The THIRD SUBDIVISION is

THE GENERA

OR FAMILIES OF PLANTS;

for the comprehending of which it will be necessary to enter more fully into the parts of the flower, called scientifically the Parts of Fructification: namely—

The CALYX.	The PERICARP.
COROLLA.	SEED.
STAMEN.	RECEPTACLE.
PISTIL.	

To these may be added the NECTARY, which, although not met with in all flowers, should be noticed.

These will be found to vary in different flowers in shape and size, but practice will soon bring persons acquainted with the terms made use of for distinctions; and perhaps no readier mode can be recommended than to read the descriptions of the flowers in either the *Genera Plantarum* or in the translation thereof by the *Lichfield Society*, called Families of Plants, comparing the terms with the explanations in Martyn's Language of Botany, or Milne's Botanical Dictionary, in which figures are given of all the forms of petals, leaves, &c.

The CALYX, or FLOWER-CUP, is the general term for that part of every flower answering to the description we gave of it. It is defined by Linnæus to be the termination of the outer bark of the plant, called the *cortical epidermis*, which, after it has accompanied the plant round the stem and all the different branches, terminates with the flower, where it shelters the parts of fructification, as in the Tulip. Here it will be observed that the exterior coat of the flower-bud, when it is become advanced, changes and becomes beautifully striped with different colours. This may also be observed in the Lily, Crown Imperial, &c. In others it is thrown off with the expansion of the petals, and then appears as if the flower had been wholly destitute, as is the case in the Poppy. The colour, as we observed, is mostly green; but in some instances it is of some other brilliant hue, as is instanced in Fuchsia, &c. The colour of the calyx is sometimes changed by culture, when it will assume the appearance of the corolla, as in some kinds of Primrose, Cowslip, and Polyanthus. A similar change is sometimes observed in the Tulip, when the lower leaves of the corolla have the appearance of a calyx*.

* We mention these observations as instances that sometimes persons are led astray. But the young botanist should recollect that all plants are changed by culture: they should be set aside as monstrous productions, and more properly belong to the province of the florist than the botanist.

When the calyx is near the flower, and serves as a protection to the parts, as we observed before, it is styled a PERIANTHIUM: and when below the fruit, *i. e.* including the seed-vessel and flower, as in the Primrose, it is called the Perianthium of the Fructification: and when placed above the fruit, as in Willow Herb (*Epilobium*), it is styled the Perianthium of the Flower. This also differs, as follows, in the number of leaves of which it is composed: as

One-leafed (Monophyllus). Examp.—*Solanum*, Nightshade. These are either entire or indented on the edges.

Many-leaved (Polyphyllus); composed of several leaves.

When speaking of the calyx in the class Syngenesia, it is termed *Common*, from inclosing many florets, as in *Centaurea*, Corn-bottle. Here it is composed of a number of scales lying over each other like tiles on a house, and is termed *Imbricate*.

It is also in some instances composed of two parts lying one on the other, as in Mallow (*Malva*); in which case it is termed *Double*.

SPATHA, or *Sheath*, is that species of calyx accompanying the Liliaceous flowers; as Narcissus.—This incloses the flower before it is expanded, and bursts lengthways from bottom to top, and in general consists of one piece. In the Plantain Tree (*Musa*) it is scaly.

AMENTUM, or *Catkin*, is that species of calyx including the fructification of the *Salix* (Willow), and of the Birch (*Betula*). And also of the coniferous trees, *Pinus* (Fir), *Thuja* (Arbor-vitæ), where the stamens are on catkins and the pistils on cones. These occur in the classes Monoecia and Dioecia, and are composed of a number of scales lying over each other, between which the stamens and pistils are inclosed.

INVOLUCRUM.—This term is applied to the calyx in the Umbelliferous plants, as Hemlock (*Conium*). It is composed of a number of leaves, mostly five, and is placed at the foot of the stalks, bearing the flowers in these plants. It is called a *Partial* Involucrum when it incloses the shorter footstalks, as in *Phellandrium*, Water Hemlock.

It is termed a *General* one when it incloses the longer footstalks, as in Hemlock. Many plants contain both the partial and general involucrum.

GLUMA, a *Husk*: the Calyx of Grasses. This is composed of two, and in some kinds of three valves, or scales, commonly transparent in the margins, and ending in the *arista*, or *awn*, as is seen in *Hordeum* (Barley), &c.

VOLVA: the calyx of Mushrooms.

CALYPTRA: the calyx of the Mosses.

Having endeavoured to explain the different kinds of Calyces, we shall next give a description of the COROLLA, which is, as we said before, that part of the flower which is in general beautifully coloured, and is defined by Linnæus to be the termination of the inner bark of

the plant. A Monopetalous Corolla is composed of two parts:—the BORDER, which is the outer extremity; and the TUBE, which is very conspicuous in some flowers, as in Mirabilis, Crocus, &c.; in others it is short, as in *Symphytum*, which is the part beneath. The Bind-weed (*Convolvulus*) gives a good instance of a monopetalous corolla.—This is of various forms:

CAMPANULATA (*Bell-shaped*).—As in Deadly Nightshade (*Atropa*).

HYPOCRATERIFORMIS (*Salver-shaped*).—As in Periwinkle (*Vinca*).

ROTATA (*Wheel-shaped*).—As in Borage (*Borago*), whose corolla is flat like a wheel, without any tube.

RINGENS (*Gaping*).—As Dead Nettle (*Lamium*). This is composed of upper and lower parts, called Lips, the space between which is called the *Faux*, or mouth.—N. B. These flowers are principally of the class Didynamia and Diandria.

PERSONATA (*Personate*).—Similar to RINGENS, but has the *faux* (or mouth) closed, as in *Antirrhinum*, Snapdragon.

The narrow part of the petals that compose a Polypetalous Corolla is called the *Unguis*, or Claw; the other extremity, which is broad, is the *lamina*, or limb: this is observed in the petals of *Cheiranthus*.

REGULAR COROLLA.—When the petals are of an equal size and shape, as in the Lily, *Lilium*; Rose, &c. it is called a Regular Corolla.

IRREGULAR COROLLA.—When composed of several unequal petals it is termed Irregular: this is instanced in *Impatiens*, Balsam; *Delphinium*, Larkspur, &c.; from which several distinct names are given, as

PAPILIONACEA (*Butterfly flowers*).—*Papilionacea* is applied to flowers of the sixteenth class, which are the Pea-flowers, and have some distant resemblance to the Butterfly:—hence the name. These are composed of four petals, viz.

Vexillum (Standard).—The Vexillum or Standard is that part which is the uppermost, and which spreads wide.

Alæ (Wings).—The Alæ or Wings, which are the two side petals.

Carina (Keel).—The Carina or Keel, which is the lowermost petal that surrounds the stamens.

CRUCIFORM (*Cross-leaved*). When a Corolla is composed of four petals placed in form of a cross: as in *Brassica*, Cabbage; *Raphanus*, Radish, &c.—These compose the class Tetradynamia. This circumstance and the character of the four short stamens and two long ones will imprint it on the memory.

To determine what is a Polypetalous Corolla we should examine the petals as they fall from the flower when the blooming is over; and if they fall off separately it may be considered a corolla of that description. We here mention this circumstance, as in *Agrostemma*, Campion, &c. the segments of the corolla are so deeply cut that a person who does not understand the dissection of the flower may reasonably take it to be composed of five distinct petals.

There is a part of the flower frequently attached to the Corolla, called by Linnæus NECTARIUM (*Honeycup*). This is not to be seen in all; but it does not unfrequently occur, and is of various forms in the different flowers: as in Aconite, *Aconitum*, it is composed of small pieces under the corolla, shaped like horns. In the *Aquilegia*, Columbine, it is placed below the flower and is formed like a spur. In the Narcissus, it is placed in the centre of the flower, forming a cup in the corolla, where, particularly in some species, it makes a conspicuous appearance. It is unnecessary to enumerate all the different forms this part of the flower assumes, as it will be sufficient to inform the reader that where he finds a part of the flower besides the seven parts of fructification, it is invariably styled a Nectary; and in most cases little difficulty will be found in distinguishing it from the regular parts.

The next that falls under our consideration *i. e.* the STAMENS, are each composed of three parts, as we have before stated; the *Filament*, *Anther*, and *Pollen*.

The FILAMENT is in general a slender thread, which supports the anther, and fixed to some other part of the fructification; as in the following—

On the Receptacle in *Lilium*;—on the Calyx in *Pyrus*, Apple-Tree;—on the Corolla in *Atropa*;—on the Style in *Orchis*.

It may be observed that in monopetalous flowers the stamens are generally affixed to the corolla, but in the polypetalous they are for the most part on the receptacle. For instances of this see the structure of Convolvulus and Lily.

They also vary in length; as in Night-blowing Cereus, very long;—in Primrose very short;—in Indian Reed entirely wanting, the anthers being fixed to the upper petal.—It is naked in some, in others hairy, as in Mullein and Spiderwort.

They also differ as to situation and connexion, as we have shown in the character of some classes: as in Monadelphia they are connected round the pistil; in Diadelphia in two sets; in Polyadelphia in several sets, *i. e.* adhering to each other in the bottoms, and if removed falling off together.

We next come to the ANTHERS, which are commonly on the summits of the filaments: these are of different forms; they burst either lengthways or at the top, when the pollen is immediately discharged. It is curious to observe how Nature has constructed some plants for the purpose of discharging it with effect: as in the Lily the anthers are turned inside out, by which the pollen is regularly discharged; in others the filaments are so constructed as to fly open with an elastic force, and discharge the pollen at once, as in the Stinging Nettle.

These also differ in the mode in which they are connected to the filaments. As in Rhododendron it is fixed on by its lower end to the point of the filament and is nearly erect with it. In the Passion-flower it is fixed to the filament at the middle, and turns as on a pivot, which constitutes one great beauty in that singular flower.

The POLLEN is of various forms when seen through the microscope. Its colour is mostly yellow, but in some it is scarlet, as in Hypericum *pulchrum*; green in Poppy; black in Tulip; and in Polygonum white. This substance is collected by the industrious bees, and formed into wax with which they build their cells.

The next part of fructification that we have to study is the PISTIL. This, like the stamens, is composed of three parts, viz. the *Stigma*, the *Style*, and *Germen*. The STIGMA is the upper part of the Pistil, and in different genera it assumes different forms. In the Primrose it is round. In the Comfrey it is shaped like the style. In the Iris it is composed of three long distinct parts, dividing on the top of the style. In this flower it makes a very conspicuous appearance. In the Crocus it is also divided into three distinct parts, but rather mishapen; it also changes its colour, being of a deep yellow. The Saffron of the shops is nothing but the stigma of the Autumnal Crocus.

This part of the fructification, so very essential to the perfecting fruit and seed, is generally covered with a fine downy or velvety substance; which, although more conspicuous in some flowers than in others, (as in the Lily and Willow-herb,) will be found to prevail generally when a magnifying-glass is made use of.

The STYLE is that part of the pistil which supports the stigma; and, like the filament in the stamens, seems destined for that purpose alone, for we likewise in many instances find this wholly wanting, the stigma sitting close on the germ, as will be seen in Poppy, Tulip, &c. The GERMEN is placed at the bottom of the styles, and is the fruit or seed-vessel in embryo. When the germen is placed below the fructification, as is the case in the Apple, Pear, &c. it is said to be placed below (*germen inferum*). When the calyx is placed below it, it is said to be above (*germen superum*). This is explained in treating of the Calyx and Perianthium of the fruit, &c.

After this arrives at maturity, it is called the PERICARP, which incloses the seeds, and which according to form and structure is called by different names: and as these are sometimes essential to the detection of the genera, we shall in this place give the different distinctions.

CAPSULE, *i. e. Seed-vessel.*—This is frequently dry and hollow; some containing many seeds, others only one. It divides for the purpose of casting its seeds in different directions: sometimes at the top, as in *Primrose*; along the seed, as in *Asclepias:* at bottom, as in *Triglochin*. Some have the power of bursting with an elastic force, as in *Impatiens* and *Oxalis*, by which means the seeds are more regularly distributed.

The capsule of some plants is divided into several compartments, as in *Euphorbia*; in others it is composed of one. These separate places are termed *cells*, and are distinguished as one-celled, two-celled, three-celled, &c. These seed-vessels also differ in form, and are named hereafter; as *globose, acuminate, ovate, turbinate.*

The SILIQUA is a species of pod in which the seeds are affixed alter-

nately to both sutures, as is seen in that of *Mustard, Radish, Turnep*, &c. The form of this gives the name to the order in the class *Tetradynamia Siliquosa*, as before noticed. Another seed-vessel, differing only in form from this, is called a SILICULA, which gives the name to the order *Siliculosa*. It must be observed that this is in general flat, as in *Satin-flower*; round, as in *Sea Kale*; or like a shield, as in *Biscutella*; or heart-shaped, as in *Thlaspi, Shepherd's Purse*, &c.

LEGUMEN (a *Pod*). This has two valves or external openings inclosing a number of seeds fixed along one suture only. Examp.—The *Common Pea*.

FOLLICULUS. This has one valve only, and opens longitudinally on one side, having the seeds loose in it. Examp.—As is seen in the pod of *Asclepias*, Dogs-bane.

DRUPA has no external opening like the capsule or legumen, and contains within its substance a stone or nut. This is exemplified in the Peach, Almond, Cherry, &c.

POMUM differs from the *Drupa* in containing a membranaceous capsule of different cells, in which are placed the seeds. Melon, Apple, Pomegranate, &c., are of this kind.

STROBILUS (a *Cone*). This is a species of seed-vessel composed of a number of scales lying one over another; as is exemplified in all the Cone-bearing trees, Fir, Cedar, &c.

THE SEEDS. These may be considered analogous to the eggs of animals, affording the usual and natural mode of propagation in plants. The different parts of which most seeds are composed are, The *Hilum*, or Eye, by which it was attached to the pericarp: The *Cutis*, or Husk: The *Corculum*, or Embryo of the plant; this contains the radicle and plumule: The Cotyledons, or Seed-lobes;—all which parts are essentially necessary to forward the process of vegetation.

The RECEPTACLE (*Receptaculum*), the seat of the fructification. This is also divided under the following heads.

The Common Receptacle, containing both flowers and fruit, as in the class Syngenesia. *Calendula, Marigold, Anthemis, Chamomile*, are instances of this.

This is also styled the Receptacle of the Flower, as in *Rubus*. Here the fruit is its receptacle, being below the flower; the receptacle of the fruit being still below this part also.

It varies also in shape: being *flat*, as in Dandelion;—*conic*, as in Teazle; *subulate* (awl-shaped) as in Mousetail;—*chaffy*, as in Rudbeckia;—*hairy*, as in Carduus.

It is termed an *Umbel*, as in *Conium* and *Æthusa*, &c.;—a *Rachis*, (the spike,) as in Scotch Fir;—a *Spadix*, as in *Arum*, Cuckoo-pint.