, exterior the shortest. *Receptacle* flat. *Achenia* short, 4-angled. *Pappus* in many series, the exterior paleaceous, the interior pilose. Harbaceous plants, glabrous, with glabrous leaves.

1. C. VIRGINIA'NA, (Don.) (*Krigia amplexicaulis*, Nutt.) *Stem* bearing leaves, somewhat branched, glaucous; radical leaves spatulate, lanceolate, dentate, cauline ones somewhat amplexicaul, lanceolate or ovate; involucrum generally 12-parted. *Flowers* solitary, at the extremity of the branches, large; exterior pappus consisting of 8 scales. —Yellow. ♃. June—July. Middle and upper dist. of Car. and Geo 12—14 inches.

2. C. DANDELI'ON, (D. C.) (*Krigia dandelion*, Nutt.) *Scape* bearing a few glandular hairs near the summit, slightly glaucous. *Leaves* oblong, narrow, slightly obovate; secondary leaves linear-lanceolate, long, somewhat glaucous; involucrum 10—13-parted.—Yellow. ♃. April —May. Southern Georgia.

Genus LXXXVI.—HIERA'CIUM. Tourn.

(From *hierax*, a hawk.)

Involucre imbricate; receptacle naked; pappus simple, persistent, setaceous. *Flowers* yellow, solitary or corymbose, perfect.

1. H. Maria'num, (Willd.) (*H. scabrum*, Mich.) *Stem* erect, villous and scabrous, leafy. *Leaves* sessile, obovate, oblong, strigose, upper leaves small, lower ones denticulate. *Flowers* in irregular panicles; involucre hispid, tomentose; florets numerous.—Yellow. 2f. Aug.—Sept. Mountains. 2—4 feet.

2. H. Grono'vii, (L.) *Stem* leafy, erect, hairy, with a glandular pubescence. *Leaves* few, near the base of the stem, ovate, sessile, ciliate, pubescent. *Flowers* in terminal panicles; involucre cylindric, covered with hispid glands. *Seed* oblong, furrowed.—Yellow. 2f. June—Sept. In dry soils. Common.

3. H. veno'sum, (L.) *Stem* herbaceous, glabrous toward the summit, hairy at the base. *Leaves* all radical, ovate-oblong, little hairy on the upper surface, entire, margins ciliate, with dark red veins. *Flowers* in corymbose panicles; involucre glabrous. *Seed* striate, receptacle dotted.—Yellow. 2f. May—June. In shaded soils. 1—2 feet.

Veiny Hawkweed.

4. H. panicula'tum, (L.) *Stem* leafy, erect, pubescent beneath, glabrous above. *Leaves* lanceolate, denticulate, glabrous. *Flowers* in large compound panicles, on slender peduncles; involucre with the interior leaves very narrow, glabrous. *Seed* furrowed.—Yellow. 2f. July—Sept. Mountains.

Genus LXXXVII.—NAB'ALUS. Cass. (*Prenanthes*, L.)

(From *nabla*, a harp, alluding to the lyrate leaves.)

Involucre cylindric, in a single row, somewhat imbricate at the base with a few appressed scales; receptacle slightly pitted. *Florets* perfect. *Stigmas* somewhat hispid, filiform. *Fruit* narrow, angled; pappus pilose, erect, persistent, colored, scabrous.

1. N. al'bus. (*P. serpentaria*, Pursh.) *Stem* erect, nearly glabrous. *Leaves* hastate, radical ones palmate, cauline ones on long petioles, sinuate, pinnatifid, somewhat 3-lobed, middle segment 3-parted, with a long, attenuated base, upper leaves lanceolate. *Flowers* in terminal, paniculate racemes, nodding; florets 12 in each capitulum; involucrum 8-cleft.—Purple. 2f. Mountains. Aug.—Oct. Upper district of Carolina. *Rattlesnake-root. White Lettuce. Lion's-foot.*

2. N. altis'simus, (Hook.) (*Prenanthes altissima*, L.) *Stem* erect, branching, glabrous. *Leaves* 3-lobed, alternate, angled, nearly hastate, slightly dentate, scabrous on the margin. *Flowers* in axillary racemes, nodding; involucre about 5-flowered, cylindrical. *Seeds* angular, striate.—Yellow. 2f. Aug.—Sept. 4—6 feet.

3. N. Fra'seri, (D. C.) (*Prenanthes alba*, Ell.) *Stem* herbaceous, much branched, pubescent, slightly angled; radical leaves hastate, angled, toothed; upper leaves spatulate, obovate-lanceolate, toothed and angled. *Flowers* in loose panicles, in terminal clusters, nodding; florets 8—12 in a capitulum; involucrum with 8 oblong pubescent leaves

fringed at the summit. *Seeds* cylindrical, striate; pappus 7, scabrous.—Pale yellow. 2. Sept.—Oct. Dry soils. 2 ft. *Gall of the earth.*

4. N. BARBA'TUS, (T. & G.) (*P. crepidinea*, Ell.) *Stem* branching toward the summit. *Leaves* broad-lanceolate, attenuate at the base, upper ones sessile, denticulate, scabrous. *Flowers* in terminal panicles, composed of nodding clusters; involucrum with 8—10 nearly glabrous leaves; florets numerous; pappus scabrous.—2. Sept. Mountains. 4—6 feet.

5. N. VIRGA'TUS, (D. C.) (*P. virgata*, Mich.) *Stem* erect, simple, glabrous. *Leaves* sessile, runcinate, somewhat amplexicaul, upper leaves narrow-lanceolate. *Flowers* in long terminal racemes, pendulous, 10—12 florets in a capitulum; involucrum with 8 oblong, obtuse leaves, fringed at the summit. *Seeds* cylindric, striate; pappus scabrous.—Pale purple. 2. Oct. Pine-barrens. Common.

6. N. CORDA'TUS, (Hook.) *Stem* erect, generally glabrous. *Leaves* ovate-lanceolate, petioled, cordate at the base, irregularly toothed, ciliate, upper leaves lanceolate. *Flowers* in racemose panicles, nodding, 6—8 flowers in a head; leaves of the involucrum usually 8, with membranaceous margins. *Seeds* striate, with scabrous pappus.—Yellow. 2. July—Aug. Mountains. 4—6 feet.

7. N. PELTOI'DEUS, (Hook.) *Stem* simple, slender. *Leaves* on long petioles, deltoid, acuminate, acutely denticulate, lower ones triangular, glabrous, slightly glaucous beneath. *Flowers* in axillary racemes, 5 in each capitulum; involucrum with 5 equal linear leaves, with membranaceous margin. *Seeds* glabrous, angled; pappus hairy.—Purple. 2 Sept. Mountains. 2 feet.

GENUS LXXXVIII.—LYGODES'MIA. Don.

(From *lugodes*, pliant, and *mia*, one, the allusion not apparent.)

Heads 5—10-flowered. *Florets* in 1 or 2 series. *Involucre* 5-leaved, cylindrical, elongated, with a few scales at the base. *Achenia* linear, compressed, sulcate. *Pappus* abundant, pilose, colored, scabrous. Herbaceous plants, glabrous, and somewhat glaucous, with linear, subulate, entire leaves.

1. L. APHYL'LA, (D. C.) *Stem* slender, angled, dichotomously divided at the summit. *Leaves* radical, linear, filiform, minute bracts at the origin of the branches. *Heads* showy, involucre cylindrical. *Achenia* long, slender.—Rose-color. Pine-barrens. Geo., Flor. 1—2 feet.

GENUS LXXXIX.—TARAX'ACUM. Haller. (*Leontodon*, L.)

(From *tarasso*, to disorder.)

Involucre imbricate, with a few loose scales at the base; florets perfect; receptacle naked; pappus stiped.

1. T. DENS-LIONIS, (Dis.) (*L. taraxacum*, L.) *Scapes* several from each root, terete, glabrous, each 1-flowered. *Leaves* all radical, runcinate, oblong; segments lanceolate, toothed, slightly hairy when young; involucrum with numerous leaves, equal, sometimes colored; scales reflexed. *Seeds* oblong, angled; pappus stipitate, hairy; receptacle convex.—Yellow 2. March—April. Damp soils. Introduced.

Dandelion.

Genus XC.—PYRRHOPAP'PUS. D. C. (*Borkhausia.*)

(From *purros*, reddish, and *pappus.*)

Involucre many-leaved, with a dorsal tooth near the summit, surrounded at the base with a few short subulate scales. *Pappus* hairy, stipitate. *Receptacle* naked. *Florets* perfect.

1. P. Carolinia'nus, (D. C.) (*B. Caroliniana*, Nutt.) *Stem* erect, few-flowered, pubescent toward the summit. *Leaves* oblong-lanceolate, old ones pinnatifid, pubescent along the margins, narrow. *Flowers* few, solitary, on the summit of the branches; florets numerous. *Seed* compressed, striate.—Yellow. 2f. March—July. Common.

Genus XCI.—LACTU'CA. Tourn.

(From *lac*, milk, in allusion to the milky juice.)

Involucre cylindrical, imbricate, scales membranaceous at the margin. *Receptacle* naked. *Florets* perfect. *Seeds* smooth; pappus simple, stipitate.

1. L. elonga'ta, (Muhl.) *Stem* glabrous. *Leaves* long, smooth beneath, the lower ones runcinate, amplexicaul, entire, toothed, the upper ones lanceolate; involucre imbricate, reflexed when old; florets numerous. *Flowers* in corymbose panicles. *Seeds* compressed; pappus stipitate, hairy.—Yellow. 2f. July—Sept. 4—7 feet. *Fire-weed.*

2. L. graminifo'lia, (Mich.) *Stem* erect, simple, glabrous. *Leaves* sessile, long, tapering to an acute point, narrow, sometimes amplexicaul, usually undivided. *Flowers* in loose, leafless panicles; leaves of the involucre subulate. *Seeds* compressed, lanceolate.—Purple. 2f. April—Sept. In dry soils.

3. L. sagittifo'lia, (Ell.) *Stem* erect, terete, glabrous. *Leaves* sessile, sagittate, tapering toward the apex, entire, glabrous. *Flowers* in loose, terminal panicles; involucre with glabrous, subulate leaves. *Seed* compressed; pappus hairy.—Yellow. 2f. July—Sept. Middle Carolina. 4—6 feet.

Genus XCII.—MULGE'DIUM. Cass.

(From *mulgeo*, to milk.)

Heads many-flowered. *Involucre* many-leaved, imbricate. *Receptacle* alveolate, naked. *Achenia* glabrous, compressed, with the summit extending into a short beak. *Pappus* capillary. Herbaceous plants, with undivided or pinnatifid leaves. *Flowers* blue.

1. M. acumina'tum, (D. C.) (*Sonchus acuminatus*, Willd.) Radical leaves slightly runcinate, spatulate, ovate, sometimes angled, acutely toothed. *Petiole* winged, upper surface glabrous, lower pubescent. Cauline leaves ovate, acuminate, toothed in the middle, petioled.—Purple. 2f. Aug.—Sept. Rich soils.

2. M. Florida'num, (D. C.) (*Sonchus Floridanus*, L.) *Stem* erect, glabrous. *Leaves* narrow, lanceolate, lyrate, sometimes with 1 or 2 runcinate segments, acutely denticulate. *Flowers* in long slender panicles. *Peduncles* scabrous.—Blue. 2f. July—Sept. Upper districts Car. and Geo. 3—5 feet.

Genus XCIII.—SON'CHUS. L.

(The Greek name.)

Involucre many-leaved, imbricate, connivent at the summit. *Florets* perfect. *Receptacle* pitted, naked or scabrous. *Stigma* hispid. *Pappus* hairy.

1. S. Carolinia'nus, (Willd.) (*S. asper*, Vill.) *Stem* erect, glabrous, fistulous. *Leaves* lanceolate, acute, toothed, undulate, auriculate, somewhat clasping at the base. *Flowers* in lateral and terminal umbels. *Seed* compressed, striate; pappus sessile.—Yellow. ☺. March—April. Common. 1—3 feet.

2. S. olera'ceus, (L.) *Stem* terete, fistulous, succulent, glabrous, branching. *Leaves* oblong-lanceolate, amplexicaul, sinuate, pinnatifid, segments acute, slightly toothed. *Flowers* in axillary umbels, with tomentose spots on the peduncles. *Seed* oblong, compressed, sulcate.—Yellow. ☺. March—July. Common. *Sow-thistle.*

3. S. macrophyl'lus. *Stem* erect. *Leaves* lyrate, pubescent, and hispid on the under surface, cordate at the base, large. *Flowers* in panicles. *Peduncles* hirsute.—Blue. ♃. Aug.—Sept. In shaded, damp soils. 4—7 feet.

Order LXIX.—LOBELIA'CEÆ. (*Lobelia Family.*)

Calyx 4—5-cleft. *Corolla* irregular, inserted into the calyx, 5-cleft. *Stamens* 5, inserted into the calyx, alternate with the lobes of the corolla. *Anthers* cohering. *Ovary* 2—3-celled; ovules numerous. *Styles* simple. *Stigma* surrounded by a cup-like fringe. *Capsule* 2—3-celled, many-seeded, dehiscing at the apex. Herbaceous plants, with alternate leaves.

Genus I.—LOBE'LIA. L. 5—1.

(In honor of Lobel, a French botanist.)

Calyx 4—5-cleft. *Corolla* irregular, cleft on the upper side nearly to the base. *Stamens* united into a tube. *Stigma* 2-lobed. *Capsule* sometimes attached to the calyx. *Seeds* minute, scabrous.

1. L. Kal'mii, (L.) *Stem* erect, slender. Radical leaves spatulate, ovate or nearly orbicular, pubescent; cauline leaves linear, nearly subulate. *Flowers* in terminal racemes, small, scattered, on short peduncles. *Calyx* 4-cleft, with subulate segments. *Corolla* with a 3-cleft border; the lateral segments subulate, reflexed, the middle segment 3-cleft. *Anthers* cohering into a tube, villous at the summit. *Stigma* villous. *Capsule* 2-valved, 2-celled, surrounded by the calyx.—Blue. ♃. May—Aug. Damp soils. Common. *L. Nuttallii*, Rœm.

2. L. pallida, (Muhl.) (*Spicata.*) *Stem* slender, glabrous, slightly angled. *Leaves* lanceolate, cuneate, denticulate, the upper ones small, the lower ones 2 inches long. *Flowers* in racemes, remote. *Calyx* small. *Anthers* exserted.—Blue. ♃. Through the summer. Damp soils.

VAR. CLAYTONIA'NA, (Mich.) *Stem* erect, pubescent. *Leaves* sessile, oblong, serrulate; radical ones entire. *Flowers* in crowded spikes. *Stamens* longer than the tube of the corolla.—Blue. 2f. July—Sept. Near Columbia. *L. spicata*, Lam.

3. L. BOYKIN'II, (T. & G.) *Stem* glabrous, branching; branches erect, virgate. *Leaves* narrow-linear, erect, glandular-denticulate; racemes lax, elongated; pedicels slender, flattened. *Calyx* turbinate; lobes narrow, linear-lanceolate, acuminate.—Blue. Wet places. Geo. and Flor.

4. L. DORTMAN'NA, (L.) *Stem* erect, simple, nearly naked; cauline leaves minute; radical leaves in a tuft, terete, fleshy, consisting of two tubes. *Flowers* 3—4, in a terminal raceme, nodding.—Pale blue. 2f. July—Sept. Ponds and swamps. Geo. and northward. 9—18 inches. *Water Gladiole.*

5. L. PALUDO'SA, (Nutt.) *Stem* erect, smooth, nearly naked; small stems from each root, fistulous. *Leaves* smooth, fleshy, crenulate; radical ones linear-oblong, crowded, obtuse; cauline ones linear. *Flowers* few, remote, with minute bracts.—Pale blue. 2f. Swamps. Geo. and northward. 2 feet. *Marsh Lobelia.*

6. L. LEPTOSTA'CHYS, (D. C.) *Stem* erect. *Leaves* oblong-lanceolate, denticulate, sessile; racemes elongated; bracts linear-lanceolate, dentate; lobes of the calyx narrow, linear; lower lip of the corolla pilose. —Blue. 2f. Geo. and Car. 1—2 feet.

7. L. BREVIFO'LIA, (Nutt.) *Stem* erect, simple, glabrous. *Leaves* scattered, dentate, oblong-linear, smooth; lower ones narrowed into a short petiole. *Flowers* in spicate racemes; pedicels much shorter than the linear dentate bracts; tube of the calyx short, pilose; lobes lanceolate. *Corolla* much longer than the lobes of the calyx.—Blue. 2f. Ala.

8. L. GLANDULO'SA, (Walt.) *Stem* erect, glabrous, leafy near the base. *Leaves* linear-lanceolate, sessile, somewhat amplexicaul and ciliate at the base. *Flowers* in racemes; pedicels bracteate. *Calyx* hairy; segments dentate; margin of the corolla hairy.—Blue. 2f. Sept.—Oct. Damp pine-barrens. Common.

9. L. INFLA'TA, (L.) *Stem* erect, branching, hirsute. *Leaves* oval-lanceolate, sessile, serrate. *Flowers* in paniculate racemes. *Calyx* inflated, glabrous. *Corolla* small. *Stamens* about as long as the tube of the corolla.—Pale blue. 2f. July—Sept. Upper country of Car. and Geo.

The seeds of this species are used in large quantities in the *Botanico-medical* practice, as an emetic.

10. L. SYPHILIT'ICA, (L.) *Stem* erect, hirsute, angled, nearly glabrous near the base. *Leaves* oval-lanceolate, sessile, large, crenulate; lower ones nearly glabrous. *Flowers* in leafy racemes. *Calyx* hispid, with reflexed margins. *Corolla* large.—Blue. 2f. July—Sept. Mountains. 2—3 feet.

11. L. PUBER'ULA, (Mich.) *Stem* erect, slightly angled, silky, pubescent. *Leaves* sessile; the lower ones obovate, obtuse, serrulate; the upper ones lanceolate, finely serrulate, with a silky luster. *Flowers* in racemes, on short pedicels, all turning to one side; segments of the calyx villous, lanceolate, ciliate.—Blue. 2f. Sept.—Oct. Wet soils. Common. 2—3 feet.

12. L. AMŒ'NA, (Mich.) *Stem* erect, simple, pubescent, angled near the

summit. *Leaves* broad-lanceolate, sessile, decurrent, sometimes incised, pubescent. *Flowers* in leafy racemes, secund. *Calyx* with subulate segments. *Anthers* blue. *Stigma* compressed.—Bright blue. 2. Sept.—Oct. In wet places. Common. 2—4 feet.

13. L. CARDINA'LIS, (L.) *Stem* erect, terete, simple, pubescent toward the summit. *Leaves* broad-lanceolate, serrate, cuneate, sprinkled with hairs. *Flowers* in terminal, secund racemes; segments of the calyx subulate; filaments red. *Anthers* blue.—A bright scarlet flower. 2. Sept. Damp rich soils. 2—3 feet. *Cardinal Flower*

The *L. inflata* and *syphilitica* are possessed of powerful medical properties; the former of which has long been esteemed by the profession as a remedial agent in asthma and other pectoral affections. It is now considered by a respectable and influential class of practitioners, as of prime importance in the cure of almost all diseases. Its being of universal application, we believe they found on the hypothesis of its possessing alterative powers in a high degree. Of the truth of these assertions we are entirely unable to judge.

ORDER LXX.—CAMPANULA'CEÆ.

Calyx superior, 5-parted, persistent. *Corolla* inserted into the top of the calyx, with a 5-cleft border, marcescent, regular; æstivation valvate. *Stamens* 5, inserted into the calyx. *Anthers* 2-celled. *Ovary* 2-celled, with many ovules. *Style* simple, hairy. *Fruit* dry, crowned by the persistent calyx and corolla, dehiscing by pores. *Seeds* numerous, attached to a central placentæ. Herbaceous plants.

GENUS I.—CAMPAN'ULA. Tourn. 5—1.

(From *campana*, a bell, from the shape of its flower.)

Calyx 5-cleft. *Corolla* campanulate, closed with valves, bearing the stamens. *Stigma* 3-cleft. *Capsule* inferior, 3-celled, dehiscing by lateral pores.

1. C. AMPLEXICAU'LIS, (Mich.) *Stem* generally simple, erect, pentangular, with the angles retrorsely aculeate. *Leaves* cordate, sessile, pubescent, persistent, 5-parted, with lanceolate segments. *Corolla* with 5 acute segments. *Anthers* purple. *Style* pubescent toward the summit. *Capsule* oblong, angled.—Purple. ☺. April. Very common. 6—12 inches. *Specularia perfoliata*, D. C.

2. C. ACUMINA'TA, (Mich.) *Stem* erect, terete, glabrous. *Leaves* lanceolate, remotely serrate, cuneate, glabrous. *Flowers* generally 3 in the axil of each leaf.—Blue. 2. July—Aug. Mountains. *C. Americana*, L.

3. C. DIVARICA'TA, (Mich.) *Stem* erect, glabrous. *Leaves* sessile, lanceolate, with a long, tapering summit, a cluster of small leaves in each axil. *Flowers* small, solitary, in terminal panicles, with subulate leaves at each division.—Sept. Mountains. 2 feet.

4. C. ERINOI'DES, (L.) *Stem* decumbent, diffuse, flexuous, angled by the decurrent leaves. *Leaves* lanceolate, serrate, decurrent, with margins and midrib retrorsely aculeate. *Flowers* in panicles, small, solitary, terminal, nodding.—Aug. Mountains.

Order LXXI.—VACCINA'CEÆ.

Calyx adhering to the ovary, 4—5-toothed. *Corolla* urceolate, or sometimes campanulate, 4—5-cleft. *Stamens* 8—10, inserted into an epigynous disk. *Anthers* with 2 horns at the base, 2-celled. *Ovary* inferior, 4—5-celled, many-seeded. *Style* simple. *Fruit* a berry, crowned by the limb of the calyx, succulent. Shrubs, with alternate, coriaceous leaves.

Genus I.—VACCIN'IUM. L. 10—1.

(Latin name of the plant.)

Calyx superior, 4—5-cleft. *Fruit* globose, 4—5-celled, many-seeded. *Stamens* 8—10.

a. Leaves deciduous. Corolla campanulate.

1. V. frondo'sum, (Willd.) (*V. glaucum*, Mich. *Gaylussacia frondosa*, T. & G.) A branching shrub, with the young branches pubescent. *Leaves* oval, lanceolate, entire, rugose, somewhat glaucous, slightly pubescent, sprinkled with glandular dots. *Flowers* 6—8, in racemes. *Corolla* contracted at the mouth, somewhat urceolate. *Fruit* large, blue.—White. ♄. April. In close soils. 3 feet.

Whortleberry. Blue-tangle.

2. V. resino'sum, (Ait.) (*Gaylussacia resinosa*, T. & G.) A branching shrub. *Leaves* oblong, oval, entire, sprinkled with resinous dots on the under surface. *Flowers* in lateral racemes, secund. *Corolla* short, ovate. *Stamens* exserted. *Berries* large, black.—White. April—May. Mountains. *Black Whortleberry.*

3. V. dumo'sum, (Curt.) (*Gaylussacia hirtella*, T. & G.) A small shrub, with the young branches sprinkled with resinous dots. *Leaves* cuneate, obovate, nearly sessile, finely serrulate, with revolute margins. *Flowers* in leafy racemes; pedicels solitary, axillary; peduncles and calyx roughened with glandular dots. *Corolla* angled. *Berries* nearly black.—White. ♄. June. Pine-woods. 12—18 inches.

Low Swamp Whortleberry.

4. V. hirtel'lum, (Ait.) *Branches* virgate, somewhat cinerous. *Leaves* narrow, obovate-oblong, mucronate, entire, somewhat hispid beneath. *Racemes* leafy; pedicels hispid, bracteate. *Stamens* somewhat exserted. *Anthers* not awned. ♄. Car.

5. V. arbore'um, (Mich.) A small tree; young branches long straight, pubescent; old ones crooked. *Leaves* broad, lanceolate, serrulate, pubescent on the under surface, on short petioles, sometimes nearly round. *Flowers* in leafy racemes, nodding. *Calyx* small. *Corolla* 5-cleft, angled; segments reflected. *Stamens* very short. *Berry* globular, black, dry.—White. ♄. April—May. Dry fertile soils.

Farkle Berry.

6. V. diffu'sum, (Ait.) *Branches* diffuse, smooth. *Leaves* ovate-lanceolate, acuminate, obsoletely serrate. *Racemes* leafy; pedicels 1-flowered, naked. *Fruit* globose, black.—Red and white. ♄. A large shrub. S. Car. 10—15 feet.

7. V. STAMIN'EUM, (L.) A shrub, erect, branching; young branches pubescent. *Leaves* oval, lanceolate, nearly acute, entire, glaucous beneath. *Flowers* solitary, axillary, nodding, on filiform peduncles; segments of the corolla oblong, acute. *Anthers* exserted, awned. *Berry* blue.—White. ♄. April—May. Dry soils. 2—3 feet.

Whortle or Huckle Berry.

8. V. ELEVA'TUM, (Banks & Sol.) *Branches* smooth; young ones pubescent. *Leaves* oval, obovate, lanceolate, elliptic-oblong, acute, entire, glaucous beneath, pubescent; pedicels solitary, axillary, filiform. *Corolla* campanulate. *Anthers* exserted, awned. *Fruit* globose, white.—White. ♄. Car.

b. Leaves perennial.

9. V. MYRTIFO'LIUM, (Mich.) A creeping shrub, glabrous. *Leaves* oval, petiolate, denticulate, shining. *Flowers* small, in sessile, axillary clusters. *Corolla* campanulate, 5-toothed. *Anthers* unawned. *Fruit* small, on pedicels, globose, black.—White. ♄. April—May. Car. and Geo.

10. V. MYRSINI'TES, (Mich.) A small shrub, erect, branching; young branches pubescent. *Leaves* small, sessile, ovate, mucronate, serrulate, pubescent when young, dotted on the under surface. *Flowers* in axillary and terminal racemes; segments of the calyx acute, red. *Corolla* oblong or nearly urceolate.—Pale purple. ♄. March—April. Pine-barrens. Very common. 1—2 feet.

c. Corolla urceolate.

11. V. CORYMBO'SUM, (L.) A shrub, with few, geniculate, straggling branches. *Leaves* nearly sessile, long-lanceolate, acute, finely serrulate, pubescent when young. *Flowers* in crowded racemes, near the summit of the stem, bracteate. *Corolla* oblong, slightly angled. *Stamens* short, with unawned anthers; filaments hairy. *Style* longer than the stamens. *Berries* black.—White, tinged with purple. ♄. March—April. In damp soils. Common. 4—8 feet. *Bilberry.*

VAR. AMŒ'NUM, (Pursh.) *Corolla* cylindric. *Calyx* reflexed. *Flowers* large; young branches reddish.

VAR. FUSCA'TUM, (Ait.) *Leaves* serrulate. *Flowers* in terminal, corymbose racemes, nodding. *Corolla* cylindric, striped with red. *Calyx* brown.

12. V. VIRGA'TUM, (L.) A shrub, with the flower-bearing branches nearly leafless. *Leaves* oblong-serrulate, glabrous on both surfaces. *Flowers* in sessile racemes, bracteate. *Calyx* with reflexed segments. *Corolla* contracted at the throat.—White, tinged with red. March—April. Damp soils. 2—3 feet.

13. V. GALE'ZANS, (Mich.) A small shrub, with pubescent, dotted branches and creeping roots. *Leaves* sessile, lanceolate, cuneate, serrulate, pubescent, with the margins often tinged with purple. *Flowers* in sessile fascicles, axillary, with 3—4 bracts at the base of each peduncle. *Corolla* long, nearly cylindrical, slightly angled; filaments hairy. *Anthers* uncrowned. *Fruit* small, black.—White, tinged with red. ♄. March—April. Damp soils. 1—2 feet.

14. V. TENEL'LUM, (Ait.) A small shrub, with numerous green branches; branches angled. *Leaves* sessile, ovate-lanceolate, mucronate, serrulate, shining on both sides. *Flowers* in dense terminal fascicles. *Calyx*

green. *Corolla* ovate. *Fruit* bluish-black, large.—Pale red. ♄ March—April. In dry soils. 1—2 feet.

15. V. MYRTILOI'DES, (Mich.) A large shrub, with long, slender, numerous branches. *Leaves* small, sessile, lanceolate, crenulate, glabrous, shining. *Flowers* usually solitary, axillary. *Fruit* black.—White. ♄. March—April. On the banks of rivers. Middle and Southern Geo. 6—8 feet.

GENUS II.—OXYCOC'CUS. L. 8—1.

(From *oxus*, sour, and *kokkus*, berry.)

Calyx 4-cleft. *Corolla* with 4 linear segments. *Stamens* 8; filaments connivent. *Anthers* tubular, 2-parted. *Fruit* many-seeded. *Cranberry.*

1. O. ERYTHROCAR'PUS, (Pers.) A small shrub, with erect, flexuous branches. *Leaves* oval, membranaceous, acuminate, serrulate, and ciliate, hairy along the veins. *Flowers* axillary. *Calyx* minute, 4-cleft; segments acute. *Corolla* long, revolute. *Fruit* red, transparent.—Red. ♄. June. Mountains. 2—3 feet.

ORDER LXXII.—ERICA'CEÆ. (*Heath Tribe.*)

Calyx 4—5-cleft, nearly equal, persistent. *Corolla* 4—5-cleft, regular or irregular. *Stamens* definite. *Anthers* 2-celled, dehiscing by pores. *Ovary* many-celled; ovules numerous, attached to a central placentæ. *Style* 1. *Fruit* capsular or baccate, many-seeded. *Leaves* verticillate or opposite, exstipulate, often evergreen.

ANALYSIS.

1. Stamens 5 2
   Stamens more than 5 4
2. Shrubs 3
   Herbaceous plants ..... *Galax*, 17
3. Style long ..... *Azalea*, 13
   Style short ..... *Cyrilla*, 1
4. Stamens 8 5
   Stamens more than 8 6
5. Flowers white ..... *Elliottii*, 3
   Flowers not white ..... *Menziesia*, 6
6. Stamens 10 7
   Stamens 14 ..... *Bejaria*, 12
7. Shrubs or small trees 8
   Herbaceous plants, or small, scarcely shrubby plants 11
8. Capsule 3-celled 9
   Capsule 5-celled 10
9. Leaves perennial ..... *Mylocarium*, 2
   Leaves not perennial ..... *Clethra*, 5
10. Corolla ovate or cylindrical ..... *Andromeda*, 7
    Corolla salver-form, with a regular border ..... *Kalmia*, 8
    Corolla funnel-form, with an irregular border ..... *Rhododendron*, 9
11. Parasitic plants 12
    Not parasitic plants 13
12. Anthers 1-celled ..... *Schweinitzia*, 18
    Anthers 2-celled ..... *Monotropa*, 16

13. Creeping plants 14
Plants not creeping 15

14. Flowers in spikes ..... *Pyrola*, 14
Flowers in corymbs ..... *Chimaphila*, 15
Flowers in racemes ..... *Epigæa*, 10

15. Fruit a berry ..... *Gaultheria*, 4
Fruit a capsule ..... *Leiophyllum*, 11

Genus I.—CYRIL'LA. L.

(In honor of Dr. Cyrilli, of Naples.)

Calyx minute, 5-parted. *Petals* 5, inserted into the calyx. *Stamens* 5. *Style* 1. *Stigmas* 2. *Fruit* a berry, 2-celled. *Seeds* solitary.

1. C. racemiflo'ra, (Walt.) A large shrub, with verticillate branches, which spring from the summit of the wood of the preceding year. *Leaves* alternate, cuneate, lanceolate, coriaceous, and growing only on the new wood; petioles slightly decurrent. *Flowers* in simple racemes, clustered at the summit of the branches of the preceding year. *Calyx* small. *Petals* scarcely united, inserted into the calyx. *Anthers* bifid at the base, 2-celled. *Style* short, thick. *Stigmas* 2, obtuse.—White. ♄. June—July. 10—15 feet.

Genus II.—MYLOCA'RIUM. Willd.

(From *mule*, a mill, and *karua*, a kernel, from the nuts resembling millstones.)

Calyx 5-cleft. *Petals* 5. *Style* with winged angles. *Stigma* 3—4-cleft. *Capsule* 3-celled, angular.

1. M. ligustri'num, (Willd.) A shrub. *Leaves* perennial, lanceolate, cuneate, entire, coriaceous, glabrous, alternate, sessile, somewhat glaucous underneath. *Flowers* in terminal racemes. *Calyx* small. *Petals* obovate.—White. ♄. March—April. Southern Geo. and Flor. 6—15 feet. *Buckwheat-tree.*

Genus III.—ELLIOTT'IA. Muhl

(In honor of Stephen Elliott, one of the most distinguished American botanists.)

Calyx 4-toothed, inferior. *Corolla* 4-parted. *Stigma* capitate or clavate, undivided. *Capsule* 4-celled, many-seeded.

1. E. racemo'sa, (Muhl.) A shrub, with numerous virgate branches. *Leaves* alternate, lanceolate, mucronate, entire, on short petioles, pubescent on the under surface. *Flowers* in terminal racemes. *Calyx* small. *Corolla* with the segments very slightly cohering at the base. *Stamens* 8, hypogynous. *Anthers* sagittate.—White. ♄. June—July. Southern Geo. 4—8 feet.

Genus IV.—GAULTHE'RIA. L.

(In honor of Dr. Gaulther, of Quebec.)

Calyx 5-cleft, bracteolate. *Corolla* ovate. *Capsule* 5 celled. *Stamens* 10.

1. G. PROCUM'BENS, (Pursh.) A very small shrub. *Stem* procumbent; branches erect. *Leaves* obovate, acute at the base, crowded toward the summit, coriaceous, with fine serratures. *Flowers* few, terminal, nodding. *Fruit* a berry, red, eatable.—White. ♄. May—July. Mountains.

GENUS V.—CLE'THRA. L. 10—1.

(From *klethra*, name of the Alder.)

Calyx 5-parted, persistent. *Petals* 5. *Stamens* 10. *Style* 1—3-cleft at the summit, persistent. *Capsule* 3-celled, 3-valved, inclosed by the calyx.

1. C. ALNIFO'LIA, (Pursh.) A small under-shrub. *Leaves* cuneate, obtuse, acute, serrate, glabrous, of the same color on both surfaces. *Flowers* in simple, terminal racemose spikes, bracteate, tomentose.—White. ♄. July—Aug. Middle Car. and Geo.

Spiked Alder. White-bush.

2. C. TOMENTO'SA, (La Marsh.) A shrub, with the young branches clothed with a stellular pubescence. *Leaves* cuneate, obovate, acute, serrate, scabrous, pubescent on the upper surface, tomentose and white underneath. *Flowers* in terminal racemose spikes, bracteate. *Petals* obovate, double the length of the calyx. *Anthers* sagittate. *Seeds* numerous, compressed.—White. ♄. July—Aug. Common. 2—4 ft.

3. C. SCA'BRA, (Pers.) Similar to the preceding. *Leaves* scabrous on both surfaces, with large uncinate serratures. *Flowers* in somewhat paniculate spikes, tomentose.—White. ♄. July. Near Flint River, Middle Geo. 3—4 feet.

4. C. PANICULA'TA, (Pursh.) *Leaves* narrow, cuneate, lanceolate, acute, with acuminate serratures, glabrous on both surfaces. *Panicle* terminal, with the branches racemose, tomentose, and white.

5. C. ACUMINA'TA, (Mich.) A small tree. *Leaves* on long petioles, oval, acuminate, serrate, glabrous, somewhat glaucous beneath. *Flowers* in racemose spikes, bracteate, with bracts longer than the flowers.—White. ♄. Mountains.

GENUS VI.—MENZIE'SIA. Smith, 8—1.

(In honor of Archibald Menzies.)

Calyx 4-cleft. *Corolla* globose, 4—5-cleft. *Stamens* 8, hypogynous. *Style* 1. *Capsule* 4-celled; dissepiments produced by the inflexed margins of the valves. *Seeds* numerous, oblong.

1. M. GLOBULA'RIS, (Salis.) A small shrub. *Leaves* lanceolate, very pubescent when young, and glaucous beneath, except the nerves. *Flowers* globose.—Yellowish-brown. ♄. Mountains. 2—4 feet.

GENUS VII.—ANDROM'EDA. L. 10—1.

(From Andromeda.)

Calyx small, 5-parted, inferior. *Corolla* ovate or cylindrical; border 5-cleft. *Stamens* 10. *Capsule* 5-celled, 5-valved; style 1.

1. A. SPECIO'SA, (Mich.) (*Zenobia speciosa*, Don.) A small, branching, glabrous shrub. *Leaves* oval, obtuse, crenate. *Flowers* in naked terminal racemes. *Corolla* campanulate. *Anthers* 4-awned.—White. ♄. May—June. Southern Car. and Geo. 3—4 feet.

2. A. RACEMO'SA, (L.) (*Zenobia racemosa*, D. C.) A small shrub, with irregular branches. *Leaves* lanceolate, acute, serrulate, pubescent on the under surface. *Flowers* in terminal racemes. *Calyx* purple, ciliate. *Corolla* oblong-ovate, furrowed. *Anthers* 4-awned.—White. ♄. March—May. Wet places. 3—5 feet.

3. A. FLORIBUN'DA, (Pursh.) (*Zenobia floribunda*, D. C.) *Stem* glabrous. *Leaves* ovate-oblong, coriaceous, acute, slightly serrulate; racemes axillary, secund.—White. ♄. May—June. Mountains.

4. A. ARBORE'A, (L.) (*Oxydendrum arboreum*, D. C.) A shrub or tree, much branched. *Leaves* lanceolate-oval, acuminate, finely serrate or entire, glabrous, sour to the taste. *Flowers* in terminal racemose panicles. *Corolla* pubescent, ovate-oblong. *Anthers* unawned, linear.—White. ♄. Middle and upper Geo. and Car. June—July. 15—20 feet. *Sorrel-tree.*

5. A. AXILLA'RIS, (Mich.) (*Leucothoe spinulosa*, Don.) A shrub, with flexuous branches, terete, sparingly branched; young branches pubescent. *Leaves* lanceolate-oval, acuminate, glabrous, somewhat coriaceous, finely serrulate, paler on the under surface, sprinkled with hairs. *Flowers* in axillary racemes, numerous. *Calyx* deeply cleft. *Corolla* cylindrical-ovate; bracteas pubescent.—White. ♄. February—April. Margin of swamps. 2—4 feet.

6. A. ACUMINA'TA, (Willd.) (*Leucothoe acuminata*, D. C.) A glabrous shrub: branches fistular. *Leaves* ovate-lanceolate, acuminate, nearly entire, coriaceous, slightly serrate. *Flowers* in axillary racemes. *Corolla* cylindrical. *Anthers* gibbous at the base.—White. ♄. April. On the margins of swamps. Middle and Southern Geo.

7. A. NIT'IDA, (Mich.) (*Leucothoe coreacea*, D. C. *A. rhomboidalis*, Vaill.) A shrub, glabrous, with slender, angled branches. *Leaves* oval, acuminate, entire, 3-nerved. *Flowers* clustered in the axils of the leaves, 6—10. *Calyx* purple; segments acute. *Corolla* cylindrical. *Anthers* horned at the base.—White, tinged with red. ♄. March—April. In wet lands. 3—6 feet. *Sour-wood. Sorrel-tree.*

8. A. MARIA'NA, (L.) (*Leucothoe Mariana*, D. C.) A small shrub, sparingly branched. *Leaves* broad-lanceolate, acute, entire, coriaceous, sour to the taste. *Flowers* in clusters, near the summit of the old branches; peduncles 1-flowered. *Corolla* ovate; filaments hairy at the base.—White, tinged with red. ♄. May—Aug. Dry sandy soils.

9. A. CALYCULA'TA, (L.) (*Cassandra calyculata*, Don.) A shrub. *Leaves* oval or lanceolate, oblong, obtuse, obsoletely serrulate, perennial, sub-revolute, ferruginous beneath. *Flowers* in leafy, terminal racemes, secund; peduncles axillary, solitary; segments of the calyx acute, bracteolate. *Corolla* cylindrical.—White. ♄. April—May. Mountains. 2—5 feet.

10. A. ANGUSTIFO'LIA, (Pursh.) (*Cassandra angustifolia*, Don.) Resembles the preceding. *Leaves* slightly ferruginous beneath, with revolute margins; segments of the calyx acuminate. *Corolla* oblong-oval.—White. ♄. April—May. In wet places. Middle Car. and Geo. 2—5 feet.

11. A. LIGUSTRI'NA, (Muhl.) (*Lyonia ligustrina*, D. C.) A shrub, with irregular branches, pubescent. *Leaves* obovate, lanceolate, acuminate, nearly entire, or finely serrulate. *Flowers* in terminal panicles; peduncles 3—6 at each bud, 1-flowered. *Corolla* nearly globose, pubescent.—White. ♄. May—June. Damp soils. 3—15 feet.

12. A. FRONDO'SA, (Pursh.) (*Lyonia frondosa*, Nutt.) A small shrub, pubescent. *Leaves* obovate-lanceolate, nearly sessile, acute or acuminate, tomentose. *Flowers* on leafy paniculate branches; pedicels axillary, 2—5 at each bud. *Corolla* globose. *Anthers* awned.—Whitish. ♄. May—June. Damp soils. 3—5 feet.

13. A FERRUGINE'A, (Walt.) (*Lyonia ferruginea*, Nutt.) A shrub, with flexuous branches. *Leaves* obovate, entire, scaly beneath, coriaceous, on long petioles, with revolute margins. *Flowers* axillary, clustered. *Corolla* globose, ferruginous on the outside. *Anthers* unawned.—White. ♄. June—July. Pine-barrens. 3—5 feet.

14. A. RIG'IDA, (Pursh.) (*Lyonia rigida*, Nutt.) A small tree, with rigid branches. *Leaves* lanceolate, on short petioles, crowded, tomentose underneath; margins revolute. *Flowers* in axillary clusters. *Corolla* globose, ferruginous.—Yellowish. ♄. June—July. Southern Geo. and Flor. 15—20 feet.

GENUS VIII.—KAL'MIA. L. 10—1.

(In honor of Peter Kalm, a pupil of Linnæus.)

Calyx 5-parted. *Corolla* salver-form, with a border continuing at the base into 10 cornute protuberances, in the cavities of which the anthers are concealed. *Stamens* 10. *Style* 1. *Capsule* 5-celled.

1. K. LATIFO'LIA, (L.) A small shrub, with irregular, crooked branches. *Leaves* on long petioles, scattered, and by threes, oval, coriaceous, glabrous and green on both sides, perennial, shining. *Flowers* in large, terminal corymbs, pubescent, viscid. *Calico-flower. Ivy-bush.*

2. K. ANGUSTIFO'LIA, (L.) A very small shrub, with creeping roots. *Leaves* scattered or ternate, oblong, obtuse, slightly ferruginous underneath. *Flowers* in lateral corymbs; peduncles and calyx glandular, pubescent.—Red. ♄. April—May. Sandy woods. 1—2 feet.

3. K. CUNEA'TA, (Pursh.) *Leaves* cuneate, oblong, pubescent underneath, scattered, slightly awned at the apex. *Flowers* few, in lateral corymbs.—White, with red near the base. ♄. June—July. Southern Car. 1—2 feet.

4. K. HIRSU'TA, (Walt.) A small shrub, with hairy branches. *Leaves* alternate and opposite, nearly sessile, lanceolate, acute, hairy. *Flowers* solitary, on axillary peduncles, longer than the leaves.—Red. ♄. May—Sept. In wet, sandy pine-barrens. 10—18 inches.

The Kalmias afford some of the most splendid ornaments of the forest. The leaves are all poisonous; nevertheless some animals, it is said, eat them with impunity, and that too to such an extent as to make their flesh poisonous to man, it becoming so impregnated with the poison of the leaves. This has proved the case with partridges after a winter of deep snows among the mountains, when the bird is compelled to live almost entirely on these leaves. An ointment made from the leaves has been used in cases of *scald-head*, *itch*, and other cutaneous affections. Care should be had in its use, lest the system should be injuriously affected by the cutaneous absorption of the poison.

Genus IX.—RHODODEN'DRON. L. 10—1.

(From *rododendron*, rose-tree.)

Calyx 5-parted. *Corolla* funnel-shaped, with an unequal border. *Stamens* declined, 10. *Style* 1. *Capsule* 5-celled.

1. R. max'imum, (L.) A large shrub. *Leaves* oblong, acute, the under surface lighter than the upper, coriaceous, thick, perennial, entire, ferruginous on the under surface. *Flowers* in compact terminal racemes, covered when young with large ferruginous bracteas. *Corolla* large, irregular. *Stamens* declining, longer than the corolla. *Styles* as long as the stamens. The leaves of this species vary considerably in form, some being obtuse and the others acute at the base: the flowers also vary from purple, white, to rose-color.—♄. Mountains. 4—20 feet. *Mountain-laurel.*

2. R. puncta'tum, (L.) A small shrub, with straggling branches. *Leaves* oblong-lanceolate, ferruginous underneath, with resinous dots, glabrous above. *Flowers* in compact terminal racemes. *Corolla* with oval or ovate segments, a little undulate.—Pale red. ♄. June—July. 4—6 feet.

Genus X.—EPIGÆ'A. L. 10—1.

(From *epi*, upon, and *ge*, the ground, from its trailing on the ground.)

Calyx 5-parted, with 3 bracts at the base, large. *Corolla* hypocrateriform; border 5-parted, spreading; tube villous within. *Stamens* 10. *Style* 1. *Capsule* 5-celled.

1. E. re'pens, (L.) A very small prostrate shrub, creeping. *Leaves* cordate, ovate, entire, reticulate, when young slightly fringed, hispid along the midrib. *Flowers* in axillary racemes; bracts as long as the calyx. *Corolla* sub-cylindrical.—White, tinged with red, fragrant Jan.—March. Common in sandy soils.

Trailing Arbutus. Ground-laurel.

Genus XI.—LEIOPHYL'LUM. Pers. 10—1.

(From *leios*, smooth, and *phullon*, foliage.)

Calyx deeply 5-parted. *Petals* scarcely united. *Stamens* 10, exserted. *Capsule* 5-celled, opening at the summit.

1. L. buxifo'lium, (Ell.) A very small shrub, branching, glabrous. *Leaves* small, oval, lanceolate, entire, glabrous, revolute at the margin. *Flowers* in small terminal corymbs, with persistent calyx.—White. ♄. Mountains. 6—8 inches. *Sand-myrtle. Sleek-leaf.*

Genus XII.—BEJA'RIA. Juss. 12—1.

(In honor of Bejar, a Spanish botanist.)

Calyx 7-cleft. *Corolla* 7-petaled. *Stamens* 14. *Style* 1. *Capsule* 7-celled, many-seeded.

1. B. racemo'sa, (Pursh.) A handsome shrub, erect, branching, hispid, and glutinous. *Leaves* ovate-lanceolate, alternate, perennial, entire, glaucous on the under surface. *Flowers* in long, simple racemes. *Calyx* campanulate, with very short segments. *Petals* obovate, as long

as the stamens. *Style* persistent. *Capsule* globular.—White. ♄ June—July. Southern Geo. 3—4 feet.

Genus XIII.—AZA'LEA. L. 5—1.

(From *azaleos*, arid; inappropriate to our species.)

Calyx small, 5-parted. *Corolla* campanulate, with somewhat unequal segments. *Stamens* 5, inserted on the receptacle. *Style* 1, straight. *Capsule* 5-celled, 5-valved, dehiscing at the summit.

1. CALENDULA'CEA, (Mich.) A small shrub. *Leaves* ovate, pubescent on both sides. *Flowers* in clusters, large, not viscid; teeth of the calyx oblong. *Corolla* with rather a short tube. Flowers vary in color from deep red variegated with yellow to bright yellow and rose-colored, all of which are often found growing near each other.—♄. April—June. Abundant near Culloden, Geo. 2—6 feet.

2. A. CANES'CENS, (Mich.) A small shrub. *Leaves* obovate, pubescent above, tomentose beneath. *Flowers* not viscid, rather naked; teeth of the calyx short, rounded.—Rose-color. ♄. April—May. Lower Car. and Geo. 3—4 feet.

3. A. BI'COLOR, (Pursh.) A small shrub, with the young branches hairy, hispid. *Leaves* oblong, hairy on both sides. *Flowers* small, naked, not viscid. *Calyx* very short, with one long narrow segment. *Stamens* longer than the tube.—Nearly white, with red tube. ♃ May—June. Sandy hills, Car. and Geo. 2—3 feet.

4. A. NUDIFLO'RA, (L.) A small shrub, producing many stems from the root. *Stem* branching toward the summit, young branches pubescent. *Leaves* pubescent, lanceolate-oblong, the veins beneath bristly, alternate, crowded toward the summit, margins of under surface pubescent. *Flowers* in terminal racemes; tube of the corolla pubescent, viscid; segments of the border unequal, filaments longer than the corolla. *Capsule* hairy. A very variable plant, from which has arisen numerous varieties, but the preceding description, we believe, will include all the essential characteristics.—White, pale red, deep red, scarlet, and yellow. ♄. March—May. Common.

5. A. VISCO'SA, (Walt.) A small shrub, with young hispid branches. *Leaves* lanceolate, oval, or obovate, with scabrous margins; nerves of the leaves hispid. *Flowers* in terminal racemes. *Calyx* minute. *Corolla* hispid and viscid. *Stamens* hardly as long as the corolla. *Style* longer than the stamens.—White or red. ♄. May—July. Damp soils. 3—6 feet.

Genus XIV.—PYRO'LA. 10—1.

(Origin of the name uncertain.)

Calyx minute, 5-parted. *Stamens* 10, slightly united at the base. *Anthers* opening by 2 pores at the base. *Corolla* rotate, 5-lobed. *Capsule* 5-celled. *Seeds* arilled.

1. P. ROTUNDIFO'LIA, (Mich.) A small, creeping plant. *Leaves* nearly round, entire or crenulate, coriaceous, perennial. *Flowers* in spikes; scape triquetrous, many-flowered; segments of the calyx lanceolate, acute.—White. ♃. July. Sandy soils. Near Macon, Geo.

Round-leaved Wintergreen.

Genus XV.—CHIMAP'HILA. L. 10—1.

(From *cheima*, winter, and *phileo*, to love.)

Calyx and corolla as in the preceding. *Stigma* sessile, orbicular. *Anthers* beaked. *Capsule* 5-celled, dehiscing at the angles.

1. C. MACULA'TA, (Pursh.) A small, creeping plant. *Leaves* lanceolate, acuminate, incisely serrate, variegated in the middle with white, opposite or by threes. *Flowers* in corymbs, on pubescent peduncles, fragrant, nodding.—Reddish-white. ♃. July. Rich, shaded soil. Common. 3—4 inches. *Spotted Wintergreen.*

This plant resembles very closely the *C. umbellata* in its sensible properties of taste and smell, and we should presume, would have nearly the same effect on the human system. The C. umbellata is a well-known remedy, under the names of *Pyrola umbellata* and *pipsissewa;* the latter, no doubt, its Indian name. The Indians, it is well known, highly esteemed it as a remedy in scrofula, rheumatism, &c. It is astringent, tonic, and diuretic, and has been recommended in dropsy.

Genus XVI.—MONOT'ROPA. 10—1.

(From *monos*, one, and *tropos*, turn, the solitary flower turning to one side.)

Calyx 5-parted, cucullate at the base. *Corolla* 5-petaled. *Stamens* 10. *Anthers* 2-celled, appendaged at the base. *Style* 1. *Capsule* 5-valved, 5-celled, many-seeded.

1. M. UNIFLO'RA, (L.) *Roots* parasitic, growing from the roots of trees; scape erect, short, glabrous, succulent, white, bearing one flower on its summit, generally in clusters. *Leaves* merely scales, ovate, white. *Flowers* solitary, terminal. *Petals* pubescent on the inside. *Stamens* 10, unequal. *Anthers* reniform. *Seeds* numerous.

2. M. MORRISONIA'NA, (Mich.) *Scape* long, straight, 1-flowered. *Flowers* erect, solitary; scales of the stem distant. *Capsule* globose.—Shady woods. Car., and near Macon, Geo. 6—10 inches.

3. M. LANUGINO'SA, (Mich.) *Scape* bearing flowers in a spike. *Leaves* merely scales, membranaceous, sessile, crowded at the base. *Flowers* in terminal spikes, woolly. *Petals* oblong, erect; whole plant white, turning black by decay.—White. ☺. July. Shaded soils. 8—10 inches. *Indian Pipe.*

Genus XVII.—GA'LAX. L. 5—1.

(From *galax*, milky, from the whiteness of its flowers.)

Calyx 5-parted, persistent. *Petals* 5, twice as long as the calyx, adhering with the stamen tube at the base. *Stamens* 10, united into a tube, 5 sterile, 5 shorter and fertile. *Stigma* 3-lobed. *Capsules* 3, ovate, 3-celled, 3-valved. *Seeds* numerous, small.

1. G. APHYL'LA, (L.) *Root* red, creeping, perennial. *Leaves* coriaceous, radical, reniform, crenate. *Scape* many-flowered. *Flowers* small, in a long spike. Emits a bad odor.—White. ♃. Running streams. Mountains. Geo. and Car. *Beetle-weed.*

Genus XVIII.—SCHWEINIT'ZIA. Ell 10—1.

(From the botanist, Schweinitz.)

Calyx 5-leaved; leaves concave, equal with the corolla. *Corolla* campanulate, 5-cleft; a 5-cleft paracorolla at the base. *Stamens* 10. *Anthers* adnate, 1-celled, opening by pores. *Ovary* sub-globose, 4—5-angled. *Capsule* 5-celled.

1. S. odora'ta, (Ell.) An herbaceous, parasitic plant. *Scape* squarrose. *Flowers* terminal, aggregated, sessile, bracteal; bracts large.—Reddish-white. N. C. In rich, shaded woods.

Order LXXIII.—STYRA'CEÆ. (*Storax Family.*)

Calyx 4—5-cleft, persistent. *Corolla* 4—5-cleft, or as many petaled. *Stamens* 10, or numerous, inserted into the tube of the corolla, of unequal length, slightly cohering. *Ovary* 3—5-celled. *Style* simple. *Fruit* 1—5-celled; embryo imbedded in the albumen; cotyledons foliaceous. Shrubs with alternate exstipulate leaves. *Flowers* axillary.

Genus I.—STY'RAX. Tourn. 15—12.

(From *sturax*, the ancient name of a gum this genus furnishes.)

Calyx 4—5-toothed. *Corolla* 5-parted. *Stamens* 10, united at the base, cohering to the tube of the corolla. Drupe coriaceous, dry.

1. S. grandifo'lium, (L.) A middle-sized shrub, with the young branches pubescent. *Leaves* large, broad-obovate, acuminate, on short petioles, glabrous on the upper surface, hoary underneath. *Flowers* in simple axillary racemes, peduncles leafy near the base. *Calyx* tomentose. *Corolla* with expanding oblong segments. *Drupe* adhering to the calyx, many-celled.—White. ♄. April—May. In rich soils, middle Car. and Geo. 6—12 feet.

2. S. pulverulen'tum, (Mich.) A small shrub, growing in dense bunches. *Leaves* oblong, nearly sessile, acute, serrulate, a little hairy on the upper surface, tomentose beneath. *Flowers* on small lateral branches, axillary, terminal, fragrant.—White. ♄. March—April. In pine-barrens. 10—18 inches.

3. S. læ've, (Walt.) A small shrub, with virgate and slightly geniculate branches. *Leaves* varying in size, lanceolate, acuminate, serrate, thick, glabrous. *Flowers* in lateral, leafy racemes. *Corolla* tomentose, *Fruit* globular, 1-celled.—White. ♄. April. On the margins of swamps. 4—6 feet.

4. S. gla'brum, (Ell.) A shrub, with diffuse spreading branches. *Leaves* ovate-lanceolate, acute, finely serrulate, thin membranaceous, glabrous. *Flowers* in lateral, leafy racemes.—White. ♄. April. Margins of rivers. Middle Geo. 6—8 feet.

GENUS II.—HALE'SIA. Ellis, 15—12.

(In honor of Dr. Hales.)

Calyx 4-toothed, attached to the ovary. *Corolla* 4-cleft, or 4-petaled. *Stamens* 8—12. *Fruit* 4-angled, 2-seeded.

1. H. TETRAP'TERA, (L.) A small tree. *Leaves* ovate-lanceolate, pubescent, acuminate, serrulate, on short petioles, generally glaucous beneath. *Flowers* in small axillary clusters. *Corolla* campanulate, 4-cleft. *Stamens* 10—12, hairy at the base. *Fruit* 4-winged, oblong.—White. March—April. Very common. 10—20 feet.

2. H. DIP'TERA, (L.) A small tree. *Leaves* ovate and broad-lanceolate, acuminate, serrulate. *Flowers* in axillary clusters, 4-petaled. *Stamens* 8. *Fruit* compressed, obovate, with 2 large wings.—White. ♄ March—April. Common.

GENUS III.—HO'PEA. L. 15—12.

(In honor of Dr. John Hope.)

Calyx superior, 5-cleft. *Petals* 5. *Stamens* numerous, collected into 5 parcels. *Style* 1. *Fruit* drupaceous, with a 3-celled nut.

1. H. TINCTO'RIA, (L.) A small tree or shrub, with expanding branches and smooth bark. *Leaves* lanceolate, serrulate, crowded near the summit of the branches, shining on the upper surface. *Flowers* in axillary clusters, sessile. *Calyx* campanulate, with scales at the base.—Yellow. ♄. March—April. In rich soils. 4—20 feet.

ORDER LXXIV.—EBENA'CEÆ. (*Ebony Family.*)

Flowers diœcious. *Calyx* 4—6-cleft, nearly equal, persistent. *Corolla* urceolate, hypogynous, regular, 4—6-cleft, in the sterile florets 8—16 stamens; filaments frequently double, each bearing an anther. *Anthers* 2-celled, with longitudinal dehiscence; in the fertile florets 4—5 stigmas. *Fruit* fleshy, nearly globular, 8—12-seeded; embryo straight; cotyledons foliaceous. Trees or shrubs, with alternate exstipulate leaves.

GENUS I.—DIOSPY'ROS. L. 20—13.

(From *dios*, Jupiter, and *puros*, fruit.)

Genus the same as the Order.

1. D. VIRGINIA'NA, (L.) A tree or shrub, with irregular branches. *Leaves* alternate, on short petioles, oval-lanceolate, acuminate, somewhat pubescent along the margin. *Flowers* axillary, solitary, on short peduncles. *Calyx* of the fertile flowers persistent. *Fruit* yellowish-red, with several large seeds immersed in a soft pulp, eatable when perfectly ripe.—Greenish-yellow. ♄. May—June. Common. 6—40 feet. *Persimmon*

The Persimmon is too well known to need my directing the attention of the student to its uses or properties. The bark is a powerful astringent, and is used in intermittent fevers. The fruit when perfectly ripe, and mixed with yeast and sugar, makes an agreeable and healthy drink, known as *Persimmon Beer*.

Order LXXV.—AQUIFOLIA'CEÆ.

Flowers dicœcious. *Calyx* 4—8-cleft. *Corolla* 4—8-parted, hypogynous, æstivation imbricate. *Stamens* 4—8. *Filaments* erect. *Anthers* adnate. *Ovary* 2—6-celled. *Ovules* solitary. *Fruit* fleshy, 2—6-seeded; albumen fleshy, large. *Embryo* 2-lobed. Trees and shrubs, with coriaceous leaves. *Flowers* small and axillary.

Genus I.—I'LEX. L. 4—4.

(The Latin name of a species.)

Flowers dicœcious. *Calyx* 4-toothed. *Corolla* rotate, 4-cleft; in the sterile flowers stamens 4, alternate with the segments of the corolla and inserted into it; in the fertile florets stigmas 4. *Style* none. *Fruit* 4-seeded.

1. I. opa'ca, (Ait.) A large tree, with dense, irregular branches. *Leaves* alternate, oval-lanceolate, acute, spiny, dentate, glabrous, coriaceous, shining on the upper surface, perennial. *Flowers* clustered, on short peduncles. *Calyx* with 4 minute teeth. *Corolla* small, rotate, 4-cleft. *Fruit* scarlet, 4-seeded.—White. April—May. Dry rich soils. 30—40 feet. *Holly.*

2. I. Dah'oon, (Walt.) A small shrub, with long, virgate branches. *Leaves* alternate, oblong-lanceolate, coriaceous, glabrous, spiny when young, often entire when old. *Flowers* in axillary, paniculate clusters. *Corolla* small. *Berry* red, persistent.—White. ♄. May. Common. 4—12 feet. *Dahoon Holly.*

3. I. ligustri'na, (Ell.) A shrub with expanding branches. *Leaves* narrow, lanceolate, cuneate, usually entire, coriaceous, perennial. *Flowers* generally solitary. *Fruit* red, scattered.—White. ♄. May—June. Swamps. 6—10 feet.

4. I. myrtifo'lia, (Walt.) A shrub, with expanding, rigid branches, pubescent when young. *Leaves* alternate, perennial, linear-lanceolate, glabrous, occasionally with a few sharp serratures. Sterile flowers generally by threes, fertile ones solitary, axillary.—White. ♄. May—June. Around ponds. 10—20 feet.

5. I. Cassi'ne, (Walt.) A shrub, with erect, virgate branches, branchlets expanding, pubescent when young. *Leaves* alternate, oval, obtuse, serrate, glabrous, shining. *Flowers* in axillary clusters; peduncles generally 3-flowered, pubescent. *Corolla* with obtuse segments. *Fruit* globose, 4-celled, scarlet.—White. ♄. March—April. Loose soils, near the ocean. 6—15 feet.

6. I. prinoi'des, (L.) A small shrub, with virgate branches. *Leaves* lanceolate, cuneate; peduncles several-flowered, one of them abortive, the others fertile.—White. ♄. April—May. Near Culloden, Geo.

Genus II.—PRI'NOS. L. 6—1.

(The Greek name of a species.)

Calyx 4—8-cleft. *Corolla* 4—8-parted, rotate. *Stamens*

4—8. *Flowers* often dicœcious, with the rudiment of a pistil. Fertile florets; style none; stigma 4—8-cleft. *Fruit* baccate, 4—8-seeded.

1. P. AMBIG'UUS, (Mich.) A small shrub, branches terete, somewhat virgate. *Leaves* deciduous, ovate-lanceolate, acuminate at each end, slightly serrulate, pubescent underneath, on short petioles. *Flowers* with the sterile ones clustered, axillary, fertile ones generally solitary, or 3—4 in each axil; segments of the calyx sometimes 5, and of the corolla the same number. *Stigmas* 4—5, furrowed. *Fruit* red, with 4—5 seeds.—White. ♄. April—May. Southern Geo. 3—4 feet.

2. P. VERTICILLA'TUS, (L.) A large shrub or small tree. *Leaves* deciduous, on short petioles, oval, acuminate, finely serrate, pubescent underneath. *Flowers* with the fertile ones clustered, axillary, umbellate. *Stamens* 6. *Calyx* and *corolla* 6-cleft. *Fruit* red.—White. ♄. April —May. Fertile soils. 10—20 feet. *Black Alder.*

3. P. INTEGRIFO'LIA, (Nutt.) A small tree. *Leaves* deciduous, oval, entire, on short petioles, mucronate, glabrous; fertile flowers solitary, on long peduncles.—White. ♄.

4. P. LANCEOLA'TUS, (Pursh.) A shrub. *Leaves* deciduous, lanceolate, serrulate, glabrous, acute; fertile florets scattered, generally in pairs. *Calyx* and *corolla* 5-cleft; sterile florets clustered. *Stamens* 3.—White. ♄. June. Middle Car. and Geo. 6—8 feet.

5. P. GLA'BER, (L.) A small shrub, with many expanding branches. *Leaves* perennial, lanceolate, cuneate, alternate, glabrous, shining, somewhat serrate toward the apex; fertile flowers solitary, axillary; sterile ones clustered. *Stamens* 6. *Corolla* rotate. *Calyx* and *corolla* 6—8 parted. *Stigma* 3-lobed. *Fruit* black, 6—8-seeded.—White. ♄. April —May. Damp soils. *Ink-berry.*

6. P. CORIA'CEUS, (Pursh.) A small shrub, with virgate branches. *Leaves* perennial, elliptical, acute, serrate near the summit, shining on the upper surface, dotted beneath, coriaceous; fertile flowers solitary, sterile ones clustered. *Calyx* and *corolla* generally 8-parted. *Stamens* 8. *Fruit* 6—8-seeded.—White. ♄. May. On the margins of swamps. 5—6 feet.

ORDER LXXVI.—SAPOTA'CEÆ.

Calyx 5-cleft, regular, persistent. *Corolla* 5-cleft, hypogynous, regular, deciduous. *Stamens* 5, inserted into the corolla. *Style* 1. *Ovary* several-celled, with an erect ovule in each cell. *Fruit* baccate, by abortion only 1-seeded; embryo erect, large. Trees or shrubs. *Leaves* alternate, entire, coriaceous, without stipules.

GENUS I.—BUME'LIA. Sw. 5—11.

(The Greek name of the Ash.)

Calyx 5-cleft. *Corolla* 5-cleft, salver-form. *Style* 1, paracorolla 5-leaved; drupe 1-seeded.

1. B. LYCIOI'DES, (Pursh.) A small tree, with smooth branches, spiny. *Leaves* lanceolate, broad, smooth on both sides, on short petioles, clus-

tered on the old alternate buds, alternate on the young branches; spines axillary. *Flowers* clustered, on 1-flowered peduncles; drupe black.—Greenish-white. ♄. May—June. Wet soils. Middle Carolina, near Columbia.

2. B. RECLINA'TA, (Pursh.) A small shrub, with spreading branches, spiny. *Leaves* small, obovate, smooth. *Flowers* in clusters, 15—20, on short pedicels.—Greenish-white. ♄. June—July. Banks of streams. Georgia.

3. B. TE'NAX, (L.) A small tree, with slender, flexible branches. *Leaves* lanceolate, cuneate, pubescent underneath. *Fruit* oval. *Flowers* in clusters.—Greenish-white. ♄. June—July. In dry soils. 20—30 feet.

4. B. LANUGINO'SA, (Mich.) A small tree, with expanding pubescent branches. *Leaves* oblong-lanceolate, covered with a ferruginous pubescence on the under surface, obtuse. *Drupes* globose.—White. ♄. June—July. Dry, light soils. 8—12 feet.

ORDER LXXVII.—JASMINA'CEÆ. Br.

Flowers perfect, regular. *Calyx* persistent, 5-lobed. *Corolla* salver-form, 5-lobed. *Stamens* 2. *Ovary* 2-celled; style simple; stigma 2-lobed.

GENUS I.—JASMI'NUM. Tourn. 2—1. (*Arabic name.*)

1. J. OFFICINA'LE, (L.) *Stem* somewhat running, striate, somewhat angular. *Leaves* unequally pinnate; leaflets lanceolate, 3 pairs. *Flowers* axillary and terminal. *Corolla* much longer than the subulate lobes of the calyx, 5-lobed; lobes lanceolate.—White. Asia, from the base of the Caucasus. Naturalized in Europe and America.

White Jasmine.

2. J. FRU'TICANS, (L.) *Stem* not running, branches angular. *Leaves* alternate, ternate, rarely simple. *Flowers* few, mostly terminal. *Corolla* much longer than the subulate lobes of the calyx.—Yellow. Southern Europe. Introduced. *Yellow Jasmine.*

ORDER LXXVIII.—OLEA'CEÆ. (*Olive Family.*)

Flowers perfect or dicœcious. *Calyx* divided, persistent. *Corolla* hypogynous, 4-cleft. *Stamens* 2, alternate with the segments of the corolla. *Ovary* simple, 2-celled, 2 seeds in a cell. *Style* 1. *Stigma* simple, or bifid. *Fruit* usually a drupe, often 1-seeded by abortion; cotyledons foliaceous. Trees or shrubs, with opposite leaves.

GENUS I.—O'LEA. Tourn. 2—1.

(From *elaia*, the Olive.)

Flowers dicœcious. *Calyx* small, 4-toothed. *Corolla* with a short tube; limb 4-cleft; segments ovate. *Fruit* a drupe, 1-seeded.

1. O. Americ'na, (L.) A small tree. *Leaves* opposite, lanceolate, elliptic, coriaceous, shining, perennial. *Flowers* in paniculate racemes, with persistent bracts.—White, fragrant. ♄. April—May. Near the sea-coast. 10—20 feet.

Genus II.—CHIONAN'THUS. L. 2—1.

(From *chion*, snow, and *anthos*, flower.)

Calyx minute, 4-cleft, persistent. *Corolla* 4-cleft, with long, linear, pendulous segments. *Stamens* 2. *Fruit* a striated drupe.

1. C. Virgin'ica, (L.) A beautiful shrub. *Leaves* opposite, lanceolate, entire, shining when mature. *Flowers* in panicles, composed of opposite branches.—White. ♄. April—May. Common. 6—10 feet.
Fringe-tree, or *Old Man's Beard*

Genus III.—FRAX'INUS. Tourn. 20—2.

(From the Latin *fraxinus*, the Ash.)

Flowers dicœcious. *Calyx* small, 3—4-cleft, or none. *Corolla* none, or 4-petaled. *Stamens* 2. In the fertile florets, stamens none. *Pistil* 1. *Fruit* a 1-seeded samara, foliaceous at the extremity.

1. F. acumina'ta, (Lam.) A large tree. *Leaves* unequally pinnate; leaflets 7—9, elliptic, oval-lanceolate, acuminate, lucid on the upper surface, usually entire. *Samara* with a long lanceolate wing.—White. ♄. March—April. Swamps. 50—70 feet. *F. Americana*, L.

2. F. platycar'pa, (L.) A small tree. *Leaves* opposite; leaflets petiolate, oval-lanceolate, serrate, pubescent when young. *Samara* with a broad-lanceolate wing.—White. ♄. March—April. Swamps.

3. F. trip'tera, (Nutt.) A small tree. *Leaflets* obovate, tomentose beneath, oblique at the base. *Fruit* unlike that of the other species of this genus, 3-winged, tapering at the base. *Seed* 3-sided.

4. F. epip'tera, (Mich.) A middle-sized tree. *Leaves* unequally pinnate; leaflets 7—9, elliptic, lanceolate, acuminate, glabrous, slightly serrate. *Flowers* in axillary panicles. *Samara* cuneate, emarginate.—White. ♄. March—April. River swamps. 40—60 feet.

5. F. pubes'cens, (L.) A large tree. *Leaflets* 7—9, ovate lanceolate, serrate, on short petioles, acuminate, pubescent beneath. *Samara* with an oblong-lanceolate wing.—♄. March—April. Swamps. 50—60 ft.
Red Ash.

6. F. Carolinia'na, (L.) A small tree. *Leaflets* generally 7, lanceolate, slightly serrulate toward the apex, entire and attenuate at the base, glabrous, lucid on the upper surface. *Flowers* having a calyx.—White. ♄. April—May. In high lands. *F. pubescens.*

Genus IV.—SYRIN'GA. L. 2—1.

(From *suriax*, a pipe, because pipes were made of its branches.)

Calyx short, 4-toothed, persistent. *Corolla* salver-form, 4-parted. *Stamens* 2, included. *Ovary* 2-celled. *Style* included, bifid.

1. S. VULGA'RIS, (L.) *Leaves* cordate or ovate-cordate, smooth, opposite, petiolate. *Flowers* in a terminal thyrse, sweet-scented.—Various shades of purple. Persia. Common in yards. 4—12 feet.

Common Lilac.

Several other species have been introduced; the Persian Lilac, *S. Persica*, with blue flowers, varying in color, and entire or pinnatifid leaves, is the most common, and is a smaller plant than the preceding.

GENUS V.—LIGUS'TRUM. Tourn. 2—1.

(From *ligo*, to bind, from the use made of its branches.)

Calyx short, tubular. *Corolla* funnel-form, 4-lobed, the lobes ovate, obtuse. *Stamens* 2, included. *Fruit* a berry, 2-celled, 1—2-seeded.

1. L. VULGA'RE, (L.) A shrub. *Leaves* entire, on short petioles, broad-lanceolate, smooth, thick. *Flowers* in terminal panicles. *Berry* black. —White. April—May. Europe. Naturalized. *Privet* or *Prim.*

ORDER LXXIX.—ASCLEPIADA'CEÆ. (*Asclepias Family.*)

Calyx 5-cleft, persistent. *Corolla* hypogynous, 5-lobed, æstivation intricate. *Stamens* 5; filaments connate. *Anthers* 2-celled. *Pollen* in masses, adhering to the processes of the stigma. *Ovaries* 2. *Styles* 2. *Stigma* 1, dilated, with 5 processes; placentæ attached to the suture. *Follicles* 1 or 2. *Seeds* numerous, imbricate, comose. Plants with a milky juice, sometimes twining. [This order includes the *Oleander*, *Nerium oleander*, and the *Periwinkles*, *Vinca minor*.]

GENUS I.—ENSLE'NIA. Nutt.

(In honor of A. Enslen, an Austrian botanist.)

Calyx 5-parted. *Corolla* 5-parted, sub-rotate; lobes erect; crown 5-leaved; leaves membranaceous, free, upper margin truncate or lobed at the apex, with a pair of flexuous awns. *Anthers* terminated by one erect membrane; pollen masses oblong, attached below the apex. *Follicles* cylindrical, smooth, oblong-lanceolate. *Seeds* silky.

1. E. AL'BIDA, (Nutt.) A twining herb, smooth. *Leaves* large, ovate-cordate, petioles long. *Flowers* in racemose clusters, on slender axillary peduncles.—River banks. July—Sept. 8—12 feet.

GENUS II.—PODOSTIG'MA. Ell.

(From *pous*, foot, and *stigma*, from its shape.)

Calyx 5-parted. *Corolla* 5-parted; lobes oblong, concave, erect. Staminal crown 5-leaved; leaves short, concave. *Anthers* terminated by a membrane; pollen masses attached at the apex, compressed. *Follicles* smooth.

1. P. PUBES'CENS, (Ell.) *Stem* erect, terete, pubescent. *Leaves* opposite, ovate or linear-oblong; umbels on short peduncles, few-flowered; flowers rather large.—Yellowish-green. Dry pine-barrens. 12—18 inches.

GENUS III.—ACER'ATES. Ell.

(From *a*, priv., and *keras*, a horn, the hoods of the crown being destitute of a horn.)

Calyx 5-parted. *Corolla* deeply 5-parted; limb spreading or reflexed. Stamineal crown destitute of horns.

1. A. VIRIDIFLO'RA, (Ell.) *Stem* erect or ascending, hairy. *Leaves* oval, ovate or obovate, or lanceolate and nearly linear, thick, on short petioles, tomentose, pubescent. *Flowers* in sub-globose umbels, nearly sessile. *Follicles* smooth.—Green. 2. July. Sandy fields. 1—2 ft.

GENUS IV.—ASCLE'PIAS. L. 18—5.

(The Greek name of Æsculapius.)

Calyx small, 5-parted. *Corolla* reflexed, 5-parted. Stamineal crown 5-leaved; leaflets opposite the anthers, each producing from its base a subulate averted process. *Stigma* with 5 angles. *Pollen* in 10 masses, arranged in pairs. *Follicles* 2. *Seeds* comose.

1. A. PURPURAS'CENS, (L.) *Stem* erect, simple. *Leaves* ovate, nearly sessile, nearly glabrous above, downy beneath, purple midrib. *Flowers* in erect, terminal umbels. Horns of the nectary resupinate.—Purple. 2. June—July. In swamps. 3—4 feet.

2. A. PHYTOLACCOI'DES, (Pursh.) *Stem* erect, simple. *Leaves* opposite, broad-lanceolate, large, acuminate, smooth, pale beneath. *Flowers* in lateral and terminal umbels, nodding.—Greenish-purple. 2. June—July. Mountains. 2—4 feet.

3. A. AMPLEXICAU'LIS, (Mich.) *Stem* decumbent, terete. *Leaves* large, succulent, sessile, opposite, cordate, strongly veined. *Flowers* in axillary and terminal umbels. Horns of the nectary exserted.—Dull white. 2. April—May. Dry sandy soils. 1—2 feet.

4. A. OBTUSIFO'LIA, (Mich.) *Stem* simple, erect, purple. *Leaves* sessile, opposite, cordate, ovate, undulate, glabrous, glaucous beneath. *Flowers* in terminal umbels, usually solitary, on long peduncles. *Corolla* large, tinged with purple and green. Horns of the nectary exserted.—Purple and white. 2. June—July. Sandy soils. 2—3 ft.

5. A. VARIEGA'TA, (L.) *Stem* erect, simple, terete, with 2 pubescent lines. *Leaves* opposite, oval-lanceolate, undulate, glabrous beneath, veins and margins pubescent. *Flowers* in terminal umbels, with the peduncles and pedicels pubescent, with a caducous bract at the base of each pedicel. *Calyx* hairy, reflexed, with subulate segments. *Corolla* glabrous, green on the outer surface; follicle lanceolate, smooth.—White. 2. April—June. In rich soils. Common. 2—3 feet.

6. A. QUADRIFO'LIA, (Muhl.) *Stem* erect, simple, smooth. *Leaves* verticillate by fours, ovate-lanceolate, glabrous, acuminate on short petioles. *Flowers* in terminal and axillary umbels; pedicels capillary; nectaries with horns, 2-toothed.—White. 2. June—July. Dry woods. 2—3 ft.

7. A. INCARNA'TA, (L.) *Stem* erect, branching, tomentose. *Leaves* opposite, lanceolate, long, somewhat tomentose, pubescent along the veins and margins. *Flowers* in numerous umbels, generally in pairs; nectaries with subulate, exsert horns.—Purple. 2f. July—Aug. On the banks of streams. 2—4 feet.

8. A. TUBERO'SA, (L.) *Stem* erect, and decumbent, hirsute, branching toward the summit. *Leaves* alternate, crowded, sessile, or on short petioles. *Flowers* numerous in umbels.—Orange. 2f. Sandy soils. *Pleurisy-root. Butterfly-weed.*

9. A. PARVIFO'LIA, (L.) *Stem* erect and decumbent, slightly pubescent. *Leaves* opposite, lanceolate, acuminate, tapering at the base, slightly pubescent, silky on the upper surface, on short petioles. *Flowers* in axillary and terminal umbels. Horns of the nectary long.—White. 2f. May—Aug. 1—2 feet.

10. A. PAUPER'CULA, (Mich.) *Stem* erect, glabrous, marked by a decurrent, hairy line. *Leaves* opposite, linear-lanceolate, long, glabrous, margins pubescent. *Flowers* in umbels, on long peduncles.—Bright purple. 2f. May—July. Damp sandy soils. 3—4 feet.

11. A. ANGUSTIFO'LIA, (Ell.) *Stem* pubescent, terete. *Leaves* alternate, slightly pubescent, long, strap-shaped. *Flowers* in terminal umbels. Horns of the nectary included.—Dull white. 2f. May—June Pine-barrens. 8—16 inches. *A. Michauxii.*

12. A. CINE'REA, (Walt.) *Stem* erect, slender. *Leaves* long, linear, opposite, glabrous, upper ones minute. *Flowers* in terminal umbels. Horns of the nectary exserted.—Dull white, variegated. 2f. June—July. Pine-barrens. 2—3 feet.

13. A. VERTICILLA'TA, (L.) *Stem* erect, slender. *Leaves* hairy, linear, crowded at the base, verticillate in the middle, opposite toward the summit of the stem. *Flowers* in axillary and terminal umbels. Horns of the nectary exserted.—Dull white. 2f. May—Aug. In rich soils. 2—3 feet.

14. A. OBOVA'TA, (Ell.) *Stem* erect, tomentose, terete. *Leaves* opposite, nearly sessile, obovate, obtuse, mucronate, tomentose on the under surface; the upper ones smaller and lanceolate. *Flowers* in terminal and axillary umbels, nearly sessile.—Middle Geo. 2—3 feet.

15. A. LAURIFO'LIA, (Mich.) *Stem* erect, glabrous, marked by a decurrent hairy line. *Leaves* sessile, opposite, ovate, tapering at the summit, glabrous. *Flowers* in axillary and terminal umbels; peduncles long. *Corolla* green on the outer surface.—Purple. 2f. June—July. Damp pine-barrens. 2 feet. *Toxicarpus laurifolius.*

The root of the *A. tuberosa* is highly esteemed throughout the Southern States as a valuable remedial agent. It is a diaphoretic and expectorant, and is employed in all affections of the lungs, dysentery, rheumatism, and pleurisy, and it is said with great benefit in all of these cases.

GENUS V.—SEUTE'RA. Rich.

(In honor of the botanist Seuter.)

Calyx 5-leaved; sepals lanceolate, acute. *Corolla* sub-rotate; tube short, deeply 5-parted; lobes acute, smooth. Stamineal crown 5-leaved; leaves erect, somewhat fleshy, flat. Masses of pollen ovoid, subventricose, attached by the apex. *Follicles* smooth, slender. *Seeds* comose.

1. S. MARI'TIMA, (D. C.) *Stem* glabrous, climbing. *Leaves* opposite sessile, linear, channeled; succulent. *Umbels* 9—10-flowered, solitary, axillary; calyx small; sepals erect, acute; leaves of the stamineal crown oval, obtuse, white.—Greenish. June—Oct. On lands overflowed by salt water. *Lyoni maritima*, Ell.

GENUS VI.—GONOLO'BUS. L. 18—5.

(From the Greek *gonia*, an angle, and *lobos*, a pod.)

Calyx small. *Corolla* rotate, 5-parted. Stamineal crown shield-form, lobed. *Stamens* 5. *Anthers* opening transversely. Pollen masses 10, in 5 pairs. *Stigma* flattened. *Follicles* 2, ventricose. *Seed* comose.

1. G. CAROLINEN'SIS, (Mich.) *Stem* climbing, pubescent. *Leaves* oblong, cordate, acuminate, slightly auriculate, pubescent. *Flowers* in axillary umbels; segments of the corolla long, obtuse; follicles ribbed, angular.—Purple. 4. May—Aug. Clay soils. *G. hirsutus*, Mich.

2. G. MACROPHYL'LUS, (Mich.) *Stem* climbing over small shrubs, pubescent. *Leaves* opposite, broad-cordate, acuminate, pubescent. *Flowers* in axillary umbels; segments of the corolla obtuse; follicles muricate —Obscure yellow. 4. June—Aug. Light soils.

GENUS VII.—METASTEL'MA. Br

(From *meta*, behind, and *stelma*, a girdle.)

Calyx small, 5-leaved. *Corolla* sub-campanulate; lobes with white hairs within. Stamineal crown 5-leaved; leaves simple; anthers terminated by a membrane; pollen masses ovoid, compressed, attached by the apex. *Follicles* smooth, slender. *Seeds* comose.

1. M. FRA'SERI, (Decai.) Herbaceous plant, erect, smooth. *Leaves* oval or ovate, mucronate, or acuminate smooth. Lobes of the corolla ovate, acute.—Greenish. Carolina.

GENUS VIII.—CHTHAMA'LIA. Decai.

(From *chthamalos*, on the ground.)

Calyx 5-parted, lobes ovate-pubescent. *Corolla* campanulate, with a short tube; limb 5-parted, lobes erect, ovate-oblong. Stamineal crown campanulate. *Follicles* ovoid, fleshy. *Seeds* hairy.

1. C. PUBIFLO'RA, (Decai.) Decumbent, puberulent; branches terete, slender. Lower leaves sub-reniform; upper ones ovate-cordate, acute, puberulent. *Flowers* 3—4; lobes of the corolla villous within.—Car.

There are many interesting exotics belonging to this order. The *Hoya carnosa*, the *Wax Plant*, is a plant from the East Indies. and receives its common name from its wax-like flowers. The *Stapelias*, from the Cape of Good Hope, are singular plants, and readily distinguished by their disgusting odor; hence called *carrion* flowers.

Order LXXX.—APOCYNA'CEÆ. (*Dog-bane Family.*)

Calyx persistent, 5-cleft. *Corolla* hypogynous, 5-lobed, regular, æstivation twisted. *Stamens* 5, inserted into the corolla, alternate with its lobes. *Ovaries* 2, or 1—2-celled, many-seeded. *Style* 1—2, or wanting. *Stigma* 1. *Fruit* usually a follicle, double or single, or a capsule. *Seed* numerous. Plants usually with a milky juice. *Leaves* entire.

Genus I.—APOC'YNUM. Tourn. 18—5.

(From *apo*, from, and *kuon*, a dog.)

Calyx minute, 5-cleft, persistent. *Corolla* campanulate, with the limb divided into 5 short, spreading or revolute lobes, the base furnished with 5 glandular teeth, alternating with the stamens. *Stamens* 5; anthers sagittate. *Style* wanting. *Follicles* 2, long, distinct.

1. A. androsæmifo'lium, (L.) *Stem* erect, with spreading branches. *Leaves* ovate, glabrous. *Flowers* in terminal and lateral cymes. Tube of the corolla longer than the calyx.—White, tinged with red. 2f. June—July. Common. 3—5 feet. *Dog's-bane.*

2. A. Cannabi'num, (L.) *Stem* erect, branched. *Leaves* lanceolate, acute, on short petioles, glabrous. *Flowers* in paniculate cymes. *Calyx* about as long as the tube of the corolla.—Greenish-white. 2f. June—July. Common. *Indian Hemp.*

3. A. pubes'cens, (Br.) *Stem* erect. *Leaves* ovate, oblong, on short petioles, mucronate. *Flowers* in short pubescent cymes; tube of the corolla longer than the calyx.—Greenish-white. 2f. June—July. Common. 2—3 feet.

Genus II.—AMSO'NIA. Walt. 18—5.

Calyx 5-parted. *Corolla* funnel-shaped, with the throat closed. *Follicles* 2, erect. *Seed* terete, with the summit obliquely truncate.

1. A. latifo'lia, (Pursh.) *Stem* erect, glabrous. *Leaves* oval-lanceolate, on short petioles, alternate; upper ones acuminate, pubescent along the veins beneath. *Flowers* in terminal corymbose panicles; follicles linear, long.—Pale blue. 2f. April—May. Very common. Middle Car. and Geo.

2. A. salicifo'lia, (Pursh.) *Stem* erect, smooth, growing in bunches. *Leaves* linear-lanceolate, acute, glabrous. *Flowers* in terminal corymbs, numerous; follicles long, slender.—Pale blue. May—June. Abundant near Macon, Geo. 1—2 feet.

3. A. angustifo'lia, (Mich.) *Stem* erect, pubescent, branching. *Leaves* linear-lanceolate, numerous, pubescent, erect, those of the branches linear, ciliate; follicles long, slender.—Blue. 2f. April—May. Middle Car. and Geo. Abundant. *A. ciliata.*

GENUS III.—ECHI'TES. Walt. 18—5.

(From *echis*, serpent, from the form of its roots.)

Calyx 5-parted, with acute segments. *Corolla* funnel-shaped, the border 5-parted, the throat naked. *Anthers* adhering to the stigma. *Follicles* 2, distinct, long, slender.

1. E. DIFFOR'MIS, (Walt.) *Stem* climbing over small shrubs. *Leaves* opposite, pubescent beneath, the lower ones narrow-lanceolate or linear, the upper oval-lanceolate, acuminate. *Flowers* in corymbose racemes. *Stamens* included, inserted into the base of the corolla.—Yellowish-white. ♃. May—Aug. Damp rich soils.

ORDER LXXXI.—LOGANA'CEÆ or SPIGELIA'CEÆ.

Calyx 5-parted. *Corolla* hypogynous, tubular, 5-lobed. *Stamens* 5, inserted into the corolla. *Ovary* superior, 2-celled. *Style* articulated. *Stigma* simple. *Fruit* capsular, 2-celled, 2-valved, dehiscing elastically. *Placentæ* central. *Albumen* abundant. *Embryo* minute. Herbaceous plants with opposite entire leaves. *Flowers* in secund spikes.

GENUS I.—SPIGE'LIA. L. 5—1.

(In honor of Adrian Spigelius of Padua.)

Calyx 5-parted. *Anthers* converging. *Flowers* in secund spikes.

1. S. MARYLAND'ICA, (L.) *Stem* square, branching at the base, slightly winged. *Leaves* sessile, ovate-lanceolate margins, and veins pubescent beneath. *Flowers* in a simple terminal, secund spike; segments of the calyx subulate; tube of the corolla ventricose, long, yellow within, segments short.—Deep red. ♃. May—July. Dry soils. Very common. 1—2 feet. *Carolina Pink*, or *Pink-root.*

2. S. GENTIÆNOI'DES, (Chap.) *Stem* erect, simple, 4-angled. *Leaves* sessile, lower obovate, middle ovate, upper ovate-lanceolate. *Spikes* 2—5-flowered; lobes of the calyx shorter than the tube of the corolla; lobes of the corolla narrow-lanceolate.—Florida.

The root of this plant is much used in both the regular and domestic practice, as a vermifuge, or in cases of worms. It should always be employed in connection with some cathartic medicine, since it acts as a narcotic, if not carried from the system, either by its own action or that of some other agent.

GENUS II.—GELSEM'INUM. Ait. 5—2.

(An ancient name of Jasmine.)

Calyx 5-leaved. *Corolla* funnel-shaped, with the border 5 lobed. *Capsule* compressed, 2-celled. *Seed* flat.

1. G. SEMPERVI'RENS, (Ait.) (*nitidum.*) *Stem* twining, smooth, glabrous. *Leaves* opposite, lanceolate, entire, perennial, shining on the upper surface, paler beneath. *Flowers* in axillary clusters, on short peduncles, which are covered with small scales. Leaves of the calyx equal, glabrous. *Capsule* oblong, furrowed, terminated by the style.—Yellow ♄. Feb.—March. *Yellow Jessamine*

Order LXXXII.—GENTIANA'CEÆ. (*Gentian Family.*)

Calyx 4—10-cleft, persistent. *Corolla* hypogynous, usually regular, limb with as many lobes as the calyx. *Stamens* inserted into the corolla, and alternate with the segments, and equal to them in number. *Ovary* 1—2-celled, many-seeded. *Style* 1. *Fruit* capsular, 1-celled. *Seeds* numerous, small. Herbaceous plants, with opposite exstipulate leaves.

Genus I.—GENTIA'NA. L. 5—2.

(From Gentius, king of Illyria.)

Calyx 4—5-cleft *Corolla* tubular, campanulate, 4—5-cleft, with the orifice naked. *Stamens* 4—5, included. *Stigmas* 2. *Capsule* 1-celled, 2-valved.

1. G. saponaria, (L.) *Stem* erect, simple, terete, glabrous. *Leaves* ovate-lanceolate, acute, glabrous. *Flowers* axillary, terminal, sessile, clustered. *Calyx* with short segments. *Corolla* with the border 5-cleft, with the segments acute; the inner segments unequally 2-cleft.—Bright blue. Sept.—Oct. Upper districts of Car. and Geo. 1—2 feet. *Soap Gentian.*

2. G. Catesbæi, (Walt.) *Stem* erect, simple, slightly pubescent, rough. *Leaves* narrow, lanceolate, scabrous. *Flowers* axillary, 1—3 in an axil. *Calyx* with the segments 2—3 times as long as the tube; border of the corolla erect, or expanding. *Anthers* sagittate. *Seed* compressed, slightly winged, small.—Blue. 2f. October. In damp places. Low country. Car. and Geo.

3. G. ochroleuca, (L.) *Stem* simple, terete, glabrous. *Leaves* lanceolate, entire, glabrous, of the margins scabrous; segments of the calyx foliaceous, linear-lanceolate. *Flowers* opposite, sometimes clustered, on very short peduncles; border of the corolla connivent, the interior segments short, dentate.—White, striped with green and purple. 2f. Sept.—Oct. Damp soils. 10—15 inches. *Sampson Snake-root.*

4. G. angustifolia, (Mich.) *Stem* simple, slender, glabrous. *Leaves* linear, cuneate. *Flowers* terminal. *Corolla* large, of the segments expanding, the middle ones shorter and lacerate.—Blue, tinged with purple. 2f. Wet places. Oct.—Nov. 12—18 inches.

5. G. crinita, (L.) *Stem* erect, terete at the base, angled toward the summit, glabrous. *Leaves* sessile, with scabrous margins, acute. *Flowers* solitary, axillary, and terminal, on rather long peduncles; segments fimbriate.—Pale blue. 2f. Oct.—Nov. Mountains. 1—2 feet.

6. G. quinqueflora, (L.) *Stem* erect, branching, glabrous, angled, and slightly winged. *Leaves* sessile, ovate-lanceolate, amplexicaul, acute. *Flowers* usually terminal, generally from 3—5. *Corolla* with the segments undulate.—Blue. 2f. Among the mountains.

7. G. acuta, (Mich.) *Stem* erect, angular. *Leaves* oblong, acute, amplexicaul. *Flowers* in terminal and lateral clusters; throat of the corolla ciliate; segments linear-lanceolate.—Blue. 2f. Mountains.

Genus II.—FRASE'RA. Walt. 4—1.

(In honor of John Fraser.)

Calyx 4-parted, with the segments lanceolate. *Corolla* 4-parted, with a paracorolla in the center of each segment. *Capsule* 1-celled, 2-valved. *Seed* compressed, winged, elliptical.

1. F. Walte'ri, (Mich.) *Stem* erect, angled, branching, furrowed. *Leaves* verticillate or opposite, glabrous; the lower ones lanceolate-oblong, long; the upper ones narrower, small. *Flowers* verticillate; segments of the corolla lanceolate. *Stamens* 4. *Stigmas* 2.—Red and yellow. ♂. July—Aug. Middle Car. 6—8 feet.
Wild Columbo. F. Carolinensis, Walt.

Genus III.—SABBA'TIA. DL. 5—1.

(In honor of Sabbati, an Italian botanist.)

Calyx 5—12-parted, persistent. *Corolla* rotate, 5—12-parted. *Stamens* 5—12. *Stigmas* 2, spiral. *Capsule* 1-celled, 2-valved.

1. S. panicula'ta, (Ell.) *Stem* erect, much branched, marked by a decurrent line. *Leaves* linear-lanceolate. *Flowers* in diffuse panicles; segments of the calyx setaceous. *Corolla* with the segments lanceolate.—White. ♃. July—Oct. Pine-barrens. Common.

2. S. corymbo'sa, (Bald.) *Stem* erect, branches near the summit, opposite, quadrangular. *Leaves* ovate, sessile. *Flowers* in corymbs. *Corolla* usually 6-parted, much longer than the calyx. *Stamens* usually 6.—White. ♃. June—July. Wet pine-barrens.

3. S. gra'cilis, (Sal.) *Stem* erect, slightly furrowed. *Leaves* lanceolate, opposite, sessile; upper ones linear. *Flowers* in corymbs. *Calyx* turbinate, with linear segments. *Corolla* with obtuse obovate segments. *Stamens* 5. *Style* short.—Red and yellow. ☉. July—Sept. On the sea-coast. 12—18 inches.

4. S. brachia'ta, (Ell.) *Stem* erect, slightly angled, with brachiate branches. *Leaves* lanceolate. *Flowers* in panicles, generally 3 at the extremity of each branch; segments of the calyx linear-lanceolate; those of the corolla obovate.—Red. ♃. June—Aug. Middle Car. and Geo. 1—2 feet.

5. S. angula'ris, (Pursh.) *Stem* erect, angled, winged, glabrous, with opposite, brachiate branches. *Leaves* cordate-ovate, ternate, amplexicaul. *Calyx* angled, with subulate segments. *Corolla* with 5 obovate segments. *Stamens* 5.—Red. ♃. July—Aug. In rich soils. 1—2 ft.

6. S. calyco'sa, (Pursh.) *Stem* slightly angled, sparingly branched, or simple. *Leaves* sessile, oval, obtuse. *Flowers* terminal, frequently solitary. *Calyx* usually 10-parted, with the segments leafy. *Corolla* 7—10-parted, with lanceolate segments.—Red. ♃? June—Sept. In rich and wet soils. 1—2 feet.

7. S. chloroi'des, (Pursh.) *Stem* erect, slender, branching. *Leaves* lanceolate, erect; segments of the calyx 7—12-parted, linear, shorter than the corolla. *Corolla* 8—12-parted, with the segments lanceolate.—Red. ♃? July—Sept. Around ponds.

8. S. GENTIANOI'DES, (Ell.) *Stem* erect, slightly angled. *Leaves* linear, acute, long. *Flowers* axillary and terminal, the terminal ones crowded. *Calyx* campanulate, 8—10-parted, with the segments subulate. *Corolla* 8—10-parted, with obovate segments. *Stamens* short.—Red. 2f ? Aug.—Sept. Middle Geo. *Lapithea gentianoides*, Gris.

GENUS IV.—CENTAUREL'LA. Rich. 4—1.

(Diminutive of Centaurea.)

Calyx 4-cleft, persistent, glabrous. *Corolla* campanulate, persistent, 4-cleft. *Stamens* 4, inserted into the tube of the corolla, short. *Capsule* 1-celled, 2-valved, many-seeded.

1. C. VER'NA, (Mich.) *Stem* simple, angular, glabrous. *Leaves* few, resembling scales. *Flowers* terminal, 1—3. *Calyx* with lanceolate, expanding segments. *Style* persistent. *Stigma* 2-cleft.—White. ☺. Feb.—April. On the sea-coast of Geo. 4—8 inches.

2. C. PANICULA'TA, (Mich.) *Stem* smooth, with brachiate branches. *Leaves* minute, subulate, those of the base alternate, those toward the summit opposite. *Flowers* in panicles, on opposite peduncles, the lower ones branched. *Calyx* 4-cleft, the two outer decurrent. *Corolla* about the length of the calyx.—Greenish-white. ☺. Aug.—Sept. In ditches and damp grounds. 8—12 inches.

GENUS V.—VILLAR'SIA. Vent. 5—1.

(In honor of D. Villars, a French botanist.)

Calyx 5-parted. *Corolla* rotate, with the limb 5-parted, ciliate. *Stamens* 5. *Style* 1. *Stigma* 2-lobed, glands 5, alternating with the stamens. *Capsule* 1-celled, 2-valved, many-seeded.

1. V. LACUNO'SA, (Vent.) *Stem* filiform, floating. *Leaves* reniform, lacunose beneath, slightly crenate, on long petioles. *Flowers* somewhat umbellate, arising from the petioles.—White. 2f. July—August. In still waters. *Limnanthemum lacunosum*, Gris.

GENUS VI.—OBOLA'RIA. L. 13—2.

(From *obolos*, a small Greek coin.)

Calyx 2-parted, in the form of bracts. *Corolla* campanulate, 4-cleft; segments equal, entire, or crenulate. *Stamens* 4, somewhat didynamous. *Stigma* 2-cleft. *Capsule* 1-celled, 2-valved, many-seeded.

1. O. VIRGIN'ICA, (L.) *Stem* cespitose, simple, or sparingly branched, glabrous. *Leaves* opposite, sessile, obovate, slightly decurrent, glabrous. *Flowers* 2—3, on the summit of axillary branches.—White or red. 2f. April—May. In rich soils. 4—6 inches.

ORDER LXXXIII.—BIGNONIA'CEÆ. (*Trumpet-flower Family.*)

Calyx divided. *Corolla* hypogynous, usually irregularly 4—5-lobed. *Stamens* 5, 1 or 3 sterile. *Ovary* 2-celled, or

spuriously 4-celled, many-seeded. *Style* 1. *Capsule* 1—2-celled. *Seed* compressed, usually winged. *Albumen* none. Trees, climbing or running plants. *Leaves* without stipules.

Genus I.—BIGNO'NIA. L. 13—2.

(In honor of the Abbé Bignon.)

Calyx 5-cleft, cup-shaped, coriaceous. *Corolla* campanulate, 5-lobed, ventricose beneath. *Stamens* 4, didynamous. *Pod* 2-celled. *Seed* with membranaceous wings.

1. B. capreola'ta. A vine, climbing over trees and shrubs. *Leaves* connate, lanceolate, cordate, glabrous, bearing tendrils, peduncles axillary, each 1-flowered.—Dull red. ♄. March—April. Common. *Cross-vine.*

2. B. rad'icans. A vine, climbing over the loftiest trees, attaching itself by radicles. *Leaves* pinnate; leaflets ovate, toothed, acuminate, glabrous on the upper surface, pubescent beneath. *Flowers* in corymbs. *Corolla* slightly ventricose beneath, tinged with yellow on the inside, with the segments nearly round, with a barren filament.—Red. ♄. June—Sept. Common. *Tecoma radicans.*

Genus II.—CATAL'PA. L. 2—1.

(Its name in India.)

Calyx 2-parted. *Corolla* campanulate, with the tube ventricose, border with 4 unequal lobes. *Stamens* 2, fertile, and 2—3 sterile. *Stigma* in 2 plaits. *Capsule* cylindrical, 2-celled, 2-valved. *Seed* with membranaceous margins.

1. C. cordifo'lia. A tree, with long, opposite, expanding branches. *Leaves* nearly round, cordate, acuminate, glabrous on the upper surface, downy beneath, very large, usually 3 in a whorl. *Flowers* in large, terminal panicles; segments of the calyx obovate, concave; those of the corolla crenulate, with the tube variegated, with yellow and purple; silique long, with the dissepiment opposite the valves.—White. ♄. April—May. Common on the Ocmulgee. 20—50 feet.

Genus III.—MARTYN'IA. 13—2.

(In honor of John Martyn, an English botanist.)

Calyx 5-cleft. *Corolla* hypogynous, bilabiate, with the limb 5-lobed. *Stamens* 4, didynamous. *Ovary* spuriously 4-celled. *Style* 1. *Stigma* divided. *Fruit* a ligneous capsule, terminated by a hooked beak. *Seed* few, large. Herbaceous plants, with alternate leaves, and axillary flowers.

1. M. proboscid'dea, (Glox.) *Stem* procumbent, branching, fistulous, viscidly pubescent, whole plant fetid. *Flowers* on axillary peduncles. *Calyx* split to the base on the under side. *Capsule* ligneous, 2-valved, 4-celled, with the surface furrowed, with 2 curved beaks, 2—3 inches long.—Dull yellow. ☺ June—Aug. Common.

Order LXXXIV.—POLEMONIA'CEÆ. (*Phlox Family.*)

Calyx 5-parted, persistent, sometimes irregular. *Corolla* regular, 5-lobed. *Stamens* 5, inserted into the middle of the tube of the corolla, and alternate with its segments. *Ovary* superior, 3-celled. *Style* simple. *Stigma* trifid. *Capsule* 3-celled, dehiscence loculicidal. *Seed* angular or oval, ascending; embryo straight; cotyledons foliaceous. Herbaceous plants.

Genus I.—PHLOX. L. 5—1.

(From *phlox*, a flame, the appearance of the flowers.)

Calyx prismatic, deeply 5-cleft. *Corolla* salver-form, with a flat 5-lobed border, lobes cuneate. *Stamens* unequal, inserted into the tube of the corolla. *Capsule* ovate, 3-celled, 1 seed in each cell.

1. P. acumina'ta, (Pursh.) *Stem* erect, little scabrous toward the summit, smooth toward the base. *Leaves* membranaceous, scabrous, lower ones spatulate-ovate, acuminate, upper ones lanceolate. *Flowers* in terminal corymbs; segments of the calyx subulate, awned; segments of the corolla rounded.—Purple. 2f. Aug.—Sept. Common in the upper country. 3—5 feet.

2. P. panicula'ta, (L.) *Stem* smooth, erect. *Leaves* opposite, lanceolate, flat, with scabrous margins, acuminate. *Flowers* in numerous opposite corymbs; segments of the calyx pubescent, awned. *Anthers* linear, 2-celled. *Stigma* hispid.—Purple. 2f. June—July. Upper districts of Carolina. 2 feet.

3. P. undula'ta, (Pursh.) *Stem* erect, glabrous. *Leaves* oblong-lanceolate, undulate, with scabrous margins. *Flowers* in paniculate corymbs; segments of the calyx awned, those of the corolla retuse.—Blue. 2f. July—Aug. Mountains. 2—3 feet.

4. P. pyramida'lis, (Pursh.) *Stem* erect, scabrous. *Leaves* cordate-ovate, acute. *Flowers* in pyramidal, fastigiate panicles; segments of the calyx lanceolate, acute; those of the corolla cuneate, truncate.—Purple. 2f. June—Aug. Mountains.

5. P. corda'ta, (Ell.) *Stem* erect, glabrous. *Leaves* cordate, tapering toward the summit, auricled at the base, with scabrous margins. *Flowers* in somewhat paniculate corymbs, numerous; segments of the calyx awned, as long as the tube.—Blue. 2f. August. Upper districts of Carolina. 1—2 feet.

6. P. macula'ta, (L.) *Stem* erect, terete, dotted, sprinkled with glandular hairs. *Leaves* sessile, ovate-lanceolate, acute, with scabrous margins. *Flowers* in alternate corymbs. *Calyx* with subulate segments, angled. *Corolla* with obovate rounded segments.—Purple. 2f. May—July. Rich soils. Common. 2—3 feet.

7. P. Caroli'na, (Pursh.) *Stem* erect, pubescent. *Leaves* ovate-lanceolate, acute, glabrous. *Flowers* in fastigiate corymbs. *Calyx* glabrous, with linear-lanceolate teeth; segments of the corolla rounded.—Purple. 2f. July—Sept. Upper districts of Carolina.

8. P. NIT'IDA, (Pursh.) *Stem* erect, glabrous. *Leaves* ovate-lanceolate, somewhat coriaceous. *Flowers* in fastigiate corymbs; segments of the calyx linear-lanceolate, acuminate; those of the corolla obovate. —Purple. 2f. May—June. Middle Carolina and Georgia.

9. P. GLABER'RIMA, (L.) *Stem* erect, glabrous. *Leaves* linear-lanceolate, or oval-lanceolate, glabrous, long, smooth. *Flowers* in terminal corymbs; segments of the calyx acute, linear-lanceolate; of the corolla nearly round.—Blue. 2f. May—June. Low country. 1—2 feet.

10. P. ARISTA'TA, (Mich.) *Stem* erect, slender, pubescent. *Leaves* linear. *Flowers* few, corymbose; segments of the calyx awned; tube of the corolla curved; segments obovate.—Purple. 2f. May—June. Upper districts of Carolina.

11. P. PILO'SA, (L.) *Stem* erect, villous, purple, covered with a white pubescence. *Leaves* linear-lanceolate, or ovate-lanceolate, pubescent, sessile, with revolute margins. *Flowers* in fastigiate corymbs, bracteate; segments of the calyx hairy, acute, subulate; those of the corolla obovate or acute.—Purple. 2f. March—April. Rich soils. 12—18 inches.

12. P. AMŒ'NA, (Sims.) *Stem* decumbent, assurgent, hirsute. *Leaves* ovate-lanceolate. *Flowers* numerous, in corymbs; segments of the calyx subulate, those of the corolla obtuse.—Purple. 2f. May—June. Southern Georgia.

13. P. DIVARICA'TA, (Pursh.) *Stem* erect, smooth, with divaricate branches. *Leaves* remote, ovate, membranaceous, sessile, upper ones alternate. *Flowers* in corymbs, scattered; segments of the calyx subulate.—Purple. 2f. April. Swamps. 1—2 feet.

14. P. SUBULA'TA, (L.) *Stem* procumbent, assurgent, branching, hirsute. *Leaves* subulate, mucronate, ciliate, pubescent, the lower opposite, the upper alternate. *Flowers* axillary, somewhat corymbose. *Calyx* hairy, with acute linear segments; segments of the corolla cuneate, emarginate.—Rose-color. 2f. Feb.—May. In light soils, middle and upper districts of Carolina and Georgia.

15. P. SETA'CEA, (L.) *Stem* procumbent, assurgent, hairy. *Leaves* subulate, ciliate, somewhat fasciculate, pubescent. *Flowers* somewhat umbelled, or solitary, forming terminal corymbs; teeth of the calyx subulate; segments of the corolla cuneate, emarginate.—Purple. 2f. April—May. Middle Carolina and Georgia.

GENUS II.—POLEMO'NIUM. L. 5—1.

(From *polemos*, war; from having caused war between two kings.—Pliny.)

Calyx campanulate, 5-cleft. *Corolla* rotate, 5-parted; segments erect. *Stamens* 5, inserted on 5 teeth or valves, which close the orifice of the corolla. *Stigma* 3-cleft. *Capsule* 3-celled.

1. P. REP'TANS, (L.) *Stem* erect, glabrous, branching. *Leaves* pinnate, from 7—11 leaflets; leaflets lanceolate, acute, glabrous, entire. *Flowers* terminal, nodding. *Calyx* 5-cleft.—Blue. 2f. Mountains. 10—12 inches. *Jacob's Ladder.*

GENUS III.—CAN'TUA. Juss. 5—3. (*Gilia.*)

(The Peruvian name of this plant.)

Calyx 3—5-cleft. *Corolla* funnel-form. *Stigma* 3-cleft, spotted. *Stamens* 5. *Capsule* 3-celled, many-seeded. *Seeds* angled.

1. C. CORONOPIFO'LIA, (Willd.) *Stem* pubescent. *Leaves* pinnatifid, sessile, fasciculate, with smooth, linear segments. *Flowers* in long racemose panicles. *Calyx* pubescent; segments subulate. *Corolla* dotted with red. *Stamens* inserted into the tube of the corolla. *Capsule* oblong, 3-furrowed.—Red and yellow. ♂. July. On the Congaree, near Columbia, S. C. *Standing Cypress. Gilia coronopifolia.*

One of the most beautiful of our native plants, which has become extensively introduced into our gardens. We have also found it on the Ocmulgee, near Macon.

GENUS IV.—COLLO'MIA. Nutt. 5—1.

(From *kolla*, glue.)

Calyx 5-cleft, somewhat campanulate, large. *Corolla* funnel-form, 5-lobed, lobes oval, oblong; tube straight, long, slender. *Capsule* 3-celled, triangular. *Seeds* oblong, angular, covered with a mucilage containing the fibro-cellular tissue.

1. C. LINEA'RIS, (Nutt.) *Stem* pubescent. *Leaves* oblong-linear, somewhat lanceolate, floral ones ovate-lanceolate, acute. *Calyx* viscid. —Whitish-purple. ☉. June. Louisiana.

ORDER LXXXV.—HYDROPHYLLA'CEÆ.

Calyx 5—10-cleft, persistent. *Corolla* hypogynous, 5-lobed, with two lamellæ at the base of each lobe. *Stamens* 5, alternate with the segments of the corolla. *Ovary* simple, 1-celled; ovule suspended. *Style* 1, bifid. *Placentæ* 2, parietal. *Fruit* capsular, inclosed in the permanent calyx. Few or many seeded. Herbaceous plants, hispid.

GENUS 1.—HYDROPHYL'LUM. 5—1.

(From *hudor*, water, and *phullon*, leaf.)

Calyx 5-parted. *Corolla* campanulate, 5-cleft, with 5 longitudinal nectariferous grooves on the inside. *Stamens* 5, exserted; filaments bearded. *Capsule* globose, 1-celled, 2-valved, usually 1-seeded.

1. H. VIRGIN'ICUM, (L.) *Stem* erect, nearly glabrous. *Leaves* pinnate and pinnatifid; segments oval-lanceolate, serrate. *Flowers* in compact axillary clusters; segments of the calyx linear.—Blue. 2ℓ. May—June. In shady, rocky situations. 1—2 feet.

2. H. CANADEN'SE, (L.) Nearly smooth. *Leaves* palmately 5—7-lobed, rounded, unequally toothed. *Flowers* in globose cymes; pedun

cles much shorter than the petioles; lobes of the calyx linear; sinuses of the calyx naked; filaments longer than the corolla.—White. 2f. Mountains.

GENUS II.—PHACE'LIA. Juss. 5—1. (*Cosmanthus*, Nolte.)

(From *phakelos*, a bundle.)

Calyx 5-cleft. *Corolla* 5-cleft, sub-campanulate, with 5 nectariferous grooves on the inside. *Stamens* 5, exserted. *Style* filiform. *Stigmas* 2. *Capsule* 2-celled, 2-valved, 4-seeded.

1. P. FIMBRIA'TA, (Pursh.) *Stem* assurgent, hispid. *Leaves* pinnatifid, with undivided lobes. *Flowers* in simple, terminal racemes, revolute before flowering, afterward erect; segments of the corolla fimbriate. —Blue. 2f. May—June. Common around Macon. 6—10 inches.
Cosmanthus fimbriatus, Nolte.

GENUS III.—DIAPEN'SIA. L. 5—1.

(From *diapente*, 5-cleft.)

Calyx 5-parted, bracteate, fringed. *Corolla* salver-form, with a short tube. *Stem* creeping, with short assurgent branches.

1. D. BARBULA'TA, (Ell.) *Leaves* lanceolate, cuneate, acute, pubescent at the base, upper ones crowded. *Flowers* at the extremities of the branches, solitary. *Anthers* beaked.—White. 2f. June—Aug. Mountains.

GENUS IV.—HYDRO'LEA. L. 5—2.

(From *hudor*, water, and *elaia*, oil.)

Calyx 5-parted or 5-leaved. *Corolla* campanulate, with the limb 5-parted. *Stamens* 5; filaments inserted into the tube of the corolla, dilated at the base. *Capsule* 2-celled. *Seeds* numerous.

1. H. QUADRIVAL'VIS, (Walt.) *Stem* decumbent, assurgent, hairy, geniculate, spiny *Leaves* cuneate, lanceolate, alternate, entire, hairy along the veins. *Flowers* in axillary clusters, nearly sessile. *Calyx* 5-parted, hairy, with subulate segments. *Corolla* pubescent, with acute segments. *Capsule* globose. *Seeds* numerous, oval.—Blue. 2f. July —Sept. Around ponds. 1—2 feet.

2 H. CORYMBO'SA, (Mar.) *Stem* erect, or assurgent toward the summit, without spines. *Leaves* lanceolate, sessile, with the veins and margins pubescent. *Flowers* solitary, on the extremities of the small branches, somewhat corymbose. *Calyx* with the segments acute, hairy. *Corolla* campanulate, with ovate segments, with yellowish veins, and white spots near the base. *Capsule* globose, glabrous.—Blue. 2f. Through the summer. In pine-barren ponds. 1—2 feet.

GENUS V.—NEMOPH'ILA. Barton, 5—1.

(From *nemos*, a grove, and *phileo*, to love; growing in shady places.)

Calyx deeply 5-parted, with 5 small reflexed interlobes, ciliate; lobes lanceolate, 3-nerved. *Corolla* campanulate, twice as long

as the calyx, glabrous. *Stamens* 5, inserted into the tube of the corolla, shorter than the corolla; pollen somewhat angular. *Ovarium* 1-celled, 1—2-seeded.

1. N. EVANES'CENS. *Stem* 3—4 inches high, succulent, angular, hairy on the angles; several stems from the same root. *Leaves* alternate, ciliate, variously lobed; lobes obtuse, usually mucronate and dentate; petiole triangular. *Flowers* opposite the leaves, solitary. Grows in rich, damp soil. Springs up in February, blooms in March, and dies in June.—White. On the Ocmulgee.

GENUS VI.—ELLIS'IA. 5—1.

(In honor of John Ellis, a botanist.)

Calyx 5-parted. *Corolla* funnel-form, 5-cleft, smaller than the calyx. *Capsule* 2-celled, 2-valved, each cell 2-seeded. Herbaceous, annual plants, dichotomously branched; leaves pinnatifid.

1. E. MICROCA'LYX. *Stem* glabrous, decumbent. *Leaves* lyrate, pinnatifid; segments 3—5, lateral ones oblique, deeply toothed, middle ones trifid and obtuse. *Flowers* solitary, small.—Alluvial grounds. Ala. 4—6 inches.

ORDER LXXXVI.—CONVOLVULA'CEÆ. (*Bind-weed Family.*)

Calyx 5-parted, persistent. *Corolla* hypogynous, regular, 5-lobed, deciduous, plaited. *Stamens* 5, inserted into the base of the corolla, alternate with its segments. *Ovary* 2—4-celled, occasionally 1-celled; ovules few, erect. *Style* 1, usually bifid, sometimes separated to the base. *Capsule* 1—4-celled. *Seeds* borne at the base of the placentæ. Herbs or shrubs, usually twining. *Leaves* alternate, exstipulate.

GENUS I.—CONVOLV'ULUS. L. 5—1.

(From *convolvere*, to entwine.)

Calyx 5-parted, sometimes bracteolate. *Corolla* funnel-form or campanulate, plaited, with 5 segments. *Stamens* 5, shorter than the limb. *Ovary* 2—3-celled, few-seeded. *Stigmas* 2. *Style* undivided.

1. C. TENEL'LUS, (L.) *Stem* prostrate, branching at the base, hairy. *Leaves* on short petioles, elliptic, mucronate, slightly cordate, entire, somewhat hairy; peduncles axillary, bearing several flowers, longer than the leaves; bracts 2, at the summit of the peduncle. *Calyx* 5-leaved, acuminate, ciliate. *Corolla* small, externally hairy, with the margin obscurely 10-toothed; filaments 5, villous. *Anthers* sagittate. *Style* deeply cleft. *Capsule* hairy, 4-celled.—White. ♃. June—Aug. Common

2. C. AQUAT'ICUS, (Walt.) *Stem* tomentose. *Leaves* oblong-ovate, on short petioles; peduncles generally 3-flowered, sometimes as long as the leaves. *Corolla* hairy. *Capsule* tomentose.—Rose-color. ♃. Through the summer. Middle and lower Geo.

Stylisma convolvuloides, Chois.

3. C. SPITHAMÆ'US, (L.) *Stem* erect, branching, pubescent. *Leaves* cordate or oval, pubescent. *Flowers* solitary, on axillary peduncles; bracts longer than the calyx.—White. ♃. June—July. In dry soils.

4. C. OBTUSILO'BUS, (Mich.) *Stem* prostrate, glabrous, branching. *Leaves* alternate, sinuate-lobed, nearly hastate, emarginate. *Flowers* on peduncles, with 2 small leaves near the middle. *Corolla* large, with a yellow tube and white limb. *Style* 2-cleft.—♃. Aug.—Oct. On the coast.

Batatus litoralis, Chois.

5. C. PURPU'REUS, (L.) *Stem* twining, hairy. *Leaves* cordate, entire; peduncles 1—3-flowered. *Calyx* hairy. *Corolla* funnel-shaped.—Blue, purple, or white. ☉. Through the summer. Introduced.

Morning-glory

6. C. MACRORHI'ZUS, (Ell.) *Root* very large, white, farinaceous, insipid. *Stem* twining, pubescent, somewhat angled. *Leaves* cordate, entire or lobed, pubescent underneath, the young leaves tomentose, acute; peduncles 1—5-flowered. *Calyx* pubescent. *Corolla* with the limb obscurely 10-lobed, pubescent on the outer surface. *Stamens* unequal. *Style* 2-cleft. *Capsule* 2—3-celled. *Seeds* hairy.—White, tinged with purple. ♃. June—Oct. Is. of Car. and Geo.

Batatus jalapa, Chois.

7. C. BATA'TAS, (L.) *Stem* creeping. *Leaves* very various, cordate often variously angled and divided, usually with long petioles; peduncles 3—4-flowered, equaling in length the petioles. *Sepals* usually acuminate, mucronate. *Corolla* campanulate.—Various shades of pink and purple. From the East Indies; now cultivated in all warm countries for its valuable root. *Sweet Potato.*

8. C. PANDURA'TUS, (L.) *Root* large. *Stem* terete, nearly glabrous young branches pubescent. *Leaves* cordate, entire or 3-lobed, mucronate, pubescent; peduncles 1—5-flowered, stipulate. *Corolla* with the limb slightly lobed. *Style* simple.—White and purple. ♃. May—Aug. In dry soils. *Wild Potato-vine. Ipomœa pandurata*, Mey

9. C. SAGITTIFO'LIUS, (Mich.) *Stem* twining, terete, glabrous. *Leaves* glabrous, sagittate, with long, acute, diverging auricles; peduncles axillary, 1-flowered, solitary, bracteate. *Style* 2-cleft. *Capsule* 2-celled.—Purple. ♃. Through the summer. On the coast.

10. C. RE'PENS, (Ell.) *Stem* twining, pubescent. *Leaves* sagittate, with obtuse or truncate auricles, entire, pubescent, on long petioles; peduncles axillary, solitary, 1-flowered, thickened toward the summit, pubescent. *Calyx* bracteate. *Corolla* with a long tube, the limb obscurely 4-lobed. *Style* slightly 2-cleft. *Capsule* 3-celled.—White, tinged with red. ♃. April—May. On the coast.

11. C. TAMNIFO'LIUS, (Ell.) *Stem* twining, terete, hairy. *Leaves* cordate, slightly undulate, acuminate, entire, with hairy margins; veins on the under surface, muricate. *Flowers* in capitate clusters; common peduncle muricate, hairy. *Calyx* villous. *Corolla* small, 5-toothed *Style* slightly 2-cleft. *Capsule* 2-celled.—Blue. ☉. Aug.—Sept. Middle Geo.

Genus II.—IPOMŒ'A. L. 5—1.

(From *ips*, bind-weed, and *homoios*, similar.)

Resembling the preceding genus. *Stigma* capitate, globose. *Capsule* 3-celled.

1. I. ORBICULA'RIS, (Ell.) *Stem* prostrate. *Leaves* orbicular, emarginate, coriaceous, on rather long petioles; peduncles usually 3-flowered, partial peduncles bracteate. *Sepals* ovate, slightly mucronate. *Corolla* with a short tube.—Purple. 2f Through the summer. On the coast.

2. I. BO'NA NOX, (Pursh.) *Stem* prostrate, roughened, sometimes prickly. *Leaves* cordate, entire, or angled; peduncles 1—3-flowered. *Calyx* awned. *Corolla* undivided, with a long tube, large, white.
Calonyction spuriosum, Chois.

3. I. COCCIN'EA, (L.) *Stem* twining. *Leaves* alternate, cordate, acuminate, angled at the base; peduncles 3—5-flowered. *Sepals* awned. *Corolla* salver-form; limb plaited.—Red. ☉. June—Sept. Common.
Quamoclit coccinea, Mœn.

4. I. TRICHOCAR'PA, (Pursh.) *Stem* twining, hairy, angled. *Leaves* cordate when young, 3-lobed when old; villous margins frequently purple; peduncles 1—3-flowered, with 2 bracts at each division. *Sepals* oblong, ciliate. *Corolla* pubescent on the inside near the base. *Stigma* globose. *Capsule* 4-celled, hairy.—Purple or red. ☉. July—Oct. In cultivated lands. Common. *I. commutata*, R.

5. I. NIL, (Pursh.) *Stem* twining, hairy. *Leaves* cordate, the old ones 3-lobed, acuminate; peduncles 1—3-flowered; segments of the calyx subulate, long, villous. *Corolla* with the limb obscurely 5-angled. *Stigma* globose.—White and blue. ☉. In cultivated lands. Common. Aug.—Oct. *Pharbitis nil*, Chois.

6. I. DISSEC'TA, (Pursh.) *Stem* hairy. *Leaves* 7-lobed, glabrous, on pubescent petioles; segments sinuate; peduncles 1-flowered; segments of the calyx oval. *Corolla* campanulate.—☉. July. Calcareous soils. Geo. and Flor. *I. sinuata*, Ait.

Genus III.—CALYSTE'GIA. Br. 5—2.

(From *kalux*, a calyx, and *stege*, a covering.)

Bracts 2, opposite, inclosing the flower. *Sepals* 5, equal. *Corolla* campanulate. *Style* 1. *Stigma* 2-lobed. *Ovary* 2-celled, sometimes 1-celled.

1. C. CATESBEIAN'A, (Pursh.) *Stem* voluble, tomentose. *Leaves* cordate, oblong-lanceolate, or sagittate, acute, tomentose; peduncles 1-flowered; bracts lanceolate, acuminate, somewhat inflated. *Sepals* obtuse.—Car.

2. C. PARADOX'A, (Pursh.) *Stem* lying on the ground, tomentose. *Leaves* oblong, cordate-sagittate, acute; peduncles 1-flowered, elongated; bracts linear, remote from the flower. *Sepals* naked, smooth, acuminate.—White. Vir.—Car.

The medicinal substances, Jalap and Scammony, are the production of plants of this order. The former from the *Convolvulus jalapa*, a native of Mexico, and the latter from the *C. scammonia*, indigenous in Greece and the East.

GENUS IV.—DICHON'DRA. Foster, 5—2.

(From *dis*, twice, and *chondros*, a grain, from the form of its capsules.)

Calyx 5-parted; segments spatulate. *Corolla* 5-parted, bell-form, short. *Stamens* 5. *Stigmas* 2. *Capsule* 2-celled, formed of 2 carpels, each 1-seeded. *Seeds* globose.

1. D. CAROLINEN'SIS, (Mich.) *Stem* creeping, pubescent. *Leaves* somewhat reniform, emarginate. *Calyx* ciliate, villous.—Purple. ♃. June. Lou.

GENUS V.—CUSCU'TA. Tourn. 5—2.

(The ancient name of a parasitical plant.)

Calyx 4-cleft. *Corolla* globose, urceolate; limb 4—5-cleft. *Stamens* 5, inserted into the corolla. *Stigmas* 2. *Capsule* 2-celled, 2 seeds in each cell; dehiscence transverse.

1. C. AMERICA'NA, (L.) *Stem* twining, filiform, resembling orange-colored threads, springing first from the earth, afterward becoming parasitic; the root dying. *Leaves* none. *Flowers* in racemose clusters. —White. ☺. Through the summer. Common.
Love-vine. C. compacta, Juss.

ORDER LXXXVII.—BORAGINA'CEÆ. (*Borage Family.*)

Calyx 5-cleft, persistent. *Corolla* hypogynous, regular, 5-cleft. *Stamens* inserted into the corolla, alternate with its segments. *Ovary* 4-lobed, 4-celled, with 4 suspended ovules. *Style* simple, arising from the base of the lobes. *Nuts* 4, distinct. Herbaceous plants, with alternate, scabrous leaves. *Flowers* in secund spikes or racemes.

GENUS I.—LITHOSPER'MUM. L. 5—1.

(From *lithos*, a stone, and *sperma*, a seed.)

Calyx 5-parted. *Corolla* funnel-form, small, 5-lobed. *Stamens* included. *Nuts* shining.

1. L. ARVEN'SE, (L.) *Stem* erect, hispid, branching. *Leaves* oblong-obtuse or ovate. *Flowers* solitary, axillary, forming leafy racemes. *Calyx* with long, linear, subulate segments. *Nuts* rugose.—White. ☺. April—May. Introduced. 12—18 inches. *Corn Gromwell.*

2. L. HIR'TUM, (Leh.) *Stem* erect, hirsute, simple. *Leaves* hispid, oblong, somewhat oval, those of the flowers ovate. *Calyx* with long, lanceolate segments, persistent. *Corolla* with 5 tubercles in the throat. *Flowers* in terminal racemes.—Bright orange. ♃. April—May. Common. 10—16 inches. *Batschia Gmelini*, Mich.

3. L. CANES'CENS, (Leh.) *Stem* villous, erect, simple. *Leaves* oblong, mucronate, obtuse, villous beneath. *Flowers* axillary, crowded near the summit of the stem. *Calyx* with linear-lanceolate segments, short; tube of the corolla double the length of the calyx.—Bright orange. ♃. June—July. 8—12 inches. *Puccoon.*

Genus II.—CYNOGLOS'SUM. L. 5—1.

(From *kuon*, a dog, and *glossa*, a tongue.)

Calyx 5-parted. *Corolla* funnel-form, with a short tube and 5-lobed border; orifice closed. *Seeds* depressed, affixed to the style by their inner margin.

1. C. Virgin'icum, (L.) *Stem* erect, hispid. *Leaves* large, oval, oblong, the upper ones amplexicaul, hairy. *Flowers* in terminal corymbs. —Blue. ♃. May—June. In shady woods. 1—2 feet.
Hound's Tongue.

2. C. Moriso'ni, (D. C.) (*Myosotis Virginiana*, L.) *Stem* branching, hairy. *Leaves* oblong-lanceolate, acuminate, scabrous above. *Flowers* in divaricate, dichotomous racemes. *Nuts* covered with hooked prickles.—Blue. ♂. June—July. Upper districts of Car. and Geo. 1—2 feet.

Genus III.—ONOSMO'DIUM. Mich. 5—1.

(From *onosma* and *eidos*—like the Onosma.)

Calyx 5-parted, with acute, ciliate segments. *Corolla* campanulate, with a border 5-parted, ventricose. *Stamens* included. *Style* exserted. *Nuts* shining.

1. O. Carolinia'num, (A., D. C.) Villous. *Leaves* oblong-oval, ciliate; bracts ovate-lanceolate; lobes of the calyx ovate-lanceolate, shorter than the tube of the corolla. *Corolla* glabrous; lobes ovate, acute.—White. ♃. Stony hills.

2. O. his'pidum, (Nutt.) *Stem* obtusely angled, hispid, branched. *Leaves* sessile, oblong-lanceolate, pubescent, entire. *Flowers* in simple racemes. *Calyx* hispid, ciliate. *Corolla* pubescent. *Seed* angled on the inner side.—Yellowish. ♃. May—June. Sandy soils. Common. 12—18 inches.

Genus IV.—PULMONA'RIA. L. 5—1.

(From its supposed effect on the lungs.)

Calyx small, 5-parted, persistent, prismatic. *Corolla* funnel-form, obscurely 5-lobed.

1. P. Virgin'ica, (L.) *Stem* erect, glabrous, branching. *Leaves* lanceolate-ovate, glabrous, glaucous. *Flowers* in terminal fascicles. *Corolla* several times as long as the calyx. *Style* slender, as long as the stamens.—Violet-color. ♃. April—May. Mountains. 1—2 feet.
Mertensia Virginica, D. C.

Genus V.—HELIOTRO'PUM. L. 5—1.

(From *helios*, the sun, and *trope*, twining.)

Calyx 5-parted, persistent. *Corolla* hypogynous, 5-parted. *Stamens* 5, alternate with the segments of the corolla. *Ovary* entire, 4-celled, with a pendulous ovule in each cell. *Style* simple. *Fruit* drupaceous, easily separable into 4 pieces. *Seed* solitary. Herbaceous plants, with alternate simple leaves. *Flowers* in axillary or terminal spikes.

1. H. In'dicum, (L.) *Stem* erect, hispid, furrowed. *Leaves* alternate, cordate, ovate, scabrous, acute; margins irregular. *Flowers* in axillary spikes. *Calyx* 5-parted, hirsute, shorter than the corolla. *Fruit* angular, separating.—Blue. ☺. June—Aug. Middle and southern Car. and Geo. 8—12 feet.

2. H. curassav'icum, (L.) *Stem* erect or decumbent, simple or branched, succulent, glaucous. *Leaves* narrow, lanceolate, glabrous, succulent. *Flowers* in terminal spikes. *Calyx* succulent, as long as the tube of the corolla. *Corolla* salver-form, furrowed. *Fruit* angled on the inside, coated with a fleshy pulp.—White, tinged with yellow. ☺. May—July. On the sea-coast. 6—12 inches.

Order LXXXVIII.—SOLANA'CEÆ. (*Nightshade and Potato Families.*)

Calyx 4—5-parted, persistent. *Corolla* hypogynous, 4—5-cleft. *Stamens* 5, inserted into the corolla, alternate with its segments, sometimes 1-abortive. *Ovary* 2-celled, with 2 polyspermous placentæ. *Stigma* simple. *Fruit* a capsule, with 2—4 cells and a double dissepiment, or a berry with the placentæ adhering to the dissepiment. *Seeds* numerous. *Embryo* curved. Herbaceous or shrubby plants, with alternate leaves.

Genus I.—LYCOPER'SICUM. Tourn.

(From the Greek *lukos*, a wolf, and *persica*, a peach.)

Calyx persistent, 5—many-parted. *Corolla* rotate; limb 5—many-cleft. *Stamens* 5 or more, inserted into the throat of the corolla, exsert. *Ovary* 2—many-celled; ovules numerous. *Fruit* a berry, many-seeded. *Seeds* reniform, somewhat villose. Herbaceous plants, with compound, alternate leaves.

1. L. esculen'tum, (Mill.) *Stem* somewhat fleshy, villous. *Leaves* unequally pinnatifid; segments incisely toothed, pilose. *Flowers* extra-axillary. *Calyx* deeply divided; limb of the corolla plaited. *Anthers* oblong-conical, opening by a slit on the internal face. The parts of the flowers and fruit vary very much, from the soldering of two or more flowers together, making the fruit many-celled and irregular. Native of the warm parts of America. *Tomato. Love-apple. Wolf-peach.*

There are numerous varieties of Tomato, bearing fruit red, yellow, and white. The Tomato may readily be grafted on the Irish potato, and both flourish and bear their accustomed fruits.

Genus II.—SOLA'NUM. L. 5—1.

(The derivation of the name uncertain.)

Calyx 5-cleft. *Corolla* rotate, 5-cleft. *Stamens* 5, connivent, dehiscing by 2 pores at the extremity. *Fruit* a sub-globose berry, 2-celled.

1. S. tubero'sum, (L.) *Stem* herbaceous, with a rhizoma bearing tubers. *Leaves* unequally pinnatifid; segments unequal, alternately

large and small, oval, unequal at the base, minutely villous. *Pedicels* articulated. *Corolla* plicate, 5-angled.—☉. South America. *Potato.*

Extensively cultivated as one of the most important agricultural productions, especially in Europe and the Northern U. States.

2. S. NODIFLO'RUM, (Jacq.) *Stem* herbaceous or suffructicose; branches terete, glabrous. *Leaves* glabrous, ovate, entire. *Flowers* sub-umbellate, numerous; peduncles, pedicels, and calyx puberulent. *Fruit* black, globose, shining.—White, yellowish at the base. So. Car., Geo., and Flor. 2 feet.

3. S. NI'GRUM, (L.) *Stem* erect, angled, glabrous, with the young branches pubescent, unarmed. *Leaves* ovate-angled, dentate, tapering at the base, on long petioles, sprinkled with hair. *Flowers* in 3—6-flowered umbels, between the leaves. *Calyx* persistent, pubescent. *Corolla* pubescent, with acute segments. *Fruit* black, many-seeded.—White. ♃. Through the summer. Damp soils. Common. *Nightshade.*

4. S. PTYCAN'THUM, (Duu.) *Stem* herbaceous, slender, hispid, angled. *Leaves* petiolate, ovate-oblong, acuminate, acute at the base, pubescent, pale beneath. *Peduncles* filiform, short, hirsute, 1—3 flowered. *Calyx* 5-cleft; lobes ovate. *Fruit* globose.—White. Geo.

5. S. MAMMO'SUM, (L.) *Stem* prickly. *Leaves* cordate, angled, villous, lobed, very broad, and prickly on both sides. *Flowers* in loose terminal racemes and opposite. *Fruit* yellow, tapering at the base.—Yellow. ☉. June—Aug. Middle and southern Geo.

6. S. PU'MILUM, (Dun.) *Stems* pilose-hirsute, yellowish-red, numerous, rooting. *Leaves* broad-ovate, obtuse, nearly entire, attenuate at the base; midrib spiny. *Flowers* in racemes, 3—5-flowered. *Peduncles* filiform, long. *Calyx* red.—Purple. Middle Geo.

7. S. VIRGINIA'NUM, (L.) *Stem* erect, prickly; branches angled. *Leaves* pinnatifid, prickly, ciliate; segments obtuse. *Calyx* prickly. *Fruit* small, greenish-white.—White. July—Aug. Sandy soils. Common. 6—10 inches.

8. S. CAROLINEN'SE, (L.) *Stem* erect, with numerous expanding branches, hairy, armed with stiff, sharp prickles. *Leaves* ovate-lanceolate, hastate, scabrous, prickly, covered with stellular pubescence. *Flowers* in simple, lateral racemes. *Calyx* pubescent, prickly.—White. ♃. May—July. Very common. 1—2 feet. *Horse-nettle.*

9. S. ESCULEN'TUM, (Dun.) *Stem* herbaceous, spiny, or unarmed. *Leaves* ovate, acuminate, repand or sinuate, tomentose, canescent, aculeate on the veins and petiole, unequal at the base. *Flowers* usually solitary. *Peduncle* reflexed. *Calyx* tomentose, aculeate, 6—9-cleft, persistent; segments linear-lanceolate, increasing with the fruit. *Corolla* 6—9-cleft; segments broad. *Stamens* 6—9. *Fruit* large, smooth, shining, obtuse at the apex, white or purple, 6—9-celled; placentæ fleshy. *Seeds* numerous small, compressed.—Purple and yellow. East Indies. Cultivated extensively for the table. *Egg-plant. Jew's-apple.*

GENUS III.—PHYSA'LIS. L. 5—1.

(From the Greek *phusa*, a bladder, in allusion to the inflated calyx.)

Calyx 5-cleft, increasing after flowering, becoming inflated. *Corolla* rotate, 5-cleft. *Stamens* 5, connivent. *Berry* globose, 2-celled, inclosed in the inflated calyx.

1. P. VISCO'SA, (L.) *Stem* erect, dichotomous, the young branches pubescent and viscid. *Leaves* alternate and lanceolate, repand, dentate, viscid, on long petioles. *Flowers* solitary, in the divisions of the stem. *Calyx* pubescent. *Corolla* pubescent, with brownish spots at the base.—Yellow. ☉. July—Oct. Cultivated lands. Common. 1—2 feet. *Ground Cherry.*

2. P. PENNSYLVAN'ICA, (L.) *Stem* slightly angled, pubescent. *Leaves* ovate, obtuse, slightly repand, tomentose on the under surface. *Flowers* on axillary, solitary peduncles. *Fruit* red, small.—Yellow. ☉. June—Aug. Common. 10—12 inches.

3. P. TOMENTO'SA, (Walt.) *Stem* branching, stellate-tomentose. *Leaves* ovate, repand-toothed, tomentose beneath, whitish. *Peduncles* filiform, longer than the petioles. *Corolla* spotted yellow. *Stigma* bifid.—Yellow and purple. ♃. Car. and Geo.

4. P. LANCEOLA'TA, (Mich.) *Stem* erect, densely pubescent, angled, somewhat branched. *Leaves* alternate, oval-lanceolate, entire, tomentose, on rather short petioles. *Flowers* solitary, nodding. *Calyx* truncate.—Yellow, with purple spots. ♃. June—Aug. Dry soils. Common.

5. P. VISCIDO-PUBESCENS, (Dun.) *Stem* erect, slender, viscid, hirsute-tomentose. Uppermost leaves in pairs, ovate or ovate-oblong, subacuminate, pubescent on both sides, viscid. *Peduncles* winged, filiform, erect. *Calyx* hirsute, tomentose, 5-cleft; lobes ovate, acuminate. *Corolla* campanulate, plicate.—Sandy soils. Geo. and Car.

6. P. HIRSU'TA, (Dun.) *Stem* erect, angular, striate, divaricately branched, hirsute; branches pubescent. *Leaves* long-petiolate, oblique-cordate, acute, repand, dentate or nearly entire. *Calyx* deeply 5-cleft; lobes oblong, acute. *Peduncles* winged, shorter than the petiole, 1-flowered.—☉. Blue. Car. and Geo. 10—12 inches.

P. angulata, Walt. *P. pruinosa*, L.

GENUS IV.—LY'CIUM. L. 4—1.

(From *lycion*, a name given to a thorny shrub.)

Calyx 4-toothed, short. *Corolla* tubular. *Stamens* 4; filaments bearded. *Fruit* a 2-celled, many-seeded berry, red.

1. L. CAROLINIA'NUM, (Walt.) A small shrub, with long, slender branches, unarmed. *Leaves* clustered, cuneate, glabrous, narrow. *Flowers* solitary, axillary.—White. ♄. Through the summer. Saline marshes. 3—5 feet.

GENUS V.—DATU'RA. L. 5—1.

(Arabian name.)

Calyx large, tubular, ventricose, 5-angled. *Corolla* funnel-form, with a long tube; the limb 5-angled, plaited. *Stamens* 5. *Stigma* bilamellate. *Capsule* 2-celled; cells 2-parted, apparently 4-celled.

1. D. STRAMO'NIUM, (L.) *Stem* erect, branching, dichotomous. *Leaves* alternate, angled, sinuate, unequal at the base, on long petioles. *Flowers* solitary, in the divisions of the stem. *Calyx* pubescent, with acute segments. *Fruit* spinous.—Whitish-purple. ☉. May—Sept. Very common. *Thorn-apple. Jamestown-weed*

GENUS VI.—NICOTIA'NA. L. 5—1.

(From John Nicot, of Nismes.)

Calyx urceolate, 5-cleft. *Corolla* funnel-form, 5-cleft, regular. *Stamens* 5. *Stigma* emarginate. *Capsule* 2-valved, many-seeded.

1. N. TABA'CUM, (L.) *Stem* erect, viscidly pubescent. *Leaves* ovate, entire, petiolate, very large. *Flowers* in terminal panicles and racemes; tube of the corolla cylindrical, much longer than the calyx.—White, tinged with pink. ☺. July—Aug. Introduced. 2—5 feet.

Tobacco.

GENUS VII.—PETU'NIA. Juss.

Calyx tubular, 10-nerved, 5-parted; lobes oblong-spatulate. *Corolla* campanulate; tube cylindrical or ventricose; limb spreading, plicate, 5-lobed. *Stamens* 5, inserted into the middle of the corolla tube, unequal. *Ovary* 2-celled, many-ovuled. *Seeds* minute, nearly spherical. South American plants.

1. P. EL'EGANS, (Miers.) Suffructicose, clothed with viscid, articulated hairs. *Leaves* numerous, linear, obtuse; margin revolute, canescent beneath. *Flowers* axillary. *Capsule* small, obovate, smooth, surrounded by the persistent calyx, 2-valved, 2-celled. Brazil. Cultivated.

Petunia.

GENUS VIII.—AT'ROPA. L. 5—1.

(From Atropos, one of the Fates.)

Calyx with acute angles, somewhat sagittate at the base. *Corolla* campanulate. *Stamens* 5, distant. *Style* 1. *Fruit* baccate, globose, 2-celled.

1. A. PHYSALIOI'DES, (L.) *Stem* erect, much branched. *Leaves* alternate, sinuate, angled, ovate, glabrous. *Flowers* axillary, solitary.—Blue. ☺. June—Sept. Cultivated lands.

There are many plants of this order in cultivation, although many are poisonous:—The *Solanun tuberosum*, the Irish Potato, so extensively cultivated for food; the *Capsicun annuum*, the Cayenne Pepper; the *Lycopersicum esculentum*, the Tomato; and the *Petunia*, belong to this order.

ORDER LXXXIX.—OROBANCHA'CEÆ.

Calyx divided, persistent. *Corolla* hypogynous, persistent. *Stamens* 4, didynamous. *Ovary* superior, with parietal placentæ. *Style* 1. *Stigma* 2-lobed. *Fruit* a capsule, 1-celled, 2-valved, with one or two placentæ in the middle of the valves. *Seed* numerous, minute. Herbaceous, parasitic plants. *Leaves* brown, or colorless scales.

GENUS I.—OROBAN'CHE. L. 13—2.

(From *orobos*, vetch, and *ancho*, to strangle; supposed to kill plants on which it grows.)

Calyx 4—5-cleft; segments unequal. *Corolla* ringent. *Cap-*

sule ovate, 1-celled. *Seed* numerous, with a gland beneath the base of the germ.

1. O. AMERICA'NA, (L.) *Stem* simple, thick, covered with ovate-lanceolate scales. *Flowers* in spikes, terminal. *Corolla* recurved. *Stamens* exserted.—Brownish-yellow. 4. July—Aug. Rich soils. 6—8 inches. *Conopholis Americana*, Walt. *Cancer-root.*

2. O. UNIFLO'RA, (L.) *Stems* erect, short, numerous from each root, covered with smooth, concave scales. *Scape* 1-flowered, 4—6 inches long, pubescent. *Corolla* with oblong, oval lobes, with a pubescent margin.—Bluish white. 4. May—July. Pine-barrens.
Anoplanthus uniflorus, En.

GENUS II.—EPIPHE'GUS. Nutt. 12—2.

(From *epi*, upon, and *phegas*, the Beech.)

Calyx short, 5-toothed. *Flowers* polygamous, the upper ones sterile, the lower fertile. *Corolla* of the sterile florets ringent, compressed, 4-cleft; of the fertile 4-toothed, small. *Capsule* truncate, oblique, 1-celled.

1. E. VIRGINIA'NUS, (Bart.) *Stem* erect, branching, covered with small ovate scales. *Flowers* alternate, small; sterile flowers largest, striped with purple, growing on the roots of beech-trees.—White, with purple. 4. Aug.—Sept. 12—18 inches.

ORDER XC.—SCROPHULARIA'CEÆ. (*Figwort Family.*)

Calyx divided, unequal, persistent. *Corolla* bilabiate, hypogynous. *Stamens* usually 4, didynamous, sometimes only 2. *Ovary* 2-celled. *Style* 1. *Stigma* 2-lobed. *Fruit* generally a 2-celled capsule. *Placentæ* central. *Seed* usually numerous, small. Herbaceous plants, with the leaves generally opposite.

ANALYSIS.

1.	Stamens 4	2
	Stamens 2 or 5	19
2.	Stamens didynamous	3
	Stamens not didynamous	17
3.	Divisions of the calyx 2	4
	Divisions of the calyx more than 2	5
4.	Leaves entire	*Euchroma or Castilleja*, 18
	Leaves not entire	*Pedicularis*, 20
5.	Divisions of the calyx 4	6
	Divisions of the calyx 5	7
6.	Seeds 1—4	*Melampyrum*, 21
	Seeds many	*Schwalbea*, 19
7.	The two longest stamens sterile	*Lindernia*, 9
	Four stamens fertile	8
8.	Flowers with a sterile filament	9
	Flowers with no sterile filament	10
9.	Flowers dull, greenish-purple	*Scrophularia*, 3
	Flowers white	*Chelone*, 4
	Flowers bright purple	*Penstemon*, 5
10.	Corolla bilabiate	11
	Corolla nearly regular	13
11.	Flowers gibbous at the base	*Linaria or Antirrhinum*, 2
	Flowers not gibbous at the base	12

12. Calyx 5-leaved ..... *Herpestis*, 7
Calyx 5-toothed ..... *Mimulus*, 6
13. Calyx and corolla curved ..... *Buchnera*, 12
Corolla campanulate 14
14. Flowers yellow 15
Flowers not yellow 16
15. Tube of the corolla long ..... *Dasystoma*, 17
Tube of the corolla short ..... *Seymeria*, 13
16. Leaves auriculate ..... *Otophylla*, 14
Leaves not auriculate ..... *Gerardia*, 16
17. Calyx 4-cleft 18
Calyx 5-cleft ..... *Macranthera*, 15
18. Flowers without bracts ..... *Scoparia*, 11
Flowers bracteate ..... *Polypremum*.
19. Stamens 5 ..... *Verbascum*, 1
Stamens 2 20
20. Capsule 1-celled ..... *Micranthemum*, 10
Capsule 2-celled 21
21. Capsule obcordate ..... *Veronica*, 11
Capsule not obcordate ..... *Gratiola*, 8

Genus I.—VERBAS'CUM. L. 5—1.

(From *barbascum*, bearded, in allusion to its filaments.)

Calyx 5-parted. *Corolla* rotate, 5-lobed, unequal. *Stamens* 5, declined, usually hairy. *Capsule* 2-valved, 2-celled, ovate or globose.

1. V. Thap'sus, (L.) *Stem* erect, winged, tomentose. *Leaves* alternate, lanceolate, decurrent, tomentose, hoary. *Flowers* in terminal spikes. *Calyx* tomentose, persistent. *Corolla* tomentose on the outer surface. *Seed* dotted.—Yellow. ♂. May—Aug. Common. Introduced from Europe. *Mullein.*

2. V. lych'nitis, (L.) *Stem* erect, angled. *Leaves* oblong, cuneate, naked above, tomentose beneath. *Flowers* in paniculate spikes, lateral and terminal.—Yellow. ♄. June—July. Car. and Geo. Introduced from Europe.

3. V. Blatta'ria, (L.) *Stem* slightly angled, simple, pubescent. *Leaves* sessile, amplexicaul, slightly cordate, serrate. *Flowers* in terminal racemes; peduncles 1-flowered, solitary.—Yellow, tinged with purple. ♂. May—Aug. Common. Middle Geo. 2—3 feet. Introduced from Europe.

Genus II.—LINA'RIA. Juss. 13—2.

(From *linum*, flax, from its resemblance.)

Calyx deeply 5-parted. *Corolla* large, personate, spurred at the base. *Capsule* thin, many-seeded.

1. L. vulga'ris, (Mill.) Smooth and glaucous. *Stem* erect. *Leaves* numerous, linear. *Flowers* in terminal racemes, on short pedicels; spur long; lower lip bearded.—Orange-yellow. 2. In cultivated grounds. Introduced from Europe. *Toad-flax.*

2. L. Canaden'sis, (Dum.) *Stem* assurgent, glabrous, simple. *Leaves* scattered, erect, linear, dotted, alternate on the fertile branches, verticillate on the sterile; the spur of the corolla long, subulate. *Seeds* angled.—Blue. 2. March—April. Common. 12—18 inches.
Antirrhinum Canadense.

Genus III.—SCROPHULA'RIA. L. 13—2.

(From its supposed use in scrofula.)

Calyx campanulate, 5-cleft, with equal segments. *Corolla* with the tube globose, the border 5-cleft. *Stamens* 4, didynamous. *Capsule* 2-celled, many-seeded.

1. S. Marylan'dica, (L.) *Stem* erect, angled, glabrous, much branched. *Leaves* opposite, cordate, ovate, lanceolate, serrate; petioles ciliate. *Flowers* in compound, terminal panicles. *Corolla* twice as long as the calyx; the 4 upper segments erect, the lower one reflexed.—Greenish, tinged with purple. 2f. Aug.—Oct. Rich soils. 2—4 feet.

S. nodosa, L.

Genus IV.—CHELO'NE. L. 13—2.

(From *chelone*, a tortoise.)

Calyx 5-parted, with 3 bracts. *Corolla* ringent, ventricose. *Stamens* 4, with a fifth sterile filament shorter than the rest. *Anthers* woolly. *Capsule* 2-celled, 2-valved, many-seeded. *Seeds* with a membranaceous margin.

1. C. gla'bra, (L.) *Stem* angled, rooting at the joints, glabrous. *Leaves* usually opposite, oblong-lanceolate, acuminate, serrate, glabrous, nearly sessile. *Flowers* in terminal spikes. *Bracts* shorter than the calyx. *Calyx* with the segments obtuse. *Corolla* with the lower lip bearded.—White. 2f. July—Aug. In wet shady places. 2—3 feet.

2. C. Lyo'ni, (Pursh) Glabrous; stem obtusely angled. *Leaves* opposite, petiolate, ovate, acuminate. *Flowers* in dense spikes; segments of the calyx and bracteas oblong, ciliate.—Rose-color. August. Mountains.

Genus V.—PENTSTE'MON. L'Her. 13—2.

(From *pente*, five, and *stemon*, a stamen.)

Calyx 5-leaved, bilabiate, ventricose. *Stamens* 4, with a fifth sterile filament bearded on the upper side and longer than the others. *Anthers* smooth. *Capsule* ovate, 2-celled, 2-valved. *Seed* numerous.

1. P. læviga'tus, (Sol.) *Stem* glabrous, or slightly pubescent, terete. *Leaves* ovate, oblong; those of the root lanceolate, acute, upper ones slightly denticulate. *Flowers* in terminal panicles. *Calyx* hairy. *Corolla* pubescent, upper lip 2-cleft, with the segments reflexed; the lower 3-cleft.—Pale purple. 2f. June—Sept. Fertile soils. 1—2 feet.

2. P. pubes'cens. *Stem* pubescent, erect. *Leaves* sessile, lanceolate, oblong, serrulate, amplexicaul, pubescent. *Flowers* in terminal panicles.—Pale purple. 2f. May—Sept. In dry soils. 1—2 feet.

3. P. dissec'tus, (Ell.) *Stem* erect, slightly pubescent. *Leaves* opposite, glabrous, compoundly dissected, with the segments irregular, linear. *Flowers* in panicles, with the flowers at the summit of the branches.—Purple. 2f. June—July. Middle Georgia. 1—2 feet.

4. P. digita'lis, (Nutt.) Glabrous, or rarely puberulent. Radical leaves petiolate, elliptic-oval or oblong; cauline ones lanceolate, am-

plexicaul, serrate or rarely entire. *Panicle* lax; corolla sub-campanulate, upper lip scarcely shorter than the lower; sterile filaments longitudinally bearded.

Genus VI.—MIM'ULUS. L. 13—2.

(From *mimo*, an ape, from its ringent corolla.)

Calyx prismatic, 5-toothed. *Corolla* ringent, with the upper lip reflexed at the sides; palate of the lower lip prominent. *Stamens* 4, didynamous. *Stigma* thick, bifid. *Capsule* 2-celled, many-seeded. *Seeds* minute.

1. M. RIN'GENS. *Stem* erect, glabrous, 4-angled. *Leaves* opposite, sessile, narrow, lanceolate, acuminate, serrate, glabrous. *Flowers* axillary, on peduncles about the length of the leaves; segments of the calyx subulate; lower lip of the corolla 3-lobed, larger than the upper. *Seed* numerous, small.—Pale blue. 2f. July—Sept.

2. M. ALA'TUS. *Stem* erect, glabrous, square, slightly winged. *Leaves* ovate, lanceolate, serrate, on short petioles. *Flowers* axillary, on short peduncles; segments of the calyx mucronate. *Corolla* tinged with yellow.—Pale blue. 2f. Aug.—Sept. Pine-barrens. 1—2 feet.

Genus VII.—HERPES'TIS. Gært. 13—2.

(From *herpestes*, any thing that creeps.)

Calyx 5-cleft, unequal. *Corolla* tubular, somewhat bilabiate. *Stamens* 4, didynamous, included. *Capsule* 2-celled, 2-valved, with the dissepiment parallel to the valves.

1. H. CUNEIFO'LIA, (Pursh.) *Stem* prostrate, branching, glabrous, succulent. *Leaves* opposite, cuneate, obovate, obscurely crenate toward the summit, sessile. *Flowers* on axillary peduncles about as long as the leaves; the three exterior segments of the calyx broad, the two interior narrow, with 2 bracts at the base. *Corolla* nearly campanulate, with a 5-cleft border; segments nearly equal.—Pale purple. 2f. May—Oct. Inundated lands. *H. Monnieria*, Hum.

2. H. ROTUNDIFO'LIA, (Pursh.) *Stem* procumbent, assurgent, pubescent. *Leaves* oval, nearly orbicular, slightly hairy, amplexicaul. *Flowers* on opposite peduncles; the 3 outer leaves of the calyx large, the 2 interior small and subulate. *Anthers* sagittate.—Blue. 2f. July—Sept. Along the margins of ponds.

3. H. AMPLEXICAU'LIS, (Pursh.) *Stem* procumbent, woolly. *Leaves* cordate, amplexicaul, entire. *Flowers* on opposite peduncles, shorter than the leaves, larger than the preceding species.—Blue. 2f. July—Sept. Wet pine-barrens. Mid. Car. and Geo.

4. H. MICRAN'THA, (Pursh.) *Stem* prostrate, glabrous, succulent. *Leaves* sessile, ovate, obtuse, entire, glabrous. *Flowers* on axillary peduncles, shorter than the leaves.—White. 2f. Sept.—Oct. On the margins of rivers. *Hemianthus micranthoides.*

5. H. NIGRES'CENS, (Walt.) *Stem* erect, square, glabrous. *Leaves* lanceolate, toothed at the summit. *Flowers* solitary, axillary. *Stamens* 4, fertile. *Capsule* compressed, acute.—2f. Aug.—Sept. Wet places. 12—18 inches.

GENUS VIII.—GRATIO'LA. L. 2—1.

(From *gratia*, favor, from its supposed medicinal qualities.)

Calyx 5-leaved or 5-parted, often with 2 bracts at the base. *Corolla* irregular, resupinate. *Stamens* 2—4; when 4, two of them sterile. *Capsule* 2-celled.

a. Two bracts at the base of the calyx.

1. G. FLORIDA'NA, (Nutt.) *Stem* glabrous, erect, somewhat branching. *Leaves* lanceolate, or the lowermost obovate, slightly serrate, narrow at the base. *Corolla* with the upper lip emarginate, tube long. *Stamens* 2.—4.

2. G. VIRGINIA'NA, (L.) *Stem* succulent, somewhat furrowed, not quite terete, erect, or declined. *Leaves* sessile, obscurely 3-nerved. *Flowers* axillary, on short peduncles; lobes of the calyx nearly equal, with the bracts about equal to the segments. *Corolla* curved. *Stamens* 2, short. *Capsule* ovate, 2-celled, 2-valved. *Seeds* numerous.—White, tinged with red. 4. March—April. Wet places. 3—8 inches.

3. G. SPHÆROCAR'PA, (Ell.) *Stem* procumbent, jointed, terete, furrowed. *Leaves* sessile, obovate, serrate, obscurely 3-nerved. *Flowers* solitary, axillary. *Sepals* equal. *Bracts* large, expanding. *Stamens* 2. *Style* short. *Capsule* globose. *Seeds* numerous.—4. Sept.—Oct. In ponds.

4. G. AU'REA, (Muhl.) *Stem* procumbent, glabrous, terete, slightly furrowed, jointed. *Leaves* ovate-lanceolate, somewhat amplexicaul, obscurely 3-nerved, acutely serrate, dotted. *Flowers* axillary, solitary, on short peduncles. *Bracts* as long as the segments of the calyx.—Yellow. 4. April—June. Wet pine-barrens. 1—2 feet.

5. G. VISCO'SA, (Schw.) Viscidly pubescent, decumbent. *Leaves* ovate-lanceolate, acute, dentate, 3-nerved, amplexicaul. Segments of the calyx broad-lanceolate; bracts short.—White, yellow within.

6. G. DRUMMOND'II, (Benth.) Viscid, puberulent, decumbent. *Leaves* lanceolate, acute, few serratures, 3-nerved, amplexicaul. *Bracts* short; segments of the calyx subulate.—Blue or white.

b. Calyx without bracts.

7. G. QUADRIDENTA'TA, (Mich.) *Stem* procumbent, terete, pubescent, slightly furrowed. *Leaves* opposite, subulate, with 2 teeth near the summit. *Flowers* solitary, axillary. *Sepals* unequal. *Anthers* white,—White, tinged with yellow and purple. 4. Around ponds.

8. G. PILO'SA, (Mich.) *Stem* erect, terete at the base, square at the summit, hairy. *Leaves* oval, amplexicaul, serrate, rugose. *Flowers* axillary, solitary. *Sepals* unequal. *Capsule* smooth.—White, tinged with purple. 4. In wet places. Common. July—Sept.

9. G. SUBULA'TA, (Bald.) *Stem* erect, hispid. *Leaves* linear-lanceolate, margins revolute, entire. *Flowers* subsessile. Segments of the calyx subulate; tube of the corolla long, slender.—6—8 inches.

10. G. TETRAGO'NA, (Ell.) *Stem* procumbent, square, jointed, glabrous. *Leaves* sessile, lanceolate, slightly toothed, obscurely 3-nerved. *Flowers* solitary, axillary, on square peduncles. *Sepals* linear, equal *Capsules* oblong.—White, streaked. 4. In water. Sept.—Nov.

Ilysanthes gratioloides, Benth.

11. G. MEGALOCAR'PA, (Ell.) *Leaves* lanceolate, serrate, pubescent. *Flowers* opposite, on peduncles longer than the leaves. *Sepals* linear. *Capsule* large, globose.—Yellow. 4. July—Aug. Wet places.

Genus IX.—LINDER'NIA. L. 2—1.

(In honor of F. B. Von Linden.)

Calyx pubescent, 5-leaved. *Corolla* bilabiate, 4-cleft; the upper lip short, reflexed, emarginate; the lower lip 3-cleft, with the segments oval, obtuse. *Stamens* 4, the two longest sterile. *Capsule* 2-valved, 2-celled, many-seeded.

1. L. DILATA'TA, (Ell.) *Stem* procumbent, smooth, square. *Leaves* oblong, ovate, amplexicaul, sparingly toothed. *Flowers* axillary, on square peduncles, covered with glandular hairs. *Corolla* resupinate. *Stigma* compressed.—Pale purple. ☺. May—Sept. Around ponds. 6—8 inches. *Gratiola tetragona.*

2. L. ATTENUA'TA, (Muhl.) *Stem* procumbent or erect, square, glabrous. *Leaves* lanceolate and obovate, narrowed at the base. *Flowers* on erect peduncles, shorter than the leaves, axillary, solitary.—Purple. ☺. May—June. Wet places. 6—8 inches. *L. refracta.*

Genus X.—MICRAN'THEMUM. Mich. 2—1.

(From *mikros*, small, and *anthos*, flower.)

Calyx 4-parted. *Corolla* 4-cleft, segments unequal. *Stamens* 2. *Capsule* 1-celled, 2-valved, many-seeded.

1. M. ORBICULA'TUM, (Mich.) *Stem* prostrate, creeping, glabrous, terete. *Leaves* opposite, sessile, orbicular, abruptly narrowed at the base, entire, obscurely 5-nerved. *Flowers* axillary, solitary, on short peduncles; segments of the calyx slightly spatulate, the two upper ones shorter. *Corolla* shorter than the calyx; the lower segments elongated. *Stamens* dilated at the base. *Anthers* globose, 2-lobed, white. *Style* filiform. *Capsule* globose, 2-celled, 2-valved, many-seeded, with central placentæ.—White. ♃. Through the autumn. Very common. 3—6 inches. *Round-leaved Micranthemum.*

2. M. EMARGINA'TUM, (Ell.) *Stem* prostrate or floating, creeping *Leaves* sessile, oval, and obovate, entire, emarginate, obscurely 5-nerved. *Flowers* smaller than the preceding, on very short peduncles.—White. ♃ Through the summer. Common in wet places.

Large-leaved Micranthemum

Genus XI.—VERON'ICA. L. 2—1.

(Origin of the name uncertain.)

Calyx 4, rarely 5-parted. *Corolla* 4-lobed, unequal; the lower segments narrowest. *Stamens* 2. *Capsule* 2-celled, obcordate. *Seed* few.

1. V. VIRGIN'ICA, (L.) *Stem* erect, glabrous, slightly angled. *Leaves* verticillate, by fours or fives, lanceolate, acute, serrate, pubescent beneath. *Flowers* in long, axillary spikes. *Corolla* tubular. *Style* long, persistent.—White. ♃. June—Aug. Mountains. 2—3 feet.

2. V. AMERICA'NA, (Schw.) Glabrous; stem decumbent, assurgent. *Leaves* ovate, petiolate, thick, serrate, subcordate at the base. *Racemes* opposite, long. *Capsule* orbiculate, obtuse, emarginate.—Blue. ♃. May—June. Damp places. 1—2 feet.

3. V. PEREGRI'NA, (Pursh.) *Stem* erect, terete, glabrous, frequently simple. Lower leaves opposite, oblong, toothed; the upper ones alter

nate, linear, lanceolate. *Flowers* solitary, axillary. *Corolla* shorter than the calyx. *Stamens* very short.—White. ☺. Feb.—March. Wet lands. Very common. 6—8 inches.

4. V. SERPYLLIFO'LIA, (L.) *Stem* decumbent, sometimes creeping, pubescent, slightly angled. *Leaves* ovate, on short petioles, decussate, glabrous, crenate. *Flowers* in terminal, leafy racemes. *Capsule* emarginate.—Pale blue. 2. May—June.

5. V. AGRES'TIS, (L.) *Stem* procumbent, hairy. *Leaves* cordate, alternate, on short petioles, notched. *Flowers* solitary, axillary, on hairy peduncles. *Calyx* deeply parted. *Seeds* 8 in a cell.—Blue. ☺. Jan. —April. Common in the low country.

6. V. ANAGAL'LIS, (L.) *Stem* succulent, erect. *Leaves* lanceolate, serrate, varying in width. *Flowers* in long, opposite racemes.—Blue. 2. May—June. In damp places. 1—2 feet.

7. V. ARVEN'SIS, (L.) *Stem* procumbent, hairy, with assurgent branches. *Leaves* opposite, cordate-ovate, on short petioles, slightly dentate; the upper ones usually sessile, lanceolate. *Flowers* axillary, solitary, on short peduncles. *Corolla* shorter than the calyx. *Stamens* short.—Pale blue. ☺. May—June. Damp soils. Common.

GENUS XII.—BUCHNE'RA. L. 13—2.

(In honor of J. G. Buchner.)

Calyx cylindrical, 5-toothed. *Corolla* tubular, a little curved, with the border equally 5-cleft; segments obcordate. *Stamens* 4, didynamous. *Capsule* 5-celled.

1. B. AMERICA'NA, (L.) *Stem* simple, terete, scabrous, and hairy. *Leaves* lanceolate, sessile, opposite, dentate. *Flowers* in spikes. *Calyx* slightly curved, bilabiate, upper lip 3-cleft, the lower bifid. *Corolla* pubescent. *Stamens* short.—Purple. 2. Through the summer. Damp soils. Common. 1—2 feet.

2. B. ELONGA'TA, (Sw.) *Stem* scabrous, simple or sparingly branched. Radical leaves obovate; lower ones oblong, few-toothed, middle ones lanceolate, upper ones linear, entire. *Spikes* elongated; bracts ovate, or ovate-lanceolate; calyx erect.—Blue or white.

GENUS XIII.—SEYME'RIA. L. 13—2.

(In honor of Henry Seymer.)

Calyx deeply 5-cleft. *Corolla* campanulate, equally 5-cleft. *Stamens* 4, inserted into the throat of the corolla. *Capsule* ovate, ventricose, 2-celled, 2-valved, many-seeded, dehiscing at the summit.

1. S. TENUIFO'LIA, (Pursh.) *Stem* erect, glabrous, much branched, rough. *Leaves* opposite, sessile, compoundly pinnatifid, with filiform segments. *Flowers* axillary, on rather short peduncles. *Calyx* with subulate segments. *Corolla* with short tube, pubescent.—Yellow and purple. ☺. Aug.—Sept. Low country. 3—4 feet.

2. S. PECTINA'TA, (Pursh.) *Stem* much branched, viscidly pubescent, obtusely angled. Lower leaves pectinately pinnatifid, with the segments linear, entire; upper ones smaller, and often entire. *Flowers* on axillary peduncles. *Corolla* with a short tube.—Yellow. ☺. Aug. —Sept. Middle Georgia. 2—4 feet.

Genus XIV.—OTOPHYL'LA. Benth.

(From *ous*, *otos*, an ear, and *phullon*, a leaf.)

Calyx campanulate, deeply 5-cleft; lobes foliaceous, unequal. *Corolla* with the lobes entire, spreading. *Stamens* didynamous, included. *Style* elongated. *Capsule* sub-globose, obtuse. *Seeds* numerous, angular.

1. O. Michaux'ii, (Benth.) *Stem* erect, pubescent. *Leaves* opposite, lanceolate, or ovate-lanceolate; some nearly entire, others auriculate. *Flowers* axillary, solitary. *Corolla* somewhat pilose within.—Carolina and northward. *Gerardia auriculata*, Mich.

Genus XV.—MACRAN'THERA. Torr.

Calyx 5-cleft, campanulate; lobes narrow, elongated. *Corolla* tubular; limb oblique; lobes short, entire, spreading. *Stamens* exserted, nearly equal. *Capsule* ovate, acuminate. *Leaves* opposite, pinnatifid. *Flowers* in racemes.

1. M. Fuchsioi'des, (Torr.) *Leaves* lanceolate; lobes lanceolate, lower ones subdentate. *Racemes* elongated, lax, secund; filaments pilose; lobes of the calyx a little shorter than the tube of the corolla.—Yellow. 2f. Lou.

2. M. Leconti'ii, (Torr.) Resembles the preceding. Calyx lobes 2—3 times shorter than the tube of the corolla.—Yellow. 2f. Georgia and Florida.

Genus XVI.—GERAR'DIA. L. 13—2.

(In honor of John Gerard, an English botanist.)

Calyx 5-toothed. *Corolla* sub-campanulate, unequally 5-lobed; segments rounded. *Stamens* 4, didynamous. *Capsule* 2-celled, dehiscing at the summit.

1. G. aphyl'la, (Nutt.) *Stem* erect, naked, nearly simple, with opposite, ovate scales, sometimes a few minute leaves. *Calyx* small, 5-toothed. *Corolla* small, longer than the peduncle. *Capsule* ovate.—Purple. ☺. June—July. Along the sea-coast. 2—3 feet.

2. G. seta'cea, (Walt.) *Stem* erect, much branched, glabrous, slender. *Leaves* setaceous, glabrous. *Flowers* axillary and terminal, on leafy branches. *Calyx* truncate, with small, subulate teeth. *Corolla* hairy, the border nearly equally 5-cleft, ciliate, with the tube white.—Purple. ☺. Aug.—Sept. Damp lands. 1—2 feet.

3. G. fascicula'ta, (Ell.) *Stem* erect, scabrous, marked with lines, branching at the summit. *Leaves* opposite and by threes, sometimes alternate, linear, acute, clustered. *Flowers* large, on peduncles shorter than the leaves. *Calyx* truncate, with small, subulate teeth. *Corolla* with the upper segments reflexed, villous, the three lower pubescent, ciliate.—Purple, spotted with red. ☺. Aug.—Oct. Common in the low country. *G. purpuera.*

4. G. filifo'lia, (Nutt.) *Stem* erect, terete, branching. *Leaves* filiform, glabrous, alternate, in axillary clusters; segments of the calyx acutely toothed. *Flowers* on peduncles longer than the leaves. *Corolla* with the throat pubescent, ventricose.—Purple. ☺. Aug.—Oct. Southern Georgia.

5. G. tenuifo'lia, (Vahl.) *Stem* diffuse, much branched, glabrous, angled. *Leaves* linear, acute, glabrous, except on the margins. *Flowers* on pedun-

cles shorter than the leaves. *Calyx* with minute teeth. *Corolla* pubescent, ventricose, with the segments ciliate, with the tube nearly white.—Purple. ☺. Aug.—Oct. Dry sandy soils. Common in middle Geo.

6. G. LINIFO'LIA, (Nutt.) *Stem* erect, slender, with erect, virgate branches. *Leaves* linear, appressed to the stem. *Flowers* on peduncles shorter than the leaves, which become elongated. *Calyx* truncate, with 5 minute teeth.—Purple. 4. Aug.—Sept. Damp pine-barrens.

GENUS XVII.—DASYSTO'MA. (*Gerardia.*)

Calyx campanulate, 5-cleft. Tube of the corolla elongated, large; limb spreading, 5-lobed; lobes entire. *Stamens* 4, included, didynamous. *Capsule* ovate, acute. *Seeds* numerous.

1. D. PUBES'CENS, (Benth.) (*Gerardia flava*, L.) *Stem* pubescent, sparingly branched, or simple pubescent. Lower leaves lanceolate, sometimes deeply serrate, on short petioles; upper ones entire, or slightly dentate. *Flowers* axillary, opposite, on very short peduncles. *Calyx* with subulate segments.—Yellow. 4. July—Sept. Upper dist. Car. and Geo. 2—3 feet.

2. D. QUERCIFO'LIA, (Benth.) (*G. quercifolia*, Pursh.) *Stem* erect, branching, obtusely angled, purple. Upper leaves lanceolate, scabrous; lower leaves pinnatifid, with acute, toothed segments. *Flowers* axillary, on short peduncles. *Calyx* pubescent. *Corolla* pubescent on the inner surface, ventricose. *Anthers* hairy.—Yellow. 4. May—Sept. Rich soils. Common.

3. D. PEDICULA'RIA, (Benth.) (*G. pedicularia*, L.) *Stem* erect, branching from the base, purple, viscid, densely pubescent. *Leaves* oblong, sessile, irregularly dissected, serrate. *Flowers* axillary, on short peduncles; segments of the calyx foliaceous. *Corolla* villous.—Yellow. ☺. July—Sept. Pine-barrens. Common.

4. D. PECTINA'TA, (Benth.) Very hirsute. *Leaves* lanceolate, pectinate, pinnatifid; lobes dentate or incised; lower ones opposite. *Calyx* with the lobes longer than the tube, often dentate. *Corolla* 3 times as long as the calyx.—Yellow. 4.

GENUS XVIII.—EUCHRO'MA. Nutt. 13—2. (*Castilleja.*)

(From *eu*, well or beautiful, and *chroma*, color.)

Calyx tubular, 2—4-cleft, ventricose. *Corolla* bilabiate, with the upper lip very long, inclosing the stamens; lower lip trifid, short. *Stamens* 4. *Capsule* compressed, 2-celled, many-seeded.

1. E. COCCIN'EA, (Spren.) *Stem* pubescent. Radical leaves lanceolate, entire, hairy; cauline ones pubescent, divided into 3 linear segments. *Flowers* in a terminal spike. *Bracts* large, red.—Yellowish. ☺ or ♂. June—Aug. Common. 12—18 inches.

2. E. GRANDIFLO'RA, (Nutt.) *Leaves* mostly trifid; segments divaricate. *Calyx* 4-cleft, oblique. *Corolla* longer than the calyx. *Flowers* in many-flowered spikes, pubescent, long; segments of the lower lip linear-lanceolate, acuminate, shorter than the upper, plaited. *Capsule* ovate, acute.—Greenish-white.

GENUS XIX.—SCHWAL'BEA. L. 13—2.

(In honor of C. Schwalbe, a German botanist.)

Calyx tubular, ventricose, obliquely 4-cleft, upper segment

small; lower large, emarginate. *Corolla* bilabiate, ringent; the upper lip arched, entire, the lower 3-lobed. *Capsule* ovate, 2-celled, 2-valved. *Seed* numerous, winged.

1. S. Ameri'cana, (L.) *Stem* pubescent, angled, simple. *Leaves* alternate, lanceolate, entire, sessile. *Flowers* in terminal racemes, nearly sessile. *Bracts* 2, as long as the calyx.—Dull purple. 2f. May—June. Pine-barrens.

Genus XX.—PEDICULA'RIS. L. 13—2.

(From *pediculus*, a louse, from its supposed effect on sheep.)

Calyx 2-cleft at the summit, obliquely truncate. *Corolla* ringent, with the upper lip emarginate, compressed. *Stamens* 4. *Capsule* 2-celled, mucronate, oblique. *Seeds* few in each cell, slightly angled.

1. P. Canaden'sis, (L.) *Stem* simple, succulent, pubescent. *Leaves* pinnatifid, with the segments notched and toothed, the lower ones crowded, with compressed petioles. *Flowers* in leafy spikes; lower lip of the corolla 3-lobed, middle lobe smallest.—Yellow, tinged with purple. 2f. March—April. Common. 6—12 inches.

Genus XXI.—MELAMPY'RUM. L. 13—2.

(From *melos*, black, and *puros*, wheat.)

Calyx 4-cleft; upper lip of the corolla compressed, with the margins folded back; lower lip trifid, grooved. *Capsule* oblique, 2-celled, 2 seeds in each cell.

1. M. America'num, (Mich.) *Stem* erect, branching, terete; lower leaves linear, entire, the upper ones lanceolate, toothed at the base, all opposite. *Flowers* axillary, solitary. *Seeds* oblong, cartilaginous.—Yellow. ☺. June—July. Mountains.

Order XCI.—LABIA'TÆ. (*Labiate Family.*)

Calyx tubular, persistent, regular, or bilabiate, hypogynous. *Corolla* bilabiate, with the upper lip entire, or bifid, the lower 3-cleft. *Stamens* 4, didynamous, the two shorter being sometimes abortive, inserted into the corolla. *Ovary* 4-lobed; ovules 4. *Style* 1, arising from the base of the lobes; stigma bifid. *Fruit* inclosed within the persistent calyx. *Seed* erect, with little or no albumen. Usually herbaceous plants, with whorled, spiked, or capitate flowers and square stems, and opposite branches and leaves.

ANALYSIS.

1. Stamens 2		2
Stamens 4		7
2. Calyx bilabiate		3
Calyx with the segments nearly equal		5
3. Corolla yellow	*Collinsonia*, 12	
Corolla not yellow		4
4. Flowers purple	*Hedeoma*, 10	
Flowers blue or violet	*Salvia*, 13	
5. Corolla bilabiate		6
Corolla nearly regular, 4-lobed	*Lycopus*, 8	

6. Upper lip of the corolla emarginate ..... *Cunila*, 4
Upper lip linear, inclosing the stamens ..... *Monarda*, 14
7. Calyx bilabiate 8
Calyx not bilabiate 12
8. Calyx closed by a lid of a flower ..... *Scutellaria*, 19
Calyx not closed by a lid 9
9. Flowers blue ..... *Trichostema*, 26
Flowers not blue 10
10. Stamens exserted ..... *Ceranthera*, 9
Stamens included 11
11. Flowers in spikes ..... *Prunella*, 18
Flowers in opposite clusters ..... *Calamintha*, 8
12. Calyx 10-toothed ..... *Marrubium*, 21
Calyx 3-cleft ..... *Macbridea*, 20
Calyx 5-cleft, or toothed 13
13. Stamens longer than the corolla 14
Stamens shorter than the corolla 16
14. Corolla consisting of 4 nearly equal lobes ..... *Mentha*, 2
Corolla bilabiate 11
15. Flowers in spikes ..... *Hyssopus*, 11
Flowers in racemes ..... *Teucrium*, 27
Flowers in heads or whorls ..... *Pycnanthemum*, 5
16. Flowers purple 17
Flowers not purple 19
17. Leaves cordate 20
Leaves not cordate 18
18. Flowers in terminal spikes ..... *Dracocephalum*, 16
Flowers in whorls ..... *Stachys*, 22
19. Corolla campanulate ..... *Isanthus*, 25
Upper lip of the corolla entire ..... *Leonurus*, 23
Upper lip of the corolla 2-cleft ..... *Hyptis*, 1
20. Flowers purple, stem creeping ..... *Cedronella*, 17
Flowers purple, stem not creeping ..... *Lamium*, 24
Flowers nearly white ..... *Nepeta*, 15

GENUS I.—HYP'TIS. Jacq. 13—1.

(From *hyptios*, resupinate; the limb of the corolla is turned on its back.)

Calyx 5-toothed, tubular. *Corolla* ringent; the upper lip 2-cleft, the lower 3-parted, the middle segment forming a small sack. *Stamens* 4, inserted into the tube.

1. H. RADIA'TA, (L.) *Stem* erect, square, pubescent. *Leaves* sessile, ovate-lanceolate, pubescent, tapering at the base, dentate. *Flowers* in axillary heads, on long peduncles; involucre about 12-leaved. *Calyx* pubescent, 5-toothed, teeth linear.—White, tinged with purple. ♃. July—Sept. Damp soils. Common. 3—4 feet.

2. H. SPICA'TA, (Poit.) *Branches* nearly glabrous or scabrous, angular. *Leaves* ovate, acute, unequally serrate, cuneate, glabrous, or pubescent above. *Heads* in lax, paniculate racemes; bracts ovate, shorter than the calyx; calyx inflated at the base, elongated; corolla small, white within. *Achenia* small, black.—Violet. Florida. 10—12 inches.

GENUS II.—MEN'THA. L. 13—1.

(From *Menthe*, a daughter of Cocytus, who was turned into mint.)

Calyx tubular, ciliate, glabrous, 5-toothed. *Corolla* funnel-shaped, with the border nearly equally 4-cleft, with the upper segment broad-emarginate. *Stamens* erect, distant, equal.

1. M. VIR'IDIS, (L.) *Stem* procumbent, assurgent, branching, glabrous, rooting at the joints. *Leaves* opposite, ovate-lanceolate, serrulate, on short petioles. *Flowers* in whorls, numerous; tube of the corolla rather longer than the calyx. *Stamens* short. *Seeds* 4.—Purple. 2f. July —Aug. In wet soils. Europe. 1—2 feet. *Spearmint.*

2. M. PIPERI'TA, (L.) *Stem* like the preceding, often purplish. *Leaves* ovate-oblong, acute, serrate, rounded at the base. *Whorls* crowded in short spikes; teeth of the calyx hairy. *Corolla* smooth.—Pale purple. England. *Peppermint.*

The first is the species from which the *Oil of Peppermint* of the shops is obtained. This oil exists in the whole plant, and is distilled with water, or it yields the oil to alcohol by maceration. It is an aromatic stimulant, and is extensively used as a family medicine.

GENUS III.—LYCO'PUS. L. 2—1.

(From *lukos*, a wolf, and *pous*, a foot.)

Calyx tubular, campanulate, 5-cleft; throat naked. *Corolla* tubular, 4-cleft; segments nearly equal, the upper segment rather broader and emarginate. *Stamens* 2, distant. *Seeds* 4.

1. L. VIRGIN'ICUS, (L.) *Stem* erect, square, pubescent, branched. *Leaves* broad-lanceolate, serrate, sessile, acuminate, tapering at the base. *Flowers* in crowded axillary whorls, sessile. *Calyx* persistent, unarmed, shorter than the seed. *Anthers* 2-lobed, purple.—White. 2f. June—Aug. Wet soils. Common. 1—2 feet. *Bugle-weed.*

2. L. ANGUSTIFO'LIUS, (Ell.) *Stem* erect, glabrous, square. *Leaves* narrow-lanceolate, acuminate, the upper ones slightly, and the lower ones deeply toothed. *Flowers* in dense whorls, sessile. *Calyx* armed with spines, longer than the seed, with the segments acuminate.—White. 2f. Aug.—Sept. Wet places. 1—2 ft. *Water Horehound.*

3. L. SINUA'TUS, (Ell.) *Stem* erect, furrowed, glabrous, square. *Leaves* sinuate and incised, and sometimes dentate; the segments acute. *Flowers* in dense sessile whorls; segments of the calyx acute, longer than the seeds.—White. 2f. Aug.—Sept. In swamps. 4—6 feet.

The *Lycopus Virginicus* is a medicinal plant possessing mild narcotic properties. In hemorrhage from the lungs it has been used with advantage, it being taken in the form of infusion.

GENUS IV.—CU'NILA. L. 13—1.

Calyx ovoid, many-nerved, 5-toothed; throat villous. *Corolla* 2-lipped, upper lip flat, emarginate, lower 3-lobed. *Stamens* 2, exserted, distant.

1. C. MARIA'NA, (L.) *Stem* much branched, purple. *Leaves* subsessile, ovate, subcordate, serrate. *Flowers* in corymbose cymes.—Pale red. 2f. Dry hills and rocks. July—Aug. *Common Dittany.*

GENUS V.—PYCNAN'THEMUM. Mich. 13—1.

(From *puknos*, dense, and *anthos*, flower.)

Calyx tubular, striate, many-nerved, 5-toothed. *Corolla* with the upper lip nearly entire, the lower one trifid, with the middle segment longest. *Stamens* 4, distant. Cells of the anthers

parallel. *Flowers* in heads, surrounded by a many-leaved involucre.

1. P. ARISTA'TUM, (Mich.) *Stem* square, pubescent, much branched. *Leaves* lanceolate-ovate, slightly serrate, on short petioles, whitish. *Flowers* in 1 or 2 sessile whorls, and a terminal head; bracts awned. *Calyx* with the segments terminated by long awns. *Corolla* glabrous, small.—White. 4. July—Aug. Mountains. 2—3 feet.

2. P. HYSSOPIFO'LIUM, (Benth.) *Stem* rigid. *Leaves* subsessile, oblong-linear, nearly entire, obtuse, nearly glabrous. *Calyx* scarcely bilabiate. 12—18 inches.

3. P. ALBES'CENS, (T. & G.) *Leaves* ovate-lanceolate, subserrate, glabrous above, hoary beneath. *Verticels* cymose, lax. *Achenia* bearded at the apex.

4. P. INCA'NUM, (Mich.) *Stem* quadrangular, pubescent toward the summit, glabrous at the base. *Leaves* opposite, oblong, ovate, acute, pubescent, hoary. *Flowers* in lateral and terminal heads. *Bracts* setaceous. *Calyx* tomentose, striate. *Corolla* pubescent on the inner surface. *Stamens* exserted. *Seeds* rugose.—Yellow, spotted with purple. 4. Aug.—Sept. In dry fertile soils. 3—6 ft. *Wild Basil.*

5. P. LOOMIS'II, (Nutt.) *Leaves* ovate, subserrate, acute, glabrous above. *Verticels* cymose, many-bracted, bracts lanceolate, acuminate, white. *Flowers* spotted.

6. P. TUL'LIA, (Benth.) *Leaves* ovate or oblong, acute, subserrate, petiolate, villous-pubescent. *Calyx* bilabiate, teeth nearly equal, with subulate awns.—Whitish.

7. P. DU'BIUM, (Dr. A. Gray.) *Stem* pubescent. *Leaves* lanceolate, acute, nearly entire, petiolate, glabrous. *Flowers* in verticillate cymes, teeth of the calyx subulate, the two lower ones shorter than the tube.

8. P. MU'TICUM, (Pursh.) *Stem* erect, branching. *Leaves* lanceolate, sessile, slightly dentate, glabrous, dotted. *Flowers* in loose heads. *Bracts* rather short, acute. *Calyx* with acute segments, ciliate. *Corolla* pubescent, small.—Whitish. 4. July—Aug. Upper districts of Car. and Geo. 1—2 feet.

9. P. VIRGIN'ICUM, (Nutt.) *Stem* erect, pubescent, branching. *Flowers* in terminal heads. *Leaves* sessile, linear-lanceolate, entire, dotted. *Bracts* villous, acuminate. *Calyx* villous. *Corolla* pubescent on the outer surface.—White, spotted. 4. July—August. Damp lands. 2—3 feet.

10. P. LINIFO'LIUM, (Pursh.) *Stem* erect, glabrous, fastigiately branched. *Leaves* usually clustered, linear, entire, dotted, acute. *Flowers* in terminal heads, corymbose. *Bracts* ovate, awned, ciliate. *Corolla* pubescent.—White, spotted. 4. July—Aug. Mountains. 2—3 feet.

11. P. NU'DUM, (Nutt.) *Stem* erect, simple, glabrous. *Leaves* sessile, oblong-ovate, glabrous, entire. *Flowers* in numerous heads. *Bracts* smooth, lanceolate. *Calyx* covered with resinous dots. *Corolla* pubescent. *Stamens* exserted.—Purple. 4. July—Aug. Mountains. 1—2 feet.

12. P. MONTA'NUM, (Mich.) *Stem* glabrous, purple. *Leaves* oval-lanceolate, serrate, nearly sessile. *Flowers* in 1 or 2 whorls, and a terminal head. *Calyx* erect, bracts ciliate. *Corolla* with the throat pubescent. *Stamens* exserted. *Seed* hairy at the summit.—Purple, spotted. 4. July—Aug. Mountains. 1—2 feet.

GENUS VI.—THY'MUS. L. 13—1.

(From *thumos*, strength; the smell of thyme reviving persons.)

Calyx bilabiate; many-nerved, throat hairy; upper lip three-toothed, spreading; inferior bifid, the awl-shaped division ciliate; throat villous. *Corolla* naked within, upper lip flat, lower three-lobed, middle lobe the longest.

1. T. SERPYL'LUM, (L.) *Stem* procumbent, canescent. *Leaves* small, with short petioles, ovate, scabrous, flat. Upper lip of the calyx with short, lanceolate teeth, the lower subulate, ciliate.—Nearly white. Europe, Asia, and Africa. *Thyme.*

GENUS VII.—MICROME'RIA. 13—1.

Calyx tubular, many-striæ, 5-toothed, teeth nearly equal; throat often villous within. *Corolla* bilabiate; upper lip erect, entire or emarginate, nearly flat; lower lip with nearly equal lobes, spreading. *Stamens* 4.

1. M. BRACTEOLA'TA, (Benth.) *Stem* pubescent, simple, slender *Leaves* linear-lanceolate, acute, entire. *Pedicels* 3—5-flowered. *Corolla* minute.—Carolina. *Hedeoma bracteolata*, Nutt.

2. M. BROWN'EI, (Benth.) *Stem* glabrous, prostrate, branches filiform. *Leaves* roundish-ovate, obtuse, subcrenate, glabrous. *Peduncles* elongated. *Calyx* villous within.—Florida.

GENUS VIII.—CALAMIN'THA. Pursh. 13—1.

(From *kalos*, beautiful, and *mentha*, mint.)

Calyx tubular, ribbed, glabrous; throat closed with hair after flowering. *Corolla* pubescent, with the throat inflated, the upper lip emarginate, erect, the lower one 3-parted, with the segments obtuse, nearly equal. *Stamens* 4.

1. C. GRANDIFLO'RA, (Pursh.) *Stem* slightly pubescent, terete. *Leaves* ovate, obtuse, slightly toothed, glabrous. *Flowers* in opposite, dichotomous clusters. *Stamens* shorter than the corolla. *Anthers* crescent-shaped.—Rose-color, spotted with purple. 2. June—Aug. Middle Car. and Geo.

2. C. COCCIN'EA, (Nutt.) Glabrous, or covered with the lightest pubescence. *Leaves* obovate-oblong, or cuneate-linear, obtuse, nearly entire, narrowed into a short petiole. Upper lip of the calyx 3-toothed; calyx villous within. *Verticels* elongated, 2—6-flowered.—Red. East Florida.

3. C. CANES'CENS, (T. & G.) Canescent when young. *Leaves* linear, obtuse, entire, margin revolute, somewhat fasciculate. *Verticels* 2-flowered. Upper lip of the calyx 3-toothed. *Corolla* twice as long as the calyx.—Red. West Florida.

GENUS IX.—CERANTHE'RA. Ell. 13—1. (*Dicerandra*, Benth.)

(From *keras*, a horn, and *anthera*, an anther.)

Calyx bilabiate; the upper lip emarginate, the lower 2-cleft.

Corolla double the length of the calyx, bilabiate; the upper lip 2-lobed, the lower 3-parted. *Stamens* 4, distant, exserted. *Anthers* awned.

1. C. LINEARIFO'LIA, (Ell.) *Stem* erect, glabrous, branching. *Leaves* linear, dotted, sometimes clustered. *Flowers* in terminal racemes. *Calyx* striate, usually tinged with purple, minutely pubescent at the summit, dotted. *Corolla* with throat inflated. *Style* longer than the stamens, hispid.—Reddish, spotted with violet. ☺. Sept.—Oct. Near Culloden, Geo. 12—18 inches.

GENUS X.—HEDEO'MA. Pers. 13—1.

(A Greek name for mint.)

Calyx bilabiate; the upper lip with 2 subulate, ciliate segments; the lower lip 3-cleft, segments lanceolate. *Corolla* ringent. *Stamens* 2.

1. H. PULEGIOI'DES, (L.) *Stem* pubescent, angular. *Leaves* lanceolate, serrate, pubescent. *Flowers* on axillary peduncles, verticillate. *Calyx* hairy.—Pale purple. ☺. July—Aug. Sandy soils. 6—10 in.
Squaw Mint. Wild Pennyroyal.

This plant is an aromatic stimulant, and like many of the plants of this order is used much in family practice. It is taken in hot infusion for producing perspiration.

GENUS XI.—HYS'SOPUS. L. 13—1. (*Lophanthus.*)

(Origin of the name uncertain.)

Lower lip of the corolla 3-parted, middle lobe sub-crenate. *Stamens* straight, distant, long. *Style* longer than the corolla.

1. H. SCROPHULARIÆFO'LIUS, (Willd.) *Stem* herbaceous, pubescent toward the summit, glabrous below. *Leaves* cordate, and ovate-lanceolate, acuminate, petioles pubescent. *Flowers* in crowded whorls, forming spikes. *Bracts* ovate, acuminate.—Reddish. 2. July—September. Mountains. 2—3 feet.

GENUS XII.—COLLINSO'NIA. L. 2—1.

(In honor of Peter Collinson, a friend of Linnæus.)

Calyx bilabiate; upper lip 3-toothed, lower one bifid, 10-nerved. *Corolla* unequal, lower lip with numerous capillary segments. *Stamens* 2—4. *Seed* generally abortive except 1.

1. C. CANADEN'SIS, (L.) *Stem* 4-angled, smooth. *Leaves* broad-cordate, ovate, glabrous, teeth of the calyx subulate. *Flowers* large, in a compound terminal panicle.
Horse-balm. Heal-all. Stone-root. Knot-root.

2. C. TUBERO'SA, (Mich.) *Stem* somewhat pubescent, branching. *Leaves* large, rhomboid-oval, glabrous, serrate, on long petioles, except the upper ones.—Yellow. 2. Aug.—Sept. Rich soils. 3—4 feet.

3. C. SCAB'RA, (L.) *Stem* furrowed, pubescent toward the summit, glabrous at the base. *Leaves* rugose, pubescent, ovate, slightly cordate, obtuse, on short petioles. *Flowers* in terminal racemes. *Calyx* pubes-

cent, with lanceolate segments. *Corolla* pubescent, the lower lip fimbriate.—Yellow and purple. Sept.—Oct. In the low country. 2—3 feet.

Var. C. ova'lis, (Pursh.) *Stem* glabrous. *Leaves* oblong-oval, glabrous, acute, on long petioles. *Flowers* in simple terminal panicles; teeth of the calyx short. *Corolla* small.—Yellow. 4. July—Aug. Middle Carolina.

4. C. puncta'ta, (Ell.) *Stem* erect, scabrous, pubescent, branching at the summit. *Leaves* ovate-lanceolate, large, acuminate, dentate, pubescent and dotted beneath; upper pair nearly sessile, ovate. *Flowers* in compound paniculate racemes. *Calyx* with the lower lip longest, sprinkled with resinous dots. *Corolla* pubescent; upper segments short, lower one fimbriate; filaments 4, two upper ones sterile.—Yellow. 4. Sept.—Oct. Rich soils. Common. 2—4 feet.

5. C. verticilla'ta, (Bald.) *Stem* erect, simple. *Leaves* verticillate, oval, acuminate. *Flowers* in a terminal, verticillate raceme.

Var. C. purpuras'cens. *Flowers* purple, in a short panicle.—Yellow. 4. May—July. Middle Georgia. 1—2 feet.

6. C. anisa'ta, (Sims.) *Stem* erect, branching, pubescent; segments of the calyx linear. *Flowers* in a compound panicle, leafy, pubescent. *Stamens* 4.—Pale yellow. 4. July—Sept. Mountains. 1—2 feet.

Genus XIII.—SAL'VIA. L. 2—1.

(From the Latin *salvo*, to save or heal, in allusion to its supposed healing properties.)

Calyx somewhat campanulate, 2-lipped; upper lip 3-toothed, the lower bifid. *Corolla* ringent. *Stamens* 2. *Filaments* bifid, with the connectivum elongated, bearing an anther cell at each extremity.

1. S. azure'a, (Lam.) *Stem* much branched. *Leaves* linear, glabrous. *Flowers* in distant whorls. *Calyx* pubescent, 3-cleft.—Blue. 4. Through the summer. Middle and upper Car. and Geo. 4—6 feet.

2. S. urticifo'lia, (L.) *Stem* erect, villous, somewhat viscous. *Leaves* ovate, doubly serrate, acuminate, attenuate at the base, pubescent. *Flowers* in remote whorls, viscous. *Calyx* pubescent.—Blue. 4. June—July. Upper districts Car. and Geo. 12—15 inches.

3. S. coccin'ea, (L.) *Stem* erect, much branched. *Leaves* cordate, serrate, tomentose, on rather long petioles. *Flowers* 6 in a whorl; upper lip of the corolla erect, emarginate, connectivum bearing the anther only at one extremity.—Red. 4. Through the summer. On the sea-coast. 1—2 feet. *Scarlet Sage.*

4. S. lyra'ta, (L.) *Stem* square, hirsute, branching at the summit, retrorsely pubescent. Radical leaves terete, dentate, hirsute, spotted; upper leaves lanceolate, slightly dentate, few. *Flowers* usually 6 in a whorl. *Calyx* angled, hirsute. *Corolla* hairy on the outside.—Blue. 4. March—Sept. Common. 2—3 feet. *Cancer-weed.*

5. S. obova'ta, (Ell.) *Stem* erect, slightly angled. *Leaves* very large, obovate, dentate, pubescent. *Flowers* 6 in a whorl.—Blue. 4. June—July. Middle Geo. 1—2 feet.

6. S. Clayto'ni, (Ell.) *Stem* erect, square. *Leaves* cordate-ovate,

sinuate, dentate, rugose, pubescent on the veins. *Flowers* 6 in a whorl *Calyx* hispid along the veins.—Violet. 2f. June—Oct. Common 8—12 inches.

GENUS XIV.—MONAR'DA. L. 2—1.

(In honor of N. Monarda.)

Calyx many-nerved, 5-toothed, cylindric. *Corolla* ringent, with the tube long, cylindric; upper lip linear, entire, the lower one reflexed, 3-lobed, middle lobe longest. *Stamens* 2. *Seed* 4.

1. M. CLINOPO'DIA, (Pursh.) *Stem* glabrous, obtuse, angled. *Leaves* ovate-lanceolate, tapering at the base, serrate near the middle, smooth, or slightly hairy, whitish beneath. *Flowers* in simple terminal heads. *Bracts* broad-ovate, acute, entire, nearly glabrous. *Calyx* short, ciliate. *Corolla* slender, pubescent.—Pale purple. 2f. July—Sept. Mountains. Dry soils. 2—3 feet.

2. M. PUNCTA'TA, (L.) *Stem* erect, branched, nearly glabrous, obtuse, angled, whitish. *Leaves* oblong, lanceolate, remote and obscurely serrate, tapering at the base, smooth. *Flowers* in whorls. *Bracts* lanceolate, colored, longer than the whorl. *Calyx* long. *Corolla* hairy, dotted with brown, the upper lip slightly arched, longer than the lower. —Yellow. ♂. Dry pine-barrens. Common. 3—5 feet. *Horsemint.*

3. M. CILIA'TA, (L.) *Stem* acutely angled, hirsute. *Leaves* pubescent, ovate, finely serrate, tapering. *Flowers* in whorls. *Bracts* strongly veined. *Calyx* hairy. *Corolla* small.—Blue. 2f. July—September. Mountains. *Blephilia ciliata*, Raf.

GENUS XV.—NEP'ETA. L. 13—1. (*Catmint.*)

(From Nepi, a town in Tuscany.)

Calyx tubular, ribbed, 5-toothed, with the teeth nearly equal. *Corolla* with the upper lip slightly emarginate, straight, the lower one 3-lobed, the middle lobe crenate. *Stamens* approximate.

1. N. CATA'RIA, (L.) *Stem* pubescent. *Leaves* on petioles, cordate, serrate, pubescent, hoary beneath. *Flowers* in verticillate spikes. Upper tooth of the calyx longest. *Corolla* small, with lateral lobes reflexed.—Nearly white. 2f. June—Aug. Common around buildings. 1—3 feet. *Catnip.*

This plant is very frequently employed as a family medicine, in poultices as an external application, and internally for colic in children. It is agreeable, and is said to be efficacious.

GENUS XVI.—DRACOCEPH'ALUM. L. 13—1. (*Physostegia.*)

(From *drakon*, a dragon, and *kephale*, a head.)

Calyx 5-cleft, with the segments nearly equal. *Corolla* with the throat inflated, the upper lip concave. *Stamens* 4.

1 D. VIRGINIA'NUM, (L.) *Stem* erect, glabrous, or pubescent near the summit, square. *Leaves* opposite, linear-lanceolate, sessile, acutely serrate. *Flowers* in terminal spikes, crowded. *Bracts* small, subulate,

pubescent. *Calyx* pubescent, with short segments. *Corolla* large.—Bright purple. 2f. June—July. Mountain meadows. 2—3 feet.

2. D. VARIEGA'TUM, (Pursh.) *Stem* glabrous, square, with cartilaginous angles. *Leaves* sessile, oblong-lanceolate, toothed toward the summit, glabrous, lower ones alternate at the base. *Flowers* in short spikes. *Bracts* ovate, pubescent. *Calyx* pubescent. *Corolla* pubescent, inflated, the upper lip large, the middle segments of the lower lip streaked. —Bright purple. 2f. May—June. Wet soils. 2—3 feet.

3. D. DENTICULA'TUM, (L.) *Stem* glabrous, or minutely pubescent at the summit. *Leaves* sessile, ovate-lanceolate, glabrous, slightly toothed. *Flowers* in long spikes. *Bracts* subulate, finely pubescent. *Calyx* with the teeth nearly equal, pubescent. Lower lip of the corolla variegated. —Purple. 2f. June—July. Mountains. 10—12 inches.

4. D. OBOVA'TUM, (Ell.) *Stem* erect, pubescent at the summit, glabrous below. *Leaves* obovate, sessile, cuneate, toothed at the summit. *Flowers* in short spikes. *Bracts* very small, pubescent. *Calyx* and *corolla* pubescent.—Purple. 2f. May—July. Southern Georgia. 12—15 inches.

GENUS XVII.—CEDRONEL'LA. Mœnch. 13—1.

(From *kedros*, cedar, from the odor of its leaves.)

Calyx tubular or campanulate, oblique, 5-toothed. *Corolla* expanding, bilabiate; upper lip 2-lobed, lower lip 3-cleft, spreading. *Stamens* 4.

1. C. CORDA'TA, (Benth.) *Stem* low, creeping, pubescent. *Leaves* broad-cordate, petiolate, crenate. *Whorls* few-flowered. *Corolla* hairy within.—Pale purple. June. Shady places.
Dracocephalum cordatum, Nutt.

GENUS XVIII.—PRUNEL'LA. L. 13—1.

(From a German word, that means a disorder of the throat.)

Calyx with unequal lips, the upper one truncate, 3-toothed. Upper lip of the corolla dilated. *Filament* forked at the extremity, one point bearing an anther. *Stigma* bifid. *Stamens* 4.

1. P. VULGA'RIS, (L.) *Stem* square, pubescent along the angles, hairy at the summit, branching at the base. *Leaves* oblong-ovate, denticulate at the base, on long hairy petioles. *Flowers* in compact spikes, axillary and terminal. *Bracts* ciliate. *Calyx* somewhat hairy, upper one 3-awned. *Corolla* with the upper lip emarginate.—Violet. 2f. May —July. Common. 6—8 inches. *Self-heal* or *Heal-all.*

GENUS XIX.—SCUTELLA'RIA. L. 13—1.

(From *scutellum*, a little shield; from the shape of the lid of the calyx.)

Calyx bilabiate; upper lip with a lid closing the calyx after flowering. *Corolla* bilabiate, upper lip concave, lower 3-lobed, tube long. *Stamens* 4.

1. S. INTEGRIFO'LIA, (L.) *Stem* 4-angled, usually branching, pubescent. Lower leaves ovate, attenuate at the base, crenate, on short petioles;

upper ones linear-lanceolate, obtuse, sessile. *Flowers* in panicles composed of opposite racemes, a bract at the base of each peduncle. *Corolla* villous, spotted with white. *Anthers* hairy.—Blue. 2f. May—Aug. In damp soils. Common. 2—3 feet.

2. S. CAROLINIA'NA, (Lam.) *Stem* erect, branching, glabrous. *Leaves* linear-lanceolate, entire, acute, petiolate. *Flowers* in leafy, loose racemes. *Calyx* with the segments obtuse.—Blue. 2f. May—June. In thick woods. Middle Car. and Geo. 1—2 feet.

3. S. SERRA'TA, (Pursh.) *Stem* erect, pubescent, branching. *Leaves* oval or ovate, acuminate, serrate, on short petioles. *Flowers* in terminal racemes. *Bracts* lanceolate. *Stamens* shorter than the corolla.—Blue. 2f. June—Sept. In fields. 2—3 feet.

4. S. VILLO'SA, (Ell.) *Stem* erect, villous, branching. *Leaves* lanceolate, villous along the veins beneath, on short petioles. *Flowers* in racemose panicles. *Bracts* lanceolate.—Blue. 2f. May—July. Middle Georgia. 2—3 feet.

5. S. PILO'SA, (Mich.) *Stem* erect, hairy, tinged with purple. Lower leaves cordate, obtuse; upper ones ovate, all rugose, crenate, hairy and dotted on the under surface, on short petioles. *Flowers* in paniculate racemes. *Calyx* hispid. *Corolla* hispid on the outer surface.—White, tinged with violet. 2f. May—July. Fertile soils. 1—2 feet.

6. S. CORDIFO'LIA, (Muhl.) *Stem* erect, pubescent. *Leaves* cordate, acute, obtusely toothed, on long petioles, pubescent. *Flowers* in opposite and terminal racemes. *Calyx* villous.—White and blue. July—Aug. Car. and Geo. 2—3 feet.

7. S. LATERIFLO'RA, (L.) *Stem* erect, glabrous, with the angles sometimes pubescent, much branched. *Leaves* ovate, serrate, acuminate, lower ones on rather long petioles, the upper nearly sessile. *Flowers* in leafy racemes. *Calyx* glabrous.—Blue. 2f. June—Sept. Upper Carolina and Georgia.

GENUS XX.—MACBRI'DEA. 13—1.

(In honor of Dr. Wm. Macbride, of Charleston.)

Calyx turbinate, striate, 3-cleft; two of the segments large, the other narrow. *Corolla* bilabiate; the upper lip entire, the lower one 3-lobed. *Anthers* villous, fringed.

1. M. PULCHEL'LA, (Nutt.) *Stem* erect, simple, glabrous, pubescent at the joints. *Leaves* lanceolate, serrulate, slightly hairy on the upper surface, ciliate; the upper ones sessile, the lower ones on short petioles. *Flowers* in a whorl, bracteate. *Corolla* with the lateral lobes obtuse, reflexed.—White and purple. 2f. August—Sept. Pine-barrens. 1—2 feet.

GENUS XXI.—MARRU'BIUM. 13—1.

(From *marrob*, a Hebrew word for bitterness.)

Calyx with 10 ribs, with 5 or 10 spreading teeth; throat hairy. *Corolla* with the upper lip bifid, linear, straight, the lower lip 3-cleft, the middle segment largest, emarginate. *Stamens* 4, lower pair longest.

1. M. VULGA'RE, (L.) *Stem* erect, branching at the base, tomentose. *Flowers* numerous, in whorls. *Leaves* roundish, ovate, rugose, dentate, tomentose beneath. *Calyx* with ten setaceous teeth. *Corolla* small.—White. 2f. Through the summer. Common around buildings.
White Hoarhound.

This plant is a tonic, and in large doses cathartic. It is decidedly a family medicine, and is used in the incipient stages of coughs and catarrhs with good effects. It also derives celebrity from being extensively used in manufacturing the hoarhound candy

GENUS XXII.—STA'CHYS. L. 13—1.

(From *stachys*, a spike.)

Calyx 5-cleft, segments awned. Upper lip of the corolla vaulted; lower lip 3-lobed, with the lateral lobes reflexed, the middle lobe large, emarginate. *Stamens* 4.

1. S. AS'PERA, (Mich.) *Stem* erect, square, retrorsely hispid. *Leaves* sessile, linear-lanceolate, serrulate, glabrous. *Flowers* usually 6 in a whorl. Teeth of the calyx divaricate, spiny.—Purple. 2f. June—Aug. Pine-barrens. 1—2 feet.

2. S. HYSSOPIFO'LIA, (Mich.) *Stem* erect, generally glabrous, slender, usually simple. *Leaves* sessile, linear-lanceolate, remotely dentate, or finely serrulate. *Flowers* sessile, about 4 in a whorl. *Calyx* glabrous, with the teeth rigid. *Corolla* slightly pubescent on the inside.—Purple. 2f. June—Aug. Wet pine lands. 12—18 inches.

3. S. HIS'PIDA, (Pursh.) *Stem* erect, pubescent, hispid, with the bristles usually retrorse. *Leaves* on short petioles, ovate, oblong, acute, serrulate, hispid; the upper ones nearly linear. *Flowers* 4—6 in a whorl. *Calyx* hairy; segments acute. Lower lip of the corolla whitish with dark spots.—Yellowish-purple. 2f. Aug.—Sept. Pine-barrens. 1—2 feet.

GENUS XXIII.—LEONU'RUS. L. 13—1.

(From *leon*, a lion, and *oura*, a tail.)

Calyx 5-angled, with 5 acute, expanding teeth. *Corolla* bilabiate; the upper lip entire, hairy, the lower 3-parted, reflexed. *Stamens* 4. *Anthers* sprinkled with shining dots.

1. L. CARDIA'CA, (L.) *Stem* with 4 pubescent angles. *Leaves* pubescent, the lower ones 3-lobed, lanceolate, the upper ones entire, pale beneath, sometimes dentate, on petioles about an inch long. *Flowers* in numerous axillary whorls. *Calyx* nearly glabrous. *Corolla* small, villous on the outer surface.—White, tinged with red. ♂ or 2f. May—Aug. In rich soils. Introduced. *Motherwort.*

GENUS XXIV.—LA'MIUM. L. 13—1.

(From *laimos*, the throat.)

Calyx tubular, hairy, with a 5-cleft expanding border. *Corolla* bilabiate; the upper lip vaulted, the lower lip 2-lobed, toothed at the base. *Anthers* hairy.

1. L. AMPLEXICAU'LE, (L.) *Stem* pubescent, square, branching at the

base. *Leaves* pubescent, broadly cordate, crenate, the upper ones sessile, clasping, the lower ones on short petioles. *Flowers* on axillary whorls. *Calyx* hairy. *Corolla* with the tube long, marked with pale spots.—Bright purple. ☺. Common. 6—8 inches.

Genus XXV.—ISAN'THUS. Mich. 13—1.

(From *isos*, equal, and *anthos*, flower, the corolla being nearly regular.)

Calyx campanulate, 10-nerved, 5-toothed; throat naked. *Corolla* short, campanulate, of 5 nearly equal rounded lobes. *Stamens* 4, nearly equal, erect.

1. I. cœru'leus, (Mich.) Viscidly pubescent. *Leaves* broad-lanceolate, 3-nerved. *Flowers* 1—3, on axillary peduncles.—Pale blue. July—Aug. River banks. *False Pennyroyal.*

Genus XXVI.—TRICHOSTE'MA. L. 13—1.

(From *thrix*, a hair, and *stema*, a stamen.)

Calyx campanulate, oblique, resupinate, unequally 5-cleft, the 3 upper teeth elongated. *Corolla* with a slender tube, upper lip falcate. *Stamens* 4, long and curved.

1. T. dichot'oma, (L.) *Stem* erect, branching. *Leaves* ovate-lanceolate, broad, pubescent, entire. *Flowers* in dichotomous panicles, solitary, in the divisions of the branches. *Calyx* hispid, ribbed, bilabiate. *Stamens* unequal. *Stigmas* 2.—Blue. ☺. July—Sept. Dry soils. Very common. 2—3 feet.

2. T. linea'ris, (Walt.) *Stem* viscidly pubescent. *Leaves* linear, smooth, sessile, acute at each end; teeth of the calyx awned. *Stamens* very long.—Blue. ☺. June—Sept. Dry fields. 6—12 inches.

Genus XXVII.—TEU'CRIUM. L. 13—1.

(Named after Teucer, son of Scamander.)

Calyx tubular, or campanulate, nearly equally 5-toothed. *Corolla* with the tube short, 4 upper lobes of the limb nearly equal, the lowest lobe longest.

1. T. Canaden'se, (L.) *Stem* erect, furrowed, pubescent, somewhat jointed. *Leaves* opposite, ovate-lanceolate, serrate, on short petioles, almost tomentose beneath. *Flowers* in whorled racemes. *Bracts* subulate, longer than the calyx. *Calyx* pubescent, with the 3 upper segments broad, the 2 lower narrow. *Corolla* pubescent, the upper lips deeply divided. *Stigmas* 2.—Blue or reddish. 4. July—September. Damp soils. Common. 2—3 feet.

2. T. Virgin'icum, (L.) *Stem* pubescent, furrowed. *Leaves* ovate oblong, serrate; those near the summit nearly sessile. *Flowers* in verticillate racemes, crowded. *Bracts* as long as the calyx.—Blue or purple. 4. July—Aug. In wet grounds. 2—3 feet.

Order XCII.—VERBENA'CEÆ. (*Vervain Family.*)

Calyx tubular, persistent, inferior. *Corolla* hypogynous, usually with an irregular limb. *Stamens* 4, didynamous, sometimes only 2. *Ovary* 2—4-celled. *Ovules* erect or pendulous, solitary or twin. *Style* 1. *Fruit* a drupe or berry. *Albumen* none. Shrubs or herbaceous plants, with exstipulate leaves.

ANALYSIS.

1. Plants, shrubs 2
   Plants, herbaceous 3
2. Stamens didynamous ..... *Lantana*, 4
   Stamens not didynamous ..... *Callicarpa*, 2
3. Flowers in spikes, calyx erect ..... *Verbena*, 1
   Flowers in spikes, calyx reversed in fruit ..... *Phryma*, 5
   Flowers in heads ..... *Zappania*, 3

Genus I.—VERBE'NA. L. 13—2.

(The Celtic name of the plant.)

Calyx 5-cleft. *Corolla* funnel-form, with the tube curved, and the limb unequally 5-cleft. *Stamens* 4, didynamous. *Seeds* 4. *Flowers* in paniculate spikes.

1. V. Auble'tia? *Stem* creeping, assurgent, angled, pubescent. *Leaves* opposite, oval-lanceolate, 3-lobed, dentate. *Flowers* in terminal spikes. *Calyx* angled, with unequal, setaceous segments. *Corolla* pubescent at the summit, the border expanding.—Purple. ♃. Through the summer. Pine-barrens. Common.

2. V. spu'ria. *Stem* decumbent, divaricately branched. *Leaves* sessile, deeply laciniate, somewhat pinnatifid; segments serrate. *Flowers* in filiform spikes, loose. *Bracts* longer than the calyx.—Purple. ☺. Aug.—Oct. Middle Geo. 1—2 feet.

3. V. hasta'ta. *Stem* erect, pubescent. *Leaves* lanceolate, acuminate, serrate, the lower ones frequently lobed, or hastate. *Flowers* in short, linear spikes, paniculate. *Bracts* ovate, shorter than the calyx.—Purple. ♃. July—Aug. Middle Car. and Geo. 2—4 feet.

4. V. panicula'ta. *Stem* erect, scabrous, almost hispid. *Leaves* long, lanceolate, coarsely serrate, undivided. *Flowers* in numerous spikes, forming a corymbose panicle.—Purple. ♃. July—Aug. Mountains. 4—6 feet.

5. V. urticifo'lia. *Stem* erect, somewhat pubescent, with numerous slender branches. *Leaves* ovate, acute, serrate. *Flowers* in filiform spikes, axillary and terminal, forming panicles. *Bracts* subulate; segments of the corolla nearly equal.—White, tinged with purple. July—Aug. Common. 2—3 feet.

6. V. Carolinia'na. *Stem* erect, scabrous, simple, viscid. *Leaves* oblong, obovate, irregularly serrate, sometimes slightly lobed. *Flowers* in long spikes. *Bracts* subulate. *Corolla* somewhat bilabiate.—Pale purple. May—July. Dry soils. Common.

Genus II.—CALLICAR'PA. L. 4—1.

(From the Greek *kalos*, beautiful, and *karpos*, fruit.)

Calyx small, persistent, 4-cleft. *Corolla* 4-cleft, with obtuse segments. *Fruit* baccate, 4-celled, juicy, purple.

1. C. America'na. A shrub bearing many branches, the old wood glabrous, young branches tomentose. *Leaves* opposite, lanceolate, serrate, tomentose beneath; petioles sprinkled with resinous atoms. *Flowers* in axillary clusters, on very short peduncles. *Calyx* tomentose. —Purple. ♄. May—July. Very common. 3—5 feet.
French Mulberry.

Genus III.—ZAPA'NIA. Sco. 13—2.

(In honor of P. A. Zappa, an Italian botanist.)

Calyx 5-toothed. *Corolla* 5-lobed. *Stamens* 4, didynamous. *Stigma* capitate, peltate, oblique. *Seeds* 2, covered at first by an evanescent pericarp. *Flowers* in heads.

1. Z. nudiflo'ra. *Stem* procumbent, branching, somewhat scabrous, herbaceous. *Leaves* ovate, cuneate, serrate toward the apex, on short petioles. *Flowers* on axillary peduncles, in small heads. *Bracts* broad, purple along the margin. *Stamens* short. *Seeds* 2.—Bluish-white. 2f. July—Aug. Damp soils. Common. 4—6 inches.

2. Z. lanceola'ta. *Stem* herbaceous, creeping, similar to the preceding. *Leaves* linear-lanceolate, serrate. *Flowers* on long peduncles, in conical heads.—Bluish-white. 2f. July—Aug. Banks of streams. 6—8 inches. *Lippia lanceolata.*

Genus IV.—LANTA'NA. L. 13—2.

(An ancient name of Viburnum.)

Calyx obtusely 4-toothed. *Corolla* with the limb 4-cleft. *Stamens* 4, didynamous. *Stigma* hooked. *Fruit* a drupe, dark blue, containing a smooth 2-celled nut. *Flowers* in heads.

2. L. cama'ra. A shrub, with the stems rough, square. *Leaves* opposite, ovate-lanceolate, scabrous, pubescent along the veins, serrate. *Flowers* on axillary peduncles, numerous. *Bracts* longer than the calyx. *Stamens* short. *Drupes* globular.—Bright yellow. ♄. June—Nov. Southern Geo. and Florida. 2—4 feet.

Genus V.—PHRY'MA. 13—2.

(Etymology unknown.)

Calyx tubular, 5-nerved, bilabiate; upper lip the longer, trifid. *Corolla* bilabiate; upper lip emarginate, the lower much larger, flat, 3-lobed. *Stamens* 4, included. *Fruit* 1-seeded.

1. P. leptosta'chya. *Stem* branching above. *Leaves* large, ovate-acute; coarsely toothed. *Flowers* in slender terminal spikes, small, mostly opposite. *Calyx* turned downward in fruit.—Purplish. 2f. July. Shady woods. *Lopseed.*

ORDER XCIII.—ACANTHA'CEÆ. (*Acanthus Family.*)

Calyx 4—5-cleft, persistent, with the segments equal or unequal. *Corolla* hypogynous, with a regular or irregular border. *Stamens* inserted into the tube of the corolla, 2 or 4, when 4 didynamous, the short ones sometimes sterile. *Ovary* 2-celled, surrounded at the base by a disk. *Style* 1. *Capsule* 2-celled, few or many-seeded; dissepiments opposite the valves. *Seeds* suspended, nearly globular. *Cotyledons* large. Herbaceous plants, with opposite, simple leaves.

GENUS I.—JUSTI'CIA. L. 2—1. (*Rhytiglossa*, Nees.)

(In honor of J. Justice, a Scotch botanist.)

Calyx 5-parted, often with 2 bracts at the base. *Corolla* bilabiate, the upper lip emarginate, the lower 3-cleft. *Stamens* 2. *Stigma* 1. *Capsule* 2-celled, 2-valved.

1. J. HU'MILIS, (Mich.) *Stem* assurgent, glabrous toward the base, rough near the summit, jointed. *Leaves* decussate, lanceolate, serrulate, scabrous. *Flowers* in long axillary spikes. *Bracts* minute. *Calyx* persistent, ventricose. *Corolla* with the upper lip reflexed; middle segment of the lower lip longest, spotted.—Violet. 2. May—June. In wet soils. 12—18 inches.

2. J. ENSIFOR'MIS, (Walt.) *Stem* assurgent. *Leaves* decussate, linear-lanceolate, glabrous, acute, slightly oblique. *Flowers* in short, compact spikes, on long peduncles.—Violet. 2. May—June. Southern Geo.

3. J. BRACHIA'TA, (Pursh.) *Stem* 6-angled, brachiately branched, glabrous. *Leaves* ovate-oblong, obtuse at the apex, attenuate at the base, glabrous beneath, hairy on the veins. *Peduncles* axillary, by twos or threes; heads 2—3-flowered, with the leaves of the involucre unequal, mucronate, cuneate, 3-nerved. *Flowers* small. *Capsule* oval, mucronate, partly pubescent.—August. *Dicliptera brachiata.*

GENUS II.—RUEL'LIA. L. 13—2.

(In honor of J. Ruelli, a French botanist.)

Calyx 5-parted, often with 2 bracts. *Corolla* campanulate, with a 5-lobed border. *Stamens* 4 or 5, approximate. *Capsule* attenuate, dehiscing at the summit.

1. R. STRE'PENS, (L.) *Stem* erect, 4-angled, hairy. *Leaves* opposite, petiolate, lanceolate-ovate, entire. *Flowers* axillary, 1—3 in each axil. *Calyx* with acute hispid segments, with 2 bracteal leaves as long as the calyx. *Corolla* with the segments rounded; tube longer than the calyx. *Seed* generally 4.—Blue. 2. May—Sept. Damp soils. 1—2 ft. *Dipteracanthus pallidus.*

2. R. HIRSU'TA. *Stem* erect, obtusely angled, sparingly branched, hirsute. *Leaves* opposite, ovate-lanceolate, sessile, acute, rough. *Calyx* with hispid subulate segments, longer than the tube of the corolla. *Style* long.—Blue. 2. July—Oct. Georgia and Alabama. *Hydrophila hirsuta*

3. R. CILIO'SA, (Pursh.) *Stem* erect, branching. *Leaves* ovate-oblong, ciliate, hairy along the veins. *Bracts* short; segments of the calyx subulate, short.—Blue. 4. July—Sept. Southern Geo. 1—2 ft.
Dipteracanthus ciliosus, Nees.

4. R. OBLONGIFO'LIA, (Mich.) *Stem* erect, obtusely angled, branched or simple, pubescent. *Leaves* sessile, obovate, obtuse; lower leaves nearly round. *Calyx* with the segments filiform, as long as the tube of the corolla, hispid; segments of the corolla emarginate. *Capsule* surrounded with a glandular ring. *Seed* few.—Blue, spotted with yellow. 4. May—Sept. Very common. 1—2 feet.
Calophanes oblongifolius, Don.

5. R. HUMISTRA'TA, (Mich.) *Stem* diffuse, glabrous. *Leaves* on long petioles, obtuse oval. *Flowers* nearly sessile. *Capsule* linear.—Blue. 4. May—Sept. Sandy pine-barrens. Southern Geo.
Calophanes humistratus.

6. R. CILIO'SA, (Le Conte.) *Stem* erect, white-pubescent, hirsute. *Leaves* oval-oblong, subcrenate, running into a short petiole, hirsute. *Flowers* subsessile. *Calyx* bracteolate; bracts oblong-lanceolate, longer than the calyx; lobes of the calyx linear, setaceous, hirsute, half the length of the corolla.—East Florida.
Dipteracanthus Mitchellianus, Benth.

7. R. TUBIFLO'RA, (Le Conte.) Hirsute or nearly glabrous. *Stem* branching. *Leaves* oblong, entire or undulate, subsessile. *Flowers* solitary, axillary, opposite, peduncles short; lobes of the calyx linear-lanceolate, one third the length of the corolla.—Georgia and Florida.
Dipteracanthus noctiflorus, Benth.

8. R. TUBERO'SA, (L.) *Stem* erect, villous. *Leaves* ovate, cuneate at the base, attenuate into the petiole, entire, crenate or undulate, smooth or pilose; lobes of the calyx subulate, acuminate, more or less hirsute. —Throughout the South. *Cryphiacanthus Barbadensis*, Nees.

GENUS III.—ELYTRA'RIA. Vahl. 2—1.

(From the Greek *elutron*, an envelope.)

Calyx 4—5-parted, with the front segment bifid. *Corolla* 5-cleft, with the segments nearly equal. *Stamens* 2, with 2 barren filaments. *Capsule* 2-celled, 2-valved, few seeds in each cell.

1. E. VIRGA'TA, (Mich.) *Stem* none. *Leaves* long, entire, lanceolate, cuneate at the base, scabrous on the upper surface, slightly undulate; scape covered with ovate, amplexicaul scales. *Flowers* in dense spikes. *Bracts* inclosing the flowers rigid; scales 2 at the base of the calyx, pubescent. *Calyx* pubescent.—4. May—June. Damp pine-barrens. 1—2 feet.

ORDER XCIV.—LENTIBULARIA'CEÆ. (*Butterwort Family.*)

Calyx divided, persistent, hypogynous. *Corolla* irregular, bilabiate, spurred. *Stamens* 2, included within the corolla. *Anthers* simple, 1-celled. *Ovary* 1-celled. *Style* 1, short.

Stigma bilamellate. *Capsule* 1-celled, many-seeded, with central placentæ. *Seeds* minute. Herbaceous plants, with radical leaves; growing in swamps and marshes.

Genus I.—PINGUIC'ULA. L. 2—1.

(From *pinguis*, fat, in allusion to the greasiness of its leaves.)

Calyx bilabiate, 5-cleft. *Corolla* ringent, spurred at the base. *Stamens* 2, very short.

1. P. ela'tior, (Mich.) *Stem* none. *Leaves* all radical, spatulate, ovate, entire, viscid, obtuse; scape columnar, villous at the base, several from each root. *Flowers* solitary. *Calyx* deeply 5-cleft, the 3 lower segments approximate; tube of the corolla ventricose, villous within, veined with purple, equally 5-cleft; segments 2-lobed; spur obtuse, compressed, half as long as the tube. *Anthers* globose, approximate, 1-celled. *Style* short. *Stigma* somewhat 3-lobed. *Capsule* 1-celled, terminated by the persistent style.—Yellow. 2f. March—April. Common in wet places. *Tall Pinguicula.*

2. P. lu'tea, (Walt.) *Stem* none; scapes 1—3 from each root, pubescent, 1-flowered. *Leaves* similar to the preceding. *Calyx* equally 5-cleft. *Corolla* campanulate, 5-cleft, with the segments 2-lobed; the inferior lamella of the stigma dilated, covering the anthers, the upper one minute: the whole plant pubescent, with the hairs terminated by a viscid gland.—Yellow. 2f. March—April. Pine-barrens. Very common. *Yellow Pinguicula.*

3. P. pu'mila, (Mich.) *Scapes* several from each root, pubescent, hairs terminated by viscid globules. *Leaves* smoother than in the preceding species. *Calyx* pubescent, with obtuse segments. *Corolla* villous within; tube streaked with purple, yellowish. *Stigma* with the upper lamella slightly 3-lobed, short, the lower one ciliate, covering the anthers. *Capsule* globose, pubescent.—Pale blue. 2f. March—April. Common in southern and middle Geo.

Genus II.—UTRICULA'RIA. L. 2—1.

(From *utriculus*, a little bladder.)

Calyx bilabiate, lips undivided, nearly equal. *Corolla* ringent, the lower lip spurred at the base. *Stamens* 2, with the filaments incurved, bearing the anthers within the apex. *Stigma* bilamellate. *Capsule* 1-celled.

1. U. infla'ta, (Walt.) *Stem* submersed, branching, terete, glabrous. *Leaves* alternate, the lower ones whorled, inflated, pinnatifid at the extremities; segments setaceous. *Flowers* in racemes, surrounded by a 6-leaved involucre floating on the surface of the water. *Calyx* persistent; segments nearly equal, concave, ovate. *Corolla* with the upper lip entire, broad-ovate, smaller than the under lip; lower lip 3-cleft, the lateral segments broad, and shorter than the middle segments. *Spur* bifid; the lower lamella of the stigma dilated, ciliate, reflexed. —Yellow. 2f. Still waters. Very common.

2. U. fibro'sa, (Walt.) *Stem* submersed, round. *Flowers* in simple racemes; peduncles 6—8 inches long, columnar; pedicels 1—2 inches

long, slender; upper lip of the corolla large, slightly 3-lobed, lower lip smaller; spur subulate, emarginate.—Yellow. 2f. Sept.—Oct. 2—3 feet.

3. U. SACCA'TA, (Le Conte.) *Stem* submersed, glabrous, terete. *Leaves* alternate, 4—5-parted at the base, segments divided, with setaceous segments; peduncles axillary, 1—2, generally 1-flowered; upper lip of the corolla nearly round, shorter than the lower; the middle segment of the lower lip oval, with reflexed margin; spur subulate, covered by the reflexed margins of the middle segment.—Purple. 2f. June—July. Stagnant waters. Common. 1—2 feet.

4. U. LONGIROS'TRIS, (Le Conte.) *Stem* floating. *Leaves* divided, with setaceous segments. *Flowers* on peduncles 2—3 inches long, 2-flowered; lips of the corolla obscurely 3-lobed, the lower one emarginate, ascending.—Yellow. 2f. June. Stagnant water. Car. and Geo.

5. U. GIB'BA, (L.) *Stem* floating; peduncle 6—8 inches long, bearing several small flowers. *Corolla* with the lips obscurely lobed; spur shorter than the lower lip of the corolla, gibbous in the middle.—Yellow. 2f. June. In ponds in the low country.

6. U. BIPARTI'TA, (Ell.) *Scape* 2—4 inches high, bearing generally several flowers. *Corolla* small; lips nearly entire, equal; spur obtuse, half the length of the corolla; lower segment of the calyx generally 2 cleft.—Yellow. 2f. October. In muddy places.

7. U. BIFLO'RA, (Le Marck.) *Stem* submersed, slender. *Leaves* verticillately divided with setaceous segments. *Flowers* on axillary peduncles; peduncles long (3—4 inches), generally 2-flowered; lips of the corolla entire, or the upper one obscurely 3-lobed, reflexed, shorter than the lower; spur subulate.—Yellow. 2f. May—June. In stagnant water.

8. U. PERSONA'TA, (Le Conte.) *Scape* 1—2 feet high, slender, glabrous, leafless. *Flowers* 4—10, rather large; upper lip emarginate; spur subulate, slightly curved.—Yellow. 2f. July—Aug. In damp soils. Middle Car. and Geo.

9. U. SETA'CEA. (Mich.) *Stem* erect, setaceous, nearly leafless, with a few ovate scales. *Flowers* on short, setaceous peduncles, 4—7; lower lip 3-lobed, upper lip ovate; spur subulate; the lower lamella of the stigma incised.—Yellow. 2f. April—May. Wet soils. Common.

ORDER XCV.—PRIMULA'CEÆ. (*Primrose Family.*)

Calyx divided, 4—5-cleft, inferior, regular, persistent. *Corolla* hypogynous, regular; limb 4 or 5 cleft. *Stamens* inserted upon the corolla, opposite to its segments. *Ovary* 1-celled. *Style* 1. *Stigma* capitate. *Capsule* with central placentæ. *Seeds* numerous, peltate; embryo straight, cylindrical. Herbaceous plants, with opposite or whorled leaves.

GENUS I.—LYSIMA'CHIA. L. 5—1.

(From the Greek *lusis*, dissolution, and *mache*, strife.)

Calyx 5-parted. *Corolla* rotate, 5 cleft. *Stamens* 5. *Stigma* 1. *Capsule* 10-valved, globose.

1. L. HERBEMON'TI, (Ell.) *Stem* erect, glabrous, columnar. *Leaves* usually by fours, ovate-lanceolate, entire, glabrous, dotted, sessile, 3—5 nerved, lateral ones obscure. *Flowers* in terminal racemes; the lower flowers opposite, or verticillate, the upper ones alternate; segments of the calyx linear-lanceolate; those of the corolla oblong-lanceolate, dotted; filaments 5, cohering at the base.—Yellow. 4. June—July. A few miles east of Columbia, S. C.

2. L. QUADRIFO'LIA, (L.) *Stem* erect, hairy. *Leaves* verticillate by fours, ovate, acute, nearly sessile. *Flowers* on axillary peduncles; peduncles 1-flowered, about half the length of the leaves; segments of the calyx lanceolate, pubescent, dotted. *Stamens* shorter than the corolla, cohering at the base.—Yellow. 4. May—July. Middle Car. and Geo. 1—2 feet. *Loose-strife.*

3. L. LANCEOLA'TA, (Pursh.) *Stem* erect, simple, smooth. *Leaves* verticillate by fours, on short petioles, lanceolate. *Flowers* on verticillate peduncles, the upper ones in racemes; peduncles many-flowered; segments of the corolla ovate, acute.—Yellow. 4. June—July. Middle Carolina.

4. L. CILIA'TA, (Ell.) *Stem* erect, branching, quadrangular, furrowed, glabrous, dotted. *Leaves* generally by fours, verticillate, on rather short ciliate petioles, cordate-ovate, upper ones lanceolate. *Flowers* axillary, on 1-flowered peduncles, nodding; segments of the calyx acuminate, lanceolate; tube of the corolla composed of a purple ring, sprinkled with yellow glands; segments toothed, slightly ciliate at the base *Anthers* 2-lobed.—Yellow. 4. June—July. In rich soils.

5. L. QUADRIFLO'RA, (Sims.) *Stem* glabrous, branching, furrowed. *Leaves* opposite, sessile, long-linear, lanceolate, narrowed at the base, almost to a petiole. *Flowers* on peduncles, by fours, terminal; segments of the calyx long, lanceolate, acuminate; those of the corolla slightly crenate.—Yellow. 4. June—July. South. Geo. 2—3 feet.

6. L. HETEROPHYL'LA, (Mich.) *Stem* erect, branching, glabrous, angular. *Leaves* opposite, the lower ones nearly orbicular, becoming narrower toward the summit; the upper ones being linear, glabrous, ciliate at the base. *Flowers* axillary, nodding, on 1-flowered peduncles; segments of the calyx lanceolate, of the corolla crenate.—Yellow. 4. June—Aug. Middle country of Car. and Geo.

GENUS II.—CENTUN'CULUS. L. 4—1

(The Roman name of the plant.)

Calyx 4-cleft, persistent, with lanceolate segments. *Corolla* 4-cleft, persistent, with acute segments. *Stamens* 4, inserted into the corolla. *Capsule* globose, 1-celled.

1. C. LANCEOLA'TUS, (Mich.) *Stem* prostrate, creeping, with assurgent extremities, branched, glabrous. *Leaves* alternate, lanceolate, somewhat cuneate, slightly decurrent. *Flowers* solitary, axillary, sessile. *Calyx* persistent. *Corolla* a little longer than the calyx, attached to the capsule. *Anthers* 2-lobed.—Red. ☺. March. In pastures. 2—3 inches. *Pimpernell.*

GENUS III.—HOTTO'NIA. L. 5—1.

(In honor of P. Hotton, a Dutch professor.)

Calyx 5-parted. *Corolla* salver-form, shorter than the calyx. *Stamens* 5, inserted on the tube of the corolla. *Capsule* globose.

1. H. INFLA'TA, (Ell.) *Stem* thick, spongy, generally submersed. *Leaves* long, crowded, pectinate, submersed, with the segments linear; several scapes, rising from the summit of the stem, with inflated internodes. *Flowers* verticillate, pedunculate.—White. 2f. June—July. Middle Georgia.

GENUS IV.—ANAGAL'LIS. Tourn. 5—1.

(From *anagelao*, to laugh, from its supposed power of removing despondency.)

Calyx 5-parted, persistent, with acute, linear-lanceolate segments. *Corolla* 5-parted, with oblong segments, rotate. *Stamens* 5. *Filament* 1. *Capsule* 1-celled.

1. A. ARVEN'SIS, (Pursh.) *Stem* procumbent. *Leaves* opposite, entire, sessile, ovate-lanceolate. *Flowers* axillary, solitary, on peduncles longer than the leaves. *Calyx* persistent, with acute segments. *Corolla* with segments longer than the calyx, crenulate. *Stamens* shorter than the corolla. *Style* filiform. *Stigma* simple.—Red. ☺. June—July. Low country. 6—12 inches. *Red Chickweed.*

GENUS V.—SAM'OLUS. L. 5—1.

(From *san*, salutary, and *mos*, a pig, Celtic for pig's food.)

Calyx 5-cleft, persistent. *Corolla* 5-lobed, salver-form. *Stamens* 5, with 5 sterile filaments alternating with them. *Capsule* 1-celled, semi-inferior, many-seeded.

1. S. VALERAN'DI. *Stem* generally simple, erect. *Leaves* obovate, entire, obtuse, tapering into a petiole. *Flowers* in terminal loose racemes, small.—White. 2f. June—Sept. In wet boggy places. 6—10 inches. *Black-weed.*

ORDER XCVI.—PLUMBAGINA'CEÆ. (*Sea-pink Family.*)

Calyx tubular, plaited, entire, persistent. *Petals* 5, regular. *Stamens* 5, inserted on the petals. *Ovary* superior. *Ovule* inverted, pendulous, suspended from the point of a strap-like umbilical cord, which arises from the base of the ovary. *Stigmas* 5. *Fruit* indehiscent, 1-celled. *Seed* inverted. *Embryo* straight. Herbaceous plants, with sheathing leaves, exstipulate. *Flowers* in panicles.

GENUS I.—STA'TICE. L. 5—5.

(From *statio*, to arrest; from its stopping diarrhœa.)

Genus the same as the Order. [The only genus belonging to this order, found in our geographical limits.]

1. P. LIMO'NIUM, (L.) *Root* thick, ligneous, scaly toward the summit. Radical leaves obovate, obtuse, narrowed at the base, on long petioles; those of the scape barely scales, embracing the stem and branches. *Flowers* in panicles, consisting of secund spikes. *Involucre* 3-leaved, 2-flowered, the upper one colored. *Calyx* 10-toothed, pubescent at the base. *Petals* obovate. *Anthers* purple. *Capsule* 5-angled, 1-celled, 1-seeded, seed angled.—Blue. ♃. July—Oct. Along the sea-coast.

Marsh Rosemary

The root of this plant possesses decided medicinal properties. It is very astringent, and may be used as a substitute for the most astringent medicines. In ulcerated sore mouth it forms a most valuable gargle, in the form of infusion or decoction.

ORDER XCVII.—PLANTAGINA'CEÆ. (*Ribwort or Plantain Family.*)

Calyx 4-parted, persistent. *Corolla* 4-cleft, persistent. *Stamens* 4, inserted into the corolla alternate with the segments; filaments long; anthers versatile, 2-celled. *Ovary* usually 2-celled. *Style* simple; stigma hispid. *Capsule* membranaceous, with a transverse dehiscence. Herbaceous plants, with flowers on scapes.

GENUS I.—PLANTA'GO. L. 4—1.

(From *planta*, the sole of the foot, from the resemblance of the leaves.)

Genus same as the Order.

1. P. MA'JOR, (L.) *Leaves* broad-ovate, glabrous, on rather long petioles, remotely toothed, 5-nerved; petiole pubescent; scape pubescent. *Flowers* in bracteate spikes; segments of the calyx lanceolate, glabrous. *Capsule* 2-celled, the upper half falling off when the seeds are mature.—White. ♃. June—Aug. Common. 8—12 inches.

Plantain.

2. P. VIRGIN'ICA, (L.) *Leaves* spatulate, lanceolate, pubescent, sparingly dentate, 5-nerved, the two marginal ones obscure; scape tomentose, angular, columnar. *Flowers* remote when mature.—Yellowish. ♂. June—July. Common. 3—6 inches.

3. P. LANCEOLA'TA, (L.) *Leaves* long, tapering, lanceolate, 5-nerved, slightly pubescent, sparingly dentate; scape hairy. *Flowers* in a compact spike; bracts ovate.—White. ♃. Through the summer. Introduced. 1—2 feet.

4. P. INTERRUP'TA, (La Marck.) *Leaves* long, narrow, lanceolate, 3—5-nerved; scape pubescent near the base, spike long, slender. *Flowers* scattered, glabrous, occasionally in clusters.

5. P. PUSIL'LA, (Nutt.) *Scape* erect, minutely pubescent. *Leaves* linear, entire, or with one tooth on each side near the summit. *Spike* cylindrical, loosely flowered. *Stamens* 2—4.—White. ☉. April. Abundant about Macon.

MONOCHLAMYD'EÆ.

Flowers with a simple perianth.

ORDER XCVIII.—NYCTAGINA'CEÆ. (*Marvel of Peru Family.*)

Perianth tubular, somewhat colored, æstivation plaited, becoming indurated at the base. *Stamens* definite, hypogynous. *Ovary* superior; ovule 1, erect. *Style* 1. *Fruit* inclosed in the tube of the calyx. *Seed* with its testa coherent with the utricle. *Cotyledons* foliaceous. *Leaves* opposite, usually unequal.

GENUS I.—BOERHAA'VIA. L. 3—1.

(Named after Boerhaave, a celebrated Dutch physician, and friend and patron of Linnæus.)

Perianth campanulate, plaited. *Stamens* 2, or more, attached to the base of the perianth. *Style* 1. *Stigma* capitate. *Seed* 1.

1. B. EREC'TA, (L.) *Stem* erect, trichotomous, glabrous at the summit, jointed. *Leaves* opposite, ovate, undulate, veins purple on the under surface. *Flowers* in corymbose panicles. *Perianth* seated on a minute glandular ring, white, tinged with purple. *Stamens* 2—3, longer than the perianth.—☺. June—Sept. Sandy soils.

GENUS II.—ALLIO'NIA. L. 4—1.

(In honor of Allioni, an Italian botanist.)

Involucre oblong, simple, 3-flowered. *Perianth* longer than the involucre, irregular. *Stamens* 4. *Style* 1.

1. A. AL'BIDA, (Sweet.) *Stem* erect, quadrangular, furrowed, sprinkled with a glandular pubescence. *Leaves* opposite, oblong-lanceolate, irregular, often slightly panduriform, scabrous along the margins. *Involucre* 5 cleft, hairy. *Seed* naked, angled, almost hispid.—☺. April —May. Middle Car. and Geo.

GENUS III.—OXYBAPH'US. Vahl. 3—1.

(From *oxus*, acid, and *baphe*, dyers' color.)

Involucre 5-cleft, 1—3-flowered. *Perigonium* tubular, limb plicate, campanulate. *Stamens* 3, united. *Fruit* ovate, ribbed.

1. O ANGUSTIFO'LIUS, (Sweet.) *Stem* herbaceous, erect, glabrous. *Leaves* linear-lanceolate, sessile, obtuse at the base, acute at the apex. *Flowers* in lax panicles.—White. ♃.

Order XCIX.—AMARANTHA'CEÆ. (*Amaranth Family.*)

Perianth 2—5-leaved, hypogynous, persistent. *Stamens* 3—5. *Styles* 2—3. *Ovary* superior, 1-celled, 1-seeded. *Seeds* pendulous. *Embryo* curved. Herbaceous plants, with simple leaves. *Flowers* monœcious.

Genus I.—IRE'SINE. Willd. 20—5.

(From *eiros*, wool, referring to the woolly branches.)

Flowers diœcious. Sterile florets; perianth double, exterior one 2—3-leaved, the interior 5-leaved, petaloid. *Stamens* 5, with glands between the filaments. Fertile florets; the inner perianth surrounded by long hair. *Stigmas* 2. *Capsule* ovate, 1-celled, 1-seeded.

1. I. celosioi'des, (Willd.) *Stem* erect, glabrous, with opposite branches, fistulous, furrowed. *Leaves* opposite, attenuate at the summit, lanceolate, irregularly serrate, swollen at the joints.—☺. Sept. —Oct. On the sea-coast. 2—4 feet.

Genus II.—ACHYRAN'THES. L. 15—5.

(From *achuron*, chaff, and *anthos*, a flower, from the appearance of the floral leaves.)

Perianth double, exterior one 3-leaved, the interior 5-leaved, unequal. *Stamens* 5, sitting on a nectary. *Style* 1. *Capsule* 1-celled, 1-seeded.

1. A. re'pens, (Dill.) *Stem* procumbent, hairy. *Leaves* opposite, usually unequal, lanceolate, somewhat hairy beneath. *Flowers* in sessile, ovate heads, somewhat 3-angled; the interior calyx hairy near the base; the two interior sepals smaller than the others, hairy at the summit.—♃. March—Oct. Cultivated grounds. Low country.
Telanthera polygonioides, Mich. *Forty-knot.*

Genus III.—AMARAN'THUS. L. 19—5.

(From *a*, privative, and *maraino*, to wither, in allusion to the long time the colors are bright.)

Flowers monœcious. Sterile florets. *Calyx* 3—5-leaved. *Stamens* 3 or 5. Fertile florets 3—5-leaved. *Styles* 3. *Capsule* 1-celled, 1-seeded.

1. A. hypocondria'cus, (L.) *Stem* erect, glabrous, furrowed. *Leaves* large, oblong, lanceolate, entire, red or purple, on long petioles. *Flowers* in compound paniculate racemes. *Perianth* purple, 5-leaved. *Stamens* 5. *Styles* 3.—☺. June—Oct. Cultivated grounds. 4—8 feet.

2. A. hyb'ridus, (L.) *Stem* erect. *Leaves* ovate-lanceolate. *Flowers* in compound racemes, crowded, pentandrous. *Perianth* consisting of subulate leaves.—☺. June—Sept. About cultivated grounds. 2—3 feet.

3. A. SPINO'SUS, (L.) *Stem* erect, glabrous, much branched. *Leaves* lanceolate, mucronate, entire, with 2 spines at the base of the petiole. *Flowers* in compound axillary and terminal racemes. *Stamens* 5. *Styles* 3.—☺. June—Oct. Cultivated grounds. 2—3 feet.

4. A. LIV'IDUS, (L.) *Stem* erect, glabrous, usually purple. *Leaves* alternate, ovate, or elliptic, slightly undulate, veins prominent. *Flowers* clustered, axillary and terminal, with the sterile and fertile intermingled. *Stamens* 3. *Styles* 2 or 3.—☺. June—Sept. Cultivated lands. Common. 2—3 feet. *Euxolus lividus*, Moq.

5. A. PUMI'LUS, (Ell.) *Stem* procumbent, fleshy, glabrous, usually purple. *Leaves* ovate, fleshy, obtuse, emarginate. *Flowers* in sessile, axillary clusters. *Perianth* 5-leaved. *Stamens* 5. *Styles* 3.—☺. Aug. —Oct. On the sea-coast. 1—2 feet.

6. A. SANGUIN'EUS, (L.) *Stem* naked. *Leaves* red, oblong, acute. *Flowers* in terminal, erect racemes. *Branches* expanding, glabrous. *Stamens* 5.—☺. Aug.—Oct. On the sea-coast. 1—2 feet.

GENUS IV.—OPLOTHE'CA. 15—5.

(From *oplose*, armour, and *theca*, a sheath, from the appearance of the capsules.)

Perianth double, the exterior 2-leaved, truncate; the interior 5-cleft, tomentose. *Stamens* 5, monadelphous. *Capsule* 1-seeded, inclosed in the calyx.

1. O. FLORIDA'NA, (Nutt.) *Stem* erect, branching at the summit, pubescent, with swollen joints. *Leaves* opposite, sessile, linear-lanceolate, woolly beneath. *Flowers* in paniculate spikes; the inner perianth tomentose.—♃. June—Sept. Middle and Western Georgia.
Frœlichia Floridana, Moq.

GENUS V.—ACNI'DA. Mitch. 20—5.

(From the Greek *a*, privative, and *knide*, the nettle; like it, but does not sting.)

Flowers dicœcious. Sterile florets, perianth 5-parted. *Stamens* 5. Fertile florets, perianth 3-parted. *Stigmas* 3—5, sessile. *Capsule* 1-seeded.

1. A. RUSOCAR'PA, (Mich.) *Stem* fistulous, erect, thick, angular. *Leaves* alternate, petiolate, entire, ovate-lanceolate, acuminate. *Flowers* in dense panicles, axillary and terminal. *Fruit* angled, tubercled. —Salt marshes. *Water-hemp.*

2. A. CANNABI'NA, (L.) *Stem* erect, glabrous, slightly angled. *Leaves* alternate, ribbed, ovate-lanceolate, usually colored, 2—5 inches long. *Flowers* in large axillary and terminal panicles, the sterile plant smaller than the fertile. *Stigmas* nearly plumose. *Seed* ovate, compressed, glabrous.—☺. Oct.—Nov. Marshes. 4—8 feet. *Water-hemp.*

ORDER C.—CHENOPODIA'CEÆ. (*Goosefoot Family.*)

Perianth deeply divided, persistent, sometimes tubular at the base. *Stamens* 1 or 5, inserted into the base of the perianth, opposite its segments. *Ovary* single, superior, sometimes ad-

hering to the calyx. *Ovule* 1. *Styles* divided, rarely simple. *Fruit* membranaceous, sometimes baccate. *Seed* erect. *Embryo* curved. Herbaceous plants. *Flowers* small, sometimes polygamous.

Genus I.—SALICOR'NIA. L. 1—1.

(From *sal*, salt, and *cornu*, horn.)

Perianth ventricose, fleshy, closed. *Stamens* 1—2. *Style* 1, bifid. *Fruit* inclosed in the perianth. *Seed* 1.

1. S. HERBA'CEA, (L.) *Stem* erect, much branched, jointed, succulent; joints notched, compressed. *Flowers* by threes, in cylindrical spikes, slightly tapering at the extremity. *Perianth* thick, truncate, split on one side.—⊙. Aug.—Sept. Salt marshes. 10—12 inches.
Samphire.

2. S. AMBIG'UA, (Mich.) *Stem* procumbent, branching, assurgent; joints crescent-shaped, small. *Flowers* in opposite and alternate spikes. *Calyx* truncate.—♃. July—Sept. Salt marshes. Very common.
Anthrocnemum ambiguum, Moq.

The Beet, *Beta vulgaris*, with all its varieties, belongs to this order; also the Spinach, *Spinacia oleracea.*

Genus II.—AT'RIPLEX. L. 5—2.

(From *ater*, black.)

Flowers polygamous, or monœcious. Perfect flowers, perianth 5-parted. *Stamens* 5. *Style* 2-parted. *Fruit* depressed, 1-seeded, inclosed by the calyx. Pistillate florets, perianth 2 parted. *Stamens* none. *Style* 2-parted.

1. A. PAT'ULA, (L.) *Stem* prostrate, spreading, somewhat angled, glabrous. *Leaves* triangular, hastate, acuminate, entire, or slightly toothed, glabrous. *Flowers* clustered, in axillary and terminal spikes. *Calyx* persistent, submuricate on the sides.—⊙. June—Sept. In low country. 1—2 feet.

2. A. ANGUSTIFO'LIA, (L.) *Stem* divaricate, angled, glabrous. Lower leaves hastate, slightly toothed, the upper ones lanceolate, entire, attenuate at the base. *Flowers* in axillary and terminal compact clusters. *Calyx* hastate.—⊙. June—July. On the sea-coast.

3. A. LACINIA'TA, (L.) *Stem* diffuse, terete, pubescent toward the summit. *Leaves* triangular, deeply toothed, pubescent beneath; lower ones opposite. *Flowers* in axillary clusters. *Stamens* 4. *Calyx* rhomboidal, acute, entire.—⊙. June—Aug. Salt marshes.

4. A. ARENA'RIA, (Nutt.) *Stem* geniculate, glabrous, much branched. *Leaves* oblong-ovate, mucronate, alternate, covered with white scales beneath, entire. *Perianth* muricate, dentate. *Flowers* monœcious, sterile ones at the extremity of the branches, fertile ones in axillary clusters.—⊙. July—Nov. On the sea-coast. 10—12 inches.
Obione arenaria.

GENUS III.—CHENOPO'DIUM. L. 5—2. (*Pig-weed.*)

(From the Greek *chen*, a goose, and *pous*, a foot.)

Flowers perfect. *Perianth* 5-cleft, 5-angled, inclosing the fruit. *Stamens* 5. *Styles* 2.

1. C. MURA'LE, (L.) *Stem* decumbent, branching. *Leaves* ovate, lanceolate, toothed, on long petioles. *Flowers* in leafy, corymbose racemes.—☺. Aug.—Sept. Cultivated lands. 12—18 inches.

2. C. AL'BUM, (L.) *Stem* branching. *Leaves* ovate, rhomboid, erose, entire at the base, the upper ones entire, when old becoming covered with a mealy substance. *Flowers* in branched racemes, somewhat leafy. *Seed* smooth.—☺. July—Aug. Waste grounds. 3—6 feet.

3. C. BOT'RYS, (L.) *Stem* much branched, somewhat viscid. *Leaves* oblong, sinuately pinnatifid, with the segments toothed. *Flowers* in short, axillary racemes at the extremity of the branches.—☺. July—Aug. Common. 1—3 feet.

Jerusalem Oak. *Ambrina Botrys*, Moq.

4. C. AMBROSIOI'DES, (L.) *Stem* much branched, somewhat pubescent. *Leaves* lanceolate, remotely toothed, on short petioles. *Flowers* in erect spikes, leafy.—☺. Aug.—Sept. Road-sides. 1—2 feet.

Ambrina ambrosioides, Spath.

5. C. ANTHELMIN'TICUM, (L.) *Stem* erect, branching, furrowed. *Leaves* oblong-lanceolate, sinuately toothed, rugose, dotted on the under surface. *Flowers* in axillary, terminal, and leafless spikes.—♃ June—August. Fields. 4—6 feet.

Worm-seed. *Ambrina anthelmintica*, Spach.

GENUS IV.—SALSO'LA. L. 5—2.

(From *salsus*, salt.)

Perianth 5-leaved. *Stamens* 5. *Styles* 2, or none. *Stigmas* acute. *Capsule* 1-seeded. *Embryo* spiral.

1. S. CAROLINIA'NA, (Mich.) *Stem* erect, striate, glabrous, branching. *Leaves* subulate, fleshy, rigid. *Flowers* usually solitary, sessile, with 2 bracts at the base. *Calyx* persistent, red.—☺. June—Sept. In drifting lands. *S. kali.*

2. S. LINEA'RIS, (Ell.) *Stem* erect, furrowed, glabrous, branching. *Leaves* linear, alternate. *Flowers* sessile, axillary, crowded. *Calyx* fleshy. *Style* none. *Stigmas* 2. *Fruit* clothed by the calyx, spiral.—☺. Sept.—Oct. On the sea-coast. *Chenopodina linearis.*

ORDER CI.—PHYTOLACCA'CEÆ. (*Poke-root Family.*)

Perianth 5-parted, petaloid. *Stamens* 5—10, alternate with the segments of the perianth. *Ovary* 5—10-celled, with one ovule in each cell. *Styles* 5—10. *Fruit* indehiscent. *Seed* ascending, solitary. Herbaceous plants, with alternate leaves.

GENUS I.—PHYTOLAC'CA. L. 10—5.

(From *phuton*, a plant, and *lacca*, lac, from the color of the fruit.)

Genus the same as the Order.

1. P. DECAN'DRA, (L.) *Stem* succulent, tinged with purple. *Leaves* ovate, alternate, entire. *Flowers* in simple racemes, opposite the leaves. *Fruit* superior, 10-celled, 10-seeded, dark purple.—2f. May—Sept. Cultivated grounds. Very common. 4—10 feet. *Pokeberry.*

ORDER CII.—POLYGONA'CEÆ. (*Buckwheat Family.*)

Perianth divided, inferior, æstivation imbricate. *Stamens* definite, 5—9, inserted into the bottom of the perianth. *Ovary* superior, with a single erect ovule. *Styles* or stigmas several. *Fruit* usually a triangular nut. *Seed* with farinaceous albumen. *Embryo* inverted. Herbaceous plants, with alternate leaves sheathing at the base.

GENUS I.—ERIOGO'NUM. L. 9—12.

(From the Greek *erion*, wool, and *gonu*, joint, from the joints being woolly.)

Involucre campanulate, many-flowered. *Perianth* 6-cleft. *Stamens* 9. *Style* 1. *Stigmas* 3. *Seed* 1—3-angled.

1. E. TOMENTO'SUM, (Mich.) *Stem* erect, branching, somewhat dichotomous. *Leaves* oval-lanceolate, 3 at each division of the stem, sessile, white, tomentose beneath; lower leaves attenuate at the base. *Flowers* in axillary sessile clusters.—2f. June—Sept. Sand-hills. 1—2 ft.

GENUS II.—POLYG'ONUM. L. 8—3.

(From the Greek *polus*, many, and *gonu*, joint.)

Perianth 5-parted, petaloid, persistent. *Stamens* 4—9. *Styles* usually 3. *Fruit* 1-seeded, mostly triangular.

a. Flowers axillary. Stamens 8. *Stigmas* 3.

1. P. MARIT'IMUM, (L.) *Stem* glabrous, branching. *Leaves* lanceolate, attenuate at the base, with revolute margins. *Stipules* large, frequently lacerate. *Flowers* axillary. *Perianth* white, tinged with red.—2f. May—Sept. On the sea-coast. 1—2 feet.

2. P. AVICULA'RE, (L.) *Stem* procumbent, striate, glabrous, much branched. *Leaves* alternate, elliptic-lanceolate, varying in size and shape, margins scabrous. *Stipules* membranaceous. *Flowers* axillary, few. *Perianth* persistent, greenish-white.—2f. June—Oct. Common. *Knot-grass.*

3. P. TENU'E, (Mich.) *Stem* slender, erect, branching, acutely angled. *Leaves* linear, acuminate, straight. *Stipules* lacerate, villous at the

summit. *Flowers* usually solitary, alternate, small, on short pedicels. *Perianth* white. *Nut* triangular, shining, black.—⊙. July—Sept. On rocks. 6—10 inches.

b. Flowers in axillary or terminal spikes. Stamens 5—8. *Stigmas mostly* 2.

4. P. PUNCTA'TUM, (Ell.) *Stem* slender, branched, sometimes decumbent at the base. *Leaves* with pellucid punctures, lanceolate, acute, with a sheathing petiole, scabrous on the margin and midrib. *Stipules* ciliate, pubescent. *Flowers* in filiform spikes. *Stamens* 8. *Styles* 3-parted. Plant very acrid.—⊙. Aug.—Sept. Wet ground. 1—2 ft. *Water Pepper. Smart-weed.*

5. P. MI'TE, (Pers.) *Stem* decumbent and erect, hairy at the summit, branching. *Leaves* narrow-lanceolate, acuminate, entire, with long ciliæ. *Flowers* in crowded spikes. *Stamens* 8. *Styles* 3-parted. *Perianth* purple.—⊙. July—Sept. Ditches and ponds. 1—2 feet.

6. P. VIRGINIA'NUM, (L.) *Stem* simple, hairy toward the summit. *Leaves* broad-lanceolate, acuminate, scabrous, with fringed serratures. *Stipules* ciliate. *Spikes* axillary and terminal. *Stamens* 5. *Styles* 2. *Perianth* white.—♃. July—Aug. Shady woods. 2—4 feet.

7. P. SETA'CEUM, (Bald.) *Stem* erect, glabrous. *Leaves* broad-lance olate, acuminate. *Stipules* long, fringed. *Flowers* in hirsute spikes, on long peduncles. *Stamens* 8. *Style* 3-cleft. *Perianth* white.—♃. June —Aug. Stiff soils. 1—2 feet.

8. P. HIRSU'TUM, (Walt.) *Stem* erect, decumbent, branching, hairy *Leaves* oblong, often slightly cordate at the base, hairy, entire. *Flowers* in slender spikes. *Stamens* 8. *Style* 3-cleft. *Perianth* white.—♃. May—Aug. Shallow ponds. 1—2 feet.

9. P. INCARNA'TUM, (Ell.) *Stem* geniculate, slightly angled, scabrous toward the summit. *Leaves* lanceolate, serrulate, pubescent on the upper surface, large. *Flowers* in several simple spikes. *Stamens* 6. *Style* 2-cleft. *Perianth* white, or rose-colored.—♃. July—Oct. Ditches and ponds. 2—3 feet.

10. P. PENNSYLVA'NICUM, (L.) *Stem* geniculate, with swollen joints, glabrous, angled. *Leaves* lanceolate, slightly hairy, petioled. *Flowers* in crowded oblong spikes, large. *Stamens* 8. *Style* 2-cleft. *Peduncles* hispid. *Perianth* reddish.—⊙. July—Sept. Margins of ponds. 2—4 feet.

11. P. ORIEN'TALE, (L.) *Stem* erect. *Leaves* large, ovate, acuminate, minutely pubescent, petioled. *Stipules* hairy. *Flowers* in crowded spikes, large. *Stamens* 6. *Styles* 2. *Perianth* rose-color, or white.—⊙. July—Aug. Cultivated grounds. 4—5 feet. *Prince's Feather.*

c. Spikes in panicles.

12. P. POLYGA'MUM, (Vent.) *Stem* erect, branching, glabrous. *Leaves* small, sessile, with glabrous stipules. *Spikes* paniculate, jointed. *Flowers* solitary at each joint. *Stamens* 8. *Styles* 3. *Perianth* white.—♃. July—Sept. Pine-barrens. Middle Car. and Geo. 6—8 inches

d. Flowers in racemose panicles. Leaves subcordate or sagittate.

13. P. SAGITTA'TUM, (Mich.) *Stem* slender, climbing, angled, retrorsely serrate. *Leaves* nearly sessile, glabrous, sagittate. *Flowers* axillary and terminal, in small compact heads, on long peduncles. *Stamens* 8. *Styles* 3-cleft. *Perianth* white.—⊙. July—Aug. Wet grounds.

14. P. ARIFO'LIUM, (Mich.) *Stem* retrorsely aculeate, prostrate, flexuous, sometimes climbing, square, pubescent. *Leaves* hastate, on long petioles, pubescent. *Spikes* few-flowered, terminal and axillary. *Stamens* 6. *Styles* bifid.—⊙. Aug.—Sept. Wet grounds.

15. P. CONVOL'VULUS, (Mich.) *Stem* long, climbing, angular, somewhat rough. *Leaves* petioled, hastate-cordate, with spreading lobes. *Flowers* in axillary racemes. *Stamens* 8. *Style* 3-cleft. *Perianth* whitish or reddish.—⊙. July—Aug. In fields.

16. P. SCAN'DENS, (Mich.) *Stem* climbing, glabrous, bright purple, angled. *Leaves* broad-cordate, with the margins and veins slightly scabrous. *Flowers* in axillary racemes, large. *Stamens* 8. *Styles* 3. *Perianth* winged, white, or reddish.—⊙. July—Aug. Shady woods.
P. dumetosum.

17. P. FAGOPY'RUM, (L.) (From *fagus*, beech, and *puros*, wheat, from the resemblance of the nut to the beech-nut. The English name is from the German *buche*, beech, compounded with wheat, making *Buckwheat*, or Beechwheat.) An annual plant, with triangular-cordate leaves. *Flowers* in paniculate racemes, or corymbose, white or greenish.
Fagopyrum esculentum, Mœnch.

GENUS III.—RU'MEX. L. 6—3.

(From *rumo*, to suck; the Romans sucked the leaves to allay thirst.)

Perianth 6-leaved, in 2 rows. *Stamens* 6. *Styles* 3. *Nut* triquetrous, inclosed by the three interior valves of the perianth. *Stigmas* many-cleft.

1. R. SANGUIN'EUS, (L.) *Stem* erect. Radical leaves large, entire, cordate-lanceolate, variegated with red veins. *Flowers* in small, distant whorls. *Perianth* persistent, marked on the back with red grains.—♃. June—July. In fields. 3 feet. *Bloody Dock.*

2. R. PUL'CHER, (L.) Radical leaves oblong, with a sinus on each side; cauline leaves entire. *Perianth* toothed.—♃. June—July. Introduced.

3. R. VERTICILLA'TUS, (L.) *Leaves* long, lanceolate, narrow, acute, with cylindrical sheaths. *Flowers* whorled, in simple racemes. Leaves of the perianth entire, each bearing a vein on the back. *Pedicels* thick, half an inch long.—♃. June—July. Wet grounds. 1—2 feet.
Swamp Dock.

4. R. BRITAN'NICUS, (L.) *Stem* branching, tinged with red, furrowed. *Leaves* broad-lanceolate, flat, alternate. *Flowers* in leafless whorls, forming a compound terminal panicle, polygamous.—♃. April—May. Swamps. 2—3 feet.

5. R. CRIS'PUS, (L.) *Stem* erect, angled. Radical leaves lanceolate,

long, acute, undulate, attenuate at the base. *Flowers* in crowded whorls, pedicellate. Leaves of the perianth large, cordate, entire, bearing grains. —4. May—June. Introduced. 1—2 feet. *Curled Dock.*

6. R. PERSICARIOI'DES, (Pursh.) *Stem* erect, much branched, smooth, often colored. *Leaves* on short petioles, lanceolate, undulate, entire. *Flowers* in whorls. Leaves of the perianth with 3 long teeth on each side, each leaf bearing a grain.—4. July. Wet shady places. 6—12 inches. *Golden Dock. R. maritimus.*

7. R. DIVARICA'TUS, (L.) *Stem* erect. *Leaves* cordate, oblong, pubescent, undulate. *Flowers* in whorls, forming a long, slender spike. Leaves of the perianth 4 or 5 toothed at the base.—4. June—Aug. Marshes. 1—2 feet.

8. R. ACETOSEL'LA, (L.) *Flowers* dicœcious. *Stem* erect, furrowed. *Leaves* lanceolate, entire, hastate, on rather long petioles, not auricled. *Flowers* in fasciculate racemes.—4. April—June. Dry sandy soils. Very common. 1—2 feet. *Sorrel.*

9. R. HASTAT'ULUS, (Bald.) *Flowers* dicœcious. *Stem* erect. *Leaves* petiolate, oblong, hastate, with obtuse entire auricles. *Perianth* persistent, becoming red by age.—4. April. Poor dry soils. 1—3 feet.

ORDER CIII.—LAURA'CEÆ. (*Laurel Family.*)

Flowers perfect, polygamous and dicœcious. *Perianth* 4—6-cleft. *Stamens* perigynous, usually 9, the 3 inner ones sterile. *Anthers* adnate, 2—4-celled, with thick connectivum. *Ovary* superior, single. *Style* simple, obtuse. *Fruit* a one-seeded drupe. Shrubs or small trees, with alternate leaves.

GENUS I.—LAU'RUS. Pliny, 9—1.

(From the Celtic *laur*, green.)

Genus the same as the Order.

1. L. CAROLINEN'SIS, (Mich.) A large shrub, or small tree. *Leaves* oval-lanceolate, coriaceous, perennial, glaucous beneath, entire, rigid. *Flowers* in small clusters, polygamous, pale yellow; exterior segments of the perianth half as long as the interior.—♄. May—June. Swamps. 4—30 feet. *Bay Galls.*

2. L. CATESBEYA'NA, (Mich.) A middle-sized shrub. *Leaves* perennial, broad-lanceolate, glabrous. *Flowers* in panicles, on short peduncles; segments of the perianth oblong, obtuse, deciduous, white. *Nectary* 3-cleft. *Berry* ovate, black.—♄. May—June. On the sea-coast. 6—9 feet.

3. L. BENZO'IN, (L.) A shrub with virgate branches. *Leaves* obovate, lanceolate, deciduous, pubescent beneath, cuneate at the base. *Flowers* dicœcious, in clustered umbels, on short pedicels, pale yellow. *Fruit* red.—Feb.—March. Margins of rivulets. 4—10 feet.
Spice-wood. Fever-bush. Benzoin odoriferum, Nees.

4. L. GENICULA'TA, (Walt.) A small tree, much branched, with the branches regularly bent. *Leaves* small, oval, glabrous, obtuse. *Flow-*

ers deciduous, dicœcious, in umbels, yellow. *Fruit* red.—♄. Feb.—March. Around ponds. 10—15 feet.

5. L. MELISSÆFO'LIA, (Walt.) A small shrub. *Leaves* cordate, lanceolate, pubescent beneath, deciduous. *Flowers* in clustered umbels, dicœcious, yellow. *Fruit* red.—♄. Feb.—March. Around ponds. 2—3 feet.

6. L. SASSAFRAS, (L.) A small tree. *Leaves* entire and lobed, lanceolate, ovate, varying in form, glabrous or pubescent, deciduous. *Flowers* dicœcious, in umbels. Stamens of the sterile flowers 9; stamens of the fertile flowers 6, imperfect. *Fruit* blue.—♄. March. Light soils. 10—25 feet. *Sassafras officinale*, Nees.

ORDER CIV.—THYMELEA'CEÆ. (*Daphne Family.*)

Perianth inferior, tubular, colored, campanulate, with the limb obsolete. *Stamens* 8, perigynous, inserted into the perianth, unequal. *Style* 1. *Stigma* simple. *Fruit* a drupe, 1-seeded. *Leaves* alternate, entire. Shrubs with a tough bark.

GENUS I.—DIR'CA. L. 8—1. (*Moose-wood.*)

(From *dirka*, a fountain, from its being found in wet places.)

Genus the same as the Order.

1. D. PALUS'TRIS, (L.) A small shrub, with numerous tough branches. *Leaves* alternate, oblong-oval, entire, obtuse, pale green. *Flowers* yellow; the bark has a sweetish taste, and is very tough.—♄. April. Damp moist places. 2—4 feet. *Leather-wood*

ORDER CV.—SANTALA'CEÆ. (*Sandal-wood Family.*)

Perianth superior, 4 or 5 cleft, partly colored; æstivation valvate. *Stamens* 4 or 5, opposite the segments of the perianth and inserted into their bases. *Ovary* 1-celled, with 1—4 ovules. *Style* 1. *Stigma* often lobed. *Fruit* a nut or drupe, 1-seeded. Trees or shrubs, with alternate or opposite undivided leaves.

GENUS I.—NYS'SA. L. 20—5. (*Tupelo. Pepperidge.*)

(The name of a water-nymph, from some of the species growing in water.)

Dicœcious. Sterile florets: perianth 5-parted, stamens 5—10; fertile florets, calyx 5-parted. *Stamens* 2—5. *Style* 1. *Drupe* inferior, 1-seeded.

1. N. MULTIFLO'RA, (Wang.) A middle-sized tree. *Leaves* oval-lanceolate, entire, acute at each end, with petiole and under surface pubescent. *Flowers* in small umbellate clusters. Sterile florets numerous; fertile florets 5—8 in an umbel. *Drupe* nearly spherical, bluish-black. —♄. April. Damp soils. 40—50 feet. *Sour-gum. Black-gum*

2. N. AQUAT'ICA, (L.) A small, or large tree. *Leaves* oblong-lanceolate, entire, glabrous, acute at each end, slightly pubescent beneath. Sterile florets numerous, small; fertile florets 2. *Fruit* oval, compressed, blue. *Tupelo*

3. N. CAPITA'TA, (Walt.) A small tree. *Leaves* on short petioles, oblong-lanceolate and oval, pubescent and hoary beneath. Sterile florets numerous in compact heads; fertile florets solitary, on short peduncles. *Perianth* tomentose. *Fruit* ovate, of a dull red-color, sour.—♄. April—May. Wet soils. 15—20 feet.

4. N. TOMENTO'SA, (Mich.) A tree. *Leaves* on long petioles, oblong-acuminate, tomentose beneath, coarsely and acutely toothed. Fertile florets solitary, pedunculate; segments of the perianth cuneate.—♄. April—May. Southern Geo.

5. N. UNIFLO'RA, (Walt.) A large tree. *Leaves* on long petioles, large, ovate, oblong, acuminate, irregularly and acutely toothed, pubescent beneath; the old leaves cordate. Fertile flowers solitary, axillary. *Fruit* oval or ovate, dark-blue, large.—♄. April—May. Deep swamps. 60—80 feet.

GENUS II.—HAMILTO'NIA. ROX. 20—5.

(In honor of Mr. Hamilton, a botanist of Philadelphia.)

Polygamous. Perfect flowers. *Perianth* turbinate, campanulate, 5-cleft. *Germ* immersed in a 5-toothed, glandular disk. *Stamens* 5. *Style* 1. *Stigmas* 2—3. *Drupe* inferior, 1-seeded, inclosed in the base of the perianth.

1. H. OLEIF'ERA, (Muhl.) A shrub. *Leaves* oblong, obovate, entire, acuminate, pubescent beneath, petiolate. *Flowers* in a terminal raceme, small, greenish-yellow. *Nut* globular, depressed, 1-celled; the whole plant more or less oily.—♄. May—June. Mountains. 4—6 feet.
Oil-nut. Pyrularia oleifera, Mich.

GENUS III.—THE'SIUM. L. 5—1.

(From *thes*, a servant, from the mean appearance of the plant.)

Flowers perfect. *Perianth* 4 or 5 cleft. *Stamens* 4 or 5, opposite the lobes of the perianth, villous externally. *Nut* 1-seeded, crowned by the persistent perianth.

1. T. UMBELLA'TUM, (L.) *Stem* erect, glabrous, branching near the summit. *Leaves* oblong, lanceolate, entire, alternate, mucronate. *Flowers* in terminal panicles, sub-corymbed. *Involucre* 4-leaved, small. *Perianth* 5-cleft, with the upper half colored.—♃. July—Aug. Rocky hills. 8—12 inches. *Comandra umbellata*, Nutt.

GENUS IV.—DAR'BYA. A. Gray, 20—5.

(From J. Darby.)

Flowers dicœcious. *Perianth* simple, turbinate, 4—5-cleft. *Disk* thick, attached to the tube of the perianth, margin with 4—5 curvatures. *Stamens* 4—5, opposite the lobes of the perianth; filaments short, subulate; anthers 2-celled. *Fruit* not known.

1 D. UMBELLA'TA. A shrub, smooth. *Leaves* opposite, membranaceous, oval, margin entire, undulate, on short petioles, lighter on the

under surface. *Peduncles* axillary, solitary, shorter than the leaf, bearing 3—8 flowers. *Flowers* small.—Whitish-yellow. ♄. Moist places. Middle Car. and Geo. 2—5 feet.

ORDER CVI.—ARISTOLOCHIA'CEÆ. (*Birthwort Family.*)

Flowers perfect. *Perianth* superior, tubular, 3-cleft, regular, or sometimes very unequal; æstivation valvate. *Stamens* 6—12, epigynous. *Ovary* inferior, 3—6-celled. *Ovules* numerous. *Styles* simple. *Stigmas* radiating, equal in number to the cells of the ovary. *Fruit* capsular, 6-celled, many-seeded. *Leaves* alternate, simple. *Flowers* axillary, solitary, of a brownish dull color. Herbaceous or shrubby plants, the latter usually climbing.

GENUS I.—AS'ARUM. L. 18—12.

(From the Greek *a*, privative, and *saron*, feminine.)

Perianth campanulate, urceolate, 3—4-cleft. *Stamens* 12, placed upon the ovary. *Anthers* attached to the side of the filament. *Style* short. *Stigma* stellate, 6-lobed. *Capsule* 6-celled.

1. A. CANADEN'SE, (L.) *Leaves* by pairs, broad, reniform. *Perianth* woolly, deeply 3-parted, segments sub-lanceolate, reflexed. *Peduncles* short.—♃. April. Rich soils. *Wild Ginger.*

2. A. VIRGIN'ICUM, (L.) *Leaves* solitary, cordate, nearly round, coriaceous, glabrous, spotted. *Perianth* glabrous, externally short, campanulate, with obtuse segments.—♃. April. Rocky woods.

3. A. ARIFO'LIUM, (Mich.) *Leaves* several from each root, hastate, cordate, variegated, on long pubescent petioles. *Perianth* urceolate, dark purple, border 3-cleft, pubescent within. *Filaments* 12, short. *Anthers* linear. *Seed* few in each cell.—♃. March—April. Loose soils. Very common.

GENUS II.—ARISTOLO'CHIA. L. 18—6.

(From *aristos*, best, and *locheia*, parturition.)

Flowers gynandrous. *Perianth* tubular, ligulate at the apex, ventricose at the base. *Anthers* 6, sub-sessile, inserted into the style. *Stigma* 6-cleft. *Capsule* 6-sided, 6-celled, many-seeded.

1. A. SI'PHO, (L'Her.) A vine, climbing over large trees. *Leaves* very large, cordate, acute, alternate, sprinkled with hairs. *Flowers* solitary, pedunculate, with an ovate bract at the base. *Perianth* ascending, somewhat tubular, the border 3-cleft, brown.—♄. June. Mountains. *Dutchman's Pipe.*

2. A. TOMENTO'SA, (Sims.) *Stem* twining, ascending the loftiest trees. *Leaves* nearly round, cordate, tomentose beneath, strongly veined. *Perianth* villous, the border 3-cleft, nearly equal, the orifice oblique, greenish-yellow, with the margin dark purple. *Stigmas* 3.—♄. June. Mountains.

3. A. SERPENTA'RIA, (L.) *Stem* herbaceous, pubescent, erect, geniculate and flexuous, geniculate at the base. *Leaves* cordate, oblong, acuminate, slightly hairy. *Flowers* on radical peduncles, sometimes under the surface of the ground. Limb of the perianth lanceolate, ventricose at the base.—♄. Through the summer. Dry soils. 8—12 inches.
Virginia Snake-root.

4. A. HASTA'TA, (Nutt.) *Stem* flexuous, simple, erect and procumbent. *Leaves* somewhat cordate, hastate, acute, auriculate. *Peduncles* radical; lip of the perianth ovate.—Mountains.

ORDER CVII.—EMPETRA'CEÆ. (*Crowberry Family.*)

Flowers dicœcious. *Perianth* consisting of 2—4 rows of imbricated hypogynous scales. *Stamens* equal in number to the scales, and alternate with them. *Anthers* with 2 distinct cells. *Ovary* superior, seated in a fleshy disk, 6—9-celled. *Style* 1. *Stigma* multifid, radiating. *Fruit* baccate, 2-celled, 2-seeded. An evergreen shrub, with flowers in the axils of the leaves.

GENUS I.—CERATIO'LA. Mich. 20—2.

(From the Greek *keration*, a little horn, from the shape of the stigma.)

Genus the same as the Order.

1. C. ERICOI'DES, (Mich.) An evergreen shrub, with virgate branches, somewhat verticillate when young, tomentose. *Leaves* linear, glabrous, rigid, with the margins revolute, verticillate, 3—4 in a whorl. *Flowers* axillary, sessile. *Scales* of the calyx persistent, tomentose. *Berries* small, 2-seeded.—♄. Aug.—Sept. Dry soils. 4—8 feet.

ORDER CVIII.—EUPHORBIA'CEÆ.

Flowers monœcious, or dicœcious. *Perianth* lobed, inferior, frequently with glandular or scaly appendages. Sterile flowers. *Stamens* 1—12, or numerous. Fertile flowers. *Ovary* 1, superior, sessile or stiped, usually 3-celled. *Ovules* solitary, or twin, suspended. *Styles* usually 3, sometimes united. *Fruit* usually consisting of three dehiscent cells, separating from the axis. *Seed* suspended. Herbaceous or shrubby plants, usually with milky juice.

ANALYSIS.

1. Stamens 4 or less 2
   Stamens more than 4 6
2. Stamens 4 ..... *Pachysandra*, 10
   Stamens less than 4 3
3. Involucre corolla-like ..... *Euphorbia*, 1
   Involucre calyx-like 4
4. Flowers dicœcious ..... *Borya*, 11
   Flowers monœcious 5
5. Flowers separate ..... *Tragia*, 3
   Several in an involucre ..... *Stillingia*, 2

6. Stamens 5 ..... *Crotonopsis*, 7
   Stamens more than 5 7
7. Perianth 3—4-parted ..... *Acalypha*, 4
   Perianth 5 or more parted 8
8. Stamens 6, united ..... *Phyllanthus*, 9
   Stamens more than 6 9
9. Perianth funnel-shaped, petaloid ..... *Jatropha*, 5
   Perianth not petaloid 10
10. Leaves peltate, palmate ..... *Ricinus*, 6
    Leaves undivided ..... *Croton*, 8

Genus I.—EUPHOR'BIA. L. 19—1.

(Named after Euphorbus, an eminent physician.)

Monœcious. *Involucre* campanulate, 8—10-toothed, the inner segments membranaceous and erect. Sterile florets, attached to the inside of the involucre. *Stamen* 1. *Filaments* articulated in the middle. Fertile florets solitary, central, stipulate, naked. *Stigmas* 3, 2-cleft. *Capsule* 3-lobed, 3-celled.

1. E. CYATHOPH'ORA, (Muir.) Somewhat shrubby, glabrous. *Leaves* alternate, oblong, petiolate, slightly toothed, panduriform, the upper ones red at the base. *Flowers* in terminal clusters. *Involucre* colored. *Capsule* smooth, 3-celled.—♄. Through the summer. 2 feet.

2. E. GRAMINIFO'LIA, (Mich.) *Stem* erect, branching from the base, finely pubescent, small. *Leaves* scattered, linear, entire. *Flowers* fasciculate, terminal.—On the sea-coast of Geo. and Flor.

3. E. HYPERICIFO'LIA, (L.) *Stem* erect, branching; spreading branches, divaricate. *Leaves* opposite, oval-oblong, slightly falcate, serrate, 3-nerved, spotted. *Flowers* in terminal corymbs, small.—☉. August—Sept. Fields. 1—2 feet.

4. E. MACULA'TA, (L.) *Stem* erect, spreading, or decumbent, dichotomously branched, slightly pubescent, usually purple. *Leaves* opposite, on short petioles, serrate, oblong, hairy, 3-nerved, oblique at the base. *Flowers* axillary, solitary, crowded near the summit, inner segments of the involucre colored.—☉. June—Oct. Cultivated lands. 2—3 ft.

5. E. DEPRES'SA, (Torr.) *Stem* procumbent, pubescent, slender, branches alternate. *Leaves* oval, opposite, slightly serrate, unequal at the base, hairy beneath. *Flowers* solitary, axillary, clustered toward the summit of the branches. *Stipules* 4 at each joint, plumose; inner segments of the perianth white, 4, small.—☉. Through the summer. Cultivated lands. Very common. 8—12 inches.

6. E. CORDIFO'LIA, (Ell.) *Stem* prostrate, branching, glabrous, with the branches alternate. *Leaves* unequal, and cordate at the base, oval, entire, glabrous, small. *Flowers* solitary, axillary, surrounded at the base with plumose stipules; inner segments of the perianth white.—☉. Through the summer. Cultivated lands. 8—15 inches.

7. E. POLYGONIFO'LIA, (L.) *Stem* procumbent, branching, succulent, glabrous. *Leaves* oblong-ovate, linear-lanceolate, entire, obtuse. *Flowers* solitary in the divisions of the stem. *Stipules* subulate, simple.—♃. July—Sept. Sandy soils. On the sea-shore. 8 inches.

8. E. IPECACUAN'HÆ, (L.) *Stem* procumbent or erect, small, glabrous. *Leaves* sessile, varying in form from obovate lanceolate to linear, op-

posite. *Flowers* solitary, axillary, on peduncles as long as the leaves. *Root* very long.—♃. April—July. Sandy soils.

9. E. PUBENTIS'SIMA, (Mich.) *Stem* erect, very pubescent, somewhat dichotomous. *Leaves* opposite, sessile, elliptic, entire, slightly cordate, obtuse. *Flowers* solitary in the division of the stem, on peduncles about as long as the leaves; interior segments of the involucre white.—♃. April—July. Pine-barrens. 12—18 inches.

10. E. HELIOSCO'PIA, (L.) *Stem* erect, glabrous, branching. *Leaves* alternate, obovate, scattered, sessile, cuneate, finely serrate, the floral ones obovate, or broad-lanceolate. *Umbel* 5-cleft, with the small branches dichotomous. *Fruit* smooth.—☺. May. Damp clay soils. 12—18 inches.

11. E. COROLLA'TA, (L.) *Stem* erect, slightly hairy, usually simple. *Leaves* alternate, oval, petiolate, varying in form. *Flowers* in terminal umbels, conspicuous; the inner segments of the involucre petaloid, ob ovate.—♃. Through the summer. In dry fields. 1—2 feet.

VAR. E. ANGUSTIFO'LIA, (Ell.) *Leaves* 3—4 inches long, linear-lanceolate, sessile, hairy beneath; the upper branches of the umbel dichotomous.—♃. May—Sept. Dry soils. Very common. 1—2 feet.

12. E. PANICULA'TA, (Ell.) *Stem* slightly angled, hairy. *Leaves* large for the genus, entire, with revolute margins, hairy along the midrib beneath. *Flowers* terminal, somewhat paniculate. *Fruit* smooth.—♃. Aug.—Sept. Middle Car. and Geo. 1—2 feet.

GENUS II.—STILLIN'GIA. Gard. 19—15.

(In honor of Dr. Benjamin Stillingfleet.)

Monœcious. *Involucre* hemispherical, many-flowered. *Perianth* tubular, erose. *Stamens* 2—3, exserted. Fertile florets; perianth 1-flowered, fimbriate or toothed. *Style* trifid. *Capsule* 3-celled, 3-seeded.

1. S. SYLVAT'ICA, (L.) *Stem* herbaceous, somewhat angled, glabrous, with a milky sap. *Leaves* sessile, oblong-lanceolate, serrulate, sub-coriaceous, lucid on the upper surface. *Flowers* in a terminal spike, the upper ones sterile, with a few fertile ones at the base.—♃. May—June. Sandy soils. 2—3 feet. *Queen's Delight.*

2. S. SEBIF'ERA, (L.) A small tree, with glabrous branches, yielding a milky juice or sap. *Leaves* alternate, petiolate, rhomboidal, acuminate, entire, with a gland on the petiole. *Flowers* in terminal spikes, with the fertile ones few at the base of the spikes. *Involucre* 10—12-flowered. *Perianth* 4-toothed. *Styles* 3, subulate. *Capsule* black. *Seed* white.—♄. June—July. Introduced. 20—40 feet.

3. S. LIGUSTRI'NA, (Mich.) A shrub much branched, glabrous. *Leaves* lanceolate, tapering, entire, petiolate. *Flowers* in terminal spikes. Sterile florets numerous at the summit; fertile ones few at the base. *Involucre* 1—2-flowered. *Perianth* 3-cleft.—♄. May—July. Margins of creeks. 6—12 feet.

Genus III.—TRA'GIA. Plu. 19—3.

(A German botanist, called Tragus.)

Monœcious. Sterile florets; perianth 3-parted. *Stamens* 3. Fertile florets; perianth 5-parted. *Style* 3-cleft. *Capsule* 3-celled, 3-seeded. *Seed* solitary.

1. T. linearifo'lia, (Ell.) *Stem* erect, pubescent, almost tomentose. *Leaves* alternate, linear-pubescent, usually entire. *Flowers* in axillary spikes. *Capsule* hirsute.—♃. July—Aug. Southern Georgia. 12—18 inches.

2. T. u'rens, (L.) *Stem* erect, branching, villous. *Leaves* alternate, lanceolate, toothed toward the summit, hoary beneath. *Flowers* usually in small terminal spikes. *Anthers* united by pairs. *Perianth* of the fertile floret 6-parted.—♃. May—Aug. Dry soils. Common. 10—15 inches.

3. T. urticifo'lia, (Mich.) *Stem* erect, hirsute, usually simple. *Leaves* cordate-ovate, serrate, hirsute. *Spikes* opposite the leaves. Fertile flowers at the base of each spike. *Capsules* hirsute.—♃. May—Aug. Dry soils. Common. 12—18 inches.

Genus IV.—ACAL'YPHA. L. 19—15.

(From *a*, privative, *kalos*, pleasant, and *aphe*, touch.)

Monœcious. Sterile florets; perianth 3—4-parted. *Stamens* 8—16, united. Fertile florets; styles 3, 2-parted. *Capsule* 3-celled, 3-seeded.

1. A. Virgin'ica, (L.) *Stem* erect, pubescent, striate, branching. *Leaves* alternate, lanceolate, on short petioles, remotely and obtusely serrate, dotted. *Involucre* axillary, pubescent, cordate, toothed. Sterile florets in a spike; perianth 4-leaved, hairy. Fertile florets within the involucre; perianth 3-leaved.—☉. June—Sept. In woods and cultivated lands. Common. 12—18 inches.

2. A. Carolinia'na, (Walt.) *Stem* erect, pubescent, striate. *Leaves* rhombic-ovate, acuminate, serrate, entire at the base, on long petioles. *Involucre* small, sessile, deeply notched. *Spikes* axillary, small, with the fertile flowers at the base.—☉. July—Aug. Cultivated lands. 10—20 inches.

Genus V.—JA'TROPHA. L. 19—15.

(From the Greek *iatros*, physician, *trophe*, food, in allusion to its medicinal properties.)

Monœcious. Sterile florets; perianth funnel-shaped, petaloid *Stamens* 10, alternately short. Fertile florets; perianth 5-leaved, expanding. *Styles* 3, 2-cleft. *Capsule* 3-celled, 3-seeded.

1. J. stimulo'sa, (Mich.) *Stem* herbaceous, hispid, stinging. *Leaves* palmately lobed, lobes 3—5-toothed, slightly sinuate, ciliate. *Flowers* with terminal cymes. Fertile florets setting in the divisions of the peduncles. Sterile florets; perianth salver-form, pubescent, with a 5-cleft border, petaloid, white. *Stamens* 10. Fertile florets; perianth 5-leaved. *Style* 12-cleft.—♃. Through the summer. Shady soils. 6—18 inches.

Genus VI.—RIC'INUS. L. 19—15.

(From *ricinus*, a tick, from the appearance of the seeds.)

Flowers monœcious. Staminate flowers—calyx 5-parted; stamens numerous. Pistillate flowers—calyx 3-parted; styles 3, 2-cleft; capsules spiny, 3-celled, 3-seeded.

Castor-oil Plant.

1. R. COMMU'NIS. *Stem* erect, hoary, pruinose. *Leaves* peltate, palmate; lobes lanceolate, serrate.—Road-sides. Introduced from the East Indies.

Genus VII.—CROTONOP'SIS. Rich. 19—5.

(From its resemblance to Croton.)

Monœcious. Sterile florets; perianth 5-parted, with 5 petaloid scales. *Stamens* 5. Fertile florets; perianth 5-parted *Stigmas* 3, twice bifid. *Capsule* 1-seeded, indehiscent.

1. C. LINEA'RIS, (Mich.) *Stem* erect, dichotomously branched, covered with silvery scales. *Leaves* linear-lanceolate, entire, on short petioles, stellately pubescent above, and with silvery scales beneath. *Flowers* in terminal and axillary spikes, very minute.—☺. May—June. Pine barrens. 12—18 inches.

Genus VIII.—CRO'TON. L. 19—15.

(From the Greek *kroton*, a tick, from the form of its seed.)

Monœcious. Sterile florets; perianth cylindrical, 5-toothed *Corolla* 4-petaled or none. *Stamens* 10—15. Fertile flowers; perianth 5 or many leaved, or none. *Corolla* none. *Styles* 3—6, 2-cleft. *Capsule* 3-celled, with 1 seed in each cell.

1. C. MARIT'IMUM, (Walt.) *Stem* somewhat shrubby, erect, trichotomously divided, with the branches clothed with a stellular tomentum. *Leaves* oval, obtuse, entire, subcordate, pale above, hoary beneath. *Flowers* in spikes; those of the sterile florets many-flowered, the fertile florets generally in pairs. *Capsule* tomentose.—♃. June—October. Drifting sands along the sea-coast. 2—3 feet.

2. C. ARGYRAN'THEMUM, (Mich.) *Stem* somewhat shrubby. *Leaves* entire, obtuse, obovate. *Flowers* numerous, in short terminal racemes. *Perianth* pedicellate, silvery.—♃. July. Dry soils. 1—2 feet.

3. C. GLANDULO'SUM, (L.) *Stem* erect, hispid, trichotomously divided, often colored. *Leaves* oblong, serrate, hairy beneath, bearing 2 glands at the base. *Flowers* in spikes in the divisions of the stem, with the fertile and sterile intermingled; the sterile with a 5-petaled corolla, the petals white, longer than the calyx, and inserted into its base. *Stamens* 10. Fertile florets; perianth 5-leaved, hispid; leaves unequal. —☺. June—Oct. Cultivated lands. Very common. 1—2 feet.

4. C. ELLIP'TICUM, (Nutt.) *Stem* pubescent, irregularly branched, tomentose when young. *Leaves* oval-lanceolate, entire, pale beneath, stellular pubescent. *Flowers* in terminal clusters; the sterile spike growing in the midst of the fertile flowers. *Capsule* tomentose.—☺. July. Middle Car. and Geo. 1—2 feet.

GENUS IX.—PHYLLAN'THUS. L. 19—15.

(From the Greek *phullon*, a leaf, and *anthos*, a flower.)

Monœcious. Sterile florets; perianth 5—6-parted, filaments 6, united. Fertile florets; perianth 5—6-parted, paracorolla a 12-angled margin. *Styles* 3. *Capsule* 3-celled, 3-seeded.

1. P. CAROLINEN'SIS, (Walt.) *Stem* erect, with alternate branches, glabrous. *Leaves* alternate, oval, obtuse, smooth, distichous. *Flowers* axillary, nodding, fertile and sterile intermingled. *Perianth* colored at the base.—⊙. Sept.—Oct. Damp soils. 10—12 inches.

GENUS X.—PACHYSAN'DRA. Mich. 19—4.

(From the Greek *pachus*, thick, and *andros*, a stamen.)

Perianth 4-leaved. *Stamens* 4. *Filaments* sub-clavate *Styles* 3. *Capsule* 3-horned, 3-celled, cells 2-seeded.

1. P. PROCUM'BENS, (Mich.) *Stem* procumbent and simple. *Leaves* alternate, pubescent, crenate, toothed, oval. *Flowers* in spikes, nearly radical, the lower ones fertile, the upper ones sterile, all bracteate. *Perianth* minute, ciliate. *Capsule* finely pubescent.—♃. June. Mountains.

GENUS XI.—BO'RYA. Willd. 20—2.

(In honor of Bory de St. Vincent.)

Dicœcious. Sterile florets; perianth 4-leaved. *Stamens* 2—3. Fertile florets; perianth 4-leaved, unequal. *Stigma* capitate. *Fruit* 1-seeded.

1. B. PORULO'SA, (Mich.) Somewhat shrubby, rarely spiny. *Leaves* coriaceous, opposite, oblong-lanceolate, sessile, dotted underneath, and ferruginous, margins revolute.

ORDER CIX.—URTICA'CEÆ. (*Nettle Family.*)

Flowers monœcious or dicœcious, scattered or clustered. *Perianth* membranaceous, lobed, persistent. *Stamens* definite, 4—5, inserted into the base of the perianth and opposite its lobes. *Ovary* superior, simple. *Ovule* solitary, erect. *Stigma* simple. *Fruit* an indehiscent nut, surrounded by the perianth. Usually herbaceous plants, with alternate leaves, often covered with stings.

GENUS I.—UR'TICA. Tourn. 19—4.

(From *uro*, to burn, from its stinging.)

Flowers usually monœcious. Sterile florets; perianth of 4 leaves. *Stamens* 4. Fertile florets; perianth 2-leaved. *Stigma* 1. *Seed* 1, shining.

1. U. PU'MILA, (L.) *Stem* usually erect, succulent. *Leaves* opposite, decussate, ovate, acuminate, serrate, 3-nerved, lower ones on rather

long petioles. *Flowers* monœcious, in clustered corymbs. *Stamens* usually 3.—☺. July. Wet grounds. 6—12 inches.

2. U. U'RENS, (L.) *Stem* erect, quadrangular, hairy, hispid. *Leaves* opposite, elliptic, 3-nerved, or partly 5-nerved, coarsely toothed, with white stings. *Spikes* glomerate, by pairs. *Flowers* clustered.—☺. June—July. Cultivated grounds. *Stinging Nettle.*

3. U. CHAMÆDROI'DES, (Pursh.) *Stem* erect, glabrous. *Leaves* opposite, ovate, hairy beneath, with white stings on the upper surface. *Flowers* in axillary clusters, the upper ones fertile, the lower sterile. *Perianth* hairy.—☺. Feb.—March. Southern Geo. 4—6 inches.

4. U. DIOI'CA, (L.) *Stem* erect, branching, hispid. *Leaves* cordate, ovate-lanceolate, coarsely serrate. *Flowers* dicœcious, in clustered, paniculate spikes; spikes 2 from each axil, covered with stings.—♃. June—Aug. Waste places. 2—3 feet. *Large Stinging Nettle.*

5. U. PROCE'RA, (Muhl.) *Stem* erect, pubescent, quadrangular. *Leaves* ovate-lanceolate, serrate, on fringed petioles. *Flowers* dicœcious, in compact, clustered spikes.—♃. July—Aug. Wet soils. 3—4 feet.

6. U. CAPITA'TA, (L.) *Stem* erect, furrowed, quadrangular. *Leaves* alternate, cordate-ovate, acuminate, serrate, 3-nerved. *Flowers* in sessile clusters. *Spikes* solitary, lateral, and axillary.—♃. June—July. Damp soils. 4—5 feet.

7. U. DIVARICA'TA, (L.) *Stem* erect, branching, covered with stings. *Leaves* alternate, ovate, acuminate, smooth, serrate, on long, ciliate petioles. *Panicles* axillary, solitary, divaricately branched.—♃. July—Aug. Damp rocky situations. 2—3 feet.

8. U. CANADEN'SIS, (L.) *Stem* erect, branching, hispid, with stings. *Leaves* alternate, cordate-ovate, acuminate, hispid. *Flowers* in axillary panicles; the lower ones sterile, the upper fertile.—♃. July—Aug. Wet soils. Mountains. 2—3 feet.

GENUS II.—BŒHME'RIA. Jacq. 19—4.

(In honor of Bœhmer, a German botanist.)

Monœcious or dicœcious. Sterile florets; perianth 4-parted. *Stamens* 4. Fertile florets; perianth none. *Style* 1. *Nut* compressed.

1. B. CYLIN'DRICA, (L.) *Stem* obtusely 4-angled, glabrous. *Leaves* opposite, ovate-oblong, acuminate, dentate, smooth. *Flowers* dicœcious. Sterile spikes clustered, interrupted; fertile ones cylindrical.—♃. June—Aug. Wet grounds. 2—3 feet.

2. B. LATERIFLO'RA, (Mich.) *Stem* smooth, with opposite branches. *Leaves* alternate, ovate-lanceolate, acuminate, serrate, scabrous, on long petioles. *Flowers* in lateral and axillary clusters.—♃. July. Shady woods.

The *Cannabis sativa*, the common hemp, although an exotic, has escaped from cultivation, and often lines the road-side.

GENUS III.—PARIETA'RIA. Tourn. 19—4.

(From *paries*, a wall, the usual place of its growth.)

Flowers monœcious or polygamous, surrounded by a many-cleft involucre. Perfect florets; perianth 4-cleft. *Stamens* 4.

Style 1. Pistillate florets; perianth 2—4-cleft. *Style* 1. *Seed* 1, inclosed by the perianth.

1. P. Pennsylva'nica, (Muhl.) *Stem* simple, erect, striate, pubescent. *Leaves* alternate, linear-lanceolate, pubescent, with opake dots. *Involucre* 3-leaved. *Flowers* in compact, axillary clusters. *Perianth* oblong, persistent, inclosing the seed.—☺. June. Upper districts Car. and Geo. 12—15 inches. *Pellitory.*

2. P. Florida'na, (Nutt.) *Stem* decumbent, with erect branches, pubescent near the summit. *Leaves* ovate, pubescent, dotted, sometimes nearly round. *Flowers* in axillary clusters. Leaves of the involucre nearly linear.—☺. May—Oct. Damp sandy soils. 12—18 in.

Genus IV.—HU'MULUS. L. 20—5.

(From *humus*, fresh earth, from its choice of soil.)

Flowers dicœcious. Sterile florets in loose axillary panicles; perianth 5-parted. *Stamens* 5. Fertile florets; scales of the ament large, persistent, concave, entire, 1-flowered. *Perianth* none. *Styles* 2. *Seed* 1.

1. H. lu'pulus, (L.) *Stem* twining, scabrous. *Leaves* opposite, 3—5-lobed, scabrous, serrate. Sterile florets paniculate, axillary, and terminal; fertile florets verticillate and sessile.—♃. August. *Hop.*

The aments of the fertile flowers constitute Hops; the useful, bitter principle of which resides in resinous, glandular scales, surrounding the fruit. The pure substance is called Lupulin.

Order CX.—ULMA'CEÆ. (*Elm Family.*)

Flowers perfect or polygamous. *Perianth* divided, campanulate, inferior. *Stamens* definite, 5—8, inserted into the base of the perianth. *Ovary* superior, 1-celled, with solitary pendulous ovules. *Stigmas* 2, distinct. *Fruit* 1—2-celled, membranaceous or drupaceous. *Seed* solitary, pendulous. Trees or shrubs.

Genus I.—UL'MUS. 5—2.

(A Saxon word, *elm* or *ulm.*)

Flowers perfect. *Perianth* campanulate, 4—5-cleft. *Stamens* 5—8. *Styles* 2. *Fruit* compressed, with a broad membranaceous border.

1. U. America'na, (Mich.) A large tree, with smooth, gracefully recurved branches. *Leaves* alternate, lanceolate, oblique, doubly serrate, with the serratures uncinate. *Flowers* 5—10, in a fascicle, pedicellate. *Fruit* fimbriate. *Styles* 2, short. *Fruit* 1-seeded, surrounded by a large, membranous wing.—♄. Feb.—March. Rich soils. 40—100 feet. *White Elm.*

2. U. ful'va, (Mich.) A small tree. *Leaves* large, oval, doubly serrate, rough, sometimes slightly cordate, acuminate, pubescent. *Flowers*

nearly sessile. *Stamens* 5—7. *Stigmas* purple. *Buds* tomentose. *Fruit* pubescent.—♄. Feb.—March. In fertile lands. 20—30 feet. *Slippery Elm*

3. U. ALA'TA, (Mich.) A middle-sized tree or shrub, with a cork-like excrescence on opposite sides of the branches. *Leaves* nearly sessile, oblong-lanceolate, doubly serrate. *Samara* pubescent, ciliate.—♄. Feb. March. Fertile soils. 10—30 feet. *Whahoo.*

GENUS II.—PLAN'ERA. Mich. 5—2.

(In honor of John Planer, a German botanist.)

Flowers perfect. *Perianth* campanulate, 3—5-cleft. *Stamens* 5. *Stigmas* 2. *Nut* 1-seeded, roughened.

1. P. GMELI'NI, (Mich.) A middle-sized tree. *Leaves* ovate, acute, glabrous, serrate. *Flowers* axillary, generally by threes. *Perianth* 3—5-cleft. *Stamens* 3—5. *Stigmas* 2, plumose. *Nut* roughened.—♄. Feb.—March. River swamps. 30—40 feet.

GENUS III.—CEL'TIS. L. 23—1.

(An ancient name for Lotus.)

Flowers perfect. *Perianth* 5 or 6 parted. *Stamens* 5 or 6. *Styles* 2, expanding. *Drupe* small, purple.

1. C. OCCIDENTA'LIS, (L.) A large tree. *Leaves* ovate, acuminate, serrate, unequal at the base, pubescent beneath. *Flowers* small. *Fruit* a small berry, with a sweet pulp.—♄. April—May. Rich soils. 60—80 feet. *Beaver-wood. Sugarberry-tree.*

ORDER CXI.—MORA'CEÆ. (*Artocarpaceæ.*) (*Mulberry Tribe.*)

Flowers monœcious, in aments or heads. *Perianth* usually divided, sometimes tubular or entire. *Stamens* 4, straight. *Ovary* 1 or 2 celled, with a suspended ovule. *Style* 1, filiform. *Stigma* bifid. *Fruit* a fleshy receptacle, covered by numerous nuts. *Seed* suspended, solitary. Trees or shrubs.

GENUS I.—MO'RUS. Tourn. 19—4.

(*Morea*, the Greek name of mulberry.)

Flowers monœcious or dicœcious, in spikes. Sterile florets with a 4-parted perianth; stamens 4. Fertile florets in dense spikes, with a 4-parted perianth, which becomes succulent, enveloping the achenium, and forming an oblong, juicy, edible fruit. Trees with milky juice.

1. M. AL'BA. Monœcious. A small tree. *Leaves* deeply cordate, unequal at the base, unequally serrate, nearly glabrous.—♄. May. Introduced. *White Mulberry.*

2. M. RU'BRA. Dicœcious. A large tree. *Leaves* cordate, ovate, acuminate, serrate, scabrous, pubescent beneath. *Perianth* 4-parted, becoming juicy.—♄. March. Rich soils. 20—60 feet. *Red Mulberry.*

GENUS II.—MACLU'RIA. Nutt. 20—4.

(In honor of Wm. Maclure.)

Flowers dicœcious. Fertile flowers collected into a dense head; style 1, long, villous; achenia obovate, compressed, imbedded in a pulp, all forming a fruit the size of an orange, with an irregular surface. A small tree, with straggling branches.

1. M. AURANTIA'CEA, (Nutt.) A tree; branches flexuous, terete. *Leaves* alternate, entire, with supra-axillary spines. *Flowers* axillary.—♄. In the Southwest, on the banks of streams. *Osage Orange. Bow-wood.*

Used in forming hedges, and promises to be the best plant for the Southern States. It is attacked by no animal, and in a few years forms an impenetrable hedge. The Fig, *Ficus carica*, belongs to this Order. Its fruit consists of a succulent hollow receptacle, inclosing numerous single-seeded carpels, forming a *syconus*.

ORDER CXII.—PODOSTEMA'CEÆ.

Flowers naked, monœcious, bursting through an irregularly lacerated spathe. *Stamens* hypogynous, monadelphous, 2 or more, alternately sterile and shorter. *Ovary* 2-celled, with numerous ovules *Stigmas* 2—3. *Fruit* capsular. *Seed* numerous, minute. *Flowers* minute. Aquatic plants, with capillary leaves.

GENUS I.—PODOSTE'MUM. Rich, 19—2.

(From the Greek *pous*, foot, and *stemon*, a stamen, from their standing on a foot.)

Genus the same as the Order.

1. P. CERATOPHYL'LUM, (Mich.) *Stem* floating, filiform, stiff, horn-like. *Leaves* alternate, pinnate, many-cleft. *Flowers* axillary, solitary. *Stamens* 2, affixed to a common pedicel. *Stigmas* 2, sessile. *Capsule* ovate, 2-valved, 2-celled, many-seeded.—♃. July. In the beds of rivers. *River-weed.*

ORDER CXIII.—CALLITRICHA'CEÆ.

Flowers perfect or imperfect, with 2 opposite colored bracts. *Stamen* 1. *Anthers* reniform, 1-celled. *Ovary* solitary, 4-cornered, 4-celled. *Ovules* solitary. *Styles* 2, subulate. *Stigmas* simple points. *Fruit* indehiscent, 4-celled, 4-seeded. *Seed* peltate. *Flowers* axillary, solitary, very minute. Small aquatic, herbaceous plants.

GENUS I.—CALLIT'RICHE. L. 1—2.

(From the Greek *kallos*, beauty, and *trix*, hair

Genus the same as the Order.

1. C. HETEROPHYL'LA, (Pursh.) *Stem* floating, creeping, round. Floating leaves spatulate, immersed ones linear, all opposite, sessile, entire. *Perianth* persistent, lanceolate, white. *Filament* subulate. *Styles* 2, subulate.—♃. May—June. Still waters.

Order CXIV.—SAURURA'CEÆ.

Flowers naked, seated upon a scale. *Stamens* 6, hypogynous, filaments slender. *Anthers* cuneate. *Ovaries* 4, distinct, each with 1 ovule. *Stigmas* 3—4. *Fruit* consisting of 4 indehiscent nuts. *Leaves* alternate, stipulate. *Flowers* in spikes. Herbaceous plants, growing in marshy places.

Genus I.—SAURU'RUS. L. 7—4.

(From *saura*, lizard, and *oura*, tail.)

Genus the same as the Order.

1. S. cer'nuus, (L.) *Stem* erect, furrowed, with jointed hairs. *Leaves* cordate, pubescent, entire. *Flowers* in spikes, opposite the leaves. *Perianth* tubular, hairy, split on the upper side.—♃. May—July. Bogs and ponds. Very common. 2—3 feet.

Order CXV.—AMENTA'CEÆ.

Flowers monœcious or diœcious. Sterile florets in aments, with scales, or scaly perianth. *Stamens* inserted into the scales. *Anthers* 2-celled. Fertile florets in aments, with scales or perianths. *Ovary* free, simple. *Stigmas* many. *Fruit* a drupe, or a bony, membranaceous capsule, usually 1-celled. *Seed* 1, or many. Trees or shrubs.

ANALYSIS.

1. Flowers without calyx or corolla 2
   Flowers with at least a bract-like calyx 5
2. Fruit capsular 3
   Fruit not capsular 4
3. Capsule 1-celled ..... *Salix*, 1
   Capsule 2-celled ..... *Populus*, 2
4. Fruit a drupe ..... *Myrica*, 3
   Fruit a round bur ..... *Comptonia*, 4
5. Fruit cone-like 6
   Fruit not cone-like 8
6. Middle-sized or large trees ..... *Betula*, 5
   Shrubs ..... *Alnus*, 6
   Small trees 7
7. Scales 2-flowered ..... *Carpinus*, 7
   Scales 1-flowered ..... *Ostrya*, 8
8. Fertile aments globose 9
   Fertile aments not globose 10
9. Fertile aments on long peduncles ..... *Platanus*, 9
   Fertile aments near the base of the sterile ..... *Liquidambar*, 10
10. Fruit an acorn ..... *Quercus*, 11
    Fruit a prickly bur ..... *Castanea*, 12
    Nut ovate ..... *Corylus*, 13
    Nut triquetrous ..... *Fagus*, 14

Sub-order I.—SALICA'CEÆ. (*Willow Tribe.*)

Flowers naked. *Seeds* comose. *Leaves* stipulate. *Ovary* 1-celled.

Genus I.—SA'LIX. L. 20—2.

(From the Celtic words *sal*, near, and *lis*, water.)

Dicœcious. Sterile florets; ament cylindrical; scales 1-flowered, imbricate, with a nectariferous gland at the base; perianth none. *Stamens* 1—5. Fertile florets; scales 1-flowered; perianth none. *Stigmas* 2, often 2-cleft. *Capsule* 1-celled, many-seeded. *Seeds* comose.

1. S. Muhlenbergia'na, (Willd.) A small shrub, often decumbent, with pubescent branches. *Leaves* lanceolate, pubescent, hoary, entire, white, tomentose beneath. *Flowers* diandrous, appearing before the leaves. *Scales* oblong, villous along the margin, white, with a red apex. *Germs* ovate-lanceolate, on long pedicels, hairy. *Styles* short. *Stigmas* bifid.—♄. April. Dry woods. 2—5 feet.

2. S. tris'tis, (Ait.) A small shrub. *Leaves* linear-lanceolate, acute at each end, entire, with revolute margins, glabrous above, rugosely veined, and tomentose beneath. *Stipules* none or caducous.—♄. March—April. Sandy soils. 1—4 feet. *Dwarf Willow.*

3. S. rosmarinifo'lia, (L.) A small shrub, the branches silky, pubescent. *Leaves* linear-lanceolate, acute at each end, entire when young, pubescent above, silky beneath, becoming nearly glabrous when old; scales of the ament obtuse, ciliate. *Germs* lanceolate, villous. *Stigmas* bifid.—♄. March—April. Wet lands. 1—3 feet.

4. S. conif'era, (Ware.) A small shrub, with the young branches pubescent, with cone-like excrescences at the extremities of the branches. *Leaves* oblong-lanceolate, acutely serrate toward the apex, glabrous on the upper surface, tomentose beneath, on long petioles. *Scales* lanceolate, villous. *Germs* lanceolate, villous. *Stigmas* 4.—♄ March—April. Dry soils. 4—8 feet.

5. S. disco'lor, (L.) A shrub, with brownish branches. *Leaves* oblong, somewhat obtuse, remotely serrate, glaucous beneath. *Stipules* lanceolate, serrate. *Stamens* 2; scales oblong, hairy, black. *Germs* lanceolate, tomentose. *Stigmas* 2-parted.—♄. April. Low grounds. 8—15 feet. *Bog Willow.*

6. S. ni'gra, (L.) A small tree, branching from the base. *Leaves* alternate, lanceolate, slightly acuminate, serrulate, on short petioles. *Stamens* usually 5. *Scales* obovate, obtuse, villous. *Capsule* oblong, glabrous.—♄. March. On water-courses. 15—20 feet.

S. Babylon'ica (Tourn.) is the weeping-willow, often planted in cemeteries. A variety of this has curled leaves, which is known under the names of *Ring-leaved* or *Hoop Willow.*

S. vimina'lis (L.) is the Basket Osier, from which the *willow-work* is manufactured: it is introduced from Europe.

GENUS II.—POP'ULUS. Tourn. 20—8.

(Origin of the name uncertain.)

Dicœcious. *Ament* cylindrical. *Scales* lacerated. Sterile florets; anthers 8—30, arising from a turbinate, oblique, entire, single perianth. Fertile florets; perianth entire. *Stigmas* 4. *Capsule* superior, 2-celled, 2-valved, many-seeded. *Seeds* comose.

1. P. GRANDIDENTA'TA, (Mich.) A large tree, with a smooth greenish bark. *Leaves* alternate, nearly round, unequally and sinuately toothed, glabrous, villous when young, petioles compressed near the summit. *Flowers* in small axillary, cylindrical aments.— ♄. March. Mountains. *Cotton-tree* or *American Aspen.*

2. P. ANGULA'TA, (Ait.) A large tree, with the branches winged. *Leaves* ovate, deltoid, acuminate, serrate, glabrous, with the serratures uncinate. *Flowers* small.— ♄. March. On the margins of rivers. 60—80 feet. *Carolina Poplar.*

3. P. HETEROPHYL'LA, (L.) A large tree, branches terete. *Leaves* roundish, ovate, obtuse, uncinately toothed, the sinus small, cordate, and somewhat auricled, when young tomentose.— ♄. May. Swamps. Middle and upper districts. 60—80 feet.

SUB-ORDER II.—MYRICA'CEÆ. (*Gale Tribe.*)

Fruit usually drupaceous. *Flowers* naked. *Stamens* 2—8. *Ovary* 1-celled.

GENUS III.—MYRI'CA. L. 20—4.

(From the Greek *murio*, to flow; found on the banks of streams.)

Dicœcious. *Ament* ovate-oblong. *Scales* crescent-shaped. Sterile florets; stamens 4—6; anthers 4-valved. Fertile florets; ovary 1. *Stigmas* 2. *Drupe* 1-celled, 1-seeded.

1. M. CERIF'ERA, (L.) A small shrub, diffusely branched. *Leaves* perennial, alternate, somewhat coriaceous, linear-lanceolate, glabrous, dotted, slightly pubescent when young. *Flowers* in short, cylindrical, axillary aments. *Stamens* 4. *Scales* nearly round.— ♄. March—April. In damp soils. *Bayberry* or *Wax-myrtle.*

2. M. CAROLINEN'SIS, (L.) A small shrub. *Leaves* cuneate, oblong, coarsely toothed. *Scales* acute. *Fruit* globular, large.— ♄. March—April. Wet places. 3—4 feet.

GENUS IV.—COMPTO'NIA. Banks, 19—3.

(In honor of Henry Compton, Bishop of London.)

Monœcious. Sterile florets; ament cylindrical. *Scales* 1-flowered. *Perianth* 2-parted. *Stamens* 3-forked. *Anthers* 6. Fertile floret; ament globose; scale 1-flowered. *Styles* 2. *Nut* ovate.

1. C. ASPLENIFO'LIA, (Ait.) A small shrub. *Leaves* long, linear-lanceolate, alternate, irregularly pinnatifid. *Flowers* in oval, sessile aments.

Perianth of the sterile florets reniform, acuminate, 1-flowered. *Filaments* 3. *Anthers* 6. *Nuts* forming a round bur.—♄. April—May. Woods and fields. 2—4 feet. *Sweet-fern*

Sub-order III.—BETULA'CEÆ. (*Birch Tribe.*)

Flowers with bracts. *Fruit* membranous, 2-celled, forming a sort of cone.

Genus V.—BET'ULA. L. 19—12.

(From *betu*, its Celtic name.)

Monœcious. *Ament* cylindrical. Sterile florets, with the scales peltate. *Stamens* 10—12. Fertile florets; scales imperfectly 3-lobed, 3-flowered. *Styles* 2. *Nuts* compressed, with a membranaceous margin.

1. B. ni'gra, (L.) A tree, covered with smooth scaly bark, with long flexible branches. *Leaves* rhombic-ovate, doubly serrate, acute, pubescent beneath, entire at the base, on short petioles. Fertile ament ovate. *Scales* villous, with equal and linear segments.—♄. May. Banks of streams. 30—40 feet. *Red Birch.*

2. B. len'ta, (L.) A large tree, with long slender branches, which are spotted with white when young, with a fragrant and aromatic bark. *Leaves* cordate, ovate, acuminate, sharply serrate, nerves and petioles hairy; scales of the ament smooth.—♄. May. Mountains. 70—80 ft *Cherry Birch. Black Birch.*

Genus VI.—AL'NUS. Tourn. 19—12.

(From *al*, near, and *lan*, the edge of the river.)

Monœcious. Sterile florets; ament long, cylindrical; scales 3-lobed, 3-flowered; perianth 4-parted. *Stamens* 4. Fertile florets; ament ovate; scales 2-flowered; perianth none. *Styles* 2. *Seed* compressed, ovate, naked.

1. A. serrula'ta, (Ait.) A middle-sized shrub, with numerous irregular branches. *Leaves* alternate, obovate, acuminate, with the veins on the under surface hairy, doubly serrate. Sterile flowers in long pendulous aments.—♄. February. Along water-courses. Very common. 8—12 feet.

Genus VII.—CARPI'NUS. L. 19—12.

(From *car*, wood, and *pinda*, head.)

Monœcious. Sterile florets; ament long, cylindrical; scales ciliate at the base. *Stamens* 8—14, somewhat bearded at the top. Fertile florets; ament imbricate; scales leafy, 2-flowered. *Stigmas* 2. *Nut* long, ovate, sulcate, 1-seeded.

1. C. America'na, (Mich.) A small tree. *Leaves* oblong-ovate, acuminate, unequally serrate. *Scales* 3-parted, the middle segment oblique, toothed on one side. Scales of the fertile florets large, foliaceous.—♄. May. In woods. 15—20 feet. *Iron-wood. Hornbeam.*

GENUS VIII.—OS'TRYA. Mich. 19—12.

(From the Greek *ostruos*, a scale.)

Monœcious. Sterile florets; ament cylindrical; scales 1-flowered; filaments branched. Fertile florets; ament naked. *Capsules* inflated, imbricate, 1-seeded at the base.

1. O. VIRGIN'ICA, (Willd.) A small tree, with very compact, hard wood. *Leaves* ovate-oblong, cordate at the base, alternate, unequally serrate. *Ament* oblong-ovate, erect, with inflated capsules, 1-seeded.—♄. May. In woods. 20—30 feet. *Iron-wood.*

SUB-ORDER IV.—PLATANA'CEÆ. (*Plane Tribe.*)

GENUS IX.—PLAT'ANUS. L. 19—12.

(From the Greek *platus*, ample, in allusion to its foliage.)

Monœcious. Sterile florets; ament globose. *Stamens* numerous, intermixed with linear scales. Fertile florets; scales spatulate. *Stigma* recurved. *Seed* clavate.

1. P. OCCIDENTA'LIS, (L.) A large tree, with nearly white branches with soft wood. *Leaves* 5-angled, obscurely toothed, pubescent beneath. *Aments* axillary, on long peduncles. *Seed* forming a compact head.—♄. May. Banks of streams. 60—70 feet.

Button-wood or *Sycamore.*

GENUS X.—LIQUIDAM'BAR. L. 19—12.

(From *liquidus*, liquid, and *amber*, amber, in allusion to the exudation from the trees.)

Monœcious. Sterile florets; ament conical, with a 4-leaved involucre; perianth none. *Stamens* numerous. Fertile florets; ament globose; perianth 2-leaved, urceolate, 2-flowered. *Styles* 2. *Capsules* 2, 1-celled, many-seeded.

1. L. STYRACIFLU'A, (L.) A large tree. *Leaves* alternate, palmately lobed; lobes acuminate, serrate. Sterile ament terminating the branches. Fertile ament near the base of the sterile.—♄. May. Damp soils. 70—80 feet. *Sweet Gum.*

SUB-ORDER V.—CUPULIF'ERÆ. (*Nut Tribe.*)

GENUS XI.—QUER'CUS. L. 19—12.

(From the Celtic *quer*, fine, and *cuez*, a tree.)

Monœcious. Sterile florets; ament loose; perianth mostly 6—8-cleft. *Stamens* 5—10. Fertile florets; capsule cup-shaped, scaly; perianth 6-lobed. *Ovary* 3-celled, 2 of them abortive. *Style* 1. *Stigmas* 3. *Acorn* 1-celled, 1-seeded.

a. Fructification biennial. Leaves usually setaceously mucronate, entire.

1. Q. PHEL'LOS, (L.) A middle-sized tree, slender and straight. *Leaves* deciduous, linear-lanceolate, tapering at both ends, glabrous,

mucronate. *Acorn* small, nearly spherical.—♄. May. In swamps. 30—60 feet. *Willow Oak.*

2. Q. IMBRICA'RIA, (Mich.) A small-sized tree, with irregular branches. *Leaves* deciduous, oblong, tapering at each extremity, mucronate, entire, pubescent beneath. *Cup* shallow; scales broad-ovate. *Acorn* small, nearly spherical.—♄. June. Banks of rivers. Mountains. 40—50 feet. *Shingle Oak.*

3. Q. PUM'ILA, (Walt.) A small shrub. *Stem* slender, virgate, sparingly branched, tomentose when young. *Leaves* oblong-lanceolate tapering toward the base, undulate, tomentose beneath. *Acorns* small, in a shallow cup.—♄. March—April. In pine woods. 2—3 feet. *Running Oak.*

4. Q. VI'RENS, (Ait.) A large tree, with spreading, irregular branches. *Leaves* perennial, coriaceous, oval-lanceolate, with revolute margins, pubescent beneath. *Fruit* oval, nearly black, generally in pairs.—♄. April. Along the sea-coast. 40—50 feet. *Live Oak.*

5. Q. LAURIFO'LIA, (Mich.) A middle-sized tree. *Leaves* sessile, oblong-lanceolate, tapering at the base, entire, glabrous, the young leaves toothed and sometimes sinuate. *Acorn* ovate, in a shallow, nearly sessile cup.—♄. April. Rich sandy soils. 40—50 feet.

b. Leaves lobed at the summit.

6. Q. AQUAT'ICA, (Walt.) A small tree, with regular branches. *Leaves* obovate, cuneate, nearly sessile, obscurely lobed at the summit. *Acorn* ovate, rather small, in a shallow cup, on a short peduncle.—♄. March—April. Damp soils. 30—70 feet. *Water Oak.*

7. Q. NI'GRA, (Willd.) A small tree, with thick, rough, black bark. *Leaves* coriaceous, cuneate, dilated at the summit, retusely 3-lobed, 5—7 inches long, ferruginous beneath. *Acorn* ovate, mucronate, in rather a deep, sessile cup.—♃. March—April. In poor soils. 15—30 feet. *Black-jack.*

8. Q. TINCTO'RIA, (Bart.) A large tree, with dark-colored bark. *Leaves* obovate, sinuate, mucronate, angled, glabrous on the upper surface. *Acorn* depressed, in a deep, sessile cup.—♄. March—April. In rich uplands. 50—70 feet. *Black Oak.*

9. Q. COCCIN'EA, (Van.) A large tree. *Leaves* deeply sinuate, glabrous, with the lobes acute, notched and mucronate, petioles rather long. *Fruit* abundant. *Acorn* oblong, mucronate, in a deep cup.—♄. April. In rich lands. 70—80 feet.

10. Q. RU'BRA, (L.) A large tree. *Leaves* glabrous, oblong, sinuate, with the angles rather acute. *Lobes* acute and tapering, acutely notched, mucronate. *Acorn* large, mucronate, in a flat, shallow, sessile cup.—♄. April. Dry soils. 70—80 feet. *Red Oak.*

11. Q. CATES'BÆI, (Mich.) A small tree, with stem and branches irregular and crooked. *Leaves* coriaceous, cuneate, sinuate, the lobes divaricate, usually simple. *Acorn* ovate, in a large, deep cup, sessile, with the scales obtuse.—♄. April. Poor sandy soils. 15—30 feet.

12. Q. FALCA'TA, (Mich.) A large tree, with regularly expanding branches. *Leaves* on long petioles, deeply lobed, falcate, mucronate, shining on the upper surface, tomentose beneath. *Fruit* small, abundant, with a shallow cup.—♄. April—May. Common. 70—80 feet. *Spanish Oak.*

Var. (*a*) Q. tri'loba, (L.) *Leaves* cuneate, nearly equally 3-lobed at the summit, mucronate.

Var. (*b*) Q. pagodæfo'lia, (Ell.) *Leaves* oblong, many-lobed, on rather long petioles; lobes simple, mucronate.

13. Q. ilicifo'lia, (Van.) A small shrub. *Leaves* cuneate, on long petioles, obovate, 3—5-lobed, tomentose beneath. *Fruit* abundant. *Acorn* ovate, in a shallow cup.—♄. April—May. Poor soils. 3—8 ft.

c. Fructification annual. Leaves unawned.

14. Q. obtusilo'ba, (Mich.) A middle-sized tree, with irregular branches. *Leaves* oblong, sinuate, on short petioles, generally 5-lobed, the upper ones dilated, pubescent beneath. *Acorn* oblong, in a hemispherical cup.—♄. April. In stony, clay soils. 30—40 feet.
Post Oak.

15. Q. lyra'ta, (Walt.) A large tree. *Leaves* long, irregularly lyrate, the lobes oblong, nearly acute, the upper ones dilated, glabrous. *Acorn* nearly globular, almost entirely inclosed in the cup.—♄. April. In swamps. 60—70 feet. *Over-cup Oak.*

16. Q. al'ba, (L.) A large tree. *Leaves* oblong, pinnatifid, sinuate, pubescent beneath, on short petioles. *Lobes* oblong, obtuse. *Fruit* large, usually in pairs. *Acorn* ovate, in a deep cup.—♄. April. Rich soils. 70—80 feet. *White Oak.*

17. Q. pri'nus, (L.) A large tree, with a long trunk without branches. *Leaves* large, obovate, or oblong-lanceolate, obtusely toothed, slightly pubescent beneath. *Fruit* abundant. *Acorn* large, in a hemispherical cup.—♄. April. Common. 70—80 feet. *Swamp-chestnut Oak.*

18. Q. Michaux'ii, (Nutt.) A large tree. *Leaves* obovate, unequally toothed, sinuate, obtuse at the base, tomentose beneath. *Fruit* usually in pairs. *Acorn* large, ovate.—♄. April. Rich soils. 60—80 feet.

19. Q. monta'na, (Willd.) A large tree. *Leaves* obovate, acute, tomentose beneath, coarsely toothed, teeth indurated at the point. *Acorn* ovate, in a hemispherical cup.—♄. April. In rocky places near the mountains. 30—50 feet.

20. Q. Casta'nea, (Muhl.) A large tree. *Leaves* oblong-lanceolate, on long petioles, tomentose beneath, acuminate, coarsely-toothed, teeth with indurated points. *Acorn* ovate, in a hemispherical cup.—♄. April—May. In rich, damp soils. 60—70 feet. *Chestnut Oak.*

21. Q. chin'quapin, (Mich.) A small shrub, with a smooth, slender stem. *Leaves* oblong-lanceolate, on short petioles, coarsely toothed, glabrous when mature. *Acorn* ovate, in a hemispherical cup.—♄. April—May. Near the mountains. 3—4 feet.

Genus XII.—CASTA'NEA. 19—12.

(Castanea, a town in Thessaly.)

Monœcious. Sterile florets; ament naked, long, cylindrical; perianth 6-lobed. *Stamens* 5—20. Fertile florets 3, within a muricated involucre; perianth 5—6-lobed. *Styles* 6. *Seed* 1—3, inclosed by the involucre.

1. C. ves'ca, (L.) A large tree, generally with an erect trunk and

irregular branches. *Leaves* lanceolate, oblong, mucronate, serrate, glabrous when old. Aments of the sterile flowers axillary; florets in clusters; fertile spikes short, 2 or 3 together. *Style* 1. *Stigmas* numerous. *Involucre* spinous.—♄. May—June. Dry woods. 60—70 feet.
Chestnut.

2. C. PU'MILA, (L.) A shrub or small tree. *Leaves* oblong, serrate, mucronate, tomentose beneath. Fertile florets generally one in each involucre. *Nut* small, inclosed in a spiny involucre.—♄. May. In light soils. 15—20 feet. *Chinquapin.*

3. C. NA'NA, (Muhl.) A small shrub. *Leaves* oval-lanceolate, obtuse, serrate, mucronate, shining on the upper surface, slightly tomentose beneath. It agrees nearly with the preceding species, except in size.—♄. May. Sandy pine-barrens. 2—4 feet.

GENUS XIII.—COR'YLUS. L. 19—12.

(From the Greek *korus*, a helmet, from the calyx inclosing the fruit.)

Monœcious. Sterile florets; ament cylindrical; scales 3-cleft. *Stamens* 8. Fertile florets; ovaries several. *Stigmas* 2. *Nut* ovate, surrounded with the enlarged coriaceous and scaly involucre.

1. C. AMERICA'NA, (Walt.) A small shrub, with erect, virgate branches, pubescent when young. *Leaves* oblong-ovate, cordate, acuminate, pubescent on the under surface. *Involucre* roundish, campanulate, with the border dilated and many-cleft. *Nut* large, ovate.—♄. March—April. Shady woods. 4—8 feet. *Hazel-nut. Wild Filbert.*

2. C. ROSTRA'TA, (Ait.) A small shrub. *Leaves* oblong-ovate, acuminate, slightly cordate, on short petioles, doubly serrate, pubescent beneath. *Involucre* somewhat globular, hirsute, 2-parted at the summit, with incised segments.—♄. March—April. Mountains. 2—4 feet.
Beaked Hazel-nut.

GENUS XIV.—FA'GUS. L. 19—12.

(From the Greek *phago*, to eat; the nuts were used as food.)

Monœcious. Sterile florets; ament globose; perianth 6-cleft. *Stamens* 5—12. Fertile florets 2, within a 4-lobed prickly involucre; perianth with 4—6 minute lobes. *Ovaries* 3-celled, 2 of them abortive. *Styles* 3. *Nut* 1-seeded, inclosed by the involucre.

1. F. SYLVAT'ICA, (L.) A large tree. *Leaves* ovate, acuminate, ciliate, slightly toothed, on short petioles. *Involucre* persistent. *Seed* triquetrous.—♄. March—April. Damp rich soils. 50—60 feet. *Beech.*

ORDER CXVI.—JUGLANDA'CEÆ. (*Walnut Family.*)

Flowers monœcious. Sterile florets in an ament. *Perianth* oblique, membranous, scaly, irregularly lobed. *Stamens* 3—36, inserted on the receptacle. *Filaments* short. *Anthers* 2-celled. Fertile florets with the perianth 4—6-parted. *Ovary*

1-celled, with an erect solitary ovule. *Styles* 1—2, short, or wanting. *Stigmas* 2, lacerated or discoid, 4-lobed. *Fruit* 1-celled, with 4 imperfect partitions. *Seed* 4-lobed. Trees, with alternate, unequally pinnate leaves.

Genus I.—JUG'LANS. L. 19—12.

(*Jovis glans*, the nut of Jove.)

Monœcious. Sterile florets; scales usually 5-parted, imbricate; perianth 5—6-parted. *Stamens* numerous. Fertile florets; perianth double, each 4-parted. *Drupe* large, with the nut irregularly furrowed.

1. J. NI'GRA, (L.) A large tree. *Leaflets* ovate-lanceolate, numerous, serrate, slightly cordate, pubescent beneath when young. *Fruit* spherical, scabrous, the pulp decaying and turning black.—♄. April. Rich soils. 30—60 feet. *Black-walnut.*

2. J. CIN'EREA, (L.) A middle-sized tree. *Leaflets* numerous, lanceolate, pubescent, on villous petioles. *Fruit* oblong-ovate, acuminate, irregularly grooved.—♄. April. Fertile soils. 30—50 feet. *Butternut.*

Genus II.—CARY'A. Nutt. 19—12.

(From *caryon*, a nut.)

Monœcious. Sterile florets; ament imbricate; scales 3-parted: perianth none. *Stamens* 4—6. Fertile florets; perianth 4-cleft, superior. *Style* none. *Stigma* 4-lobed. *Pericarp* 4-valved. *Nut* quadrangular, smooth.

1. C. SULCA'TA, (Willd.) A large tree. *Leaves* pinnate; leaflets obovate, lanceolate, serrate, pubescent beneath, 7—9. Sterile aments pendulous, 3-parted; fertile florets terminal. *Nut* covered with a thick pericarp.—♄. April. Fertile soils. 60—80 feet. *Thick Shell-bark Hickory.*

2. C. AL'BA, (L.) A large tree, with the bark separating in flat scales. *Leaves* pinnate; leaflets large, oblong-lanceolate, serrate. *Nut* nearly spherical, with the pericarp thin.—♄. April. Fertile soils. 40—60 feet. *Shag-bark Hickory.*

3. C. TOMENTO'SA, (Mich.) A large tree. *Leaves* pinnate; leaflets obovate-lanceolate, acuminate, slightly serrate, pubescent beneath, 7—9. *Ament* tomentose, very long. *Fruit* sub-globose, smooth, with a thick pericarp. *Nut* somewhat 6-angled, with a thick, hard shell.—♄. April—May. Fertile soils. 40—60 feet. *Common Hickory. White heart Hickory.*

4. C. AMA'RA, (Mich.) A large tree. *Leaves* pinnate; leaflets sessile, ovate-oblong, sharply serrate, acuminate, glabrous, except the veins and midrib. *Fruit* small, bitter, and astringent.—♄. May. Fertile woods. 40—50 feet. *Bitter-nut.*

VAR. C. PORCI'NA, (Mich.) A large tree. *Leaves* pinnate; leaflets lanceolate, 7—9, glabrous. *Fruit* small, with a hard, smooth nut, very bitter.—♄. April. Margins of swamps. 70—80 feet. *Pig-nut Hickory*

5. C. AQUAT'ICA, (Mich.) A middle-sized tree. *Leaves* pinnate; leaflets narrow, lanceolate, oblique, slightly serrate, glabrous, 9—13, with the midrib tomentose. *Fruit* nearly round, angled.—♄. April. In swamps. 40—60 feet.

GYMNOSPER'MÆ.

Ovules naked and fertilized by the direct action of the pollen. Cotyledons often numerous.

ORDER CXVII.—CONIF'ERÆ. (*Cone-bearing Family.*)

Flowers monœcious or dicœcious; sterile flowers monandrous or 5, and monadelphous, collected in a catkin. *Anthers* 2 or many lobed, bursting outwardly; fertile flowers usually in strobiles or cones, sometimes solitary. *Ovary* none or open, resembling a scale, destitute of style or stigma. *Ovules* naked. *Fruit* a naked seed. *Leaves* with parallel veins. Trees or shrubs, abounding in resin.

GENUS I.—PI'NUS. L. 19—15.

(From *pinos*, the Greek for Pine-tree.)

Flowers monœcious. Sterile flowers; scales peltate. *Perianth* none. *Anthers* 2, each 1-celled, sessile. Fertile flowers in an ovate cone. *Scales* closely imbricate, 2-flowered. *Pistil* 1. *Nut* winged. *Scales* woody.

a. Leaves 2—5, with a sheath at the base. Scales of the cone thickened at the summit.

1. P. IN'OPS, (Ait.) A small tree, abounding in resin, with scattered, smooth branches. *Leaves* short, in pairs. *Cone* oblong, conic, about the length of the leaves. *Scales* with subulate spines.—♄. May. Sandy barrens. 20—40 feet. *Scrub Pine.*

2. P. VARIAB'ILIS, (L.) A large tree, much branched. *Leaves* by pairs or threes, slender and channeled, 4—5 inches long, deep green. *Cone* generally solitary, ovate, 2—3 inches long. *Scales* with incurved spines.—♄. April. Along the sea-coast. 60—70 feet.

3. P. RIG'IDA, (L.) A large tree. *Leaves* by threes, 4—6 inches long, with short sheaths. *Cones* ovate, scattered, or in clusters, usually the latter, 2—4 inches long. *Scales* with reflexed spines.—♄ April—May. Usually in the upper country. 70—100 feet.

4. P. SEROTI'NA, (Mich.) A small tree. *Leaves* by threes, 6—8 inches long. *Cones* ovate, large for the size of the tree. *Scales* with straight, slender spines.—♄. April. Around ponds. 30—40 feet.

5. P. PUN'GENS, (Lam.) A middle-sized tree, irregularly branched. *Leaves* by pairs, short, acute. *Cones* ovate, clustered, sessile. *Spines* long, subulate, the lower reflexed.—♄. Mountains. 40—50 feet.

6. P. TÆ'DA, (L.) A large tree, with a straight, tall trunk. *Leaves* long, by threes, in long sheaths. *Cones* long, deflexed. *Scales* armed with rigid spines. This is an abundant species, but affords very little resin.—♄. April. 80—100 feet.

7. P. PALUS'TRIS, (L.) A large tree. *Leaves* by threes, very long, with the sheaths pinnatifid. *Cones* nearly cylindrical, 6—10 inches long. *Scales* muricate.—♄. April. Common in sandy soils. 80—100 feet. *Long-leaved Pine.*

8. P. STRO'BUS, (L.) A large tree. *Leaves* by fives, slender, in short sheaths. *Cones* solitary, pendulous, long. *Scales* loose.—♄. April. Mountains. 100—140 feet. *White Pine.*

b. Leaves solitary, distinct at the base. Scales of the cone even, attenuated, glabrous.

9. P. BALSA'MEA, (L.) A small tree. *Leaves* solitary, emarginate, flat, glaucous beneath, somewhat pectinate at the summit, nearly erect, below recurved, spreading. *Cone* solitary, erect, cylindrical. *Bracts* short, obovate, mucronate, somewhat serrulate, with the margins thin and smooth.—♄. May. Mountains. 40—50 feet.
Balsam Fir. Balm of Gilead.

10. P. CANADEN'SIS, (L.) A large or small tree, with horizontal branches. *Leaves* solitary, flat, denticulate, in two rows. *Cone* small, ovate, terminal, scarcely longer than the leaves.—♄. May. Mountains. 30—100 feet. *Hemlock.*

11. P. NI'GRA, (Ait.) A large or small tree. *Leaves* solitary, very numerous, 4-angled, scattered, erect, straight, dark green. *Cones* ovate, 1—2 inches long. *Scales* elliptical, imbricate, erosely denticulate at the apex, undulate on the margins.—♄. April. Mountain swamps. 30—100 feet. *Black Spruce.*

12. P. AL'BA, (Ait.) A small tree. *Leaves* solitary, 4-sided, less crowded than the preceding species, incurved. *Cones* slender, nearly cylindrical. *Scales* broad, ovate, entire.—♄. May. Mountains, swamps. 30—40 feet. *White Spruce.*

GENUS II.—JUNIP'ERUS. L. 20—15.

(Celtic, *juniperus*, rough.)

Flowers dicœcious. Sterile florets; ament ovate. *Calyx* a scale, verticillate, peltate. *Anthers* 4—8, 1-celled. Fertile florets; ament globose. *Scales* 3, concave. *Stigma* open. *Fruit* a berry, with three long, 1-seeded nuts, surrounded with the united and fleshy scales.

1. J. VIRGINIA'NA, (L.) A middle-sized tree, with horizontal branches. Upper leaves imbricated, in four rows, ovate-acute, very small, by threes. *Flowers* axillary. *Fruit* dry, 1—2-seeded, covered with a blue powder.—♄. May. Common. 20—60 feet. *Red Cedar.*

Genus III.—CUPRES'SUS. L. 19—15.

(From *kus*, to produce, and *parisos*, equal, in allusion to the branches.)

Flowers monœcious. Sterile flowers; the ament ovate, imbricate. *Scales* peltate. *Anthers* 4, sessile. Fertile florets; ament a cone. *Perianth* none. *Ovaries* 4—8 under each scale. *Nuts* angular, compressed.

1. C. DIS'TICA, (L.) A large tree. *Leaves* small, linear, acute, flat, deciduous. Sterile flowers paniculate; catkin sub-globose.—May. Deep swamps. 90—100 feet. *Cypress.*

2. C. THYOI'DES, (L.) A large tree, with compressed branches. *Leaves* imbricate, in four rows, ovate, tuberculate at the base; catkin globose. —♄. May. Swamps. 70—80 feet. *White Cedar.*

The Cypress is one of our most remarkable trees. It grows to its greatest dimensions in deep, miry soil. The base of the trunk is conical and usually hollow. Its roots are immense, and produce remarkable protuberances, which rise to the hight of 2–3 feet. These are conical and hollow, covered by the same kind of bark as the root: never produce branches or leaves. Often used for bee-hives. The wood of the Cypress is the most durable of any in exposed situations.

Genus IV.—THU'YA. L. 19—15.

(From *thuon*, a sacrifice: the resin used as incense.)

Flowers monœcious. Sterile florets; ament imbricate. *Calyx* a scale. *Anthers* 4, sessile. Fertile flowers in cones, with scales 2-flowered. *Nut* 1-winged.

1. T. OCCIDENTA'LIS, (L.) A small tree, with spreading, ancipital branches. *Leaves* imbricate, in four rows, appressed, naked, ovate-rhomboidal, tuberculate. *Cones* obovate, with the inner scales truncate, gibbous below the summit.—♄. May. Mountain streams. 15—20 feet. *American Arbor-vitæ.*

Genus V.—TOR'REYA. Arn. 20—15.

(In honor of Professor John Torrey.)

Dicœcious. Staminate flowers; ament sub-globose, lengthening as it becomes perfected, with bracts at the base, imbricate, in 4 rows, many-flowered; anther bearing scales, pedicellate. Pistillate flowers; ament ovate, 1-flowered, bracteate; ovule solitary, sessile; seed nut-like; testa thick, without coriaceous-fleshy, within fibrous. Small trees, with spreading branches.

1. T. TAXIFO'LIA, (Arn.) (*Taxus montana*, Nutt.) An evergreen tree. Branches spreading; branchlets distichously forked. *Leaves* approximate, solitary, distichous, on short petioles, linear, mucronate, shining above, paler beneath; vein broad, about one inch long. *Fruit* about one inch long, ovate, rough; outside covering brittle.—Middle Florida. 20—40 feet. *Florida Yew-tree.*

MONOCOTYLED'ONÆ.

Trunk usually cylindrical, with no distinction of pith, wood, and bark. Leaves with simple, parallel veins running from the base to the apex of the leaf, usually alternate. Embryo with 1 cotyledon, or if more than 1, alternate. Radical inclosed in a sheath, through which it bursts in germination.

I. DICTYOGEN'EÆ.

(From *dictuon*, a net, and *gennæin*, to produce, the leaves being net-veined.)

Monocotyledonous plants, with reticulated veined leaves, and with the roots resembling, in some respects, dicotyledons.

ORDER CXVIII.—DIOSCOREA'CEÆ. (*Yam Tribe.*)

Flowers dicœcious. *Perianth* superior, 6-cleft, equal. *Stamens* 6, inserted into the base of the perianth. *Ovary* 3-celled, with 1—2 ovules in a cell. *Style* deeply 3-parted. *Stigmas* simple. *Fruit* a thin, compressed capsule. *Seed* flat. *Embryo* small. Twining, herbaceous plants, with reticulated leaves.

GENUS I.—DIOSCORE'A. L. 20—6.

(From Dioscorides, a Greek physician.)

Genus same as the Order.

1. D. VILLO'SA, (L.) *Stem* herbaceous, climbing over shrubs, terete. *Leaves* alternate, opposite, and verticillate; the lower verticillate, the upper alternate, cordate, acuminate, 9-nerved, pubescent beneath. Sterile flowers in axillary panicles, small; fertile flowers in simple racemes. *Styles* 3. *Capsule* 3-celled, 3-winged, 2-seeded.—White. ♃. May—July. Sandy soils. Common. 10—12 feet. *Yam-root.*

2. D. QUATERNA'TA, (Walt.) *Stem* climbing. *Leaves* verticillate or alternate, cordate, acuminate, glabrous, 7-nerved; lateral nerves bifid. —White. ♃. July. Old fields. 6—8 feet.

ORDER CXIX.—SMILA'CEÆ. (*Sarsaparilla Family.*)

Flowers dicœcious or perfect. *Perianth* petaloid, 4—6-parted. *Stamens* 4—6, inserted into the base of the perianth. *Ovary* 3-celled, 1 or many seeded. *Style* usually 3-parted. *Stigmas* 3. *Fruit* baccate. *Seeds* with a membranaceous testa, shrubby or herbaceous, often climbing. *Leaves* reticulated.

GENUS I.—SMI'LAX. L. 20—6.

(From *smile*, a scraper, from their rough stems.)

Flowers dicœcious. *Perianth* campanulate, spreading, 6-parted. Sterile florets with 6 stamens; fertile ones with 4 styles and 3 stigmas. *Berry* globose, 1—3-celled, 1—3-seeded.

1. S. LAURIFO'LIA, (L.) *Stem* prickly, climbing; branches unarmed. *Leaves* oval-lanceolate, crowded, acuminate, lucid, perennial. *Flowers* in axillary umbels, on short peduncles. *Fruit* black, 1-seeded.—White. ♄. July. Swamps. N. J. to Lou.

2. S. ROTUNDIFO'LIA, (L.) *Stem* prickly, flexuous. *Leaves* cordate, ovate, nearly round, 5—7-nerved, pale beneath. *Flowers* in umbels, on very long peduncles.—White. ♄. June. Rich soils.

VAR. S. QUADRANGULA'RIS, (Muhl.) *Stem* quadrangular, prickly at the base, unarmed toward the summit. *Leaves* ovate, unarmed, slightly cordate, 5-nerved, distinctly reticulate.—White. ♄. June—July. Dry soils.

3. S. CADU'CA, (L.) *Stem* flexuous, prickly, somewhat angled. *Leaves* ovate, mucronate, 5-nerved. *Flowers* in axillary umbels, on short peduncles.—White. ♄. June—July. Dry fields. Very common.

4. S. PU'MILA, (Walt.) *Stem* unarmed, prostrate, pubescent, sparingly branched. *Leaves* cordate-ovate, somewhat 5-nerved, pubescent beneath. *Flowers* in axillary umbels, on short peduncles. *Fruit* white, 1-seeded.—Greenish-yellow. ♄. Sept.—Oct. In rich, shaded soils.
S. puberula, Mich.

5. S. SARSAPARIL'LA, (L.) *Stem* slightly angled, prickly; prickles subulate, incurved. *Leaves* ovate-lanceolate, unarmed, cuspidate, 5-nerved, glaucous beneath. *Flowers* on long peduncles, small. *Fruit* black, 3-seeded.—White. ♄. June—July. Rich soils.

6. S. TAMNOI'DES, (L.) *Stem* twining, prickly, terete. *Leaves* ovate-oblong, 5-nerved, panduriform, acute, shining, somewhat rigid. *Flowers* in axillary umbels. *Fruit* black.—White. ♄. June—July. Dry soils.

7. S. PANDURA'TA, (Pursh.) *Stem* glabrous; branches angular, prickly, flexuous. *Leaves* ovate, panduriform, 3-lobed, acuminate, mucronate, rounded at the base, 7-nerved, membranaceous. Staminate peduncles axillary, solitary, many-flowered; leaves of the perianth lanceolate-acute. Fruit-bearing branches terete; fruit black.—Car. to Lou.

8. S. BEYRICH'IA, (Br.) Unarmed, glabrous. *Branches* angular, striate, flexuous, green. *Leaves* auriculate, lanceolate, acute, mucronate, rounded at the base, 5-nerved, glabrous. *Tendrils* long, filiform, spiral, glabrous. *Umbels* axillary, solitary, many-flowered. *Flowers* on capillary pedicels. *Perianth* 6-leaved, glabrous; leaflets lanceolate, 1-nerved.—♄. Humid, shady places. Car. and Geo.

9. S. HEDERÆFO'LIA, (Br.) Unarmed, glabrous. *Branchlets* quadrangular; branches nearly terete. *Leaves* subdeltoid-ovate, somewhat 3-lobed, mucronate, rounded or slightly cordate at the base, 5—7-nerved, membranaceous. *Umbels* axillary, solitary, many-flowered. *Ovary* naked, sessile, subglobose, smooth, 3-celled.—♄. Geo. Banks of streams, in the middle and low country.

10. S. HASTA'TA, (Willd.) A twining plant. *Stem* angled, glabrous, becoming prickly with age. *Leaves* alternate, lanceolate, acuminate, hastate, 3-nerved, ciliate. *Flowers* in axillary umbels. *Berry* globose, black.—White. ♄. June—July. In rich soils.

11. S. BONA NOX, (L.) Climbing over small shrubs. *Stem* unarmed, angled. *Leaves* cordate-ovate, sometimes slightly hastate, glabrous, 7-nerved, prickly along the midrib and margins. *Flowers* in small, axillary umbels. *Fruit* black.—White. ♄. Damp, rich soils.

12. S. LANCEOLA'TA, (L.) *Stem* climbing, terete; the upper branches unarmed. *Leaves* lanceolate and ovate, membranaceous, 3—5-nerved, perennial. *Flowers* numerous, in axillary umbels, on short peduncles. *Fruit* red.—White. ♄. May—June. Damp, rich soils.

13. S. WALTE'RI, (Pursh.) *Stem* angled, spiny. *Leaves* cordate, ovate, smooth, 3-nerved. *Fruit* red, 3-seeded.—White. ♄. July. Low country of Car.

14. S. OVA'TA, (Pursh.) *Stem* nearly terete, unarmed, branching, covering small shrubs. *Leaves* ovate, cuspidate, 3-nerved, unarmed, mucronate, on short petioles. *Flowers* in small umbels, fragrant. *Fruit* black.—Greenish. ♄. June—July. Sea Islands.

15. S. AL'BA, (Pursh.) *Stem* obsoletely angled, nearly unarmed. *Leaves* long-lanceolate, coriaceous, glabrous, entire, 3-nerved. *Umbels* few-flowered; peduncles short. *Fruit* white.—♄. Banks of rivulets. Car. and Geo.

16. S. PSEU'DO CHI'NA, (L.) *Stem* climbing, unarmed. Lower leaves cordate, 5-nerved; those of the branches ovate. *Flowers* in axillary umbels, on long peduncles. *Fruit* black.—White. ♄. June—July. Very common.

17. S. CERCIDIFO'LIA, (Pursh.) *Stem* prickly. *Leaves* orbiculate-cordate, acuminate, 5-nerved, glabrous, short, petiolate.—♄. So. Car.

18. S. AURICULA'TA, (Walt.) *Leaves* 5-nerved, oblong, auriculate, obtuse, terminated by a spine.—Car.

GENUS II.—COPROSMAN'THUS. 20—6.

Flowers dioecious. *Perianth* 6-leaved, deciduous. *Leaves* oblong, 1-nerved, spreading and recurved; the interior ones a little shorter and narrower. *Stamens* 6. *Ovary* 3-celled, two ovules in each cell. *Stigmas* 3, sessile. *Fruit* globose, naked. Usually herbaceous, perennial plants.

1. C. PEDUNCULA'RIS, (Br.) (*Smilax pedunculatis*, Muhl.) *Stem* terete, unarmed, bearing stipular tendrils. *Leaves* cordate, ovate, slightly acuminate, 3-nerved. *Flowers* in umbels, on long peduncles. *Fruit* blue. The whole plant fetid.—Greenish. ♄. May—July. Rich soils.

2. C. HERBA'CEUS, (Br.) (*Smilax herbacea*, L.) *Stem* slightly angled, glabrous, sparingly branched. Young leaves oval or ovate when old, slightly cordate; the upper ones verticillate and crowded, 5—7-nerved, pubescent beneath. *Flowers* on long, compressed peduncles, arising from the base of the stem. *Fruit* black, 2—3-seeded.—Yellowish-white. ♄ May—July. Fertile soils. Common.

Order CXX.—TRILLIA'CEÆ. (*Trillium Family.*)

Flowers perfect. *Sepals* 3. *Petals* 3. *Stamens* 6. *Ovary* 3-celled, few or many seeded. Herbaceous plants, with leaves in 1—2 whorls. *Flowers* at the summit of the stem.

Genus I.—TRIL'LIUM. L. 6—3.

(From *trilex*, triple, in allusion to its floral organs.)

Perianth 6-parted, the 3 outer resembling a calyx, the 3 inner petaloid. *Stamens* 6, inserted into the base of the segments. *Stigmas* 3, usually distinct. *Fruit* 3-celled, many-seeded.

1. T. ses'sile, (L.) *Stem* erect, glabrous, spotted, with sheaths at the base. *Leaves* 3, at the summit of the stem, sessile, broad-ovate, acute. *Flowers* sessile, erect; the petal-like segments lanceolate, erect, twice as long as the calyx. *Fruit* glabrous, dark purple.—Dark purple. 2f. March—April. Rich lands. Common. 6—12 inches.

2. T. disco'lor, (Wray.) *Flowers* sessile, erect. *Petals* obovate, spatulate, erect, twice as long as the spreading calyx. *Leaves* sessile, 3, roundish-ovate, acute, spreading, smooth, spotted, paler beneath, 5-nerved. *Stem* erect, purple, green above. *Ovary* ovate, 3-lobed, greenish-purple. *Styles* linear, purple externally, yellow within.—Geo. 2f. 6 inches.

3. T. recurva'tum, (Beck.) *Stem* erect, purple below. *Leaves* petiolate, ovate, acute, spotted, 5-nerved, paler beneath. *Flowers* sessile, erect. *Petals* unguiculate, ovate-oblong, acuminate, erect. *Sepals* reflexed, ovate-lanceolate, acute, 3-nerved, green.—Lou.

4. T. pusil'lum, (Mich.) *Plant* small. *Leaves* sessile, oval, oblong, obtuse. *Peduncle* erect. *Petals* scarcely longer than the calyx.—Flesh-colored. 2f. May—June. Pine-barrens. 6—8 inches.

5. T. erec'tum, (L.) *Leaves* broad, rhomboid, acuminate, sessile. *Peduncle* inclining. *Flower* nodding. *Petals* ovate, acuminate, flat, broader than the calyx. Dark purple or white. 2f. May—June. Common.

6. T. grandiflo'rum, (Salis.) *Leaves* rhomboid-ovate, broad, sessile, acuminate. *Peduncle* erect or slightly inclined. *Flower* nearly erect. *Petals* longer than the calyx, spatulate-lanceolate.—White or reddish. 2f. May—June. Banks of streams. 8—12 inches.

7. T. erythrocar'pum, (Mich.) *Leaves* ovate, acuminate, rounded at the base, abruptly contracted into a short petiole. *Peduncle* erect or declining. *Petals* ovate-lanceolate, recurved, broader than the calyx.—White, with purple veins. 2f. May—June. Shady woods. 6—8 inches.

8. T. cer'nuum, (L.) *Leaves* rhomboidal, acuminate, very large, on rather long petioles. *Peduncles* recurved. *Petals* lanceolate, acuminate, reflexed, about as long as the calyx.—White. 2f. April—May. Rocky places. 12—18 inches.

9. T. Cates'bæi, (Ell.) *Leaves* obovate and oval, acuminate, attenuate at the base. *Peduncle* recurved. *Petals* lanceolate, expanding,

larger than the calyx.—Rose-color. ♃. April—May. Upper Car and Geo. 10—12 inches.

10. T. NERVO'SUM, (Ell.) *Leaves* lanceolate, ovate, acute, membranaceous. *Peduncle* recurved. *Petals* oblong-lanceolate, larger than the calyx.—Rose-color. ♃. April—May. Middle and upper Car. and Geo. 12 inches.

11. T. STYLO'SUM, (Nutt.) *Stem* erect, smooth. *Leaves* sub-petiolate, elliptic-lanceolate, acute at both ends. *Peduncle* recurved. *Petals* undulate, spreading, larger than the calyx, oblong-obtuse. *Fruit* succulent, globose.—Pale rose-color. ♃. Mountains. 8—10 inches.

GENUS II.—MEDE'OLA. L. 6—3.

(From Medea, the name of a sorceress.)

Perianth 6-parted, revolute. *Stamens* 6. *Stigmas* 3, united at the base. *Fruit* 3-celled, each cell 3—6-seeded.

1. M. VIRGIN'ICA, (L.) *Stem* erect, terete, with small sheaths at each joint. *Leaves* verticillate around the middle of the stem, 6—8 in a whorl, a 3-leaved whorl at the summit, lanceolate, 3-nerved, entire, membranaceous. *Flowers* terminal, on peduncles arising from the upper whorl.—Yellow. ♃. May—July. In rich, shaded soils. 12—18 inches. *Indian Cucumber.*

II. PETALOI'DEÆ.

I. OVARY INFERIOR.

Stamens and pistils naked, or inclosed in a regularly developed corolla.

GROUP I.—TRIPET'ALÆ.

Plants with calyx and corolla distinct, with 3 petals.

ORDER CXXI.—HYDROCHARIDA'CEÆ. (*Frog-bit Family.*)

Flowers monœcious or diœcious. *Sepals* 3. *Petals* 3. *Stamens* epigynous, definite. *Ovary* solitary, 1-celled; ovules numerous. *Stigmas* 3—6. *Fruit* indehiscent, 1 or many celled. *Albumen* none. Floating plants, sometimes with spiny leaves. *Flowers* spathaceous.

GENUS I.—HYDRO'CHARIS. L. 20—9.

(From *hudor*, water, and *charis*, grace.)

Flowers monœcious. *Sepals* 3, oval, membranaceous. *Petals* 3, narrower than the sepals. Sterile florets usually with 2 filaments, united at the base with a 2-leaved spathe. Fertile

florets with a 2-leaved spathe. *Styles* 6, 2-cleft. *Capsule* 5-celled, many-seeded.

1. H. SPONGIO'SA, (Bore.) *Leaves* floating, orbicular, cordate, with purple veins beneath, with inflated vessels near the summit of the stem. *Flowers* axillary. *Styles* 6, deeply 2-cleft. *Stigma* simple, spotted. *Seed* numerous, striate.—White, tinged with purple. 4. July—Sept. Stagnant waters.

GENUS II.—VALLISNE'RIA. Mich. 20—2.

(In honor of Antonio Vallisneri, an Italian botanist.)

Flowers dicœcious. Sterile florets; spathe 2—4-parted; spadix covered with minute flowers; sepals 3; stamens 2. Fertile flowers; scape spiral, very long; spathe 2-cleft; sepals 3, elongated; petals 3, smaller than the sepals; stigmas 3, sessile; capsule cylindrical, 1-celled, many-seeded, 3-toothed.

1. V. SPIRA'LIS, (L.) A floating plant. *Leaves* linear, obtuse, 3-nerved, minutely serrulate. *Scapes* axillary; those bearing the sterile flowers very short, the fertile ones long and spiral, raising the flowers to the surface of the water when ready to expand.—White. 4. Aug. —Sept. *Tape-weed. Eel-grass.*

ORDER CXXII.—ORCHIDA'CEÆ. (*Orchis Family.*)

Perianth superior, ringent, 6-parted; the 3 outer segments colored, the odd one uppermost, from the twisting of the ovary; the 3 inner colored, with the odd one below, which is frequently lobed and different from the others, often spurred. *Stamens* 3, united into a central column, epigynous, the two lateral ones usually abortive. *Pollen* powdery, or in waxen masses. *Ovary* usually 1-celled, with 3 parietal placentæ; ovules numerous. *Style* forming a part of the column with the stamens. *Stigma* a viscid cavity in front of the column. *Fruit* usually an inferior capsule, rarely baccate. *Seeds* numerous. *Albumen* none. Herbaceous plants, usually with tuberous roots. *Leaves* simple, entire.

ANALYSIS.

1. Lip spurred or saccate 2
   Lip not spurred 5
2. Lip saccate ..... *Cypripedium*, 15
   Lip spurred 3
3. Spur joined to the ovary ..... *Corallorhiza*, 7
   Spur free 4
4. Lip entire; racemes not leafy ..... *Tipularia*, 12
   Lip entire; racemes leafy ..... *Orchis*, 10
   Lip not entire ..... *Habenaria*, 11
5. Flowers solitary 6
   Flowers several or numerous 7
6. Stems sheathed ..... *Arethusa*, 8
   Stems with one or more leaves ..... *Pogonia*, 5

7 Flowers axillary, nodding.....*Triphora*, 9
Flowers in spikes or racemes 8
8. Plants parasitic.....*Epidendrum*, 16
Plants not parasitic 9
9. Column winged .....*Malaxis*, 14
Column not winged..... 10
10. Pollen becoming waxy .....*Bletia*, 13
Pollen farinaceous 11
11. Leaf solitary, seldom 2.....*Calopogon*, 6
Leaves more than 1 12
12. Leaves 2, near the middle of the stem.....*Listera*, 3
Leaves several..... 13
13. Radical leaves broad, veined.....*Goodyera*, 1
Radical leaves not veined..... 14
14. Radical leaves oval-lanceolate.....*Cranichis*, 4
Radical leaves lanceolate.....*Neottia*, 2

Genus I.—GOODYE'RA. Brown, 18—1.

(In honor of John Goodyer, a British botanist.)

Perianth ringent; the two outer lateral segments situated beneath the lip, the interior segments ovate, with the lip gibbous at the base, undivided at the summit. *Pollen* consisting of granules in a loose state of cohesion, angular. *Column* free.

1. G. PUBES'CENS. (Willd.) *Stem* pubescent toward the summit. Radical leaves ovate, petiolate, reticulate, veined with white. *Flowers* in an oblong spike. *Lip* ovate, acuminate.—White. 2f. July—Aug. Shady woods. 6—10 inches. *Rattlesnake-plantain.*

Genus II.—NEOT'TIA. L. 18—1. (*Spiranthes*, Rich.)

(From *neottia*, a bird's-nest, in allusion to the fibres of the root.)

Perianth ringent; the two outer segments affixed beneath the lip, interior ones connivent. *Lip* unguiculate, parallel to the column. *Pollen* farinaceous.

1. N. TOR'TILIS, (L.) *Stem* pubescent toward the summit. Radical leaves linear, glabrous; cauline ones subulate, acute. *Scape* sheathed. *Flowers* in compact, spiral spikes; the lip 3-cleft, the middle lobe large and crenulate.—White. 2f. June—July. Damp soils. Through the summer. 8—12 inches.

2. N. CER'NUA, (L.) *Stem* erect, sheathed. *Leaves* lanceolate, nerved. *Flowers* in dense spikes, recurved, nodding. *Lip* oblong, acute, entire. This plant varies much in the form of its leaves and the size of its flowers, and in the time of their blooming.—Greenish-white. 2f. Through the summer. Moist grounds. 1—2 feet.

Genus III.—LISTE'RA. Brown, 18—1.

(In honor of Martin Lister, an English physician.)

Perianth irregular, spreading or reflexed. *Lip* pendulous, 2-lobed, sessile. *Column* minute, free. *Pollen* farinaceous.

1. L. PUBES'CENS, (Nutt.) *Stem* erect, pubescent, leafless. *Leaves* all radical, ovate, acute. *Flowers* in racemes; the lip 2-lobed, the other segments connivent, about as long as the lip. *Capsule* clavate.—Greenish-white. 2f. June—July. Pine-barrens, Car. and Geo.

2. L. CONVALLARIOI'DES, (Nutt.) *Stem* erect, with two opposite, sessile leaves near the middle. *Leaves* cordate, nearly round. *Flowers* in spikes or racemes; segments of the perianth reflexed. *Lip* deeply 2-cleft. *Capsule* oval.—Greenish-white. 2f. May—June. Damp soils. Southern Geo. and Flor. 6—12 inches.

GENUS IV.—CRAN'ICHIS. L. 18—1.

Segments of the perianth reflexed. *Lip* vaulted. *Pollen* farinaceous. *Anthers* parallel with the style, inserted behind.

1. C. MULTIFLO'RA, (Ell.) *Stem* pubescent toward the summit. Radical leaves oval-lanceolate, glabrous, alternate at the base, on very short petioles; cauline leaves merely scales, sheathing. *Flowers* in a terminal spike; the exterior segments of the perianth lanceolate, pubescent on the outer surface; the two upper interior segments obliquely ensiform, connivent. *Lip* vaulted, compressed at the margins, generally inclosing the column. *Capsule* triquetrous, tapering to the base.—Pale green. 2f. Sept.—Oct. Southern Geo. and Flor. 1—2 feet.

GENUS V.—POGO'NIA. Juss. 18—1.

(From *pogon*, a beard, in allusion to the fringed lip.)

Lip sessile, cucullate, crested internally, the remaining 5 segments distinct, without glands. *Pollen* farinaceous. *Anthers* terminal, persistent.

1. P. OPHIOGLOSSOI'DES, (L.) *Stem* erect, with an oval-lanceolate leaf and a foliaceous bract near the flower. *Lip* scarcely longer than the other segments, winged, fimbriate, with the center thickened, with crested ridges. *Flowers* solitary, nodding. *Column* short, thick, solid. *Anthers* in a cavity at the summit of the column.—Purple. 2f. April—May. Damp soils. Common. 10—15 inches.

2. P. DIVARICA'TA, (Nutt.) *Stem* erect, glabrous. *Leaves* narrow, lanceolate, acute, glabrous; one near the middle of the stem, the other at the summit. *Flowers* solitary, at the summit of the stem; the three exterior leaves of the perianth linear-lanceolate, the two interior lanceolate, connivent, somewhat fleshy. *Lip* 3-lobed; middle lobe longest, crested, crenulate. *Capsule* furrowed.—Purple. 2f. May. Damp soils. 1—2 feet.

3. P. VERTICILLA'TA, (Muhl.) *Stem* erect, glaucous. *Leaves* 5, verticillate, oblong-lanceolate, cuneate. *Flowers* solitary, at the summit of the stem; the three exterior leaves of the perianth long-linear, the two interior lanceolate. *Lip* rather short, 3-lobed, crested along the center, the terminal lobe undulate. *Anthers* 2-celled.—Greenish. 2f. May. Middle Car. and Geo. 12—18 inches.

Genus VI.—CALOPO'GON. Brown, 18—1.

(From *kalos*, beautiful, and *pogon*, beard.)

Segments of the perianth spreading, distinct. *Lip* unguiculate, the lamina bearded. *Column* free, winged at the apex. *Anther* terminal. *Pollen* angular.

1. C. Pulchel'lus, (Nutt.) *Stem* erect, glabrous, naked. *Leaves* radical, ensiform, long, erect, generally but one. *Flowers* in a terminal spike; segments of the perianth lanceolate; the two lateral exterior ones oblique, the interior narrower. *Anthers* in a small cavity at the summit of the column.—Purple. 2f. June—July. In damp soils. 12—18 inches.

Genus VII.—COROLLORHI'ZA. Haller, 18—1. (*Coral-root.*)

(From *korallion*, coral, and *rhiza*, root.)

Segments of the perianth equal, connivent. *Lip* extended behind, joined to the spur or free. *Column* free. *Anthers* terminal. Pollen masses 4, oblique.

1. C. multiflo'ra, (Nutt.) *Stem* glabrous, clothed with sheaths; the upper sheath frequently terminating in a subulate leaf. *Leaves* none. *Flowers* numerous, in a terminal raceme, nodding. *Lip* cuneate-oval, with two teeth at the base. *Spur* adnate, conspicuous.—Purplish-brown. 2f. Sept.—Oct. In rich woodlands. 12—15 inches.

2. C. odontorhi'za, (Willd.) *Stem* erect, slender, inclosed in two or three sheaths. *Flowers* numerous, in terminal racemes, pendulous; segments of the perianth connivent. *Lip* dilated, spotted, with two teeth. *Capsule* globose.—Purple. 2f. March—April. In rich soils, middle and lower Car. and Geo.

3. C. hyema'lis, (Nutt.) *Leaf* solitary, large, somewhat plaited, tapering into a long petiole. *Scape* inclosed in about three sheaths. *Flowers* in erect, terminal racemes; segments of the perianth nearly equal, connivent, linear-oblong. *Lip* dilated at the summit, ridged along the middle, 3-lobed; the middle lobe nearly round, crenulate. Pollen masses 4, waxy.—Purple. 2f. May. In rich, shaded soils. 12—18 inches.

Genus VIII.—ARETHU'SA. Swartz., 18—1.

(An ancient Nymph.)

Flower ringent; segments of the perianth united at the base. *Lip* joined to the column, cucullate at the apex, crested internally. Pollen masses granular.

1. A. bulbo'sa, (L.) *Stem* sheathed, generally 3—4. *Flower* 1, at the summit of the stem; segments of the perianth nearly equal, the upper ones incurved. *Lip* about the length of the other segments, crenulate, bearded in the middle.—Purple. 2f. June. Mountains. 6—12 inches.

Genus IX.—TRIPH'ORA. 18—1.

(From *tria*, three, and *phero*, I bear; alluding to its three flowers.)

Segments of the perianth lanceolate, acute, distinct, connivent. *Lip* unguiculate, cucullate. *Column* spatulate, flat, without wings. *Pollen* farinaceous.

1. T. pen'dula, (Nutt.) *Stem* erect, obscurely angled, nodding at the summit, succulent. *Leaves* alternate, amplexicaul, decurrent. *Flowers* axillary and terminal, 3—4, on short peduncles. *Lip* 3-lobed, the lateral ones inflexed.—Purple. 2f. July—Aug. Damp soils. 12—18 inches.

Genus X.—OR'CHIS. L. 18—1.

(Named from the shape of its roots.)

Perianth ringent, the upper segment vaulted. *Lip* dilated, entire, with a spur at the base. Pollen masses 2, affixed by the base, terminal, pedicellate. Glands contained in a common bag.

1. O. spectab'ilis, (L.) *Root* palmate; scape pentangular, sometimes bearing a leaf. *Flowers* few, large; lip obovate, undivided, crenate, retuse; segments of the perianth connivent; spur clavate. *Bracts* longer than the flower. *Leaves* radical, oval, glabrous, generally 2, large.—Purple and white. 2f. June. Shady woods. 8—10 inches.

2. O. ni'vea, (Nutt.) *Scape* erect; lower leaves linear, very long, subulate. *Flowers* in dense spikes. *Bracts* short. *Lip* linear, oblong, entire; the other segments spreading; spur filiform. *Column* small. Pollen masses nearly sessile.—White. 2f. May—June. Southern Geo.

3. O. vir'idis, (L.) A small plant. *Lip* linear, 3-toothed at the apex; other segments of the perianth connivent; spur obtuse, somewhat inflated. *Bracts* longer than the flowers.—Greenish-white. Mountains. 3 inches.

4. O. bidenta'ta, (Ell.) *Stem* erect, nearly naked. *Leaves* narrow, lanceolate. *Lip* oval, oblong, 2-toothed at the base; the other segments ovate, expanding; spur short, thickened at the point.—Yellowish. 2f. May—June. Middle Car. and Geo. 12—18 inches.

Genus XI.—HABENA'RIA. Will. 18—1. (*Platanthera*, Rich.)

(From *habena*, a rein, in allusion to its spur.)

Perianth ringent. *Lip* dilated, toothed, lobed, or fringed, spurred at the base. Pollen masses pedicellate. Glands of the pedicels naked, distant.

1. H. cilia'ris, (Br.) *Stem* erect, leafy, glabrous. *Leaves* lanceolate, acute, entire, sheathing at the base, long. *Flowers* in terminal spikes. *Lip* oblong, lanceolate, beautifully ciliate, double the length of the other segments; spur filiform, long.—Orange-yellow, varying with age. 2f. In moist lands. 1—2 feet.

2. H. BLEPHARIGLOT'TIS. *Stem* erect, leafy. *Leaves* lanceolate, acute, sheathing at the base. *Flowers* in terminal spikes. *Lip* lanceolate, ciliate, about as long as the upper petal; spur filiform, pendulous.—White. 4. June—July. Damp soils. 1—2 feet.

3. H. CRISTA'TI. *Stem* erect, slightly angled, glabrous, leafy. *Leaves* lanceolate, sheathing at the base, long. *Flowers* in a terminal spike, crowded. *Lip* longer than the exterior segments, ciliate; the other segments rounded, the two lateral ones toothed; spur short.—Yellow. 4. June—July. Swamps. 1—2 feet.

4. H. PSYCO'DES. *Stem* erect, slender, glabrous. *Leaves* long, lanceolate, sheathing at the base. *Flowers* in loose, terminal spikes. *Lip* twice as long as the other segments, 2-parted, many-cleft; the other segments ovate-lanceolate; spur filiform, clavate, ascending longer than the germ.—Pale yellow. June—July. Middle Car. and Geo. 12—18 inches.

5. H. ELLIOT'TII. *Stem* erect, leafy. *Leaves* narrow-lanceolate, sheathing; upper ones small. *Flowers* in crowded spikes; exterior segments of the perianth rather large. *Lip* with the margins toothed, almost fimbriate, smaller than the other segments; spur subulate.—Yellow. 4. July. Low grounds. Common. 1—2 feet.

6. H. TRIDENTA'TA. *Stem* erect, slender, glabrous. *Leaves* lanceolate; the lower one large, the upper one small. *Flowers* in compact spikes. *Lip* ovate-lanceolate, 3-toothed; the other segments ovate, obtuse, connivent; spur filiform.—Yellowish-green or white. 4. June—July. Swamps. 1—2 feet. *Gymnadenia tridentata.*

7. H. FUSCES'CENS. *Stem* erect, glabrous, leafy. *Leaves* lanceolate, glabrous, sheathing. *Flowers* scattered, in terminal spikes. *Lip* ovate, toothed at the base; the other segments spreading; spur subulate. *Bracts* longer than the flowers.—Brownish-yellow. 4. July—Aug. In open lands. Mid. Geo. 10—12 feet.

8. H. MICHAUX'II, (Nutt.) *Stem* erect, leafy. *Leaves* numerous, ovate-lanceolate, glabrous, sheathing at the base. *Flowers* in a long terminal spike, scattered. *Lip* 3-parted; the lateral segments setaceous, the two interior segments 2-parted; spur long, obtuse.—4. Aug.—Oct. Pine-barrens, southern Car. and Geo.

9. H. RE'PENS. *Stem* erect, leafy. *Leaves* lanceolate. *Lip* 3-parted, with the lateral segment setaceous, the two inner segments of the perianth 2-parted, the lower segment setaceous. *Bracts* as long as the flower.—Greenish-yellow. 4. Aug.—Sept. Damp soils. 12—18 inches.

GENUS XII.—TIPULA'RIA. Nutt. 18—1.

(From its resemblance to the insect *Tipula.*)

Segments of the perianth spatulate, expanding. *Lip* 3-lobed; middle lobe elongated, sessile, spurred at the base. *Column* free, wingless, extended forward. *Anther* persistent. Pollen masses 4, parallel.

1. T. DISCO'LOR, (Nutt.) *Root* bulbous, concatenated. *Leaf* solitary, ovate, petiolate, plaited, glabrous. *Flowers* in a terminal raceme, nodding, minute. *Operculum* furnished with two auxiliary valves, closing the masses of the pollen.—Greenish. 4. Aug. Pine-barrens.

Genus XIII.—BLE'TIA. Ru. & Pa. 18—1.

(In honor of Louis Blet, a Spanish botanist.)

Leaves of the perianth distinct. *Lip* sessile, cucullate, sometimes spurred. *Column* free. Pollen masses 4—8, 2-lobed.

1. B. verecun'da, (Nutt.) *Leaves* radical, lanceolate, plaited, broad. *Scape* many-flowered. *Lip* ventricose, the border emarginate, furrowed; the interior segments connivent.—2f. July—Aug. Southern Geo. and Flor.

2. B. aphyl'la, (Nutt.) *Stem* erect, simple, scaly. *Leaves* none. *Flowers* in spikes, numerous, pendulous. *Lip* emarginate, crested along the center; the other segments connivent, oblong-lanceolate.—Brown, streaked with purple. 2f. Aug.—Sept. On the margins of swamps. 1—2 feet.

Genus XIV.—MALAX'IS. (*Liparis*, Rich.) Swartz., 18—1.

(From *malaxis*, delicate, in allusion to its texture.)

Segments of the perianth expanding, resupinate. *Lip* sessile, entire, flattened. *Column* winged. Pollen masses 4, becoming waxy.

1. M. liliifo'lia, (L.) *Leaves* 2, radical, oval, lanceolate, glabrous. *Scape* 3—5 angled. *Flowers* numerous, in a terminal raceme; the exterior segments of the perianth acute, the two interior filiform, reflexed. *Lip* obovate, concave, acute at the summit.—White and yellow. 2f. June—July. Upper dist. Car. and Geo. 6—8 inches.

2. M. ophioglossoi'des, (Muhl.) *Stem* erect, with a single leaf near the middle. *Leaf* ovate, amplexicaul. *Flowers* numerous, in a terminal raceme, small. *Lip* erect, concave, cucullate, bidentate; the other segments connivent, the two interior filiform. *Column* minute.—Greenish-white. 2f. May—June. Middle and upper dist. Car. and Geo. 6—9 inches.

Genus XV.—CYPRIPE'DIUM. L. 18—2. (*Lady's Slipper.*)

(From *Cypris*, one of the names of Venus, and *podion*, a slipper; hence its common name, Venus' or Lady's Slipper.)

Lip ventricose, inflated, saccate, large; the other segments of the perianth expanding, 4. *Column* terminating in a petaloid lobe.

1. C. parviflo'rum, (Salis.) *Stem* leafy, slightly pubescent. *Leaves* alternate, lanceolate, acute, pubescent beneath, sessile, sheathing. *Flowers* usually solitary; outer segments of the perianth ovate-oblong, acuminate, the inner ones linear, twisted, bearded on the inner surface. *Lip* shorter than the petals, bearded at the base within.—Yellow, spotted. May—June. Upper dist. Car. and Geo. 8—10 inches.

2. C. pubes'cens, (Willd.) *Stem* leafy. *Leaves* oval, clasping, pubescent. *Lip* yellow, contracted at the mouth; lobe of the style triangular, oblong, obtuse; the exterior petals acuminate, the interior very long, linear, twisted.—Bright yellow. 2f. May. Middle Geo., near Culloden. 1—3 feet.

3. C. SPECTAB'ILE, (Salis.) *Stem* leafy. *Leaves* ovate-lanceolate plaited, entire, pubescent, sheathing at the base. *Flowers* 2—3, large outer segments broad, oval, the two interior linear-lanceolate, white lobe of the style white, with red spots. *Lip* longer than the petals, cleft in front.—White and purple. 2f. May—June. Mountains. 2—3 feet.

4. C. HU'MILE, (Salis.) *Stem* pubescent. *Leaves* lanceolate, nerved, pubescent. *Flowers* solitary. *Lip* large, cleft in front, pubescent; the outer segments brownish-purple, the interior narrower and twisted.—Purple, striped. 2f. May—June. Rocky soils. Middle and upper Car. and Geo. 6—12 inches.

GENUS XVI.—EPIDEN'DRUM. L. 18—1.

(From the Greek *epi*, upon, and *dendron*, a tree.)

Segments of the perianth spatulate, expanding. *Lip* 3-lobed at the summit, the middle segment obtuse. *Column* with the lip united into a tube. Pollen masses 4, parallel, divided by persistent partitions.

1. E. CONOP'SEUM, (Ait.) *Root* fibrous, adhering to the barks of trees; branches short, alternate. *Leaves* lanceolate, acute, succulent, entire, generally two on each branch, sheathing at the base. *Flowers* in a terminal raceme; exterior segments of the perianth lanceolate, the interior cuneate, smaller. *Anther* operculate.—Yellow, tinged with purple. Aug.—Sept. On the barks of trees along the sea-coast of Car. and Geo.

ORDER CXXIII.—MARANTA'CEÆ OR CANNA'CEÆ.
(*Arrow-root Family.*)

Sepals 3, superior, short. *Corolla* tubular, irregular, in two whorls; the outer 3-parted, nearly equal, the inner irregular. *Stamens* 3, with only one fertile petaloid. *Ovary* 3-celled; ovules solitary and erect, or numerous. *Style* petaloid or swollen. *Fruit* capsular. *Seed* round. *Embryo* straight. Herbaceous plants, with creeping roots. *Leaves* simple, sheathing. *Flowers* spathaceous.

GENUS I.—CAN'NA. L. 1—1.

(Celtic name for a cane.)

Calyx 3-leaved, superior. *Corolla* with a long tube, the margin 6-parted; the three exterior segments reflexed, two of the inner ones obovate, undulate, the other one very large; margin reflexed, nearly round. *Style* ensiform. *Stigma* linear, attached to the margin of the style. *Capsule* globose, 3-celled, 3-valved, many-seeded.

1. C. FLAC'CIDA, (Rose.) *Stem* glabrous, terete. *Leaves* alternate, lanceolate, large, membranaceous, glabrous, with a long sheath at the

base; upper leaves merely a sheath. *Flowers* in a terminal spike *Bracts* an ovate scale. *Sepals* lanceolate, acute. *Petals* flaccid.—Red, 2f. May—July. Wet soils. Low country of Car. and Geo. 2—3 ft
Indian Shot. Headache Plant.

GENUS II.—THA'LIA. L. 1—1.

(In honor of Thalius, a German physician.)

Sepals 3, ovate-lanceolate, concave, small. *Corolla* tubular, 6-parted. *Anther* simple, ovate. *Style* short, deflected. *Stigma* ringent. *Capsule* 2-celled.

1. T. DEALBA'TA, (Pursh.) *Leaves* all radical, distichous, cordate-ovate, acute, glabrous, long, and wide, on very long petioles. *Scape* erect, columnar. *Flowers* in terminal panicles. *Peduncles* jointed, with a many-leaved involucre at each joint. *Bracts* 2-flowered, coriaceous. *Sepals* ovate-lanceolate, purple; the three exterior segments of the corolla obovate, equal, the three interior irregular. Sterile filaments irregular, the fertile one filiform.—Purple. 2f. June—Sept In the low country. 3—5 feet.

ORDER CXXIV.—IRIDA'CEÆ. (*Iris Family.*)

Perianth tubular, 6-parted, petaloid, irregular, the outer segments largest. *Stamens* 3, opposite the outer segments. *Ovary* 3-celled, inclosed in the tube of the perianth. *Ovules* numerous. *Style* 1. *Stigmas* 3, in the *Iris* dilated, and petaloid. *Capsule* 3-celled, 5-valved, dehiscence loculicidal. *Seeds* numerous. *Flowers* spathaceous. Herbaceous plants, with equitant leaves.

GENUS I.—I'RIS. L. 3—1. (*Flower-de-luce.*)

(From *iris*, the eye, in allusion to its colors.)

Perianth 6-parted; segments unequal, the outer ones large and reflexed, the inner smaller, and erect. *Stamens* 3, distinct. *Style* none. *Stigmas* 3, petaloid, deflected, covering the stamens.

1. I. CRISTA'TA, (L.) *Stem* compressed, short. *Leaves* ensiform; scape 1-flowered; exterior segments of the perianth oblong, obtuse, entire, with 3 longitudinal crests; interior petals narrower.—Blue and yellow. 2f. Feb.—March. Abundant in Middle Car. 2—4 inches.
Crested Iris.

2. I. VERSIC'OLOR, (L.) *Stem* erect, simple, or branched toward the summit. *Leaves* ensiform. *Flowers* 2—4, at the summit of the scape; segments of the perianth spatulate; exterior segments pubescent on the inner surface, inner ones smaller. *Stigmas* ligulate, 2-toothed near the base. *Capsule* ventricose.—Blue, variegated with green, yellow, and purple. 2f. April—May. In ponds. Very common. 2—3 feet.
Variegated Iris.

3. I. TRIPET'ALA, (Walt.) *Stem* slender, columnar. *Leaves* ensiform. *Flowers* solitary; exterior segments of the perianth large, interior ones very small, 3-toothed. *Stigmas* 2-toothed near the base. *Capsule* ob

scurely angled.—Purple. 2f. April—May. Southern Georgia and Florida. 2—3 feet.

4. I. HEXAGO'NA, (Walt.) *Stem* columnar, flexuous. *Flowers* solitary; exterior segments of the perianth spatulate, reflexed, variegated at the base, with purple and white, the exterior ones erect, spatulate. *Capsule* hexagonal, ventricose.—Blue. 2f. May—July. In swamps in the low country. 2 feet.

5. I. CUP'REA, (Pursh.) *Stem* erect, angled on one side. *Leaves* ensiform, axillary; the exterior segments of the perianth obovate, emarginate, the interior ones smaller. *Stigmas* with a membranaceous margin. *Capsule* ventricose, hexagonal.—Tawny. 2f. April—May. In marshes of lower Georgia and Florida.

GENUS II.—SISYRIN'CHIUM. L. 15—3.

(From *sus*, a pig, and *ryngchos*, a snout.)

Perianth 6-leaved. *Stamens* usually monadelphous, 3. *Capsule* triangular, projecting out of the spathe, with grass-like leaves.

1. S. MUCRONA'TUM, (Mich.) *Stem* simple, compressed. *Leaves* narrow, acute, usually tinged with blue. *Flowers* in terminal clusters. *Spathe* colored, 2-leaved, with a partial sheath at the base of each peduncle. Leaves of the perianth emarginate, mucronate. *Style* triquetrous. *Capsule* 3-valved, 3-celled, many-seeded.—Blue.—2f. June—July. Damp soils. Mountains. 4—6 inches.

2. S. BERMUDIA'NA, (L.) *Stem* erect, compressed, glabrous, divided at the summit. *Leaves* ensiform, glabrous. *Flowers* in terminal racemes. *Spathe* 2-leaved, with a small spathe at the base of each peduncle. Leaves of the perianth emarginate, mucronate, pubescent. *Capsule* pubescent, 3-celled, 3-valved, many-seeded.—Blue. 2f. March—May. Damp soils. 12—18 inches.

3. S. AN'CEPS, (L.) *Stem* compressed, winged, simple. *Leaves* ensiform, radical. *Flowers* in clusters. *Spathe* 2-leaved, unequal. Leaves of the perianth mucronate.—Blue. 2f. July—August. Dry soils. 8—12 inches.

The species of Sisyrinchium might be united in one, as there are very slight differences between them.

ORDER CXXV.—BURMANNIA'CEÆ.

Perianth 6-parted, tubular, superior, the three alternate segments small. *Stamens* 3. *Anthers* sessile, 2-celled, the connectivum fleshy. *Ovary* inferior, 3-celled, many-seeded. *Style* 1. *Stigma* 3-lobed. *Capsule* 3-celled, 3-valved. *Seeds* numerous. Herbaceous plants, with minute, subulate leaves.

GENUS I.—BURMAN'NIA. 3—1.

Genus the same as the Order.

1. B. CAPITA'TA, (L.) *Stem* erect, setaceous, glabrous. *Leaves* subulate, minute, alternate. *Flowers* in terminal heads. *Perianth* dilated

at the base, inclosing the capsule.—White. ☺. Aug.—Sept. Middle Car. and Geo. 3—6 inches.

2. B. cœru lea, (L.) *Stem* erect, setaceous. *Leaves* minute, subulate. *Flowers* few, in a terminal raceme, with 2 unequal bracts. *Perianth* with the tube contracted, inclosing the capsule, the segments unequal. *Capsule* winged, 3-celled, 3-valved, many-seeded.—Blue. ☺. Oct.—Nov. In stagnant swamps. Low country. 2—4 inches

Order CXXVI.—HÆMODORA'CEÆ.

Perianth 6-lobed, petaloid, superior. *Stamens* 3 or 6, arising from the perianth. *Ovary* 3-celled, usually many-seeded. *Style* 1. *Stigma* simple. *Fruit* a 3-celled capsule. *Seeds* orthotropous. Herbaceous plants, with showy flowers, the æstivation equitant.

Genus I.—LACHNAN'THES. Ellis, 3—1.

(From *lachne*, wool, and *anthos*, a flower.)

Perianth with the border 6-parted, woolly; segments unequal, the three inner ones small, linear, the three others lanceolate. *Stamens* 3, long. *Style* declining. *Capsule* 3-celled, many-seeded, truncate.

1. L. tincto'ria, (Ell.) *Stem* erect, simple, pubescent toward the summit. *Leaves* ensiform, shorter than the stem. *Flowers* in corymbose panicles. *Stigma* minutely 3-lobed.—Yellow. 4. July—Aug. In ponds and wet pine-barrens. 2—3 feet.

Genus II.—CONOS'TYLIS. R. Br. 6—1. (*Lophiola*, Ker.)

(From *konos*, a cone, and *stylos*, a style.)

Perianth 6-parted, persistent, densely woolly. *Stamens* 6. *Style* conic. *Stigma* simple. *Capsule* 3-celled, many-seeded, superior.

1. C. America'na, (Pursh.) *Stem* or *scape* erect, tomentose, 1—2-leaved. *Leaves* ensiform, narrow, glabrous. *Flowers* in crowded corymbs. *Perianth* woolly within; segments oblong, acute. *Capsule* ovate or nearly globular, glabrous.—Yellow. 4. June—July. Wet places. 12—18 inches. *Weed-grass.*

Genus III.—ALE'TRIS. L. 6—1.

Perianth tubular, ovate, 6-cleft, rugose. *Stamens* 6, inserted upon the margin of the orifice. *Style* triquetrous, 3-parted. *Capsule* 3-celled, many-seeded, clothed with a marcescent perianth.

1. A. farino'sa, (L.) *Stem* none. *Leaves* expanding, oblong, lanceolate, acute, membranaceous, glabrous. *Flowers* in lax spikes; scape

terete, furrowed, somewhat viscid, with a few small scales. *Perianth* rough.—White. May—June. Pine-barrens. Common. 2 feet.
Star-grass.

2. A. AU'REA, (Walt.) *Stem* none. *Leaves* lanceolate, acuminate. *Flowers* in a terminal spike, sub-campanulate. *Perianth* becoming rugose and scabrous.—Yellow. 2ℓ. July—Aug. Pine-barrens. 2—3 ft.

ORDER CXXVII.—AMARYLLIDA'CEÆ. (*Amaryllis Family.*)

Perianth superior, petaloid, regular, the outer segments overlapping the inner. *Stamens* 6, arising from the perianth. *Ovary* 3-celled, with numerous ovules. *Style* 1. *Stigma* 3-lobed. *Fruit* a 3-valved, 3-celled capsule. *Seed* numerous. Herbaceous plants, with ensiform leaves.

GENUS I.—AMARYL'LIS. L. 6—1.

(The name of a Nymph.)

Perianth 6-parted, petaloid. *Filaments* 6, inserted into the throat of the tube. *Anthers* incumbent. *Pod* membranaceous.

1. A. ATAMAS'CO, (L.) *Stem* none. *Leaves* linear, entire, glabrous, concave; scape terete. *Spathe* 1-leaved, 2-cleft at the summit. *Perianth* erect, sub-campanulate. *Flowers* solitary.—White, tinged with red. 2ℓ. June—July. In moist places. Common. 6—10 inches.
Atamasco Lily.

GENUS II.—PANCRA'TIUM. Herb. 6—1.

(From *pan*, all, and *kratus*, powerful; from its supposed medicinal virtues.)

Perianth with the tube very long, with the border 6-parted; segments linear-lanceolate; the tube of the perianth bearing a 12-cleft paracorolla. *Stamens* 6.

1. P. MEXICA'NUM, (L.) *Stem* none. *Leaves* oblong-lanceolate, glabrous, somewhat succulent; scape simple, generally 2-flowered, the paracorolla bearing the stamens. *Spathe* consisting of 2 pair of membranaceous leaves. *Capsule* 3-angled, 3-celled, 3-valved, many-seeded.—White. 2ℓ. April—May. On the border of streams. 1—2 feet.

2. P. MARIT'IMUM, (L.) *Stem* none. *Leaves* linear-lanceolate; scape erect, bearing many flowers. *Paracorolla* 12-toothed, funnel-shaped, erect, not bearing the stamens.—White. 2ℓ. June—Aug. Moist places, middle Georgia. 1—2 feet.

GENUS III.—AGA'VE. L. 6—1.

(From *agauos*, admirable.)

Calyx and *corolla* confounded, 6-parted, erect, tubular, furrowed. *Stamens* 6, longer than the corolla. *Anthers* versatile. *Style* spotted, shorter than the stamens.

1. A. VIRGIN'ICA, (L.) *Stem* or *scape* erect, glabrous, succulent. Radical leaves lanceolate, acute, succulent, serrate; cauline leaves amplexicaul, resembling scales, broad. *Flowers* in long terminal spikes. *Capsule* 3-celled, 3-valved. *Seeds* numerous, compressed, with two rows in each cell, attached to a central placentæ.—Greenish-white. 4. July —Aug. Middle Geo. 4—6 feet.

Virginian Agave. Rattlesnake's Master. Thick-leaved Snake-root.

There are many representatives of this order in our gardens, forming the earliest flowers of spring. The *Snow-drop*, GALAN'THUS NIVA'LIS; the *Narcissus*, N. POETICUS; the *Snow-flake*, LEUCO'JUM VER'NUM; the *Jonquil*, NARCIS'SUS JONQUIL'LA; the *Daffodil*, N. PSEUDO-NARCISSUS.

ORDER CXXVIII.—HYPOXIDA'CEÆ.

Perianth petaloid, superior, 6-parted, regular. *Stamens* 6, inserted into the base of the segments. *Ovary* inferior, 3-celled, many-seeded. *Style* 1. *Stigma* 3-lobed. *Capsule* indehiscent, many-seeded. Herbaceous plants, with grass-like leaves.

GENUS I.—HYPOX'IS. L. 6—1.

(From the Greek *hupo*, under, and *oxus*, sharp, alluding to the base of the capsule.)

Flowers inclosed in a 2-valved spathe. *Perianth* persistent, 6-parted. *Capsule* elongated, narrowed at the base, 3-celled, many-seeded. *Seeds* globular, naked.

1. H. EREC'TA, (L.) *Leaves* subulate, entire, hairy, channeled, 3-nerved; scape slender, hairy, slightly compressed, 1—4-flowered. *Perianth* expanding, green on the outer surface.—Yellow. 4. March—April. Very common. 3—6 inches.

2. H. FILIFO'LIA, (Ell.) *Leaves* filiform, hairy, slightly 3-angled, scape usually 2-flowered. *Stigmas* 3.—Yellow. 4. March—April. Middle and Southern Geo. Sandy soils. 6—8 inches.

ORDER CXXIX.—BROMELIA'CEÆ.

Calyx gamosepalous, 3-parted or tubular, persistent. *Petals* 3. *Stamens* 6, inserted into the base of the corolla. *Ovary* 3-celled, usually cohering with the calyx. *Style* simple; stigma 3-parted, often twisted. *Fruit* capsular, 3-celled, many-seeded. Plants, usually without stems, with rigid, channeled leaves.

GENUS I.—TILLAND'SIA. L. 6—1.

(In honor of Elias Tillands of Abo.)

Calyx 3-cleft, persistent, divided nearly to the base. *Sepals* 3, slightly united at the base. *Capsule* 1—3-celled. *Seeds* comose. Parasitic plants.

1. T. USNEOI'DES, (L.) *Stem* long, attached to the limbs of trees, covered with membranaceous scales, nearly terete. *Leaves* similar to the stem. *Flowers* solitary, axillary; segments of the calyx lanceolate, membranaceous. *Petals* linear. *Stamens* shorter than the tube.—Greenish-white. ♃. Through the summer. *Long Moss.*

2. T. BARTRAM'II, (Ell.) *Stem* attached to the bark and wood of old trees. *Leaves* subulate, channeled, hoary, covered with whitish scales, cartilaginous at the base. *Flowers* in pairs, at the summit of simple leafy scapes; the upper leaves tinged with red at the base.—♃. June. Middle Geo.

3. T. RECURVA'TA, (L.) *Stem* terete, short. *Leaves* subulate, terete, recurved. *Flowers* in pairs, at the summit of the stem, sessile. *Petals* longer than the calyx.—Purple. ♃. On old trees. Southern Georgia and Florida.

II. OVARY SUPERIOR.

ORDER CXXX.—LILIA'CEÆ.

Perianth colored, regular, deeply 6-parted. *Stamens* 6, perigynous, opposite to the segments. *Ovary* superior, 3-celled, many-seeded. *Style* 1. *Fruit* capsular, 3-celled, 3-valved, many-seeded, dehiscence loculicidal. *Seed* in 1—2 rows. *Embryo* straight. Plants usually with scaly bulbs.

ANALYSIS.

1. Cauline leaves none, radical leaves 2 ..... *Erythronium*, 3
   Cauline leaves present, or radical leaves numerous 2
2. Flowers white or reddish 3
   Flowers yellow ..... *Lilium*, 1
3. Leaves stiff and pointed ..... *Yucca*, 2
   Leaves not stiff 4
4. Flowers in spikes ..... *Convalaria*, 8
   Flowers in panicles ..... *Nolina*, 6
   Peduncles axillary ..... *Polygonatum*, 7
   Flowers in umbels or racemes 5
5. Fruit baccate ..... *Smilacina*, 9
   Fruit capsular 6
6. Flowers in umbels ..... *Allium*, 5
   Flowers in racemes ..... *Ornithogalum*, 10

GENUS I.—LIL'IUM. Tourn. 6—1.

(From the Celtic word *lis*, whiteness.)

Perianth campanulate, deeply 6-parted. *Segments* straight or reflexed, with a longitudinal, nectariferous line. *Stamens* 6. *Stigma* entire. *Pod* oblong; seeds numerous, 2 rows in each cell.

1. L. CATES'BÆI, (Walt.) *Stem* erect, simple, glabrous. *Leaves* sessile, linear-lanceolate, appressed, most numerous near the middle of the stem. *Flowers* solitary, terminal. *Perianth* erect, the segments with long claws, undulate at the margin, reflexed at the summit.—Scarlet, spotted with yellow and brown. ♃. June—Aug. Pine-barrens 18—24 inches.

2. L. Philadel'phicum, (L.) *Stem* erect, glabrous. *Leaves* verticillate, linear-lanceolate, acuminate. *Flowers* 1—2. *Perianth* erect, campanulate; spreading segments unguiculate.—Dark orange, spotted at the base. ♃. July—Aug. Woods. 1—2 feet.

3. L. Canaden'se, (Pursh.) *Stem* erect, terete, glabrous. *Leaves* verticillate, in remote whorls, lanceolate, 3-nerved, hirsute along the nerves beneath. *Flowers* on long reflexed peduncles, generally by threes. *Perianth* campanulate, revolute; segments lanceolate.—Yellow, spotted on the inside. ♃. July—Aug. Wet lands. 2—3 feet.

4. L. Carolinia'num, (Mich.) *Stem* erect, terete. *Leaves* verticillate and scattered, lanceolate, cuneate. *Flowers* terminal, solitary, in pairs, or by threes. *Perianth* with the segments long, lanceolate, the midrib of the three interior winged.—Deep yellow, spotted with purple. ♃. July—Aug. Damp soils. Low country. 1—2 feet.

5. L. super'bum, (L.) *Stem* erect, terete, glabrous. *Leaves* linear-lanceolate, 3-nerved, the lower ones verticillate, the upper scattered. *Flowers* in a pyramidal raceme. *Perianth* revolute.—Deep yellow, spotted with purple. ♃. July—Aug. Up country. 5—6 feet.
Superb Lily.

Genus II.—YUC'CA. L. 6—1.

(The name of the plant in Peru.)

Perianth campanulate, expanding. *Stamens* 6. *Stigma* sessile. *Capsule* 3-celled.

1. Y. filamento'sa, (Pursh.) *Leaves* lanceolate, with filamentous margins, the veins roughened on both surfaces. *Scape* long, terminated by a long panicle. *Stigmas* recurved, expanding.—White. ♃. Aug. —Sept. Common in rich soils. 7—8 ft. *Silk-grass. Bear-grass.*

2. Y. glorio'sa, (Pursh.) *Stem* erect, thick, succulent, usually simple, roughened toward the base by the remains of decayed leaves. *Leaves* crowded, lanceolate, acute, thick. *Flowers* in a large, terminal panicle, consisting of simple racemes. *Pedicels* stipulate at the base. *Perianth* 6-leaved; leaves lanceolate, acute, slightly ciliate. *Filaments* pubescent, compressed. *Stigmas* bifid, concave. *Capsule* pulpy, glabrous.—White. ♄. May—Aug. On the sea-coast. Cultivated in the up country. 2—6 feet. *Dwarf Palmetto.*

3. Y. Draco'nis, (L.) *Stem* erect, branching. *Leaves* lanceolate, reflexed when old, the margins rigid; the young leaves erect and expanding. *Flowers* in racemose panicles similar to the preceding.—White. ♄. May—Aug. On the sea-coast. Cultivated. 10—12 feet.

4. Y. recurvifo'lia, (Salis.) *Stem* erect, simple. *Leaves* recurved, linear-lanceolate, with the margins filamentose. *Flowers* in racemose panicles. Leaves of the perianth unequal, the interior widest.—White. ♄. May—Aug. On the sea-coast of Geo. 3—4 feet.

Genus III.—ERYTHRO'NIUM. L. 5—1.

(From *erythros*, red.)

Perianth 6-leaved, campanulate. *Stamens* 6. *Style* 1, 3-angled. *Nectary* consisting of 2 tubercles attached to the base of alternate leaves.

1. E. AMERICA'NUM, (Smith.) *Leaves* lanceolate, sheathing at the base, variegated with purple. *Scape* bearing a solitary, nodding flower; the 3 exterior leaves of the perianth reflexed. *Stamens* short. *Capsule* 3-celled, 3-valved, many-seeded.—Yellow. 4. March—April. Common. 6—8 inches.

This plant when fresh has long been known to be an emetic, but, as far as we know has been but little used for any purpose. In scrofulous sores it is used in family practice, by making the fresh plant into poultices, with milk, and applying to the sores. Happy effects are said to result from its application in this manner.

GENUS IV.—SCIL'LA. 6—1. *L. squill.*

Perianth 6-leaved, spreading. *Stamens* 6; filaments oval-shaped. *Style* slender. *Ovary* 3-valved, 3-celled, triangular, many-seeded. *Seeds* black, angular.

1. S. ESCULEN'TA, (Ker.) *Scape* arising from a truncated bulb. *Leaves* long, linear, keeled. *Flowers* in a simple raceme, elongated, bracteate. *Sepals* 3-nerved, spreading.—Pale blue. Ky. and Tenn.
Eastern Quamash. Wild Hyacinth. *Phalangium esculentum*, Nutt.
Camassia esculenta, Lind.

This plant is said to be found south of the Alleghany Mountains in Alabama. We are not certain of the fact.

GENUS V.—AL'LIUM. L. 6—1.

(From the Celtic *all*, hot or burning.)

Perianth 6-parted, expanding. *Flowers* in umbels, clustered, arising from a 2-leaved spathe. *Capsule* superior. *Stamens* 6. *Style* 1.

1. A. CANADEN'SE, (L.) *Leaves* linear, flat, straight, about 4—6 inches long; scape terete, erect, about the length of the leaves. *Head* bearing bulbs; segments of the perianth oval.—White. 4. June. In wet soils. Common. *Wild Meadow Garlick.*

2. A. CER'NUUM, (Muhl.) *Leaves* linear, flat, striate; scape slightly ancipitous. *Flowers* in umbels, numerous, nodding. Leaves of the perianth lanceolate.—Rose-colored. 4. July. Mountains. 1—2 feet. *Wild Onion.*

3. A. STRIA'TUM, (Pursh.) *Leaves* glabrous, linear, concave; scape as long as the leaves, compressed; spathe 2-leaved, united at the base, acute, withering. *Flowers* in a simple umbel. Leaves of the perianth unequal, the exterior largest. *Filaments* unequal.—White. 4. March—April. Low lands. 12—15 inches.

4. A. MUTAB'ILE, (Mich.) *Leaves* linear, flat, narrow, setaceous at the summit, membranaceous at the base. *Scape* terete; spathe 3-leaved. *Umbels* many-flowered. Leaves of the perianth lanceolate, acute.—Green, becoming red. 4. May—June. Pine-barrens. 2 feet.

GENUS VI.—NOLI'NA. Mich. 6—3.

(In honor of P. C. Nolin, an American botanist.)

Perianth 6-parted, expanding. *Stamens* 6. *Stigmas* 3. *Capsule* 3-angled, 3-celled, 1 seed in each cell.

1. N. GEORGIA'NA. *Stem* erect, with small, subulate scales at the base. *Leaves* linear, long, coriaceous, scabrous along the margins. *Flowers* in racemose panicles, small.—White. 2f. April—May. Sandhills. Middle Carolina and Georgia.

GENUS VII.—POLYGONA'TUM. Desf. 6—1.

(From *polus*, many, and *gonu*, joint.)

Perianth 6-cleft, cylindrical. *Stamens* 6, inserted near the summit of the tube. *Fruit* baccate, 3-celled, with two seeds in each cell.

1. P. BIFLO'RUM, (Walt.) *Stem* erect, glabrous. *Leaves* elliptic-lanceolate, sessile, alternate, 3-nerved. *Peduncles* axillary, solitary, 2-flowered.—Pale yellow. ☺. July—Aug. 12—18 inches.

2. P. MULTIFLO'RUM, (L.) *Stem* erect, terete. *Leaves* oblong, oval, broader than the preceding species, amplexicaul, usually 7-nerved. *Peduncles* long, axillary, several-flowered.—Pale yellow. ☺. April—August. Common. 15—24 inches.

3. P. PUBES'CENS, (Pursh.) *Stem* slightly furrowed. *Leaves* ovate, alternate, amplexicaul, pubescent beneath. *Peduncles* short, axillary, usually 2-flowered.—☺. May—June. On the banks of rivulets. 1—2 feet. *Solomon's Seal.*

GENUS VIII.—CONVALLA'RIA. L. 6—1.

(From *convallis*, a valley.)

Perianth campanulate, 6-cleft, inferior. *Stamens* 6, inserted into the base of the perianth. *Style* 1. *Fruit* globose, 3-celled, cells 1—2-seeded.

1. C. MAJA'LIS, (L.) *Leaves* ovate; scape naked, smooth. *Flowers* in spikes, campanulate, nodding.—White. 2f. May. Mountains. 1—2 feet.

GENUS IX.—SMILACI'NA. Desf. 6—1.

(From *smile*, a scraper, from its rough stem.)

Perianth 6-parted, expanding. *Stamens* 6, expanding, inserted into the base of the segments of the perianth. *Fruit* baccate, 3-celled.

1. S. UMBELLA'TA, (Pursh.) *Stem* erect, pubescent. *Leaves* embracing the base of the stem, oblong-oval, many-nerved, attenuate at the base, ciliate. *Flowers* in a small terminal umbel.—Pale yellow. 2f. May—Aug. 12—15 inches.

2. S. RACEMO'SA, (Pursh.) *Stem* geniculate, leafy. *Leaves* oblong, sessile, acuminate, many-nerved. *Flowers* in terminal racemes, crowded.—Nearly white. 2f. June—July. Common. 1—2 feet. *False Spikenard.*

GENUS X.—ORNITHOG'ALUM. 6—1. (*Star of Bethlehem.*)

Perianth 6-leaved, erect, persistent, expanding near the sum-

mit. *Stamens* 6, dilated at the base, hypogynous. *Capsule* angled, 3-celled.

1. O. CRO'CEUM, (Ell.) *Stem* none. *Leaves* linear, nerved, flat, 12—18 inches long. *Scape* terete, glabrous. *Flowers* in a terminal raceme, on peduncles twice as long as the flower. *Bracts* ovate, short; leaves of the perianth oval, obtuse. *Filaments* subulate.—White. 2f. June—July. Middle Geo. 12—18 inches.

ORDER CXXXI.—MELANTHA'CEÆ.

Perianth 6-parted, petaloid, inferior. *Stamens* 6. *Anthers* usually turned outward. *Ovary* 3-celled, many-seeded. *Style* 3-parted. *Stigmas* 3. *Capsule* divisible into 3 pieces. Herbaceous plants, with leaves sheathing at the base.

ANALYSIS.

1. Stamens 9 ..... *Pleea*, 2
   Stamens 6 2
2. Styles 1 3
   Styles 3 4
3. Fruit baccate ..... *Streptopus*, 7
   Fruit capsular ..... *Uvularia*, 6
4. Perianth with an involucre ..... *Tofieldia*, 1
   Perianth without an involucre 5
5. Flowers white 6
   Flowers greenish-white 7
6. Leaves of the perianth with glands ..... *Zygadenus*, 4
   Leaves of the perianth without glands ..... *Helonias*, 3
7. Leaves narrow ..... *Melanthium*, 5
   Leaves broad ..... *Veratrum*, 8

GENUS I.—TOFIEL'DIA. Hudson, 6—3.

(In honor of Mr. Tofield.)

Perianth 6-parted, with a 3-parted involucre at the base. *Stamens* 6. *Style* 1. *Capsule* 3—6-celled, united at the base.

1. T. PU'BENS, (Smith.) *Stem* scabrous, simple, naked toward the summit. *Leaves* ensiform, narrow, glabrous, the upper one very small. *Flowers* in racemes. Segments of the perianth lanceolate, alternately larger; the involucre very small, 3-toothed. *Stamens* attached to the base of the perianth. *Capsule* 3-angled, 3-valved, 3-celled, with 2 seeds in a cell.—Green and purple. 2f. July—Sept. In wet soils. Common. 1—2 feet.

2. T. GLABER'RIMA, (Nutt.) *Stem* terete, leafy near the base. *Leaves* linear, ensiform, sheathing. *Flowers* in racemes, nearly verticillate. *Involucre* small, 3-toothed. Segments of the perianth oblong-oval.—White. 2f. Oct. Middle Car. and Geo. 2—3 feet.

GENUS II.—PLE'EA. Mich. 9—3.

(From *pleias*, the seven stars, from the disposition of its flowers.)

Perianth 6-parted, expanding. *Stamens* 9. *Styles* 3. *Capsule* 3-angled, 3-valved, 3-celled. *Seeds* numerous, attached to the margin of the valves.

1. P. TENUIFO'LIA, (Mich.) *Stem* erect, leafy. *Leaves* ensiform, narrow, glabrous. *Flowers* in a terminal spike. *Spathe* 1-flowered; segments of the perianth lanceolate, acute.—Yellowish-red. 4. May—June. Wet soils. Carolina. 1—2 feet.

GENUS III.—HELO'NIAS. L. 6—3.

(From *helos*, a marsh.)

Perianth 6-leaved. *Leaves* flat, sessile, without glands. *Stamens* 6. *Styles* 3, distinct. *Capsule* 3-celled, few-seeded, 3-horned.

1. H. ERYTHROSPER'MA, (Mich.) *Stem* erect, leafy, glabrous. *Leaves* linear, long, nerved. *Flowers* in oblong racemes, with short bracts. Leaves of the perianth ovate, sessile, persistent. *Capsule* shortened, with divaricate horns. *Seed* red.—White. 4. April—May. Rich soils. 2 ft. *Fly Poison. Amiantanthus muscœtoxicum*, Gray.

2. H. ANGUSTIFO'LIA, (Mich.) *Stem* erect, terete, glabrous, leafy. *Leaves* linear, long, subulate, upper ones very minute. *Flowers* in terminal racemes. *Capsule* oblong, with the summit appressed. *Seed* linear.—White. 4. June—July. Damp soils. 1—2 feet.
Amiantanthus angustifolius, Gray.

3. H. DIOI'CA, (Pursh.) *Stem* erect, slightly angled, glabrous, leafy. Radical leaves spatulate, long; cauline ones narrower, becoming almost linear toward the sumit. *Flowers* in simple racemes, diœcious. Leaves of the perianth linear, obtuse, green, 3-furrowed. *Stigmas* 3, sessile. *Capsule* 3-celled, many-seeded.—White. 4. May—June. Damp soils. Very common. 2—3 feet.
Unicorn Plant, or *Blazing Star. Chamælirium Carolinianus*, Willd

4. H. ASPHODELOI'DES, (L.) *Stem* leafy, scapiform. *Leaves* numerous, elongated, linear, rigid, flat, striate; cauline ones shorter and narrower. *Flowers* in elongated racemes; pedicels long, filiform; filaments subulate, dilated at the base. *Capsule* sub-globose, 3-celled, 3-valved.—White. 4. Sandy woods, from New Jersey to Geo.
Xerophyllum asphodeloides, Gray.

5. H. GRAMIN'EA, (Ell.) *Stem* leafy, branches recurved. *Leaves* linear, flat, glaucous underneath. *Flowers* in a compound raceme, pyramidal; leaves of the perianth broad-oval.—White. New Jersey to Carolina. 18—24 inches. *Amiantanthus leimanthoides*, Gray.

6. H. DU'BIA, (Pursh.) *Scape* simple, glabrous. *Leaves* keeled, long, narrow, grass-like. *Flowers* small, in a spike, 3—4 inches long.—Pale green. Geo. and Flor. Sandy places. 2—3 feet.
Schœnocaulon gracile, Gray.

GENUS IV.—ZYGADE'NUS. Rich, 6—3.

(From *zugos*, a yoke, and *aden*, a gland; the glands on the petals.)

Perianth 6-leaved, expanding, with 2 glands at the base of each. *Stamens* 6, inserted into the petals. *Styles* 3, shorter than the stamens. *Capsule* membranaceous, 3-celled, many-seeded.

1. Z. GLABER'RIMUS, (Mich.) *Stem* erect, leafy, terete. *Leaves* sessile, linear-lanceolate, glabrous, channeled, long and wide. *Flowers* in a

terminal panicle. Leaves of the perianth equal, persistent. *Capsule* 3-sided, furrowed, 3-celled, pointed with the persistent styles. *Seed* numerous, angled.—White. 4. June. In wet soils. 2—4 feet.

2. Z. HYBRI'DUS, (Endl.) *Leaves* linear-lanceolate, elongated. *Flowers* in panicles; leaves of the perianth narrow, unguiculate; lamina rhomboid, sub-orbiculate, margin undulate.—Greenish-yellow. 4. Canada to Georgia.

GENUS V.—MELAN'THIUM. L. 6—3.

(From *melas*, black, and *anthos*, flower, in allusion to the dusky color of the flowers.)

Perianth rotate, expanding; segments unguiculate, with 2 glands at the base. *Stamens* 6, arising from the claws of the perianth. *Capsule* sub-ovate, 3-celled, partly trifid. *Seed* numerous, winged.

1. M. VIRGIN'ICUS, (Endl.) *Stem* erect, terete, pubescent, leafy. *Leaves* long, linear-lanceolate, flat, smooth. *Flowers* in a large panicle, pyramidal; segments of the perianth ovate, somewhat hastate, flat. *Flowers* polygamous.—Greenish-white. 4. June—July. Wet meadows. 3—4 feet. *Zygadenus Virginicus*

2. M. MONŒ'CUS. *Stem* erect, pubescent. *Leaves* linear-lanceolate. flat. *Flowers* monœcious, the lower sterile, the upper fertile, in paniculate racemes. Leaves of the perianth flat, slightly unguiculate.—Greenish-white. 4. July. Mountains. 1—2 feet.

GENUS VI.—UVULA'RIA. L. 6—1.

(From *uvula*, used in curing the disease of the uvula.)

Perianth inferior, 6-parted, erect, with a nectariferous cavity at the base. *Stamens* 6, hypogynous, short. *Stigmas* 3, reflexed. *Capsule* 3-celled, 3-valved, many-seeded, angled.

1. U. PERFOLIA'TA, (L.) *Stem* erect. *Leaves* perfoliate, elliptic, obtuse. *Perianth* campanulate, granular within. *Flowers* solitary, axillary, nodding. *Capsule* 3-angled, truncate.—Yellow. 4. April. Common. 8—12 inches.

2. U. FLA'VA, (Smith.) *Leaves* perfoliate, elliptic, oblong, obtuse, undulate at the base. *Perianth* tapering at the base, scabrous within. *Anthers* awned.—Bright yellow. 4. May—June. Sandy soils. Common. 8—12 inches.

3. U. GRANDIFLO'RA, (Smith.) *Leaves* perfoliate, oblong, acute. *Perianth* glabrous. *Anthers* unawned. *Nectaries* nearly round; pistil shorter than the stamens.—Yellow. 4. May—June. Rocky hills. 12—18 inches.

4. U. PUBER'ULA, (Mich.) *Leaves* oval, rounded at the base, amplexicaul, pubescent along the margin. *Flowers* few, glabrous.—Yellow. May—June. Upper Car. and Geo. 8—12 inches.

5. U. SESSILIFO'LIA, (Pers.) *Leaves* sessile, lanceolate-oval, many-nerved. *Flower* 1, on a short peduncle. Segments of the perianth flat, smooth within.—Yellow. 4. May—June. Common. 8—12 inches

GENUS VII.—STREP'TOPUS. Mich. 6—1.

(From *streptos*, twisted, and *pous*, foot, from the twisted flower-stalks.)

Perianth 6-parted, revolute, campanulate, with nectariferous pores at the base. *Stamens* 6. *Style* 1. *Fruit* baccate, subglobose, 3-celled, few-seeded.

1. S. RO'SEUS, (Mich.) *Stem* erect, glabrous, dichotomous. *Leaves* oval, acuminate, clasping, many-nerved. *Flowers* axillary, solitary, small, on nodding peduncles.—Rose-colored. 2f. May—June. Mountains. 12—18 inches. *Hekorima dichotoma.*

2. S. LANUGINO'SUS, (Mich.) *Stem* hoary, erect, branching. *Leaves* sessile, ovate, acuminate, somewhat cordate, 5—7-nerved, pubescent. *Peduncles* at the summit of the branchlets, 2-flowered. *Flowers* on long pedicels. *Fruit* red.—Greenish-purple. 2f. Mountains. Pennsylvania to Carolina. *Prosartes lanuginosa*, Don.

GENUS VIII.—VERA'TRUM. 6—3.

(From *vere atrum*, truly black; in allusion to the color of the stem.)

Perianth 6-parted, expanding, the segments sessile, without glands. *Stamens* 6, inserted on the receptacle. *Style* 3, short. *Capsule* oblong, 2-valved, many-seeded.

1. V. VIR'IDE, (Ait.) *Stem* erect. *Leaves* large, sheathing at the base, plaited, oval. *Flowers* in paniculate racemes. Bracts of the branches oblong-lanceolate; partial ones longer than the sub-pubescent peduncles. Segments of the perianth oblong-oval, acute.—Greenish-yellow. 2f. July. Mountains. 3—6 feet.

2. V. PARVIFLO'RUM, (Mich.) *Leaves* oval-lanceolate, flat, glabrous. *Flowers* in slender, expanding panicles. Segments of the perianth acute at each end, bearing the stamens.—Green. 2f. July. Mountains. 2—3 feet. *Zygadenus monœcus*, Gray.

3. V. ANGUSTIFO'LIUM, (Pursh.) *Flowers* dicœcious, in simple panicles. Segments of the perianth linear; leaves very long, linear, keeled.—Greenish-yellow. 2f. June. Mountains. 3—4 feet. *Stenanthium angustifolium*, Gray.

ORDER CXXXII.—PONTEDERIA'CEÆ.

Perianth tubular, colored, 6-parted, more or less irregular, æstivation circinate. *Stamens* 3 or 6, unequal, perigynous. *Ovary* superior, 3-celled, many-seeded. *Style* 1. *Stigma* simple. *Capsule* 3-celled, 3-valved, dehiscence loculicidal. *Seeds* numerous, orthotropous. *Placentæ* central. Aquatic plants, with leaves sheathing at the base. *Flowers* spathaceous.

GENUS I.—PONTEDE'RIA. L. 6—1. (*Pickerel Weed.*)

(In honor of Julius Pontedera, of Padua.)

Perianth inferior, 6-parted, bilabiate, the under side of the tube perforated with 3 longitudinal foramina, lower part persistent. *Stamens* 6, unequally inserted. *Capsule* 3-celled.

1. P. CORDA'TA, (L.) *Stem* none. *Leaves* cordate, obtuse, entire, membranaceous, glabrous; petioles very long, succulent. *Flowers* in crowded spikes. *Corolla* villous on the outer surface; the upper lip 3-parted, the lower 3-cleft, with a yellow spot at the center; 3 of the stamens at the base of the tube, and 3 at the summit.—Blue. 4. April—Sept. Bogs and ditches. *Wampee.*

2. P. LANCIFO'LIA, (Muhl.) *Stem* none. *Leaves* oblong, lanceolate, nearly linear when young; in other respects similar to the preceding species.

GENUS II.—HETERANTHE'RA. Beau. 3—1.

(From *heteros*, variable, and *anthera*, an anther.)

Flowers in a spathe, *Perianth* with the border 6-parted, equal. *Stamens* 3. *Anthers* unlike. *Capsule* 3-celled, many-seeded.

1. H. RENIFOR'MIS, (R. & P.) *Stem* partly floating. *Leaves* orbicular, reniform, on petioles; spathe oblong, acuminate, 3—5-flowered.—White. 4. July—Aug. North Carolina. *Mud Plantain.*

GENUS III.—SYE'NA. Pursh. 3—1. (*Mayaca*, Sch.)

(In honor of Arnold Syen, of Leyden.)

Sepals 3, persistent. *Petals* 3. *Stamens* 3. *Style* 1. *Capsule* 3-celled, 1-valved.

1. S. FLUVIAT'ILIS, (Pursh.) *Stem* herbaceous, partly submersed. *Leaves* subulate, crowded. *Flowers* axillary, solitary, on peduncles longer than the leaves.—Purple. 4. June. In wet places. Middle Car. and Geo. 2—3 inches. *Myaca Michauxii*, Schw.

ORDER CXXXIII.—XYRIDA'CEÆ.

Sepals glumaceous, 3. *Petals* 3, unguiculate. *Stamens* 6, with 3 fertile ones inserted into the claws of the petals, and 3 sterile ones alternate with the petals. *Ovary* single. *Style* 3-cleft. *Capsule* 1-celled, 3-valved, many-seeded, with parietal placentæ. Herbaceous plants, with radical ensiform leaves. *Flowers* in terminal imbricate heads.

GENUS I.—XY'RIS. L. 3—1.

(From *xuros*, acute, from the shape of its leaves.)

Sepals 3, glumaceous, somewhat cartilaginous. *Petals* 3, equal, crenate. *Stigma* 3-cleft.

1. X. FLEXUO'SA, (Ell.) *Stem* erect, spiral, dilated at the summit, furrowed with two lines, glabrous. *Leaves* ensiform, spiral, sheathing. *Flowers* in terminal imbricate heads. *Bracts* ovate, rigid, inclosing the flower. *Petals* unguiculate. *Capsule* 1-celled, 3-valved. *Seeds* numerous, small.—Yellow. 4. July—Sept. Pine-barrens. Common. 2 ft. *X. Caroliniana*, Walt.

2. X. FIMBRIA'TA, (Ell.) *Stem* erect, slightly scabrous, dilated at the

summit. *Leaves* ensiform, long. *Flowers* in oblong heads. *Bracts* round. *Sepals* fimbriate, longer than the bracts.—Yellow. 2. July —Aug. Middle Geo. 2 feet.

3. X. BREVIFO'LIA, (Mich.) *Stem* erect, compressed toward the summit. *Leaves* twisted, subulate. *Calyx* incised, linear. *Flowers* in globose heads.—Yellow. 2. August—Sept. Pine-barrens. Common. 12—18 inches.

4. X. JUN'CEA, (Bald.) *Stem* erect, terete. *Leaves* terete, 4—8 inches long, fistular. Keel of the calyx slightly toothed.—Yellow. 2. May —June. Pine-barrens. Southern Geo. 12—18 inches.

X. Baldwiniana, K.

5. X. BULBO'SA, (Kunth.) *Leaves* narrow, linear, obtuse, membranaceous, glabrous. *Peduncles* double the length of the leaves; above striate, sub-triangular. *Heads* ovate, acute, many-flowered; scales ovate, convex. Peduncles 2 ft. long, sheathed below.—Yellow. Mass. to Georgia.

6. X. AMBIG'UA, (Beyr.) *Leaves* sword-shaped, linear, acute. *Peduncles* 2—3 times the length of the leaves, many-angled, compressed, rigid, sheathing at the base, scabrous on the angles. *Heads* elliptical, many-flowered; scales obovate, coriaceous.—Yellow. 2. 1½—2 feet.

ORDER CXXXIV.—JUNCA'CEÆ. (*Rush Family.*)

Perianth 6-parted, more or less glumaceous. *Stamens* 3—6, inserted into the base of the segments. *Ovary* 1—3-celled, 1 or many-seeded. *Style* 1. *Stigmas* generally 3, sometimes 1. *Fruit* capsular, 3-valved; dehiscence loculicidal. Herbaceous plants, with fistular or flat channeled leaves. *Flowers* brown or green.

GENUS I.—JUN'CUS. L. 6—1.

(From *jungo*, to join, from ropes being made of it.)

Perianth 6-parted, with 2 bracts at the base, glumaceous. *Stamens* 6. *Capsule* 3-celled, 3-valved, many-seeded, dissepiments bearing the seeds.

a. Leaves none.

1. J. ACU'TUS, (L.) *Stem* erect, rigid, hard, with a sheath at the base. *Flowers* in terminal panicles. *Involucre* 2-leaved, erect, spinous. Leaves of the perianth lanceolate, acute, the three exterior longest. *Capsule* obovate, pointed with the persistent style.—Brown. 2. April. Salt marshes. 2—3 feet. *J. maritimus.*

2. J. EFFU'SUS, (L.) *Stem* erect, terete, soft, with a sheath at the base. *Flowers* in compound panicles. *Stamens* 3. Leaves of the perianth acute, equal, with white margins. *Capsule* 3-angled. *Seed* oblong.—2. April—May. Wet soils. Common. 2—3 feet. *J. communis.*

3. J. SETA'CEUS, (Ros.) *Stem* filiform, terete, declining. *Flowers* in lateral panicles. Leaves of the perianth lanceolate, acute, the outer ones largest.—2. July. Swamps. 2—3 feet.

b. Plants with leaves.

4. J. TEN'UIS, (Pers.) *Stem* erect, terete, simple, sometimes naked. *Leaves* channeled, linear-subulate, concave, the radical ones shorter than the stem, cauline ones longer. *Flowers* in panicles, sessile; the 2 lower leaves of the involucre longer than the panicle.—♃. April—May. In wet pastures. Common. 10—12 inches.

5. J. DICHOT'OMUS, (Ell.) *Stem* erect, glabrous, sometimes naked. *Leaves* channeled, filiform, shorter than the stem, sheathing. *Flowers* in dichotomous panicles, solitary, one leaf of the involucre longer than the panicle. Leaves of the involucre nearly equal.—♃. April—May. In wet pastures. 1—2 feet.

6. J. BUFO'NIUS, (L.) *Stem* terete, dichotomous toward the summit. *Leaves* angled, subulate, concave, sheathing at the base. *Flowers* in terminal panicles, solitary, or by pairs. Leaves of the perianth acute, the 3 exterior longest.—☺. March—May. On the coast. 3—6 in.

7. J. BIFLO'RUS, (Ell.) *Stem* erect, glabrous, leafy. *Leaves* linear, flat, sheathing. *Flowers* in long panicles. Leaves of the perianth lanceolate, somewhat ferruginous. *Stamens* 3.—♃. May—July. Around ditches and ponds. 2—3 feet. *J. aristulatus.*

8. J. ARISTA'TUS, (Mich.) *Stem* erect, compressed. *Leaves* flat, glabrous, nerved, sheathing at the base. *Flowers* in terminal panicles.—♃. May—June. Damp soils. Common. 2—3 ft. *J. aristulatus.*

9. J. RE'PENS, (Mich.) *Stem* geniculate, compressed, leafy. *Leaves* linear, flat. *Flowers* in lateral and terminal fascicles. *Stamens* 3. Leaves of the perianth subulate, acute, the interior longest.—♃. May—July. Muddy soils. Very common. 6—12 inches.

10. J. ACUMINA'TUS, (Mich.) *Stem* terete, jointed, glabrous. *Leaves* terete, jointed, with an open sheath at the base. *Flowers* in trichotomous panicles. Leaves of the perianth acute, rigid, nearly equal. *Stamens* 3.—♃. March—May. Damp, wet places. 1—2 feet.

11. J. POLYCEPH'ALUS, (Mich.) *Stem* compressed toward the base, terete above. *Leaves* ensiform, jointed, compressed, long. *Flowers* in panicles, composed of numerous heads. Leaves of the perianth acute, nearly equal. *Stamens* 3. *J. paranotus.*

12. J. ECHINA'TUS, (Muhl.) *Stem* terete, glabrous. *Leaves* terete, jointed, sheathing at the base. *Flowers* in large, terminal heads. Leaves of the perianth subulate, rigid. *Stamens* 3.—♃. May—Aug. Wet soils. Very common. 2 feet.

GENUS II.—LUZULA. D. C.

(Said to be derived from *luciola*, a glow-worm; because its flowers sparkle by moonlight.)

Perianth spreading, glumaceous. *Stamens* 6. *Stigmas* 3. *Capsule* 1-celled, 3-valved. *Seeds* 3.

1. L. MELANOCAR'PA, (Desv.) *Leaves* broad-linear, flat; sheaths smooth. *Flowers* in lax branches, sub-paniculate; pedicels elongated, slender; bracts incised, dentate at the apex, glabrous; sepals oblong, mucronate. *Stamens* short.—♃. Car. northward.

2. L. CAMPES'TRIS, (L.) *Stem* leafy, terete. *Leaves* flat, pubescent, shorter than the stem, very hairy at the throat of the sheath. *Flowers*

in a simple umbel. Leaves of the perianth ovate, acuminate, with membranaceous margins. *Capsule* 3-angled, truncate, 3-valved, 3-seeded.—2f. May—June. Abundant near Macon.

Order CXXXV.—PALMA'CEÆ. (*Palm Tribe.*)

Flowers perfect or polygamous. *Perianth* 6-parted, in 2 series, persistent. *Stamens* 6, opposite the segments of the perianth, into the base of which they are inserted. *Ovary* 1—3-celled: when 3-celled it is deeply lobed, cells 1-seeded. *Fruit* baccate or drupaceous.

Genus I.—SA'BAL. Adans. 6—3.

Flowers perfect. *Stamens* 6. *Styles* 3. *Spathes* partial. *Filaments* thickened at the base. *Fruit* dry, 1-seeded. *Seed* bony.

1. S. pu'mila, (Walt.) *Stem* none. *Leaves* flabelliform, 1—3 feet high. *Stipes* naked, compressed. *Scape* erect, terminated by a long panicle. *Flowers* small, nearly sessile. *Fruit* nearly round, bluish black.—White. 2f. June—Aug. Along the coast of Car. and Geo. 4—6 feet. *Dwarf Palmetto. S. Adansonii.*

2. S. min'ima, (Nutt.) *Stem* creeping; frond palmate, plicate; stipe serrate. *Berry* oblong-ovoid.—Georgia and Florida.

Genus II.—CHAM'ÆROPS. 19—2.

(From *chamai*, on the ground, and *rhops*, a twig.)

Flowers polygamous. *Spathe* compressed; spadix branching. *Filaments* partly united. *Drupe* 3-celled, only 1 usually containing a seed.

1. C. serrula'ta, (Mich.) *Stem* creeping. *Leaves* flabelliform, with the stipes sharply serrate. *Scape* terminated by a panicle. *Flowers* small. *Fruit* nearly black, 1-seeded.—White. July—Aug. Common in sandy soils, along the Ocmulgee. *Sabal serrulata*, Rom.

2. C. hys'trix, (Fraser.) *Stem* creeping. *Leaves* flabelliform, with the stipes intermingled with long thorns from the root. *Flowers* as in the preceding species.—White. 2f. June—Aug. In clayey soils. 4—5 feet. *Blue Palmetto.*

3. C. palmet'to, (Mich.) A tree. *Leaves* palmate, flabelliform, 5—6 feet in length, crowded at the summit of the tree. *Flowers* in naked panicles. *Fruit* bluish-black.—White. ♄. June—July. On the sea-coast of Car. and Geo. 40—50 ft. *Palmetto. Sabal palmetto*, Lord.

The following remarks of Elliott on the *C. Palmetto* are peculiarly appropriate: "This palm possesses a great, and, to this country, an increasing value. It is the only tree produced in our parts which is not attacked by the *Teredo Navalis;* and as it is incorruptible in salt-water, its value for submarine construction is almost incalculable. Its leaves can be employed in the manufacture of hats, baskets, mats, and many other purposes of domestic economy; and the Cabbage, composed of the unexpanded embryo leaves, may be classed among the most delicious vegetables produced on our tables. It is, however, a wasteful luxury, as the tree always perishes when deprived of this part of its foliage."

Order CXXXVI.—COMMELYNA'CEÆ. (*Spider-wort Family.*)

Sepals 3, distinct. *Petals* 3, sometimes united at the base. *Stamens* 6, or sometimes fewer, hypogynous, a part of them deformed or abortive. *Ovary* 3-celled, with few ovules in a cell. *Style* 1. *Stigma* 1. *Capsule* 2—3-celled, with as many valves. *Seed* anatropous, inserted by their whole side, on the inner angle of the cell. Herbaceous plants.

Genus I.—COMMELY'NA. L. 3—1.

(In honor of J. & G. Commelyn, Dutch botanists.)

Sepals 3. *Petals* 3. *Stamens* 6, usually 3 of them sterile and furnished with cruciform glands. *Capsule* 3-celled, 3-valved.

1. C. COMMU'NIS, (L.) *Stem* prostrate, creeping, glabrous, much branched, jointed. *Leaves* alternate, ovate-lanceolate, with cartilaginous margins, sheathing, with the sheath ciliate. *Flowers* on peduncles, opposite the leaves. *Bracts* ciliate. *Sepals* unequal, the lateral ones large, obtuse. *Petals* unequal, the lateral ones rounded, spatulate, the others reniform. *Style* blue. *Seed* 2 in a cell.—Light-blue. ☺. June —Nov. Wet grounds.

2. C. EREC'TA, (L.) *Stem* procumbent and erect, branching near the base, slightly pubescent. *Leaves* ovate-lanceolate, slightly scabrous on the upper surface, sheathing; sheath ciliate. *Bracts* cordate, inclosing the flower before it expands. *Sepals* 3, oval, unequal, white. *Petals* 2, one larger than the other.—Blue. 4. May—June. Dry sandy soils. 12—18 inches.

3. C. VIRGIN'ICA, (L.) *Stem* erect, slightly pubescent, striate. *Leaves* oblong, finely serrulate, scabrous, slightly hairy, sheathing at the base; sheath ciliate. *Flowers* clustered, axillary, or terminal. *Sepals* 3, membranaceous, unequal. *Petals* 5, unequal, lower one smallest.—Blue. 4. Aug.—Oct. Moist places. 2 feet.

4. C. HIRTEL'LA, (Vahl.) *Stem* erect, hairy. *Leaves* lanceolate, petiolate; sheaths lateral and terminal, sessile.—July. In shaded, rocky situations.

5. C. ANGUSTIFO'LIA, (Mich.) *Stem* assurgent, branching, glabrous. *Leaves* lanceolate, acuminate; sheaths hirsute, ciliate at the orifice. *Spathe* cucullate, acuminate, subcordate-ovate. *Sepals* glabrous; exterior glandular, punctate; interior petaloid, unequal, sessile.—Purple. 4. Carolina to Pennsylvania.

Genus II.—TRADESCAN'TIA. L. 6—1.

(In honor of John Tradescant, gardener to Charles I.)

Sepals 3. *Petals* 3. *Stamens* 6, villous, with jointed hair. *Style* 1. *Capsule* 3-celled, many-seeded.

1. T. VIRGIN'ICA, (L.) *Stem* erect, branching, glabrous, succulent. *Leaves* long, lanceolate, glabrous, sessile, channeled. *Flowers* in termi-

nal clusters, sessile, pubescent; involucre 2-leaved. *Petals* ovate, expanding in the morning, withering before noon. *Filaments* covered with a plumose down.—Purple. 2. May—June. Upper country. *Spider-wort.*

2. T. RO'SEA, (Vent.) *Stem* erect, simple, succulent. *Leaves* long, linear, glabrous, channeled. *Flowers* in terminal clusters, on elongated peduncles. *Sepals* spotted, small, glabrous.—Rose-color. 2. Common. May—Aug. 8—12 inches.

ORDER CXXXVII.—ALISMA'CEÆ. (*Water-plantain Family.*)

Perianth 6-parted, in two rows. *Sepals* 3, herbaceous. *Petals* 3. *Stamens* usually indefinite. *Ovaries* superior, several, 1-celled. *Ovules* solitary, or in pairs, erect or ascending. *Styles* several. *Fruit* dry, indehiscent, 1—2-seeded. *Albumen* none. *Embryo* curved. Aquatic plants, with parallel-veined leaves.

GENUS I.—SAGITTA'RIA. L. 19—12.

(From *sagitta*, an arrow, from the shape of the leaves.)

Flowers monœcious. *Sepals* 3, herbaceous. *Petals* 3, colored. Sterile florets with stamens numerous. Fertile florets with capsules numerous, compressed, each 1-seeded.

1. S. SAGITTIFO'LIA, (Mich.) *Stem* none. *Leaves* ovate, sagittate, acute. *Lobes* long, acute, acuminate, lanceolate, on long petioles, 1—2 ft. *Flowers* whorled by threes; the upper ones sterile, the lower fertile. *Petals* larger than the calyx, round. *Stamens* numerous. *Capsules* collected into a globose head.—White. 2. Aug.—Oct. In wet places. Common. 1—2 feet. *Arrow-head.*

[The above species is very variable in the form of its leaves, and its flowers are sometimes diœcious.]

2. S. NA'TANS, (Mich.) *Stem* none. *Leaves* floating, elliptic, lanceolate, obtuse, entire, 3-nerved, alternate at the base; the lower ones somewhat cordate, 7-nerved. *Scape* simple, few-flowered, 3—6 inches long. *Flowers* small; the upper ones sterile, the lower ones fertile, with the peduncles elongated. *Sepals* lanceolate. *Petals* round. *Stamens* 8. *Capsules* numerous.—White. 2. May—Aug. In shallow ponds. 6—8 inches.

3. S. LANCIFO'LIA, (L.) *Stem* none. *Leaves* oval-lanceolate, very long, entire, somewhat coriaceous, glabrous, on long petioles, 1—2 feet. *Scape* 2—3 feet long, simple. *Flowers* verticillate by threes, the upper ones sterile, the lower fertile. *Sepals* tinged with purple, nearly round. *Petals* larger than the calyx. *Stamens* numerous. *Capsules* numerous, collected into a globose head.—White. 2. April—June. In marshes. 2—3 feet. *S. falcata.*

4. S. GRAMIN'EA, (Mich.) *Stem* none. *Leaves* linear-lanceolate, entire, 3-nerved, 4—5 inches long, about half an inch wide, on long petioles. *Scape* simple. *Flowers* verticillate; the upper sterile, the lower fertile. *Sepals* lanceolate, small. *Petals* larger than the calyx. *Stamens* about

10, hairy. *Capsules* mucronate.—White. 2f. April—June. In wet pine-barrens. Very common. 4—5 inches.

5. S. PUSIL'LA, (Mich.) *Leaves* linear, obtuse, short. *Scape* simple. *Flowers* few; only one usually fertile.—Muddy banks. Georgia to New York. 2—4 inches. *Dwarf Arrowhead.*

GENUS II.—ALIS'MA. L. 6—12.

(From the Celtic *alis*, water.)

Sepals 3, persistent. *Petals* 3. *Stamens* 6. Ovaries and styles numerous. *Capsules* numerous, indehiscent, distinct, 1-seeded.

1. A. PLANTA'GO, (L.) *Stem* none. *Leaves* cordate, ovate, 9-nerved, on long petioles. *Scape* triangular, 1—2 feet. *Flowers* in compound, verticillate panicles. *Fruit* obtusely triangular.—White. 2f. July —Aug. In the water. 1—2 feet.

GENUS III.—TRIGLO'CHIN. 6—3.

Perianth 6-leaved. *Stamens* 3—4. *Stigmas* 3. *Capsules* 3—4, opening at the base. *Seed* solitary.

1. T. TRIAN'DRUM, (Mich.) *Leaves* terete, linear, as long as the scape, erect, sheathing; scape terete. *Flowers* numerous. *Anthers* sessile. *Capsules* 3—4, united by a spongy membrane.—July to August. In sands on the coast. 6 inches.

FLOWERS INCOMPLETE, WITHOUT A PROPER PERIANTH.

ORDER CXXXVIII.—ARA'CEÆ. (*Arum Family.*)

Flowers monœcious, arranged upon a naked spadix, or with a spathe. *Perianth* 3-leaved, 4—6-parted. *Stamens* 3 or 6. *Anthers* wedge-shaped. *Ovary* superior, 1-celled, with a solitary, pendulous ovule. *Style* short. *Stigmas* linear, 1 or 2. *Fruit* indehiscent, 1-celled, 1-seeded. *Leaves* usually ensiform. *Spadix* with or without a spathe. Herbaceous plants, growing in marshes.

ANALYSIS.

1. Flowers perfect 2
   Flowers monœcious 4
2. Floating plants ..... *Pistia*, 8
   Not floating plants 3
3. Leaves long, narrow ..... *Acorus*, 4
   Leaves broad ..... *Orontium*, 5
4. Floating plants ..... *Lemna*, 7
   Not floating plants 5
5. Flowers in globular heads ..... *Sparganium*, 1
   Flowers in long spikes ..... *Typha*, 2
   Flowers on a spadix 6
6. Spadix naked at the summit ..... *Arum*, 3
   Spadix covered with flowers ..... *Caladium*, 6

Genus I.—SPARGA'NIUM. 19—3.

(From *sparganon*, a band or fillet.)

Flowers monœcious. Sterile florets: ament nearly spherical, dense; perianth 3-leaved. Fertile florets: ament nearly spherical; perianth 3-leaved. *Stigma* 2-cleft, or simple. *Fruit* a dry, 1-seeded nut.

1. S. America'num, (Nutt.) *Stem* flexuous, terete, glabrous, sparingly branched. *Leaves* ligulate, glabrous, thick; the lower ones carinate, about as long as the stem, the upper concave at the base, erect. *Flowers* in sessile, globular heads; fertile heads 2—5, usually sessile; sterile ones 6—9. *Stigma* simple, oblique.—♃. May—June. In stagnant waters. 12—15 inches. *Burr-reed.*

Genus II.—TY'PHA. 19—3.

(From *tiphos*, a bog or marsh.)

Flowers monœcious, collected into a long, cylindrical spike. Sterile florets: perianth wanting. *Stamens* united into a common filament. Fertile florets: perianth none. *Pericarp* pedicellate, surrounded at the base with hairs resembling a pappus.

1. T. latifo'lia, (L.) *Stem* terete, glabrous. *Leaves* linear, nearly as tall as the stem, sheathing at the base. *Flowers* in a cylindrical spike, the upper ones sterile, the lower ones fertile.—♃. July—Aug. In stagnant waters. 5—6 feet.

Genus III.—A'RUM. L. 19—12. (*Arisæma.*)

(An Egyptian word.)

Flowers monœcious. *Spathe* 1-leaved, cucullate, convolute at the base. *Spadix* naked at the summit, bearing sterile florets in the middle, and fertile ones at the base. *Perianth* none. *Fruit* 1-celled, many-seeded.

1. A. Dracon'tium, (L.) *Leaves* perhaps never but one, pedate; leaflets lanceolate, oblong, entire, on long petioles. *Spadix* subulate, longer than the spathe.—White. ♃. June. Moist places. 10—12 inches. *Green Dragon. Arisæma Dracontium*, Schreb.

2. A. triphyl'lum, (L.) *Leaves* ternate; leaflets ovate, acuminate, entire. *Spadix* clavate, about half as long as the spathe. *Fruit* scarlet, 3—4-seeded. [This species is said to be sometimes dicœcious. The *A. quinatum* differs in no respect from the above, but in its quinnate leaves.]—Purple, striped. ♃. March—April. Rich soils. 10—12 in. *Dragon-root. Wake-robin. Indian Turnip. A. atro-rubens*, Blum.

3. A. Virgin'icum, (L.) *Leaves* oblong, hastate, entire, glabrous, 10—15 inches long; petioles long, sheathing at the base; spathe incurved. *Spadix* about as long as the spathe. *Fruit* many-seeded.—♃. April—May. Marshy soils. Very common. 12—18 inches. *Peltametra Virginica*, Raf.

4. A. WALTE'RI, (Ell.) *Leaves* sagittate, triangular, with the lobes divaricate, acute, probably only a variety of the preceding.—♃. April —May. In swamps. 12—18 inches.

The root of the *A. triphyllum* is possessed of decided medicinal properties, which are due to an exceedingly volatile substance, which is mostly dissipated by drying, and wholly by boiling. It is exceedingly acrid, producing intense pain in the mouth by biting the fresh root. It is not soluble in water, alcohol, or ether, as it communicates none of its properties to these fluids. It has been employed with much benefit in asthma, chronic coughs, rheumatism, &c. It is administered by grating the dried root, and mixing it with sugar, in a dose of ten grains.

GENUS IV.—A'CORUS. L. 6—1.

(From *a*, privative, *kore*, pupil of the eye; from some supposed effect on the eye.)

Spadix cylindrical, covered with flowers. *Perianth* glumaceous, 6-leaved, naked. *Stamens* 6. *Stigma* sessile. *Capsule* 3-celled, 3-angled, many-seeded.

1. A. CAL'AMUS, (L.) *Leaves* ensiform, ancipitous, glabrous, entire. *Scape* 3-angled, concave on one side, with the summit resembling the leaves. *Flowers* on a cylindrical spadix, protruding from the side of the ensiform scape. *Stigma* obtuse.—Pale yellow. ♃. April. Wet places. 2—3 feet. *Sweet-flag.*

The dried root of this plant is known in shops under the name of *Calamus*. It is a stimulant, tonic, and aromatic. It is prescribed in the regular practice as aid to cathartic medicines, and in cases of debility of the alimentary canal. It was anciently much more highly esteemed than at the present day.

GENUS V.—ORON'TIUM. L. 6—1.

(The Greek name.)

Spadix cylindric, crowded with flowers. *Perianth* 6-leaved, naked. *Stigma* sessile, very small. *Fruit* 1-seeded.

1. O. AQUAT'ICUM, (L.) *Leaves* lanceolate, ovate, radical, entire, glabrous, somewhat glaucous, membranaceous; spathe short. *Spadix* long, green at the base, purple in the middle, white at the summit. *Perianth* small, persistent. *Filaments* short. *Fruit* globular, fleshy.—Yellow. ♃. March—April. In marshes. Very common. 1—2 feet. *Golden-club.*

GENUS VI.—CALA'DIUM. Vent. 19—12.

(Meaning not known.)

Flowers monœcious. Sterile florets: perianth none. *Stamens* numerous. *Anthers* peltate, collected in a spike at the summit of the spadix. Fertile florets at the base of the spadix. *Perianth* none. *Stigma* sessile. *Fruit* 1-celled, many-seeded.

1. C. GLAU'CUM, (Ell.) *Leaves* hastate, cordate, acuminate, entire, glaucous; lobes long; scape about the length of the petioles; spathe cucullate, dilated at the summit. *Spadix* longer than the tube, with the sterile florets extending to the summit. *Fruit* red, many-seeded. —White. May—June. Wet soils. 12—15 inches.

GENUS VII.—LEM'NA. L. 19—2.

(From *lemina*, a husk.)

Flowers monœcious, with the sterile and fertile flowers collateral. *Stamens* 2. *Capsule* 1-celled, 1—5-seeded.

1. L. MI'NOR, (L.) A small floating plant. *Leaves* elliptic, flat, bearing flowers in clefts, on the margins of the leaves or fronds. *Root* solitary. Plants increasing by gemmæ.—☺. July—Aug. In stagnant waters.

2. L. POLYRHI'ZA, (L.) *Leaves* elliptic, flat, cohering at the base, compressed, succulent, of a firm texture. *Root* a bundle of 8—10 simple fibers, in the middle of the leaf.—☺. June—July. In stagnant waters, rare. *Spirodela polyrhiza*, Sch.

GENUS VIII.—PIS'TIA. L. 5—8.

(From *pistos*, to drink, from its loving water.)

Perianth tubular, cucullate; spathe strap-shaped. *Stamens* 3—8. *Capsule* 1-celled, many-seeded.

1. P. SPATHULA'TA, (Mich.) A floating plant. *Leaves* all radical, abruptly narrowed into a petiole, dilated, round and obtuse toward the summit. *Flowers* solitary, sub-sessile.—White. ☺. May—Aug. In stagnant waters.

ORDER CXXXIX.—NAIADA'CEÆ or POTA'MEÆ. (*Pond-weed Family.*)

Flowers monœcious or perfect. *Perianth* 2 or 4-parted, or none. *Stamens* hypogynous, definite. *Ovary* superior, with a solitary ovule. *Stigma* simple. *Fruit* indehiscent, 1-celled, 1-seeded, dry. *Seed* pendulous, anatropous. Aquatic plants, with cellular leaves.

GENUS I.—ZOS'TERA. L. 21—1.

(From *zoster*, a girdle.)

Flowers monœcious. *Perianth* none. *Stamens* and *pistils* separated, in two rows, upon one side of the spadix. *Spathe* foliaceous. *Anthers* sessile, alternating with the ovaries. *Drupe* 1-seeded.

1. Z. MARI'NA, (L.) *Stem* flexuous, terete, somewhat jointed. *Leaves* long, linear, entire, somewhat 3-nerved. *Anther* slightly curved. *Style* short. *Capsule* membranaceous.—♃. August. Salt-waters. *Grass-wrack.*

GENUS II.—CAULIN'IA. D. C. 19—1. (*Najos.*)

(In honor of F. Cavolini, a botanist of Naples.)

Flowers monœcious. *Perianth* none. *Anther* 1, sessile. *Style* filiform. *Stigma* 2-cleft. *Capsule* 1-seeded.

1. C. FLEX'ILIS, (Willd.) *Stem* slender, glabrous, submersed, branching. *Leaves* verticillate, in a whorl, linear, denticulate at the summit. *Flowers* solitary, axillary, sessile.—♃. May—July. Stagnant waters. 2—3 feet.

GENUS III.—RUP'PIA. L. 4—4.

(In honor of H. B. Ruppius, of Gottingen.)

Flowers perfect, on a spadix, arising from the base of the leaves. *Stamens* sessile. *Stigmas* 4. *Ovaries* 4. *Perianth* none. *Fruit* pedicellate, consisting of four 1-seeded drupes.

1. R. MARITI'MA, (L.) *Stem* floating, glabrous. *Leaves* filiform, with inflated sheaths. *Peduncles* axillary, somewhat spiral, bearing 2 naked green flowers. *Anthers* 4, sessile.—♃. July. Salt marshes.

GENUS IV.—POTAMOGE'TON. L. 4—3.

(From *potamos*, a river, and *geton*, near.)

Flowers perfect, on a spadix arising from the spathe. *Perianth* 4-leaved. *Anthers* 4, sessile, alternating with the leaves of the perianth. *Nuts* 4, 1-seeded, sessile.

1. P. FLU'ITANS, (L.) *Stem* branching, glabrous. *Leaves* floating, on long petioles, sub-coriaceous, oval-lanceolate; the lower ones narrow, sessile, long. *Flowers* in axillary spikes, almost submersed.—♃. May—June. Stagnant waters. 2—6 feet.

2. P. HETEROPHYL'LUM, (L.) *Stem* branching, glabrous; upper leaves opposite, lanceolate, 5-nerved, lower ones linear, sessile. *Flowers* crowded on the spadix.—♃. July—Aug. Stagnant waters.

3. P. PAUCIFLO'RUM, (Pursh.) *Stem* branching, diffuse. *Leaves* linear, sessile; the upper verticillate, the lower alternate. *Spadix* 1 from each whorl of leaves, bearing 4—10 flowers.—♃. Through the summer. Shallow water.

4. P. LU'CENS, (L.) *Stem* long, branched. *Leaves* submersed, elliptic and elliptic-lanceolate, large, pellucid, veined. *Spadix* cylindric, many-flowered. *Peduncle* thickened above, varying in length. *Fruit* compressed, obtusely angled, slightly keeled.—♃. July—Aug. Carolina to Canada.

ORDER CXL.—RESTIA'CEÆ. (*Cord-rush Family.*)

Flowers monœcious. *Perianth* 4-parted. *Stamens* 4—6, attached to the perianth. *Ovary* 2—3-lobed, 2—3-celled, with a solitary, pendulous ovule in each cell. *Fruit* capsular. Herbaceous plants, with stems naked, or bearing leaves. *Flowers* in terminal heads, separated by bracts.

GENUS I.—ERIOCAU'LON. L. 3—3.

(From *erion*, wool, and *caulon*, a stem.)

Flowers monœcious; sterile florets occupying the center of the capitulum. *Stamens* 4—6. *Perianth* 4-parted, the 2 in-

terior segments cohering. Fertile florets in the circumference, perianth 4-parted. *Style* 1. *Stigmas* 2 or 3.

1. E. DECANGULA'RE, (L.) *Leaves* ligulate, very narrow, glabrous, 10—12 inches long. *Scape* terete, 10-furrowed, glabrous, sheathed near the base, bearing a large spherical head. Scales of the involucre ovate; those of the disk longer than the flowers. *Perianth* somewhat fimbriate.—White. 2. July—Aug. Wet soils. 2—3 feet.

2. E. GNAPHALOI'DES, (Mich.) *Leaves* subulate, ensiform, glabrous, 8—10 inches long. *Scape* 10-furrowed, sheathed at the base. *Flowers* in a compact head. Scales of the involucre oval, silvery white, villous when young.—White. 2. May—Aug. Damp soils. 10—15 inches.

3. E. VILLO'SUM, (Mich.) *Leaves* subulate, hairy, 2—3 inches long. *Scapes* villous, slender, clustered. *Flowers* in small, globose heads. Scales of the involucre colored, ovate. *Perianth* very dark-colored, with the summit white.—2. May—Sept. Damp soils. 10—12 in.
Lachnocaulon Michauxii, Rich.

4. E. FLAVID'ULUM, (Mich.) *Leaves* subulate, nerved, 1—2 inches long, slightly hairy. *Scape* 7-furrowed, pubescent or glabrous. *Flowers* in convex heads. Scales of the involucre nearly round; those of the disk linear-lanceolate. *Capsule* didymous.—2. June—July. Wet soils. Mid. Car. and Geo. 3—4 in. *Pachalanthus flavidulus*, Rich.

GLUMA'CEÆ.

Flowers destitute of a true perianth, the floral envelopes consisting of imbricated bracts, which are alternate, instead of verticillate, as in all preceding flowers.

ORDER CXLI.—CYPERA'CEÆ. (*Sedge Family.*)

Flowers perfect or monœcious, consisting of imbricated, solitary bracts. *Perianth* none, unless the glumes, when present, be so considered. *Stamens* hypogynous, definite, 1—12. *Anthers* fixed by their base. *Ovary* 1-seeded, often surrounded by hypogynous setæ, which are probably a rudimentary perianth. *Style* 1, divided. *Stems* usually angular. *Sheaths* of the leaves entire.

ANALYSIS.

1. Achenium inclosed in a sac (perigynium) ..... *Carex*, 14
Achenium not inclosed in a sac 2
2. Flowers perfect 3
Flowers not perfect ..... *Scleria*, 13
3. Flowers with hypogynous setæ (bristles) 4
Flowers without hypogynous setæ 9
4. Flowers distichous (2-rowed) ..... *Dulichium*, 12
Flowers not distichous 5
5. Setæ capillary 6
Setæ not capillary ..... *Fuirena*, 7
6. Setæ consisting of numerous hairs ..... *Eriophorum*, 6
Setæ of 5—many bristles 7
7. Spikelets few-flowered; style bifid ..... *Rhyncospora*, 11
Spikelets usually many-flowered 8
8. Plants with no leaves ..... *Eleocharis*, 4
Plants with leaves ..... *Scirpus*, 5
9. Flowers distichous 10
Flowers imbricate 12
10. Spikes 1—3-flowered 11
Spikes more than 3-flowered ..... *Cyperus*, 1
11. Style bifid ..... *Kyllingia*, 3
Style trifid ..... *Mariscus*, 2
12. Style trifid ..... *Eleocharis*, 4
Style bifid 13
13. Stamen 1 ..... *Isolepis*, 8
Stamens usually more than 1 14
14. Leaves of the involucre 5 or more ..... *Dichromena*, 10
Leaves of the involucre 2—5 ..... *Fimbristylis*, 9

Tribe I.—CYPE'REÆ.

Flowers perfect, 2-ranked.

Genus I.—CYPE'RUS. 3—1.

(From *cypris*, a name of Venus.)

Spikelets compressed. *Glumes* imbricate, in 2 rows, each generally inclosing a flower. *Setæ* none.

§ 1. *Style trifid; achenium compressed.*

1. C. flaves'cens, (L.) *Stem* nearly terete, shining. *Leaves* linear, sheathing the stem at the base. *Umbels* compound; spikelets crowded, lanceolate. *Stamens* 3.—♃. July—Oct. Wet soils. 8—12 in.

2. C. rivula'ris, (Kunth.) *Stem* triangular, glabrous. *Leaves* shorter than the stem, nearly glabrous. *Umbels* of 3—4 rays; rays unequal; involucre 3-leaved, exceeding the umbel in length. *Spikes* 20—25-flowered, compressed, broadly linear; scales ovate, obtuse; stamens 2. —Georgia. River banks.

3. C. holoscri'ceus. *Stem* triangular, smooth, leafy at the base. *Leaves* longer than the culm, membranaceous, flat; margins scabrous. *Umbel* about 10 rays; rays unequal; involucre 6-leaved, long; spikes

linear-lanceolate, compressed, 10—11-flowered. *Scales* keeled, obovate. *Stamens* 2.—Georgia.

4. C. FLAVIC'OMIS, (Mich.) *Stem* obtusely angled. *Leaves* linear-lanceolate, slightly serrulate near the summit. *Umbels* compound; involucre long; spikes expanding, 10—12-flowered.—2f. May—Sept. Rich soils. 1—2 feet.

§ 2. *Style trifid; achenium triangular.*

(1.) *Spikes many-flowered, compressed; stamen* 1.

5 C. VEGE'TUS, (Willd.) *Stem* slender, nearly terete. *Leaves* linear-lanceolate, channeled, finely serrulate near the summit. *Flowers* in compound umbels; spikelets in globose heads; involucre 4-leaved. *Glumes* ovate.—2f. June—Sept. Ponds and ditches. 2—3 feet.

6. C. VI'RENS, (Mich.) *Stem* triquetrous. *Leaves* linear-lanceolate, 2—3 feet long. *Umbels* compound; spikelets in compact heads, many-flowered; involucre long. *Flowers* monandrous.—2f. May—October. Rich swamps. Common.

(2.) *Spikes many-flowered, compressed; stamens* 3.

7. C. COMPRES'SUS, (L.) *Stem* triquetrous, naked. *Leaves* linear-lanceolate. *Flowers* in compound umbels; spikelets many-flowered, nearly capitate. *Glumes* acuminate, with white margins.—2f. Aug. —Sept. Sandy pastures. 3—8 inches.

8. C. AUTUMNA'LIS. (Vahl.) (*C. harpan*, L.; *C. gracilis*, Muhl.) *Stem* nearly terete. *Spikes* slender, terminal, digitate, usually by threes; involucre 2-leaved, as long as the umbel. *Glumes* purple.—2f. July —Aug. On margins of ponds.

9. C. ARTICULA'TUS, (L.) *Stem* erect, jointed, clothed at the base with 3 sheath-like leaves. *Flowers* in compound umbels; spikelets many-flowered. *Glumes* dotted with red; two or three of the lowest sterile. —2f. June—Aug. Wet places. 3—6 feet.

10. C. HY'DRA, (Mich.) (*C. rotundus*, L.) *Stem* obtusely angled. *Leaves* radical, recurved. *Umbels* simple and compound; spikelets linear; involucre 2—3-leaved.—2f. Through the summer. Sea-coast. 3—8 inches.

11. C. RE'PENS, (Ell.) (*C. phymatodes*, Muhl.) *Stem* 3-angled, with the sides concave. *Leaves* glabrous, recurved. *Umbels* usually simple; involucre 3—4-leaved; spikes crowded.—2f. July—Sept. In fields. 12—18 inches.

(3.) *Spikes few-flowered.*

12. C. BRIZÆ'US. *Culm* triangular, leafy at the base. *Leaves* longer than the culm, rigid. *Umbel* compound, crowded; involucre 3-leaved, long; spikes 12—14-flowered, compressed; scales elliptic, short, mucronate, concave, 9—10-nerved, purple.—Geo. and Car. Grows in swamps.

13. C. STRIGO'SUS, (L.) *Stem* 3-angled. *Leaves* long, minutely serrate. *Spikes* oblong; spikelets subulate; involucre longer than the umbel.—2f. Aug.—Oct. Wet places. 2—3 feet.

14. C. SPECIO'SUS, (Vahl.) *Stem* erect, angled. *Leaves* channeled, serrulate. *Spikes* in corymbs; spikelets subulate, 6—8-flowered, distichous. *Involucre* many-leaved, long; involucels longer than the partial umbels; common peduncles sheathed at the base.—♃. Aug.—Oct. Wet places. 2—4 feet.

15. C. FILICUL'MIS, (Vahl.) (*C. mariscoides*, Ell.) *Stem* erect, glabrous, naked. *Leaves* channeled, serrulate. *Spikes* in globose heads, terminal; involucre 3-leaved, long. *Glumes* compressed.—♃. June—Sept. Sandy soils. 1 foot.

16. C. PŒFOR'MIS, (Pursh.) *Stem* triquetrous, glabrous. *Leaves* linear, glabrous. *Spikes* fascicled, flattened; involucre 3-leaved, 2 of them long. *Glumes* ovate, yellowish.—♃. July—Aug. Sandy fields. 6—8 inches.

17. C. FASCICULA'TUS, (Ell.) *Stem* triquetrous. *Leaves* setaceous, 1 or 2. *Spikes* many-flowered, in terminal fascicles; involucre 2-leaved, linear. *Glumes* with the keel green.—♃. June—Aug. Middle Geo. 6—8 inches.

18. C. TETRAGO'NUS, (Ell.) *Stem* naked, angled. *Leaves* channeled, serrulate. *Umbels* many-rayed. *Spikes* 3—5-flowered.—♃. 2—3 ft.

19. C. ENSLE'NII, (Pursh.) *Stem* 3-angled. *Leaves* linear, scabrous along the midrib and margins. *Spikes* corymbose, branching at the base; spikelets numerous, linear, crowded, brown; involucre 8-leaved, exterior one longest.—♃. August—Sept. In wet places. 1—2 feet.

GENUS II.—MARIS'CUS. Vahl. 3—1.

(From the Celtic *mar*, a marsh.)

Flowers in spikes, clustered in heads. *Spikes* 1—8-flowered. *Stamens* 3. *Style* 2-cleft. Seeds and stem triquetrous. *Seed* naked.

1. M. OVULA'RIS, (Vahl.) (*M. echinatus*, Ell.) *Stem* glabrous, obtusely 3-angled. *Leaves* linear, channeled, glabrous. *Spikes* 6—8-flowered, linear-lanceolate, in globose heads; flowers in 2 rows. *Stamens* usually 5.—June to Oct. Common. 1—2 feet.

2. M. RETROFRAC'TUS, (Vahl.) *Stem* naked, pubescent, obtusely 3-angled. *Leaves* pubescent, linear. *Spikes* 1—3-flowered, reflexed, collected into an obovate head. *Seed* oblong, destitute of bristles.—June—Aug. Cultivated lands. Common. 1—2 feet.

3. M. CYLIN'DRICUS, (Ell.) *Stem* naked, pubescent, obtusely 3-angled. *Leaves* linear, channeled, glabrous. *Spikes* 2—4-flowered, crowded, compressed. *Glumes* keeled, acute. *Seed* acute, without bristles.—June—Aug. Common about cultivated fields. 2—3 feet.

GENUS III.—KYLLIN'GIA. Rottb. 3—1.

(In honor of Kylling, a Danish botanist.)

Flowers distinct, arranged in a roundish spike, imbricate. *Glumes* 2, 1-flowered. *Paleæ* 2, longer than the glumes.

1. K. MONOCEPH'ALA, (L.) *Stem* filiform, 3-angled. *Leaves* linear heads single, inclining to one side; involucre generally 3-leaved, one of the leaves erect.—♃. October. Lower Geo. 2—12 inches.

2. K. PU'MILA, (Mich.) *Stem* erect, triquetrous, glabrous. *Leaves* subulate, expanding; involucre usually 3-leaved, unequal. *Flowers* in a terminal, nearly globose head. *Glumes* none. *Paleæ* 2, compressed. *Flowers* diandrous.—♃. August—Dec. Damp soils. Very common. 3—6 inches.

3. K. MACULA'TA, (Mich.) (*Lipocarpha maculata*, Kunth.) *Stem* triquetrous, glabrous. *Leaves* subulate. *Flowers* usually in 3 heads. *Glume* 1, lanceolate, cuneate. *Paleæ* 2, unequal, the exterior one shortest. *Flowers* monandrous.—♃. August—Oct. 3—5 inches.

TRIBE II.—SCIR'PEÆ.

Flowers perfect. *Spikes* many-flowered. *Perianth* of bristles, hairs or none.

GENUS IV.—ELEOCH'ARIS. Br. 3—1.

(From *helos*, a marsh, and *chairo*, to delight.)

Spikes many-flowered. *Scales* imbricate, some of the lowest not flower-bearing. *Calyx* usually 6 bristles. *Stamens* 3. *Style* trifid, dilated at the base. *Culm* sheathed, leafless, 1-spiked.

1. E. ACICULA'RIS. (*Scirpus trichodes*, Ell.) *Stem* setaceous, glabrous. *Spikes* ovate-lanceolate. *Glumes* ovate-lanceolate, nearly white. *Seed* 3-angled, ribbed.—☉. June—July. Low country. 6—8 inches.

2. E. SIM'PLEX, (Dietr.) (*Scirpus simplex*, Ell.) *Stem* erect, glabrous, with a sheath at the base. *Spike* ovate. *Glumes* obtuse, nearly white. —♃. Through the summer. Wet places. 8—13 inches.

3. E. TOR'TILIS, (Schult.) *Culm* cespitose, filiform, triangular; in drying, twists spirally. *Scales* ovate, obtuse, 1-nerved; keel green. *Setæ* 6.—Geo. and Car.

4. E. TUBERCULO'SA, (Br.) (*Scirpus tuberculosa*, Mich.) *Stem* erect, columnar, sheathed at the base. *Spike* ovate-lanceolate. *Glumes* obtuse, with scarious margins. *Stamens* 2. *Seed* striate, with a sagittate tubercle. *Bristles* plumose.—♃. July—Aug. Wet soils. 10—12 in.

5. E. FILIFOR'MIS, (Kunth.) (*Scirpus filiformis*, Lam.) *Stem* filiform, terete. *Spike* cylindrical, oblong, obtuse. *Glumes* nearly round.—July —Aug. Wet places.

6. E. VIVIP'ARA, (Link.) *Culm* cespitose, filiform, sheathing at the base. *Spikes* solitary, elliptic-oblong, obtuse, many-flowered, often viviparous; scales elliptic-ovate. *Stamens* 3. *Setæ* 5, white.—On the margins of lakes. Carolina and Georgia.

7. E. PALUS'TRIS, (Brown.) (*Scirpus palustris*, L.) *Stem* glabrous, striate, lucid, with 2—3 sheaths at the base. *Spike* oblong-lanceolate. *Glume* obtuse, with the midrib green.—♃. April—May. Marshes. 1—2 feet.

8. E. CAPITA'TA, (Brown.) (*Scirpus capitatus*, Willd.) *Stem* erect, glabrous, inflated, with a short sheath at the base. *Spike* ovate. *Glumes* coriaceous, nearly round. *Bristles* 6.—♃. Through the summer. Damp soils. 10—18 inches.

9. E. GENICULA'TA, (Brown.) *Culm* terete. *Spikes* solitary, cylindrical; scales convex, obovate-spatulate, obtuse. *Setæ* 7.—Carolina and northward. Sea-shore.

10. E. QUADRANGULA'TA, (Brown.) (*Scirpus quadrangulatus*, Mich.) *Stem* quadrangular, glabrous, with the sides unequal, sheathed at the base. *Spike* cylindrical. *Glumes* nearly orbicular, with ferruginous margins. *Bristles* 3, setaceous.—2f. April—May. In swamps. 1—2 ft.

GENUS V.—SCIR'PUS. Beau. 3—1.

(From the Celtic *cirs*, rushes.)

Glumes imbricating the spike on all sides, one or two of the outer ones occasionally without flowers. *Paleæ* none; spikes having involucral leaves. *Seed* 1, with bristles at its base. *Sheaths* usually leaf-bearing.

1. S. PUSIL'LUS, (Vahl.) (*S. capillaceus*, Mich.) *Stem* erect and procumbent, slightly furrowed, with a sheath surrounding its base. *Leaves* none. *Glumes* acute. *Seed* compressed, obovate, with 6 bristles at the base.—⊙. March—June. 1—3 inches.

2. S. DEB'ILIS, (Muhl.) *Stem* erect, triangular, glabrous, sheathed at the base. *Spikes* 3, ovate; involucre long, erect. *Glumes* mucronate, ovate, membranaceous.—2f. Aug.—Sept. Upper districts Carolina and Georgia. 12—18 inches.

3. S. PUN'GENS, (Vahl.) (*S. Americanus*, Pers.) *Stem* erect, triangular, glabrous, sheathed at the base. *Spikes* 6—8, ovate, sessile. *Glumes* ferruginous, ovate. *Bristles* pilose.—2f. Through the summer. Very common. 2—3 feet.

4. S. LACUS'TRIS, (L.) *Stem* erect, stout, glabrous, striate. *Spikes* numerous, forming an umbel; involucre 2-leaved, unequal. *Glumes* lanceolate, ciliate. *Bristles* 6, retrorsely aculeate.

5. S. MARIT'IMUS, (L.) *Stem* erect, 3-angled. *Leaves* very long, glabrous, channeled. *Spikes* arranged in a leafy panicle; some sessile, others pedunculate, large and ovate. *Glumes* mucronate, toothed at the summit, with the midrib extending into an awn.—2f. May—June. In salt-water marshes. 3—4 feet.

6. S. ERIOPH'ORUM, (Mich.) (*Trichophorum cyperium*, Pers.) *Culm* obtusely triangular, leafy; panicle decomposed, proliferous, nodding. *Leaves* 1—2 feet, linear; sheaths very long, margin brown. *Bristles* 6, exserted when the fruit is ripe.—Borders of swamps and meadows. 4—5 feet.

7. S. EXALTA'TUS, (Pursh.) (*Scirpus polyphyllus*, Vahl.) *Stem* obtusely 3-angled. *Leaves* long, glabrous, finely serrulate. *Spikes* ovate, clustered, in a compound umbel. *Involucre* many-leaved, longer than the umbel; involucel short.

VAR. S. VIVIP'ARUS. *Stem* tall, somewhat climbing. *Umbels* viviparous, bearing flowers at the base of the branches.—2f. July—August. In shady woods. 2—10 feet.

8. S. LINEA'TUS, (Mich.) *Stem* triangular, leafy, glabrous. *Leaves* lanceolate, channeled, finely serrulate. *Spikes* ovate, in axillary umbels. *Glumes* ferruginous, with the midrib green.—2f. June—Aug. Pine-barrens. 2—3 feet.

9. S. EQUISETOI'DES, (Ell.) *Stem* erect, terete, glabrous, jointed, sheathed at the base. *Spikes* cylindrical. *Glumes* obtuse, tinged with purple.—2f. June—July. Damp soils. 18—24 inches.

GENUS VI.—ERIOPH'ORUM. L. 3—1.

(From *erion*, wool, and *phoreo*, to bear.)

Glumes chaffy, imbricate in all directions. *Paleæ* none. *Seed* surrounded by a long, dense wool.

1. E. VIRGIN'ICUM, (L.) *Stem* erect, glabrous, terete. *Leaves* linear, keeled, with the margins scabrous. *Spikes* clustered, in a globose head. *Involucre* longer than the head, 3-leaved, unequal. *Flowers* diandrous. 2f. Aug.—Sept. In wet places. 3—4 feet.

GENUS VII.—FUIRE'NA. Rottbl.

(In honor of Fuiren, a Dutch botanist.)

Glumes arranged in a spike, on all sides, awned. *Spikes* many-flowered, axillary and terminal. *Paleæ* 3, petaloid, awned, cordate, unguiculate. *Stamens* 3.

1. F. SCIRPOI'DEA, (Vahl.) *Stem* erect, slender, terete, smooth, sheathed. *Flowers* in a terminal ovate head. *Glumes* pubescent, with a short awn. *Paleæ* oval or lanceolate, sometimes unawned.—2f. July—Aug. Damp soils. 12—15 inches.

2. F. SQUARRO'SA, (Mich.) *Stem* erect, hairy at the summit. *Leaves* lanceolate, 3-nerved, ciliate. *Flowers* in ovate heads, clustered. *Glumes* oval, with long awns, expanding. *Paleæ* cordate, or rounded at the base.—2f. Aug.—Sept. Bogs. 1—2 feet.

3. F. HIS'PIDA, (Ell.) *Stem* erect and decumbent, smooth below. *Leaves* narrow, tapering, 4—8 inches long, many-nerved, hispid on the lower surface. Scales of the spikes oval, outer ones hispid, the inner ones finely pubescent; awn long. *Stamens* 3. *Stigmas* 3.—Around ponds. Middle Georgia.

GENUS VIII.—ISOLE'PIS. R. Br. 3—1.

(From *isos*, equal, and *lepis*, a scale; scales regular.)

Spikes many, rarely few-flowered. *Scales* imbricate; all flower-bearing. *Stamens* 1—3; achenium triangular.

1. I. MICRAN'THA, (Rœm.) (*Scirpus minimus*, Pursh.) *Culm* setaceous, filiform, terete, 1-leaved, smooth. *Leaf* short, setaceous or capillary. *Spikes* sessile, ovate, acute; involucre 2-leaved; scales obovate, acuminate. *Stamen* 1. *Style* divided; setæ none.—Wet sandy fields. Virginia to Georgia.

2. I. STENOPHYL'LA, (Kunth.) (*Scirpus stenophyllus*, Ell.) *Stem* filiform, obtusely 3-angled, erect and procumbent. *Leaves* setaceous, with the throat of the sheath hairy. *Spikes* clustered, sessile; involucre 4-leaved, with the leaves unequal. *Flowers* monandrous.—⊙. July—Sept. Dry soils. 3—4 inches.

3. I. CAPILLA'RIS, (Rœm.) (*Scirpus ciliatifolius*, Ell.) *Stem* slender, striate. *Leaves* linear, channeled, ciliate. *Spikes* ovate, in compound umbels, with a short involucre. *Glumes* lanceolate.—☺. Sept.—Oct. Damp soils. 6—8 inches.

4. I. DIVARICA'TA, (Dietr.) (*Scirpus divaricatus*, Ell.) *Stem* erect, obtusely 3-angled, glabrous. *Leaves* flat, with finely serrulate margins, glabrous. *Spikes* oval, pendulous, in compound umbels. *Glumes* ovate, margins white, midrib green.—♃. May—June. Pine-barrens. 2—4 ft.

GENUS IX.—FIMBRIS'TYLIS. Vahl.

(From *fimbria*, a fringe, and *stylus*, a style.)

Spikes usually many-flowered. *Scales* imbricate. *Perianth* none. *Stamens* 1—3. *Styles* 2—3-cleft, with a bulb-like base; achenium lenticular or triangular.

1. F. AUTUMNA'LIS, (Rœm.) (*Scirpus autumnalis*, Pursh.) *Stem* erect, compressed. *Leaves* linear, flat; sheath bearded at the throat. *Spikes* lanceolate, in compound umbels. *Glumes* lanceolate.—☺. Aug.—Oct. Damp soils. Very common. 8—12 inches.

2. F. LAX'A, (Vahl.) (*Scirpus sulcatus*, Ell.) *Stem* erect, glabrous, terete. *Leaves* glabrous, serrulate. *Spikes* ovate-lanceolate, in compound umbels; involucre subulate, small. *Glumes* membranaceous.—Aug.—Sept. Damp soils. 12—15 inches.

3. F. CASTA'NEA, (Vahl.) (*Scirpus castaneus*, Mich.) *Stem* erect, striate. *Leaves* narrow, erect, rigid. *Spikes* ovate, in a terminal compound umbel; involucre 2-leaved. *Glumes* nearly round.—☺. June—July. Low country.

4. F. SPADI'CEA, (Vahl.) (*Scirpus spadiceus*, L.) *Stems* forming a thick tuft. *Leaves* long, narrow, arranged in two rows. *Spikes* in compound umbels, with the sessile one in the division of the stem; involucre subulate. *Glumes* nearly orbicular, glabrous.—June to Oct. On the sea-coast. 2—3 feet.

5. F. COARCTA'TA, (Schw.) (*Scirpus coarctatus*, Ell.) *Stem* filiform, generally declining. *Leaves* glabrous, with the throat of the sheath bearded. *Spikes* in a compound umbel; involucre many-leaved, setaceous, one of the leaves longer than the rest. *Glumes* ferruginous, ciliate.—☺. Sept.—Oct. Dry soils. 10—12 inches.

6. F. FERRUGINE'A, (Vahl.) (*Scirpus ferrugineus*, L.) *Stem* erect, compressed, with the angles at the summit scabrous. *Leaves* coriaceous, with cartilaginous margins; throat of the sheath ciliate. *Spikes* in compound umbels, with the sessile one in the division of the stem; involucre ciliate. *Glumes* coriaceous, ferruginous, pubescent and ciliate.—♃. June—Oct. In moist places. 1—3 feet.

TRIBE III.—RHYNCOSPO'REÆ.

Flowers perfect or polygamous. *Spikes* many and few flowered. *Scales* distichous or imbricate, lower one empty. *Stamens* 3—6.

Genus X.—DICHRO'MENA. Vahl. 3—2.

(From *dis*, two, and *chroma*, color, alluding to the white and green of the flowers.)

Glumes imbricate on all sides; the lower ones without flowers. *Paleæ* none. *Seed* naked.

1. D. LEUCOCEPH'ALA, (Mich.) *Stem* erect, triangular, naked. *Leaves* linear, glabrous, concave. *Flowers* in compound heads; involucre 6-leaved, white at the base, the three exterior ones longest. *Glumes* membranaceous, lanceolate, white.—2f. July—Oct. Damp soils. 10—12 inches.

2. D. LATIFO'LIA, (Ell.) *Stem* erect, glabrous, leafy at the base, terete. *Leaves* usually longer than the stem, concave, with long sheaths. *Flowers* in compressed heads, compound; involucre about 10-leaved, the exterior ones longest, tapering toward the summit, white. *Glumes* ovate, white.—2f. May—June. On the margins of ponds. 10—18 in

Genus XI.—RHYNCOS'PORA. Vahl.

(From *rhyncos*, a beak, and *spora*, a seed.)

Glumes collected into a spike; inferior ones without flowers. *Paleæ* none. *Seed* 1, crowned with a persistent style, surrounded by bristles.

1. R. LONGIROS'TRIS, (Ell.) *Stem* triangular, erect, glabrous. *Leaves* linear-lanceolate, channeled, glabrous. *Flowers* in corymbose panicles, axillary and terminal. *Glumes* usually 6, with the flowers between the fifth and sixth glumes. *Seed* compressed, terminated by a long persistent style.—2f. July—Oct. Wet places. 3—6 feet.

2. R. AL'BA, (Lind.) *Stem* slender, glabrous, 3-angled at the summit. *Leaves* linear, channeled, glabrous. *Spikes* in corymbose clusters, axillary and terminal. *Glumes* nearly white. *Seed* tuberculate, surrounded by 10 bristles.—☉. May—June. Common. 10—12 inches.

3. R. CILIA'TA, (Vahl.) (*R. punctata*, Ell.) *Stem* triangular, slender. *Leaves* linear-lanceolate, with scabrous margins. *Flowers* in lateral and terminal fascicles, clustered at the summit. *Glumes* mucronate. *Seed* compressed.—2f. July—Aug. Damp places. 1—2 feet.

4. R. GLOMERA'TA, (Vahl.) (*R. capitellata*, Ell.) *Stem* erect, triangular. *Flowers* in spherical, axillary heads. *Leaves* setaceous, shorter than the stem. *Seed* compressed, surrounded by scabrous bristles.—2f. May—Sept. Wet places. 1—2 feet.

5. R. DIS'TANS, (Vahl.) (*R. cymosa*, Ell.) *Stem* terete, erect. *Leaves* linear, glabrous, concave. *Flowers* in axillary and terminal panicles. *Glumes* usually 6, with the outer ones ferruginous, the inner one white, 2-flowered. *Seed* compressed, oval. *Bristles* 6.—2f. Through the summer. Bogs and ditches. 1—3 feet.

6. R. PLUMO'SA, (L.) *Stem* erect, glabrous, 3-angled, slender. *Leaves* linear, with scabrous margins. *Flowers* terminal, crowded. *Glumes* ovate, awned. *Seed* rugose, with 6 plumose bristles.—2f. June—Aug. Pine-barrens. 8—12 inches.

7. R. INEXPAN'SA, (Vahl.) *Stem* somewhat triangular, generally inclined. *Leaves* linear, channeled. *Flowers* in axillary and terminal

panicles, pendulous. *Seed* compressed, surrounded by scabrous bristles. —2f. Through the summer. Wet soils. 1—2 feet.

8. R. SETA'CEA, (Vahl.) (*R. rariflora*, Ell.) *Stem* leafy, setaceous. *Leaves* glabrous, setaceous. *Flowers* in lateral and terminal panicles. *Glumes* 5—7; the exterior ones smallest, the two interior resembling paleæ. *Bristles* 3—4.—2f. April—May. In bogs. Common. 10—12 inches.

9. R. SPAR'SA, (Vahl.) *Stem* triangular, erect. *Leaves* linear-lanceolate, glabrous, serrulate. *Flowers* in diffuse axillary panicles. *Seed* rough, surrounded by bristles.—2f. Wet soils. May—Aug. 1—2 ft.

10. R. CADU'CA, (Ell.) *Stem* triangular, erect. *Leaves* linear-lanceolate, glabrous, serrulate. *Flowers* in axillary panicles; spikelets sessile. *Seed* rough, surrounded by bristles.—2f. July—August. Damp soils. 1—2 feet.

11. R. ELLIOTT'II, (Dietr.) (*Scirpus schœnoides*, Ell.) *Stem* triangular, glabrous. *Leaves* linear, short. *Spikes* ovate-lanceolate, clustered, numerous, arranged in a compound panicle. *Glumes* ovate, ferruginous. —2f. July—Aug. In low country. 2—3 feet.

GENUS XII.—DULICH'IUM. Pers. 3—1.

(The name of an island.)

Spikes somewhat racemose, axillary; spikelets linear-lanceolate, compressed. *Glumes* distichous, sheathing. *Style* very long, 2-cleft. *Nut* with bristles at the base.

1. D. SPATHA'CEUM, (Rich.) *Stem* striate, columnar, terete at the base, triangular above. *Leaves* linear-lanceolate, pointing in 3 directions; spikelets spreading, 6—7-flowered, forming axillary racemes. *Peduncles* as long as the sheaths of the leaves.

TRIBE IV.—SCLERIN'EÆ.

Spikes monœcious; fertile spikelets 1-flowered, staminate several-flowered; achenia nut-like, globular.

GENUS XIII.—SCLE'RIA. 19—3.

(From *skleros*, hard; the fruit is hard.)

Flowers monœcious. Sterile florets; glumes 2—6, many-flowered; paleæ unawned. Fertile florets; glumes 2—6, 1-flowered; paleæ none. *Stigmas* 1—3. *Seed* sub-globose.

1. S. PAUCIFLO'RA, (Muhl.) (*S. oligantha*, Mich.) *Stem* slender, 3-angled, glabrous, slightly pubescent at the summit. *Leaves* linear, slightly pubescent at the base, scabrous on the upper surface. *Flowers* in fascicles or spikes, 2—3, sessile near the summit, one on a long peduncle. Fertile florets at the summit; sterile at the base. *Seed* white, smooth. —2f. May—June. Pine-barrens. 12—18 inches.

VAR. *Stem* slender, acutely 3-angled, glabrous. *Leaves* linear, scabrous along the margin. *Spikes* lateral and terminal, pendulous. *Glumes* keeled, ferruginous, glabrous. *Seed* rough.—2f. May—Sept. Damp soils. 12—18 inches.

2. S. NIT'IDA, (Willd.) *Culm* 3-angled, angles membranaceous. *Leaves* narrow, rigid, scabrous; limb ovate, rigid. *Peduncles* axillary and terminal, few-spiked; spikes long; perfect and staminate spikes intermixed. *Stamens* 3.—North Carolina.

3. S. CILIA'TA, (Mich.) *Stem* erect, glabrous, generally 1-leaved. *Leaf* pubescent on the upper surface, linear, channeled. *Spikes* in terminal clusters. *Glumes* ciliate, ovate, ferruginous. *Seed* rough.—2f. May—June. Damp soils. 1—2 feet.

4. S. INTERRUP'TA, (Rich.) *Stem* erect, 3-angled, pubescent. *Leaves* pubescent. *Spikes* clustered, alternate. *Glumes* bristly. *Seed* globose, mucronate, transversely wrinkled.—2f. July—Aug. Damp soils. 12—15 inches.

5. S. VERTICILLA'TA, (Muhl.) *Stem* slender, glabrous, 3-angled. *Leaves* glabrous, filiform. *Flowers* in clustered spikes. *Glumes* ovate, acuminate. *Seed* globose, mucronate, transversely wrinkled.—2f. July—Aug. Damp soils. 10—15 inches.

6. S. CAROLINIA'NA, (Willd.) (*S. hirtella*, Mich.) *Stem* erect, triangular, pubescent. *Leaves* narrow, pubescent, channeled. *Spikes* axillary or terminal. *Bracts* hairy, ciliate. *Glumes* pubescent, unequal. *Seed* wrinkled.—2f. Through the summer. Damp soils. 12—18 in.

7. S. TRIGLOMERA'TA, (Mich.) (*Cladium triglomeratum*, Nees.) *Stem* triangular, striate, scabrous. *Leaves* linear-lanceolate, somewhat hairy. *Flowers* in terminal and lateral spikes, clustered, pendulous. *Glumes* ciliate, mucronate. Fertile florets 2—3 in each spike. *Seed* smooth.—2f. Through the summer. In dry or moist soils. Common. 1—2 ft.

8. S. GRA'CILIS, (Ell.) *Stem* filiform, 3-angled, glabrous. *Leaves* linear, glabrous, narrow. *Spikes* 2—3 at the summit of the stem, each bearing a fertile floret. *Glumes* ferruginous, mucronate. *Seed* white, smooth.—2f. May—June. Southern Geo. 10—12 inches.

TRIBE V.—CARI'CEÆ.

Flowers monœcious or diœcious; achenium inclosed in a sac, lenticular or triangular.

GENUS XIV.—CA'REX. L. 19—3.

(From *careri*, to want; the upper spikes destitute of seeds.)

Flowers monœcious, rarely diœcious; imbricate, amentaceous. *Glume* 1, 1-flowered. Paleæ of the sterile florets none; of the fertile ones ventricose, persistent, inclosing the nut.

I. STYLE BIFID.

§ 1. *Spikelets numerous, collected into a spike, staminate and pistillate, and androgynous, often intermixed.*

1. C. BROMOI'DES, (Schkuhr.) *Stem* 3-angled, scabrous along the margins, slender. *Leaves* linear, slightly scabrous. *Flowers* in numerous linear spikes, the spikes alternate, erect. *Glumes* lanceolate, mucronate. *Paleæ* ovate. *Fruit* scabrous, bifid, longer than the glume.—2f. April. Damp soils. 12—18 inches.

§ 2. *Spikes compound, androgynous, apex staminate.*

2. C. MUHLENBER'GII, (Schkuhr.) *Stem* erect, angular, stout, scabrous at the summit. *Leaves* linear, sheathing the stem. *Spikes* about 5, ovate, crowded at the summit of the stem. Bracteal leaves setaceous, longer than the spikes. *Glumes* mucronate, longer than the paleæ. *Paleæ* 2-cleft at the summit.—2f. May. Shady woods. 1—2 feet.

3. C. SPARGANOI'DES, (Muhl.) *Stem* erect, nearly terete. *Leaves* numerous, striate. *Flowers* in 6—8 sessile spikes, numerous. *Bracts* longer than the spikes. *Glumes* mucronate. *Paleæ* expanding, serrate. *Fruit* ovate, compressed, bifid, double the length of the glume.—2f. April—May. Damp soils. 1—2 feet.

4. C. STIPITA'TA, (Muhl.) *Stem* erect, smooth, succulent. *Leaves* channeled, ligulate. *Spikes* numerous, compound, bracteate, with the bracts longer than the spikelets. *Glumes* membranaceous. *Palcæ* ovate, serrulate. *Fruit* lanceolate, bidentate.—2f. April—May. Wet lands. 1—3 feet.

5. C. RO'SEA, (Schkuhr.) *Stem* slender, slightly angled. *Leaves* linear. *Spikes* 4—6, remote, the lowest one with a setaceous bract. *Fruit* ovate, 2-toothed, ciliate. *Glumes* ovate, nearly as long as the paleæ.—2f. May. Damp woods. 10—12 inches.

6. C. RETROFLEX'A, (Muhl.) *Stem* slightly angled, slender. *Leaves* nearly filiform, scabrous along the margin. *Spikes* 4—6. *Glumes* ovate, shorter than the paleæ. *Fruit* ovate-lanceolate, bitentate, as long as the glumes.—2f. May. Dry soils. 10—12 inches.

7. C. MULTIFLO'RA, (Muhl.) *Stem* scabrous, 3-angled. *Leaves* narrow, rigid, longer than the stem. *Spike* compound, oblong; spikelets glomerate, ovate, oblong, obtuse. *Glumes* lanceolate, brownish. *Fruit* ovate, acuminate, compressed, 3-nerved, serrulate on the margin, diverging when mature, shorter than the glumes.—2f. May. Moist lands. 12—18 inches.

8. C. CEPHALOPH'ORA, (Muhl.) *Stem* 3-angled, scabrous along the margins, leafy at the base. *Leaves* linear, long. *Spikes* collected into an elliptical head. *Glumes* ovate, mucronate. *Fruit* ovate, scabrous on the margin.—2f. May—June. Oak woods. Common. 2—3 feet.

§ 3. *Spikes* 3—12, *androgynous, staminate lowest.*

9. C. LEPORI'NA, (L.) *Spikes* 3, nearly round, elliptic, attenuate, clustered, green, tinged with yellow; fruit elliptic, compressed, acuminate; scales ovate, acute, glabrous.—Carolina and northward.

10. C. SCOPA'RIA, (Schkuhr.) *Stem* obtusely angled. *Leaves* linear, with scabrous margins toward the summit. *Spikes* 5—8, alternate, elliptic, lowest one bracteate. *Glumes* ovate, membranaceous. *Fruit* ovate-lanceolate, margined, smooth, bicuspidate, longer than the glumes, nerved.—2f. May. Swamps. 1—2 feet.

11. C. FŒ'NEA, (Willd.) *Stem* obtusely 3-angled, scabrous near the summit, furrowed. *Spikes* numerous; the lower ones compound, the upper ones aggregated. *Paleæ* serrulate, larger than the ciliate glumes; the lowest bract largest, subulate.—2f. May—June. Marshes. 1—2 feet.

12. C. LAGOPODIOI'DES, (Schkuhr.) *Stem* erect, obtusely 3-angled, scabrous toward the summit. *Leaves* sheathing the stem at the base,

ligulate. *Spikes* numerous, elliptic, crowded; bract beneath the lowest, very long, overtopping the stem. *Fruit* bicuspidate, erect, lanceolate, with a serrulate margin longer than the glume.—2f. May. Wet lands. 1—2 feet.

13. C. SCIRPOI'DES, (Schkuhr.) *Stem* erect, slender, slightly 3-angled. *Leaves* narrow, the lower ones short. *Spikes* 4—6, ovate, the uppermost one clavate. *Glume* small. *Paleæ* ovate, 2-toothed. *Fruit* ovate, bidentate, longer than the glume.—2f. May. Swamps. 6—12 in.

14. C. STER'ILIS, (Schkuhr.) *Stem* obtusely angled, slightly scabrous. *Leaves* linear, sheathing. *Spikes* 3—6. *Fruit* ovate-acuminate, 3-angled, compressed; apex recurved, bicuspidate.—2f. May. Marshes. 8—12 inches.

15. C. FESTUCA'CEA, (Schkuhr.) *Stem* erect, slender, sometimes decumbent. *Leaves* narrow. *Flowers* in linear spikes, 5—8, approximate. *Bracts* small. *Glumes* lanceolate, membranaceous. *Fruit* beaked, winged, serrulate along the margins, white or green.—2f. May. Damp soils. 2—3 feet.

§ 4. *Staminate and pistillate spikes distinct.*

16. C. FLORIDA'NA. *Spikes* distinct; staminate ones solitary, sessile, small; pistillate ones aggregate, ovate, sessile, bracteate; lower ones more remote. *Fruit* oval, compressed, beaked; scales ovate-oblong.—Florida.

17. C. CESPITO'SA, (L.) *Stem* erect, slender, 3-angled, striate. *Leaves* linear, acute, with scabrous margins. Fertile spikes cylindrical, generally 3, nearly sessile, sometimes with sterile florets at the summit. *Bracts* long. *Fruit* ovate, obtuse, longer than the glume.—2f. May. In bogs. 12—18 inches.

18. C. ACU'TA, (Good.) *Stem* 3-angled, scabrous. *Leaves* narrow, with scabrous margins; the upper ones sessile, the lower sheathing. Sterile spikes 1—3; fertile 3—4, nodding, cylindrical, the upper ones sessile, with sterile florets at the summit. *Glumes* acute. *Paleæ* ovate, entire. *Fruit* oblong.—2f. April—May. In bogs. 1—2 feet.

19. C. CRIN'ITA, (Lam.) *Stem* acutely angled, concave, serrulate. *Leaves* channeled, glabrous. Fertile spikes 3—4, pendulous, each generally terminated by a number of sterile florets. *Glumes* ovate, with a subulate point. *Paleæ* ovate, not divided at the summit, shorter than the glume. *Fruit* elliptic, with a short beak, shorter than the glume.—2f. April—May. In swamps. 1—2 feet.

II. STYLE TRIFID.

§ 1. *Spikes solitary, androgynous, apex staminate.*

20. C. FRASERIA'NA. *Spikes* simple; scales obovate, oblong, obtuse, smooth. *Fruit* ovate, ventricose, beak short.—Carolina and northward.

21. C. SQUARRO'SA, (L.) *Stem* triangular, scabrous along the margin. *Leaves* narrow, glabrous, with scabrous margins. *Spikes* mostly simple, sometimes 2—3, cylindrical, oblong, very thick. *Glumes* at the base sterile, lanceolate, slightly colored, those of the summit fertile. *Fruit* imbricate, smooth, bidentate, longer than the glume.—2f. May—June. In bogs. 1—2 feet

§ 2. *Spikes numerous; terminal ones sterile or androgynous, base staminate.*

22. C. DASYCAR'PA, (Muhl.) *Stem* triquetrous, glabrous. *Leaves* very narrow, lanceolate, linear, glabrous. Sterile spike very small, terminal; scales lanceolate. Fertile spikes generally 3, near each other, upper sessile.—Car. and Geo.

23. C. TRI'CEPS, (Mich.) *Stem* acutely angled, slender, scabrous along the margins. *Leaves* linear, pubescent at the base. *Spikes* usually 4, approximate, sessile, 3 of them larger than the other. *Glumes* ovate. *Paleæ* shorter than the glume, glabrous. *Fruit* ovate, compressed, 3-angled.—4. April—May. Damp soils. 12—18 inches.

24. C. HIRSU'TA, (Willd.) *Stem* 3-angled, slender, pubescent near the summit. *Leaves* narrow, slightly pubescent. *Spikes* 3—4, the terminal one sterile at the base, lower ones on short peduncles. *Fruit* ovate, obtuse.—4. May—June. Southern Geo. 10—12 inches.

25. C. BUXBAU'MII. *Stem* slender, 3-angled. *Leaves* narrow, with scabrous margins. *Spikes* 3—4, the terminal one, with the lower half, bearing sterile flowers. *Glumes* lanceolate, dark-colored. *Paleæ* light-colored, 2-cleft at the summit. *Fruit* elliptic, as long as the glume.—4. July—Aug. Swamps. 1—2 feet.

§ 3. *Staminate spikes solitary or* 1—3; *pistillate* 1—3, *generally sessile.*

26. C. VA'RIA, (Mueh.) *Stem* erect, slender, with scabrous angles. *Leaves* subulate. Fertile spikes generally 3, nearly globose; sterile spike terminal. *Glumes* oblong-lanceolate, tinged with brown. *Paleæ* pubescent. *Fruit* sub-globose, hispidly pubescent, obtusely 3-angled.—4. April—May. Dry woods. 8—12 inches.

27. C. MARGINA'TA, (Mueh.) *Stem* slender, 3-angled. *Leaves* linear, with slightly scabrous margins; fertile spikes generally 2, sub-globose, approximate, the sterile one terminal, cylindrical, long. *Glumes* ovate, brown, with a white margin. *Fruit* globose, pubescent, longer than the glume.—4. April—May. Dry soils. 8—12 inches.

28. C. PLANTAGIN'EA, (Lam.) *Stem* erect, glabrous, with purple sheaths, nearly leafless. *Leaves* linear, nerved, glabrous. Sterile spike terminal; fertile ones mostly 4, distant, erect, linear, the lower ones on long peduncles. *Bracts* leafy, sheathing the peduncle. *Fruit* oblong, cuneiform, recurved at the apex.—4. April—May. Shaded soils. 8—12 inches.

29. C. CONOI'DEA, (Schkuhr.) *Stem* 3-angled, the angles scabrous. *Leaves* narrow, flat, scabrous along the margin. Fertile spikes 2—3, remote, the lower ones on long peduncles; sterile spike terminal, small, with lanceolate glumes; the lower bracts leaf-like. *Fruit* conical, obtuse, recurved at the apex.—4. April. Wet soils. About 1 foot.

VAR. C. TETAN'ICA, (Ell.) *Stem* slender, glabrous, 3-angled. *Leaves* linear, shorter than the stem. Fertile spikes 2, distant, the upper one nearly sessile, the lower on a long peduncle; the sterile spike on a long peduncle. *Glumes* mucronate. *Fruit* ovate-oblong, acute at each end, oblique.—4. May. Wet soils. 12 inches.

30. C. AN'CEPS, (Mueh.) *Stem* 3-angled, compressed. *Leaves* broad. Fertile spikes 3, loosely flowered, cylindric. *Bracts* sheathing. *Fruit*

ovate, 3-angled, acute, narrowed at the base, about as long as the glume. —2f. April—May. Woods. 12—15 inches.

31. C. LAXIFLO'RA, (Lam.) *Stem* 3-angled, with scabrous margins. *Leaves* narrow-lanceolate, acute, nerved. Sterile spike nearly sessile; fertile spikes 2—3, the lowest one on a long peduncle, the upper one shorter. *Glume* ovate, cuspidate. *Fruit* ovate-oblong, longer than the glume, shining, inflated.—2f. May. Woods. 12—18 inches.

32. C. GRANULA'RIS, (Mueh.) *Stem* erect or decumbent, glaucous. *Leaves* narrow, somewhat glaucous. Sterile spike usually solitary; fertile spikes 2—3, the lowest pedunculate, the upper nearly sessile. *Glumes* ovate, acuminate. *Palecæ* nearly orbicular. *Fruit* nerved, with a short, recurved beak.—2f. May. Wet shaded soils. 12 inches.

33. C. VERRUCO'SA, (Mueh.) *Stem* glabrous. *Leaves* very long, acute, nerved. Sterile spikes 3; fertile spikes 4—6, erect, cylindrical, sterile flowers at the summit; lower peduncles longest, the upper nearly surrounded by the bracteal leaves; scales ovate, obtuse.—South Carolina.

34. C. MILIA'CEA, (Mueh.) *Stem* slender, 3-angled, with the angles scabrous. *Leaves* linear, with scabrous margins. Fertile spikes 3, slender, filiform, nodding; bracts of the lower spike longer than the stem, those of the upper small. *Glumes* emarginate. *Fruit* ovate, 3-angled, with short beak, longer than the glume.—2f. May. Wet grounds. 12—15 inches.

35. C. FLEXUO'SA, (Mueh.) *Stem* slender, 3-angled, glabrous. *Leaves* linear, slightly channeled. Sterile spike slender, terminal; fertile spikes 4, pendulous, remote, the peduncles sheathed. *Glumes* lanceolate. *Palecæ* striate. *Fruit* oblong, beaked, double the length of the glume. —2f. April—May. Damp soils. 12 inches.

§ 4. *Spikes androgynous; apex staminate.*

36. C. WILLDENOW'II, (Schkuhr.) *Stem* triangular, erect. *Leaves* linear, longer than the stem. *Spike* terminal, simple, ovate; sterile and fertile florets about equal in number, about 6. *Fruit* ovate, nearly terete, beaked. *Glumes* ovate, the inferior ones long and foliaceous, acuminate.—2f. May—June. Dry woods. 6—8 inches.

§ 5. *Staminate spikes 2—3; pistillate as many.*

37. C. PELLI'TA, (Mueh.) *Stem* erect, 3-angled. *Leaves* long, linear. Sterile spikes 2—4, the upper ones pedunculate; fertile ones 2—3, the upper ones sessile, the lower on erect peduncles. *Glumes* lanceolate, mucronate. *Fruit* ovate, 2-cleft, hairy, shorter than the scale.—2f. April—May. Damp woods. 1—2 feet.

38. C. TRICHOCAR'PA, (Mueh.) *Stem* erect. Sterile spikes 2—4, pedunculate; fertile florets 3, pedunculate, erect, cylindric. *Fruit* ovate-lanceolate, acuminate, pubescent. *Glumes* ovate, acuminate, shorter than the fruit.—2f. May. Swamps. 2—3 feet.

39. C. RIPA'RIA, (Curt.) *Stem* erect, smooth, 3-angled. *Leaves* ligulate, the upper ones without sheaths. Sterile spikes usually 4; fertile spikes 3, erect, with sterile flower at the summit. *Glumes* chaffy. *Fruit* ovate, 2-cleft, nerved, shorter than the glume.—2f. March—April. Marshes. 1—2 feet.

40. C. GLAUCES'CENS, (Ell.) *Stem* 3-angled, glabrous. *Leaves* narrow, channeled, serrulate, the lower ones glaucous. Sterile spike solitary,

pedunculate, with ferruginous, ovate glumes; fertile spikes 3—4, cylindrical, on short peduncles, becoming pendulous; scales ovate, emarginate, mucronate. *Paleæ* ovate, glaucous. *Fruit* 3-angled.—♃. April—May. Around ponds. 1—2 feet.

41. C. BULLA'TA, (Schk.) *Stem* slender, acutely 3-angled. *Leaves* narrow, with scabrous margins. Sterile spikes 3, slender; fertile spikes 2, erect, on short peduncles. *Glumes* lanceolate, acute. *Paleæ* ovate, with pubescent nerves. *Fruit* ovate, beaked, 3-angled.—♃. April. In ditches. 2 feet.

42. C. ROSTRA'TA, (Mueh.) (*C. tentaculata*, Ell.) *Stem* 3-angled. *Leaves* long, linear-lanceolate, nerved. Sterile spike solitary, cylindrical; fertile spikes 3, sessile, horizontal, with long bracts. *Glumes* mucronate. *Paleæ* ovate, beaked. *Fruit* ovate, nerved, with a long beak.—♃. May—June. Wet places. 12—18 inches.

43. C. HYSTERICI'NA, (Mueh.) *Stem* 5-angled, with the angles scabrous. *Leaves* narrow, long; scabrous. Sterile spikes cylindrical, with ovate-lanceolate glumes; fertile spikes 3—4, thick, the lower ones on exserted peduncles. *Paleæ* ovate, with a long 2-cleft beak. *Glume* ovate, terminated by a hispid setaceous bristle. *Bracts* long. *Fruit* ovate, nerved, beaked.—♃. April—May. Wet soils. 1—2 feet.

44. C. LUPULI'NA, (Mueh.) *Stem* erect, glabrous, leafy, thick, 3-angled. *Leaves* linear-lanceolate, with scabrous margins. Sterile spike on a short peduncle; fertile ones 3, erect, with long, leafy bracts. *Glume* with a hispid point. *Paleæ* 2-beaked, longer than the glume. *Fruit* ovate, nerved, with 2 long beaks.—♃. April—May. Swamps. 2—3 feet.

45. C. FOLLICULA'TA, (L.) *Stem* erect, 3-angled. *Leaves* ligulate, scabrous. Sterile spike solitary, terminal, with acute, lanceolate glumes, fertile spikes usually 4, erect, on short peduncles. *Paleæ* ovate, beaked, inflated. *Fruit* ovate, beaked.—♃. June. Swamps. 12—18 in.

46 C. ELLIOTT'II, (Torrey.) (*C. castanea*, Ell.) *Stem* 3-angled, slender, purple at the base. *Leaves* linear, shorter than the stem. Sterile spikes shorter than the bract. *Glumes* brown, with white margins. Fertile spikes 3, nearly round, the lowest one on a long peduncle. *Paleæ* inflated, with a long beak, shining. *Fruit* 3-angled.—♃. April. Wet pine-barrens. 1—2 feet.

47. C. GIGAN'TEA, (Rudgr.) *Stem* erect, 3-angled, glabrous. *Leaves* ligulate, slightly channeled. Sterile spike terminal, with acute, ovate glumes; fertile spikes 3. *Paleæ* ovate, nerved. *Fruit* 3-angled.—♃. April—May. In bogs. Common. 1—2 feet.

§ 6. *Staminate spikes solitary; pistillate* 2—3—5.

48. C. VESTI'TA, (Schk.) *Stem* acutely 3-angled. *Leaves* narrow, ligulate. Sterile spike mostly solitary, terminal; fertile spikes generally 2, sessile, sometimes sterile at the summit. *Glumes* brown, with white margins. *Paleæ* pubescent. *Fruit* ovate, nerved, pubescent, with a short beak.—♃. May—June. Wet soils. 1—2 feet.

49 C. PSEUDO-CYPE'RUS, (L.) *Stem* erect, acutely 3-angled, scabrous along the angles, stout. *Leaves* channeled, with scabrous margins. Sterile spike long, slender, with linear-lanceolate glumes; fertile spikes 3, pendulous. *Bracts* long, scabrous, nerved. *Paleæ* ovate, beaked, 2-cleft at the summit. *Glume* small, with a subulate point. *Fruit* oblong-lanceolate, beaked, many-nerved, with the apex bifid.—♃. June. In swamps. 2 feet.

Order CXLII.—GRAMINA'CEÆ. (*Grass Family.*)

Flowers usually perfect, sometimes monœcious or polygamous; the exterior floral envelopes called *glumes*, the interior ones *paleæ*, and the innermost at the base of the ovary, *scales*. *Glumes* usually 2, sometimes single, usually unequal. *Paleæ* 2; the exterior one simple, the interior or uppermost usually keeled. *Scales* 2 or 3, sometimes wanting. *Stamens* hypogynous, 1—6. *Anthers* versatile. *Ovary* simple. *Styles* 2, rarely 1 or 3. *Stigmas* hairy or plumose. *Albumen* farinaceous. *Embryo* on one side of the albumen. *Culms* cylindrical, fistular, jointed. *Leaves* with a split sheath.

ANALYSIS.

1. Spikelets 1-flowered. 2
   Spikelets more than 1-flowered 17

2. Flowers in panicles 3
   Flowers in spikes 18

3. Glumes not present 4
   Glumes present 5

4. Stamens 6, monœcious ..... *Zizania*, 3
   Stamens 1—3 ..... *Leersia*, 1

5. Glumes minute 6
   Glumes not minute 7

6. Stamens 6 ..... *Oryza*, 2
   Stamens 3 ..... *Muhlenbergia*, 17

7. Paleæ awned 8
   Paleæ not awned ..... *Agrostis*, 18

8. Lower paleæ with 3 awns ..... *Aristida*, 16
   Lower paleæ with only 1 awn 9

9. Paleæ herbaceous 10
   Paleæ membranaceous or cartilaginous 11

10. Stamen 1 ..... *Cinna*, 18
    Stamens 3 ..... *Calamagrostis*, 20

11. Paleæ membranaceous ..... *Agrostis*, 18
    Paleæ cartilaginous 12

12. Fruit black ..... *Stipa*, 15
    Fruit white ..... *Oryzopsis*, 14

13. Flowers in unilateral spikes 14
    Flowers in cylindrical spikes 16

14. Paleæ unequal ..... *Spartina*, 23
    Paleæ equal 15

15. Glumes unlike ..... *Manisurus*, 40
    Glumes orbicular ..... *Paspalum*, 9
    Glumes lanceolate ..... *Cynodon*, 19

16. Paleæ 2, shorter than the glumes, without awns ..... *Phleum*, 6
    Paleæ 1, equal to the glumes, awned at the base ..... *Alopecurus*, 5
    Paleæ 2, the lower one awned ..... *Hordeum*, 38

17. Spikelets 2-flowered, flowers unlike 18
    Spikelets 2-flowered and alike, or many-flowered 24

18. Inflorescence paniculate 19
    Inflorescence in unilateral spikes 22
    Inflorescence not in unilateral spikes 23

19. Inferior flower neutral 20
Superior flower neutral 22

20. Flowers with a hair-like involucre ..... *Erianthus*, 42
Paleæ of the fertile flowers coriaceous 21
Paleæ membranaceous ..... *Andropogon*, 43

21. Paleæ awned ..... *Oplismenus*, 12
Paleæ not awned ..... *Panicum*, 10

22. Spikes by fours, digitate ..... *Chloris*, 20
Spikes terminal, simple ..... *Rottbœllia*, 11

23. Spikes terminal, simple ..... *Cenchrus*, 14
Spikes terminal, compound ..... *Setaria*, 13

24. Flowers monœcious 25
Flowers not monœcious 26

25. Staminate and pistillate flowers on the same spike ..... *Tripsacum*, 39
Staminate and pistillate flowers not on the same spike ..... *Zea*, 4

26. Inflorescence paniculate 27
Inflorescence spicate 40

27. Lower palea awned 28
Lower palea not awned 34

28. Awn at the apex of the palea 29
Awn at the back of the palea 31

29. Paleæ entire ..... *Festuca*, 32
Paleæ toothed or divided 30

30. Awn twisted at the base ..... *Danthonia*, 26
Awn straight ..... *Uralepis*, 27

31. Awn near the base of the palea 32
Awn near the apex of the palea ..... *Bromus*, 33

32. Palea entire, emarginate ..... *Anthoxanthum*, 8
Palea bicuspidate 33

33. Spikelets 2-flowered ..... *Aira*, 25
Spikelets more than 2-flowered ..... *Avena*, 26

34. Lower paleæ entire 35
Lower paleæ toothed ..... *Aira*, 25

35. Spikelets 2—3-flowered 36
Spikelets usually more than 3-flowered 37

36. Paleæ 4 ..... *Phalaris*, 7
Paleæ 2 ..... *Melica*, 29

37. Spikelets flat, ancipital ..... *Uniola*, 34
Spikelets cordate ..... *Briza*, 30
Spikelets ovate 38

38. Paleæ herbaceous 39
Paleæ membranaceous ..... *Poa*, 28

39. Lower palea many-nerved ..... *Arundinaria*, 35
Lower palea few-nerved ..... *Festuca*, 32

40. Spikes paniculate 41
Spikes digitate ..... *Eleusine*, 21
Spikes single 42

41. Spikes short ..... *Dactylis*, 31
Spikes long ..... *Eleusine*, 21

42. Glumes wanting ..... *Elymus*, 37
Glumes present 43

43. Paleæ awned below the summit ..... *Monocera*, 22
Paleæ not awned below the summit ..... *Elymus*, 37

Tribe I.—ORY'ZEÆ.

Spikelets 1-flowered. *Flowers* often monœcious, in branched panicles.

Genus I.—LEER'SIA. Sol.

(Named after Leers, a German botanist.)

Spikelets 1-flowered. *Glume* none. *Paleæ* 2, keeled, compressed. *Scales* 2. *Flowers* in panicles.

1. L. Virgin'ica, (Willd.) *Stem* decumbent, erect, hairy at the joints *Leaves* linear-lanceolate, scabrous, acute. *Panicle* loose, terminal, with scattered branches. *Flowers* on one side of the rachis, monandrous. *Paleæ* equal; the exterior one keeled, the interior one ciliate.—4. Aug.—Sept. Damp soils. 2—3 feet. *Rice-grass.*

2. L. lenticula'ris, (Mich.) *Stem* erect, glabrous, except at the joints. *Leaves* scabrous along the margins; sheaths hispid. *Panicle* erect. *Flowers* large, diandrous. *Paleæ* ciliate.—4. Aug.—Sept. Damp soils. 2—4 feet.

3. L. oryzoi'des, (Swartz.) *Stem* erect, or procumbent at the base. *Leaves* scabrous, linear-lanceolate. *Panicle* large. *Flowers* triandrous, imbricate, with the keel of the paleæ ciliate.—4. Oct.—Nov. Swamps. 3—4 feet.

Genus II.—ORY'ZA. L. (*Rice.*)

(From *eruz*, the Arabic name for Rice.)

Spikelets 1-flowered. *Glumes* 2, small, membranaceous. *Paleæ* 2, coriaceous, compressed, keeled, about equal in length; lower one much the broadest. *Stamens* 6. *Ovarium* smooth. *Styles* 2. *Achenium* smooth, oblong.

1. O. sati'va, (L.) *Leaves* linear, elongated, scabrous. *Flowers* in racemose panicles; branches weak, scabrous. *Glumes* linear-lanceolate; spikelets terminated by an awn.—Cultivated in all parts of the world.

There are six varieties of this species described by authors, which have, no doubt, been produced by cultivation and peculiar local circumstances.

2. O. latifo'lia, (Des.) *Culm* winged. *Leaves* lanceolate, narrow, acute at the apex, obtuse at the base. *Panicle* with the lower branches verticillate. *Glumes* lanceolate, acute. *Paleæ* hispid.—Carolina and southward to S. America.

Genus III.—ZIZA'NIA. L. (*Water or Indian Rice.*)

(From *zizanion*, the name of some wild grain.)

Flowers monœcious. *Glume* none. Sterile florets mingled with the fertile ones. *Paleæ* 2, sub-awned. Fertile florets paleæ 2, awned; style 2-parted.

1. Z. aquat'ica, (Ell.) (*Hydropyrum esculentum*, Link.) *Stem* erect, glabrous, pubescent at the joints. *Leaves* oblong, lanceolate, glabrous; sheaths shorter than the joints. *Flowers* in terminal panicles; the upper branches bearing fertile flowers, the lower ones sterile. *Stamens* 6. *Styles* 2.—4. Oct.—Nov. In inundated lands. 6—12 feet. *Wild Rice.*

2. Z. FLU'ITANS, (Mich.) *Stem* slender, branching. *Leaves* linear, flat. *Spikes* solitary, axillary, setaceous, usually 4-flowered; upper ones staminate, lower pistillate. A small, creeping, jointed grass.—Wet places. Geo., on the coast. *Hydropyrum fluitans*, Kunth.

3. Z. MILIA'CEA, (Mich.) *Stem* erect, glabrous. *Leaves* very long, 2—6 feet, 1—2 inches wide, flat. *Flowers* in an expanding panicle, fertile and sterile ones intermingled. *Glumes* with short awns.—2ƒ. April—May. In water. 6—10 feet.

TRIBE II.—PHALARI'DEÆ.

Spikelets usually 1-flowered and perfect; if more than 1-flowered, polygamous or monœcious.

GENUS IV.—ZE'A. L. (*Indian Corn.*)

(From *zao*, to live.)

Flowers monœcious; staminate flowers terminal, racemose, paniculate. *Spikelets* 2-flowered; pistillate flowers in axillary, compact spikes, inclosed in many sheaths. *Spikelets* 2-flowered; lower one neutral, superior one fertile. *Glumes* 2, fleshy, broad, ciliate. *Paleæ* fleshy, glabrous, concave. *Ovarium* oblique, sessile, smooth. *Style* terminal, long, exserted without the sheaths, bifid at the apex, pubescent, channeled.

1. Z. MAYS, (L.) *Culm* solid, simple. *Leaves* broad, flat; ligule short, ciliate; fertile spikes, with the spikelets in many series, inclosed in several sheaths or husks, which are the sheaths of leaves from partially developed internodes.

Indigenous in Paraguay and probably in other parts of the world. Corn is said to have been found in the tombs of Egypt, and to have been cultivated in China before the discovery of America. It is now the most extensively cultivated grain, being grown within the limits of 42° south to 45° north latitude, and on plains and mountains. It affords food for men and animals from the grain, and its leaves afford fodder for animals. It may be grown for sugar. Keep off the tassel and silk till the stalk is mature, and sugar of good quality may be made from it and in great abundance. There is a great variety of Indian Corn. Some suppose the varieties to be distinct species; others, that they are the result of cultivation. Some varieties will perfect their growth, it is said, in forty days from planting; which the French call *Maïs quarantain*, or *forty-days corn:* other varieties require six months. This adaptation to climate is of immense importance in its wide distribution over the surface of the globe.

GENUS V.—ALOPECU'RUS. L. (*Fox-tail Grass.*)

(From *alopex*, fox, and *oura*, tail, from the shape of the spike.)

Glumes 2, 1-flowered, nearly equal. *Paleæ* united, cleft on one side below the middle. *Styles* often connate.

1. A. GENICULA'TUS, (L.) *Stem* geniculate, ascending, glabrous. *Leaves* glabrous; sheaths shorter than the joints, glabrous. *Panicle* composed of cylindrical spikes. *Glumes* compressed, connate at the base, pubescent. *Paleæ* truncate, glabrous, with an awn at the base.—2ƒ. March. In rice-fields. Common. 12—18 inches.

Genus VI.—PHLE'UM. L. *Herds-grass.*

(An ancient Greek name.)

Glumes 2, equal, mucronate, longer than the paleæ. *Paleæ* 2, included in the glume, truncate, boat-shaped, without awns. *Flowers* in dense, cylindrical spikes.

1. P. PRATEN'SE, (L.) *Stem* erect, glabrous, simple. *Leaves* flat, linear-lanceolate; sheaths longer than the joints. *Glumes* equal, hairy, ciliate. *Paleæ* smaller than the glumes.—♃. June—July. Introduced into the Southern States. 2—3 feet. *Herds-grass.*

Genus VII.—PHALA'RIS. L. (*Canary-grass.*)

(From *phalos*, shining, alluding to the grain.)

Glumes 2, nearly equal, membranaceous, keeled, 1-flowered. *Paleæ* 2, coriaceous, pubescent at the base, shorter than the glumes. *Scales* 2, opposite, ovate. lanceolate. *Flowers* in compound spikes.

1. P. ARUNDINA'CEA, (L.) *Panicle* clustered, spreading when old. *Glumes* obtusely keeled, with pointed tips; rudimentary flowers hairy, much shorter than the fertile ones.—Wet places. July. 2—4 feet.

The *ribbon-grass* of the gardens is a variety of this species.

2. P. AMERICA'NA, (Ell.) *Stem* erect, branching, scabrous near the summit, geniculate near the base. *Leaves* glabrous; sheath shorter than the joints. *Style* 1, bifid.—♃. July—Aug. Swamps. 2—5 ft. *Calamagrostis Americana. American Canary-grass.*

Genus VIII.—ANTHOXAN'THUM. L. (*Vernal-grass.*)

(From *anthos*, flower, and *anthon*, of flowers: flower of flowers.)

Glumes 2—3-flowered; lateral florets imperfect, with one paleæ bearded; intermediate florets perfect, shorter than the lateral ones. *Paleæ* obtuse. *Stamens* 2. *Styles* 2. *Panicle* contracted.

1. A. ODORA'TUM, (L.) *Stem* erect, scabrous at the summit. *Leaves* linear, hairy; sheath striate, pubescent at the throat. *Flowers* in appressed panicles. *Glumes* acute, membranaceous, hairy, the interior one twice as long as the other. *Paleæ* equal, villous, with an awn at the base of each. *Styles* 2, filiform.—♃. May—June. Common in the low country. Introduced. 12—15 inches.
Sweet-scented Vernal-grass.

Tribe III.—PANI'CEÆ.

Spikelets 2-flowered; inferior flowers incomplete.

Genus IX.—PAS'PALUM. L.

(The Greek name for Millet.)

Glumes 2, 1-flowered, membranaceous, equal. *Paleæ* 2,

equal. *Seeds* coated with the paleæ. *Flowers* in spikes, arranged on one side of the rachis.

1. P. FLU'ITANS, (Kunth.) (*Ceresia fluitans*, Ell.) *Stem* procumbent, creeping, assurgent, glabrous. *Leaves* scabrous, 2—3 inches long, slightly glaucous beneath; sheaths hairy at the base; spikes numerous, 20—30, recurved; rachis with the flowers arranged on the upper surface *Glumes* dotted, white. *Paleæ* equal; the interior one flat, the exterior convex.—☺. Sept.—Nov. Swamps. 1—3 feet.

2. P. WALTERIA'NUM, (Schu.) (*P. vaginatum*, Ell.) *Stem* creeping, glabrous, branching. *Leaves* linear, short, the sheaths of the upper leaves longer than the joints; spikes 1—2, one of them sessile.—♃. Through the summer. Damp soils, low country. 12—18 inches.

3. P. FILIFOR'ME, (Swartz.) (*Digitaria filiformis*, Ell.) *Stem* erect, glabrous. *Leaves* narrow-lanceolate, slightly scabrous, and hairy on the upper surface; sheath hairy; spikes alternate, filiform, sometimes very long. *Glumes* pubescent, nearly equal.—♃. Sept.—Oct. On poor lands. 1—2 feet.

4. P. SEROTI'NUM, (Flue.) *Spikes* about 5, approximate; rachis flat; spikelets rather broad. *Glume* elliptic-lanceolate, acute, pubescent. *Culm* decumbent; sheaths pilose.—Car.

5. P. NOTA'TUM, (Flue.) *Spikes* 2, conjugate; rachis flat; spikelets narrow. *Glumes* ovate, obtuse.—Car.

6. P. DIS'TICHUM, (Ell.) *Stem* prostrate, creeping, geniculate. *Leaves* short, shining; sheath with the throat hairy; spikes 2—4. *Glumes* lanceolate.—♃. Through the summer. In damp soils. Common. *Joint-grass.*

7. P. MICHAUXIA'NUM, (Kunth.) (*Milium paspaloides*, Ell.) *Stem* ascending and decumbent, compressed, glabrous. *Leaves* ciliate, glabrous, 3—6 inches long; spikes digitate, conjugate. *Glumes* glabrous, ovate-lanceolate, acute. *Paleæ* equal, shorter than the glumes. *Seed* ovate, compressed.—♃. June—Sept. Low country. 1—2 feet.

8. P. TRISTA'CHYUM, (Leconte.) Glabrous, creeping, erect in water, prostrate on land. *Leaves* short, narrow, smooth; sheaths broad, bearded at the orifice; spikes about 3, naked at the base. *Glumes* ovate, in two series.—Geo.

9. P. FURCA'TUM, (Flue.) *Spikes* 2, conjugate; rachis triquetrous. *Glumes* ovate-lanceolate, acuminate, smooth.—Car. and southward.

10. P. LÆ'VE, (Mich.) *Stem* erect, glabrous. *Leaves* short, lanceolate, glabrous, hairy at the throat; spikes 3—6. *Flowers* 1 from each head; rachis a little hairy at the base.—♃. June—Sept. Damp pastures. 1—2 feet.

11. P. BOSCIA'NUM, (Flue.) *Spikes* numerous; rachis flat, straight; spikelets lateral. *Glumes* obtuse, nearly round, smooth, 5-nerved. *Leaves* hairy at the base.—Car.

12. P. SETA'CEUM, (Mich.) *Stem* erect, slender, glabrous. *Leaves* villous, narrow; sheath villous; spikes usually solitary. *Flowers* in two rows. *Peduncle* long. *Glume* equal, 3—5-nerved, minutely pubescent.—♃. June—Aug. Dry soils. Common.

13. P. DASYPHYL'LUM, (Ell.) *Stem* decumbent, glabrous. *Leaves* hairy, broad; sheaths shorter than the joints; spikes 2—3, alternate. *Glumes* 3-nerved, oval, pubescent.—July to Oct.

14. P LATIFO'LIUM, (L.) Smooth. *Culm* nearly erect. *Leaves* long, broad, ciliate; sheath naked, except at the orifice; spikes 2—3, alternate, pilose at the base. *Glumes* orbicular, in three series, the intermediate pedicellate; rachis narrow.—Car.

15. P. TEN'UE. Erect, glabrous. *Leaves* long, narrow; spikes 4—5, alternate, spreading, pilose at the base. *Glumes* orbicular, in three series; rachis flexuous, narrow.—Geo. and northward.

16. P. ARUNDINA'CEUM, (Poir.) Smooth. *Spikes* alternate, elongated; spikelets in three series. *Glumes* obtuse, equal. *Leaves* ensiform; margins rough.—Car.

17. P. ALTIS'SIMUM, (Lec.) Smooth, erect, high. *Leaves* long; sheaths ciliate at the base and at the orifice; spikes 4—5, alternate, erect, pilose at the base. *Glumes* large, orbiculate, in two series; rachis broad. —N. Car.

18. P. MACROSPER'MUM, (Flue.) (*P. Floridanum*, Mich.) *Stem* erect, glabrous. *Leaves* long, the lower ones hairy and scabrous, the upper ones becoming nearly glabrous; throat of the sheath villous; spikes generally 3; rachis hairy at the base. *Flowers* 1—2 from each bud.—4. June—Sept. Common. 3—4 feet.

19. P. LENTIF'ERUM, (Lam.) (*P. præcox*, Walt.) *Stem* erect, glabrous. *Leaves* linear-lanceolate, glabrous; spikes numerous, with the flowers crowded, two from each bud, and one of them sessile; rachis hairy at the base. *Glumes* orbicular, glabrous.—4. May—Aug. Damp soils. 1—2 feet.

20. P. MUCRONA'TUM, (Mich.) *Culm* glabrous, creeping on the land and swimming in the water. *Leaves* broad, ciliate at the base; sheaths broad, swollen, ciliate; spikes numerous, narrow, the lowest verticil late, others scattered, naked at the base. *Glumes* ovate, small, in two series.—Geo. to Miss. *P. natans*, Leconte.

21. P. PURPURAS'CENS, (Ell.) *Stem* decumbent and erect, branching, glabrous. *Leaves* long, hairy at the base, dark purple; spikes numerous. *Flowers* crowded, two from each bud; rachis hairy at the base.—4. July—Oct. Common. 12—18 inches.

22. P. UNDULA'TUM, (Poir.) (*P. plicatulum*, Mich.) *Leaves* somewhat keeled; margins scabrous, ciliate at the base; sheaths smooth; spikes numerous; rachis flat, glabrous; margins scabrous; spikelets in 2—4 series; inferior glumes pubescent, superior glabrous.—Geo. and Flor.

GENUS X.—PAN'ICUM. L.

(The ancient Latin name for some of the species.)

Glumes 2, unequal, the lower one very small; the lower florets usually abortive or bearing stamens only. *Paleæ* concave, equal, beardless. *Seed* coated with the paleæ. *Flowers* in loose, scattered panicles or spikes.

§ 1. *Spikes digitate.*

1. P. MOL'LE, (Mich.) (*Eriochloa mollis*, Kunth.) *Stem* erect, pubescent toward the summit and all the joints. *Leaves* glabrous, with the throat of the sheath ciliate. *Flowers* in spikes or racemes. *Glumes* 2-

flowered, perfect and sterile; valves acute, hairy. *Palea* of the sterile floret 1.—♃. Aug.—Sept. On the sea-islands. 4—6 feet.

2. P. SANGUINA'LIS, (L.) (*Digitaria sanguinalis*, Scop.) *Stem* decumbent and assurgent, geniculate, taking root at the joints. *Leaves* hairy, with the sheaths shorter than the joints, sometimes purple; spikes digitate, spreading, 4—6. *Glumes* glabrous, exterior ones small. *Paleæ* with the valves equal, lanceolate.—☺. Through the summer. Cultivated grounds. Very common. *Crab-grass.*

§ 2. *Spikes racemose.*

3. P. ELLIOTTIA'NUM, (Schult.) (*P. gibbum*, Ell.) *Stem* erect, glabrous. *Leaves* linear-lanceolate, pubescent. *Flowers* in appressed racemes. *Glumes* 2-flowered, perfect and sterile. *Palcæ* of the perfect flower about half the length of the glumes.—☺. Through the summer. Damp soils. Common. 1—2 feet.

§ 3. *Branches paniculate, more or less divided; spikelets solitary, scattered.*

4. P. IGNORA'TUM, (Kunth.) (*Aulaxanthus ciliatus*, Ell.) *Stem* erect, glabrous, compressed toward the base. *Leaves* linear, ciliate, glabrous; sheath ciliate, hairy at the throat. *Glumes* villous. *Paleæ* brown, nearly black when mature.—♃. Sept.—Oct. Pine-barrens. 1—2 ft.

5. P. RU'FUM, (Kunth.) (*Aulaxanthus rufus*, Ell.) *Stem* erect, larger than the preceding. *Leaves* glabrous. *Panicle* large. *Glumes* covered with long, reddish-brown hair.—♃. Aug.—Sept. Damp soils. 2—3 feet.

6. P. DEB'ILE, (Poir.) (*P. hians*, Ell.) *Stem* slender, decumbent, glabrous. *Leaves* linear, ciliate near the base; sheaths short, contracted and pubescent at the throat. *Flowers* in racemose panicles. *Glumes* ovate, acute, 2-flowered; valves of the sterile floret long, of the fertile ovate, cartilaginous.—☺. Aug.—Oct. Pine-barrens. Common. 10—15 inches.

7. P. PROLIF'ERUM, (Lam.) (*P. geniculatum*, Muhl.) *Stem* assurgent, geniculate, branching, large. *Leaves* long, hairy, and scabrous on the upper surface, glabrous beneath. *Flowers* in large panicles, diffuse. *Glumes* 1-flowered.—♃. Aug.—Oct. Wet soils. 3—6 feet.

8. P. VIRGA'TUM, (L.) *Stem* erect, glabrous. *Leaves* somewhat serrulate, long; sheaths shorter than the joints. *Panicle* large, with the branches often verticillate. *Glumes* 2-flowered, perfect and sterile, with an accessory valve.—♃. Aug.—Sept. Sea-coast. 4—6 feet.

9. P. SCABRIUS'CULUM, (Ell.) *Stem* erect, large, somewhat pubescent, scabrous. *Leaves* linear-lanceolate, pubescent beneath, serrulate; sheaths pubescent, hairy at the throat. *Panicles* large, expanding. *Peduncles* glabrous. *Glumes* 2-flowered, perfect and sterile.—♃. Sept.—Oct. Low country of Geo. 2—3 feet.

10. P. MULTIFLO'RUM, (Poir.) Smooth. *Panicle* dense, many-flowered. *Flowers* sub-acute, oblong, small; branches rough. *Leaves* broad, linear, smooth.—Car.

11. P. AMA'RUM, (Ell.) *Stem* erect, stout, glabrous. *Leaves* flat, thick; throat of the sheath contracted, purple. *Panicle* large. *Flowers* large. *Peduncles* glabrous. *Glumes* 2-flowered, tinged with pur-

ple. *Paleæ* nearly equal in both flowers.—2f. Oct. Sand-hills on the sea-coast. 2—3 feet.

12. P. RAMULO'SUM, (Mich.) (*P. debile*, Ell.) *Stem* slender, decumbent, branching, glabrous. *Leaves* long, serrulate; sheaths ciliate, hairy at the throat. *Glumes* lanceolate, glabrous. *Flowers* in slender, diffuse panicles. *Pedicels* 2-flowered.—2f. Aug.—Oct. Damp soils. 2—4 feet.

13. P. FRA'GILE, (Kunth.) (*P. divergens*, Muhl.) *Stem* assurgent, slender. *Leaves* subulate, glabrous on the under surface, scabrous above; sheaths scabrous, longer than the joints. *Flowers* solitary, on long peduncles. *Glumes* 1-flowered, with a subulate, accessory glume. *Paleæ* shorter than the glumes.—2f. June—Aug. Dry soils. 12—15 inches.

14. P. DICHOT'OMUM, (Gross.) *Stem* procumbent, geniculate, pubescent, branched toward the summit. *Leaves* pubescent, serrulate; sheath pubescent. *Flowers* small. *Glumes* 2-flowered.—2f. June—Oct. Pastures and woods. Common. 1—2 feet.

15. P. NODIFLO'RUM, (Lam.) (*P. pauciflorum*, Ell.) *Stem* erect, geniculate, branching at the joints. *Leaves* narrow-lanceolate, acute, ciliate at the base; sheaths hairy. *Flowers* large, solitary, few. *Glumes* 1-flowered, with an accessory valve.—2f. May. Damp soils. 12—18 inches.

16. P. CONSANGUIN'EUM, (Kunth.) (*P. villosum*, Ell.) *Stem* erect, villous, somewhat branched. *Leaves* erect, hairy, rigid; sheaths shorter than the joints. *Flowers* few, obovate. *Glumes* 1-flowered, obovate.—2f. April—May. Damp places. 1—2 feet.

17. P. SETA'CEUM, (Muehl.) *Peduncles* solitary, 1-flowered, rarely paniculate. *Culm* erect, cæspitose, dichotomous, somewhat pubescent.—Geo.

18. P. MUEHLENBERGIA'NUM, (Schal.) *Culm* smooth, branching from the base; nodes pilose. *Leaves* linear, glabrous; branches of the panicle solitary. *Pedicels* flexuous, pubescent.—Geo.

19 P. NIT'IDUM, (Lam.) *Stem* erect, slender, glabrous. *Leaves* linear lanceolate, expanding; sheaths shorter than the joints, hairy at the throat. *Flowers* in a diffuse panicle, nearly spherical, small. *Glumes* purple.—2f. April—May. Damp soils. 1—2 feet.

20. P. OVA'LE, (Ell.) *Stem* erect, pubescent, terete. *Leaves* ovate-lanceolate, cordate, hairy at the base; sheath contracted at the throat. *Flowers* numerous, oblong, hairy.—2f. Aug.—Sept. Middle and Southern Geo. 1—2 feet.

21. P. LANUGINO'SUM, (Ell.) *Stem* pubescent, whitish. *Leaves* linear, acute, downy; sheaths lanuginous at the throat. *Panicle* diffuse. *Flowers* small, nearly globular. *Peduncles* smooth.—2f. July—Sept. Middle Geo. 1—2 feet.

22. P. MICROCAR'PUM, (Muhl.) *Stem* erect, simple. *Leaves* linear-lanceolate, erect, slightly pubescent beneath; sheaths hispid, hairy at the throat. *Glumes* tinged with purple.—2f. June—July. Banks of streams. 2—3 feet.

23. P. DEPAUPERA'TUM, (Muehl.) *Leaves* linear-lanceolate; lower ones short, upper ones longer, pilose or glabrous; sheaths pilose. *Panicles*

terminal, erect. *Glumes* acute, lanceolate, smooth.—Car. and northward.

24. P. VIS'CIDUM, (Ell.) *Stem* erect and decumbent, branching, very pubescent and viscid at the joints. *Leaves* slightly cordate, pubescent, ciliate; sheath viscid. *Panicle* expanding. *Flowers* pubescent, obovate. *Glumes* 2-flowered. *Paleæ* of the sterile floret very small.—♃. June. Damp soils. 2—4 feet.

25. P. CILIATIFO'LIUM, (Kunth.) (*P. ciliatum.*) *Stem* decumbent, terete, glabrous. *Leaves* lanceolate, ciliate; sheath glabrous, ciliate. *Glumes* 2-flowered, with an accessory glume. *Paleæ* of the neutral floret small.—♃. March—April. Damp soils. 4—10 inches.

26. P. ENSIFO'LIUM, (Ell.) *Stem* erect, slender. *Leaves* ovate-lanceolate, acute, glabrous; sheath short, glabrous *Flowers* small, pubescent.—♃. April—May. Damp soils. 12—18 inches.

27. P. BARBULA'TUM, (Mich.) *Stem* erect, usually geniculate, with the joints bearded, branching at the base. *Leaves* ovate-lanceolate, glabrous, expanding; sheath glabrous, ciliate. *Glumes* 2-flowered, pubescent. *Paleæ* of the perfect flower equaling the glumes; of the sterile flower only one, small.—♃. April—July. Damp soils. 10—15 inches.

28. P. PUBES'CENS, (Lam.) *Stem* erect, much branched, pubescent. *Leaves* lanceolate, ciliate, pubescent. *Stipules* bearded. *Glumes* 2-flowered, obovate. *Paleæ* of the perfect flower longest.—♃. July—Aug. Shady woods. 1—2 feet.

29. P. SPHÆROCAR'PUM, (Ell.) *Stem* erect, terete, glabrous. *Leaves* linear-lanceolate, acute, glabrous, ciliate at the base. *Panicle* expanding. *Flowers* small, pubescent. *Fruit* globular.—♃. April—May. Middle Geo. 12—18 inches.

30. P. ANGUSTIFO'LIUM, (Ell.) *Stem* slender, glabrous. *Leaves* linear-lanceolate, ciliate at the base, scabrous above, glabrous beneath. *Flowers* solitary, pubescent.—♃. May—June. Shaded soils. 1—3 feet.

31. P. HETEROPHYL'LUM, (Bos.) (*P. multiflorum*, Ell.) *Stem* erect, glabrous. *Leaves* broad-lanceolate, pubescent at the base and ciliate, slightly undulate. *Flowers* in a much branched panicle, small, pubescent.—♃. May—July. Shaded soils. 2—3 feet.

32. P. MELICA'RIUM, (Mich.) *Stem* slender, glabrous. *Leaves* long, narrow, glabrous. *Panicle* contracted, slender. *Glumes* 2-flowered, membranaceous, nearly equal.—♃. April—June. Car. and Geo.

33. P. AN'CEPS, (Mich.) *Stem* compressed, branching, geniculate. *Leaves* hairy; sheaths hairy, longer than the joints. *Panicle* expanding, turning to one side. *Glumes* 2—3-flowered, perfect and sterile. *Paleæ* shorter than the calyx.—♃. Aug.—Nov. Wet soils. Common. 2—4 feet.

34. P. CAPILLA'RE, (Gross.) (*P. strigosum*, Ell.) *Stem* assurgent, branched, villous. *Leaves* lanceolate, ciliate, villous. *Panicles* large. *Glumes* 2-flowered, obovate. *Paleæ* of the sterile florets very small.—♃. April—May. Damp soils. 12—15 inches.

35. P. SCOPA'RIUM, (Lam.) *Stem* erect, villous. *Leaves* glabrous on the upper surface, 3—6 inches long, 1—2 wide, pubescent beneath. *Flowers* few, large. *Glumes* 2 flowered, pubescent, with an accessory valve. *Paleæ* of the perfect floret larger than those of the sterile one.—♃. April—May Shady places. 2—3 feet.

36. P. Bos'cii, (Poir.) *Stem* glabrous, simple. *Leaves* lanceolate, erect, glabrous; sheaths bearded at the base and on the margin. *Panicles* short, few-flowered, somewhat pubescent. *Glumes* nerved. *Seed* naked.—Car.

37. P. Walte'ri, (Poir.) *Leaves* oval-lanceolate, amplexicaul, smooth; sheaths tomentose, bearded at the base. *Panicles* sessile, branching. *Glumes* pubescent; outer valve oval.—Car. to Vir.

38. P. commuta'tum, (Schal.) *Stem* erect, glabrous. *Leaves* lanceolate, slightly cordate, ciliate at the base, distinctly nerved. *Panicle* diffuse. *Peduncles* pubescent. *Glume* 2-flowered.—2f. May—July. Dry soils. 2—3 feet.

39. P. latifo'lium. *Stem* procumbent, pubescent. *Leaves* ovate-lanceolate, hairy at the throat. *Flowers* solitary, scattered. *Glumes* 2-flowered, perfect and sterile, pubescent. *Paleæ* of the perfect flowers larger than those of the sterile ones.—2f. Through the summer. Dry, shady soils. Common. 12—15 inches.

Genus XI.—ROTTBŒL'LIA. L.

(In honor of C. F. Rottbœll, a Danish botanist.)

Flowers in one-sided spikes. *Glumes* 1—2-flowered, the flowers sterile and perfect.

1. R. dimidia'ta, (Mich.) (*Stenotaphrum Americanum*, Schra.) *Stem* creeping, branching, glabrous. *Leaves* glabrous, sometimes opposite, perennial; spikes terminal, flat. *Glumes* unequal, the exterior shortest. *Paleæ* lanceolate, the exterior longest.—2f. Through the summer. On the sea-coast.

Genus XII.—OPLIS'MENUS. Beauv.

(From the Greek *oplismos*, armor.)

Spikelets 2-flowered or more; inferior flowers staminate or neutral; superior flowers perfect. *Glumes* 2, unequal, concave; staminate flowers with two paleæ, the lower one awned. *Stamens* 3. Perfect flowers; paleæ 2, the inferior acuminate, mucronate. *Styles* 2.

1. O. seta'rius, (Rœm.) (*Panicum hirtellum*, Ell.) *Stem* procumbent, creeping, sometimes assurgent, hairy at the joints. *Leaves* undulate, scabrous, slightly hairy, contracted at the base, throat, and margin of the sheath; spikes compound; spikelets 5—8-flowered; rachis angled, villous. *Glumes* 1-flowered, with purple awns.—2f. Aug—Oct. Rich, dry soils.

2. O. crus-gal'li, (Kunth.) (*Panicum crus-galli*, L.) *Stem* erect, terete, glabrous. *Leaves* long, scabrous. *Flowers* on spikes, forming a terminal panicle; rachis angled, hairy. *Glumes* 2-flowered, one perfect, the other sterile; exterior glume with a long awn; the interior one flat, awned; the accessory glume very small. *Paleæ* pubescent.—⊙. Aug.—Sept. Cultivated grounds. 2—4 feet.

The glumes of this species are not always awned, and the awns vary very much in length.

3. O. MURICA'TUS, (Kunth.) (*Panicum Walteri*, Pursh.) *Stem* erect, slender, glabrous. *Leaves* horizontal, glabrous; throat of the sheath ciliate. *Flowers* in alternate spikes, in three rows; rachis scabrous. *Glumes* 2-flowered, perfect and sterile.—☺. Through the summer In damp soils. Low country. 2—3 feet.

GENUS XIII.—SETA'RIA. Beauv.

(From *seta*, a bristle.)

Spikelets 2-flowered, invested with an involucre of two or more bristles. *Glumes* 2, unequal; lower flower abortive. *Paleæ* 1—2, herbaceous; upper flower perfect. *Paleæ* cartilaginous. *Flowers* in compound, cylindrical spikes.

1. S. GLAU'CA, (Beauv.) (*Panicum glaucum*, Ell.) *Stem* erect, glabrous, slightly compressed. *Leaves* linear-lanceolate, acute; upper surface scabrous; spike cylindrical. *Glumes* with an accessory one, acute, 3-nerved. *Paleæ* 2, the exterior one obscurely 5-nerved. *Awns* 8—10, in two fascicles.—☺. July—Aug. Roadsides. 2 feet.

There are two or three varieties of this plant, varying in the direction of the stem, and in the number of the flowers in the spikelets, and in being pubescent.

2. S. CORRUGA'TA, (Schul.) (*Panicum corrugatum*, Ell.) *Stem* erect, terete, slightly scabrous. *Leaves* acute, scabrous; sheaths longer than the joints. *Flowers* in compound, compact spikes; spikelets with about half the flowers fertile, the others sterile. *Glumes* with an accessory valve, 5-nerved. *Paleæ* as long as the glumes, the exterior one wrinkled.—♃. Through the summer. Low country. 2—3 feet.

3. S. LÆVIGA'TA, (Schul.) (*Panicum lævigatum*, Muhl.) *Stem* procumbent, compressed, the upper joints longest. *Leaves* narrow, glabrous; sheaths compressed; spike columnar; spikelets 1-flowered. *Involucels* 10-awned.—♃. Through the summer. Sea-islands. 1—2 feet.

4. S. AFFI'NIS, (Schul.) *Leaves* linear-lanceolate, pilose; sheaths striate; ligule bearded. *Peduncles* pubescent; bracts purple at the apex. *Flowers* in elongated fascicles.—Geo. to Penn.

5. S. ITAL'ICA, (Kunth.) (*Panicum Italicum*, L.) *Stem* erect, slightly compressed, tomentose. *Leaves* very long, channeled, scabrous, the sheath with the throat and margins ciliate; spikes compressed, with the spikelets many-flowered. *Involucre* longer than the flowers. *Glumes* 2-flowered, only one paleæ to the sterile floret.—♃. Aug.—Sept. Wet soils. 2—10 feet.

GENUS XIV.—CEN'CHRUS. Beauv.

(A Greek name of *Setaria Italica*.)

Involucre 1—3-flowered, many-parted, bristly. *Glumes* 2, 2-flowered, exterior ones smallest; the exterior floret sterile, the other perfect *Paleæ* 2, unawned.

1. C. ECHINA'TUS, (L.) *Stem* erect, glabrous, pubescent; spikes consisting of 6—10 heads; spikelets approximate; involucre 10-parted, villous.—⊙. Aug.—Sept. Sandy soils. 1—2 feet.

2. C. TRIBULOI'DES, (L.) *Stem* erect, compressed, sometimes branched. *Leaves* scabrous on the upper surface, glabrous beneath; sheath twice the length of the joints. *Glumes* unequal, 2-flowered. *Paleæ* 2, the exterior valve acute.—⊙. July—Oct. Sandy soils. 12—15 inches.

TRIBE IV.—STIPA'CEÆ.

Spikelets 1-flowered; inferior palea awned. *Ovarium* stipitate.

GENUS XV.—STI'PA. L.

Glumes 2, membranaceous, 1-flowered. *Paleæ* 2, coriaceous, shorter than the glumes; the lower one with a long terminal awn, the upper one entire. *Panicle* lax.

1. S. AVENA'CEA, (Walt.) (*S. Virginica*, Pers.) *Stem* erect, terete, glabrous; lower leaves longest, glabrous beneath, scabrous on the upper surface. *Flowers* in diffuse panicles. *Glumes* nearly equal, concave, sometimes awned. *Paleæ* stiped, the stipe bearded. *Awn* spiral.—♃ June. Sandy soils. Common. 2—3 feet. *Feather-grass.*

GENUS XVI.—ARIS'TIDA.

(From *arista*, a beard or awn.)

Glumes 2, membranaceous, unequal. *Paleæ* 2, on pedicels; lower one coriaceous, 3-awned, the upper one very small, or wanting. *Scales* collateral.

1. A. GRA'CILIS, (Ell.) *Stem* erect, slender, glabrous, branching at the base. *Leaves* linear, with sheaths shorter than the joints. *Flowers* in long spikes, appressed. *Glumes* equaling the paleæ in length; the exterior palea involute, banded with light and dark spots, 3-awned; the interior palea minute, or wanting.—♃. Sept.—Oct. Common on the sea-coast. 10—15 inches.

2. A. STRIC'TA, (Mich.) *Stem* erect, compressed, branching at the base, lower joints short. *Leaves* glabrous; sheaths longer than the joints, with the throat ciliate. *Panicle* long, erect. *Peduncles* scabrous. *Glumes* unequal, with serrulate keels. *Paleæ* with the exterior one hairy at the base. *Awns* long, scabrous.—♃. July—Aug. Rocky soils. 2—3 feet.

3. A. DICHOT'OMA, (Mich.) *Stem* slender, branching, glabrous. *Leaves* narrow, flat, finely serrulate. *Flowers* in paniculate racemes. *Glumes* narrow-lanceolate, with short awns; keels serrulate. *Paleæ* involute, 3-awned, the middle one longest, contorted.—☌. July. Loose soils. 12—18 inches.

4. A. LANA'TA, (Poir.) (*A. lanosa*, Ell.) *Stem* erect, pubescent at the base. *Leaves* glabrous beneath, pubescent above, with scabrous margins; sheaths tomentose. *Flowers* in racemose panicles. *Glumes* acute, compressed, unequal; exterior palea 3-awned, involute, the interior one very small.—♃. Aug.—Sept. Sandy soils. 2—4 feet.

5. A. SPICIFOR'MIS, (Ell.) *Stem* erect, simple, compressed. *Leaves* linear; sheaths glabrous. *Flowers* in compound racemes, appressed. *Glumes* shorter than the paleæ, terminated by awns. *Paleæ* unequal, exterior one 3-awned, with the intermediate one longest, pubescent at the base.—2f. Sept.—Oct. Pine-barrens. 1—3 feet.

TRIBE V.—AGROSTI'DEÆ.

Spikelets 1-flowered.

GENUS XVII.—MUHLENBER'GIA. Schreb.

(In honor of Dr. Muhlenberg.)

Glumes 2, very minute, fringed. *Paleæ* ovate, gibbous, much larger than the glumes, the lower one awned. *Panicle* simple.

1. M. DIFFU'SA, (Willd.) *Stem* decumbent, geniculate, diffuse, compressed. *Leaves* linear, scabrous. *Panicle* slender, composed of alternate, appressed racemes. *Glumes* unequal, small. *Paleæ* unequal, pubescent at the base, the exterior 3-nerved; awn purple.—2f. July. In fields. 18—20 inches.

2. M. POLYPO'GON, (Trin.) *Leaves* convolute, glaucous. *Pedicels* crowded; awn longer than the floret; glumes awned at the apex.—Carolina.

3. M. CAPILLA'RIS, (Trin.) *Leaves* convolute, long, glaucous. *Flowers* crowded; paleæ 3 times as long as the glumes; awns naked.

4. M. EREC'TA, (Pursh.) *Stem* erect, simple, pubescent. *Leaves* pubescent; sheath shorter than the joint, hairy at the throat. *Panicle* loose. *Glumes* 2, with one very minute. *Paleæ* with the exterior one bearing a long awn, many-nerved.—2f. July. Rocky hills. 2—3 ft.

GENUS XVIII.—AGROS'TIS. L.

(From *agros*, a field; the place of growth.)

Glume naked, beardless, 2-valved, 1-flowered; valves longer than the paleæ. *Paleæ* 2, membranaceous. *Stigmas* longitudinally hispid.

1. A. DIS'PAR, (Mich.) Erect, large. *Panicle* loose, many-flowered, somewhat verticillate and pyramidal; the exterior glume the largest, one of the interior very small.—Low country.

2. A. LAXIFLO'RA, (Rich.) (*Trichodium laxiflorum*, Mich.) *Stem* erect, glabrous. *Leaves* setaceous, scabrous. *Panicles* diffuse, capillary, with trichotomous branches. *Glumes* unequal, lanceolate, acute. *Paleæ* shorter than the glumes, with the margins pubescent.—2f. March—May. Dry fields or swamps. 18 inches to 3 feet.

3. A. TRICHOPO'DES, (Ell.) *Stem* erect, glabrous. *Leaves* flat, scabrous; sheath glabrous, with long stipules. *Panicle* diffuse. *Pedun cles* capillary, long. *Glumes* much shorter than the paleæ; the exterior palea with a short, straight awn, the interior longest.—2f. Sept.—Oct. Common. 2—3 feet.

4. A. ARACHNOI'DES, (Ell.) (*Cinna arachnoidea*, Kunth.) *Stem* erect, slender, glabrous. *Leaves* with the sheath as long as the joints. *Stip-*

ules lacerate. *Panicle* long, with capillary branches; the upper palea awned, with the awn very slender. *Stamens* 1—3. *Styles* 2.—♃. April—May. Middle Car. 4—8 inches.

5. A. COMPOS'ITA, (Poir.) *Leaves* rough, long. *Flowers* in panicles, racemose and spicate, erect. *Paleæ* acute, longer than the glumes.—Carolina.

6. A. COMPRES'SA, (Poir.) *Flowers* in elongated panicles; peduncles somewhat verticillate; glumes compressed, exterior acute, longest.—Carolina.

7. A. CLANDESTI'NA, (Ell.) (*Sporobolus asper*, Kunth.) *Stem* erect, terete, glabrous. *Leaves* scabrous on the upper surface, with serrulate margins; sheaths shorter than the joints, hairy at the throat. *Panicles* appressed, terminal and axillary. *Glumes* glabrous, unequal. *Paleæ* hairy, with the exterior one keeled.—♃. Sept.—Oct. Sandy soils. 3—4 feet.

8. A. JUN'CEA, (Mich.) (*Sporobolus junceus*, Kunth.) *Stem* erect, slender, glabrous. *Leaves* glabrous, concave, margins scabrous. *Panicle* with verticillate branches, about 6 in a whorl. *Glumes* glabrous; the exterior much smaller than the interior, both purple. *Paleæ* nearly equal.—♃. Dry pine-barrens. Common. 1—2 feet.

9. A. VIRGIN'ICA, (L.) (*Sporobolus Virginicus*, Kunth.) *Stem* procumbent, assurgent, glabrous. *Leaves* subulate, short, entire. *Panicle* appressed. *Glumes*, the exterior shorter than the paleæ, keeled, the interior larger. *Paleæ* nearly equal; the exterior acute, the interior obtuse.—♃. Aug.—Sept. On the sea-coast. 6—8 inches.

10. A. PAUCIFLO'RA, (Pursh.) *Stem* erect, glabrous. *Leaves* linear, villous; sheaths striate, with short stipules. *Panicle* with filiform branches. *Glume* unequal, with short awns. *Paleæ* villous, with short awns.—♃. July. Mountains. 12—18 inches.

11. A. CIN'NA, (Lam.) (*Cinna arundinacea*, L.) *Stem* erect, glabrous. *Panicle* large, weak. *Leaves* broad, linear, 1-valved, slightly awned beneath the summit.—♃. Aug. Middle Georgia.

12. A. LATERIFLO'RA, (Mich.) (*Cinna lateriflora.*) *Stem* erect, branching above. *Leaves* broad, linear, flat. *Panicles* lateral and terminal, dense, somewhat secund. *Glumes* acuminate. *Paleæ* longer than the glumes, equal, pubescent at the base, without awns.—♃. Aug.—Sept. Swamps. 1—2 feet.

TRIBE VI.—CHLORID'EÆ.

Spikelets in unilateral spikes, 1—many-flowered, digitate or paniculate; rachis not articulated.

GENUS XIX.—CYN'ODON. Rich.

(From *kuon*, a dog, and *odous*, a tooth.)

Spikelets 1-flowered, with the rudiment of a flower on a pedicel. *Spikes* digitate at the summit of the stem. *Glumes* unequal, keeled. *Paleæ* unequal, the lower larger.

1. C. DAC'TYLON. Low creeping plant, with short flat leaves. *Spikes*

digitate, 3—5; paleæ longer than the rudiment.—An introduced grass. Very difficult to exterminate, especially in loose, rich soil.

Bermuda Grass. Digitaria dactylon, Ell.

Genus XX.—CHLO'RIS. Schwartz.

(From *chloros*, green, in allusion to its herbage.)

Flowers polygamous. *Glumes* 2, 2-flowered; one of them perfect and sessile, the other staminate. Paleæ of the perfect flower 2, awned. *Spikes* by fours, digitate.

1. C. PETRÆ'A, (Ell.) (*Eustachys petræa*, Desv.) *Stem* prostrate, branching, assurgent, geniculate. *Leaves* glabrous, with the margins and midrib serrulate. *Glumes* 2, 2-flowered; exterior glume awned, the interior smaller, keeled. Palea of the sterile floret concave, ob tuse.—♃. June—Aug. On the sea-coast.

Genus XXI.—ELEUSI'NE. Gært.

(From *Eleusin*, the name of a town where Ceres was worshiped.)

Flowers on one side of the rachis. *Glumes* 2, unequal, 5—7-flowered. *Paleæ* 2, obtuse, upper one bifid. *Scales* fimbriate. *Spikes* digitate.

1. E. MUCRONA'TA, (Mich.) (*Leptochloa mucronata*, Kunth.) *Stem* erect, glabrous. *Leaves* slightly scabrous, with hispid sheaths longer than the joints. *Panicle* long, with the spikes 4—5 inches long. *Glumes* nearly equal, with colored keels. *Paleæ* unequal, the exterior hairy.—☺. July—Oct. Cultivated lands. 1—3 feet.

2. E. IN'DICA, (Gært.) *Stem* decumbent, lucid. *Leaves* linear, with the under surface glabrous, long; sheaths pubescent, compressed. *Spikes* usually 5, digitate, one below the rest; spikelets usually 5-flowered. *Glumes* unequal, with the keels scabrous.—♃. June—October. Common. 1—2 feet.

3. E. CRUCIA'TA. (*Dactyloctenum Ægyptiacum*, Willd.) *Stem* decumbent and assurgent, glabrous. *Leaves* narrow, ciliate. *Spikes* 2—4; spikelets usually 3-flowered, the terminal one usually sterile or wanting; extremity of the rachis naked.—☺. July. Common. 12—18 inches.

Genus XXII.—MONOCE'RA. Ell.

(From *monos*, one, and *keros*, horn; there being but one spike.)

Flowers polygamous, on one side of the rachis. *Glumes* 2, many-flowered, awned below the summit. Paleæ of the perfect flower 2-valved, unequal; the exterior one awned below the summit; those of the sterile flower unawned.

1. M. AROMAT'ICA, (Ell.) (*Ctenium Americanum*, Sprig.) *Stem* pubescent, erect. *Leaves* scabrous on the upper surface, glabrous beneath; sheaths shorter than the joints, hairy at the throat. *Spikes* terminal, secund; spikelets in 2 rows. *Glumes* 3-flowered; the exterior glume with an awn projecting from the center of the back; the interior palea small, pubescent.—♃. May—July. Pine-barrens.

Toothache-grass.

Genus XXIII.—SPARTI'NA.

(From *spartine*, a cord, from the toughness of the leaves.)

Flowers in 1-sided spikes, imbricate, in 2 rows. *Glumes* 2, unequal, keeled. *Paleæ* 2, unequal, without awns.

1. S. JUN'CEA, (Willd.) *Stem* glabrous, columnar. *Leaves* linear, convolute when old; sheaths glabrous, ciliate at the throat; spikes few, pedunculate; exterior glume small, the interior one long, keeled; exterior palea shortest, the interior compressed, as long as the glume.—♃. Through the summer. Sea-coast. 2—3 feet.

2. S. POLYSTA'CHYA. *Stem* glabrous, columnar. *Leaves* broad, very long, scabrous on the upper surface; sheath longer than the joints, with the throat hairy; spikes numerous, 10—12, expanding, alternate. —♃. Sept. On the sea-coast. 3—10 feet.

3. S. GLA'BRA, (Muhl.) (*S. lævigata*, Link.) *Stem* glabrous, fistular. *Leaves* long, glabrous, concave; spikes erect, appressed, 5—8. *Glumes* and paleæ ciliate on the keels.—♃. August—Sept. On the sea-coast. 2—4 feet.

Genus XXIV.—GYMNOPO'GON. Beauv.

(From *gumnos*, naked, and *pogon*, a beard.)

Glumes 2, carinate, nearly equal, longer than the floret. *Paleæ* shorter than the glumes, equal; the exterior one 3-nerved, terminated by a straight awn. *Spike* panicled.

1. G. RACEMO'SUS, (Beauv.) *Stem* erect and decumbent, glabrous, short joints. *Leaves* distichous, cordate, lanceolate, nerved, short, glabrous; sheaths hairy at the throat. *Panicle* terminal, expanding, somewhat verticillate.—♃. Sept.—Oct. Dry soils. 1—2 feet.

Tribe VII.—AVENA'CEÆ.

Spikelets 2—many-flowered, panicled; the lower palea bearing a twisted or bent awn on the back.

Genus XXV.—AI'RA. L. (*Hair-grass.*)

(An ancient Greek name for Darnel.)

Glumes 2, 2—3-flowered. *Paleæ* 2, equal, inclosing the seed, exterior one usually awned. *Panicle* compound.

1. A. FLEXUO'SA, (L.) *Stem* erect, terete, glabrous. *Leaves* setaceous. *Panicle* diffuse, with the branches somewhat verticillate. *Glumes* unequal. *Paleæ* equal, the exterior one pubescent at the base, bearing an awn at the base.—♃. August—Sept. Shady woods. 1—2 feet.

2. A. CAPILLA'CEA, (L.) *Stem* erect, small. *Leaves* short, glabrous, narrow. *Flowers* in capillary panicles, diffuse, large for the size of the plant. *Glumes* acute, with the keel rough. *Paleæ* unawned, larger than the glumes.—☺. July—Aug. Sandy soils. 8—10 inches.

3. A. TRIFLO'RA, (Ell.) (*Graphephorum Elliottii*, Kunth.) *Stem* erect, glabrous, slender. *Leaves* short, flat, scabrous on the under surface

sheaths shorter than the joints, with incised stipules. *Glumes* unequal, linear-lanceolate, keeled. *Paleæ* lanceolate, 3—5-nerved.—4. April —May. Upper Carolina and Georgia. 12—18 inches.

4. A. PAL'LENS, (Muhl.) (*Avena palustris*, Mich.) *Stem* erect, geniculate at the base, glabrous. *Leaves* flat, slightly scabrous, narrow; sheaths glabrous. *Glumes* compressed, keeled; the interior valve longest. *Paleæ* 2; the exterior double the length of the interior, bearing a short awn on the back.—4. March—April. Wet soils. Common. 1—2 feet.

5. A. OBTUSA'TA, (Ell.) *Stem* erect, glabrous. *Leaves* flat, somewhat scabrous and hairy; sheaths hairy. *Panicle* racemose. *Glumes* 2—3-flowered, the exterior one linear, the interior broad, obtuse. *Paleæ* nearly equal, the exterior tinged with green, the interior white.—4. March—April. Pine-barrens. Common.

6. A. MOL'LIS, (Muhl.) (*Reboulea gracilis*, Kunth.) *Stem* slender, glabrous, naked at the summit. *Leaves* linear, short. *Flowers* in racemose panicles, scattered. *Glumes* with the interior obtuse, the exterior acute. *Paleæ* acute, the interior shortest, usually 2-cleft.—4. April —May. Middle Car. and Geo. Common. 1—2 feet.

GENUS XXVI.—AVE'NA. L. (*Oat.*)

(The Latin name.)

Glumes 2, 2—7-flowered, longer than the florets. *Paleæ* bilaciniate, or with the upper bifid, toothed, with a twisted awn on the back. *Seed* furrowed. *Panicle* loose, compound.

1. A. SPICA'TA, (L.) (*Danthonia spicata*, Rœm.) *Stem* erect, pubescent near the summit. *Leaves* subulate, small, pubescent; sheath with the throat bearded, villous. *Flowers* panicled; spikes racemose, on short pedicels. *Glumes* usually 6-flowered, longer than the spike; margins membranaceous. *Paleæ* 2; exterior one lanceolate, villous, the sides terminating in two awns, with the spiral one on the back between them; interior one ciliate.—4. April—May. Upper districts of Carolina and Georgia. 1—2 feet.

2. A. PENNSYLVAN'ICA, (L.) (*Arrhenatherum Pennsylvanicum*, Torr.) Resembles the preceding, with the exception that the glumes are 2-flowered, and seeds villous.—New York to Florida.

3. A. SATI'VA, (L.) The common oat, the most generally cultivated grain in high latitudes. There are numerous varieties—in the color of the grain or stem, or in the presence or absence of awns, &c.

4. A. NU'DA, (L.) Is an oat extensively cultivated in Europe, which is easily detached from its covering, and is used on that account for grinding into meal, and other culinary purposes.

GENUS XXVII.—U'RALEPIS. Nutt.

(From *oura*, a tail, and *lepis*, a scale, in allusion to the appearance of the lower palea.)

Spikelets 2—3-flowered; flowers alternate, longer than the glumes. *Paleæ* unequal, villous on the margin; lower palea 3-awned, upper one entire, concave. *Stamens* 1—3. *Fruit* gibbous, stiped.

1. U. PURPU'REA, (Kunth.) (*Aira purpurea*, Walt.) *Stem* slender, compressed, scabrous at the joints. *Leaves* scabrous, pubescent on the upper surface; sheaths scabrous, the throat pubescent. *Glumes* 2-flowered; the exterior valves small, with the margins incised. *Paleæ* 2, the exterior one bifid, with the midrib extending into an awn; the interior valve villous.—☺. Sept.—Oct. Sea-coast. 1—2 feet.

2. U. CUP'REA, (Kunth.) (*Poa quinquefida*, Pursh.) *Stem* erect, glabrous. *Leaves* distichous at the base, slightly serrulate; sheath hairy at the throat. *Panicle* expanding; spikelets 5-flowered; exterior palea 3—5-nerved, which extends beyond the margin, hairy at the base. —♃. Sept.—Oct. Sandy soils. Common. 4 feet.

3. U. AMBIG'UA, (Kunth.) (*Poa ambigua*, Ell.) *Stem* erect, glabrous. *Leaves* linear, glabrous; sheaths bearded at the throat. *Panicle* expanding; spikelets dark-purple, sessile.—♃. Sept. 2 feet.

TRIBE VIII.—FESTUCIN'EÆ.

Spikelets 2—many-flowered, panicled, sometimes racemose, generally without awns.

GENUS XXVIII.—PO'A. L. (*Meadow-grass.*)

(A Greek name for grass.)

Glumes 2, usually many-flowered. *Spikelets* compressed. *Paleæ* sometimes woolly at the base. *Scales* smooth. *Panicle* more or less branching, or scattered.

§ 1. *Spikelets* 2—*many-flowered, compressed, paniculate or racemose.*

1. P. MICHAUX'II, (Kunth.) (*Uniola spicata*, L.) *Stem* erect, terete, glabrous. *Leaves* distichous, subulate, involute. *Panicle* compressed. *Glumes* 2—3, 8—10-flowered.—♃. July—Sept. On the sea-coast. 1 foot.

2. P. PECTINA'CEA, (Mich.) *Stem* erect or oblique. *Leaves* erect, hairy at the base; sheaths hairy at the throat. *Panicle* capillary, expanding, pyramidal, hairy in the axils; spikelets 5—10-flowered; interior palea persistent.—☺. July—Aug. Sandy fields. 8—12 inches.

3. P. HIRSU'TA, (Mich.) *Stem* erect, compressed, glabrous, branching hairy at the axils. *Leaves* glabrous, long, pubescent at the base; sheath hairy. *Glumes* glabrous, tinged with purple.—♃. Aug.—Oct. Dry fields. 1—2 feet.

4. P. CAPILLA'RIS, (L.) *Stem* erect, glabrous. *Leaves* linear, hairy, short, flat; sheath longer than the joints, hairy at the throat. *Panicle* very large, expanding, capillary; spikelets 3-flowered, ovate. *Glumes* pubescent. *Paleæ* pubescent.—☺. August—Sept. Sandy fields. 1—2 feet.

5. P. ERAGROS'TIS, (L.) *Stem* geniculate and branching at the base, glabrous. *Leaves* short, linear, glabrous, nerved. *Panicle* spreading, lower branches hairy in the axils; spikelets 9—15-flowered; florets obtuse; exterior palea acute, 5-nerved, transparent.—☺. July—Aug Sandy fields. 12—18 inches.

6. P. REP'TANS, (Mich.) *Stem* decumbent, glabrous, terete, creeping, branched. *Leaves* subulate, striate, slightly pubescent; sheath hairy at the throat. *Panicle* fascicled; spikelets 12—20-flowered; ex-

terior palea with the midrib green.—☺. Through the summer. Moist cultivated lands. 6—18 inches.

7. P. Link'ii, (Kunth.) (*P. tenella*, Ell.) *Stem* decumbent, glabrous. *Leaves* subulate, scabrous on the upper surface; sheath hairy at the throat. *Panicle* expanding, with verticillate branches; exterior palea purple, 3—5-nerved.—☺. Through the summer. Cultivated grounds. Common. 6—12 inches.

§ 2. *Spikelets paniculate, few-flowered, rather remote.*

8. P. an'nua, (L.) *Stem* glabrous, procumbent, geniculate. *Leaves* glabrous. *Panicle* diffuse; spikelets usually 4—5-flowered. *Glumes* slightly pubescent.—☺. Feb.—April. Cultivated grounds. 6—8 in.

9. P. vir'idis, (Schr.) *Stem* erect, oblique at the base, striate, glabrous. *Leaves* glabrous, linear, flat. *Panicle* diffuse, with 3 or 4 branches at each joint. *Glumes* acute, margins scarious, white; spikelets 3—5-flowered, woolly at the base.—♃. May—June. Common. 2—3 feet.

10. P. fer'tilis, (Host.) (*P. angustifolia*, Wahl.) *Stem* glabrous, erect. *Leaves* linear, glabrous, involute, upper ones broadest. *Panicle* crowded; spikelets usually 4-flowered, villous at the base. *Paleæ* tinged with purple, villous at the base.—♃. May—June. Common. 1—2 feet.

11. P. spectab'ilis, (Pursh.) (*R. refracta*, Ell.) *Stem* erect, terete, glabrous. *Leaves* slightly hairy. *Panicle* diffuse, large; spikelets 15—20-flowered; exterior palea 3-nerved.—♃. August—Sept. Damp soils. 2 feet.

12. P. ten'uis, (Ell.) *Stem* somewhat compressed, much branched, glabrous. *Leaves* linear, long, scabrous; throat of the sheath hairy. *Panicle* diffuse, capillary; spikelets 1—3-flowered. *Glumes* glabrous. *Paleæ* glabrous, the exterior one keeled.—♃. Aug.—Sept. Upper Car. 12—18 inches.

13. P. micran'tha, (Schult.) (*P. parviflora*, Ell.) *Stem* simple, decumbent, compressed, leafy. *Leaves* distichous, flat, glabrous; sheath glabrous. *Panicle* diffuse, capillary; spikelets generally 3-flowered; florets obtuse, caducous.—♃. July. Shady woods. Middle Carolina and Georgia.

14. P. autumna'lis, (Muhl.) *Stem* erect, glabrous. *Leaves* slightly scabrous, flat. *Panicles* diffuse; spikelets generally 3-flowered. *Glumes* unequal; exterior palea obtuse, 5-nerved.—♃. Aug.—Sept. Middle Car. and Geo. 12—18 inches.

15. P. nit'ida, (Ell.) *Stem* erect, glabrous. *Leaves* linear; throat of the sheath slightly hairy. *Panicle* diffuse, capillary; spikelets 7—9 flowered. *Glumes* compressed; exterior palea 3-nerved, transparent —☺. Through the summer. Cultivated lands. 12—18 inches.

16. P. confer'ta, (Ell.) *Stem* erect, geniculate, terete, swollen at the joints. *Leaves* glabrous, flat. *Panicles* terminal and axillary, erect spikelets 8-flowered, smooth; exterior palea with colored veins.—♃ July—Aug. Middle Car. and Geo. 2—3 feet.

17. P. flu'itans, (Scop.) (*Glyceria fluitans*, Brown.) *Stem* erect glabrous. *Leaves* scabrous on the upper surface; sheaths glabrous with large stipules. *Panicle* branching; spikelets sessile, 9—10-flowered. *Glumes* membranaceous, smaller than the paleæ; exterior palea 7-nerved, obtuse.—♃. May—Aug. Upper districts. 1—2 feet.

Genus XXIX.—MEL'ICA. L.

(From *meli*, honey.)

Glumes 2, unequal, 2-flowered. *Palecæ* 2, unequal; upper florets sterile.

1. M. specio'sa, (Muhl.) (*M. glabra*, Mich.) *Stem* erect, terete, glabrous. *Leaves* linear, with long sheaths. *Flowers* in paniculate racemes; racemes 3—5-flowered. *Glumes* shorter than the paleæ; the interior palea ciliate.—♃. April—May. Middle Carolina and Geo. 2—3 feet.

2. M. diffu'sa, (L.) *Stem* erect, pubescent. *Panicles* diffuse, branching; flowers acute.—Virginia and southward.

3. M. Muhlenber'gia, (Schult.) *Ligule* short, hairy. *Panicle* simple, contracted; raceme 6-flowered; florets nodding; glumes, one obtuse, the other acute, glabrous.—Carolina and Geo.

Genus XXX.—BRI'ZA. L.

Glumes 2, many-flowered. *Flowers* imbricate, in two rows. *Palecæ* ventricose; lower one embracing the upper. *Seed* beaked. *Panicle* compound, loose, with pendulous branches.

1. B. eragros'tis, (L.) *Stem* decumbent, geniculate, glabrous. *Leaves* scabrous on the upper surface, linear-lanceolate; sheaths shorter than the joints, bearded at the throat. *Panicle* compound; spikelets cordate at the base. *Flowers* numerous; exterior palea 3-nerved, acute, the interior one ciliate along the nerves.—☺. June—Nov. Cultivated lands. Very common. 12—18 inches.

Genus XXXI.—DAC'TYLIS. L. (*Orchard-grass.*)

(From *daktulis*, a finger's breadth; the allusion not apparent.)

Glumes 2, many-flowered, unequal, the larger one keeled. *Palecæ* 2, without awns, lanceolate; lower one mucronate, the upper one bifid. *Spikelets* clustered into a 1-seeded head.

1. D. glomera'ta, (L.) *Stem* erect, glabrous. *Leaves* linear, scabrous; sheath scabrous. *Panicle* secund, clustered. *Glumes* lanceolate, 2—4-flowered. *Palecæ* with the keel ciliate.—♃. June—July. In fields. 2—3 feet.

Genus XXXII.—FESTU'CA. L.

(An ancient Latin name.)

Glumes 2, unequal, many-flowered. *Palecæ* 2, lanceolate; outer one acuminate or awned. *Panicle* usually compound.

1. F. rig'ida, (Kunth.) (*Poa rigida*, L.) *Stem* assurgent, glabrous, rigid. *Leaves* subulate, glabrous. *Panicle* secund; spikelets linear-lanceolate, 3—5—7-flowered. *Glumes* keeled. *Palecæ* rounded, tinged with purple.—♃. April—May. Dry soils. 2—4 inches.

2. F. myu'rus, (L.) *Stem* erect, geniculate at the base, glabrous. *Leaves* subulate scabrous on the margins; sheaths much longer than

the joints. *Panicle* slender, crowded, not secund; spikelets 4—7, flowered. *Glumes* small; exterior palea concave, hairy, awned.—☺. March—April. Dry soils. 6—12 inches.

3. F. TENEL'LA, (Willd.) *Stem* erect, geniculate at the base. *Leaves* subulate, pubescent and scabrous on the upper surface. *Panicle* secund, simple; spikelets 6—9-flowered. *Glumes* unequally scabrous. *Paleæ* longer than the glumes; exterior valve keeled, awned.—☺. April—May. Dry soils. Common. 6—12 inches.

4. F. DURIUS'CULA, (L.) *Stem* erect, glabrous. *Leaves* subulate, scabrous. *Panicle* erect, secund, short; spikelets 6—8-flowered. *Glumes* acute, unequal. *Paleæ* unawned, interior one small.—June to July. In fields. 12—18 inches.

5. F. NU'TANS, (Willd.) *Stem* erect, terete, glabrous. *Leaves* linear-lanceolate, glabrous. *Panicle* secund, nodding; spikelets 3—6-flowered, compressed. *Flowers* unawned.—♃. June—July. Woods. 2—3 ft.

6. F. PARVIFLO'RA, (Ell.) *Stem* slender, glabrous. *Leaves* linear, almost filiform. *Panicle* slender; spikelets subulate, terete, 5-flowered; exterior palea awned.—♃. April—May. Pine-barrens. 12—18 in.

7. F. QUADRIFO'LIA. (Walt.) *Leaves* setaceous, upper ones lanceolate. *Panicles* contracted, secund; florets lanceolate; awn terminal, scabrous, exceeding 4 times the length of the glumes.—Geo. and northward.

8. F. POLYSTA'CHYA, (Mich.) (*Leptochloa polystachya*, Kunth.) *Stem* procumbent, branching, glabrous. *Leaves* narrow, subulate; sheaths longer than the joints. *Panicle* secund, erect; spikelets about 10-flowered; the exterior glume small, the interior larger and awned; the exterior paleæ awned and keeled.—♃. Sept.—Oct. Wet soils. 1—2 feet.

GENUS XXXIII.—BRO'MUS. L.

(From *bromos*, food; the ancient name of the Oat.)

Glumes 2, usually many-flowered, shorter than the florets, which are imbricated in 2 rows; lower palea cordate, emarginate, with an awn sometimes below the summit. *Scales* ovate, smooth.

1. B. WILLDENOW'II, (Kunth.) Sheaths of the leaves bearded at the throat. *Panicle* nodding, spreading; spikelets oblong-lanceolate, compressed, 8-flowered, awnless.—Carolina.

Ceratochloa unioloides, Beauv.

2. B. CILIA'TUS, (L.) *Stem* slender, swollen and hairy at the joints. Leaves and sheaths hairy. *Panicle* nodding; spikes slender, cylindrical. *Glumes* pubescent; exterior palea pubescent, ciliate; awn nearly as long as the valve, interior one much smaller.

3. B. SECALI'NUS, (L.) *Stem* glabrous, swollen at the joints, erect. *Leaves* pubescent on the upper surface, ciliate. *Panicle* erect or nodding, branched; spikelets oblong-ovate, compressed; florets about 10, distinct, longer than the bristles.—☺. July. Cultivated lands. 2—3 feet.

4. B. PUR'GANS, (L.) *Stem* erect, glabrous. *Leaves* scabrous; sheaths villous. *Panicle* nodding, diffuse; peduncles hairy; spikelets 4—6-flowered. *Glumes* pubescent, the interior one awned; exterior palea awned, hairy at the summit.—♃. July—Sept. Mountains. 1—2 ft.

Genus XXXIV.—UNIO'LA. L.

(The ancient name of some grass.)

Glumes lanceolate, compressed, keeled. *Florets* 3—20, in two rows. *Spikelets* compressed; the lower palea carinate, mucronate, the upper one subulate. *Scales* emarginate. *Seed* 2-horned.

1. U. LATIFO'LIA, (Mich.) *Stem* terete, glabrous. *Leaves* flat, glabrous; throat of the sheath ciliate. *Glumes* 3, 7—14-flowered, the upper ones sterile; exterior palea many-nerved, with the keel ciliate *Flowers* generally monandrous.—♃. Aug.—Sept. Mountains.

2. U. NIT'IDA, (Bald.) *Stem* glabrous. *Leaves* flat, narrow. *Panicles* expanding, few-flowered. *Glumes* 3, many-flowered. *Flowers* monandrous.—♃. June—July. Middle Geo. 2—5 feet.

3. U. PANICULA'TA, (L.) *Stem* erect, glabrous. *Leaves* long, narrow, entire, glabrous; sheaths hairy at the throat. *Panicle* large. *Glumes* 4—5, many-flowered; exterior palea mucronate, 6-nerved, interior one ciliate.—♃. July—Aug. On the sea-coast. 4—8 feet.

4. U. GRA'CILIS, (Mich.) *Stem* glabrous, erect. *Leaves* scabrous on the upper surface, linear, flat. *Glumes* 3, 3-flowered. *Panicle* long, erect, with appressed branches. *Flowers* monandrous.—♃. Through the summer. Very common. 1—2 feet.

Genus XXXV.—ARUNDINA'RIA. Rich.

(From *arundo*, a reed.)

Glumes 2, many-flowered, unequal, the exterior one smallest. *Paleæ* 2, unequal, the exterior one largest. *Styles* 3-cleft, short.

1. A. MACROSPER'MA, (Mich.) *Stem* erect, glabrous, terete, with hollow internodes. *Leaves* large, flat, distichous; sheaths longer than the joints. *Panicle* terminal, composed of distichous spikes; peduncles pubescent; the exterior glumes ciliate, very small; the exterior palea largest, ciliate. *Seed* cylindrical. Does not flower every year; when it does bloom, it is in the spring.—♃. Rich damp soils. 5—20 ft. *Cane.*

Genus XXXVI.—TRIT'ICUM. L. (*Wheat.*)

(From *tritum*, ground; because the fruit is ground.)

Flowers in spikes; spikelets distichously imbricate, sessile, 3—4-flowered. *Glumes* 2, nearly equal, opposite. *Paleæ* lanceolate; the lower concave, acuminate or awned. *Scales* 2, ciliate.

1. T. SATI'VUM. *Spikes* 4-angled, imbricated; spikelets 4 or less; valves ventricose, ovate, truncate, mucronate; nerve prominent. *Flowers* awned or unawned. *Fruit* free.

The native country of wheat is uncertain, although it has been thought to have been indigenous to Central or Southwestern Asia. It has been cultivated for thousands of years. There are now no less than three hundred varieties in cultivation. The character of the grain is very much affected by soil and culture: the richest soil and highest culture produce the richest grain.

Secale cereale, Rye, is native among the mountains of Caucasus, around the Caspian Sea, and in the Crimea.

Genus XXXVII.—EL'YMUS. (*Wild Rye.*)

(From *elumus*, a hull; a name given to grasses that grow about *Elyma.*)

Spikelets 2 or more, at each joint of the rachis, 3—9-flowered. *Glumes* 2, nearly equal, sometimes absent; lower palea entire, with a short awn, upper one bifid. *Scales* ovate, hairy.

1. E. Virgin'icus, (L.) *Stem* erect, glabrous. *Leaves* scabrous, with scabrous sheaths. *Glumes* 2, somewhat lateral, terminating by an awn; the exterior palea concave, awned, about the size of the interior.—2. June—Aug. Dry soils. 2—3 feet.

2. E. stria'tus, (Willd.) *Spike* erect; spikelets 2-flowered, awned, hispid, in pairs. *Glumes* linear, awned. *Stem* erect, striate. *Leaves* lanceolate, acuminate, upper surface scabrous; rachis pubescent.—2. June. Shady woods. 8—12 inches.

3. E. hys'trix, (L.) (*Asprella hystrix*, Willd.) *Spike* erect; spikelets expanding, 4-flowered, destitute of glumes. *Paleæ* glabrous. *Leaves* glaucous.—2. July. Mountains. 2—3 feet.

Genus XXXVIII.—HOR'DEUM. L. (*Barley.*)

Spikelets 1-flowered, 3 at each joint of the rachis. *Glumes* slender awned, or bristle-form. *Paleæ* herbaceous; the lower convex, awned. *Stamens* 3.

1. H. vulga're, (L.) *Spike* long, flexible, a little arched; florets disposed in 6 rows, or less in poor soils, two opposite rows most projecting.

The native country of the Barley is uncertain. Its uses are numerous. To make temporary pastures, in this climate, it is of great value. It forms our Porter and Ale by affording the fermenting substance of malt, which is sprouted Barley. Pearl Barley is Barley with the outer covering removed.

Tribe IX.—SACCHA'REÆ.

Inflorescence spicate; rachis articulated.

Genus XXXIX.—TRIP'SACUM. L. (*Gama Grass.*)

(From *tribo*, to rub; from its polished spike.)

Flowers monœcious. Sterile florets: stamens 3; glumes 2, 2-flowered, outer one sterile, the interior neuter; palea 1, membranaceous. Fertile flowers: glumes 2, 1-flowered, surrounded by an involucre; paleæ 2. *Styles* 2. *Seed* 1.

1. T. dactyloi'des, (L.) *Stem* erect, glabrous, more or less compressed. *Leaves* large, contracted at the base; sheath villous at the throat. *Flowers* in 3 clustered spikes; the upper florets sterile, the lower fertile, generally 2—4.—2. July—Aug. On dry soils. 5—7 feet.

2. T. monosta'chyum, (Willd.) *Stem* erect, glabrous, compressed. *Leaves* large, serrulate, contracted at the base. *Flowers* in a solitary, terminal spike; upper florets sterile, the lower fertile.—2. Aug.—Oct. Along the sea-coast. 3—5 feet.

Genus XL.—MANISU'RUS. L.

(From *manica*, a glove, in allusion to its spathe.)

Spikelets in pairs, 1-flowered; inferior perfect, superior staminate. Perfect spikelet with 2 glumes; inferior glume saccate, coriaceous; superior smaller, membranaceous. *Paleæ* 2, much smaller than the glumes. *Stamens* 3. *Styles* 2.

1. M. granula'ris, (Swartz.) *Culm* branching. *Leaves* flat; sheaths hirsute. *Spikes* solitary, articulated, clothed at the base by a spathe form leaf; spikelets unilateral.—Probably introduced. About Charleston. 2—3 feet.

Genus XLI.—SAC'CHARUM. (*Sugar-cane.*)

(From *saccharum*, sugar.)

A gigantic grass, perennial, with a geniculated and fibrous root, growing from 6—12 feet high; many stems from the same root; articulated with 40—60 nodes. Internodes solid, filled with a juicy pith-like mass of great sweetness. *Leaves* sheathing at the base, 3—4 feet long. Seldom flowers in this country.

1. S. officina'rum is the common sugar-cane, of which there are numerous varieties.

The Sugar-cane was not known to the ancient Europeans. The Chinese and East Indians possessed the sugar-cane early, and through the Arabs it was introduced into Europe in the fifteenth century. It was raised in Spain and Portugal, and in the islands of the Mediterranean and Atlantic. In 1506 it was carried to St. Domingo, since which time it has spread throughout the tropical world.

Genus XLII.—ERIAN'THUS. Rich.

(From *erion*, wool, and *anthos*, flower; from a tuft of hair around the base of each spikelet.)

Glumes 2, nearly equal, villous at the base. *Paleæ* 2, unequal; the inner one bearing a long awn near its summit. *Stamens* 2. *Styles* 2.

1. E. alopecuroi'des, (Ell.) (*Erianthus saccharoides*, Mich.) *Stem* erect, a little scabrous, villous toward the summit. *Leaves* long, striate, hairy on the under surface; sheath villous at the throat. *Flowers* in a crowded villous panicle; involucre hair-like. *Glume* lanceolate. *Paleæ* purplish, unequal; the interior smallest, awned.—4. Sept.—Oct. Wet grounds. 6—10 feet.

2. E. brevibar'bis, (Mich.) *Stem* erect, upper joints bearded, lanceolate, hairy at the base. *Flowers* in appressed panicles. *Glumes* purple, ciliate. *Paleæ* ciliate, purplish.—4. Sept.—Oct. Common. 3—5 feet.

3. E. stric'tis, (Bald.) *Stem* erect. *Leaves* long, scabrous on the margins. *Panicle* appressed; spikelets 2-flowered; involucre consisting of a few hairs, or wanting. *Glumes* with the nerves spinous.—4 Aug.—Sept. Low country. 4—6 feet.

4. E. CONTOR'TUS, (Ell.) *Stem* erect, bearded at the joints. *Leaves* long, linear-lanceolate. *Panicle* appressed; involucre as long as the glumes; interior palea shortest, with a spirally contorted awn.—♃. Sept.—Oct. Low country. 4—5 feet.

GENUS XLIII.—ANDROPO'GON. L. (*Broom-grass.*)

(From *aner*, man, and *pogon*, beard; from the appearance of the rachis.)

Flowers polygamous, spiked. *Spikelets* in pairs, 1—2-flowered; the lower ones sterile; or when but one, it is perfect. Glumes and paleæ sometimes wanting; when present, the glumes coriaceous. *Paleæ* membranaceous, with the lower one generally awned.

1. A. SCOPA'RIUS, (Mich.) *Stem* glabrous, tinged with purple. *Leaves* channeled, slightly hairy; sheaths hairy. *Flowers* in straight panicles, by pairs on the spikes; the perfect ones sessile, the neuter one stiped and awned. *Rachis* hairy. *Glumes* 2, the exterior 5-nerved. *Paleæ* purple, with hairy margins, the interior awned at the summit.—♃. Sept.—Oct. Poor soils. Common. 2—3 feet.

2. A. FURCA'TUS, (Muhl.) *Stem* erect, glabrous. *Leaves* linear, nearly glabrous; spikes generally by fours, terminal; sterile florets without awns, the awn of the perfect floret contorted.—♃. August—Sept. Mountains. 2—3 feet.

5. A. MACRU'RUS, (Mich.) *Stem* erect, slightly compressed. *Leaves* linear, slightly scabrous; sheath villous along the margin. *Panicles* clustered; spikes conjugate, clustered, each having a sheath. *Peduncles* hairy. *Flowers* monandrous, with a straight awn.—♃. October Damp soils. 2—3 feet.

4. A. DISSITIFLO'RUS, (Mich.) *Stem* erect, branching. *Leaves* linear, scabrous, with the throat of the sheath hairy. *Panicle* appressed; spikes conjugate. *Flowers* by pairs, hairy, monandrous, with a straight awn.—♃. Sept.—Oct. Common. 3—4 feet. *Broom-grass.*

5. A. VAGINA'TUS, (Ell.) *Stem* erect, glabrous. *Leaves* long, linear, with glabrous sheaths. *Panicle* slender, appressed, branches divided; spikes short, solitary, or conjugate. *Rachis* hairy. *Glumes* serrulate. *Flowers* monandrous.—♃. Sept.—Oct. Damp soils. 3 feet.

6. A. TERNA'RIUS, (Mich.) *Branches* remote, solitary, simple, alternate, 3-spiked; spikes conjugate. Hairs of the bracts shorter than the glume. *Stamens* 3. The inner palea 2-cleft, producing from the cleft a long contorted awn.—Mountains.

7 A. ARGEN'TEUS, (Cass.) *Stem* glabrous, branching, tinged with purple. *Leaves* linear, scabrous. *Panicle* long, slender; spikes conjugate, covered with white silvery hairs. *Glumes* hairy along the margins.—♃. Sept.—Oct. Dry soils. 2—3 feet.

8. A. AVENA'CEUS, (Mich.) (*A. ciliatus*, Ell.) *Stem* erect, sometimes decumbent, pubescent at the joints. *Leaves* scabrous, slightly hairy *Panicle* naked, expanding. *Flowers* perfect and sterile. *Glumes* hairy; the exterior one many-nerved, the interior 5-nerved. *Paleæ* ciliate, the interior one awned.—♃ Sept. Pine-barrens. 3—4 feet.

9. A. NU'TANS, (L.) *Stem* erect, glabrous, lower joints swollen. *Leaves*

scabrous. *Panicle* branching, nodding. *Flowers* by pairs. *Glumes* hairy, colored, fringed at the summit. *Paleæ* hairy, the inner one with a contorted awn.—♃. Sept.—Oct. Dry soils. Very common. 3—6 feet.

10. A. MELANOCAR'PUS, (Ell.) *Stem* erect, branching, glabrous. *Leaves* scabrous, with the sheath hairy at the throat; spikes clustered, many-flowered, with the involucre bearing a long awn. *Glumes* 2, lanceolate, pubescent, colored. *Paleæ* small, membranaceous, with a long contorted awn arising from the base.—♃. Sept.—Oct. Pine-barrens. 2—3 feet.

11. A. TETRASTA'CHYUS, (Ell.) *Stem* erect, glabrous. *Leaves* long, hairy on the upper surface; sheaths hairy. *Panicle* slender, erect, appressed. Sheaths of the spikes long; spikes usually 4. *Glumes* serrulate, with a hairy involucre at the base. *Flowers* monandrous.—♃ October. Pine-barrens. 2—3 feet.

ABBREVIATIONS MOST COMMON IN BOTANY.

☺ An annual plant.
♂ A biennial plant.
♃ Perennial plant.
♄ Shrubs or trees.
♂ Staminate flowers.
♀ Pistillate flowers.
☿ Flowers perfect.
∞ An indefinite number.
♂ — ♀ Flowers monœcious.
♂ : ♀ Flowers diœcious.
♂ — ☿ — ♀ Flowers polygamous.
√ This figure with a number in the angle signifies the number of floral organs in a whorl; thus √ signifies that there are 3 sepals, 3 petals, 3 stamens, and 3 carpels, or the flower is said to be *trimerous;* with 4, *tetramerous;* with 5 *pentamerous*, etc.
? signifies doubt.
! placed after a synonym signifies that the author who uses it has seen the plant alluded to.
v. s. s., *vidi siccam spontaneam;* the author has seen a wild, dry specimen.
v. s. c., *vidi siccam cultam;* the author has seen a cultivated dry specimen.
v. v. s., *vidi vivam spontaneam;* the author has seen a living, wild specimen.

The above are commonly used by writers on Botany, but only the first four are used in this work.

Besides the above, the names of authors are abbreviated, using the initial letter or the first syllable. The following are the most common used in this work:

Adns.—Adanson.
Ait.—Aiton.
Arn.—Arnot.
Aubl.—Aublet.
Bart.—Barton.
Beauv.—Beauvois.
Benth.—Bentham.
Brong.—Brongniart.
Cass.—Cassini.
Cav.—Cavanilles.
D. C.—De Candolle.
Desf.—Desfontaines.
Dew.—Dewey.
Dill.—Dillenius.
Ehrh.—Ehrhart.
Ell.—Elliott.
Endl.—Endlicher.
Gært.—Gærtner.
Grev.—Greville.
Gris.—Grisebach.
Gron.—Gronovius.
Hed.—Hedwig.
Jacq.—Jacquin.
Juss.—Jussieu.
L.—Linnæus.
Lam.—Lamark.
L'Her.—L'Heritier.
Lindl.—Lindley.
Mich.—Michaux.
Mill.—Miller.
Muhl.—Muhlenberg.
Nees.—Nees von Esenbeck.
Nutt.—Nuttall.
Pav.—Pavon.
Pers.—Persoon.
Plum.—Plumier.
Poir.—Poiret.
Br.—Brown.
Raf.—Rafinesque.
Rich.—Richard.
Salis.—Salisbury.
Schreb.—Schreber.
Scop.—Scopoli.
Solan.—Solander.
Spreng.—Sprengel.
T. & G.—Torrey & Gray.
Tourn.—Tournefort.
Vaill.—Vaillant.
Vent.—Ventenat.
Walt.—Walter.
Willd.—Willdenow.

GLOSSARY AND INDEX

TO PART I.

THE FIGURES REFER TO THE PARAGRAPHS IN THE FIRST PART.

Abbreviated, shortened.
Acaulis, without a stem.
Accessory, something added to the usual number of organs.
Accrete, grown together.
Accumbent, lying on something else.
Acerose, fine and slender.
Achenium, 151.
Achlamydeous, 103.
Acicular, needle-shaped.
Acids, 300.
Acinaciform, 89.
Acotyledons, 64.
Acrogens, growing on the top.
Actinenchyma, 9.
Aculeus, a prickle.
Acuminate, 92,
Acute, 92.
Adherent, joined to.
Adnate, 123.
Adventitious leaf-buds, 70, 74.
Æstivation, the mode in which the sepals or petals are applied to each other in the bud.
Agamous, without stamens and pistils.
Albumen, 142. 166, 301.
Alburnum, 57.
Alæ, 108.
Alizarin, 304.
Alliaceous, oniony.
Alsinaceous, 108.
Alternate, single leaves on opposite sides of the stem at different heights.
Alveolate, pitted.
Ament, 116.
Amnios, 163.
Amplexicaul, clasping the stem.
Anastomosis, where branches run together and unite with one another.
Anatomy, vegetable, 3.
Anatropous, 139.
Anchusin, 304.
Ancipital, two-edged.
Andrœceum, the stamens taken as a whole.
Androgynous, both kinds of flowers in the same inflorescence.
Angiospermous, the seeds in a pod.
Angustifolius, narrow-leaved.
Annular, shape of a ring.
Annular ducts, 30.
Anomalous, out of the regular order.
Anther, 117, 122.
Antheriferous, bearing anthers.
Anthocyane, 245.
Anthotaxis, 112.
Anthoxanthine, 245.
Apetalous, without petals.
Apex, 88.
Aphyllous, without leaves.
Apiculate, tipped with an abrupt minute point.
Apocarpous, having the carpels distinct.
Appendages, 109.
Applied Botany, 3.
Appressed, 77.
Apterous, without wings.
Arabin, 288.
Aquatic, growing in the water
Arborescent, tree-like.
Arbuscula, little tree.
Areola, small spaces.
Aril, 150.
Arrow-root, 286.
Asafœtida, 298.
Ascending, rising upward.
Asperate, rough.
Assurgent, ascending.
Atropous. See *Orthotropous*.
Attenuate, slender.
Auriculate, 89.
Awl-form, shape of an awl.
Awn, a slender tip or beard.
Awnless, without awns.
Axil, angle between the leaf and the stem.
Axillary, being in the axil.
Axis, 112.

Baccate, berry-like.
Balausta, 154.
Balsams, 297.
Banner, the upper petal in papilionaceous corolla.
Barb, stiff hooked hair.
Bark, 58.
Base, 88.
Basilar, belonging to the base.
Bassorin, 288.
Beaked, terminated by a point.
Beard, a bristle.
Berry, 154.
Bibracteolate, consisting of two bracts.
Bicrenate, doubly crenate.
Bicuspidate, ending with two teeth.
Bidentate, 91.
Biennial, two years.