A

GUIDE TO BOTANY.

FRONTISPIECE

Banyan tree

Date & Cocoa-nut tree

Mountain Cabbage

Drawn & Engraved by W. & D. Lizars Edinburgh.

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A

GUIDE TO BOTANY;

OR,

A FAMILIAR ILLUSTRATION

OF

THE PRINCIPLES

OF THE

LINNÆAN CLASSIFICATION.

WITH COLOURED ENGRAVINGS.

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1818.

TO

SIR JAMES EDWARD SMITH, M.D.

FELLOW OF THE ROYAL SOCIETY,

PRESIDENT OF THE LINNÆAN SOCIETY,

ONE OF THE MOST ACCOMPLISHED SCHOLARS,

AND THE FIRST BOTANIST OF THE AGE,

THIS TREATISE

IS MOST RESPECTFULLY INSCRIBED

BY

THE AUTHOR.

PREFACE.

PREFACE.

THE following Treatise, which first appeared in the Encyclopædia Edinensis, now publishing under the superintendance of the Author, was fortunate in meeting with the approbation of several excellent practical Botanists, who thought that, in a separate form, it might be a useful appendage to the stock of Botanical literature, and might prove a valuable help to those whose time or avocations preclude them from the perusal of larger works.

IN the selection of examples for the illustration of the classification, the preference has been given to such native plants as are most common and most accessible, and to such exotics as are the most usual ornaments of the garden, the greenhouse, or parlour; some are introduced as remark-

able vegetable productions; a few are noticed on account of their importance as commercial commodities; and, to extend the interest in this delightful study beyond mere nomenclature, short details of the natural history of particular plants, in which peculiarities of structure or habits appear, are added.

In acquiring a knowledge of Botany with the help of this Treatise, the Author recommends to the student to familiarize himself with the descriptions and references to the figures in the introductory part, and at the same time not to neglect what assistance he can command from practical botanists, in procuring the names of such plants as are described in the following pages. Attention to the latter hint will greatly facilitate his labours.

Those who wish to extend their knowledge of the structure and functions of plants, may consult with advantage, *Senebier, Physiologie Vegetale;* Mirbel on the same subject; Smith's Introduction

to Botany; Willdenow's Introduction; and, for the classification and description of plants, Willdenow's Species Plantarum, Brown's *Prodromus Plant. Nov. Holland.* and the Appendix to Flinder's Voyage, by the same excellent botanist; and for British plants, Smith's *Flora Britannica*, Withering's Botanical Arrangement, and Lightfoot's *Flora Scotica*.

EDINBURGH, *May* 1818.

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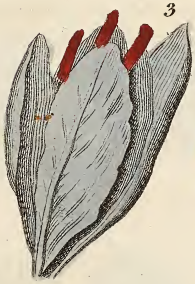

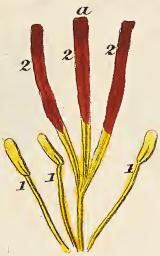

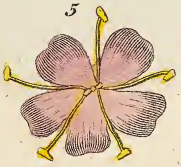

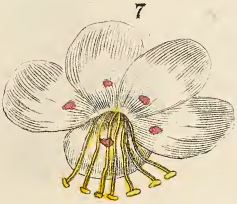

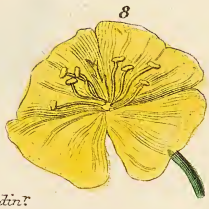

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INTRODUCTION.

Botany, derived from a Greek word, signifying *herb* or *grass*, is that department of natural history by which plants are distinguished from each other and systematically arranged; but, in a more extended sense, it includes also a knowledge of the structure and functions, as well as of the properties and uses of vegetables.

The vegetable kingdom, which is supposed to consist of at least 50,000 species, is divided, according to the system of Linnæus, into 24 classes; each class is subdivided into orders; and each order is again subdivided into genera and species. The classification of Linnæus, confessedly artificial, is by far the simplest and most convenient yet proposed for studying botany; and those who have made objections to it, have forgotten, that its object is to distinguish plants from each other with precision, rather than to associate them according to their natural alliances. In all attempts to

arrange and classify the objects of nature, it ought to be recollected, that it is for the purpose of assisting the limited powers of man in his investigations; and the more numerous any class of objects becomes, the more necessary it is to adopt method and arrangement in acquiring the knowledge of their distinctive properties.

The characters of the classes in the Linnæan system are taken from certain parts within the flower. In the common primrose, or single polyanthus, the yellow part in the one, and the red in the other, is called the *corolla;* and the green part, which includes the corolla, is called the cup, or *calyx,* from its shape. Separate the corolla from the calyx, and open the tube of the corolla with a pointed knife, and several threads or filaments attached to its inner surface, and supporting roundish bodies of a yellowish colour, will appear; these are called *stamina,* or *stamens.* Some of the classes are determined by the number of stamens; in this flower the number is five, denoting that it belongs to the fifth class. The flower of the crocus, examined in the same way, presents three stamens, shewing that it is arranged in the third class. Six stamens appear within the flower of the tulip, from which it takes its place in the sixth class; to which also belong the white and orange lily, the snow-drop, and hyacinth.

The stamens in some of the flowers now mentioned, derive their origin from the inner surface of the flower, and when the flower is drawn out of the cup, they come along with it; but when the six petals of the tulip are broken off, the stamens remain behind; and when these stamens are carefully removed, another part rising from the middle of the seed-vessel appears.

This is called *style* or *pistil*; and from the number of pistils the orders are determined; as the tulip, in which there is one pistil, belongs to the first order. In the pink there are two pistils, and it belongs to the second order of its class.

The characters of the genus are usually derived from the other parts of the flower, and those of the species are taken either from some peculiarity in the parts of fructification, or from the leaves, stem, or root. But, to be able to discriminate plants with facility and accuracy, it is necessary that the student of botany be familiar with the language which is employed, and be well acquainted with those parts on which the character of the classes, and of their subordinate divisions, depends.

Principles of the Linnæan Classification.

The characters of the classes and orders of the Linnæan system are taken from the parts of fructification; those of the genera from the same parts, and those of the species from the leaves, stems, and roots.

Parts of Fructification.

The parts of fructification, as they are described by Linnæus, are seven in number; and as some of these parts are wanting in some plants, they are not all essentially necessary to the perfection of the seed or fruit. The seven parts are, the *calyx* or cup, the *corolla* or flower, the *stamina* or stamens, the *pistillum* or pistil, the *pericarpium* or seed-vessel, the seed, and the *receptaculum* or receptacle.

Calyx.—Several varieties of calyx are described; it is called perianthium, or perianth, when it includes the other parts of the flower, as in the primrose and the pink, but it is sometimes wanting, as in the tulip; in some cases it remains till the fruit is ripe, and in others it drops off before the flower is expanded; in mallow it is double, and in scabious it is triple. The *involucrum* is a kind of calyx peculiar to umbelliferous plants, as hemlock or parsley; and it is either partial or general, as it includes the whole or only a part of the umbel. The *amentum* or catkin is a common receptacle, furnished with scales, each of which includes the parts of fructification, and the whole forms an aggregate flower. The willow and the fir tribes furnish examples of the catkin. The *spatha*, or sheath, is a kind of calyx which appears in the snowdrop and narcissus. The *gluma* or *glume* is the calyx peculiar to grasses, and it is of a chaffy texture.

Corolla.—The corolla is included within the calyx, and usually exhibits those rich and beautiful colours which are so much admired in plants. When the corolla is composed of different parts, they are called petals; it consists sometimes of one petal, and then it is said to be monopetalous, as in the primrose; and when it consists of many petals, it is called polypetalous, as in the rose.

A monopetalous corolla is divided into two parts; the tube, or cylindrical part, included in the calyx, and the limb, *limbus*, which is spread out, as in the primrose. When the corolla consists of many petals, as in the pink, that part of it which appears without the calyx is called the border or *lamina*, and that part inclosed in the calyx is denominated *unguis*, or claw.

The corolla is said to be regular or irregular, equal or unequal, when its figure is uniform, or otherwise, and the different parts of which it is composed are of the same size.

The more common forms of a monopetalous corolla are the following: Bell-shaped, *campanulata*, as in campanula and hyacinth; funnel-shaped, *infundibuliformis*, as in pulmonaria or lungwort; salver-shaped, *hypocrateriformis*, as in the primrose; wheel-shaped, *rotata*, which is the same as salver-shaped, but with scarcely any tube, as in borage; ringent, *ringens*, irregular and gaping, formerly called labiated or lipped, as in dead-nettle; and personate, *personata*, irregular, and closed by a kind of palate, as in snapdragon.

The polypetalous corolla is called cruciform, *cruciformis*, when the petals are disposed in the form of a cross, as in wallflower; rosaceous, *rosacea*, when the petals are disposed like those of the rose; papilionaceous, *papilionacea*, when they are irregular and spreading, and have the appearance of a butterfly.

The corolla is said to be incomplete when some parts seem wanting; and in some cases it is altogether wanting, although a diversity of opinion prevails whether the calyx, which is present in some of these cases, should not be considered as such.

Nectary.—The nectary, *nectarium*, is generally connected with the corolla, or forms part of it; the nectary is distinct from the petals of the corolla in columbine, it is an elongation of the corolla in the violet, and a production of the calyx in Indian cress. Larkspur and monkshood furnish striking examples of the nectary in the spur-like appendages of their flowers; and a small gland at the base of the petals of

some flowers, as the ranunculus, comes under the same denomination. The use assigned to the nectary is the secretion of honey.

Stamens.—The stamens are placed within the corolla, and vary in number in different flowers. A stamen consists of two parts, the filament and anther. In the pink the filament is slender, and in the orange-lily and tulip it is strong and thick; in some plants it is wanting, but where the filament exists it supports the anther, which is a membranous body, consisting generally of two cells or cavities. The pollen, or fine powder, is prepared in the anther, which either bursts longitudinally, or opens by pores near the summit. The pollen, when examined with the microscope, exhibits great variety of form and structure in different plants.

Pistil.—The pistil is that part which arises from the centre of the flower; it is composed of three parts, the stigma, the style, and the germen. The stigma, which is the upper part of the pistil, is various in form; either simple, scarcely more than a point, globular, lobed, hollow, or gaping. The length and thickness of the style are various, but it is sometimes entirely wanting. The germen, which gives origin to the style and stigma, is also various in its form and size; sometimes it is included between the calyx and corolla, and then it is said to be *superior*, as in the strawberry and raspberry, and *inferior*, when the calyx and corolla are above it, as in the apple and pear.

Pericarp.—The pericarp, *pericarpium*, or seed-vessel, is the enlarged germen or covering of the seed. It is not an essential part of every plant, for in some it is wanting, as in the dead-nettle, in which the seeds are

naked and deposited in the bottom of the calyx; and in the common dandelion, and many plants of the same kind, the seeds are attached to the receptacle without any covering.

Various kinds of seed-vessels are described. The *capsule*, which is of a leathery or membranous texture, is composed of one or several cells, as in campanula and poppy. The follicle is a seed-vessel of one valve and one cell, bursting lengthwise, and bearing the seeds near its edges, as in periwinkle and pæony. The silique, *siliqua*, is a long dry seed-vessel of two valves, as in stock jilly-flower. The *silicle* is a short round pod, as in vernal whitlow grass. The legume, *legumen*, is a seed-vessel of two oblong valves, and is peculiar to the pea tribe. The tamarind produces a legume filled with pulp, in which the seeds are imbedded. The drupe, *drupa*, is the seed-vessel peculiar to stone fruit, has a fleshy coat, and contains a single hard and bony nut, as in the cherry, the plum, and the peach. The cocoa-nut also comes under the denomination of drupe. The *pomum* or apple has a fleshy coat, but includes a capsule, with several seeds, as in the common apple or pear. The berry, *bacca*, is fleshy, without valves, and contains one or more seeds, surrounded with pulp, as in deadly nightshade and ivy. The fruit of the raspberry and bramble is called a compound berry, and the separated parts are named *acini*. *Strobilus* or cone, is a catkin, hardened and enlarged into a seed vessel, examples of which are found in the pine tribe.

The seeds are extremely various in form and size; they are composed of the embryo or germ; of cotyledons or seed-lobes; the *albumen* or farinaceous part, the *vitellus* or yoke; the testa, which contains the

different parts of the seed; and the *hilum* or scar by which the seed is attached to the seed-vessel. The pellicle or epidermis adheres closely to the outside of some seeds; and the *arillus* or tunic is either a complete or partial covering attached to the base only, and surrounding the other parts more or less loosely. Some seeds are furnished with a *pappus*, or down, which is chaffy, feathery, or bristly. The seeds of dandelion afford an example of the feathery structure. Seeds are also furnished with a tail, with a beak, or with wings.

The receptacle, *receptaculum*, is the common point of connection of all the other parts of fructification. It is called the receptacle of the flower, when the calyx, corolla, and stamens only, are attached to it. It is denominated a *proper* receptacle, when only one flower with its fruit is inserted into it,—and *common*, when it supports many flowers. In such as are called compound, it is very distinct, as in the daisy, where it is of a conical form; in others, it is convex, flat, or concave, and in some it is naked, hairy, scaly, or cellular, like a honey-comb.

Of the Classes.

The Linnæan system of botany includes 24 classes, the characters of which are derived from the number, situation, and proportion of the stamens. The first eleven classes are determined by the number of the stamens, and the names by which they are distinguished, derived from the Greek language, are characteristic of this mode of discrimination.

The 1st class, *Monandria*, signifies that the plants

included under it have only one stamen. The 2d, class, *Diandria*, indicates two stamens; the 3d, *Triandria*, three stamens; 4th, *Tetrandria*, four stamens; 5th, *Pentandria*, five stamens; 6th, *Hexandria*, six stamens; 7th, *Heptandria*, seven stamens; 8th, *Octandria*, eight stamens; 9th, *Enneandria*, nine stamens; 10th, *Decandria*, ten stamens; 11th, *Dodecandria*, from 12 to 19 stamens; 12th, *Icosandria*, 20 or more stamens; and, 13th, *Polyandria*, in which the stamens are very numerous. But, in the two last classes, the situation of the stamens must be taken into consideration. When they arise from the inside of the calyx, such plants belong to the class Icosandria, as in the strawberry and bramble, the cherry, and the myrtle; but when they are inserted into the receptacle or base of the flower, they fall under the class Polyandria, of which the poppy and anemone are good examples.

The 14th class, *Didynamia*, is distinguished by the proportion in the length of the stamens, which are four in number, two of which are long and two short. This is justly reckoned a natural class, for it includes plants which exhibit the same general character in the structure of their flowers, to which the denomination ringent or personate has been applied. The deadnettle, foxglove, and snapdragon are examples.

The 15th Class, *Tetradynamia*, is also a natural class, and is distinguished by four long and two short stamens; the flowers of this class are called cruciform, because the four petals of the corolla are set in opposition to each other in the form of a cross, as wallflower, radish, and mustard.

In the 16th class, *Monadelphia*, the stamens are united by their filaments into a tube, as is distinctly seen

in mallow and lavatera, and less obvious in the numerous family of geranium.

The 17th class, *Diadelphia*, has the stamens united by their filaments in two parcels ; and it is a natural class, for it consists of papilionaceous flowers, of which the flowers of the pea tribe are examples.

The 18th class, *Polyadelphia*, includes such plants as have the stamens united by the filaments into more than two parcels, as in St Johnswort.

In the 19th class, *Syngenesia*, the stamens are united by their anthers into a tube, and the flowers of this class are compound, that is, a number of flowers is collected together within the same calyx, or upon the same receptacle, of which the common daisy, dandelion, and sun-flower furnish appropriate examples.

The 20th class, *Gynandria*, is characterised by the stamens growing out of the pistil, or being united with it, of which examples are found in the orchis tribe.

The 21st class, *Monœcia*, signifying one house, includes those plants which have stamens and pistils in separate flowers, but growing on the same plant, as in the oak and hazel.

In the 22d class, *Diœcia*, which signifies two houses, the stamens and pistils are not only in separate flowers, but the flowers which produce stamens, and those which produce pistils, grow on separate plants, as in the hop, the willow, and yew.

The 23d class, *Polygamia*, comprehends such plants as have stamens and pistils separate in some flowers and united in others, either, on the same plant or on two or three different plants, as in pellitory, and sea-purslane.

The 24th class, *Cryptogamia*, includes those plants in which the parts of fructification are not distinctly

ascertained, and therefore cannot be referred to any of the preceding classes. Ferns, mosses, and sea-weeds are examples of this class.

The *Palmæ*, palm-trees, from their peculiarity of structure and appearance, were described by Linnæus in an appendix to the twenty-four classes; but it appears, from the researches and observations of succeeding botanists, that they may be arranged under the Hexandria, or 6th, class, or under Monœcia, or Diœcia, the 21st or 22d class.

Of the Orders.

In the first thirteen classes of the Linnæan system, the orders are determined by the number of pistils, and the Greek words, *Monogynia*, *Digynia*, *Trigynia*, denote one, two, or three pistils. The number of pistils is reckoned by the styles, or, when the style is wanting, by the number of stigmas, as in the gelder-rose; and the number of pistils expressed by the Greek numerals, marks the order, as *Monogynia*, having one pistil, denotes the first order, *Digynia*, *Trigynia*, *Tetragynia*, *Pentagynia*, *Hexagynia*, *Heptagynia*, *Decagynia*, *Dodecagynia*, expressive of two, three, four, five, six, seven, ten, and twelve pistils, and *Polygynia*, signifying many pistils, all refer to corresponding orders of the class in which such plants are arranged,

Didynamia, the 14th class, contains two orders; 1. *Gymnospermia*, so denominated from the seeds being naked, or uncovered, and they are almost always four in number, as in the dead-nettle; 2. *Angiospermia*, expressive of the seeds, which are numerous, being inclu-

ded in a capsule, or seed-vessel, as in foxglove and snapdragon.

Tetradynamia, the 15th class, has also two orders, which are determined by the form of the fruit: 1. *Siliculosa*, in which the fruit is a silicle, or roundish pod, as in shepherds-purse, and the common garden cress; and 2. *Siliquosa*, in which the fruit is a siliqua, or long pod, as in the pea tribe.

In the 16th, 17th, and 18th classes, Monadelphia, Diadelphia, Polyadelphia, the characters of the orders are taken from the number of the stamens, as in the first thirteen classes.

Syngenesia, the 19th class, comprehends five orders, the characters of which are taken from the florets of which the compound flower is formed, being united or separated, barren, fertile, or abortive.

The first order *Polygamia æqualis*, includes those plants in which all the florets have both stamens and pistils, and produce seeds, as in dandelion. 2. *Polygamia superflua*, in which the flowers consist of two parts, a disk, or central part, and radii, or rays, which project outward; the florets of the disk have stamens and pistil, and those of the rays have pistil only, but each of them produces perfect seed, as in the daisy, chamomile, and corn-marygold. 3. *Polygamia frustranea*, in which the florets of the disk have stamens and pistil, but those of the rays have only an abortive pistil, as in blue-bottle. 4. *Polygamia necessaria*, in which the florets of the disk are furnished with stamens only, and those of the radius with pistils only, as in garden-marygold. 5. *Polygamia segregata*, in which each of the florets has a proper calyx included in one general calyx, as in *echinops*, or globe-thistle. To this class

Linnæus added a sixth order, *Monogamia,* in which the flowers are not compound, but single, as the word denotes; but as the union of the anthers is not always uniform, the plants belonging to this order have been arranged by later botanists under other classes, according to the number of stamens.

In the 20th, 21st, and 22d classes the orders are formed from the number of stamens, or from the character of some of the preceding classes.

Polygamia, the 23d class, includes three orders, formed upon the principles of the classes immediately preceding. 1. *Monœcia,* in which flowers with both stamens and pistils, or flowers with pistils, or stamens only, grow on the same plant. 2. *Diœcia,* when two or three kinds of flowers appear on two separate plants. 3. *Triœcia,* in which the different flowers just described grow on three separate plants, of which the fig furnishes an example.

The 24th class, *Cryptogamia,* was divided by Linnæus into four orders, namely, ferns, mosses, flags, and mushrooms; but Dr Smith has added a fifth order. 1. *Filices,* or ferns, in which the fructification appears on the back, summit, or near the base of the leaf, which is denominated a frond. 2. *Musci,* or mosses, which have separate leaves, and often a stem, and are furnished with a calyptra, or hood-like corolla. 3. *Hepaticæ,* or liverworts, having the leaf and stem united, forming a frond, but the capsules do not open with a lid as in the mosses. In the 4th order, *Algæ,* or flags, the herb is a frond, and the seeds are imbedded in its substance, or in the disk of a peculiar receptacle. 5. *Fungi,* or mushrooms, have no leaves, and the fructification is in a fleshy substance.

Of Genera and Species.

Genera.—The orders are again subdivided into genera. The characteristic marks of the genera are derived from the flowers and fruit, and a genus comprehends one or more species, which resemble each other in some parts of the flower or fruit, or of both. Three kinds of generic characters are mentioned by Linnæus, the factitious, essential, and the natural, all depending on the fructification alone, and not on the inflorescence or on any other part: by the factitious character, genera that come together in the same artificial order, or section, are discriminated; by the essential character, a particular genus is distinguished by one striking mark from all genera of the same natural order, and, consequently, from all other plants; and the natural characters include all the marks common to all the species of the genus. The natural character of genera is employed by Linnæus in his *Genera Plantarum;* but to this method of discrimination it has been objected that it does not direct the mind to the most important marks, and that it only accords with such species of the genus as are known to the author, from which, it is obviously imperfect; but the essential character, which is now universally adopted to distinguish genera, comprehends all the marks necessary to discriminate each genus from every other in the system.

Species.—The characters which are employed in distinguishing species should be constructed on the same principles as the characters of the genera, and they ought to be certain, clear and concise. No characters

ought to be adopted in the discrimination of the species which have been already enumerated among the generic marks. For the sake of brevity Linnæus limited his specific definitions to twelve words, a rule which has been followed by succeeding naturalists, especially those who have employed the Latin language, in which it is most practicable.

In the construction of generic and specific characters, the arrangement of the different parts from which these marks are derived ought to be attended to. The most important in the natural order, or genus, are first mentioned, and the subordinate, or more particular marks of the object to which they are applied, ought to conclude the description; but in drawing up the natural characters of a genus, the calyx, corolla, stamens, pistils, seed-vessel, seed, and receptacle, are to be described in their order; and the root, stem, leaves, appendages, flower, and fruit, point out the arrangement, when a full description of any particular plant is required.

Sections.—The labour of research is greatly abridged and facilitated by associating together such genera and species as are allied by certain marks. Such groups of genera and species are distributed into sections; and each section being particularly characterised, if it shall appear that the plant possesses the character of that section, after the class and order have been ascertained, and the genus to which it belongs is sought for, it is only necessary to compare it with the descriptions comprehended under that particular section. Thus the position of the germen furnishes marks for the formation of two sections in certain genera, which are characterised by having the flower superior or inferior, as when

the receptacle of the flower is above the germen it is called superior, and when the receptacle is below the germen it is called inferior. The number of petals furnishes discriminative marks for the division of the genera of the 13th class into sections. In the 14th class, *Didynamia,* the character of the sections is derived from the calyx, which is said to be two-lipped, or bilabiated, when the mouth resembles two lips, and cleft when it is divided into so many parts. The pod being notched at the point, or being entire, in the first order of the 15th class, is the foundation of two sections; and the calyx being closed or open, affords characters for the two sections into which the second order is divided. The first order of the fourth class, in Dr Smith's *Flora Britannica,* exhibits a good illustration of this division into sections. This order consists of five sections; In the first the flowers are monopetalous, one seeded, and superior; in the second, they are monopetalous, two-seeded, and superior; in the third section the flowers are monopetalous, many-seeded, and inferior; in the fourth section the corolla has four petals; and in the fifth the flowers are apetalous, or want the corolla. An example of the distribution of the species belonging to the genus veronica, or speedwell, may be taken from the same work. This genus is divided into three sections, including, first, those species which have flowers in a spike; second, those whose flowers grow in clusters; and, third, those which have solitary flowers.

Method of investigating the Class, Order, &c. of a Plant.

The principles of the Linnæan classification being distinctly understood, the examination of plants, for the

purpose of ascertaining to what class, order, genus, and species they belong, is next to be attempted. Flowers in different states, some that are expanded, some not yet unfolded, and some which have ripened their fruit or seed, should be selected; and, in determining the class, the number, situation, proportion, or connection of the stamens, is to be considered.

By comparing the descriptions with the figures in the engravings, the student will be greatly assisted in this investigation.

Pl. 1. fig. 1. *Monandria* class, in which one stamen is seen. Fig. 2. *Diandria*, with two stamens and the pistil rising between them. Fig. 3. *Triandria*, three stamens. *a*. the stamens and pistil separated from the flower; 1, 1, 1, the stamens; 2, 2, 2, the stigmas. Fig. 4. *Tetrandria*, four stamens and one pistil. Fig. 5. *Pentandria*, five stamens. Fig. 6. *Hexandria* class, in which six stamens are seen surrounding the pistil. Fig. 7. *Heptandria* class, with seven stamens. Fig. 8. *Octandria* class with eight stamens.

Plate 2. fig. 9. *Enneandria* class, having nine stamens. Fig. 10. *Decandria*, with ten stamens. Fig. 11. *Dodecandria* class, having twelve stamens; *a*. the corolla laid open to shew the stamens. Fig. 12. *Icosandria* class, from twelve to twenty stamens rising from the cup; *a*. the corolla removed shewing the insertion of the stamens. Fig. 13. *Polyandria* class, with numerous stamens rising from the receptacle; *a*. the corolla separated to shew their insertion. Fig. 14. *Didynamia*, in which two stamens are long and two short. Fig. 15. *Tetradynamia*, having six stamens, four of which are long and two short. Fig. 16. *Monadelphia*, in which all the

stamens are united by their filaments and form a tube as seen at *a*.

Plate 3. fig. 17. *Diadelphia* class in which the stamens are divided into two bundles as at *a*; one stamen only in one division. Fig. 18. *Polyadelphia* having the stamens divided into more than two bundles as at *a*. Fig. 19. *Syngenesia* class, with compound flowers; *a*, one of the flowers separated; *b*, the common receptacle. Fig. 20. *Gynandria* class, in which the stamens are placed on the top of the pistil as at *a*. Fig. 21. *Monœcia* class, in which the stamens and pistils are in separate flowers on the same plant; *a. a.* flowers with stamens; *b, b,* flowers with pistils. Fig. 22. *Dicœcia* class, in which the flowers with stamens and pistils are on separate plants; *a,* flowers with stamens; *b,* flowers with pistils. Fig. 23. *Polygamia* class, in which three kinds of flowers are found on the same plant; *a,* flower with stamens only; *b,* flower with pistils only; *c,* flower with both stamens and pistil. Fig. 24. *Cryptogamia* class, in which the parts of fructification are not distinctly seen.

Inflorescence.—The inflorescence, or mode of flowering, that is, the distribution of the flowers on plants, affords useful discriminating marks, and of these different kinds have received appropriate names.

When the flowers surround the stem in a kind of ring, it is called *verticillus*, or whorl, as in dead-nettle and wild marjoram.

A cluster, or raceme, *racemus*, is composed of numerous rather distant flowers, each having its own proper stalk, but all arising from a common stalk, as in red currants. Solanum *dulcamara*, bitter sweet, exhibits an example of a compound raceme; and *actæa race-*

mosa produces an aggregate raceme, where several are collected together.

The spike, *spica*, is characterised by numerous flowers on a common stalk, without partial stalks, as in broad-leaved plantain. Sometimes the spike is compound, as in lavandula *pinnata ;* and when the flowers are all on one side, it is called *spica secunda*. A spicula, or spikelet, is applied to the grasses which have many florets in one calyx, as in poa *aquatica*.

Corymbus, or corymb, is a spike with partial flower-stalks, gradually longer as they are lower on the common stalk, so that all the flowers are nearly on a level, as in the common cabbage, which becomes a raceme when it is in fruit.

Fasciculus, or fascicle, is applied to flowers which have little stalks variously inserted and subdivided, but collected into a close bundle, which is level at the top, of which common sweetwilliam is a good example.

Capitulum, a head or tuft, has sessile flowers arranged in a globular form, as in sea-pink and globe-amaranthus.

Umbella, or umbel, has several flower-stalks or rays, nearly of equal length, rising from a common centre, and the summits forming a level, convex, rounded, and rarely a concave surface. It is called a simple umbel when each ray has a single flower, and compound when each stalk or ray supports a small or partial umbel. This peculiar distribution of the flowers is the origin of the name of a natural order of plants, which are thus denominated *umbellated*, or *umbelliferous*, as the common carrot, parsley, and hemlock.

Cyma, or *cyme*, agreeing in general appearance with the umbel, has the stalks arising from one centre, but

variously and alternately subdivided, as in the common laurus-tinus and elder.

Panicula or *panicle*, has the flowers in a loose subdivided bunch or cluster, without order. When the stalks are distant, it is called a spreading panicle, as in London-pride, saxifraga *umbrosa*, and in the common cultivated oat. When the panicle is more crowded it is called dense or close, and when more spreading, it is said to be divaricated.

Thyrsus, a bunch, is a dense or close panicle, approaching to an ovate form, as in the common lilac; and tussilago *petasites*, or common butter bur, is also an example of the thyrsus.

Stems.—A flower stalk is said to be solitary when it bears one flower; clustered, in which several stems are united together; radical, when they arise from the root; cauline, when they spring from the stem; axillary, when they grow from the axillæ of the leaves; and lateral, or terminal, as they proceed from the side or extremity of the stem.

Culmus, Culm, or straw, is the stem peculiar to the grasses, rushes, and similar plants. It is either without joints, as in the common rush; jointed, as in most of the grasses; geniculated, or knee'd, as in a common species of fox-tail grass.

Scapus, or stalk, is that stem which springs from the root, and supports the flower and seed, but not the leaves, as in the common primrose.

Pedunculus, is the flower-stalk which springs from the stem, and supports the flowers and fruit, but not the leaves.

Petiolus, or petiole, is the foot-stalk of the leaf, and is a term exclusively appropriated to leaves; and it is

either simple or compound, as it supports one or more leaves.

Frons, or frond, is a term applied to the leaves of ferns, in which the stem, leaf, and parts of fructification are united.

Stipes, or stipe, is the term applied to the stem of a frond, and to the stalk of a mushroom; the stipes in ferns is commonly scaly.

Leaves.—In the description of plants, and particularly in the discrimination of species, the forms of leaves afford obvious characters, and therefore merit particular attention. Leaves are properly distinguished into simple and compound: But their forms will be readily understood by the references to the plates.

Roots.—Roots sometimes afford specific names to plants, so that their forms and diversities require attention in descriptions.

A fibrous root, *radix fibrosa*, is the simplest kind, and is composed of fibres which are either undivided or branched. This kind of root is peculiar to many grasses, and to most annual plants.

A creeping root, *radix repens*, is considered as a kind of underground stem, which shoots out horizontally, and throws off fibres in its course. Couch-grass, and the common bent on sand-hills near the sea, are excellent examples of this kind of root, to which may be added common mint.

A fusiform, or spindle-shaped root, *radix fusiformis*, is of a tapering form, and penetrates perpendicularly into the ground, as in the carrot, the parsnip, and radish.

An abrupt root, *radix præmorsa*, has somewhat of a

spindle shape, but it is abrupt or bitten off at its extremity, as in scabiosa *succisa*, devils bit scabious.

A tuberous or knobbed root, *radix tuberosa*, is composed of fleshy knobs, connected by common stalks or fibres, as in solanum *tuberosum*, the potatoe, and helianthus *tuberosus*, or Jerusalem artichoke.

A bulbous root, *radix bulbosa*, is either solid, as in the crocus, or composed of concentrical layers, as in the onion, or scaly, consisting of fleshy scales attached at the base, as in the white and orange lily.

A jointed or granulated root, *radix articulata*, or *granulata*, is composed of a number of small grains, or fleshy knobs, as in saxifraga *granulata*, white saxifrage, and oxalis *acetosella*, or wood-sorrel.

In Plates 4th and 5th, the same series of numbers is continued.

Roots.—Fig. 1. Bulbous roots; fig. 2. tuberous roots; fig. 3. ramose, or branched; fig. 4. fusiform, or spindle-shaped; fig. 5. truncated; fig. 6. articulated, or jointed; fig. 7. creeping; fig. 8. stoloniferous, or furnishing both roots and stems from the joints.

Insertion and position of Leaves.—Fig. 9. Radical leaves; fig. 10. Cauline, or rising from the stem; fig. 11. double; fig. 12. ternate, or united by threes; fig. 13. alternate; fig. 14. opposite; fig. 15. distichous, or in two rows; fig. 16. cruciform, or disposed crossways; fig. 17. verticillate, or in whorls; fig. 18. fasciculated, or in bundles; fig. 19. imbricated; fig. 20. embracing the stem; fig. 21. decurrent; fig. 22. connate, or united together; fig. 23. sheathing; fig. 24. perfoliated; fig. 25. petiolated, or with foot stalks; fig. 26. sessile; fig. 27. bracteated; fig. 28. stipulated.

Forms of Leaves.—Fig. 29. Round, fig. 30. kidney formed, fig. 31. wedge-shaped, fig. 32. heart-shaped, fig. 33. lanceolate, fig. 34. linear, fig. 35. capillary, fig. 36. spatulated, fig. 37. arrow-headed, fig. 38. dagger pointed, fig. 39. runcinated, fig. 40. lyre-shaped, fig. 41. sinuated, fig. 42. bifid, fig. 43. trifid, fig. 44. pinnatifid, fig. 45. laciniated, fig. 46. lobed, fig. 47. serrated, or toothed; fig. 48. crenated, or notched; fig. 49. cylindrical, fig. 50. triangular, fig. 51. in pairs; fig. 52. trifoliate, or in threes; fig. 53. pedated, fig. 54. pinnated, and terminating with an odd leaflet; fig. 55. pinnated, and terminated with a tendril; fig. 56. interruptedly pinnated, fig. 57. jointedly pinnated, fig. 58. doubly pinnated.

Forms of the Corolla.—Fig. 59. Monopetalous, or one petaled; fig. 60. polypetalous, or many petaled; fig. 61. campanulated, or bell-shaped; fig. 62. tubulated, fig. 63. salver shaped, fig. 64. wheel shaped, fig. 65. personated, or masked; fig. 66. labiated, or lipped; fig. 67. cruciform; fig. 68. rosaceous, or like a rose; fig. 69. papilionaceous, or butterfly-shaped; fig. 70. liliaceous.

Forms of the Calyx or Cup.—Fig. 71. Monophyllous, or one leaved; fig. 72. polyphyllous, or many leaved; fig. 73. imbricated; fig. 74. calyculated, or with a double cup.

Insertion and position of Flowers.—Fig. 75. A sessile flower; fig. 76. pedunculated, or with a foot-stalk; fig. 77. soiltary, fig. 78. lateral, fig. 79. unilateral, or on one side; fig. 80. radical, fig. 81. terminal, fig. 82. axillary, fig. 83. verticillated, or in whorls; fig. 84. umbellated, fig. 85. corymbose, fig. 86. paniculated, fig. 87. in the form of a thyrsus or garland, fig. 88. ra-

cemose, or in bunches; fig. 89. spiked, fig. 90. capitated, or in heads; fig. 91. flosculous, fig. 92. semiflosculous, fig. 93. radiated, fig. 94. florets.

ILLUSTRATION OF THE CLASSES.

CLASS I.

MONANDRIA.

The plants arranged under this class have one stamen, and they are divided into two orders.

Order I. Monogynia.

In the distribution of the genera belonging to this order, four sections are formed. Sect. 1. contains the natural order called *scitamineæ*, or spicy plants, all of which are exotics, and they are distinguished by having the germen inferior, and having one or two cells; sect. 2. germen inferior, and four celled; sect. 3. germen superior; sect. 4. one seeded.

Amomum. *Gen. char.*—Cal. three cleft, unequal, cylindrical; corolla tripartite, unequal, spreading; nect. two lipped, and somewhat erect.

Am. *Zinziber*, Ginger. Scape naked, spike and scales ovate, leaves lance-shaped, and ciliated on the margin near the summit. This plant has something of the habit of a grass in its appearance, and it

grows to the height of two, and sometimes three feet; it is a native of the East Indies, and is extensively cultivated in the West Indies, where it is planted in March or April, flowers about September, and when the stalks have withered about the end of the year, the roots are dug up in January and February following.

The roots of ginger, on account of which it is cultivated, furnish a well known and excellent spice. Two kinds are met with in commerce, the black and the white ginger. They are the roots of the same plant, and differ only in the selection and mode of curing. The larger roots are chosen for the white ginger; and each root being washed and scraped separately, is dried in the sun. The whole of the remaining roots of the crop, after being picked and cleaned, are put into baskets, dipped into boiling water, and after being scalded, are dried on a platform, and put up in bags for the market, under the name of black ginger.

The young roots of ginger constitute one of the most delicious preserves. When intended for this purpose, the roots are dug up while they are tender and full of sap, carefully picked and washed, and after being scraped and peeled, they are put into jars, and covered with syrup, which is sometimes shifted two or three times.

CANNA. *Gen. char.*—Cal. three-leaved; cor. six-parted, erect, with a two-parted, revolute lip; style lance-shaped, adhering to the corolla.

Can. *Indica*, common Indian Reed, or Indian Shot; leaves ovate, acuminated, and ribbed; the first name derived from the appearance of its stem and leaves, and the second from its hard round seeds, resembling lead shot, and employed, it is said, by the Indians for

the same purpose; is a native of both the Indies, and is often cultivated in the gardens of Europe on account of the beauty of its foliage and flowers; but it requires artificial heat.

Several varieties of this beautiful plant are enumerated, some of which have yellow flowers.

SALICORNIA. *Gen. char.*—Cal. entire, ventricose; cor. none; one seed, covered by the calyx.

Sal. *herbacea*, Jointed Glasswort, or Saltwort. Knees compressed, emarginate, joints obconical, spikes with footstalks, tapering towards the top.

Sal. *fruticosa*, Shrubby Samphire, or jointed Glasswort; knees round, entire, joints equal, spikes subsessile. Both these species are natives of Britain, and grow in salt-marshes near the sea. They flower in August and September, and the first is annual or biennial, and the last perennial.

HIPPURIS. *Gen. char.*—Cal. indistinct, entire; cor. none; stigma simple; one seed, inferior.

Hip. *Vulgaris*, Mare's tail. Leaves linear, in whorls. Native of Britain, in ditches and stagnant pools, but not very common. Near Lynn, and other parts of Norfolk, and at the edge of Duddingston-loch near Edinburgh. Perennial, and flowers in May. This plant is easily distinguished by its spreading linear leaves, from eight to twelve in the whorl, and by the single stamen rising from the base of the leaf, or the single seed at a later period of the season.

Order II. Digynia.

Callitriche. *Gen. char.*—Cal. none; petals two; stigmas acute; seeds four, compressed, naked, marginated on one side.

Call. *Aquatica*, Water starwort; an annual plant, common in the ditches or stagnant waters of Britain; is in flower from April to October, and is easily distinguished by its floating leaves and small white sessile, solitary and axillary flowers. Two species, *verna* and *autumnalis*, have been described, but they are considered as only varieties, the latter of which is distinguished by all the leaves being uniformly linear.

Blitum. *Gen. char.*—Cal. three-cleft; petals none; one seed in a berried calyx.

Blit. *Virgatum*, Strawberry-blite. Little heads, sparse, and growing from the sides of the stem. This species, which is a native of Spain and Tartary, and was first introduced into this country in 1759, is now well known among the hardy annuals of every garden under the name of Strawberry Spinach, a name derived from the beautiful red colour of its berries, and the form of its leaves.

Observ.—It sometimes happens, that a plant, which, from those parts of fructification that determine the class, should be arranged in a different class from those species with which it agrees in all other respects. To mark the anomaly, and at the same time to retain the plant in its place among those species with which it is naturally allied, Linnæus has ingeniously contrived to

introduce it after the generic characters of the order and class to which it belongs. Thus, the genus *Tradescantia* belongs to the sixth class; but one species has only a single stamen, and therefore belongs to the first class, and to the third section of the first order of that class, at the end of which it is set down with its specific name, thus, Tradescantia *monandra*. According to the same plan, Valeriana *rubra*, and *Angustifolia*, have only one stamen and one seed, and are therefore noted at the end of the fourth section of the first order of the first class, but retain their place among the species to which they are naturally allied, in the first order of the third class.

CLASS II.

DIANDRIA.

The flowers in this class have two stamens, and it is divided into three orders.

Order I. Monogynia.

Jasminum, Jasmine. *Gen. char.*—Cor. five-cleft; berry two seeded; seeds in a seed-coat; anthers within the tube.

Jas. *Officinale*, Common Jasmine; with opposite pinnated leaves, leaflets sharp pointed. The common jasmine, which is a native of Switzerland and India, recommends itself by the beauty of its leaves, and the

fragrance of its flowers, and finds a place in every garden.

Jas. *Odoratissimum*, Sweetest Jasmine; with leaves alternate, bluntish, ternate, and pinnated; a native of Madeira, but common in the greenhouses of this country, and displaying its yellow flowers from May to November. The trivial name is far from being appropriate, for it is inferior in fragrance to the common jasmine.

Jas. *Fruticans*, Yellow or Berry-bearing Jasmine; with alternate, ternate, and simple leaves, and angular stems, leaflets ob-ovate; a native of the Levant and the south of Europe; is easily distinguished by the rich green of the foliage, and fine yellow colour of the blossoms, which are succeeded by black berries.

Ligustrum, Privet. *Gen. char.*—Cor. four cleft; berry superior, two celled, four seeded.

Lig. *Valgare*, Privet, or Prim-print; leaves elliptical, lance-shaped, obtuse, and somewhat dagger-pointed. This beautiful evergreen is a native of Britain and other parts of Europe, and shews its white flowers in May and June, which are succeeded by black berries of a very bitter taste.

Syringa, Lilac. *Gen. char.*—Cor. four-cleft; caps. two celled.

Syr. *Vulgaris*, Common Lilac; with entire, ovate, heart-shaped leaves. This fine shrub, a native of Persia, is universally cultivated in this country, and is always admired on account of the beauty of its large bunches of blue, violet, or white flowers.

Syr. *Persica*, Persian Lilac; with entire lance-shaped leaves; is also, as the name indicates, a native

of Persia, but is common in the gardens of Europe; is a shrub of humbler growth, and produces a large panicle of flowers of a pale purple colour.

Fraxinus. *Gen. char.*—Cal. none, or four-parted; cor. none, or four-parted; caps. superior, two celled, leafy above, and compressed; seeds solitary, pendulous.

Frax. *Excelsior*, Common Ash-tree; with serrated leaflets, and flowers destitute of calyx, and corolla. This lofty tree, which is met with every where, affords a fine example of pinnated leaves terminated by an odd leaflet, and is remarkable for the lateness of its frondescence, or coming into leaf. It flowers in April and May, and the large dark-purple anthers fall off before the leaves are unfolded.

The variety with pendulous branches, called Weeping ash, is also well known.

Circæa. *Gen. char.*—Cor. two petaled; cal. two-leaved, superior; caps. two-celled; seed solitary.

Cir. *Lutetiana*, Common Enchanters Night-shade; with erect stem, and leaves ovate, toothed, opaque, pubescent; is common in woods and moist shady places of Britain, and flowers in June and July.

Veronica, Speedwell. *Gen. char.*—Cor. four-cleft, wheel-shaped, the lowest segment narrower; capsule superior, two-celled.

Ver. *Spicata*, Spiked Speedwell; spike terminal, with opposite bluntish-notched serrated leaves, which are very entire at the extremity of the stalk, ascending, and very simple; grows in meadows and elevated pastures with a calcareous soil, in England, as at Newmarket-

heath, and Penny-bridge, Lancashire; perennial, and flowers in July.

Ver. *Serpyllifolia*, Thyme-leaved or Smooth Speedwell; with a terminal raceme, approaching to a spike; leaves ovate, slightly notched, smooth, and three-nerved; is common in meadows and pastures of Britain, and flowers in May and June.

Ver. *Becabunga*, Brooklime; with lateral racemes, plain, elliptical leaves, and creeping stem; is not uncommon in rivulets, and ditches with clear water; is perennial, and flowers in July.

Ver. *Anagallis*, Water Speedwell or Long-leaved Brooklime; with opposite lateral racemes, lanceolated serrated leaves, and upright stem; is not uncommon in ditches and marshes of this country; flowers in July; and is easily distinguished from the former by its lanceolate leaves and erect stem.

Ver. *Chamædrys*, Germander Speedwell, or Wild Germander; racemes lateral, leaves ovate, sessile, wrinkled, serrated, the stem hairy on two sides; very common in meadows and pastures, and under warm hedges; flowers in May and June, and is easily recognised by its beautiful blue flowers.

Ver. *Hederifolia*, Ivy-leaved Speedwell; with solitary flowers, heart-shaped, plain, five-lobed leaves, segments of the calyx heart-shaped, seeds pitcher-shaped; annual, and very common in gardens and fields; flowering from April to September.

VERBENA, Vervain. *Gen. char.*—Cor. funnel-shaped, nearly equal; curved calyx with a single truncated tooth; seeds two or four, as the stamens are two or four, which happens in the species of this genus.

Ver. *Aubletia,* Rose-vervain; with 4 stamens, loose solitary spikes, and trifid notched leaves; native of North America; is biennial; flowers in June and July; and the brilliancy of its scarlet flowers renders it a charming ornament of the greenhouse.

Ver. *Triphylla,* Three-leaved Vervain; tetrandrous, flowers paniculated, leaves ternate, stem shrubby; native of South America, and common in the greenhouse, where it is easily recognised by the three leaves in a whorl, and the agreeable fragrance which every part of the bruised plant emits. *Bot. Mag.* II. 367.

Rosmarinus. *Gen. char.*—Cor. unequal, upper lip two-parted, filaments long, curved, simple, with a tooth.

Ros. *Officinalis,* Common Rosemary; leaves sessile. Native of South of Europe, but common in gardens, where its large flowers afford an easy investigation.

Salvia, *Gen. char.*—Cor. unequal, filaments two, short, transversely attached to a small footstalk.

Sal. *Verbenaca,* Wild English Clary; leaves serrated, sinuated, and somewhat smooth; the corolla narrower than the calyx; in dry stony places in Britain; perennial; flowers from June to October.

Sal. *Horminum,* Purple-topped Clary; with blunt crenated leaves, and with bracteas at the top of the stem, coloured and larger; native of Greece, but is well known as an annual in the flower-garden by its blue and purple tops, which are sometimes taken for flowers.

Order II. Digynia.

Anthoxanthum. *Gen. char.*—Cal. a glume with two valves including one flower; cor. a two-valved glume, awned.

An. *Odoratum*, Sweet scented vernal grass; spike ovat-oblong, the florets on little footstalks longer than the awn. This grass is very common in meadows and pastures, flowers in May, and communicates a fine fragrance to hay; and is a remarkable exception to the tribe of grasses which have three stamens, and are therefore arranged under the third class.

Order III. Trigynia.

Piper, *Gen. char.*—Cal. none; cor. none; berry roundish, containing one seed.

Pip. *Nigrum*, Black Pepper; leaves ovate, seven-nerved, smooth, foot-stalks simple. This plant, which is shrubby and creeping, is a native of the East Indies, and is extensively cultivated in Java and other places, on account of the berries which afford the black pepper of commerce, and are well known by their hot and aromatic taste as a spice or condiment. The berries are collected before they are ripe, and being dried in the sun, become wrinkled and black, and are known under the name of black pepper; but when the fruit is fully ripe, and the external coat is separated by maceration in water, the berry exhibits a smooth surface, is less hot to the taste, and is the white pepper of commerce.

The species belonging to this genus are very numerous, and some of them are natives of Jamaica and the other islands in the West Indies, of South America, and of the South sea islands.

CLASS III.

TRIANDRIA.

The plants belonging to this class have three stamens, and it is divided into three orders.

Order I. Monogynia.

Valeriana. *Gen. char.*—Cal. none; cor. monopetalous; gibbous at the base on one side, superior; one seed.

Val. *Dioica*, Small or Marsh Valerian; flowers triandrous, dicœcious, (that is, the stamens on one plant and the pistils on another,) radical leaves ovate, stem-leaves pinnated. Native of Britain; grows in wet and marshy meadows; is perennial, and flowers in June.

Val. *Officinalis*, Great Wild Valerian; flowers triandrous, leaves pinnated, leaflets lance-shaped, nearly uniform; a common plant on the banks of rivers and in marshy places; is perennial, and flowers in June. The roots of this plant are employed in medicine, and are well known for a peculiar odour which seems to be extremely grateful to some animals; cats are very fond

of it, and it is said also that rats are attracted by the smell.

Crocus. *Gen. char.*—Cor. six-parted, superior, tube very long, stigma convolute, eroded, spathe one-valved, radical.

Croc. *Sativus,* Saffron Crocus; with tripartite produced stigma, segments linear; flowers in September, and is extensively cultivated in Cambridgeshire, and about Saffron Walden in Essex, from which it has spread to the neighbouring fields, and grows in meadows and pastures. The summits of the pistils are collected and dried, and constitute the saffron of the shops.

Croc. *Vernus,* Spring or Garden Crocus; with trifid included stigma, and deeply cut, wedge-shaped lobes; flowers in March, and is well known as one of the earliest ornaments of the parterre, where it appears with purple, white, and yellow flowers.

Croc. *Nudiflorus,* Naked Flowering Crocus; with trifid included stigma; is remarkable for the flower appearing in autumn without the leaves, from which it is called autumnal and naked crocus.

Iris. *Gen. Char.*—Cor. six-parted, superior; the petals alternately reflected; stigmas petal-shaped.

Ir. *Pseudacorus,* Yellow Iris, or Water Flower-de-luce. Cor. without beards; interior petals less than the stigma; leaves sword-shaped; perennial; flowers in July, and is very common in wet ground.

Ir. *Fœtidissima,* Gladwin or Stinking Iris.—Cor. without beards, interior petals very spreading, stem one-angled, leaves sword-shaped; in shady woods and hed-

ges; not uncommon in the west of England; perennial, flowers in June, and is easily recognised by its unpleasant odour.

Ir. *Persica*, Persian Iris; cor. unbearded, interior petals very short, spreading horizontally; a native of Persia, and a great favourite with the florist for its early appearance in February or March, and the beauty and fragrance of its flowers.

Ir. *Florentina*, Florentine Flag; cor. bearded, with pale green leaves shorter than the stem; native of Italy and the south of Europe, grows abundantly on the walls of Florence, and is planted about graves in Algiers. The dried root furnishes the orris powder of commerce, which is extensively employed as a perfume.

Ir. *Lurida*, Dingy Flag; bearded, with a stem nearly one-half longer than the leaves; native of the south of Europe, is cultivated in gardens, and flowers in May. *Bot. Mag.* xviii. 669.

Ir. *Susiana*, Chalcedonian Iris; with smooth, sword-shaped leaves, scape one-flowered, petals rounded; is a native of Persia, as the trivial name imports, and is the most magnificent of the Iris tribe; is cultivated in gardens, but is impatient of moisture, and flowers in June. *Bot. Mag.* iii. 91.

Schoenus. *Gen. char.*—Glumes chaffy, crowded, the exterior barren; cor. none; one seed, roundish.

Sch. *Mariscus*, Prickly or Long-rooted Bog-rush; with a round stem, and leaves acutely serrated on the margin and back; native of England, grows in marshes, and is very common on the moors near Cambridge.

Sch. *Albus,* White-headed Bog-rush ; with a leafy triangular stem, flowers fasciculated, and bristly leaves; common in marshy places, particularly in Scotland; is perennial, and flowers in August.

Many species belonging to this genus are natives of tropical regions, particularly *restioides* and *cladium,* the former of which grows to the height of six feet, and the latter from eight to ten feet, in moist places and sea-marshes in Jamaica.

Cyperus. *Gen. char.*—Glumes chaffy, imbricated on two sides ; cor. none; one seed, without awn.

Cyp. *Longus,* Sweet Cyperus, or English Galingale; with a leafy triangular stem, a leafy divided umbel, naked peduncles, and alternate spikelets; perennial, and flowers in July ; is a rare plant in England, but is met with in the isle of Purbeck, and near St David's Head.

Many species belong to this genus, chiefly natives of warm climates.

Cyp. *Elegans,* is a splendid species which grows in the sea-marshes near Liguanea in Jamaica. The root-leaves are from two to three feet in length, the stalk rises two feet and a half, with two or three leaves on the top, one of which is a foot long; and the elegant panicle is composed of numerous spikelets, some of which are sessile, and some are elevated on peduncles three or four inches long.

Cyp. *Odoratus,* Sweet-scented Cyperus, a native of low lands in the same island, exceeds five feet in height.

Cyp. *Papyrus,* a native of Egypt, is still a loftier plant, which is alluded to by the ancients, and seems to have furnished the first materials for the manufacture of paper.

Scirpus. *Gen. char.*—Glume chaffy, imbricated on all sides; cor. none; one seed.

Scir. *Palustris*, Marsh-creeping Club-rush; with a round stem, sheathed at the base, spike terminal, nearly oval, glumes acute, root creeping; very common in ditches, marshes, and small streams; is perennial, and flowers in June and July.

Scir. *Lacustris*, Bull-rush; stem round, naked, panicle cymose, terminal, spikelets ovate; is common in clear water, as in still rivers and lakes; is perennial, flowers in July, and rises to the height of four or five feet.

The Bull-rush is also a native of Jamaica, where it is employed, as in England, in thatching cottages and stuffing chair-bottoms.

This is also a very numerous genus, the species of which are spread over the southern parts of Europe, the East and West Indies, and America.

Eriophorum, Cotton-grass. *Gen. char.*—Glumes chaffy, imbricated on all sides; cor. none; seed one, surrounded with very long wool.

Er. *Vaginatum*, Single-headed Cotton-grass; with round sheathed stems, solitary spike, and membranous glumes; perennial, flowers early in the spring, and is common in marshy and boggy places throughout Britain.

Er. *Polystachion*, Broad-leaved Cotton-grass; with round stems, plain leaves, and spikes with foot-stalks; is perennial; flowers in April, and is equally common.

Er. *Angustifolium*, Common Cotton-grass; with round stems, grooved leaves, triangular at the top, and spikes on foot-stalks; grows in similar places with the preceding.

NARDUS. *Gen. char.*—Cal. none; cor. a two-valved glume.

Nar. *Stricta,* Mat-grass; spike setaceous, upright, with the flowers on one side; perennial; flowers in July, and is very common in moist sandy heaths. This grass is separated from its natural family by having only one pistil.

ORDER II. DIGYNIA.

This order includes almost the whole of the valuable tribe of grasses, which either grow up spontaneously, or are cultivated for the sake of their leaves as food for domestic animals, or for the sake of their seeds as food for man. A few of the more common may be noticed.

PHLEUM. *Gen. char.*—Cal. two-valved, truncated, acuminated, sessile, one flowered, including the corolla.

Ph. *Pratense,* Common Cats-tail Grass, or Timothy-grass; with a very long cylindrical spike, the glume ciliated on the back, longer than the awn; perennial; flowers from June to October, and is common in meadows and moist pastures. This grass sometimes rises to the height of three or four feet.

ALOPECURUS, *Gen. char.*—Cal. two-valved; one flowered; cor. one-valved.

Al. *Pratensis,* Meadow Fox-tail Grass; with a smooth erect stem, spike somewhat lobed; glumes of the calyx villous, and united at the base; perennial; flowers in May, and is very common in meadows and pastures.

Al. *Geniculatus*, Floating Fox-tail Grass; with an ascending knee'd stem, spike slightly lobed and cylindrical, glumes hairy, retuse; perennial; flowers in July, and is common in pools and watery places.

Agrostis. *Gen. char.*—Cal. two-valved, one-flowered, valves acute; cor. two-valved, unequal, larger than the calyx; stigmas plumose.

Ag. *Vulgaris*, Fine Bent-grass; with a spreading panicle, the little branches capillary, divaricated, calyces equal, the interior petal one-half shorter; perennial; flowers in July, and is common in meadows and pastures.

Ag. *Stolonifera*, Creeping Bent-grass: panicle compact, with a branchy creeping stem, florets crowded, calyces equal, downy; perennial; flowers in July and August, and is common in moist meadows. This is the celebrated *fiorin-grass* which has been most injudiciously and erroneously recommended for all soils and situations.

Ag. *Alba*, Marsh, or Wood Bent-grass; with a loose panicle and creeping stem; perennial; flowers in July, and grows in ditches and marshy places. This species has been also cultivated as fiorin grass.

Poa. *Gen. char.*—Cal. two-valved, many flowered, spikelets rounded at the base; cor. two-valved, ovate, valves somewhat acute.

Poa *Trivialis*, Roughish Meadow-grass; panicle diffuse, spikelets three-flowered, glumes lance-shaped, five-nerved, straw upright and rough; perennial; flowers through the summer, and very common in meadows and pastures.

Poa *Annua,* Annual Meadow-grass; panicle divaricated, spikelets ovate, and chiefly four-flowered, with an oblique compressed stem; flowers through the whole summer, and is one of the most common grasses.

STIPA. *Gen. char.*—Cal. two-valved, one flowered; exterior valve of the corolla with a very long terminal awn, articulated at the base.

Stip. *Pennata,* Feather-grass, awns woolly; perennial; flowers in July; and is cultivated in the garden on account of its beautiful awns.

AVENA. *Gen. char.*—calyx two-valved, many flowered; cor. exterior valve awned on the back, awn twisted.

Av. *Fatua,* Wild-oat, or Haver; paniculated, cal. containing about three flowers, the florets hairy at the base, and all of them awned, and without nerves; annual; flowers in August, and is not uncommon in fields and among corn.

To this genus belong the numerous varieties of the cultivated oat, beside many other species, some of which are native and some are exotic.

ARUNDO. *Gen. char.*—Cal. two-valved, florets surrounded with persistent down.

Arun. *Phragmites,* Common reed; Cal. five flowered, panicle lax; perennial; flowers in July, and is well known as a native of ditches, stagnant waters, and banks of rivers, in Britain.

SACCHARUM *Officinarum,* Sugar-cane. *Gen. char.* Cal. two-valved, covered with down at the base, one-flowered; cor. two-valved. *Spec. char.*—Flowers panicled, and flat leaves.

This valuable vegetable is a native of India, South America, and the South-sea islands; was introduced into Europe, it is supposed, during the crusades in the 12th century; and was planted in Spain, Madeira, the Canary, and Cape de Verd islands, soon after their discovery in the 15th century; and from some of these islands found its way to the West Indies, where it is now so extensively cultivated. Several varieties of this plant are known; and in the year 1796, a new variety, called the Bourbon, or Otaheite cane, of a larger size, and more productive, was introduced into Jamaica.

A rich, deep, and open soil, is the most suitable for the culture of the sugar-cane. Trenches, six or eight inches deep, and at the distance of three feet and a half, are formed; and the cuttings of the canes, having five or six joints, are placed horizontally at the bottom of the trench, and covered with mould to the depth of two inches. The sprouts appear in twelve or fourteen days; and, as they shoot up, the soil is gradually drawn about them, till, in the course of a few months, the ridges of earth are all level.

The cane-plant, including its leaves and flower stem, rises to the height of twelve or fourteen feet; and when it arrives at maturity, which requires the period of a year or fourteen months, the canes are cut down, and the leaves and top being separated, the solid stems are tied up in bundles and carried to the mill, where they are passed through iron-plated rollers, and the juice is received in a proper vessel, from which it is conveyed to boilers, where it is boiled down and concentrated; a quantity of quicklime is added, to separate some acid, which would prevent the crystallization, and some

blood, or similar animal matter, is mixed with it, for the purpose of clarifying the liquid. When it is sufficiently concentrated and purified, the syrup is conveyed to coolers, where the sugar crystallizes, and the molasses separate. The sugar is then carried to the hogsheads in the curing-house, the bottoms of which are perforated that the molasses may drain off into a cistern below; and when the sugar is sufficiently dry, it is brought to market under the name of *muscovado*, or *raw sugar*.

To this order also belong those plants which come under the denomination of *cerealia*, or those which produce corn, such as wheat, barley, rye, and oats; one species of which has been already mentioned.

Order III. Trigynia.

Montia *Fontana*, Water Chickweed. *Gen. char.*—Cal. two leaved; cor. monopetalous, irregular; caps. one celled, three valved, three seeded. This is the only species. It is annual; flowers in April and May, and is not uncommon near springs and moist places.

Holosteum. *Gen. char.*—Cal. five leaved; petals five, eroded; caps. one celled, nearly cylindrical, opening at the top.

Hol. *Umbellatum*, Umbelliferous Chickweed; with umbellated flowers. Is annual; flowers in April, and is sometimes met with on old walls, as the walls of Norwich. Several other species are natives of tropical regions.

CLASS IV.

TETRANDRIA.

The plants belonging to this class have four stamens, and are divided into three orders.

Order I. Monogynia.

Dipsacus, *Gen. char.*—Common calyx many-leaved, foliaceous; proper calyx superior, one leaved, down cup-formed.

Dip. *Fullonum*, Cultivated or Fuller's Teasel; leaves connate, or united at the base, the chaff bent back, involucrum reflexed. This fine plant, which grows to the height of five feet, is biennial; flowers in July, and is cultivated on account of its heads, which are employed in the woollen manufactures to raise the nap of cloth.

Dip. *Sylvestris*, Wild-teasel; leaves opposite, serrated, chaff straight, involucrum bent inwards, and longer than the head; a smaller plant than the preceding; biennial; flowers in July, and grows in moist hedges and way-sides in England.

Scabiosa. *Gen. char.*—Common cal. many-leaved; proper cal. superior, double; receptacle, chaffy, or naked.

Scab. *Succisa*, Devils-bit Scabious; florets quadrifid, equal, stem-leaves toothed, flowers nearly globular.

Perennial; flowers in August, and is common in pastures. The trivial name is derived from the truncated or bitten appearance of the root.

Scab. *Arvensis,* Field-scabious; small corollas four-cleft, radiating; leaves pinnatifid, deeply cut, stem hairy. Perennial; flowers in July; is common in fields and meadows, and is easily distinguished from the preceding, particularly by its long branches and spindle-shaped root. The flowers exposed to the fumes of tobacco assume a bright green colour. *Smith.*

SHERARDIA. *Gen. char.*—Cor. monopetalous, funnel-shaped, superior; seeds 2, three toothed.

Sher. *Arvensis,* Little-field Madder; leaves whorled, flowers terminal. This beautiful little plant is annual, flowers through the whole summer, and is not uncommon among corn and in uncultivated fields.

ASPERULA. *Gen. char.*—Cor. one petaled, funnel-shaped, superior; seeds 2, round.

Asper. *Odorata,* Sweet Woodruff; eight lanceolated leaves in the whorl, fascicles of flowers on footstalks. Perennial; flowers in May, is common in shady woods, and is collected on account of its fragrance. When dried it gives out the odour of benzoin.

GALIUM. *Gen. char.*—Cor. one petaled, plain, superior; seeds two, roundish.

Gal. *Verum,* Yellow Bed-Straw, or Cheese-Rennet; with eight leaves, linear, furrowed, entire, rough; flowers paniculated and crowded; perennial; flowers in July and August, and is very common on dry banks.

It is easily known by its bright yellow flowers, which emit the smell of honey.

Gal. *Aparine*, Goose-grass, or Cleavers; with eight leaves, lanceolate, keeled, rough, reversely prickled; stem flaccid, seeds rough. An annual plant; flowers in May and August, and is very common in hedges, on which its weak trailing stems are supported.

PLANTAGO. *Gen. char.*—Calyx four cleft; cor. four cleft, inferior, limb reflected, stamens very long, capsule two celled, opening horizontally.

Plan. *Major*, Greater Plantain; with ovate smoothish leaves, shorter than the footstalk, scape or flower-stem round, spike imbricated with flowers, seeds very numerous; perennial; flowers through the summer, and is one of the most common plants in meadows, pastures, and by way-sides.

Plan. *Media*, Hoary Plantain; with ovate downy leaves, longer than the footstalk; is perennial; flowers through the summer, but is less common than the other species, from which it is readily distinguished by its dense spike and purple stamens, furnished with white anthers. Roman camp, near Dalkeith in Scotland, and on the walls of Carlisle castle.

Plan. *Lanceolata*, Ribwort Plantain; with lanceolate leaves and angular flower-stem. Is perennial; flowers in June and July, and is very common in meadows and pastures. Two other species, Plan. *Maritima*, Sea Plantain, with linear leaves, on the sea-shores; and Plan. *Coronopus*, Buckshorn Plantain, with pinnatifid leaves, in dry sandy places near the shore, are also natives of Britain.

ALCHEMILLA. *Gen. Char.*—Cal. eight cleft, with the alternate segments smaller, inferior; cor. none; one naked seed.

Al. *Vulgaris,* Common Lady's Mantle; with leaves folded, lobed; perennial; flowers in June and July, and is very common in meadows and elevated pastures.

Al. *Alpina,* Alpine Lady's Mantle; with leaves digitate, serrated, covered underneath with a white silky down; perennial; flowers in July, and is a native of the mountains of Scotland and the north of England.

PROTEA. *Gen. char.*—Four petaled, the petals uniting in different ways; the anther inserted on the petal below the apex; one seed, superior, naked.

Prot. *Cynaroides,* Artichoke-flowered Protea, or Silver-tree; with roundish smooth leaves, on footstalks. This plant is a native of the Cape, is a low shrub remarkable for the magnificence of its flowers, and is cultivated in green-houses in the vicinity of London. *Bot. Mag.* 770.

Prot. *Lepidocarpon,* Black-flowered Protea; with solitary flowers; rays of the calyx strap-shaped, incurvated, and bearded; leaves lanceolate; is also a native of the Cape of Good Hope, and has been admitted into the green houses of this country. *Bot. Mag.* 674.

The structure of the flowers in the genus Protea is extremely curious. A great number of florets is inclosed within a common calyx, which is formed of many imbricated leaves or scales, and all attached to a common receptacle; and some parts of the flower are co-

vered with fine hairs or down, from which the name of Silver-tree is derived.

Banksia. *Gen. char.*—Amentum or catkin scaly; cor. four petaled; anthers sessile, in a cavity of the segments; caps. two valved; two seeded.

Ban. *Ericifolia,* Heath-leaved Banksia; leaves approximate, acerose, smooth. Native of New Holland, but is an inmate of the greenhouse of this country. The generic name is intended to commemorate the first discovery of the plant by Sir Joseph Banks. Several other species have been added, and all natives of the same region. The length and undulating appearance of the style adds greatly to the beauty of the flower; and the stigma being retained within the corolla till the petals are fully expanded, exhibits the singular appearance of each flower being furnished with a loop. *Bot. Mag.* 738.

Order II. Digynia.

Buffonia *Tenuifolia,* Slender Buffonia. *Gen. char.*—Cal. four leaved; cor. four-petaled; caps. one celled: double seeded. An annual plant; flowers in June; but is rare in this country.

Order III. Tetragynia.

Ilex. *Gen. char.*—Cal. four or five toothed; cor. wheel-shaped; no styles; some flowers are four cleft, and have only stamens.

Il. *Aquifolium*, Holly-tree; with ovate, acute, spinous leaves; flowering in May, and common in hedges and woods. The holly is well known by its beautiful evergreen leaves and scarlet berries, which stand through the winter. The wood, which is susceptible of a fine polish, is employed by the cabinet-maker, and common birdlime is prepared from the bark.

Potamogeton. *Gen. char.*—Cal. none; petals four; no style; four seeds.

Pot. *Natans*, Broad-leaved Pondweed; with the upper leaves longish, ovate; foot-stalked; floating. Perennial; flowers in July, and is common in rivers and stagnant waters.

Pot. *Lucens*, Shining Pondweed; with ovate, lanceolate, plain leaves, diminishing into footstalks; perennial; flowers in June and July, and is frequent in ditches, rivers and lakes. The flower-spike only of this plant appears above water.

Pot. *Pectinatum*, Fennel-leaved Pondweed; with setaceous, parallel, approaching leaves, set on two sides of the stem, and sheathing at the base; perennial; flowers in July, and not uncommon in rivers and pools, and is also met with in salt-water ditches.

Sagina. *Gen. char.*—Cal. four leaved; petals four; caps. one celled.

Sag. *Procumbens*, Procumbent Pearlwort; with procumbent, smooth stems, and very short petals; perennial; flowers from May to August, and is a common plant in sandy places, on walls, and in the neglected walks of gardens.

Sag. *Apetala,* Annual small-flowered Pearl-wort; with downy, somewhat erect stalks, and obsolete petals; annual; flowers in May and June, and is common on walls and sandy places.

CLASS V.

PENTANDRIA.

This is a very large class; the plants belonging to it have five stamens, and they are divided into six orders.

Order I. Monogynia. One Style.

Heliotropium. *Gen. char.*—Cor. salver-shaped, five cleft, with teeth between; seeds four; throat closed with arches.

Hel. *Peruvianum,* Peruvian Turnsole; with lanceolate, ovate leaves, shrubby stem, and numerous aggregated corymbose spikes; native of Peru, as the name indicates, but seldom absent from the greenhouse or stove, on account of the delicious fragrance of its flowers.

Echium. *Gen. char.*—Cor. with a naked throat, irregular; stigma two-parted.

Ech. *Vulgare,* Common Viper's Bugloss; with a hairy, tuberculated stem; stem-leaves hairy, lanceolate; spikes lateral, deflected. Biennial; flowers in

June and July, and is common in fields and waste places.

Ech. *Italicum,* White Viper's Bugloss; in which the stamens are very long. Is common on sandy grounds in the island of Jersey.

Lycopsis. *Gen. char.*—Tube of corolla incurvated, and closed with convex scales.

Lyc. *Arvensis,* Small Bugloss; with rough, lanceolate leaves; annual; flowers in June and July, and is very common in fields and by way-sides, where it is easily recognised by its beautiful blue flowers, and the curved tube of the corolla.

Symphytum. *Gen. char.*—Cor. tubulated, ventricose; throat closed with awl-shaped rays; cal. five-parted.

Sym. *Officinale,* Comfrey; with leaves ovate, lanceolate, decurrent; perennial; flowers in May and June, and is not uncommon in moist and shady places.

Sym. *Asperrimum,* Prickly Comfrey; with prickly stalks; acute, ovate leaves on footstalks; floral leaves opposite; racemes double. This splendid species is a native of Caucasus, is a hardy perennial, rises to the height of five feet, and with its blue and red flowers is a fine ornament of the shrubbery. *Bot. Mag.* 927.

Borago. *Gen. char.*—Cor. wheel-shaped, throat closed with rays.

Bor. *Officinalis,* Common Borage; with all the leaves alternate; biennial; flowers in June and July, is a common plant in the garden, and is sometimes met with in waste places, and by way-sides.

PULMONARIA. *Gen. char.* — Cor. funnel-shaped, with an open throat; cal. prismatic, five angled.

Pul. *Officinalis*, Common Lungwort; cal. of the same length as the tube; leaves ovate, rough; perennial; flowers in May, is common in gardens, and sometimes appears in woody places.

Pul. *Maritima*, Sea Bugloss, or Lungwort; cal. shortened; leaves ovate, azure-coloured; stem branching, procumbent; perennial; flowers in July, and with its beautiful blue and red flowers, contrasted with elegantly-waved azure leaves, adorns the sandy shores of the western coasts of Scotland and north of England.

MYOSOTIS. *Gen. char.* Cor. salver-shaped, five cleft, slightly notched, throat closed with arches.

Myos. *Scorpioides*, Mouse-ear Scorpion-grass; seeds naked, leaves elliptical-lanceolate; racemes many flowered, without bracteas. A very common plant, and greatly diversified in its habits and appearance from soil and situation. In dry shady places it is rough and hairy, but on a wet soil it is quite smooth. Its beautiful blue flowers, which are of a fine flesh colour before expansion, cannot fail to excite admiration.

The plants now described, from the roughness of the leaves, belong to the natural order *asperifoliæ*, or rough-leaved plants; and on examination it will be found that a general uniformity of character in other respects prevails, and particularly in the evolution of the flower stem.

PRIMULA. *Gen. char.*—Cap. one celled, mouth ten cleft; tube of the corolla cylindrical, stigma round.

Prim. *Vulgaris,* Common Primrose; with leaves toothed, wrinkled; scape or flower stem one-flowered, limb of the corolla plain; perennial; is the well known harbinger of spring, and is very common in woods and hedges.

Prim. *Elatior,* Oxlip, or great Cowslip; with toothed and wrinkled leaves contracted in the middle, many-flowered scape, limb of the corolla plain; perennial; flowers in April, and grows in pastures and among brushwood, but is not very common.

Prim. *Veris,* Common Cowslip, or Paigle; differs from the preceding by the limb of the corolla being concave; is also perennial; and is common in meadows and pastures in England.

Prim. *Farinosa,* Bird's-eye Primrose; with smooth crenated leaves, dusty underneath; is also perennial; flowers in June and July, and with its elegant flowers adorns the mountainous pastures in the north of England. I met with it plentifully in a meadow north from Stromness in Orkney.

All the varieties of polyanthus which have arisen from long and repeated culture, derive their origin from the species of primula now described; and from another species, *Primula Auricula,* all the beautiful varieties of the auricula which adorn the flower garden in the spring, have proceeded.

Soldanella. *Gen. char.*—Cor. bell-shaped, deeply divided, or fringed; caps. one-celled.

Sol. *Alpina,* Alpine Soldanella; of this genus this beautiful species only is known; it is a native of the elevated regions of Switzerland and Germany; grows readily in this country, and expands its fine blue or white blossoms in March.

Dodecatheon *Meadia,* American Cowslip; is a native of Virginia, common in gardens, and is easily recognised by its wheel-shaped corolla, the segments of which are bent back.

Menyanthes. *Gen. char.*—Cor. villous; stigma bifid; caps. one celled.

Men. *Trifoliata,* Marsh Trefoil, Buck-bean, or Bog-bean; with ternate leaves, upper surface of the corolla villous; perennial; flowers in June and July, and is very common in marshy places. The elegant flowers of this plant, which are of a pure white, or delicately tinged with pink, and beautifully fringed on the upper surface, will amply reward a minute examination.

Anagallis. *Gen. char.*—Cor. wheel-shaped, caps. divides horizontally, stamens furnished with jointed hairs.

An. *Arvensis,* Scarlet Pimpernel; leaves ovate, dotted on the lower surface; stem procumbent. Annual; flowers in June and July, and is common in corn-fields and gardens. This beautiful little plant, varieties of which appear with blue and white flowers, will recommend itself to the attention of the botanist by the curious jointed structure of the hairs on the filaments, which may be seen by a hand magnifier, but more distinctly with a microscope of greater power, and also by its seed-vessel, which divides into hemispheres.

An. *Monelli,* with fine blue flowers; a native of Spain and Italy, has been long an inmate of the greenhouse; and *Fruticosa,* Shrubby Pimpernel, with large

orange flowers, supposed to be a native of Africa, has been lately introduced.

AZALEA. *Gen. char.*—Cor. bell-shaped, stamens attached to the receptacle, caps. five celled.

Az. *Procumbens,* Trailing Azalea; with diffuse procumbent branches, and opposite, very smooth revolute leaves; is a native of the high mountains of Scotland.

Az. *Pontica,* Yellow Azalea; with lance-shaped, shining leaves; is a native of mount Caucasus, and the banks of the Dnieper, and is now cultivated in gardens; rises to the height of two or three feet, and produces umbels of fragrant flowers at the extremities of the branches.

CONVOLVULUS. *Gen. char.*—Cor. bell-shaped, folded; stigmas two; caps. two or three celled, with two seeds in each.

Con. *Arvensis,* Small Bind-weed; with arrow-shaped leaves, acute on both sides; one-flowered peduncles, and minute bracteas remote from the flower. Perennial; flowers in June and July, and is a very common weed in fields and gardens.

Con. *Sepium,* Great Bind-weed; with arrow-shaped leaves, and one-flowered angular peduncles; is perennial; grows in moist hedges, where it is readily distinguished by its large white or pinkish flowers.

Con. *Soldanella,* Sea Bind-weed, with kidney-shaped leaves and one-flowered peduncles; perennial; flowers in July, and is a native of particular spots on the sandy shores of the western parts of Scotland. Its specious reddish flowers are highly ornamental to the barren shores.

POLEMONIUM. *Gen. char.*—Cor. five parted, stamens inserted on scales and shutting the base of the corolla; stigma three-cleft; caps. superior, three-celled.

Pol. *Cæruleum*, Jacob's Ladder, or Greek Valerian. Leaves pinnated, flowers erect, with the calyx longer than the tube of the corolla. This plant offers itself for examination in every garden, and varies with blue and white flowers.

CAMPANULA. *Gen. char.*—Cor. bell-shaped, the bottom closed with valves supporting the stamens; stigma three-cleft; caps. inferior, opening by lateral pores.

Cam. *Rotundifolia*, Round-leaved Bell-flower; with radical leaves kidney-shaped, stem leaves linear; perennial; flowers in August and September, and is very common on heaths, walls, and about the borders of fields.

Cam. *Latifolia*, Giant Bell-flower; with ovate lanceolate leaves, very simple round stem, and one-flowered peduncles; perennial; flowers in August, and is not uncommon in woods and shady places, both on the east and west of Scotland.

Cam. *Speculum*, Venus' Looking-glass; with branched diffuse stem, oblong slightly crenated leaves, and solitary flowers; is a native of the south of Europe, and generally finds a place among the ornamental annuals of the garden, to which the brilliancy of its flowers justly recommends it.

CINCHONA. *Gen. char.*—Cor. shaggy, stigma simple; caps. two-celled, opening within; seeds numerous.

Cin. *Officinalis*, and some other species of the same genus, which grow to the size of trees, furnish the pale,

yellow, and red bark, which are so extensively employed in medicine. From the place of their growth it is called Peruvian Bark; and the generic name, *Cinchona*, is said to have been derived from the Countess del Cinchon, the lady of a Spanish viceroy, who was cured by its use about the year 1640, and being recommended by the Jesuits, it obtained the designation of Jesuits bark.

Cin. *Caribbea*, called in Jamaica, *Sea-side Beech*, is a tree which rises to the height of fifteen or twenty feet, and was brought into notice by Dr Wright, who found that it was not less efficacious in the cure of fevers than the Peruvian bark. Two other species have been discovered in Jamaica.

Coffea. *Gen. char.*—Cor. salver-shaped, five-cleft; stigma two-parted; berry two-seeded.

Several species of this genus have been described. *Occidentalis* is a native of the West Indies; but *Coffea Arabica*, or Coffee-tree, originally from Arabia as the name imports, is the cultivated species. The leaves are opposite, and many sessile flowers are produced at their insertion. The coffee tree naturally rises to the height of 17 or 18 feet; but when under culture it is kept at five or six feet, for the convenience of collecting the ripe berries. The trees are planted in regular rows; and when they are in full bloom nothing can exceed the beauty and delicious perfume of their pure, white, clustered flowers; the air is filled with fragrance, and the trees seem as if covered with a shower of snow, affording a fine contrast to the dark green foliage. But this enchanting scene is of transient duration; the flowers decay a few hours after they are full blown, and all the beauty and fragrance which delighted the senses in the

morning, have vanished before noon. The berries which succeed the flowers are first green, when fully grown become red, ripen into a dark purple, and at last shrivel and drop from the tree. The fruit is fit for collecting about seven months from the appearance of the flowers. The berries are either dried on platforms, or the pulp is bruised by means of a machine, or passed through the grating-mill by which the pulp is torn off, and the seeds completely separated; they are then washed in water, dried in the sun or by means of artificial heat, and afterwards put up in bags for the market.

VIOLA. *Gen. char.*—Cor. five-petaled, irregular, horned behind; anthers united; caps. superior three-valved, one celled; cal. five-leaved, lengthened at the base.

V. *Odorata*, Sweet Violet; without stem, shoots creeping, leaves heart-shaped with smoothish footstalks; perennial; flowers in March and April, and grows in woods and hedges. Cultivated in the garden for the sake of its fragrant flowers.

V. *Tricolor*, Pansy Violet, Heart's Ease; stem angular, leaves oblong, toothed, crenated, with lyre-shaped pinnatifid stipulæ; annual; flowers through the summer.

V. *Lutea*, Yellow Mountain Pansy; with triangular stem, and leaves ovate, oblong, crenated and ciliated; perennial; flowers through the summer, and is common in mountainous pastures in Scotland and the north of England.

Hyoscyamus. *Gen. char.*—Cor. funnel-shaped, obtuse, irregular; stamens inclined; caps. covered, two-celled.

Hyos. *Niger,* Common Henbane; leaves embracing the stem; flowers sessile; annual; flowers in July, and is frequent in waste places about towns and villages. The calyx is finely reticulated, and the yellow corolla is beautifully marked with purple veins; but the whole plant is of a poisonous and narcotic quality.

Atropa. *Gen. char.*—Cor. bell-shaped; stamens distant; berry superior, two-celled.

At. *Belladonna,* Deadly Nightshade; stem herbaceous; leaves ovate, entire. Perennial; flowers in June, and grows in waste places, but rarely. I have only met with this plant in Scotland near the ruins of religious houses,—at Holywood near Dumfries, and Kinloss Abbey in Morayshire, which has excited a conjecture that it may have been originally introduced. The berries are a deadly poison.

Solanum, *Gen. char.*—Cor. wheel-shaped; anthers slightly united, opening at the top by a double pore; berry superior, two-celled.

Sol. *Dulcamara,* Woody Nightshade, or Bitter-Sweet; with a shrubby, waving, unarmed stem, upper leaves halberd-shaped; racemes cymose; a shrubby plant; flowers in June and July; and is common in moist hedges, where it is conspicuous by its climbing stalks, purple flowers and red berries.

Sol. *Nigrum,* Common or Garden Nightshade; with herbaceous unarmed stem, and nodding lateral umbels;

flowers through the summer, produces black berries, and grows in waste places. Both species are poisonous.

To this genus belongs the common potatoe, Solanum *Tuberosum,* the varieties of which, from culture, and diversity of soil and situation, are almost endless. Its large flowers afford great facilities in examining the characters of the genus.

Lonicera. *Gen. char.*—Cor. monopetalous, irregular; berry many-seeded.

Lon. *Caprifolium,* Pale Perfoliate Honeysuckle; with flowers ringent, whorled, terminal; deciduous leaves; upper leaves perfoliate; shrubby; flowers in May and June, and grows in woody places.

Lon. *Periclymenum,* Common Honeysuckle, or Woodbine; with flowers in ovate, imbricated, terminal heads; all the leaves distinct and deciduous; shrubby; flowers in June and July, and is common in woods and hedges.

Ribes. *Gen. char.*—Cal. superior, bell-shaped, five-cleft; petals and stamens inserted in the calyx; style two-cleft; berry many-seeded.

Rib. *Rubrum,* Common Currants; unarmed; with smooth pendulous racemes; plain flowers; petals obcordate; flowers in May, and is a native of woods and banks of rivers in the north of England, and of the island of Isla in Scotland; but is well known as the red and white currants of the garden.

Rib. *Nigrum,* Black Currants; with racemes hairy, pendulous, and with a simple peduncle at the base; grows wild in some parts of England and in Isla, but, from being universally cultivated, is equally familiar.

Rib. *Grossularia*, Rough Gooseberry; with prickly branches; footstalks of the leaves hairy; peduncles one-flowered; fruit rough.

Rib. *Uva-Crispa*, Smooth Gooseberry; is reckoned a distinct species, but is scarcely different, except in the smoothness of the fruit. From these two species all the varieties of the gooseberry have been produced.

Hedera. *Gen. char.*—Cal. five-toothed; petals five, dilated at the base; berry five-seeded, surrounded by the calyx.

Hed. *Helix*, Common Ivy; leaves ovate-lobed. This well known plant flowers in October, and affords a fine example of the *caulis radicans*, or rooting stem, which throws out fibres for its support, and attaches itself to walls or trees, as it creeps along. The leaves on the stem are five-lobed, but on the top of the branches they are ovate and undivided.

Order II. Digynia.

Ulmus. *Gen. char.*—Cal. five-cleft, inferior, permanent; cor. none; caps. membranaceous, compressed, one-seeded.

Ulm. *Campestris*, Common Elm; with leaves doubly serrated, rough, and unequal at the base; the flowers appear in April. It is easily distinguished by the inequality at the base of the leaves.

Ulm. *Montana*, Broad-leaved Elm or Witch Hazel; is distinguished from the preceding by its broader, less rough, pointed leaves; flowers at the same time and is common in woods and hedges.

GENTIANA. *Gen. char.*—Cor. tubular at the base; destitute of nectariferous pores; caps. superior, one celled, two valved, many seeded.

Gen. *Verna*, Spring Gentian; with five cleft, salver-shaped, crenated corolla; segments with appendages at the base; leaves ovate, crowded together. Perennial; flowers in April, and is a native of the mountains in the north of England and in Ireland; but is an early and beautiful ornament of the garden.

Gen. *Campestris*, Field Gentian; with four cleft, salver-shaped corolla; bearded at the throat; interior segments of the calyx very large. Annual, flowers in September; and grows in dry upland pastures, and in sandy downs near the sea.

STAPELIA. *Gen. char.*—Cor. wheel-shaped, with a double star-like nectary covering the parts of fructification.

Stap. *Grandiflora*, Great Flowered Stapelia; with club-shaped, quadrangular branches; the angles toothed; the corolla large, five cleft; segments lanceolate, acute, and ciliated on the margin. *Bot. Mag. 585.*

All the species of this singular tribe of plants are natives of the arid deserts in the vicinity of the Cape of Good Hope. They are remarkable for the succulence of their stems and branches, which enables them to exist in a parched soil. The Stapelia, from a mistaken analogy, has been denominated the camel of vegetables, because it retains a large portion of fluid in the midst of those burning sands, where scarcely any other plants appear; but the resemblance between the animal and the vegetable does not hold with regard to structure, although the stapelia, in some of its proper-

ties, approaches to the nature of animal matter. Stap. *asterias*, star-fish stapelia, exhales the odour of putrid fish; and insects, attracted by the smell, deposit their eggs in some of the species as on animal matter.

Umbellated Plants.

In their general habits and appearance these plants exhibit a striking resemblance, and are therefore associated in the same natural order. They are subdivided into three sections, as they are furnished with an involucrum or are destitute of that appendage.

A. With universal and partial involucrum.

Eryngium. *Gen. char.*—Involucrum many leaved, flowers in heads; common receptacle, conical, chaffy.

Eryn. *Maritimum*, Sea-holly; with radical leaves, roundish, folded, and spinous; flower-heads, with footstalks; perennial; flowers in July and August, and is common on sandy shores.

Eryn. *Campestre*; with leaves embracing the stem, somewhat pinnated, and deeply cut; is also perennial; flowers in July and August, and is found, but more rarely, in pastures near the sea.

Conium *Maculatum*, Common Hemlock. *Gen. char.*—The small involucrum extending half round, and about three-leaved; fruit ovate, with five ribs on each side; petals equal. *Spec. char.*—With seeds smooth and much branched, stem shining, spotted. Biennial; flowers in June and July, and is one of the most common plants among rubbish and in waste places.

HERACLEUM *Sphondylium,* Common Cow-parsnep. *Gen. char.*—Fruit elliptical, compressed, striated, dilated with a margin; flowers radiating; petals inflected, emarginate; involucrum, not permanent. *Spec. char.*—Leaves pinnated, the leaflets pinnatifid, cut, and serrated. Biennial; flowers in July, and is very common in hedges, on the borders of fields, and in moist meadows, where it is readily recognized by its tall stem, which rises to the height of four feet, and large leaves.

DAUCUS *Carota,* Wild Carrot. *Gen. char.*— Involucrum pinnatifid, flowers nearly radiated, fruit muricated. *Spec. char.*—Seeds rough, foot stalks of the leaves nerved beneath. Biennial; flowers in June, and July, and is common every where in pastures and on the borders of fields.

B. With partial involucrum, none universal.

CICUTA *Virosa,* Water Hemlock. *Gen. char.*—Fruit nearly ovate, furrowed; cor. regular. *Spec. char.* Umbels opposite to the leaves, with obtuse stipulæ attached to the foot-stalk. Perennial; flowers in August, and grows in ditches and on the banks of rivers; but as it is a very poisonous plant, it is fortunately not common. It grows sparingly at the edge of Lochend lake near Edinburgh, and on the borders of one of the lakes at Lochmaben in the south of Scotland.

ÆTHUSA *Cynapium,* Fools' Parsley, or Lesser Hemlock. *Gen. char.*—Fruit striated, small involucrum, three leaved, pendulous. This species is easily distinguished by its round, slightly striated stem, and smooth,

deep green, doubly pinnated leaves. Annual; flowers in July and August, and is a common weed in gardens. It has been sometimes mistaken for parsley, to which it has some resemblance; but as it is of a noxious quality, it should be carefully avoided.

SCANDIX. *Gen. char.*—Flowers radiating, petals emarginate, seed awl-shaped, flowers of the disk often with stamens only.

Scan. *Odorata.* Sweet Cicely, Great Chervil, or Myrrh; with angular furrowed seeds; flowers in May, and is common in waste places, but is always near houses; supposed not to be indigenous.

Scan. *Pecten-Veneris,* Venus's Comb, or Shepherd's Needle, with seeds furnished with very long beaks; common in cultivated fields; annual, and flowers in June and July.

C. With no involucrum.

PASTINACA *Sativa,* Wild Parsnep. *Gen. char.*—Seed elliptical, compressed, plain; petals rolled inwards, entire. *Spec. char.*—Leaves simply pinnated, hoary on the lower surface. Biennial, and rises to the height of three feet; flowers in July, and not uncommon on the borders of fields.

APIUM *Graveolens,* Smallage, or Wild Celery. *Gen. char.*—Seed ovate, ribbed; petals inflected, equal. *Spec. char.*—Leaflets of the stem wedge-shaped, stem furrowed. Biennial, and flowers in August; in ditches and marshes near the sea; is acrid and poisonous, but becomes esculent when cultivated.

ÆGOPODIUM *Podagraria,* Gout-weed. *Gen. char.* Seed ovate-oblong, ribbed; petals inflected, heart-shaped, unequal. A troublesome weed in cultivated grounds and waste shady places. Perennial, and flowers in May and June.

ORDER III. TRIGYNIA.

SAMBUCUS. *Gen. char.*—Cal. superior, five parted; cor. five cleft, berry three-seeded.

Sam. *Ebulus,* Dwarf Elder; with three parted cymes, and herbaceous stem; perennial; flowers in July, and grows in waste places and hedges, but not very common. The stem, which rises to the height of three feet, dies away in the winter.

Sam. *Nigra,* Common Elder; with five-parted cymes and arborescent stem; flowers in June, and is very common in hedges and woods, where it is easily recognised by its white fragrant flowers, and dark purple or white berries.

ORDER IV. TETRAGYNIA.

PARNASSIA *Palustris,* Grass of Parnassus. *Gen. char.*—Cal. five parted, petals five; nectaries five, heart-shaped, ciliated with globular summits; caps. four valved; perennial; flowers in September and October, and is frequent in marshy soils, where it is easily distinguished by its angular twisted stem, bearing one leaf and one beautiful snow-white terminal flower; but the curious and elegant structure of the

nectaries will not fail to excite the attention and admiration of the botanist.

Order V. Pentagynia.

Statice. *Gen. char.*—Cal. one leafed, entire, folded, withered; petals five; seed one, superior.

Stat. *Armeria,* Thrift, or Sea-gilliflower; with simple stem, flowers capitate, leaves linear; perennial; flowers in July and August, and is common on slimy shores, and in moist alpine regions.

Stat. *Limonium,* Sea-Lavender, with a round paniculated stem; perennial; flowers in July and August, and grows also on muddy shores, but is less common.

Linum. *Gen. char.*—Cal. five leaved; petals five; caps. superior, ten valved, ten celled, seeds solitary.

Lin. *Usitatissimum,* Common Flax; with the leaves of the calyx ovate, acute, three nerved, petals crenated, leaves lanceolate, alternate; annual; flowers in July, and sometimes appears among corn, but is well known as the cultivated species of flax.

Lin. *Catharticum,* Purging Flax; with leaves opposite, stem divided above, petals acute; annual, flowers from June to August, and is not uncommon in dry elevated pastures.

Lin. *Arboreum,* Tree-Flax; with wedge-shaped leaves and arborescent stem; is a native of the Levant, but has been admitted to the green-house on account of its beautiful yellow flowers, which grow in succession throughout the summer.

DROSERA. *Gen. char.*—Cal. five cleft, petals five; caps. one celled, three valved, superior; many seeded.

Dros. *Rotundifolia*, Round-leaved Sun-dew; with leaves round, radical, stem branched; perennial; flowers in July and August, and is not uncommon in boggy ground.

Dros. *Longifolia*, Long-leaved Sun-dew; with leaves radical, obovate, in similar places with the former, but less frequent.

Dros. *Anglica*, Great Sun-dew; has nearly the same characters as the preceding, but is furnished with eight styles and a four-valved capsule, is double the size, and a rarer plant.

The upper surface of the leaves of all these species of sun-dew is thinly set with long red hairs, which exude a transparent viscid fluid, especially during bright sunshine. Small insects, which are attracted to the leaves, or alight accidentally upon them, are entangled in the hairs, and destroyed by being enclosed in the leaves, which fold upon them in consequence of the irritation from the motions of the struggling insect.

CRASSULA. *Gen. char.*—Cal. five leaved; five petals; and five nectariferous scales at the base of the germen.

Cras. *Coccinea*, Scarlet-flowered Crassula; with ovate, plain, cartilaginous-ciliated leaves, sheathing and united at the base. Native of the Cape, but a splendid inmate of the green-house, on account of the fragrance and rich scarlet of its flowers, which blow during the summer.—*Bot. Mag.* 495.

Order VI. Polygynia.

Myosurus *Minimus,* Mouse-tail. *Gen. char.*—Cal. five leaved, with an appendage at the base; petals five, with a tubular nectariferous claw. An annual plant; flowers in May, and sometimes appears in fields of a gravelly soil.

CLASS VI.

HEXANDRIA.

The plants belonging to this class have six stamens, and they are divided into six orders.

Order I. Monogynia.

The genera arranged under this order are the most numerous of the class; they are divided into six sections, and include the splendid liliaceous tribe, which Linnæus has distinguished by the pre-eminent designation of the nobles of the vegetable kingdom.

Bromelia. *Gen. char.*—Cor. tripartite; cal. tripartite, superior; a berry.

Brom. *Penguin,* Penguin of Jamaica; with leaves ciliate, spiny, dagger-pointed, raceme terminal. This singular plant is common in the Savannahs and on the

rocky hills of Jamaica, and is usually employed for making fences; for which purpose it is admirably suited, by its firm leaves, thickly set on the edges with strong bent spines.

Brom. *Ananas*, Pine-apple; with leaves ciliate, spiny, dagger-pointed, and comose or tufted spike. Numerous varieties of this most delicious fruit are cultivated in tropical regions; and, to bring it to any degree of perfection in this country, the powerful heat of the stove is necessary.

GALANTHUS *Nivalis*, Snowdrop. *Gen. char.*—Cor. superior, six-petaled, the three interior petals shorter, acutely notched; stigma simple. The early appearance of the snowdrop, with its delicate nodding flowers, in February and March, renders it a well known plant.

NARCISSUS. *Gen. char.*—Cor. superior, six-petaled, equal; nectary funnel-shaped, one-leafed, petaliferous; the stamens within the nectary; stigma three-parted.

Nar. *Poeticus*. Common Narcissus; with one flowered sheath, nectary wheel-shaped, very short membranaceous notched leaves, obtusely keeled, reflected on the margin; said to be a native of some parts of England, but finds a place in every garden, and often varies with double flowers.

Nar. *Pseudo-Narcissus*, Common Daffodil; with one-flowered sheath, and erect bell-shaped nectary, equal in length to the ovate petals; perennial; flowers in March and April; not unfrequent in woods, common in gardens, and varies with double flowers.

Nar. *Jonquilla*, Common Jonquil, a native of Spain,

Nar. *Tazetta,* Polyanthus Narcissus, a native of Spain, Portugal, and of the Barbary coast; Nar. *Orientalis,* with its numerous varieties, and other species of this beautiful genus, have been introduced among the ornaments of the flower-garden.

AMARYLLIS. *Gen. char.*—Cor. six-petaled, irregular; filaments inserted in the throat of the tube, declining, unequal.

Am. *Belladonna,* Belladonna Lily; with many flowered sheath, cor. bell-shaped, equal; supposed to be a native of South America, as it was introduced from Portugal; is frequently cultivated in gardens on account of the beauty and fragrance of its flowers.

Am. *Sarniensis,* Guernsey Lily; with plain linear petals, and the stamens and pistil upright and longer than the corolla; a native of Japan, but is cultivated in the open ground in the island of Guernsey, to which it was introduced by the melancholy accident of the shipwreck of a Dutch or English ship, with some of the roots on board from Japan, before the middle of the 17th century. The roots were cast ashore, buried in the sand, and after a few years, to the surprise and admiration of the inhabitants, exhibited their splendid flowers in all their pomp and beauty. Various other species of Amaryllis have been since introduced, all which are remarkable for their beauty and grandeur; but among them Am. *Vittata,* or superb Amaryllis, which shoots up its stem to the height of three feet, shines conspicuous.—*Bot. Mag.* 129.

ALLIUM. *Gen. char.*—Cor. inferior, six-petaled,

spreading; spathe two-cleft, many flowered; umbel crowded, stigma simple.

Al. *Ursinum*, Broad-leaved Garlic or Ramsons; with a naked semi-cylindrical stem, and lanceolate leaves on foot-stalks; perennial; flowers in May and June, and is common in woods and moist meadows.

Al. *Vineale*, Crow Garlic; with round-leafed bulbiferous stem, and stamens three pointed; perennial; flowers in July, and is not uncommon in dry pastures and on old walls.

To the same genus belong Al. *Schænoprasum*, or Chive Garlic, Al. *Porrum*, the garden leek, and Al. *Cepa*, the cultivated onion.

Agave *Americana*, American Aloe. Cor. superior, six cleft, limb erect, shorter than the filaments; leaves somewhat compressed, dagger-shaped, spinous, toothed on the edges. This splendid plant is a native of the rocky hills of Jamaica; it is several years before it throws up the flower stem, which, in a vigorous plant, rises to the height of eight or ten, and sometimes, it is said, twenty feet, adorned with a prodigious number of yellow flowers, which render it conspicuous at the distance of many miles. It appears to be viviparous in its native soil: it seldom flowers in the stove in this country; but it is a vulgar mistake that it puts forth its blossoms only once in a hundred years. This seems to depend on the management and state of the plant.

Hyacinthus. *Gen. Char.*—Cor. inferior, six-cleft, somewhat bell-shaped; stamens inserted in the tube.

Hyac. *Nonscriptus*, (*scilla nutans* of Smith.) Wild

Hyacinth; with linear leaves, nodding spike, with the flowers reflected at the summit; perennial; flowers in May, and is very common in woods and hedges.

Hyac. *Orientalis*, Garden Hyacinth, with many flowered raceme. This fine ornament of the garden and the parlour is a native of the vicinity of Aleppo and Bagdad, and of the coast of Barbary. It was cultivated in England about the end of the 16th century; and its numerous varieties, with white, red, blue, yellow, double, and semidouble flowers, have been objects of great attention among the Dutch florists. A single root of a rare variety, has brought from L. 100 to L.200 sterling. Two thousand varieties are enumerated and named by the Harlem gardeners; and whole acres in the vicinity of that city are occupied in the cultivation of those flowers.

Lilium. *Gen. char.*—Cor. six-petaled, bell-shaped, with a longitudinal nectariferous line, petals channelled at the base.

Lil. *Candidum*, White Lily; with leaves sparse or scattered, bell-shaped corolla, smooth within; supposed to be a native of the Levant, or of Palestine, and is now a very common but splendid ornament of almost every garden, where it varies with double flowers, spotted with purple, and leaves striped or edged with yellow.

Lil. *Bulbiferum*, Orange Lily; with scattered leaves, erect, bell-shaped corolla, rough within. Native of Austria and Italy, but now one of the most common garden flowers.

Lil. *Chalcedonicum*, Chalcedonian Lily, or Scarlet Martagon; with lanceolate scattered leaves, flowers

reflected, corolla bent back. Native of Persia, and common in gardens.

Various other species of lily are cultivated, among which Lilium *Martagon*, Turks' cap Lily, and Lilium *Superbum*, Superb Lily, the former a native of Germany, and the latter of Carolina, are stately and magnificent plants.

TULIPA. *Gen. char.*—Cor. six petaled, bell-shaped, inferior, no style ; caps. three celled.

Tul. *Sylvestris*, Wild Tulip ; with a single, slightly nodding flower, and lanceolate leaves. Native of several parts of England ; perennial, and flowers in April.

Tul. *Suaveolens*, Early dwarf Tulip ; with lanceolate glaucous leaves, nearly equal in height to the one-flowered stem. This beautiful little tulip is supposed to be a native of the south of Europe, is well known under the name of *Duc Van Thol*, and is deservedly admired on account of its rich colours and sweet scent.

Tul. *Gesneriana*, which in its specific name commemorates Conrad Gesner, a botanist of the 16th century, and a systematic writer on the classification of plants, is a native of Turkey, and is the parent of all those rich varieties, amounting now to not fewer than a thousand, which command so much of the florist's care and admiration ; Tul. *Breyniana*, a native of the Cape, with stem supporting from two to six flowers, is yet rare in the gardens of this country.

BERBERIS, *Vulgaris*, Barberry. *Gen. char.*—Cal. six-leaved, petals six, with two glands at the claws ; no style ; berry superior, two seeded ; a shrubby plant ; flowers in May and June, and is common in hedges

and among brushwood. The irritability of the stamens of the barberry is very remarkable.

Order II. Digynia.

Oryza *Sativa*, Rice. Cal. one-flowered, glume two-valved; cor. two-valved; one oblong seed. One species only of this valuable plant is known; the stem rises to the height of four or five feet, and the flowers are arranged in a terminating panicle. Rice is most successfully raised in those situations which admit of flooding with water; it is extensively cultivated in China and India, where it forms the chief food of the native inhabitants, as well as in Carolina, from all of which places it is imported into Europe, and forms a wholesome, nutritious aliment.

Order III. Trigynia.

Rumex. *Gen. char.*—Cal. three-leaved; petals three, meeting together; one triangular, superior, naked seed; stigmas much divided.

Rum. *Crispus*, Curled Dock; with all the valves ovate, entire; leaves lanceolate, waved, acute; perennial; flowers in June and July, and is very common in waste places and by way-sides.

Rum. *Obtusifolius*, Broad-leaved Dock; radical leaves, heart-shaped, blunt; stem roughish. Common.

Rum. *Digynus*, Mountain Sorrel; the leaves radical, kidney-shaped, and on foot-stalks. Common on the

mountains of Wales and Scotland, and sometimes used as salad.

Rum. *Acetosa*, Common Sorrel; with dicœcious flowers, and oblong arrow-headed leaves; common in meadows and pastures.

Rum. *Acetosella*, Sheep's Sorrel; with dicœcious flowers, and lanceolate halberd-shaped leaves. Very common in barren pastures.

Order IV. Tetragynia.

Petiveria *Alliacea*, Guinea Henweed. Cal. four-leaved, no corolla; style lateral; one seed. This plant is a native of Jamaica and South America, is remarkably acrid, and when chewed, produces great heat in the mouth; the Guinea hen is extremely fond of it, from which it derives its name; and it communicates the taste of garlic to the milk, and an unpleasant flavour even to the flesh of cattle that feed upon it. The Peruvians employed it as a charm, and fancied that its effects were very powerful and extensive; but its use was prohibited by the Spaniards, either from a desire to discourage such superstitions, or from an apprehension that they were injurious to their power.

Order V. Polygynia.

Alisma. *Gen. char.*—Cal. three leaved; petals three; several seed-vessels.

Al. *Plantago*, Great Water Plantain; with acute

ovate leaves, and bluntly triangular capsules; common on the banks of lakes and rivers.

Al. *Ranunculoides*, Small Water Plantain; with linear lanceolate leaves, and incurvated five-angled capsules. In similar places with the preceding, but less common.

CLASS VII.

HEPTANDRIA.

The plants of this class have seven stamens, and they are divided into four orders.

Order I. Monogynia.

Trientalis *Europæa*, Chickweed Wintergreen.—Cal. seven-leaved; cor. seven-cleft, equal, plain; a dry berry. Common in woods on the sides of mountains in the north of England and in Scotland.

Disandra *Prostrata*, Trailing Disandra. Cal. five or seven parted; cor. wheel-shaped, five or seven parted; caps. two celled, many seeded. Native of Madeira, but not uncommon in the green-house and parlour, where its trailing stems, peltate leaves, and yellow flowers, render it an agreeable object. It is sometimes called by mistake a geranium.

Æsculus *Hippocastanum*, Horse-Chesnut. Cal. five-toothed; cor. five petaled, unequal; caps. three celled.

The horse-chesnut, which recommends itself to attention as a fine spreading tree, with large digitated leaves, and beautiful spikes of flowers, is a good example of this class and order, although the irregularity of the corolla may produce some difficulty to the young botanist.

To the second order, Digynia, belongs *Limeum,* an African genus of plants: Under the third, Tetragynia, is included *Saururus,* or Lizard's Tail, a native of Virginia: and the fourth order, Heptagynia, has only one genus, *Septas,* and one species. It is a native of the Cape of Good Hope, and is nearly allied to the genus *Crassula;* but it is remarkable in having seven segments in the calyx, seven petals, and seven germens.

CLASS VIII.

OCTANDRIA.

The plants under this class have eight stamens, and they are divided into four orders.

Order I. Monogynia.

Tropæolum *Majus,* Greater Indian Cress. *Gen. char.*—Cal. one leafed, with a spur; petals five, unequal; berries three, dry; leaves peltate, five-lobed. Native of Peru, introduced about the end of the 17th century, and now one of the most common, although not the least splendid ornaments of the flower-garden,

where it sometimes varies in colour, and with double flowers.

EPILOBIUM. *Gen. char.*—Cal. four-cleft; petals four; caps. oblong, inferior; seeds downy.

Ep. *Angustifolium*, Rosebay Willow-herb, or French Willow; with scattered linear lanceolate leaves, unequal flowers, and declining stamens. Native of Britain, and common in gardens and shrubberies.

Ep. *Hirsutum*, Great Hairy Willow-herb, or Codlins and Cream; with leaves half embracing, ovate, lanceolate: stem much branched. Common in moist and shady places, as in the ditches round Edinburgh.

Ep. *Tetragonum*, Square-stalked Willow-herb; with lanceolate toothed leaves, and square stem. On the sides of ditches, and in marshy places.

OENOTHERA. *Gen. char.*—Cal. four-cleft; petals four; caps. cylindrical, inferior; seeds naked.

Oen. *Pumila*, Dwarf Oenothera, or Tree Primrose; with lanceolate, obtuse, and smooth leaves; native of North America, and the smallest of this tribe of plants; is a hardy perennial, and continues to blossom through the summer.

Oen. *Longiflora*, Long-flowered Tree Primrose; with toothed leaves, simple hairy stem, and two-lobed petals. Native of Buenos Ayres, and rising to more than five feet in height; forms a fine ornament to an open border, where it flowers from July to October. *Bot. Mag.* 365.

Oen. *Biennis*, Biennial Tree Primrose; has been long an inhabitant of the garden, and possesses the remarkable peculiarity, as well as the preceding, and some

other species, of expanding its flowers only in the night, contrary to the ordinary habits of plants in general.

Fuchsia *Coccinea*, Scarlet Fuchsia. *Gen. char.* Cal. one-leafed, coloured, very large; petals four; berry inferior, four-celled, many seeded. *Spec. char.*—Leaves opposite, ovate, toothed. Native of Chili; and although now one of the most common ornaments of the green-house and parlour, still recommends itself by the beauty of its rich, pendulous blossoms; the calyx and stamens are of a fine scarlet; and the corolla, as if apprehensive that exposure to light would injure its deep purple colour, is folded up within the cup. This fine plant is of humble growth, as it has been hitherto treated in this country; but in its native soil it probably attains a considerable magnitude; and in the splendid conservatory of Sir Robert Liston at Millburn Tower, near Edinburgh, it has reached the height of more than eight feet, and exhibits the gayest profusion of flowers and shining black berries. The scarlet fuchsia, planted in a sheltered border, survives the winter; the stems decay, but shoot up vigorously in the spring, and are clothed with flowers during the summer.

Erica. *Gen. char.*—Cal. four-leaved; cor. four-cleft; stamens inserted in the receptacle; caps. superior, four-celled, many seeded.

Er. *Vulgaris*, Common Heath or Ling; with anthers included, bearded style protruded; cor. four-parted, shorter than the calyx, with leaves opposite. Very common in moorlands and woods.

Er. *Tetralix*, Cross-leaved Heath; with four ciliated

leaves in the whorl; flowers capitate. In moist moorlands.

Er. *Cinerea*, Fine-leaved Heath; with ternate leaves; also common in moorlands.

The three species now described are natives of every part of Britain.

Er. *Vagans*, Cornish Heath, is common in Cornwall; and *Er. Dabœcii*, Irish Heath, is a native of Ireland. But of this beautiful tribe of plants, nearly 300 species, chiefly natives of the Cape of Good Hope, and many of them pre-eminent for the elegance of their form, and the beauty of their flowers, are cultivated in this country.

Daphne. *Gen. char.*—Cal. four-cleft, having the appearance of a corolla inclosing the stamen; berry one-seeded.

Daph. *Mezereum*, Mezereon, or Spurge Olive; with sessile, ternate flowers on the stem; leaves lanceolate, deciduous. In woods in England, and common in gardens, where it is well known by the expansion of its fine red flowers before the leaves.

Daph. *Laghetto*, Lace-bark Tree; is a native of Jamaica, and grows to the height of 20 feet on rocky hills; but it is remarkable for the thickness of its bark, which is divisible into 20 or 30 thin layers as fine and white as gauze or lace, from which it has derived its name. Caps and ruffles, it is said, have been made of it; and a governor of Jamaica presented Charles II. with a cravat of the bark of this tree.

Order II. Digynia.

Moehringia *Muscosa*, Mountain Chickweed.—Cal.

four-leaved; four-petaled; caps. one-celled. Native of Germany, but not uncommon in gardens, where it sometimes has the common name of Moss-plant, from the leaves forming a close turf like some mosses.

Order III. Trigynia.

Paullinia *Curassavica,* Supple Jack. Cal. four-leaved; cor. four-petaled; caps. three-celled, one-seeded; leaves biternate; the foot-stalks margined, and branches unarmed. Common in the woods of Jamaica, and rises to a great height, with its slender, woody, and flexible stems on the neighbouring trees. Deprived of its bark, it is well known in this country by the use of the smaller twigs, as riding-switches, and the larger pieces as walking-sticks.

Coccoloba *Uvifera,* Sea-side Grape. Cal. five-parted; cor. none; berry cup-like, one-seeded; leaves round, smooth. Common on the sandy shores of Jamaica, grows to a considerable magnitude, and the berries, about the size of the common grape, are sometimes eaten. Another species, Coc. *Pubescens,* is also a native of Jamaica, is sometimes seen in the stove in this country, and is remarkable for its large downy leaves.

Polygonum. Cal. five-parted, coloured, in place of a corolla, persistent; seed one, superior, angular, covered with the calyx; the stamens and pistils varying in number.

Pol. *Amphibium,* Amphibious Persicaria; with flowers of five stamens and two pistils, spike ovate. Not un-

common in ditches and pools, where it may be readily distinguished by its floating leaves and elegant flower-spike.

Pol. *Persicaria*, Spotted Persicaria; flowers with six stamens, and ovate oblong spikes. Common in ditches and moist places.

Pol. *Bistorta*, Great Bistort, or Snake-weed; with a simple leafy stem, and ovate waved leaves. In meadows and pastures, and common in gardens.

Pol. *Aviculare*, Knot-Grass; with axillary flowers, elliptical lance-shaped leaves, rough on the margin, with herbaceous procumbent stem; in waste places, and by way-sides, very common. The number of stamens, eight, and pistils, three, is complete in this species.

Order IV. Tetragynia.

Paris *Quadrifolia*, Herb Paris, or True Love. Cal. four-leaved, petals four, narrower; berry superior, four-celled; anthers attached to the middle of the filaments. Perennial; flowers in May; grows in shady woods, but is a very rare plant. No habitat is specified in the Flora Britannica. I have met with it only in two places in Scotland, in the woods on the banks of the Cart, a little above Cathcart castle, near Glasgow, and in a shady wood on the banks of the same river, not far from the bridge on the road from Hawkhead, the seat of the Earl of Glasgow, to the old castle of Crookstone near Paisley.

Adoxa *Moschatellina*, Tuberous Moschatel. Cal. two or three-cleft; cor. four or five-cleft, superior; caps. four or five-celled. A small perennial plant; common in woods and shady hedges, and flowers early in spring.

CLASS IX.

ENNEANDRIA.

The plants of this class have nine stamens, and they are divided into three orders.

Order I. Monogynia.

Laurus. *Gen. char.*—Cal. none; cor. six petaled, in the form of a calyx; berry one seeded; glands of the nectary furnished with two bristles.

Under this genus are arranged many valuable plants, natives of different regions, among which are enumerated, the following;

Laur. *Nobilis,* or Bay Tree, with spear-shaped, nerved, stiff leaves; a native of Italy, and deservedly admired on account of its evergreen foliage and fine red berries.

Laur. *Cassia,* the Cassia Tree; a native of the East; of which both buds and bark, having the properties of cinnamon, are employed as a spice, and for medical purposes.

Laur. *Chloroxylon,* Green Heart, or Cogwood Tree of Jamaica, with three nerved ovate coriaceous leaves, a native of the mountainous parts of that island, and affording a strong durable wood, which is employed in machinery.

Laur. *Cinnamomum,* Cinnamon Tree; with ovate, oblong, three-nerved leaves. This precious tree, the bark of which yields the well-known and universally

esteemed spice, is a native of Ceylon, and rises to the height of twenty or thirty feet. The cinnamon is obtained from the inner bark of the tree, and the strongest and best kind is got from the small branches, which do not exceed an inch in diameter. The leaves and other parts of the tree yield the same delicate flavour as the bark, and may be employed for similar purposes.

In Ceylon the cinnamon trees are barked twice in the year; the first, or great harvest, continues from April to August, and the second, or small harvest, from November to January. Branches of three years old are lopped off; and the epidermis, or outer bark, being removed by scraping with a knife, the twigs are ripped up lengthways, and the bark is gradually loosened till it falls off. Smaller tubes or quills of peeled bark are inserted into those of larger diameter, which, as they dry, roll up closer together. They are afterwards tied up in bundles, and are ready for the market.

The Dutch long monopolized the trade of cinnamon. The first introduction of this plant into a British colony was in 1782, when some cinnamon trees were found in a collection of East India plants in a French ship from the Isle of France to St Domingo, which was captured by Admiral Rodney. The collection was carried to Jamaica, and one of the cinnamon trees was planted in Mr East's noble garden in Liguanea, and another in the botanic-garden at Bath. From them many hundreds of young trees, which now thrive in almost every part of the island, were produced; and it is gratifying to learn that they yield bark of the very finest quality.

Laur. *Camphora,* Camphor Tree; with lanceolate, ovate, triple-nerved leaves, the nerves extending to the point of the leaf. The camphor tree is a native of Japan, and grows to a large size, but is not a stranger to the green-house in this country.

Every part of the tree yields camphor.

Order II. Trigynia.

Rheum *Palmatum,* Rhubarb. Cal. none; cor. six-cleft; one triangular seed. This species, which has large palmated leaves, is a native of China, and yields the true rhubarb of the shops; although it is probable that the roots of more than one species are brought into commerce. The cultivation of this species has succeeded well in different parts of Britain; and the roots are considered by many to possess medical virtues equal to the imported rhubarb. Several other species of rhubarb are known; and of the stems of *rheum rhaponticum,* which sometimes is called English, and sometimes Scotch Rhubarb, an excellent tart is made.

Order III. Hexagynia.

Butomus *Umbellatus,* Flowering Rush. Cal. none; petals six; caps. six, superior; many seeded. This plant, which is the only species of the order and genus, is a fine ornament to the banks of rivers and pools in England, where it is a native.

CLASS X.

DECANDRIA.

With ten stamens, and divided into five orders.

Order I. Monogynia.

Sophora. *Gen. char.*—Cal. five-toothed, gibbous above; cor. papilionaceous, with wings the length of the vexillum.

Soph. *Tetraptera*, Wing-podded Sophora; with pinnated leaves, and pods furnished with four membranaceous wings. Native of New Zealand, where it was discovered by Sir Joseph Banks, and cultivated in green-houses in this country; in Chelsea gardens it has produced a magnificent profusion of pendulous yellow flowers, remarkable for the richness and brilliancy of their colouring.—*Bot. Mag.* 167.

Soph. *Monosperma*, Red Bead-tree; with leaves unequally pinnated, leaflets five-paired; pod one-seeded. Native of Jamaica and of the other West India islands; rises 10 feet high, and produces beautiful round scarlet seeds, marked with a black spot, which are brought to this country and employed for ornamental purposes.

Cæsalpinia. *Gen. char.*—Cal. with unequal segments; cor. with five petals, the lowest the largest.

Cæs. *Braziletto*, Brazil Wood; with leaves much divided, leaflets oval. Native of Jamaica and Brazil, produces a fine pyramidal spike of white flowers, beau-

tifully variegated with red; is a strong durable wood, susceptible of a good polish, and affords the famous Braziletto wood, extensively employed in dyeing.

HÆMATOXYLON *Campeachianum*, Logwood, or Campeachy-wood; stigma of the pistil notched at the summit, pod with boat-shaped valve. Native of the bay of Campeachy, from which the specific name is derived; it rises to the height of 16 or 20 feet, and is furnished with pinnated leaves, each having four pairs of small leaflets; has been introduced into Jamaica, where it grows luxuriantly, and is employed as a fence against cattle; but the wood of this tree is better known, as it is imported into Europe for the purpose of a dye-stuff.

SWIETENIA. *Gen. char.*—Nectary tubular, ten-toothed; caps. woody, five-valved; seeds imbricated, with a membranous border.

Swiet. *Mahagoni*, Mahogany Tree; with pinnated leaves, four paired, panicle axillary. Native of Jamaica, Cuba, and the Spanish Main; becomes a magnificent tree, and has been long celebrated as a commercial commodity, and for its extensive use in cabinet-work; it thrives well in almost every soil; but the wood of the closest texture, and most beautifully veined, is obtained from trees which grow on rocky ground.

RUTA *Graveolens*, Common Rue. Germen with ten honey-bearing points; caps. five cleft, five celled and many seeded, with supra-decompound leaves; leaflets wedge-shaped. Native of the south of Europe, but common in gardens; and once in great estimation on account of its medical virtues.

QUASSIA. *Gen. char.*—Cal. five leaved, petals five, nectary five leaved; caps. five, two-valved, one-seeded.

Quas. *Amara*, Bitter Quassia; flowers with both stamens and pistils, and leaves pinnated, with an odd leaflet. Native of Surinam, and, with its fine scarlet flowers, is a great ornament to the stove, where it blossoms freely. Three other species, *Simaruba*, *excelsa*, and *polygama*, are natives of Jamaica; and from the bark of the roots a very strong bitter, which has been employed in medicine, and as a substitute for hops, is obtained.

DIONAEA *Muscipula*, Venus' Fly-trap. Cal. five-leaved, petals five, caps. one-celled, and many-seeded. Native of marshy places in South Carolina. The leaves of this singular plant are all radical, and supported on long-winged, succulent, and strongly veined foot-stalks; the leaf itself is composed of two semi-oval lobes, jointed at the back, which permits them to fold together when touched. The sides of the lobes are furnished with a row of cartilaginous ciliæ, which lock into each other when the lobes close. Three very small spines, or bristles, rise in the middle of each lobe in some plants, but in others only two are observed. These spines are the only irritable points of the leaf.

ANDROMEDA. *Gen. char.*—Cal. five parted; cor. ovate, with mouth five cleft; caps. superior, five celled.

And. *Polifolia*, Marsh Andromeda, or Wild Rosemary; with aggregated terminal peduncles, and alternate, lanceolate, revolute leaves, glaucous on the lower surface; on peat-bogs in the north of England and south of Scotland.

RHODODENDRON. *Gen. char.*—Cal. five-parted; cor. funnel-shaped; stamens bent downwards; caps. five-celled.

Rhod. *Ponticum*, Purple Rhododendron; with shining lanceolate leaves, smooth on both surfaces, and terminal racemes. Native of Gibraltar, and of the south side of Mount Caucasus, but is familiar to the gardens of this country.

Rhod. *Maximum*, Laurel-leaved Rhododendron; with oblong leaves, smooth and discoloured underneath, with an acute reflected margin. Native of North America, where it grows to the height of sixteen feet, and has been introduced into the gardens of this country. *Bot. Mag.* 951.

KALMIA. *Gen. char.*—Cal. five-parted; cor. salver shaped, with the limb five-horned beneath; caps. five-celled.

Kal. *Latifolia*, Broad Leaved Kalmia; with ovate, elliptical, ternate, and scattered leaves. Native of North America, and now common in the garden.

Kal. *Glauca*, Glaucous Kalmia; with opposite oblong polished leaves, hoary underneath, revolute on the margin, and with terminal corymbs. Native of Newfoundland, but now not uncommon in the garden.

ARBUTUS. *Gen. char.*—Cal. five parted; cor. ovate, with the mouth five cleft, pellucid at the base; berry superior, five-celled.

Arb. *Unedo*, Strawberry tree; with arborescent stem, smooth, obtusely-serrated leaves; terminal panicle, and many-seeded berries, abundant about the lake of Killarney in Ireland.

Arb. *Alpina,* Blackberried Alpine Arbutus; with procumbent stems, and wrinkled, serrated leaves. Native of some of the higher mountains of the Highlands of Scotland, where it is distinguished by the reticulated veins of the leaves.

Arb. *Uva Ursi,* Red-berried trailing Arbutus; with procumbent stems and entire leaves. Common in the Highlands of Scotland, and near Hexham in Northumberland.

Order II. Digynia.

Hydrangea. *Gen. char.*—Cal. five cleft; cor. five petaled; caps. two-celled, two-beaked, inferior, opening between the styles.

Hyd. *Arborescens,* Shrubby Hydrangea; with a woody stem. A native of Virginia, and long an inhabitant of some gardens in England.

Hyd. *Hortensis,* Garden Hydrangea; with elliptical, serrated, very smooth leaves, and equal stamens. This magnificent plant, which, from being so common, ceases to be admired, is remarkable for the changes in the progress of flowering. The blossoms are at first green, then rose-coloured, and, last of all, green a second time; and the plant which has produced red flowers one year, shall send forth blue flowers the next, although treated in the same manner. It is a native of China and Japan, where it is also cultivated for the sake of its beauty, and was introduced from China to the gardens at Kew in 1790.

Saxifraga. *Gen. char.*—Cal. five-parted; cor.

five-petaled ; caps. two-beaked, one-celled, many seeded.

Sax. *Umbrosa,* London Pride, None-so-pretty ; with obovate leaves and naked paniculated stem. Native of some high mountains in Ireland and of some parts of England, and one of the most common plants in the flower-garden.

Sax. *Granulata,* White Saxifrage ; with kidney-formed, lobed leaves, paniculated stem, and granulated root. Frequent in meadows and pastures of a gravelly soil, and is not uncommon in the garden with double flowers.

Sax. *Hypnoides,* Mossy Saxifrage, or Lady's Cushion, with linear leaves, entire, or three-cleft; on mountainous places, as on Arthur's Seat, Edinburgh.

Sax. *Crassifolia,* Oval-leaved Saxifrage ; with oval, crenulated leaves, and naked stem. Native of the Alps of Siberia, but common in the garden, and easily distinguished by its large leaves, which are red on the under, and of a fine shining green on the upper surface, and by its tall stem supporting a large bunch of purple pendulous flowers, which appear early in spring.

Dianthus. *Gen. char.*—Cal. cylindrical, one leafed, scaly at the base ; petals five ; furnished with claws ; caps. cylindrical, superior, one-celled.

Dian. *Caryophyllus,* Clove Pink, or Carnation ;—with solitary flowers, scales of the calyx very short, and somewhat rhomboidal, petals notched, and without beard. Native of England, and found on ancient walls, as on Rochester and Deal castles ; and from this species numerous varieties have been obtained by culture.

Dian. *Deltoides*, Maiden Pink; with solitary flowers, scales of the calyx about two, ovate lanceolate acute leaves, slightly downy; in sandy and gravelly pastures, as on the north side of the King's Park at Edinburgh.

Order III. Trigynia.

Stellaria. *Gen. char.*—Cal. five-leaved, spreading; petals five, two-parted; caps. superior, one-celled, many seeded, six-toothed at the summit.

Stel. *Media*, Common Chickweed; with ovate leaves, and stems procumbent, with an alternate hairy lateral line; an annual; common every where; flowering throughout great part of the year. The number of stamens is observed to vary from ten to five.

Stel. *Holostea*, Greater Stitchwort; with serrulated lanceolate leaves, two-cleft petals, and cal. without nerves; in dry woods and among bushes.

Stel. *Graminea*, or Lesser Stitchwort; with linear, lanceolate, entire leaves, and three-nerved calyx nearly equal to the petals. In pastures and hedges in a dry soil.

Arenaria. *Gen. char.*—Cal. five-leaved spreading; petals five, entire; caps. superior, one-celled; many-seeded.

Ar. *Peploides*, Sea-chickweed, or Sandwort; with ovate, acute, fleshy leaves; cal. obtuse, and without nerves; perennial; flowers in June and July, and is frequent on sandy shores.

Ar. *Verna*, Vernal Sandwort; with bluntish awl-shaped leaves, obovate petals longer than the three-nerved calyx; perennial; continues in flower from May to August, and is a native of mountainous districts, as on Arthur's Seat, near Edinburgh, and about the mouths of lead-mines in Derbyshire.

Order IV. Pentagynia.

Sedum. *Gen. char.*—Cal. five-cleft; cor. five-petaled; five nectariferous scales at the base of the germen; capsules five, superior.

Sed. *Acre*, Biting Stone-crop, or Wall Pepper; with alternate, subovate, fleshy, gibbous leaves, and trifid leafy cymes; perennial; flowers in June, and is very common on walls, houses, and sandy places.

Sed. *Villosum*, Hairy Stone-crop; with alternate linear, somewhat plain, leaves; slightly hairy foot-stalks, and upright stem. Perennial; flowers in July, and is found in moist elevated pastures, as in the northern counties of England, and on the banks of the water of Leith, near its sources in the Pentland hills, in Scotland, where it traverses Mr Linning's lands of Colzium.

Oxalis *Acetosella*, Common Wood Sorrel. Cal. five-leaved; petals five, united by the claws; caps. superior, five-celled, opening at the angles; seeds enclosed in an elastic covering; stem one-flowered; leaves ternate, obcordate, hairy. Perennial; flowers in May, and is common in shady woods.

AGROSTEMMA *Githago*, Corn Cockle. *Gen. char.*—Cal. one-leafed, leathery; petals five, clawed, with obtuse undivided limb; caps. superior, one-celled, with five-toothed mouth. *Spec. char.* Calyx shaggy, longer than the corolla; petals entire, naked; annual; flowers in June and July; common among corn.

LYCHNIS. *Gen char.*—Cal. One-leafed, oblong; petals five, clawed; limb often divided; caps. superior, opening, five-toothed, from one to two-celled.

Lych. *Flos-cuculi*, Meadow Lychnis, or Ragged Robin; with four-cleft petals, and one-celled roundish capsule; perennial; flowers in June, and a very common plant in moist meadows.

Lych. *Viscaria*, Red German Catchfly; with undivided petals, and five-celled seed-vessel; perennial; flowers in June, and is found in the fisures of rocks, but is rather a rare plant, although abundant on the rocks of the King's Park at Edinburgh.

Lych. *Dioica*, Red or White Campion, as it varies in the colour of its flowers; with dicœcious flowers, and one-celled capsule; perennial; continues in flower through the summer, and is common in moist woods and hedges.

CERASTIUM. *Gen. char.*—Cal. five leaved; petals two-cleft; caps. superior, opening at the summit, mouth ten-toothed, one-celled.

Cer. *Vulgatum*, Broad-leaved Mouse-ear Chickweed; rough, viscid, with ovate leaves, petals equal to the calyx, and flowers longer than the peduncle; annual; flowers in May, and is common in pastures, waste places, and on walls.

Cer. *Latifolium,* Broad-leaved Rough Chickweed; with rough elliptical leaves, and terminal, simple, nearly solitary flower-stems; perennial; flowers in June, and is not uncommon on the mountains of Wales and Scotland, as on Benlomond.

Some species of Cerastium are deficient in the parts of fructification, as *Semidecandrum,* which has five stamens, and *Tetrandrum,* which has only four petals and four stamens.

Spergula. *Gen. char.*—Cal. five leaved; petals five, entire; caps. superior, ovate, one-celled, five-valved.

Sper. *Arvensis,* Corn-spurrey; with whorled leaves, flower-stems reflected; seeds kidney-shaped. Annual; flowers in July and August, and is a troublesome weed in poor exhausted soils.

Sper. *Nodosa,* Knotted Spurrey; with opposite, awl-shaped, smooth leaves; upper leaves fasciculated; calyx without nerve. Perennial; flowers in July and August, and is frequent in moist sandy places.

Order V. Decagynia.

Phytolacca, American Nightshade or Poke-weed; cal. five leaved, resembling a corolla; cor. none; berry ten celled.

The species of this genus are natives of America, Africa and India, and are conveniently distinguished by the variable number of stamens and pistils.

Phyt. *Decandra,* Redweed or Foxglove; with ten stamens and ten styles; a native of Jamaica, where it

is very common; it produces reddish berries, which were formerly employed to deepen the colour of red wines.

CLASS XI.

DODECANDRIA.

With stamens from twelve to twenty, and divided into six orders.

Order I. Monogynia.

Asarum *Europæum*, Asarabacca. Cal. three-cleft, sitting on the germen; cor. none; stamens twelve; caps. leathery, six-celled, crowned; stigma six-cleft; leaves kidney-formed, obtuse, in pairs. Perennial; flowers in May, and is a native of the woods of the north of England, but rare. The dried root in powder is employed to provoke sneezing and the flow of mucus in the nostrils.

Rhizophora *Mangle*, Mangrove. Cal. four-parted, inferior; cor. four-parted; seed one, club-shaped; a fleshy receptacle; leaves acute; native of Jamaica, and rises to the height of 30 or 40, and even 50 feet. The Mangrove-tree is generally found on the borders of the sea, in whose waters only it seems to thrive, and in such places as have a soft bottom. The larger branches throw out soft leafless shoots, which bend downward, and

in a short time reach the mud, where they strike root, and become supports to the parent tree.

LYTHRUM *Salicaria,* Purple Loose-strife. Cal. twelve-cleft; inferior petals six, inserted in the calyx; caps. two-celled, many seeded; leaves opposite, heart-shaped-lanceolate; flowers spiked, with twelve stamens. Perennial; flowers in July and August, and is a fine ornament to marshy places and banks of rivers, where it is most common.

HALESIA *Tetraptera,* Four-winged Snowdrop Tree. Cal. four-toothed, superior; cor. four-cleft; nut quadrangular, four-celled; seeds solitary; leaves ovate, pointed, with hairy veins on the lower surface; wings of the seed equal. Native of South Carolina; flowers in April and May, and from the beauty of its flowers might be a fine ornament to pleasure grounds in this country. *Bot. Mag.* 910.

ORDER II. DIGYNIA.

HELIOCARPUS *Americana,* Sun-seed. Cal. four-leaved; cor. four-petaled; caps. two-celled, one-seeded. Native of Vera Cruz, and remarkable for the fringed or radiated structure of its fruit.

AGRIMONIA *Eupatoria,* Common Agrimony. Cal. five-toothed, calyculated, or with a double calyx; petals five, inserted in the calyx; seeds two, in the bottom of the calyx; stem leaves pinnated, the odd leaflet with a foot-stalk; seed rough, with hooked bristles. Peren-

nial; flowers in June and July, and is common in woods and on the borders of fields.

Order III. Trigynia.

Reseda. *Gen. char.*—Cal. one-leaved, divided; cor. with petals much divided; caps. superior, opening at the summit, one-celled, many seeded.

Res. *Luteola,* Dyers' Weed, Yellow Weed, or Weld; with lanceolate, entire, plain leaves; cal. four-cleft. Annual; flowers in July, and is not uncommon in waste places and near walls; it is also cultivated on account of the yellow dye which it affords.

Res. *Lutea,* Wild Mignonette, or Base Rocket; with all the leaves three-cleft, the inferior pinnated; cal. six-cleft. Annual or perennial; flowers in July and August, and is not uncommon in dry soils.

Res. *Odorata,* Mignonette; with leaves entire and three-lobed, the calyx equal to the flower; native of Egypt, but a peculiar favourite of the garden and parlour, on account of the sweet fragrance of its flowers.

Euphorbia. *Gen. char.*—Cal. one-leaved, ventricose, inferior; nectaries four or five, attached to the calyx; caps. with a foot-stalk, three-celled.

Euph. *Peplus,* Petty Spurge; with trifid umbel, branches divided into two, leaves entire, obovate, foot-stalked; annual; flowers in July and August, and is very common in cultivated grounds.

Euph. *Exigua,* Dwarf Spurge; umbel trifid, branches divided, leaves linear; annual; flowers in July, and is common among corn.

Euph. *Helioscopia*, Sun Spurge, or Wartwort; umbel five-cleft, leaves serrated, wedge-shaped; annual; flowers in July and August, and is very common in cultivated places.

Order IV. Tetragynia.

To this order belong *Calligonum*, the species of which are natives of Russia and Siberia, and have been illustrated by L' Heritier, *Transact. Linn. Society, Vol.* I.; and *Aponogeton*, the species of which are aquatic plants, and natives of the Cape and of the East Indies. Two genera are arranged under the fifth order; but they are little known, or indistinctly discriminated.

Order VII. Dodecagynia.

Sempervivum. Cal. inferior, twelve-parted; petals twelve; caps. twelve, many seeded.

Semper. *Tectorum*, Common House-leek; leaves ciliated, with spreading shoots. Perennial; flowers in July, and frequent on houses and walls.

Semp. *Arachnoideum*, Cobweb House-leek; with leaves interwoven with hairs. Native of the Alps of Switzerland, but is not uncommon in gardens. The singular appearance of this plant arises from the woolly tops of the leaves; for as they expand, the woolly substance is extended, and exhibits somewhat of the structure of a cobweb.

CLASS XII.

ICOSANDRIA.

Twenty or more stamens in the calyx; three orders.

Order I. Monogynia.

Cactus. Cal. superior, one-leaved, imbricated; cor. many-cleft; berry one-celled, many seeded.

Cact. *Flagelliformis*, Creeping Cereus; with creeping angular shoots; native of the West Indies, but not an unfrequent inmate in the stove or green-house, where it cannot fail to be admired on account of the brilliancy of its flowers.

Numerous other species belong to this genus; they are all natives of warm climates; and on one of them, Cact. *Cochenillifer*, the precious Cochineal insect makes its abode.

Philadelphus *Coronarius*, Mock Orange. Cal. four or five-parted, superior; petals four or five; caps. four or five celled, many seeded; leaves somewhat toothed. Supposed to be a native of the south of Europe, but it is now one of the most common shrubs in the garden.

Myrtus. *Gen. char.*—Cal. superior, five-toothed; petals five; berry striated, seven-celled.

Myrt. *Tomentosa*, Woolly-leaved Myrtle; with one-flowered peduncles; leaves triply nerved, woolly on the under surface. A native of China, and is cultivated in

the stove in this country on account of the beauty of its foliage and flowers.

Myrt. *Communis*, The common myrtle a native of Italy, is rarely absent from collections of plants in the green-house or parlour.

Eucalyptus. Cal. superior, truncated, covered with a lid; no corolla; caps. four-celled, many seeded. Of this genus nearly 100 species have been discovered; most of them are trees, and some of them rival in height and magnitude the tallest vegetable productions. Eucalyptus *Globulus*, and another species peculiar to the southern extremity of Van Diemen's island, rear their lofty heads 150 feet, and are from ten to twelve feet in diameter. With one exception only, all the species of this genus are confined to New Holland.

Metrosideros *Citrina*, Harsh-leaved Metrosideros. Cal. five-toothed, including the germen; petals five, deciduous; stamens separate, many times longer than the petals; leaves linear, lanceolate, rigid. Native of Botany Bay, but not uncommon in the nurseries about London. The generic name is derived from the hardness of the wood. In the structure of its flowers it is nearly allied to the splendid genus *Melaleuca*; and for all its beauty, it is indebted to the brilliant scarlet colour of its long filaments. *Bot. Mag.* 260.

Psidium *Pyriferum*, Guava. Cal. superior, five-cleft; cor. five-petaled; berry one-celled, many-seeded; leaves elliptic, peduncles one-flowered. A common tree in the pastures of Jamaica, growing from eight to twelve feet high; the fruit is eaten raw or stewed with milk,

and it affords an excellent marmalade and a richly flavoured jelly.

Psid. *Montanum*, is also a native of Jamaica, and rises to the height of 60 or 70 feet, producing also an agreeable fruit and a valuable wood.

AMYGDALUS. *Gen. char.*—Cal. inferior, five-cleft; cor. five-petaled; drupe, a nut marked with pores.

This genus includes the Peach, Amyg. *Persica*, a native of Persia; the Almond-tree, Amyg. *Communis*, which by difference of culture affords bitter and sweet almonds, is a native of Barbary, but is cultivated in the south of Europe; and Dwarf Almond, Amyg. *Nana*, with leaves tapering at the base, a native of Russia and Tartary, and one of the most delicate ornaments of the shrubbery in early spring.

PRUNUS. *Gen. char.*—Cal. inferior, five-cleft; cor. five-petaled; drupe, with an entire kernel.

Prun. *Padus*, Bird Cherry; with flowers in pendulous racemes; not uncommon in woods and hedges in Britain, especially in the north of England.

Prun. *Spinosa*, Sloe Tree, or Black Thorn; with solitary peduncles, smooth lanceolate leaves, and spinous branches; common in hedges and among brushwood, and flowers early in the spring.

To this genus belong Bullace-tree, Prun. *Insititia*, with double peduncles, and branches ending in a spine; common in hedges and woods; the Cherry-tree, Prun. *Cerasus*, of which numerous varieties arise from culture; and the Plum-tree, Prun. *Domestica*, of which the varieties are not less numerous.

Order II. Pentagynia.

Mespilus. *Gen. char.*—Cal. five cleft, petals five, drupe inferior, from two to five seeded.

Mesp. *Oxyacantha,* Hawthorn, White-thorn, or May; spinous, with obtuse nearly three-cleft, smooth serrated leaves; flower with two pistils. This plant, of which varieties are produced by culture, is well known for its important application in making living hedges, for which it is admirably fitted by the stiffness of its branches, the sharpness of its thorns, and hardy nature.

Mesp. *Germanica,* the Common Medlar; is without spines, has downy leaves, and flowers with five styles; is not uncommon in gardens and shrubberies.

Pyrus. *Gen. char.*—Cal. five-cleft; petals five; pome or apple, inferior, from two to five celled, seeds two.

Pyr. *Communis,* Pear-Tree; with simple serrated leaves, and corymbose peduncles; in woods and hedges; but the cultivated varieties are almost endless.

Pyr. *Malus,* Crab-Tree, or Apple-Tree; with simple serrated leaves, and simple sessile umbels; native of woods and hedges, and the parent of all the cultivated varieties of the apple.

Pyr. *Aucuparia,* Mountain Ash, Quicken or Roan-Tree; with smooth pinnated leaves, leaflets serrated; common in woods and hedges, and deservedly admired for its white flowers in the early summer, and scarlet berries in the autumn.

MESEMBRYANTHEMUM. *Gen. char.*—Cal. five-cleft, petals numerous, linear; caps. fleshy, inferior, many seeded.

Mesem. *Dolabriforme,* Hatchet-leaved Fig Marygold; is a native of the Cape, and is easily distinguished by the form of the leaves, of which the specific name is descriptive.

Most of the species belonging to this genus are remarkable for the form or structure of their leaves, and many of them are peculiarly distinguished by the beauty and brilliancy of their flowers. Not fewer than fifty species, chiefly natives of the Cape, have been discovered, one of which, Mesem. *Crystallinum,* the ice-plant, is a well known annual.

SPIRÆA. *Gen. char.*—Cal. five-cleft; petals five; capsules superior, two valved, many seeded.

Spir. *Filipendula,* Common Dropwort; with leaves interruptedly pinnated, leaflets uniform, smooth, serrated; not uncommon in dry pastures, and cultivated in the garden, where it varies with double flowers.

Spir. *Ulmaria,* Meadow-Sweet, or Queen of the Meadow; with leaves interruptedly pinnated, woolly underneath; the odd leaflet large and lobed; very common in moist meadows, and on the banks of rivers.

ORDER III. POLYGYNIA.

ROSA. *Gen. char.*—Cal. pitcher shaped, five-cleft, fleshy, contracted at the neck; petals five; seeds numerous, attached to the inside of the calyx.

Ros. *Spinosissima,* Burnet Rose; with globular fruit, and smooth peduncles, stem covered with nume-

rous prickles; common on the borders of fields, and among brushwood in a sandy soil.

Ros. *Canina,* Common Dog Rose, Wild Brier, or Hep-Tree; with ovate fruit, smooth peduncles, and prickles on the stem hooked; very common in hedges and among brushwood.

Ros. *Rubiginosa,* Sweet Brier, or Eglantine; with ovate fruit, rough peduncles, and prickles on the stem hooked; in mountainous places, but well known in the garden for its charming fragrance.

Numerous other species of the rose have been described, and equally numerous varieties have been produced by culture. The Yellow Rose is a native of Germany; the Moss Rose is supposed by some to be a variety of the Provence, and by others of the Hundred-leaved Rose; and the China Rose, *Semperflorens,* which is seldom without flowers, is a fine ornament of the green-house and the parlour.

Rubus. *Gen. char.* — Cal. five-cleft; petals five; berry superior, composed of one-seeded acini.

Rub. *Idæus,* Raspberry; with leaves five pinnated and ternate, woolly underneath, foot-stalks channelled, stem prickly; common in woods, and cultivated in the garden.

Rub. *Fruticosus,* Common Bramble; with leaves about five together, woolly underneath, leaflets foot-stalked, prickles hooked, stem angular, and calyx reflected. One of the most common plants.

Rub. *Chamæmorus,* Mountain Bramble; with simple lobed leaves, one-flowered, unarmed stem, and segments of the calyx ovate; not uncommon on the

higher mountains of Scotland, Wales, and the north of England.

FRAGARIA. *Gen. char.*—Cal. ten-cleft, inferior; petals five; receptacle of the seeds ovate, berry deciduous, seed smooth.

Frag. *Vesca,* Wood Strawberry; with creeping runners; frequent in woods and hedges.

Frag. *Sterilis,* Barren Strawberry; with declining stem and loose flower bearing branches, with about two flowers; common in barren pastures.

POTENTILLA. *Gen. char.*—Cal. ten-cleft, inferior; petals five; seeds roundish, naked, often wrinkled, attached to a small dry receptacle.

Pot. *Anserina,* Silverweed, or Wild Tansey; with pinnated, serrated leaves, silky underneath; creeping stem, one-flowered peduncles; very common in moist meadows and by way-sides.

Pot. *Fruticosa,* Shrubby Cinquefoil; with pinnated leaves, and shrubby stem; said to be a native of Yorkshire; but is commonly cultivated in shrubberies.

GEUM. *Gen. char.*—Cal. ten-cleft, inferior; petals five; awn of the seeds bent.

Ge. *Urbanum,* Common Avens, or Herb Bennet; with ternate leaves, erect flowers, and naked, hooked awns; very common in woods and hedges.

Ge. *Rivale,* Water Avens; with radical leaves lyre-shaped, nodding flowers, and feathery, twisted awns; common in moist places, and on the banks of rivers.

CLASS XIII.

POLYANDRIA.

In this class the stamens amount to twenty or more, and they are inserted in the receptacle. It is divided into seven orders.

Order I. Monogynia.

Papaver. *Gen. char.*—Cal. two-leaved; petals four; stigma radiated; caps. superior.

Pap. *Argemone*, Long Rough-headed Poppy; with rough, club-shaped capsules, many flowered, leafy stem; annual; flowers in July, and is not uncommon in fields.

Pap. *Rhœas*, Red Poppy, or Corn Rose; with smooth, somewhat globular capsules; rough, many-flowered stem; leaves pinnatifid. Common among corn, and annual.

Pap. *Somniferum*, White Poppy; with calyx and caps. smooth, leaves glaucous, cut, embracing the stem; annual; and cultivated in the East for supplying the demands of commerce with the valuable drug opium, which is the inspissated milky juice of the capsules.

Cistus. *Gen. char.*—Cal. five-leaved, with the leaflets unequal; petals five; caps. superior, angular, three-valved, many seeded.

Cist. *Helianthemum*, Common Dwarf Cistus; shrubby, procumbent, with elliptic oblong leaves, hoary underneath; common in dry upland pastures.

Many species of this genus are cultivated in the garden, among which Cist. *Formosus* is remarkable for its specious flowers.

Sarracenia, *Flava*, Yellow Side-saddle Flower.—Cal. double, three and five leaved; cor. five-petalled; caps. five-celled; stigma in the form of a shield; leaves tubular, erect; valve contracted at the neck. Common in the swamps of North America. The tubular structure of the leaves of this plant has exercised the ingenuity of physiological botanists; but they have not succeeded in ascertaining its use. Other species are cultivated in this country. *Bot. Mag.* 780, and 849.

Nymphæa. *Gen. char.*—Cal. four or five leaved; cor. many-petalous; stigma radiated, sessile; berry superior, many celled.

Nymph. *Lutea*, Yellow Water-Lily; with cal. five-leaved, larger than the petals; stigma entire; leaves entire, heart-shaped. Not uncommon in rivers and lakes.

Nym. *Alba*, White Water-Lily; with four-leaved calyx, and lobed stigma. Frequent in rivers and lakes, where it is easily recognised by its large white flowers.

Nym. *Lotus*, Egyptian Water-Lily, or Lotus; with heart shaped, very smooth, toothed leaves. Native of Egypt and of the East Indies, and an object of veneration among the inhabitants of both countries.

Tilia *Europæa*, Lime or Linden Tree. Cal. five-parted; petals five; cap. superior, leathery, angular,

five-celled, five-valved, opening at the base. *Spec. char.* —Flowers destitute of nectary, leaves heart-shaped; branches of the veins downy. In woods and hedges.

Corchorus. *Gen. char.*—Cal. five-leaved, length of the corolla deciduous; caps. about five-celled.

Cor. *Siliquosus,* Podded Broom-weed; with linear compressed capsules, and lanceolate leaves. A native of Jamaica, where it grows to the height of three feet.

Cor. *Olitorius,* Common Jews Mallow; with oblong ventricose capsules; grows to the height of two feet, and is cultivated as a pot-herb at Aleppo. The Jews boil the leaves, and eat them with their meat.

Thea. Tea-tree. *Gen. char.*—Cal. five or six-leaved; petals six or nine; caps. three-celled; seeds solitary. Two species, Thea *Viridis* and Thea *Bohea,* are described as distinct by some botanists, while they are considered by others as only varieties. In the first, or the green tea, the stem is covered with a thin, ash-coloured bark; the leaves are oval, pointed, serrated, and of a deep green. In the bohea, the branches of the foot-stalks of the leaves and flowers are reddish, the leaves are larger, wrinkled, and of a pale bluish green.

Order II. Digynia.

Pæonia. *Gen. char.*—Cal. five leaved; petals five, regular; germens from two to five; no style; caps. many seeded.

The common pæony rose is a splendid ornament of the garden and shrubbery; and Pæonia *Tenuifolia,*

Fine-leaved Pæony, with doubly ternate leaves, and leaflets much divided, and naked, produces a specious flower—is a native of the Ukraine, and is found to be a hardy perennial in the gardens of this country.

Order III. Trigynia.

Delphinium. *Gen. char.*—Cal. none; petals five, the uppermost with a spur; nectary two-cleft, spur-shaped behind.

Del. *Consolida*, Field Lark-spur; with solitary capsule, one-leafed nectary, and subdivided stem. Native of some parts of England.

Del. *Ajacis*, Lark-spur; is one of the most common annuals in the flower-garden.

Aconitum, or Monk's Hood, of which there are many species, belongs also to this order.

Order IV. Tetragynia.

Under this order are arranged *Wintera Aromatica*, a tree which is a native of South America, and from which is obtained the winter's-bark of the shops.

Order V. Pentagynia.

Aquilegia *Vulgaris*, Common Columbine. *Gen. char.* Cal. none; petals five; nectaries five, horned, and arranged among the petals; caps. five, distinct. *Spec.*

char.—Nectaries bent inwards, scarcely equal to the petals; stem and leaves smooth. In mountainous pastures in England; but, with numerous varieties, cultivated in gardens.

Order VI. Hexagynia.

Stratiotes *Aloides*, Water Aloe, or Water Soldier. Spathe two-leaved; perianth superior; three-cleft: petals three; berry six-celled. *Spec. char.*—Leaves sword-shaped, triangular, prickly, serrated. In marshy places of Lincolnshire and Norfolk.

Order VII. Polygynia.

Anemone. *Gen. char.*—Cal. none; cor. six-petaled; seeds many.

An. *Nemorosa*, Wood Anemone; with one-flowered stem, furnished with a three-leaved involucrum, supported on a foot-stalk. Very common in woods.

An. *Pulsatilla*, Pasque flower; is also a native of England. An. *Hepatica*, is well known in gardens for its early double flowers; and the beautiful varieties of the Anemone, with double flowers, constitute some of the chief ornaments of the flower-garden.

Ranunculus. *Gen. char.*—Cal. five-leaved, petals from five to eight, with a honey pore within the claws; seeds naked.

Ran. *Flammula*, Lesser Spearwort; with ovate lanceolate leaves on foot-stalks; stems declining. Common in marshy places.

Ran. *Lingua,* Great Spearwort; with lanceolate pointed leaves, many flowered, erect stem. In marshy places, but less common.

Ran. *Ficaria,* Pilewort, or Lesser Celandine; with heart-shaped leaves on foot-stalks. Common in meadows and moist places, and one of the earliest flowers of the spring.

CLASS XIV.

DIDYNAMIA.

The plants of this class have four stamens, and the character depends on their unequal length; two of them are long and two short, by which they are distinguished from plants in the fourth class. The corolla is irregular in its form. This class is divided into two orders; the first, *Gymnospermia,* in which the seeds are naked; and the second, *Angiospermia,* in which the seeds are contained in a capsule.

Order I. Gymnospermia.

Ajuga *Reptans,* Common Bugle. *Gen. char.*— The upper lip of the corolla smallest, notched, stamens longer than the upper lip; plant smooth, with single stem, and creeping shoots. Common in woods and moist pastures.

Teucrium *Scorodonia*, Wood sage. Cor. with no upper-lip, but divided to the base; stamens protruded; leaves heart-shaped, serrated, on foot-stalks, with lateral racemes; the flowers on one side; erect stem. Common in woods and heaths.

Mentha. *Gen. char.*—Corolla nearly equal, four-cleft, with the broader segment notched; cal. five-cleft; stamens erect and distant.

Of this genus, twelve species, with numerous varieties under most of them, are described as native plants.

Men. *Viridis*, Spearmint; has interrupted spikes; leaves sessile, lanceolate, acute, naked; bracteas bristly, and teeth of the calyx somewhat rough.

Men. *Piperita*, Peppermint; has obtuse spikes, interrupted at the lower part; leaves subovate, smoothish, on foot-stalks; base of the calyx very smooth.

Both are natives, and grow in marshy and moist places, but are extensively cultivated for medical purposes.

Lamium. *Gen. char.*—Cal. five-cleft, with bristly spreading teeth; cor. upper-lip entire, arched, inferior, two-lobed, inflated, toothed on the margin on each side.

Lam. *Album*, White Dead-nettle; with heart-shaped, serrated, pointed leaves, on foot-stalks; flowers in whorls. Very common in waste places about towns.

Lam. *Purpureum*, Red Dead-nettle; with heart-shaped, obtuse leaves, on foot-stalks; upper leaves crowded together. Annual, and very common in waste places and cultivated grounds.

STACHYS. *Gen. char.*—Cal. five-cleft, bearded; cor. upper-lip arched, lower reflected at the sides; middle segment larger, notched; stamens towards the reflected sides, without anthers.

Sta. *Sylvatica*, Hedge Woundwort; with six-flowered whorls, and heart-shaped leaves on foot-stalks. Common in woods and hedges.

Sta. *Arvensis*, Corn Woundwort, or Hedge-nettle; with six-flowered whorls, weak stem, and leaves heart-shaped, blunt, crenated, somewhat hairy. Annual, and common in gardens and gravelly soils.

Sta. *Coccinea*, Scarlet Stachys; with six-flowered whorls and ovate, heart-shaped, crenated leaves, with dilated footstalks. Native of Chili, and seems hardy enough for the climate of this country. *Bot. Mag.* 18. 666.

Sta. *Lanata*, Woolly Stachys; cultivated in gardens, remarkable for its woolly leaves and stem, and much sought after by the domestic bee.

PRUNELLA. *Gen. char.*—Filaments two-forked at the summit, stigma two-cleft.

Prun. *Vulgaris*, Self-heal; with all the leaves ovate, oblong, and on footstalks. Perennial, and common in meadows and pastures.

Prun. *Grandiflora*, Great-flowered Self-heal; leaves ovate, oblong, slightly serrated, upper lip of the calyx deeply divided into three lobes. Native of the Alps; and, with its fine purple blossoms, is a hardy ornamental plant in the flower-garden. *Bot. Mag.* 10. 337.

Order II. Angiospermia.

Rhinanthus *Crista-Galli,* Yellow-rattle, or Horse-rattle. *Gen. char.*—Cal. inflated, four toothed; shield of the corolla compressed, caps. two-celled, obtuse, compressed; seeds imbricated. *Spec. char.*—Upper lip of the corolla arched; cal. smooth; leaves lanceolate, serrated. Annual, and very common in meadows and pastures.

Euphrasia *Officinalis,* Eye-bright. Cal. cylindrical, four toothed, equal; upper lip of corolla two-cleft, lower lip three-lobed, with two-cleft segments; anthers furnished with unequal spines. *Spec. char.*—Leaves ovate, minutely toothed. Very common in pastures and heathy grounds.

Antirrhinum. *Gen. char.*—Cal. five parted, base of the corolla prominent downwards, nectariferous; caps. two celled.

Ant. *Linaria,* Common Yellow-toad Flax; with lance shaped, linear, crowded leaves; stem erect, spiked; cal. smooth, shorter than the nectary. Common in hedges and the borders of fields.

Ant. *Majus,* Great Snapdragon. Cor. without spur; flowers in spikes; cal. obtuse, hairy. Perennial, and a common plant in the flower garden.

Digitalis *Purpurea,* Purple Foxglove. Cal. five-parted; cor. bell-shaped, five-cleft, inflated, caps. ovate, two-celled, many seeded. *Spec. char.*—Segments of the calyx ovate, acute; corolla obtuse; upper-lip en-

tire, leaves downy. Common in woods and hedges in a sandy or gravelly soil, and varies sometimes with white flowers.

Linnæa *Borealis*, Two-flowered Linnæa. Cal. double; cal. of the fruit two-leaved, of the flower five-parted, superior; cor. bell-shaped; berry dry, three-celled; is a native of the northern parts of Europe and America, and has been found in an old fir-wood in Aberdeenshire, in Scotland.

Bignonia. *Gen. char.*—Cal. five-cleft, cup-formed; throat of corolla bell-shaped, five-cleft, inflated beneath, pod two-celled; seeds with membranaceous wings.

Big. *Radicans*, Ash-leaved Trumpet-flower; with pinnated leaves, leaflets gashed, stem jointed, rooting. Native of North America, and successfully cultivated as an ornamental climber in the neighbourhood of London, mounting to the summit of the loftiest tree, and spreading over the highest wall; and displaying, in August and September, a vast profusion of magnificent flowers. A tree of this species has been long an inhabitant of Chelsea-garden. *Bot. Mag*, xiv. 385.

Big. *Longissima*, French Oak, or Trumpet-flower; with simple, oblong-pointed leaves; stem erect, and woolly seeds. Native of Jamaica, and an elegant tree, which rises to the height of 40 feet. Some other species of Bignonia are natives of Jamaica; and it ought to be observed, that the irregular corolla of Big. *Radicans* sometimes assumes a regular form, and five stamens of equal length appear, so that it more properly belongs to the fifth class.

CRESCENTIA. *Gen. char.*—Berry one-celled, with a hard, woody covering; cor. with tube; bell-shaped. germen, supported on a foot-stalk.

Cres. *Cujete*, Narrow-leaved Calabash, with wedge-shaped lanceolate leaves. Native of Jamaica; a tree which rises to the height of twenty feet, and is remarkable for the large size of its fruit, which is sometimes a foot in diameter; and the hard, woody shell is employed by the negroes as bottles, cups, spoons, and other kitchen utensils. Another species is a native of Jamaica; but the shell of the fruit is so thin that it cannot be applied to the same purposes.

MELIANTHUS. *Gen. char.*—Cal. five-leaved, with the inferior leaf gibbous; petals four, with the nectary beneath the lowest; caps. four-celled.

Two species of this genus have been described, *Major* and *Minor*, both of which are cultivated in this country, and are remarkable for the copious secretion of honey, which is so abundant in the former as to drop from the flowers.

CLASS XV.

TETRADYNAMIA.

In this class the character is derived from the unequal length of the stamens, four of which are long and two short, standing opposite to each other. The flowers are composed of four petals, arranged two and two opposite to each other, in the form of a cross, and hence are called *cruciform* flowers. This class is divided into two orders, characterised by the length of the pod.

Order I. Siliculosa.

The plants belonging to this order have a roundish pod or pouch, which is sometimes called silicle, or little pod.

Draba *Verna*, Common Whitlow Grass. Silicle entire, with plain valves parallel to the partition; stems naked; petals divided; leaves lanceolate, rough, slightly gashed. Annual, and one of the earliest flowers of the spring; is common on walls and dry pastures.

Thlaspi *Bursa-Pastoris*, Common Shepherds' Purse. Silicle notched, obcordate, with valves margined, keeled; an annual plant, flowering through the summer, and everywhere common.

Lunaria. *Gen. char.*—Silicle on a pedicle with flat valves; style protruded.

To this genus belongs a common plant in the garden, called Moonwort, Honesty, or Satin Flower, which last is derived from the silky appearance of the pod.

Under this order are comprehended *Crambe*, Sea-Cabbage, or Kale; *Lepidium*, one species of which, Lep. *Sativum*, is the well-known Garden Cress; *Cochlearia*, Scurvy Grass; and *Iberis*, Candytuft, remarkable for the inequality of its petals, and familiar in flower gardens.

Order II. Siliquosa.

This order is distinguished by the fruit being in the form of a long pod.

CARDAMINE *Pratensis*, Meadow Lady's Smock. Cuckow Flower; pod opening with a spring; valves bent backward, equal to the partition; stigma entire; cal. slightly gaping; a single gland on both sides between the shorter stamens and the calyx. *Spec. char.* Leaves pinnated; radical leaflets, roundish, toothed, those on the stem lanceolate. Perennial, and common in moist pastures, where it exhibits its fine purple or white flowers early in spring.

SISYMBRIUM.. *Gen. char.*—Pod opening with upright valves; cal. and cor. spreading.

Sis. *Nasturtium*, Water-Cress; with declining pods, pinnated leaves, leaflets heart-shaped, roundish. Common in rivulets and near springs, and well known as one of the earliest salads for the table.

Sis. *Monense*, Isle of Man Rocket, or Dwarf Sea Rocket; with erect pods; pinnatifid leaves, simple, naked, smooth stems. This plant is very remarkable for its habitat on the western parts of the kingdom.

ERYSIMUM. *Gen. char.*—Pod straight, exactly square; cal. shut; stigma capitate.

Er. *Officinale*, Common Hedge-Mustard; with pods closely pressed on the stem, leaves runcinated. Annual; flowers in June and July, and is very common in waste places and by way-sides.

Er. *Barbarea*, Yellow Rocket, or Bitter Winter Cress; with inferior leaves lyre-shaped, terminal lobe round, upper leaves obovate, toothed. Perennial; flowers during the summer months, and is common in waste places, by river sides, and hedges, and cultivated in the flower-garden with double flowers.

Er. *Alliaria,* Garlic Hedge-Mustard, or Jack-by-the-Hedge; with heart-shaped leaves. Biennial; flowers in May, and is common in hedges and shady places, where it is at once recognized by the garlic odour which any part of the bruised plant exhales.

Cheiranthus *Fruticulosus,* Wild Wallflower; germen with a small tooth on each side furnished with a gland; cal. closed; seeds plain; leaves lanceolate, acute, hoary on the lower surface; stem shrubby; branches angular. Common on old walls. From the wild variety the wallflower of the garden is different in some of its characters, arising probably from culture.

Brassica *Gen. char.*—Cal. upright, pod roundish, seeds globular.

To this genus belong Bras. *Napus,* Rape; Bras. *Rapa,* Turnip; and Bras. *Oleracea,* the Cabbage, with the numerous species and varieties which are cultivated in gardens.

Sinapis. *Gen. char.*—Cal. spreading; claws of the corolla upright; pod roundish, with a prominent partition.

Three native species belong to this genus; Sin. *Arvensis,* Wild Mustard, or Charlock, with angular pods, a troublesome weed among corn; Sin. *Alba,* White Mustard, with rough pods, which grows in fields and by way-sides, and is sown in the winter and spring as a salad; and Sin. *Nigra,* Common Mustard, with smooth square pods, closely pressed to the stem, which is cultivated on account of its seeds, from which is obtained the mustard of the table.

RAPHANUS. *Gen. char.*—Cal. closed; pod round, twisted, jointed.

Raph. *Raphanistrum,* Wild Radish, or Jointed Charlock; with jointed, smooth, one-celled pods. Not uncommon among corn.

Raph. *Sativus,* Cultivated Radish; is a familiar plant in the kitchen garden.

CLASS XVI.

MONADELPHIA.

The character of this class is derived from the stamens being united by their filaments into one tube; and the eight orders into which it is divided are distinguished by the number of stamens.

ORDER I. TRIANDRIA.

SISYRINCHIUM. *Gen. char.*—One pistil; two-leaved spathe; petals six, plain; caps. three-celled, inferior,

Sis. *Bermudiana,* Iris-leaved Sisyrinchium; with sword-shaped leaves: oblong, obcordate, veined, petals. Native of Bermudas; and cultivated in the green-house in this country.

Sis. *Gramineum,* Grass-leaved Sisyrinchium; with broad, double edged stem; germen smooth. Native of Virginia, and a hardy perennial in the flower garden.

FERRARIA. *Gen. char.*—One pistil; spathe three-leaved; no calyx; petals six, three outermost broader; caps. three-celled, inferior.

Fer. *Tigridia*, Mexican Ferraria, Tiger Flower; with folded leaves; corolla broad, pitcher-shaped, inner segments depressed, intersected. This plant, which is a native of Mexico and Peru, is conspicuous for the splendour and rich colouring of its flowers; but it is not less remarkable for its transient existence—all its beauties vanish in a few hours. *Bot. Mag.* xv. 532.

Fer. *Undulata*, Curled Ferraria; with many-flowered stem. A native of the Cape; and, though less splendid, yet it is equally singular and beautiful in its form and appearance, and not less fugacious in the duration of its flowers.

ORDER II. PENTANDRIA.

ERODIUM. *Gen. char.*—Cal. five-leaved; cor. five-petaled; nectary five scales; fruit five-seeded, beaked.

Er. *Cicutarium*, Hemlock Stork's Bill; with many flowered peduncles and pinnated leaves, leaflets sessile, pinnatifid, gashed; frequent in waste and sandy places.

Er. *Maritimum*, Sea Stork's Bill; with about three flowered peduncles; heart-shaped, gashed, crenated, rough leaves, depressed stems; not uncommon in sandy places on the sea-coast.

Er. *Incarnatum*, Flesh-coloured Crane's Bill; with few flowered peduncles; leaves three-parted, ternate, or trifid, rough; stem shrubby. Native of the Cape, and one of the most beautiful ornaments of the green-house.

Order III. Heptandria.

Pelargonium. *Gen. char.*—Cal. five-parted, upper segment terminating the inner capillary, nectariferous tube; cor. five-petaled, irregular; fruit five-seeded, beaked.

Pel. *Pinnatum,* Pinnated Crane's Bill; without stem; umbels somewhat compound; leaves pinnated. Native of the Cape, and one of the tenderer species.

Pel. *Bicolor,* Two-coloured Crane's Bill; with many flowered umbels, and leaves ternate, divided, lobed, and waved. This beautiful species is a fine ornament of the green-house.

Pel. *Peltatum,* Ivy-leaved Crane's Bill; with one-leaved calyx; leaves five-lobed, very entire, smooth; stem shrubby. Native of Africa.

Pel. *Incrassatum,* Fleshy-leaved Crane's Bill; nearly without stem, scape divided, rough; leaves lobed, pinnatifid, smooth. This species is tuberous-rooted, produces beautiful flowers, and is yet rare in this country.—*Bot. Mag.* xx. 761.

Order IV. Octandria.

Aitonia *Capensis,* Cape Aitonia. One style; cal. four-parted; cor. four-petaled; berry dry, quadrangular, one-celled; many seeded. Native of the Cape, and cultivated in the green-house in this country.

Order V. Decandria.

Geranium. *Gen. char.*—Cal. five-leaved; cor. five-petaled; five nectariferous glands; fruit five-seeded, beaked; beaks bent backwards, naked.

Ger. *Robertianum*, Herb Robert, or Stinking Crane's Bill; with two flowered peduncles; pinnatifid, five-angular leaves; cal. with ten angles; caps. wrinkled. Very common in waste-places, and in hedges.

Ger. *Dissectum*, Jagged-leaved Crane's Bill; with two-flowered peduncles; petals notched; leaves divided into five segments; caps. rough; seeds reticulated: Not uncommon in waste places and gravelly soils.

Ger. *Sanguineum*, Bloody Crane's Bill; with one-flowered foot-stalks, five-parted, three-cleft, round leaves; caps. bristly at the summit. Among brushwood in mountainous rocky situations; and, with its deep red specious flowers, rivals some of the exotic species.

Order VIII. Polyandria.

Malva. *Gen. char.*—Cal. double; exterior, about three-leaved; caps. numerous; one-seeded, arranged circularly.

Mal. *Sylvestris*, Common Mallow; with herbaceous, erect stem; seven-lobed, acute leaves; footstalks of leaves and flowers hairy. Common in waste places, by way-sides and hedges.

Mal. *Rotundifolia*, Dwarf Mallow; with leaves heart-shaped, round; five or seven lobed; common in waste places and by way-sides.

Mal. *Moschata,* Musk Mallow; with radical leaves kidney-shaped, gashed; stem-leaves five parted; leaflets much divided; calyx hairy. On the borders of fields, but less frequent.

LAVATERA. *Gen. char.*—Cal. double; exterior, three cleft; caps. numerous; one-seeded, arranged circularly.

Lav. *Arborea,* Sea-tree Mallow; with woody stem, leaves with seven angles, woolly, and folded. On rocky places near the sea, but rare; on the Bass island in the Frith of Forth, and on Portland island in the British channel. A biennial plant, grows to the height of six feet.

Lav. *Trimestris,* Annual Lavatera; with rough herbaceous stem, smooth leaves, and one-flowered foot-stalks; is the well known and shewy annual of the flower garden, where it frequently varies with white flowers.

HIBISCUS. *Gen. char.*—Calyx double; exterior, many-leaved; caps. five-celled, many-seeded.

Hib. *Syriacus,* better known by the name of *Althæa Frutex,* is a native Syria, and one of the finest autumnal ornaments of the flower garden.

Hib. *Elatus,* Mountain Mahoe; with heart-shaped, roundish, entire leaves; one-flowered, very short foot-stalks; calyx ten-toothed. Frequent in the woods of Jamaica, grows to a large tree, sometimes 60 feet high, and produces specious yellow flowers from the extremities of the branches, from which it has been called tulip tree. The wood is suitable for many valuable purposes, and the bark furnishes an excellent material for ropes. It varies sometimes with red flowers.

Hibisc. *Esculentus*, Eatable Hibiscus, or Ochra of the West Indies; with leaves five-parted, pedate; inner calyx bursting at the side. The capsules of this plant, which are very succulent, are an ingredient in the celebrated pepper-pot, or are eaten by themselves at table, and constitute a rich nourishing food.

Hibisc. *Subdariffa.* Indian Sorrel; with serrated leaves, upper seven-parted, lower ovate, undivided. Cultivated in Jamaica on accouut of the calyx and capsules, which have an agreeable acid taste, and are made into tarts, stewed with milk, or formed into syrup.

Camellia. With imbricated, many-leaved calyx, interior leaflets larger; of which Cam. *Japonica*, or Japan Rose, varying with red and white, single and double flowers, becomes a large tree in the groves and gardens of Japan, and is one of the most splendid inmates of the stove and conservatory in this country,—and *Alcea*, the Holly-Hock, with calyx double, the exterior six or nine-cleft, caps. numerous, one-seeded, the varieties of which, with single and double flowers, constitute the shewy ornament of the garden and shrubbery towards the close of summer.

CLASS XVII.

DIADELPHIA.

The character of this class is derived from the division of the stamens into two parcels. It contains four orders, which are istinguished by the number of their

stamens; and the flowers are almost universally papilionaceous.

Under the first order, Pentandria, a single genus, *Monnieria,* a South American plant, with gaping corolla, and alternate leaves, is placed.

Order I. Hexandria.

Fumaria. *Gen. char.*—Cal. two-leaved; cor. gaping; filaments two, membranaceous, each with three anthers.

Fum. *Officinalis,* Common Fumitory; with loose spikes, one-seeded, globular, notched pods, segments of the leaflets dilated; very common in fields and gardens.

Order III. Octandria.

Polygala. *Gen. char.*—Calyx five-leaved; two largest leaflets wing-shaped, coloured; pod heart-shaped, two celled.

Pol. *Vulgaris,* Milk Wort; with flowers crested and in racemes; and leaves linear, lanceolate. Common in warm dry pastures; and its beautiful flowers are blue, violet, and white. To the same genus belong some beautiful species from America and the Cape of Good Hope.

Order IV. Decandria.

In this order the stamens are usually divided into nine in one parcel, with a single one separate, and the genera are distributed into six sections, in the first of which the stamens are all united, as in the common broom; in the second the stigma is downy, as in *Pisum* or Pea, and *Vicia* or Vetch; in the third the pod is nearly two-celled, as in *Astragalus* or Milk-vetch; in the fourth the pod has scarcely more than one seed, as in *Trifolium* or Trefoil; in the fifth the pod is nearly jointed, as in *Hedysarum;* and in the sixth the pod is one-celled and many-seeded.

Spartium *Scoparium,* Common Broom; stigma longitudinal, villous above; filaments united, adhering to the germen; cal. produced downwards; leaves ternate and solitary; branches angular and unarmed. Frequent in dry pastures.

Ulex *Europæus,* Common Furze or Whin; cal. two leaved; pod scarcely longer than the calyx; all the stamens united. *Spec. char.*—Teeth of the cal. obtuse; bracteas ovate, loose; branches erect. In barren and heathy soils frequent.

Hedysarum *Gen. char.*—Pod with one-seeded joints; keel of the cor. transversely obtuse.

Hed. *Onobrychis,* Saint Foin; with pinnated leaves; pods one-seeded; hairy wings of the corolla of the length of the calyx. On hills and chalky pastures in England, and frequently cultivated as food for domestic animals.

Hed. *Gyrans,* Moving Plant; with ternate leaves. A native of the interior parts of Bengal, and remarkable for the constant motion or alternate meeting and receding of the two small appendages or leaflets on each side of the foot-stalks. This singular motion is continued through the whole day in its native soil; but it is only in the middle of the day that it exerts this power in the stove in this country.

To this order belong *Lupinus,* Lupine, with the anthers alternately round and oblong, and legume or pod leathery; *Pisum,* in which the style is keeled and woolly above; and of which *Pisum Sativum,* the Garden Pea, furnishes a good example;

Phaseolus, the Kidney Bean; with the keel and style spiral;

Lathyrus; with style plain and woolly above, and upper segments of the calyx one half shorter, of which Lath. *Odoratus,* Sweet Pea, or Painted Lady Pea, is one of the most shewy and common annuals in the flower-garden;

Vicia; of which the garden bean, *Vicia Faba,* is a species; with the style bearded under the stigma;

Trifolium, or Trefoil, in which the pod is one or two seeded, and scarcely longer than the calyx, and the flowers grow in heads;

Indigofera, in which the keel has a tooth on each side, and different species of which are cultivated in the

East and West Indies for the purpose of extracting the indigo of commerce; and

Cytisus, with two-lobed calyx, and pod on a foot-stalk, of which *Cyt. Laburnum*, Common Laburnum, is a well known ornament of the shrubbery.

CLASS XVIII.

POLYADELPHIA.

In this class the stamens are united by their filaments into more than two parcels; and the three orders into which it is divided are distinguished by the number or insertion of the stamens.

Order I. Dodecandria.

Theobroma *Cacao*, Chocolate Nut Tree. Cal. three-leaved; cor. five-petaled; nectaries five; the number of stamens not distinctly ascertained. The chocolate-tree grows to the height of 12 or 16 feet; "it is carefully cultivated," says Dr Wright, "in all the French and Spanish islands in the warmer parts of America. This was formerly the case also in Jamaica; but at present we have only a few straggling trees left as monuments of our indolence. This tree delights in shady places and deep vallies. The leaves are oblong, large, and pointed; the flowers, which are small and pale red, spring from the trunk and large branches; and the pods are oval and pointed. The seeds or nuts

are numerous and curiously enclosed in a white pithy substance. The cacao-nuts, being gently parched in an iron-pot over the fire, the external covering easily separates; the kernel is levigated on a smooth stone, a little annotto is added, and with a few drops of water is reduced to a mass, and formed into rolls of one lb. weight each. This simple preparation is the most natural and the best." But it ought to be added, that the chocolate of the shops is composed of various other ingredients, and perhaps, in some cases, contains but a small proportion of the real powder of the cacao-nut.

MONSONIA *Speciosa*, Large-flowered Monsonia; with five-leaved calyx; cor. five-petaled; stamens 15, united in five divisions; style five-cleft; caps. five-seeded; leaves in fives, and leaflets twice-pinnated. This splendid species is a native of the Cape, and may be treated as a hardy green-house plant.

CITRUS. *Gen. char.*—Cal. five-toothed; cor. five-petaled; stamens twenty, united into a cylinder; pistil one; berry celled, with a vesicular pulp.

This genus was placed under the following order Isocandria; but as the filaments are not inserted into the calyx, it belongs more properly, as Dr Smith remarks, to this order.

To this genus belong Cit. *Medica*, the Citron, the rind of which, and the young fruit, are prepared as a sweet-meat; Cit. *Aurantium*, the Orange, of which two varieties, the China and Seville, or the *sweet* and the *bitter*, are well known; Cit. *Decumana*, the Shaddock, which produces a fruit equal in size to a man's head, and eaten, like olives, to give a zest to wine; and of

which the forbidden fruit, as it is called in Jamaica, is supposed to be a variety. To these may be added lime and lemon trees, accounted by some as varieties, but, from the diversity of their appearance and fruit, might be properly regarded as different species.

Order II. Icosandria.

In this order the stamens are numerous, and their filaments are inserted into the calyx.

Melaleuca. *Gen. char.*—Cal. five-parted, superior; cor. five-petaled; caps. half covered with a berried calyx. Of this splendid tribe of plants, which are remarkable for the length and rich colours of the filaments, several species are successfully cultivated in the conservatories of this country; they are chiefly natives of New Holland.

Mel. *Leucadendron*, the Cajeput-Tree; the dried leaves of which afford, by distillation, an essential oil used in medicine, is a native of mountainous places in Amboyna.

Order III. Polyandria.

In this order the stamens are unconnected with the calyx.

Hypericum. *Gen. char.*—Cal. five-parted, inferior; petals five; filaments in three or five divisions, united at the base; caps. many seeded.

Hyp. *Androsæmum,* Tutsan or Park Leaves; with flowers having three pistils; berried capsules, and double-edged shrubby stem; not uncommon in woods, and with its large yellow flowers is a conspicuous ornament in the garden.

Hyp. *Quadrangulum,* Square St John's Wort; is frequent on the banks of rivers and moist meadows, where it is easily distinguished by its specific character; and Hyp. *Perforatum,* Perforated St John's Wort, is common in hedges and woods, and is distinguished by its double-edged stem and obtuse leaves, marked with pellucid spots.

CLASS XIX.

SYNGENESIA.

In this class the anthers are united into a tube, and the flowers are compound; that is, each flower consists of a number of small flowers called florets. The structure of the florets varies in different plants; sometimes each floret is furnished with perfect stamens and pistil, and brings its seed to maturity; sometimes the florets of the disk are perfect or united, while those of the margin have pistils only, but they all produce perfect seed; sometimes the florets of the disk are perfect or united, but those of the margin have neither pistils nor stamens; in other cases the florets of the disk have stamens only, and those of the margin have pistils only; and in others, several flowers, either simple or com-

pound, but with united tubular anthers, and with a partial calyx, are all included in one general calyx. These differences are the foundation of the five orders of this class.

Order I. Polygamia Æqualis.

The character of this order is derived from each floret having perfect stamens and pistil, and producing ripe seed. Some other differences in the structure of the florets give rise to the distribution of the genera of this order into three sections. Under the first section are included those which have the florets all ligulate or strap-shaped, and which are denominated by Tournefort, semiflosculous; their flowers are generally yellow, sometimes blue, and rarely reddish; they expand in a morning, and close towards noon, or in cloudy weather; and their herbage, when bruised, affords a bitter milky fluid. Of this section common dandelion, goats'-beard, and hawk-weed, are good examples. In the second section the flowers are globose, or grow in heads, and the florets are all tubular, five-cleft, and spreading, as in *Carduus*, Thistle, and *Arctium*, Burdock. In the third section the flowers are discoid; the florets are all tubular and regular, forming a flat or conical surface, as in *Bidens*, Bur Marygold, and *Santolina*, Sea-cotton Weed.

Leontodon. *Gen. char.*—Receptacle naked; cal. imbricated, down simple, on foot-stalks.

Leon. *Taraxacum*, Common Dandelion; with the exterior scales of the calyx reflected; leaves runcinat-

ed, toothed, smooth; very common in meadows, pastures, and waste places.

Leon. *Palustre*, Marsh Dandelion; with leaves sinuated, and sometimes slightly downy; in moist meadows and marshy places.

HIERACIUM. *Gen. char.*—Recept. naked, dotted; cal. imbricate, ovate; down simple, sessile.

Hier. *Pilosella*, Mouse-ear Hawk-weed; with elliptical entire leaves, woolly underneath, creeping runners, and one-flowered naked stem; very common in dry pastures.

Hier. *Subaudum*, Shrubby Broad-leaved Hawkweed; with many-flowered erect stem, and ovate lanceolate leaves. In woods and rough stoney places.

ARCTIUM *Lappa*, Burdock. Cal. globular, scales bent inwards, and hooked at the summit; leaves heart-shaped, unarmed, and on foot-stalks. Very common by way-sides and in waste places.

CARDUUS. *Gen. char.*—Cal. inflated, imbricated, with spinous scales; recept. hairy, down falling off.

Car. *Lanceolatus*, Spear Thistle; with decurrent, pinnatifid, rough leaves, segments divaricate, or alternately pointing in different directions. Common in waste places and by way-sides.

Car. *Arvensis*, Creeping Thistle; with sessile, pinnatifid, spinous leaves, stem paniculated; cal. ovate, furnished with spines, down feathery. Very common in fields and by way-sides.

Car. *Marianus*, Milk Thistle; with leaves embracing the stem, spinous, radical leaves pinnatifid; scales

of the calyx leafy, prickly on the margin. In waste places, where it is easily known by its fine green leaves, beautifully marked with white veins.

EUPATORIUM *Cannabinum*, Hemp Agrimony; recept. naked, down rough; cal. imbricated oblong; style half two-cleft, protruded; leaves digitate. In wet places on the banks of rivers.

ORDER II. POLYGAMIA SUPERFLUA.

The genera belonging to this order are divided into three sections; discoid, or without strap-shaped florets; florets half tubular, and nearly two-lipped; and radiate flowers. To the first section belong *Tanacetum*, Tansey; *Artemisia*, Wormwood; and *Gnaphalium*, Cudweed: to the second, *Perdicium*, a rare foreign genus, which is the only example; and the following having radiant flowers, or the marginal floret strap-shaped, come under the third section.

BELLIS *Perennis*, Common Daisy; recept. naked, conical; no down; cal. hemispherical, with equal scales; seeds obovate; flower stem naked; root creeping. Very common in meadows and pastures.

CHRYSANTHEMUM. *Gen. char.*—Recept. naked, no down; cal. hemispherical, imbricated, with scales dilated at the margin, and membranaceous.

Chrys. *Leucanthemum*, Great White Ox-eye; with leaves embracing the stem, oblong, obtuse, gashed, pinnatifid at the base; radical leaves obovate, and on foot-stalks. Common in fields and pastures, and is easily distinguished by its specious white flowers.

Chrys. *Segetum,* Yellow Ox-eye, or Corn Marygold; with stem-embracing leaves, divided into segments above, toothed at the base; common among corn, especially in a sandy soil.

Chrys. *Indicum,* Indian Ox-eye Daisy; with simple ovate, sinuated, angular, serrated leaves. This beautiful species, which is much cultivated in China and Japan, is highly ornamental to the green-house and parlour in the winter season, when it shews its fine double, tubular, or quilled flowers, and is not less admired for the fragrance of its leaves.

Chrys. *Tricolor,* Three-coloured Ox-eye Daisy;—with double pinnatifid leaves; leaflets linear, distant, bent backward; stem branching, erect. Supposed to be a native of Barbary, and introduced into Britain in 1798, and is an annual of easy culture.

To this order belong *Solidago,* Golden-rod; *Senecio,* Groundsel; *Tussilago,* Colt's-foot; *Aster,* Starwort; *Anthemis,* Camomile; and *Achillea,* Sneezewort; different species of which are indigenous, and most of them common.

Order III. Polygamia Frustranea.

In this order the florets of the disk are perfect or united, and those of the margin have neither pistils nor stamens.

Centaurea. *Gen char.*—Recept. bristly, down simple; rays funnel-shaped, longer than those of the disk, and irregular.

Cent. *Nigra,* Black or Lesser Knapweed; with the scales of the calyx ovate, and with erect capillary cilia;

lower leaves lyre-shaped, angular; upper leaves ovate. Common in pastures and by way-sides.

Cent. *Cyanus*, Corn Blue-bottle; with the scales of the calyx serrated; leaves linear, entire; lower leaves toothed. Common among corn.

RUDBECKIA. *Gen. char.*—Recept. chaffy, conical; down with a four-toothed margin; cal. with a double series of scales.

Rud. *Purpurea*, Purple Rudbeckia; with lanceolate-ovate leaves, alternate, undivided, and petals of the ray two-cleft. Native of Carolina and Virginia, but cultivated in the open ground in this country.

HELIANTHUS. *Gen. char.*—Recept. chaffy; down awned; cal. ragged.

Hel. *Multiflorus*, Many-flowered Sun-flower; with inferior leaves heart-shaped, three-nerved; upper leaves ovate. Native of North America, and a hardy perennial in the gardens of this country.

Hel. *Annuus*, Common Sun-flower; is a well known and shewy annual in every garden; and Hel. *Tuberosus*, Jerusalem Artichoke, is sometimes cultivated for the sake of its tuberous roots, which are eaten like potatoes.

ORDER IV. POLYGAMIA NECESSARIA.

In this order the florets of the disk have only stamens, and those of the margin have pistils only.

CALENDULA *Officinalis*, Garden Marygold, in which

the receptacle is naked, there is no down, and the seeds are membranaceous, is an example of this order.

Order V. Polygamia Segregata.

In this order, several flowers, either simple or compound, but with united tubular anthers and a partial calyx, are included in a general calyx.

Echinops *Ritro*, Small Globe Thistle; perianth one-flowered; recept. bristly; down obsolete; head globular; leaves pinnatifid, smooth on the upper surface. Native of Siberia and Southern Europe, but has been long cultivated in the gardens of Britain.

CLASS XX.

GYNANDRIA.

In this class the stamens are inserted either upon the style or germen. Linnæus divided the class into nine orders, the character of which is taken from the number of stamens; but succeeding botanists have abolished some of these orders, and some have abolished the whole class, and referred the plants included under it to other classes. Without going over the whole of the orders, a few examples will be sufficient to illustrate the class.

Order I. Diandria.

Orchis. *Gen. char.*—Nectary horn-shaped, placed behind the flower.

Or. *Bifolia*, Butterfly Orchis; with undivided bulbs; lip of the nectary lanceolate, entire; horn very long, and lateral petals spreading. In woods and moist places, with a clay soil.

Or. *Maculata*, Spotted Orchis; with palmated, divaricate roots; horn of the nectary shorter than the germen; lip three-lobed, plain; petals spreading. Common in moist meadows and pastures.

Ophrys. *Gen. char.*—Nectary slightly keel-shaped underneath, deflected.

Oph. *Ovata*, Common Twayblade; with fibrous roots two-leaved stem; leaves elliptical; lip of the nectary linear, two-cleft. In woods, meadows, and pastures.

Oph. *Corallorhiza*, Coral-rooted Ophrys; with branching, winding, divaricate roots; stem sheathed, without leaves; lip of the nectary undivided. A rare plant, observed by Lightfoot in Ross-shire, and lately discovered near Ravelrig, five miles from Edinburgh.

Cypripedium. *Gen. char.*—Nectary two-lipped, lower lip ventricose, inflated, hollow.

Cyp. *Calceolus*, Ladies Slipper; with fibrous roots; leafy stem; petals four, lanceolate, pointed; upper lip elliptical, channelled. In woody places in the north of England, but rare.

Cyp. *Parviflorum*, Yellow Ladies Slipper; with

lateral petals, linear, twisted, and longer than the nectary, which is without veins. Native of North America.

LIMODORUM. *Gen. char.*—Nectary one-leaved concave, raised on a foot-stalk within the lowest petal.

Lim. *Tuberosum*, Tuberous-rooted Limodorum; with bearded, thin, spiked flowers. Native of marshy places in South Carolina; was accidentally introduced into England in 1788, along with bog-earth brought over with some plants of Venus fly-trap. The roots of limodorum were discovered by Mr James Smith, a zealous and excellent botanist, at that time gardener to Mr Curtis, now nurseryman at Monkwood in Ayrshire.

Lim. *Altum*, Tall Limodorum, or Jamaica Saloup; with beardless flowers, and spike in the form of a panicle. Native of Jamaica, where it grows in the cooler parts of the mountains. Two other species are natives of the same island.

EPIDENDRUM. *Gen. char.*—Nectary waved, oblique, reflected.

Epi. *Sinense*, Chinese Epidendrum; with sword-shaped, striated, radical leaves; petals nearly equal; nectary bent-back, spotted; and bractea a little shorter than the germen. Native of China, and cultivated in the stove in this country.

Epi. *Vanilla*, Vanilla; leaves ovate, oblong, nerved, sessile; tendrils spiral. Native of Jamaica, and cultivated on account of the seeds, which have an agreeable aromatic odour, and are employed to give a flavour to chocolate; and as a perfume to snuff and other substances. Many other species of the same genus are natives of Jamaica.

Order III. Tetrandria.

Nepenthes *Distillatoria;* one pistil; cal. four-parted; no corolla; caps. four-celled. This singular plant, a native of Ceylon, is remarkable for the peculiar structure of its leaves, each of which terminates in a kind of close shut tube, like a tankard, and is furnished with a lid or covering, which contains water, supposed to be secreted through the foot-stalk. Small worms and insects are found dead in the tube, and a little animal like a shrimp, which is met with alive, is supposed to feed on them.

Order IV. Pentandria.

Passiflora. *Gen. char.*—Three pistils; cal. five-parted; cor. five-petaled; nectary in the form of a crown; berry on a foot-stalk.

Pass. *Cærulea,* Common Passion-flower; with entire, palmated leaves. Native of the Brazils, and cultivated in the green-house in this country.

Pass. *Alata,* Winged Passion-flower; with undivided entire leaves; membranaceous square stem. Native of the West Indies, and cultivated in the stove on account of the beauty of its flowers.

Pass. *Serratifolia,* Notch-leaved Passion-flower;—with undivided, ovate, serrated leaves. Native of Surinam, and has been admitted into the stove, for the sake of the beauty and fragrance of its flowers.

CLASS XXI.

MONOECIA.

In this class the stamens and pistils are in separate flowers, but both grow on the same plant. The characters of the orders are taken from the number of stamens, the connection of the filaments, or of the anthers, and their insertion on the style or germen. In describing the genera belonging to this class, as there are two sets of flowers, the one bearing stamens and the other pistils, separate descriptions are necessary. The first, or the flowers with stamens, are denoted by (1.) and the flowers with pistils by (2.)

MONANDRIA.

ZANICHELLIA. (1) Cal. none, cor. none. (2) Cal. one-leafed, cor. none, pistils four, seeds four.

Zan. *Palustris*, Horned Pond-weed; with square-celled anther, and stigmas very entire. Native of Britain, and found in ditches and pools.

ARTOCARPUS, Bread-fruit Tree. (1) Cal. two-valved, cor. none. (2) Cal. none, cor. none, one style; drupe many-celled.

Art. *Incisa*, notch-leaved; with gashed leaves; is the celebrated Bread-fruit tree; a native of Otaheite and other South-sea islands, which was introduced into

Jamaica in the year 1793. Three hundred trees were brought from Otaheite by captain Bligh in the ship Providence, and distributed to different places, from which they have spread to every part of the island.

When the fruit of this tree is used as bread, it is collected before it is quite ripe, roasted in an oven, and the rind being scraped off, the inside, which is soft and white, is eaten, and is found to be a nutritious substance.

The bread-fruit-tree was alluded to by Dampier, lord Anson, captain Cook, and other voyagers, as a production of the Ladrone and Philippine islands, and of Otaheite and some of the neighbouring islands; and from the opinion that was formed of its valuable qualities, the Bounty, commanded by captain Bligh, was dispatched by the British government in 1787 to collect plants to be transported to the colonies in the West Indies. A mutiny of the crew, who seized the ship, and carried it back to Otaheite, frustrated for a time this beneficial scheme; and it was not till 1793, as already alluded to, that the plan was successfully accomplished.

Several varieties of the bread-fruit-tree are known in its native soil; and another species, with entire leaves, was also introduced at the same time with the first into Jamaica, and is now very generally cultivated in that island.

Diandria.

Lemna. *Gen. char.*—(1) Cal. one-leafed, cor. none. (2) Cal. one-leafed, cor. none; style one; caps. many-seeded.

Lem. *Trisulca,* Ivy-leaved Duckweed; with lanceolate proliferous leaves on footstalks. In ditches and pools.

Lem. *Minor,* Lesser Duckweed; with sessile leaves, plain on both sides, and solitary roots. Very common in ditches and pools.

Triandria.

Sparganium, *Gen. char.*—(1) Cal. three-leaved, cor. none. (2) Cal. three-leaved; drupe dry, one seeded.

Spar. *Ramosum,* Branched Bur-reed; with leaves three-cornered at the base, concave at the sides; common peduncle branched; stigma linear. Frequent in lakes and on the banks of rivers.

Spar. *Simplex,* Unbranched Upright Bur-reed; with leaves triangular at the base, plain at the sides, and the common peduncle simple. In lakes.

Carex. (1) An imbricated catkin, cal. one-valved glume; cor, none. (2) Imbricated catkin; cal. one-valved glume; cor. none; stigmas two or three; seed inclosed in an inflated coat.

Car. *Ovalis,* Oval-spiked Carex; with about six oval spikes, alternately approaching; glumes lance-shaped, equal to the seed-coat. In marshes and moist meadows.

Car. *Remota,* Remote Carex; with single, distant, nearly sessile spikes; bracteas very long, exceeding the stem; seed coat nearly entire. In moist woods and wet shady ditches.

Car. *Arenaria,* Sea-Carex; with the spikelets crowd-

ed; bracteas scaly; stem triangular; leaves plain. Abundant in sandy places near the shore.

Car. *Sylvatica,* Pendulous Wood-Carex; with sheaths one-half shorter than the peduncle; spikes thread-shaped, loose, nodding; fruit ovate, triangular, beaked. Frequent in woods; rises to the height of two or three feet, and is furnished with an upright, leafy, smooth, triangular stem.

Car. *Flava,* Yellow Carex; with shortened sheaths nearly equal to the peduncle; spikes producing pistils, roundish; fruit beaked, deflected, stem smooth; frequent in marshy places.

Car. *Præcox,* Vernal Carex; with shortened sheaths nearly equal to the peduncle; spikes ovate, approaching; glumes slightly dagger-shaped; fruit roundish, woolly. Common on heaths and dry pastures.

Car. *Pilulifera,* Round-headed Carex; without sheaths; spikes with pistils, sessile, crowded, roundish; glumes slightly dagger-shaped; fruit roundish, hairy. Frequent in pastures and heaths.

Typha. *Gen. char.*—(1) Catkin cylindrical; anthers about three on a common filament. (2) Catkin cylindrical; seed one, with a downy footstalk.

Typha *Latifolia,* Great Cat's-tail, or Reed-mace; with the leaves nearly sword-shaped, and spikes producing anthers and pistils, approaching each other. Not uncommon in lakes and ditches.

Typha *Angustifolia,* Lesser Cat's-tail, or Reed-mace; with leaves semi-cylindrical, plain, equal to the stem; the anther and pistil-bearing spike distant. In ditches and lakes, but less frequent. In the middle of Woolwich common.

Tetrandria.

Urtica. (1) Cal. four-leaved; cor. none; rudiment of the germen cup-formed. (2) Cal. two-leaved; cor. none; seed one, superior, shining.

Urt. *Urens*, Small Nettle; with opposite, elliptical, about five-nerved leaves; racemes nearly simple. Very common in cultivated places.

Urt. *Dioica*, Great Nettle; with leaves opposite, heart-shaped, racemes much branched, double, flowers sometimes dicœcious. Common in waste places and hedges.

Buxus. *Gen. char.*—(1) Cal. three-leaved, petals two, with the rudiment of a germen. (2) Cal. four-leaved, petals three, styles three, caps. three-beaked, three-celled.

Bux. *Sempervirens*, Box-tree; on some of the chalk hills in England, and well known, as it is employed as edgings of borders, for which it is well fitted by its evergreen leaves. The close texture of the wood, and the fine polish of which it is susceptible, render its use extensive for the purpose of turnery.

Betula. *Gen. char.*—(1) Cal. scale of the catkin one-leafed, three-cleft, three-flowered; cor. four-parted. (2) Cal. scale of the catkin one-leafed, nearly three-cleft, two-flowered; styles two, seeds compressed.

Bet. *Alba*, Common Birch; with ovate-pointed, serrated, smoothish leaves; common in woods. In the beautiful variety with pendulous branches, from which

it is called the weeping-birch, the leaves are quite smooth.

Bet. *Nana*, Dwarf Birch; with notched roundish leaves. Native of elevated marshes in Scotland, and rises only to the height of three feet.

Bet. *Alnus*, Common Alder; with branching peduncles, leaves roundish, wedge-shaped, serrated, viscid. Common in marshy places.

Morus. *Gen. char.*—(1) Cal. four-parted; cor. none. (2.) Cal. four-leaved; cor. none; styles two, seed one, berried.

Mor. *Tinctoria*, Fustic-Tree; with oblong leaves, lengthened on one side, and axillary spines. Native of Jamaica, and remarkable for its quick growth, rising to the height of 30 or 40 feet in eight or ten years; the timber is of an excellent quality, and it furnishes the valuable dye-stuff Fustic.

Mor. *Alba*, White Mulberry; a native of Virginia, is cultivated for the same purpose; Mor. *Nigra*, Black Mulberry, is a native of Persia, with dark-red fruit, from which wine is made; and Mor. *Papyrifera*, Paper Mulberry, a native of Japan and the South Sea islands, affords materials for paper and cloth from its bark.

Pentandria.

Amaranthus. *Gen. char.*—(1) Proper calyx three-leaved; cor. none; stamens from three to five. (2) Proper calyx three-leaved; cor. none; styles three; caps. one-celled, cut round; seed one.

Am. *Blitum,* Wild Amaranth; with lateral heads; flowers three-cleft; triandrous; leaves ovate, stem spreading. In cultivated places in some parts of England.

Am. *Spinosus,* Prickly Calalue; with compound terminal racemes, and short prickles under the leaves; a common plant in Jamaica, and frequently employed as a wholesome and agreeable vegetable.

Polyandria.

Fagus. *Gen. char.*—(1) Cal. bell-shaped, five-cleft; cor. none; stamens from five to twelve. (2) Cal. four cleft; cor. none; styles two or three, three-cleft; seeds two or three, covered with a leathery muricated calyx.

Fag. *Castanea,* Chesnut-Tree; with lance-shaped, sharp pointed, serrated leaves; and the prickles of the fruit compound, interwoven. In woods in England; sometimes grows to a very large size; and a tree in Gloucestershire is supposed to be more than a thousand years old.

Fag. *Sylvatica,* Beech-Tree; with leaves ovate and indistinctly serrated; common in woods and hedges, and well known for its use as a close fence.

Quercus. *Gen. char.*—(1) Cal. bell-shaped, lobed; cor. none; stamens from five to ten. (2) Cal. bell-shaped, entire, rough; cor. none; style one; stigmas three; nut superior, leathery, one-seeded.

Quer. *Robur,* Common British Oak; with deciduous, oblong, indented leaves, broader at the summit,

indentations acute, lobes obtuse, and peduncles lengthened. Common in woods.

The oak in a favourable situation attains a prodigious size. The trunk of an oak in Shropshire, mentioned by Lightfoot, measured in circumference 68 feet, or nearly 23 feet in diameter; and another in Yorkshire measured 48 feet in circumference, or 16 feet in diameter.

Various other species of oak are natives of the south of Europe and of North America.

Quer. *Suber,* grows abundantly in Italy, the south of France, Spain, and Portugal, and furnishes the well-known substance cork, of so much importance in domestic economy. The Cork-tree is an evergreen, with ovate, oblong, undivided, serrated leaves, slightly downy underneath. Cork is a singular substance, which is produced on the cuticle.

Quer. *Cerris,* Gall Oak; with smooth, oval, serrated leaves. This tree, which is a native of Asia Minor, from the Bosphorus to Syria, and from the shores of the Archipelago to the frontiers of Persia, seldom attains the height of more than six feet, and more frequently appears in the form of a shrub. The galls are produced on the shoots of the young branches, and the best are those which are collected before the escape of the insect, to which their production is owing. Those which are perforated are less fit for the purpose of dye-stuff, and are known in commerce by the name of white galls; but the black or green galls are heavier, and therefore more valuable.

JUGLANS. *Gen. char.*—(1) Catkin imbricated; cor. six-cleft; stamens about eighteen. (2.) Cal. four-cleft; cor. four-petaled; styles two, drupe leathery.

Jug. *Regia,* Walnut-Tree; with alternate, oval, sessile, entire leaves; native of Asia, and cultivated throughout the warmer and more temperate regions of Europe, on account of its fruit, which is extensively employed in its green state as a pickle, and when ripe furnishes the well known walnuts of commerce.

CORYLUS. *Gen. char.*—(1) Cal. scale of the catkin three-cleft; cor. none; stamens eight. (2) Cal. two-cleft, ragged; cor. none; styles two; nut ovate, smooth, one-celled, covered with a leathery inflated calyx.

Cor. *Avellana,* Hazel-nut Tree; with ovate, obtuse stipulæ, roundish, heart-shaped, pointed leaves, and small branches hairy. Common in woods and hedges.

CALLA. *Gen. char.*—A plain spathe; the spadix, or flower stem, covered with florets; cal. none; petals none; berries many-seeded.

Cal. *Æthiopica,* Ethiopian Calla; with arrow-headed, heart-shaped leaves; native of the Cape, of the sides of rivulets in St Helena, and of the ditches in India, and is now common in the green-house and parlour of this country.

ARUM. *Gen. char.*—Spathe one-leaved, convoluted at the base; spadix or flower-spike cylindrical, naked above; flowers below producing pistils, and those in the middle stamens; berries one-celled.

Ar. *Maculatum*, Cuckoo-pint or Wake-robin; with halberd-shaped, entire leaves; spadix or flower-spike club-shaped, blunt. Not uncommon in hedges and among brushwood.

Ar. *Triphyllum*, Zebra-flowered Arum; with trifoliate leaves, leaflets oval-pointed; native of North America; is the largest and most beautiful of the genus, and has been introduced into the gardens of this country. *Bot. Mag.* xxiv. 950.

Monadelphia.

Pinus. *Gen. char.*—(1) Cal. scale of the catkin peltate; cor. none; anthers sessile, attached to the scales. (2) Cal. scale of the catkin two-flowered; cor. none; nut one-celled, winged.

Pin. *Sylvestris*, Scotch Fir; with double, rigid, linear, acute leaves; younger cones on foot-stalks bent back; summit of the anthers small. Not unknown in the elevated districts of Scotland, and the only species indigenous to the island.

Pin. *Cedrus*, the Cedar Pine; Pin. *Larix*, the Larch-Tree; Pin. *Picea*, the Pitch Pine, and some other species,—are natives of other parts of Europe, of the north of Asia, or of America.

Ricinus. *Gen. char.*—(1) Cal. five-parted, cor. none, stamens numerous. (2) Cal. three-parted, cor. none, styles three, caps. three-celled.

Ric. *Communis*, Common Oil-nut Tree; with deeply divided leaves. This plant, which has been long known by the trivial name of *Palma Christi*, is cultivat-

ed in the West Indies for the sake of its seeds. The growth is so rapid that it attains the full size of fifteen, and even twenty feet, in a single year. From the seeds, or nuts, the Castor-oil, so much employed in medicine, is obtained, either by expression, when it is said to be cold-drawn, and is esteemed of the best quality; or by boiling, the product of which brings an inferior price.

Ric. *Inermis,* Unarmed Oil-nut Tree; with peltate, somewhat palmated, serrated leaves, and unarmed fruit. A native of the Spanish West Indies, and much cultivated in Jamaica, because the nuts are larger and more productive, and the quality of the oil equal to the former. Except in the fruit being destitute of prickles, this plant resembles the other so closely, that it is regarded rather as a variety than a distinct species.

JATROPHA. *Gen. char.*—(1) Cal. none; cor. five-cleft; stamens ten. (2) Cal. none; cor. five-petaled; styles three; caps. three-celled.

Jat. *Manihot,* Bitter Cassada; with palmated leaves, lance-shaped, entire lobes. This plant, from the root of which cassada-bread, a very nutritious substance, is obtained, is much cultivated in the West Indies, and rises by a slender woody stalk, to the height of five or six feet. The roots grow to a large size, and are fit for use when they are well washed and scraped, and then grated down into a kind of pulpy meal, which is put into strong linen bags, and subjected to powerful pressure, that the whole of the juice, which is poisonous, may be separated.

Jat. *Gossypifolia,* Cotton-leaved, or Wild Cassada; with five-parted leaves, and ovate, entire, ciliated lobes.

Native of Jamaica, and common about the streets of Spanish-Town and Kingston.

HURA. *Gen. char.*—(1) Calyx two-leaved; cor. none; anthers twenty, sessile. (2) Cal. cylindrical; cor. none; one pistil; caps. ten-celled.

Hura *Crepitans*, Crackling Sand-box Tree. A native of Jamaica; rises to the height of thirty or forty feet, and with its large heart-shaped leaves, some of which are near a foot in length, and of a beautiful green, forms a thick shade. The capsule is of a woody texture, round and flat, and regularly divided into cells, each of which contains a single seed. The seeds being taken out, the shell is converted into a sand-box, from which the name is derived; and when the seeds ripen on the tree, the cells burst with an explosive noise, and discharge the seeds to a considerable distance. This is the origin of the specific name.

HIPPOMANE. *Gen. char.*—(1) Cal. two-cleft; cor. none; anthers two-cleft. (2) Cal. three-cleft; cor. none; stigma three-fold; drupe or capsule one-seeded, or three-celled.

Hip. *Mancinella*, Manchineal Tree; with ovate serrated leaves. A native of Jamaica; grows to a large tree, the wood of which answers well for furniture, and produces a fruit having some resemblance to the crab-apple. The fruit seems to possess, in certain stages of its growth, an acrid or deleterious quality; and indeed was supposed by travellers to be deadly poison.

SYNGENESIA.

CUCUMIS. (1) Cal. five-toothed; cor. five-cleft; filaments three. (2) Cal. five-toothed; cor. five-cleft; style three-cleft.

To this genus belong the Common Cucumber, Cuc. *Sativus;* the small Wild Cucumber of Jamaica, Cuc. *Anguria,* which is employed with other pot-herbs in soups; the Melon, Cuc. *Melo,* of which there are several varieties; and *Coloquintida,* or Bitter Apple, Cuc. *Colocynthis,* a native of Turkey, which is sometimes employed in medicine.

CLASS XXII.

DIOECIA.

In this class the flowers which produce stamens, and those which produce pistils and seeds, are on different plants. The characters of the orders are taken, as in the preceding, from the number and connection of the stamens.

DIANDRIA.

SALIX. *Gen. char.*—(1) Cal. a scale of the catkin; cor. none; gland of the base nectariferous; stamens

two, seldom five. (2) Cal. a scale of the catkin; cor. none; stigmas two; caps. superior, one-celled, two-valved.

Sal. *Helix*, Rose Willow; with lance-shaped, pointed, serrated, smooth leaves; style lengthened, thread-shaped, and stigmas linear. In willow and marshy grounds; rarely exceeds ten feet in height, and is much employed in all kinds of basket-work.

Sal. *Triandra*, Long-leaved, or Smooth Willow;—with linear, oblong, serrated, smooth leaves, and germens on foot-stalks. Frequent in willow grounds and on the banks of rivers; rises to the height of thirty feet, and is esteemed one of the most valuable basket willows.

Sal. *Pentandra*, Sweet Willow, or Bay-leaved Willow; with five stamens; elliptical, lance-shaped, notched, smooth leaves, and germens smooth, nearly sessile. On banks of rivers in the north of England and south of Scotland.

Sal. *Vitellina*, Yellow Willow; with lance-shaped, acute, serrated leaves, smooth on the upper surface; serratures cartilaginous; stigmas notched. In willow grounds and marshes.

Sal. *Fragilis*, Crack Willow; with lance-shaped, serrated, very smooth leaves; foot-stalks toothed, glandular, and nectary in the flowers bearing stamens double. In willow grounds, and on the banks of rivers, and is remarkable for the brittleness of its branches. The bark of this species is sometimes employed as a substitute for Peruvian bark.

Sal. *Alba*, Common White Willow; with lance-shaped, pointed, serrated leaves, downy on both sides,

the lowest serratures glandular. In woods and moist meadows, and becomes a tall tree.

Triandria.

Empetrum. *Gen. char.*—(1) Cal. three-parted; cor. three-petaled; stamens capillary from three to nine. (2) Cal. three-parted; cor. three-petaled; stigmas nine; berry superior, nine-seeded.

Emp. *Nigrum,* Black Crow, or Crake Berry; with trailing stems. Frequent in elevated heaths in the northern parts of Britain.

Ruscus. *Gen. char.*—(1) Cal. six-leaved; cor. none. (2) Cal. six-leaved; cor. none; pistil one; berry superior, three celled; seeds double.

Rus. *Aculeatus,* Knee-holly, or Butcher's Broom; with dagger-pointed sharp leaves, producing flowers on the upper surface. In woods and heaths in a gravelly soil; abundant at Stoke near Gosport.

Tetrandria.

Viscum. *Gen. char.*—(1) Cal. none; petals four, dilated at the base, united, and in the form of calyx; anthers sessile, attached to the petals. (2) Cal. slightly margined; petals four, dilated at the base; style none; berry inferior, one-seeded.

Vis. *Album,* Misseltoe; with lance-shaped, obtuse leaves; divided stem; spikes axillary. This is the celebrated misseltoe, a parasitical plant, which attaches

itself to trees, and was held in great veneration by the ancient druids, who employed it in the celebration of their mysterious rites.

MYRICA. *Gen. char.*—(1) Cal. scale of catkin concave; cor. none. (2) Scale of the catkin hollow; cor. none; styles two; berry one-seeded.

Myr. *Gale*, Sweet Gale, or Dutch Myrtle; with lance-shaped slightly serrated leaves, and shrubby stem. not uncommon in marshy places; and grows to the height of two or three feet.

PENTANDRIA.

CANNABIS. *Gen. char.*—(1) Cal. five-parted: no corolla. (2) Cal. one-leaved; cor. none; styles two; seed, a nut.

Can. *Sativa*, Hemp. A native of India, but extensively cultivated in Europe on account of the fibres of the stem, which furnish the hemp of commerce, one of the most important substances in the arts.

HUMULUS. *Gen. char.*—(1) Cal. five-leaved; cor. none; anthers with a double pore at the summit. (2) Cal. scale of the catkin oblique, entire; cor. none; styles two; seed one, coated.

Hum. *Lupulus*, Hop; grows among brushwood and in hedges, and is now extensively cultivated on account of its seeds and membranous seed coverings, which furnish the hops of commerce, the infusion of which, of a bitter aromatic nature, is employed for preserving and communicating an agreeable flavour to malt liquors.

Hexandria.

Myristica. *Gen. char.*—(1) Calyx one-leaved, three cleft; cor. none. (2) Cal. one-leaved, three-cleft; cor. none; germen oval; fruit a drupe. Three species of this genus have been described; but by far the most important is the Nutmeg Tree, *Myristica Moschata*, which produces the precious and delicate spice, and which is a native of many of the islands in the East Indies: but its cultivation was chiefly confined by the Dutch to the island of Banda, for the purpose of retaining a monopoly of the trade; and, with the same view, all the plants within their power in the other islands were destroyed.

Octandria.

Populus. *Gen. char.*—(1) Cal. scale of the catkin ragged; cor. turbinated, entire. (2) Cal. scale of the catkin ragged; cor. turbinated, oblique, entire; stigmas four; caps. superior, two celled, two valved; seeds downy.

Pop. *Alba*, Great White Poplar; with heart-shaped, roundish, lobed, toothed leaves, hoary underneath; catkins ovate. In moist woods.

Pop. *Tremula*, Trembling Poplar, or Aspen; with roundish toothed leaves, smooth on both sides; footstalks compressed; branches rough. In moist woods; and becomes a tall tree.

Pop. *Nigra*, Black Poplar; with rhomboidal, pointed, serrated leaves, smooth on both sides; a lofty tree, which grows on banks of rivers, and in watery places.

Rhodiola. *Gen. char.*—(1) Cal. four-parted; petals four; nectaries four, notched. (2) Cal. four-parted; petals four; nectaries four, notched; pistils four; caps. four; many-seeded.

Rhod. *Rosea*, Rose-root. On the mountains of Wales and Yorkshire, and frequent on the rocky shores of the Western Islands of Scotland: it is easily recognised by its succulent, smooth, azure, imbricated leaves, and yellowish flowers.

Enneandria.

Mercurialis. *Gen. char.*—(1) Cal. three-parted; cor. none; stamens from nine to twelve. (2) Cal. three-parted; cor. none; styles two; caps. two-celled; seeds single.

Merc. *Perennis*, Perennial Dog's Mercury; with very simple stem, rough leaves, and creeping root. Perennial; flowers in April and May, and is common among brushwood.

To an inexperienced eye this plant has something of the appearance of spearmint, and has been used by mistake in the form of infusion, with fatal effects to those who swallowed it. It is said also to be equally deleterious to other animals, sheep, for example, as to man.

Merc. *Annua*, Annual Dog's Mercury; with branched stem, smooth leaves, flowers in racemes, and fibrous root. Frequent in waste places near towns.

Monadelphia.

Juniperus. *Gen. char.*—(1) Cal. scales of the catkin; cor. none; stamens three. (2) Cal. scales of the catkin few, become at last fleshy, and unite into a three-seeded berry.

Jun. *Communis*, Common Juniper; with leaves ternate, spreading, needle-shaped, longer than the berry. Common in heaths and elevated places, and well known by the sweetish aromatic berries which it produces.

Taxus. *Gen. char.*—(1) Cal. none; cor. none; stamens numerous; anthers peltate, eight-cleft. (2) Cal. pitcher-shaped, entire; style none; seed one, placed on the berried calyx.

Tax. *Baccata*, Yew Tree; with approximating leaves: grows in mountainous woods, and moist loamy soils. The remains of an old wood of yew trees in Upper Lorne, in the Western Highlands of Scotland, were observed by Mr Lightfoot; and the trunk of a decayed yew tree in Fortingal church-yard is mentioned by Mr Pennant, in his tour in Scotland, as $56\frac{1}{2}$ feet in circumference.

CLASS XXIII.

POLYGAMIA.

In this class the stamens and pistils are separate in some flowers, and they are united in others, either on the same or on two or three distinct plants. This diversity is the foundation of the three orders into which the class is divided. As in the two former classes, the flowers with stamens are marked by the figure (1), and the flowers with pistils by the figure (2), the flowers producing both stamens and pistils are marked (3).

Order I. Monœcia.

Musa. *Gen. char.*—(3) Cal. none; cor. two-petaled; stamens six, one of which is fertile; fruit inferior. (3) Cal none; cor. two-petaled; stamens six, five of which are perfect; pistil one; no berry.

Musa *Paradisaica*, Plantain-tree; with nodding spadix or flower-spike, and flowers producing stamens permanent. This remarkable plant is cultivated in the West Indies on account of its fruit, and rises to the height of 15 or 20 feet, on a round, soft stem, composed of the elongated foot-stalks of the leaves; which latter are sometimes eight feet in length and two in breadth. The fruit or plantains are about a foot in length, and two or three inches in diameter when fully

grown, and of a pale yellow colour, and luscious sweet taste. A bunch of fruit, from a single plant, sometimes exceeds 40 pounds in weight; but the plantain is generally used as an excellent substitute for bread, before it is ripe and has acquired the sweet taste; and for this purpose, the outer skin being removed, it is either roasted or boiled.

Musa *Sapientum*, Banana Tree; with the spadix or flower-spike nodding, and flowers producing stamens deciduous. The banana tree nearly resembles the plantain, but the stem is marked with dark purple spots, the fruit is shorter, rounder, and in more compact bunches, and when it is ripe the pulp is of a more agreeable flavour and more delicious taste.

Mimosa. *Gen. char.*—(1) Cal. five-toothed, cor. five-cleft, stamens five, ten, or more. (3) Cal. five-toothed, cor. five-cleft, stamens five or more, pistil one, fruit a pod.

Mim. *Verticillata*, Whorled-leaved Mimosa; unarmed, with linear sharp leaves in whorls. In this species, as in some other from Botany Bay, of which it is a native, the leaves on the seedling plants are pinnated, but afterwards grow in whorls; it is a greenhouse plant. and ripens its seeds in this country.

Many species of this genus are natives of New Holland. Mimosa *Nilotica*, is a native of Egypt and the East, and produces the gum-arabic of commerce.

Atriplex. *Gen. char.*—(3) Cal. five-parted, inferior; cor. none; stamens five; style two-parted, seed one. (3) Cal. two-leaved; cor. none; style two-parted; seed one, compressed.

At. *Patula,* Spreading Halberd-leaved Orache; with spreading shrubby stem, leaves somewhat square and halberd-shaped. Common in waste and cultivated grounds, and exhibiting some varieties when it grows on the sea-shore.

At. *Angustifolia,* Narrow-leaved Orache; with entire lance-shaped leaves, the lowest somewhat halberd-shaped; common in waste and cultivated places.

In the second order of this class, Dicœcia, the different flowers are on two different plants; but excepting *Hippophae,* which is generally arranged under Monœcia Tetrandria, no distinct example has occurred to the extensive experience and acute observation of Dr Smith.

Order III. Tricœcia.

Ficus. *Gen. char.*—Common receptacle, turban-shaped, converging, closed, fleshy. (3) Cal, five-parted, cor. none, pistil one, seed one. (1) Cal. three-parted, cor. none, stamens three. The flowers producing stamens, and those producing pistils are included within the same common receptacle, but with the partial fructification distinct.

Fic. *Carica,* Fig Tree; with palmated, nearly three-lobed leaves, and pear-shaped, smooth fruit. The figs of commerce are the preserved fruit of this tree, which is extensively cultivated in Turkey, and in the warmer regions of Europe.

Fic. *Indica,* or Banyan Tree, is one of the most remarkable vegetable productions; shoots are thrown out from the horizontal branches, and as they extend to-

wards the earth increase in size, and at last strike into the ground and become stems. New branches push out, which, as they extend, again form roots and new stems, till at last a single tree becomes the parent of an extensive grove.

CLASS XXIV.

CRYPTOGAMIA.

In this class the parts of fructification are so minute that they cannot be arranged according to the principles observed in the preceding classes; but the plants which it includes are considerably different in their structure and habits from the other vegetable tribes; it is divided into five orders.

Order I. Filices, or *Ferns.*

This order is subdivided into three sections, which are characterised by the fructifications being spiked, arranged on the under surface of the leaf or frond, or being near the root.

Equisetum. *Gen. char.*—Catkin with peltated scales including the parts of fructification; small involucrums, two-valved; seeds numerous, naked, infolded by four filaments producing pollen.

Equis. *Palustre,* Marsh Horsetail; with angular branched stems; fructifications on the summit; branches

simple, erect, slightly rough. In wet and marshy places.

Equis. *Arvense,* Corn Horsetail; with barren stems, branched all round; branches slightly rough, stems producing seed, simple. Frequent in moist meadows, and among corn in a wet soil.

Equis. *Hyemale,* Rough Horsetail, or Shavegrass; with a naked, very rough stem, slightly branched at the base, and terminal catkin. In marshes and moist woods; and to the habitats noticed in the Flora Britannica may be added, a place where water stood in the winter on the Newton-green near Ayr, and the banks of the Doon, three miles south from the same place. The dried stems are much employed by cabinet-makers for polishing their work.

Ophioglossum. *Gen. char.*—Spike two rowed, capsules two-valved, sunk, and opening transversely.

Oph. *Vulgatum,* Common Adder's-tongue; with ovate veinless frond; in moist meadows and pastures, but not very common.

Osmunda. *Gen. char.*—Spikes branched, capsules two-valved, naked, globular.

Os. *Lunaria,* Common Moonwort; with pinnated frond, and spike rising from the base; the leaflets crescent-shaped, crenated. In dry pastures and meadows.

Os. *Regalis,* Royal Moonwort, or Flowering Fern; with frond twice pinnated, and spike produced at the summit; leaflets heart-shaped, lanceolate, smooth. This splendid plant, when in full vigour, rises to the height of three or four feet, and is not uncommon in marshy places and the crevices of rocks in the Western Highlands of Scotland.

Lycopodium. *Gen. char.*—Capsules axillary, single, two-valved, naked, slightly kidney-shaped, compressed.

Lyc. *Clavatum,* Common Clubmoss; with scattered filamentous leaves; flower-bearing stems, bristly. Not uncommon in elevated heaths, and readily distinguished by its long, trailing, branched stems, and erect flower-stalks, which are sometimes divided into two or three spikes.

Lyc. *Selago,* Fir Clubmoss; with entire lance-shaped scattered leaves, and erect divided stem. In moist places on mountainous heaths.

Polypodium. *Gen. char.*—Fructifications in roundish points; scattered; not marginal; no involucrum.

Pol. *Vulgare,* Common Polypody; with pinnatifid frond, lobes oblong, somewhat serrated, obtuse; root scaly. Common on walls and on the trunks of trees.

Pol. *Phegopteris,* Pale Mountain Polypody; with pinnated frond; leaflets lance-shaped, pointed, pinnatifid, united at the base, the lowest reflected. In fissures of rocks and moist places, in elevated situations, but not very common.

Aspidium. *Gen. char.*—Fructifications in roundish points, scattered, not marginal, involucrum umbilicated, opening almost on all sides.

Asp. *Filix Mas.* Male Fern; with doubly pinnated frond; leaflets, obtuse, serrated, with chaffy footstalk; involucrum bent inwards. Common in woods and shady places.

Asp. *Aculeatum,* Common Prickly Shield Fern; with doubly pinnated frond, leaflets ovate, crescent-shaped,

ciliated, spinous, hairy underneath. In moist rocky places and woods.

BLECHNUM. *Gen. char.*—Fructifications in continuous longitudinal lines near the rib; involucrum superficial, continuous, opening towards the rib.

Blech. *Boreale,* Rough Spleenwort; with smooth pinnated frond; leaflets linear, bluntish, entire, nearly equal at the base. Common in woods and heaths. Osmunda *spicant* of Lightfoot and others.

SCOLOPENDRIUM. *Gen. char.*—Fructifications in double scattered lines, involucrum superficial, opening longitudinally.

Scol. *Vulgare,* Common Hart's-tongue; with simple lance-shaped frond, smooth underneath. Common in moist, rocky, and shady places. *Asplenium Scolopendrium,* Spec. Plant. of Lightfoot and other botanists.

ASPLENIUM. *Gen. char.*—Fructifications in scattered lines; involucrum opening towards the rib.

Asplen. *Marinum,* Sea Spleenwort; with pinnated frond, leaflets ovate, oblique, serrated, obtuse, unequal at the base, and wedge-shaped. Rocks near the sea in Britain.

Asplen. *Septentrionale,* Forked Spleenwort; with pinnated, three-cleft frond, leaflets alternate, linear, ragged at the summit. In the fissures of rocks; Arthurs' Seat, Edinburgh. *Acrostichum Septentrionale* of Lightfoot, Withering and others.

Asplen. *Palmatum,* Palmated Spleenwort; with five-lobed, heart-shaped frond; three intermediate lobes

pointed. Native of Spain, Portugal, and the Canary Islands.

LONCHITIS. *Gen. char.*—Fructifications in lines under the sinuses of the frond.

Lon. *Hirsuta,* Hairy Spleenwort; with blunt entire pinnatifid fronds; native of the mountains of Jamaica, and grows to the height of four or five feet.

Lon. *Pedata,* Footed Spleenwort; with fronds pedate, leaflets pinnatifid and slightly serrated. Native of the mountains of New Liguanea, in Jamaica; grows two or three feet in height on a single stalk; divides into three parts, of which the middle is a single frond, and the lateral divisions are composed of three fronds each.

ADIANTUM. *Gen. char.*—Fructifications in roundish, distinct, marginal points.

Ad. *Capillus Veneris,* True Maiden-hair; with the frond alternately decompounded; leaflets wedge-shaped, lobed, on footstalks. On rocks and moist walls near the sea.

LINDSÆA.—Fructifications linear, continued, submarginal; capsules opening interiorly.

Lind. *Reniformis,* Kidney-shaped Lindsæa; with simple, kidney-formed, very obtuse frond. Native of Guiana. *Lin. Trans.* Vol. III.

PTERIS. *Gen. char.*—Fructifications in a continued marginal line; involucrum from the inflected margin of the frond, continuous, opening interiorly.

Pter. *Aquilina,* Common Brakes; with supra-decom-

pound frond, leaflets lance-shaped, somewhat acute; the lowest pinnatifid, the upper smaller. In heaths and neglected pastures, very common.

Order II. Musci, *Mosses.*

The plants arranged under this order are furnished with distinct leaves, and often with a distinct stem. The membranous corolla, which is of a conical form, is called a *calyptra*, or veil, and the summit is the stigma. This veil covers the capsule, which, before the seed ripens, is raised on a footstalk. The capsule, which opens by a vertical lid, consists of one cell and one valve, and the seeds are extremely minute and numerous. The stamens and pistils of the mosses are generally in separate plants, but in a few species they are united in the same flower.

According to the method adopted by Linnæus, the genera of mosses are determined chiefly by the lateral or terminal situation of the capsule; but the structure of the fringe or *peristomium*, which borders the orifice of the capsule, as proposed by Hedwig, affords more obvious and more precise marks of discrimination. The fringe is either simple or double, and is composed either of separate teeth, as is mostly the case, with the external fringe, or of a plaited and jagged membrane, which is the form of the inner fringe when it exists. The number of teeth, which is remarkably constant in each genus and species, is either four, eight, sixteen, thirty-two, or sixty-four.

The mosses are divided into three sections; as they are destitute of fringe, or as they are furnished with a

single or double fringe. Of these sections the following are examples.

Sect. I. *With no Fringe.*

Sphagnum. *Gen. char.*—Capsule with a naked mouth; calyptra divided horizontally, surrounding the capsule at the base; anthers surrounded with a ring.

Sphag. *Latifolium*, Broad-leaved Bog-moss; with swelled deflected branches, and ovate, obtuse, inflated leaves. Very common in marshy bogs.

Sphag. *Capillifolium*, Slender Bog-moss; with thread-shaped, deflected branches, and ovate lance-shaped, plain, pointed, closely imbricated leaves. In moist places on elevated heaths.

The two species now described are synonymous with Sphagnum *Palustre*, of the Species Plantarum, Withering, and others.

Phascum. *Gen. char.*—Capsule ovate, closed, deciduous, with the operculum not opening.

Phas. *Subulatum*, Awl-leaved Earth-moss; with capsule nearly sessile, and leaves awl-shaped, spreading, dilated at the base, very slender at the summit; on heaths and sandy banks.

Phas. *Muticum*, Common Dwarf Earth-moss; with ovate, awnless, concave, closing leaves, and sessile globular capsule. Frequent on banks and in hedges.

Phas. *Cuspidatum*, Sharp-leaved Dwarf Earth-moss; with ovate, bearded, pointed leaves; upper leaves closing, and capsule broadly elliptical, nearly sessile. On

heaths, banks, and walks, especially in a sandy soil, abundant.

GYMNOSTOMUM. *Gen. char.*—Capsule with a naked mouth, and deciduous lip; entire calyptra separating from the base.

Gymnost. *Truncatulum*, Little Blunt-footed Beardless Moss; with ovate, pointed, plain, entire leaves, and turban-shaped truncated capsule. In pastures, banks, and by the sides of ditches.

Gymnost. *Ovatum*, Hairy-leaved Beardless Moss; with ovate, obtuse, very entire, concave, awned leaves, and ovate capsule; on banks and mud walls.

Gymnost. *Pyriforme*, Pointed Pear-shaped Beardless Moss; with very simple and very short stem; leaves ovate, acute, slightly toothed; capsule obovate, and lid bluntly dagger-shaped. On banks and wet heaths.

SECT. II. *With a Simple Fringe.*

SPLACHNUM. *Gen. char.*—Capsule cylindrical, set upon a fleshy process; fringe simple, with sixteen teeth approaching by pairs.

Splach. *Mnioides*, Green Tapering Gland-moss with the process obconical, green, and leaves elliptical, lance-shaped, entire, awned. In moist places of elevated districts.

Splach. *Ampullaceum*, Purple Gland-moss; with greenish, purple, obconical, blunt process, three times thicker than the capsule; leaves lance-shaped, acute, serrated. In marshy bogs and moist heaths.

TETRAPHIS. *Gen. char.*—Capsule oblong; fringe with four pyramidal, erect, loose teeth.

Tet. *Pellucida,* Transparent Four-toothed Moss; *Mnium Pellucidum,* Spec. Plant. In moist, shady places, and at the roots of trees.

ENCALYPTA. *Gen. char.*——Capsule cylindrical; fringe with sixteen linear, upright teeth; calyptra bell-shaped, inflated, loose.

Enc. *Vulgaris,* Common Extinguisher-moss; with calyptra, having a very entire, smooth margin; stem nearly simple, and leaves lanceolate. In the fissures of rocks, on walls, and shady banks.

Enc. *Ciliata,* Greater Extinguisher-moss; with calyptra toothed on the margin; stem branched, and leaves lanceolate. On elevated rocks.

The two last species are varieties of *Bryum Extinctorium.* Spec. Plant.

TRICHOSTOMUM. *Gen. char.*——Capsule oblong; fringe with thirty-two thread-shaped, somewhat upright teeth, joined in pairs, or connected at the base.

Trich. *Trifarium,* Three-ranked Fringe-moss; with leaves awl-shaped, keeled, entire, in three rows; capsule ovate, and stem branched. In barren places on mountains.

Trich. *Capillaceum,* Capillary Fringe-moss; with slender sheathing leaves in two rows, conical lid, and stems forming a close turf. In elevated marshes, as on the Pentland Hills, near Edinburgh.

TORTULA. *Gen. char.*—Caps. oblong, with numerous thread-shaped teeth, spirally convoluted, and with many folds.

Tort. *Rigida,* Rigid Screw-moss; with very short stem; spreading, stiff, blunt leaves, rolled inwards, and without nerves; caps. cylindrical and lid conical. On rocks, banks, and walls. *Bryum Rigidum* of Withering, Hudson, and others.

Tort. *Ruralis,* Great Hairy Screw-moss; with branched stem; leaves blunt, recurved, hairy at the summit; upper leaves star-shaped; capsule ovate, cylindrical. Common on walls, cottages, and trunks of trees. *Bryum Rurale* of Spec. Plant. Withering and others.

Tort. *Subulata,* Awl-shaped Screw-moss; with short, somewhat simple stem; leaves ovate, lance-shaped, pointed; caps. cylindrical, and lid awl-shaped, upright. Common in moist shady places, but rare in the northern districts of Britain. *Bryum Subulatum* of Spec. Plant. Hudson, Withering, Lightfoot, &c.

Tort. *Muralis,* Wall Screw-moss; with very short, nearly simple stem; leaves ovate, sharp, hairy; caps. elliptic, cylindrical, and lid conical. One of the most common mosses; on walls and houses. *Bryum Murale,* Spec. Plant.

Sect. III. *With Double Fringe.*

Orthotrichum. *Gen. char.*—Caps. oblong, terminal; external fringe, with sixteen teeth; internal, with eight or sixteen thread-shaped teeth, and sometimes none; calyptra often rough, with straight hairs, angular.

Orthot. *Striatum,* Common Bristle-moss; with branched stem; leaves lance-shaped, keeled, bent back, spreading; calyptra entire, and internal fringe with

sixteen teeth. On the trunks of trees. *Bryum Striatum* of Spec. Plant. and Withering, and *Polytrichum Striatum* of Hudson and Hull.

Orthot. *Crispum,* Curled Bristle-moss; with branched stem; with linear leaves bent back and waved by drying, and foot-stalks lengthened and thickened at the summits. On trees. *Bryum Striatum,* Spec. Plant; *Bryum Crispum,* Withering.

Neckera. *Gen. char.*—Caps oblong, proceeding from a lateral *perichætium* or sheath; external fringe, with sixteen sharp teeth; internal, with sixteen thread-shaped intermediate teeth; calyptra smooth.

Neck. *Pumila,* Small Feathery Neckera; with pinnated branches; leaves in two rows, ovate, slightly waved, and foot-stalks scarcely exceeding the sheath. On the trunks of trees, but rare. *Hypnum Pennatum* of Withering and *Fontinalis Pennata* of Hudson.

Neck. *Crispa,* Crisped Neckera; with pinnated branches, leaves oblong, transversely wrinkled, and in two rows, and foot-stalk double the length of the sheath. On chalk-hills and elevated woods in a dry soil. *Hypnum Crispum,* Spec. Plant. Hudson, Withering, and Lightfoot.

Neck. *Heteromalla,* Lateral Neckera; with diffuse branched stem, leaves ovate, sharp, concave, imbricated on all sides, and capsule sessile on one side. On the trunks of trees.

Mnium. *Gen. char.*—Caps. cylindrical, furrowed; external fringe, with sixteen teeth dilated at the base; internal, membranaceous, divided into segments; calyptra smooth, foot-stalk terminal.

Mnium *Androgynum*, Narrow-leaved Spring-moss; monœcious, caps. erect, lid conical; leaves imbricated, spreading and toothed at the summit. In moist shady places.

Mnium *Palustre*, Greater-forked Spring-moss; dioecious, caps. oblique, lid conical, leaves sharp. In marshy and flooded places.

FUNARIA. *Gen. char.*—Caps. obovate, external fringe, with sixteen teeth, oblique, uniting at the summit; internal, with sixteen plain teeth; flowers terminal, calyptra square.

Fun. *Hygrometrica*, Twisting Cord-moss; with concave leaves and ventricose capsule. Common in moist sandy heaths, gardens, and neglected walks. *Mnium Hygrometricum*, Spec. Plant. Withering, Lightfoot. The flower-stems twist round when moistened, or even breathed upon.

BARTRAMIA. *Gen. char.*—Caps. round, furrowed; external fringe, with sixteen teeth, dilated at the base; internal, membranaceous, folded, divided into various segments; calyptra smooth; lid depressed.

Bart. *Pomiforme*, Apple Bartramia; with foot-stalks erect, exceeding the stem; leaves awl-shaped, one-nerved. In shady places and crevices of rocks. *Bryum Pomiforme*, Spec. Plant.

Bart. *Fontana*, Fountain Bartramia; with erect foot-stalks exceeding the stem, entire ovate leaves, erect, thread-shaped, fasciculated branches. Abundant on the banks of rivers and in marshy places. *Mnium Fontanum*, Spec. Plant. Withering and Lightfoot.

Polytrichum. *Gen. char.*—External fringe, with thirty-two or sixty-four short inflected teeth; internal fringe, a plain undivided membrane; calyptra often double, the external one hairy.

Polyt. *Commune,* Hair-moss; with simple stem; leaves linear, lance-shaped, slightly serrated; caps. erect, square; external fringe, with sixty-four teeth; calyptra double. Common in moist woods and boggy places.

Polyt. *Undulatum,* Waved Hair-moss; with lance-shaped serrated leaves that curl in drying; cylindrical nodding capsule, and calyptra rough on the summit; teeth of the fringe thirty-two. Frequent in shady places and hedges.

Order III. Hepaticæ, *Liverworts.*

The plants included under this order are separated from the Algæ or Flags, under which they were arranged by Linnæus. In the Liverworts the herbage is commonly frondose; the fructification originates from what is at the same time both leaf and stem; and the capsules have no lid or operculum.

Jungermannia. *Gen. char.*—(1) Barren flower, on a foot-stalk and naked, anther four-valved. (2) Fertile flower, sessile, naked, with roundish seeds.

Jung. *Trichomanes,* Powder-headed Jungermannia; with fronds simply pinnated; leaves ovate, plain, very entire; stem with the pistil at the summit. Near springs and rivulets in moist woods.

Jung. *Asplenoides,* Spleenwort Jungermannia; with fronds simply pinnated, leaflets ovate, slightly ciliated. In moist woods, at the roots of trees; and is said to be the largest of the British species.

Jung. *Complanata,* Flat Pale-green Jungermannia; with creeping shoots; leaflets eared below, and doubly imbricated; branches equal. Common on trunks of trees.

Jung. *Tamarisci,* Red Tamarisk Jungermannia; with leaves imbricated in a double series, upper leaves roundish, convex, obtuse, one-fourth larger. On trunks of trees, rocks, and in dry stony places; on the rocks of Edinburgh Castle.

MARCHANTIA. *Gen. char.*—(1) Barren flower, cal. shield-formed, covered underneath with one-leaved corollas; anthers much divided. (2) Fertile flower, cal. sessile, bell-shaped; many-seeded.

March. *Polymorpha,* Great Star-headed Marchantia; with the common calyx ten-cleft; by the sides of wells, and on moist rocks on the banks of rivulets.

A variety of this plant, which some have considered a different species, is smaller in all its parts, excepting the umbellated heads; it grows on walls, rocks, and neglected shady garden-walks.

March. *Hemispherica,* Hemispheric Marchantia;—with the common calyx five-cleft, hemispherical, and destitute of sheath. On wet banks, by the sides of rivers, not uncommon; in the King's Park at Edinburgh. The leaves are slightly notched on the margin; and the margin and under surface are of a dark-red or claret colour, covered with white downy radicles.

Order IV. Algæ, *Flags.*

In this order the herbage is frondose, sometimes of a leathery gelatinous consistence, and sometimes only a crust; and the seeds are produced either in a peculiar receptacle or in the frond itself.

Lichen. *Gen. char.*—(1) Receptacle roundish, somewhat plain, shining. (2) Dust scattered on the leaves.

Lich. *Scriptus,* Lettered Lichen; warty, whitish, with small black branched lines resembling letters. On the smooth bark of trees.

Lich. *Geographicus,* Map Lichen; warty, yellowish, with black lines resembling a map. Frequent on rocks, as in the King's Park at Edinburgh.

Lich. *Islandicus,* Eatable Iceland Lichen; leafy, laciniated, with elevated fringed margins. On mountainous places in the Highlands and Lowlands of Scotland; on the Pentland Hills, near Edinburgh.

Fucus. *Gen. char.*—(1) Vesicles interwoven with hairs. (2) Vesicles strewed with imbedded grains, slightly prominent at the summit; seeds solitary.

Fucus *Serratus,* Sea-wrack; with frond, plain, divided, ribbed, serrated, toothed, and tubercular terminal fructifications. On sea-rocks at low water-mark. The leaf is flat, radical, and about two feet long.

Fucus *Vesiculosus,* Common Sea-wrack, or Sea-ware, in Scotland; grows abundantly on rocks at low

water-mark, and is collected on the shores of Scotland for making kelp. Several other species of fucus are employed for the same purpose.

Fucus *Palmatus*, Palmated, or Sweet Fucus; dulse, or dilse, in Scotland; with a plain hand-shaped frond. Common on sea-rocks, and frequently eaten by the inhabitants.

Order V. Fungi, or *Mushrooms.*

The vegetable nature of this order of plants was long doubted by some naturalists, who were disposed to ascribe to them an animal origin; but the labours of Dryander, Schæffer, and Hedwig, have shewn that they possess a vegetable character, by detecting their seeds, and explaining the parts of fructification. In the *Synopsis Methodica Fungorum* of Persoon, the order of mushrooms is divided into such as produce their seeds internally, or in vessels, and such as have them exposed or imbedded in an appropriate membrane. To the first division belong *Sphæria* and *Lycoperdon*, or Puffball; and to the second *Helvella*, in which the seed-membrane is smooth and even; *Boletus*, in which it is porous; and *Agaricus*, in which it is composed of parallel plates, denominated *Lamellæ*, or Gills.

Agaricus. *Gen. char.*—Fungus horizontal, lamellated underneath.

Ag. *Chantarellus*, Yellow Agaric, or Chantarelle, Paddock-Stool in Scotland; with a pipe or foot-stalk, and branched lamellæ or gills. Frequent in woods. This species is of a yellow colour; the pileus, when

young, is orbicular; when full grown, the rim becomes waved and variously lobed; and the gills are branched, curled, and run down part of the stem.

Ag. *Integer*, Equal-gilled Agaric; furnished with a stem; all the gills of the same size. Not uncommon in woods.

Ag. *Piperatus*, Pepper Agaric; with a foot-stalk; pileus plain, lactescent, margin deflected, gills pale, flesh-coloured. Frequent in woods. This mushroom is of a very acrid nature, yet, after being pickled with salt, is eaten by the Russians.

Ag. *Campestris*, Common Mushroom, or Champignon; with a foot-stalk, white, convex, scaly pileus, and reddish gills. Common in dry pastures after rains. This is the only mushroom which may be eaten with safety; and the juice, preserved with salt and spice, forms the sauce well known by the name of Ketchup. The stalk of this mushroom is short, white, solid, and about the thickness of the finger; the pileus, when young, is white, hemispherical, fleshy, and covered with ragged scales; the rim is inflected, and the gills are rose or pink-coloured, and nearly of equal length.

Lycoperdon. *Gen. char.*—Fungus roundish, filled with mealy seeds.

Lyc. *Tuber*, Truffles, or Subterraneous Puff-balls; globular, solid, with sharp tubercles, and without root. Found in woods. This fungus is produced in clusters, three or four inches under ground.

Lyc. *Bovista*, Common Puff-ball; roundish, opening irregularly. Common in meadows and pastures in the autumn. This species varies much in size, figure, and colour.

APPENDIX.

PALMS.

The natural order of Palms exhibits such striking peculiarities in the structure and habits of the plants which it comprehends, as to be properly enough reserved for an appendix to the system, as was originally done by Linnæus, in consequence of the limited knowledge which he possessed of these remarkable vegetable productions. From the observations of succeeding botanists, it appears that Palms have for the most part six stamens; more rarely three or nine, with three or six petals, and one or three styles. The stamens and pistils are sometimes in the same flower; sometimes in separate flowers on the same plant; and sometimes on different plants, thus forming monœcious or diœcious plants. The fruit of the Palms is generally a drupe. Having some affinity to the liliaceous tribe, which were called by Linnæus the nobles, the Palms, from their lofty stature and elegant form, have received the dignified appellation of the princes of the vegetable kingdom.

The genera of Palms, which do not exceed ten or twelve, have been divided into three sections, the characters of which are taken from the form of the leaves. In the first they are fan-shaped; in the second pinnated, or wing-shaped; and in the third doubly pinnated.

CHAMÆROPS. *Gen. char.*—Dicœcious; pericarp three globular one-celled drupes.

Cham. *Humilis*, Smaller Palmeto, or Fan-Palm; with large fan-shaped leaves and smooth stems. A common plant in Jamaica, the leaves of which are much employed for thatching cottages; and the berries, which are sweet, are greedily devoured by birds. This species of palm is also a native of Europe; it grows as far north as the vicinity of Nice.

THRINAX. *Gen. char.*—Perianth minute, six-toothed; stamens six; pericarp a naked berry, one-celled.

Thrin. *Parviflora*, Small-flowered Palmeto Royal, or Thatch-Tree; with palmate plaited leaves. Native of Jamaica, and grows abundantly on rocky hills, and low moist plains near the sea. It shoots up with a simple stem from ten to twenty feet in height. The leaves are used for thatch, and the trunk is employed for buildings in the sea, for which purpose it is well calculated from its durable quality.

BORASSUS. *Gen. char.*—Dicœcious; (1) cal. a compound sheath; cor. with three oval and concave petals; (2) cal. a sheath; cor. with three roundish petals; drupe or berry roundish, obtuse, with three seeds.

Boras. *Flabelliformis*, Fan-leaved Palm; with hand-shaped leaves, folded, wide at top, and drawn to a point below; foot-stalk serrated. This palm is a native of India, rises to the height of thirty feet, and is terminated with a bunch of fan-shaped leaves.

CORYPHA, or Mountain Palm, is also dicœcious, with a drupe containing one seed; and it includes two

species, which are natives of the East Indies and Carolina.

PHOENIX. *Gen. char.*—(1) Cal. a three-parted one-valved sheath; cor. with three concave oval petals; (2) cal. the same; cor. with three petals; fruit oval, one-seeded.

Phœn. *Dactylifera*, Date Tree; with pinnated leaves, leaflets sword-shaped, folded. To the inhabitants of many extensive regions of Asia and Africa, the Date-Tree is the most important vegetable production; it grows with a straight cylindrical stem to the height of thirty or forty feet, thickly set on the upper part with scales, which are the vestiges of old leaves, and is terminated by a bunch of leaves nine or ten feet in length. The fruit is composed of a fine soft pulp, of a sweet and slightly vinous taste, and of a very wholesome and nutritious quality.

Cocos. *Gen. char.*—Monœcious: (1) Cal. with three leaves, cor. with three petals. (2) Cal. with two leaves, and cor. with six petals; seed vessel a drupe, with a fibrous husk, including a large oval nut.

Cocos *Nucifera*, Cocoa-nut Tree; is a native of almost every tropical region; grows to the height of fifty or sixty feet, and is terminated by a bunch of ten or twelve leaves, from ten to fifteen feet long. The cocoa-nut tree is of slow growth, but when it reaches maturity it lives long, and produces fruit three or four times a year. By wounding the upper part of the tree, which is green and tender, a sweet thick liquor distils, of an agreeable flavour, and known in Ceylon by the name of *tody*, is a wholesome and cooling drink while fresh,

and acquires, by fermentation, an intoxicating quality. Of the cocoa-nut tree it has been said, that it furnishes meat, drink, medicine, clothing, lodging, and fuel. The kernel of the nut is eaten; the milk is a cooling and pleasant beverage, which is sometimes employed as an emulsion in fevers; a fibrous substance at the base of the branch is converted into coarse cloth; the fibrous covering of the nut is manufactured into strong and durable cordage; the leaves are used as thatch, or made into mats for baskets; the woody part is applied to the purpose of lathing, and the polished shells are made into drinking cups.

Preparation of a Herbarium, or Hortus Siccus.

In prosecuting the knowledge of botany, it is recommended to the student, after being familiar with the terms and definitions, to compare, with the descriptions, those plants, the names of which he is acquainted with, or has an opportunity of learning from others. This preliminary exercise, as it may be called, will greatly abridge his labours, and enable him with more certainty and facility to refer to the class, order, genus, and species, such plants as are new or unknown to him. In botanical excursions a greater number of objects present themselves than can be conveniently examined on the spot; but by collecting plants in their own native soil and situation, many facts relative to their natural history are discovered; and for the purpose of subjecting them at leisure to future investigation, they are put up carefully in a close tin box, that those parts on which the characters depend may remain fresh and entire. The zeal of the enthusiast in botany is not to be limited by times or seasons; he will not fail to grasp at the objects of his pursuit when they are in his power; but when it is equally convenient, plants intended to be preserved are best collected in dry weather; and, when it can be accomplished, specimens in flower and in seed ought to be selected, that all the characteristic parts may be seen.

Plants are preserved by drying them slowly between the leaves of unsized porous paper, by the application of a hot smoothing iron, or in a box of sand. In the first case the plants being spread carefully between the leaves of the paper, and retaining as much as possible their natural appearance, they are subjected to pressure, which at first should be moderate and afterwards gradually increased as the plants diminish in bulk by the absorption of the moisture. The pressure is applied either by means of a press constructed for the purpose, of two strong boards, of sufficient length and breadth to cover a large sheet of paper, and furnished at the corners with screws, or what answers equally well, a folio book placed upon the paper on a flat board or table, and loaded with other books. In preserving plants in this manner, when much nicety is required, every precaution should be observed not to wound or injure any of their parts by which a copious flow of the juices is produced. If a large quantity of paper be employed, the plants often dry perfectly without being shifted, but when they are crowded together in the same paper it is necessary to change their place, and at the same time to dry the paper daily.

The application of a hot smoothing iron answers, in some cases, sufficiently well, particularly for drying succulent or juicy plants; but it ought to be applied slowly and cautiously, and with a considerable quantity of paper.

The colour of some plants is retained in higher perfection by drying them in a box of sand. After the specimen has been pressed for ten or twelve hours according to the former method, it is placed within a sheet of blossom paper, and laid in the box on a layer, an inch

thick, of fine dry sand, covered with another layer of the same thickness, on which another sheet of paper with plants is placed, and another layer of sand, till the box be full. The box is then set near a fire for two or three days, or till the plants be sufficiently dried.

Some vegetables are so tenacious of the vital principle, that they continue to grow during the process of drying; and others, as the heaths and firs, throw off their leaves. The immersion of the fresh specimen in boiling water, or the application of a hot-iron, counteracts both these effects; but even with every precaution, the colours of flowers, and the appearance of the leaves of many plants, undergo very great changes. Some yellow colours retain all their brilliancy and beauty; while others, as well as the whole plant, become black by drying. Blue colours generally fade; reds are not always permanent; and the natural aspect of most white flowers is altered.

When the specimens are dried, they are best preserved by securing them on paper with weak carpenter's glue, that they may be turned over without injury. When the stems are thick and heavy, the additional support of transverse slips of paper is necessary. A half-sheet of paper of a suitable size is to be allotted to each species; or when the species occupies little-room, two or more may be put upon the same half-sheet; and all the species belonging to the same genus are collected into one or more whole sheets; on the latter of which the name of the genus is written, and on the corner the name of the species, its place of growth, and other circumstances connected with its history. The specimens thus collected and arranged, are placed on shelves in a

cabinet; and a dry room, without a constant fire, is recommended as most suitable for a herbarium.

The depredations of insects are peculiarly destructive to dried specimens, and especially *Ptinus fur*, a small beetle, deposits its eggs in the germens or receptacles of flowers, which are in a short time devoured by the maggots when hatched. To prevent their devastations, Dr Smith recommends a solution of corrosive sublimate of mercury in rectified spirits of wine, in the proportion of two drams to a pint, with the addition of a little camphor, as the most efficacious remedy. When the specimens are quite dry, and before they are pasted, the solution is applied with a camel-hair pencil. It is also found useful to mix a few drops of the solution with the glue which is employed for pasting the plants on the papers. This application, Dr Smith observes, not only keeps off all kinds of vermin, but greatly revives the colours of most plants, and gives the collection a pleasing air of freshness and neatness.

Structure and Functions of Vegetables.

The division of natural bodies into organised and inorganised, is sufficiently discriminative; the most perfect forms of inorganised matter exhibit no analogous characters to the varied and complicated structure of plants or animals. A striking diversity prevails in the mode of formation, or the growth and increase of the objects of these two great classes. In mineral bodies,

the growth or increase is accomplished by the mere aggregation of the particles of matter already prepared, and according to the laws of affinity between these particles; and no new properties can be detected in the aggregate produced, which are not found in the minutest particle of which it is composed. But in organised bodies, under which are comprehended vegetables and animals, the growth or increase is effected by a very different process. The substances of which they are composed are received into tubes or vessels, conveyed to all parts of the vegetable or animal, subjected in their progress to peculiar changes, and are converted into new forms, exhibiting properties and qualities which no chemical or mechanical operation could discover in the simple elements. New changes are produced, and new combinations are formed, none of which could be detected in the water, the earth, the air, the heat, or the light; all of which contribute their share to the progress and increase of organised bodies. Observing the remarkable diversity between the laws which regulate the operations of vegetables and animals and the established laws of chemical action, philosophers have naturally inferred the existence and influence of a different principle called the *vital principle*, under whose power the wonderful and complicated phenomena of animals and vegetables are exhibited;—under whose power the effects of chemical or mechanical agents, which seem injurious, are counteracted;—under whose power what is beneficial is selected;—what is deficient is supplied, and what is redundant is cut off.

The division of organised bodies into vegetables and animals, although in both some points of resemblance may be traced, is, in general, sufficiently characteristic,

when their form, structure, power of motion, constituent parts, and peculiar habits, are taken into consideration.

Of the Structure of Vegetables.

A plant is composed of a root, stem, leaves, flowers, fruits, and seeds; and when these different parts are fully developed in the progress of vegetation, the plant is said to be perfect; when any of them are deficient, or less obvious, it is called an imperfect plant. The root, concealed in the earth, conveys nourishment to the whole plant; the stem supports all the other parts, and when it is large and solid, is called the trunk, which is divided into the wood and the bark; and the bark, forming the external covering, clothes the whole plant. The wood immediately under the bark is composed of concentric layers, which increase with the age of the tree; and the pith, a soft spongy substance, occupies the centre of the stem. The leaves consist of fibres, arranged in a kind of net-work, which proceed from the stem and foot-stalks by which they are attached to the branches; the flowers are composed of different parts destined to the perfection of the fruits and seeds; the fruits usually consist of a pulpy substance, containing numerous vesicles, traversed by great numbers of vessels, and seeds are constituted of a similar vesicular texture. Beside the parts now enumerated, plants contain different orders of vessels, as lymphatic vessels for the circulation of the sap, peculiar vessels which contain thick or coloured fluids, utriculi or cells, and tracheæ or spiral vessels.

Cuticle.—The bark is composed of three parts, the epidermis, parenchyma, and cortical layers. The epidermis, or cuticle, is a thin, transparent membrane which forms the external covering of the bark, and is composed of fibres crossing each other. By means of this membrane, the plant is protected from the injuries of the air, and the processes of absorption and perspiration go on through its pores. It is of a very delicate texture on some plants, and coarse and thick on others, as on the trunk of the Plane-tree; readily peals off from some, as from the Birch; and may be separated by maceration from others.

The cuticle is susceptible of extraordinary extension; for, during the growth of the plant from the commencement of vegetation, it is stretched over its whole surface, without receiving any accession of matter, as the connection with the vascular or living part of the vegetable body seems to be altogether interrupted; but on the old trunks of most trees, it may be observed to crack in all directions, and in many it is entirely obliterated.

In the Currant-tree, and in the Elder, the cuticle is smooth, and scales off in large flakes; in the fruit of the Peach, and the leaves of the Mullein, it is covered with dense harsh wool; in the leaf of the White Willow, it is of a silky texture; in the Betony, and some other plants, it is extended into rigid hairs or bristles; on the fruit of the Plum, and on many leaves, it is covered with a dry bluish powder, which repels the drops of rain; in the Cork-tree, the Common Maple, the Dutch Elm, and the Constantinople Hazel, the cuticle is covered with a singular fungous substance, well known as cork; and in Grasses and Reeds, siliceous

earth has been detected by chemical analysis; and to this, no doubt, their hardness and fine polish are to be ascribed.

Cellular integument.—Under the epidermis, or cuticle, a succulent cellular substance is deposited; it is usually of a green colour, at least in leaves and branches; exists almost universally; and has been observed in mosses and ferns. Leaves are composed almost entirely of a plate of this substance, covered on each side by the cuticle; and in this organ, the changes which are produced on the juices of plants, by light and air, are effected.

The Bark.—Next to the cellular integument lies the bark, which in plants or branches of one year old consists of a single layer, scarcely to be distinguished from the wood; but in older branches, and the trunks of trees, the number of layers is equal to the number of years during which the plant has existed. The innermost layer is called *liber*. The bark is composed of numerous woody fibres, which chiefly run in a longitunal direction, and when macerated in water exhibit a beautiful structure resembling net-work. The Lace-bark tree, *Daphne laghetto*, a native of Jamaica, presents a remarkable example of this structure, which has been already noticed in the description of that plant.

The peculiar virtues or qualities of plants chiefly reside in the bark, and especially in those layers which are next to the wood; it is here that the resin of the Fir, the astringent qualities of the Oak, and the aromatic oil of the Cinnamon, are found.

Wood.—The wood, which lies immediately under the bark, is composed of numerous concentric layers which increase with the age of the plant, and may be separated into thinner layers, which consist of longitudinal fibres. The wood which is next the bark is softer and whiter, and is hence called *alburnum* or white-wood, and known to workmen by the name of Sap; the interior part of the trunk is browner and harder, and is denominated the perfect wood. In the laburnum the concentric layers which constitute the alburnum are yellowish, and the perfect wood is brown. A transverse section of lignumvitæ affords a good example of the same diversity of appearance.

Pith.—The medulla or pith occupies the centre of the trunk or stem of the plant, and in growing stems or branches is a tolerably firm juicy substance; but when the same parts are fully grown, it becomes extremely light and cellular. Many of the grasses and umbelliferous plants have always hollow stems, lined only with a thin smooth coating of pith. Of the nature and functions of the pith, physiologists have entertained very different opinions; some have supposed that it performs no important office in the economy of plants, and others regard it as the seat of life and the source of vegetation; but whatever be its nature and functions, as it is most vigorous and abundant in young and growing branches, it cannot be doubted that it performs some essential part. Mr Knight supposes that the pith is a reservoir of moisture to supply the leaves when an excess of perspiration takes place; but it has been remarked by Dr Smith, that all the moisture in

the pith of a whole branch would be too little in some cases to supply one hour's perspiration of a single leaf.

Vessels of Plants.—Plants are furnished with different kinds of vessels, which are distinguished from each other by their course, situation, and uses. The lymphatic vessels, which serve for the circulation of the sap, are chiefly observed in the woody part of the plant. The peculiar vessels which contain thick or coloured fluids lie immediately under the bark. Some of these proper vessels are placed between the cuticle and the bark ; and some forming oval rings, and filled with the peculiar juices of the plant, are situated in the interior part of the bark.

Another set of proper vessels is distributed in the *alburnum,* nearer to the centre of the trunk, and sometimes in the perfect wood.

The *utriculi,* or cells, constitute another set of vessels, vary in form, colour, and magnitude in different vegetables, and exist in the roots, the bark, leaves, and flowers. They seem to resemble a flexible tube slightly interrupted with ligatures nearly at equal distances, while a free communication is preserved through its whole length. The tracheæ or spiral vessels appear in the form of fine threads, and may be drawn out to a considerable length without breaking. These vessels are very numerous in all plants, form a kind of ring underneath the bark, and are distributed in distinct bundles in trees, shrubs, and herbaceous plants. These spiral vessels are easily detected in succulent plants, as in the leaf-stalks of Elder, Syringa, and other shrubs ; and in many plants of a herbaceous nature, as in the Pæony and many of the lily tribe.

Spiral vessels were supposed by Malpighi and Grew to be air vessels, performing a similar office in plants, to the lungs of animals; but from the curious experiments and observations of Mr Knight, it appears that the fluids destined to the nourishment of the plant being absorbed by the root, are conveyed to the leaves by these vessels; and from their situation near the pith he has given them the name of central vessels.

Seeds.—The seeds from which the future plant proceeds is composed of different parts; of these parts the embryo, or germ, to which Linnæus gave the name of *corculum*, or little heart, is the most essential. This part is sufficiently obvious in some seeds, as the Bean, the Pea, and the Lupine; and its internal structure, before the commencement of vegetation, is very simple. The cotyledons, or seed lobes, are immediately attached to the embryo, and indeed are to be considered as forming part of it. In most seeds the cotyledons are two in number; but some seeds, as those belonging to the Grass and Corn tribe, the Palms, and some other plants, have only one cotyledon, while others have three or more; and hence the division of plants suggested by this peculiarity of structure in the seeds, into monocotyledonous, dicotyledonous and polycotyledonous. In those plants the seeds of which have only one cotyledon, the greater part of the substance of the seed is composed of a farinaceous, fleshy, or horny substance, called albumen or white. When seeds of this description germinate, the cotyledon never rises out of the ground, or performs the office of leaves; but in plants whose seeds have two cotyledons, they rise out of the ground, and being formed from the seed itself,

are called seminal or seed leaves. In some cases the seed leaves wither and decay as soon as the other leaves begin to unfold; but in other cases they continue long, and remain green and vigorous after the plant has made considerable progress; this may be observed in the Yellow Lupine. The cotyledons are abundantly obvious in the Garden Bean after it has begun to vegetate, and the embryo is seen to push out from between them.

The appendages of many seeds, and the peculiar structure of some seed-vessels, are admirably calculated to promote their dispersion; for this purpose seeds are furnished with wings, spines, hooks, and scales. The downy appendage of many seeds of syngenesious plants, as is familiar to every one in the Dandelion, wafts them through the air; the elastic power of the seed-pods of other plants, projects their contents to a considerable distance; and the barbed structure of some seeds retains them in the soil, while the uncoiling of the attached awn forces them deeper.

Functions of Vegetables.

When the perfect seeds of a plant are exposed to the influence of certain agents, they undergo a very remarkable change, in the progress of which plants exactly similar to those from which they originated are produced.

Germination.—The first change which is observed in seeds when they are placed in certain circumstances, is called germination. Heat, air, and moisture, are ne-

cessary to this process. No vegetation whatever takes place when the temperature is at the freezing point, and very little till it rises many degrees above it. Air is no less requisite for the germination of seeds; when it is entirely excluded, as in the vacuum of an air pump, no change takes place. Moisture is also necessary in this process; but in most cases water must be applied in a regulated and moderate quantity,—for, excepting the seeds of aquatic plants, which possess peculiar habits, most seeds, when exposed to excessive moisture, are deprived of their vegetative power. The exclusion of light is favourable to the vegetation of seeds, and hence it is that their germination is greatly promoted by covering them with the soil.

When a seed begins to germinate, the first change observed is the increase of size by the absorption of moisture; the radicle, or little root, pushes out and stretches downwards into the earth, from which it conveys nourishment for the growth of the future plant. Another part, called *plumula*, shoots upwards, and finally expands into leaves and branches; but these remarkable effects are owing to certain changes which take place within the seed. The absorption of the oxygen of the atmosphere, the evolution of carbonic acid gas, by the combination of the oxygen with the carbone of the seed, and the conversion of the farinaceous matter into a saccharine substance, which is destined for the nourishment of the embryo plant, are the first changes observed in the germination of seeds. The cotyledons, or seed-lobes, are to be regarded as storehouses of food for the young plant, before the evolution of its parts are fully completed, to enable it to derive nourishment from the earth.

Roots.—The roots of plants are intended to retain them firmly in the soil, and at the same time to derive nourishment for their support. The root is composed of two parts, denominated *caudex*, or body, and *radicula*, or fibre, the latter of which, as it alone imbibes nourishment, is essential to the plant. The turnip and the carrot form the *caudex*, or body of the root, while the fibres which proceed from them are to be considered as the proper roots.

The fibrous extremities of roots, which draw nourishment from the earth, are produced annually, and these extremities have a peculiar structure; for when the extremities of the fibre are cut off, the vegetation of the plant ceases till new fibres are formed; and hence the practice of cutting off most of the fibres is in many cases extremely prejudicial. The peculiarity of structure alluded to may be observed in the fibres of bulbous roots which blow in water, in which case the extremity of each fibre seems to be included in a kind of fringed bag.

Stems, &c. of Plants.—The stem, stalk, or trunk of a vegetable, thus variously denominated in different kinds of plants, forms a support for the leaves and flowers, and a necessary communication between the root and those parts which are elevated above the surface of the earth, and in which the most important functions of vegetation are accomplished. The stems of plants are not less various in form, magnitude and consistence than the character and habits of the different kinds of vegetables to which they belong. This diversity affords many important distinctions for bota-

nical classification, as well as many curious topics for physiological inquiry.

The branches of trees or shrubs, which constitute a minuter division of the trunk or principal stem of the vegetable, may be regarded as a new order of stems, whose roots are attached to a ligneous base, and thus form the necessary communication between the leaves and the source of nourishment.

The general aspect of a plant depends, in a great measure, on the distribution of the branches, as they spring from the trunk in a spiral direction, opposite to each other, in whorls, disposed irregularly, or from two sides of the trunk only, and form with it more or less acute angles. On the same plant the branches are observed to be arranged in very different, and almost opposite directions. In a large tree the lower branches are bent towards the earth, some spread out horizontally, and those towards the summit of the tree rise nearly in a perpendicular direction; but the disposition of the whole is such that the action of the air and light, of so much importance to the health and vigour of the vegetable, may be the least interrupted. Influenced by the same cause, a plant in a shady place inclines all its branches to that side where the action of air and light is most powerful; and plants, confined in a hot-house, turn all their leaves and branches towards that side from which the light proceeds.

According to Schabol, as quoted by Mirbel, five different kinds of branches may be distinguished in fruit-trees,—a distinction of no small importance in their culture and management. In the first kind the surface is smooth, the vessels run in a straight direction, and are easily separated; they bend without

breaking straight across, and produce only wood. By practical gardeners such shoots are called the *wood.* 2. In the second kind of branches the base is wrinkled and perforated with small holes, the texture is more complicated, the vessels more numerous, and the juices of greater consistence; these are the fruit branches; they produce flower-buds, and break clean across when they are bent. 3. Another set of branches bear some resemblance to the first, but they are less permanent, because they have their origin only in the bark; they are denominated branches of *spurious wood.* 4. In the fourth order of branches the base is broad, the bark is brownish and rough, their buds are black and thinly set; they have their origin in the bark, and are nourished at the expence of the useful branches; they push out rapidly and have a short duration. 5. The fifth kind of branches, which are not particularly characterised, are described as being useless to vigorous trees, and injurious to those whose vegetative powers are feeble. They draw to themselves a large portion of nourishment, and exhaust the vegetable on which they exist.

Buds.—As the trees of tropical regions, where vegetation is never interrupted, are destitute of buds, this part of the vegetable structure, in which the rudiments of a plant remain in a dormant state, till the influence of those agents which produce its evolution commences, is a necessary preservative in cold countries. The buds of trees and shrubs are formed during the summer in the bosoms of the leaves. In their structure and distribution they are remarkably uniform in the same species, but a great diversity prevails in their situation and forms

in different tribes of plants. They are composed of a number of scales, which are closely wrapped upon each other, and unfold the embryo plant or branch. To enable them to accomplish the purpose for which they are destined, many buds are furnished with some additional covering, as a coat of wool, or of a gummy or resinous secretion. Thus constructed and protected, buds are enabled to resist very great degrees of cold; for it is only when the vegetative process has commenced, when they begin to unfold their leaves, that they sustain injury from the sudden changes of a variable climate.

Buds derive their origin from the *alburnum*, or white wood, according to the observations of Mr Knight, but perhaps this is liable to certain modifications, if the remarks of Schabol, formerly detailed, on the different kinds of branches be well founded. In some tribes of plants the same buds produce both leaves and flowers, but in others the leaves and flowers appear in different buds. The bulbs, or as they are, with little propriety, denominated roots, of certain tribes of plants, as the Hyacinth, the Lily, and the Tulip, are true buds; and in some of them, as in the Tulip, the future flower is distinctly formed, and only requires the influence of the necessary agents, heat, air and moisture, for its complete evolution.

Every bud may be considered as a distinct individual performing its functions, when the influence of the proper agents is exerted, independent of the parent stem, or of any other part of the plant, excepting in the circumstance of deriving its nourishment from that source. Thus, if the branch of a vine, whose root is exposed to the open air, be introduced into a hot-house in the mid-

dle of winter, the vegetative process will immediately commence, and proceed with vigour; and if the proper temperature be continued, leaves, flowers, and fruit may be produced while every other part of the tree remains in a dormant state.

Leaves.—The leaves of plants, not only contribute to their beauty and elegance, but perform functions of essential importance in the process of vegetation. Deprived of its leaves, no tree brings its fruit to maturity, as is too often experienced in the ravages of the caterpillar on the gooseberry; and if by any accident a tree has lost its leaves, the progress of its growth is interrupted till it is again clothed with foliage.

A leaf is composed of a double layer of the fibres, and vessels of the footstalk, between which is interposed a plate or layer of the *parenchyma*, or cellular texture. Leaves, it has been long observed, and proved by decided experiments, transpire a considerable quantity of moisture, and in some cases this quantity is little inferior to the moisture absorbed. It is greatest during sun-shine and warm weather, is much interrupted during the night, and entirely checked by cold. In an experiment by Dr Hales, a plant of sun-flower, *Helianthus annuus*, lost nearly two lbs. weight in twelve hours of a hot dry day; in a dry night, the diminution of weight was only about three ounces; in a moist night, no perceptible difference was observed; and in a rainy night it gained two ounces. The matter excreted by the leaves of plants is of very different qualities. In some it is aqueous, in some of a saccharine nature, and in others it is glutinous, resinous, or waxy.

The sap of plants flows from the root towards the

branches and leaves and in the leaves it undergoes peculiar changes, in consequence of part being exhaled, and of the absorption of different principles, which, combining with it, contribute to the changes that are effected. During these changes the peculiar juice of the plant is prepared, which, in its progress from the leaves towards the roots, deposits those ingredients which produce all the variety of substances which are detected by the remarkable diversity of odour, taste, and consistence. The exhalation of a portion of the moisture taken in by the roots, and the absorption and decomposition of carbonic acid gas, by which the carbone is retained in the plant and the oxygen is given out, constitute one part of the functions of leaves. These processes are most vigorous during the day, and particularly during bright sun-shine ; but in the night they are reversed. Carbonic acid gas is given out, and moisture and oxygen gas are absorbed ; and this absorption and moisture are chiefly effected in many plants by the under surface of the leaves.

The effects of light on vegetables are very remarkable. When it is entirely excluded, although they enjoy the influence of air, heat, and moisture, they never acquire their rich green colour, but remain of a pale, sickly white. The familiar practice of blanching or whitening celery, affords a good illustration of this fact; and not only the colour, but the smell and taste undergo equal changes.

Sleep of plants.—When the influence of those agents which have a powerful effect on vegetables is withdrawn, many plants exhibit a very remarkable change in their aspect. This is particularly the case with plants which

have pinnated leaves. During the night, and sometimes in dark cloudy weather, the leaves droop or fold over each other; this has been called the sleep of plants; and it has been supposed that it may be a kind of necessary repose in some way useful to the vegetable constitution. A similar change takes place in other plants from mechanical impulse, as in the sensitive plant; the leaves of which, by the slightest touch, close together, and exhibit the same appearance as those plants which are supposed to be under the influence of sleep.

Heat of plants.—During the chemical changes that take place in plants, it cannot be doubted that heat is evolved or abstracted; and it is extremely probable that plants, as well as animals, have the power of regulating, although in a lower degree, the excesses of temperature to which they are exposed. The snow which falls on the leaves and stems of living plants melts sooner than on dead matter of the same kind,—an obvious proof that the temperature is higher; but the heat of vegetables is so much superior to that of the atmosphere, as to be indicated by the thermometer. A remarkable fact is stated by Senebier with regard to the increased temperature of the white-veined variety of the *arum maculatum* in a certain period of its growth, when the flower was for a few hours very hot; it was preceptible from three or four o'clock in the afternoon till 11 or 12 at night; and when the temperature of the air was 14 or 15 degrees of Reaumur's thermometer, the heat of the plant, when it was highest, was seven degrees above it. This curious fact, as is justly observed by Dr Smith, is well worthy of attention, and may perhaps be observed in other plants.

Duration of plants.—Many plants, as soon as they have ripened their seeds, which is accomplished by some in one season, by others in two, cease to vegetate; and hence such plants have been denominated *annuals* and *biennials*,—terms expressive of their duration for one or two years; but other plants live for a great length of time, and continue to produce seeds and fruit for many successive seasons; and hence such plants have been called *perennials*. This diversity of duration exhibits a wonderful and endless variety among the vegetable tribes. The humble annual springs up, displays its leaves, and flowers, and forms perfect seeds; and thus, within the short period of a few months, passes through the whole progress of its existence; while the stately oak rears its lofty head, and continues to be the glory and pride of the forest for hundreds of years.

THE END.

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