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BEING
A PLEASING DESCRIPTION
OF
THE VEGETABLE KINGDOM.

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supposed originally to have
been brought from America.
It is a very deleterious
Shrub. Flowers white
and large tinged with a violet
color. The *Datura Fastuosa*
or Purple Thorn Apple from
the East Indies which is
cultivated in Hot-Houses for
the sake of the flowers which
are large & handsome &
fragrant of a purple color
without, & white within.



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PINNOCK'S
Catechism
OF
BOTANY;
being a
Pleasing Description
of the
Vegetable Kingdoms



LONDON;

Published by G. & W. B. Whittaker-13 Ave Maria Lane.

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PINNOCK'S CATECHISMS.

A

CATECHISM

OF

B O T A N Y ;

BEING

A PLEASING AND FAMILIAR DESCRIPTION

OF THE

VEGETABLE KINGDOM;

IN WHICH THE LINNÆAN CLASSIFICATION OF PLANTS
HAS BEEN ADHERED TO, AND SUITABLE EXAMPLES
OF EACH CLASS GIVEN.

“ On every thorn delightful wisdom grows ;
“ In every rill a sweet instruction flows.”—YOUNG.

EIGHTH EDITION.

LONDON:

PRINTED FOR G. B. WHITTAKER,
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1828.

The *Satonia Arborea*
or Tree Thorn. Apple is a
Magnificent Species a
Native of Peru and Chili
whose White flowers
expand only at night,
when they are very fragrant.
Each of these blossoms is
often two feet in length
and as many as one
hundred and fifty have
been seen at one time
on a single Tree.

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ADVERTISEMENT.

To attempt a description of the various plants the earth produces, the method of raising them, and their uses, would exceed the compass of many volumes. This little Introductory Work of course professes no such object. It is written with the sole view of rendering more easy the study of a science which, at the present day, is cultivated by all those who have any pretensions to a polite education; and, if it be considered in a *moral* point of view, this study is well calculated to furnish us with instruction, and conduct us, by gentle steps, to the knowledge of that Great Being, who has condescended to form plants with so much delicacy, and grace them with such a variety of beauties.

A
CATECHISM
OF
BOTANY.

CHAPTER I.

Introduction.

Question. What is Botany?

Answer. Botany is that science which arranges and distinguishes all plants or vegetables, and teaches us their peculiar properties and uses.

Q. What productions of nature are included under the name of plants or vegetables?

A. Plants or vegetables are all those productions which possess life, and derive their nourishment from the earth in which they grow.*

* The following is a more scientific definition:—Plants, or vegetables, are all those bodies which have organization and life, but are destitute of sensibility and the powers of voluntary motion, deriving their nourishment from the earth in which they grow.

Q. Are they not extremely numerous ?

A. Yes : it is supposed there are upwards of twenty thousand species of plants, which compose, what naturalists have termed the *Vegetable Kingdom* ; nor will this number appear so very surprising, when we consider that the whole surface of the earth is covered with them. About 2,000 of these are natives of Great Britain, of which nearly one-half are mosses and the like.

CHAPTER II.

Of the Structure of Plants in general.

Q. Of what does a perfect plant consist ?

A. A perfect plant consists of the trunk or stem, the root, the leaves, the supports, the flower, and the fruit.

Q. What is the trunk or stem ?

A. The trunk is composed of six *organic* parts, namely :

1. The *cuticle* (or *epidermis*), which is the outward thin covering, answering to the skin of animals.

Organic, *a.* consisting of various parts so constructed as to co-operate together.

2. The *outer bark* (or *cortex*), which protects the plant from the effects of the cold.

3. The *inner bark* (or *liber*).

4. The *alburnum*, which is a soft white substance, situate between the inner bark and the wood.

5. The *wood* (or *lignum*), which is the compact *fibrous* substance, surrounding the pith.

6. The *pith* (or *medulla*), which is a soft white substance, and in young plants is very copious, but diminishes as the plant grows, and at length disappears.

Q. What is the *root*?

A. The root, which enables the tree to stand firm in the ground, and which *absorbs* the juices from the earth, necessary for its growth, by means of small fibres, is a continuation of the trunk descending into the earth, and consists of the same parts, although less conspicuous.

Q. What are the *leaves*?

A. The leaves, which differ much in their forms and manner of growth, consist of an immense number of fibres, termed the *nerves* of the leaf, but

Fibrous, *a.* composed of fibres, thread-like.

Absorb', *v.* to suck up.

which are merely its *vessels*, running in every direction, and branching out into innumerable small threads. The surface of the leaf, like the skin of animals, is full of pores, which serve both for *respiration* and the absorption of dew, air, &c., thereby nourishing the plant, and contributing to its growth.

Q. What are the *supports*?

A. The *supports* (or *fulcra*), are certain external parts of plants, which are useful to support and defend them from enemies and injuries. They are divided into seven kinds.

Q. Describe them.

A. 1. *Tendrils*; which are small strings that are not strong enough to stand alone, but support themselves by embracing some shrubs, &c., near to them. The vine and pea will serve for examples of this.

2. *Floral leaves*; which are very small leaves placed near the flower.

3. *Stipules*; small leafy appendages, situate on the sides or below the leaf, to protect it when *emerging* from the bud.

Respira'tion, *s.* the act of inhaling, breathing.

Emer'ging, *part.* coming forth, rising into view.

4. *Foot-stalks* ; these support the leaf, and defend and convey nourishment to the bud.

5. *Flower-stalks*, or *foot-stalks* to the flower and fruit.

6. *Arms* ; which is the term given to the offensive parts of plants ; as thorns, prickles, stings, &c.

7. *Pubes* ; a name applied to the defensive parts ; such as the hairy, woolly, or clammy substances common to certain plants.

Q. What is the *flower* ?

A. The flower is that temporary and beautiful part of vegetables which is intended for the introduction of the seed. It consists of seven principal parts ; namely, the calyx, corolla, stamen, pistil, pericarp or seed vessel, seed, and receptacle ; the four first belong properly to the *flower*, and the three last to the *fruit*.*

Q. What are *annual* plants ?

A. Plants are said to be annual, when they are sown, blossom, produce seeds, and die, in the course of one year.

* By the flower and fruit, or parts of fructification, the species of each plant may be for ever renewed : all other modes of propagation, such as by buds, grafts, or layers, will sooner or later have their termination.

Q. What are *biennial* plants ?

A. Those plants which totally perish the second year after they have been sown, are termed biennial.

Q. Which are *perennial* plants ?

A. Such as continue alive in the ground for several years.

CHAPTER III.

Parts of Fructification.

Q. What parts of a plant are necessary for the young Botanist to be first acquainted with ?

A. The flower and fruit ; these consist of seven parts, as before observed, which are particularly requisite to be known, as on them the classification of plants, according to the system of Linnæus, is founded.

Q. What is the *calyx* ?

A. The calyx, empalement, or flower-cup, is the green part which is situated immediately below the blossom. Its chief use is to enclose and protect the other parts of the flower. It sometimes consists of two or more leaves, as in the Rose, and, sometimes tubular, is like the Cowslip, &c.*

* Although the colour of the calyx is usually green, yet

Q. What is the *corolla*?

A. The corolla, blossom, or what is commonly called the flower, is the part which is most beautifully coloured, of the finest texture, and often smells sweet. The leaves which compose the corolla are called *petals*.

Q. What are the *stamens*?

A. The stamens or chives, which are ^{*Anthera.*} situated in the centre of the flower, are composed of two parts, one long and thin, by which they are fastened to the bottom of the corolla, called the *filament*; the other thicker, placed at the top of the filament, called the *anthera*, which opens when it is ripe, and discharges a yellowish dust, called *pollen* or *farina*, from its being like flour.*



Q. What are the *pistils*?

A. The pistils, or pointals, commonly appear

in some plants it is of other colours. In some instances also the calyx remains till the seed is ripe, as in the Dead Nettle; in others, it falls before the flower is at maturity, as in the Poppy; while the Lily, and some others, appear to be wholly without it.

* This dust, falling on the stigma of the pistil, is the cause of complete fructification.

in the centre of the corolla, from which they rise like so many columns. There are from one to twelve, or more, in each flower. The pistil consists of three parts.

Q. What are they ?

Stigma.



A. The *germ*, the *style*, and the *stigma*. The *germ* is the pedestal or base of the pistil, generally of a roundish shape, though sometimes slender. Its office is to contain the seeds which are not yet arrived at maturity ; the *style* is the pillar or thread which supports the stigma ; and the *stigma* is the highest part of the pistil.*

Germ.

* Numerous experiments have been made to ascertain the importance of the *Stamina* and *Pistilla* to the production of perfect seed, and the results have been uniformly conclusive. In fact, although Botany, as a science, was little understood by the ancients, yet they were aware of the importance of these two parts of the flower in maturing the fruit of the Palm tree ; for those trees bearing stamens only, were carefully planted among those that bore the pistils, that the Dates (the fruit) might come to perfection ; and in the present day, in those countries where this fruit is an article of food, it is scrupulously attended to.

Q. What is the *pericarp*?

A. The *pericarp*, or seed-vessel, is the case or covering of the seed, and is the external part of the germ come to maturity. It is of various shapes: globular, as in the poppy; long, as in the pod of the pea; pulpy, with a stone in the middle, as in the plum; pulpy, containing seeds inclosed in a case, as in the pear; juicy, and containing seeds which have only an external case, as in the gooseberry.

Q. What is the *seed*?

A. The seed of plants is that part of every vegetable which, at a certain state of maturity, is separated from it, and contains the rudiments of a new plant, though the parts are too minute to be discerned by our organs of sight.

Q. What is the *receptacle*?

A. The receptacle, or base, is that part which supports and connects the whole together. In some plants it is very conspicuous: particularly, for instance, in the artichoke; the whole of the lower part, which we eat, being the receptacle.

Q. When is a flower said to be *superior*?

A. A flower is superior when the receptacle of the flower is above the germ.

Q. When is it *inferior* ?

A. When the receptacle is below the germ.

Q. Is not a flower sometimes called *naked* ?

A. Yes ; it is said to be naked when the calyx is absent.

Q. Are not flowers sometimes called *complete*, and at other times *incomplete* ?

A. Yes ; a flower is complete when it has both a calyx and corolla ; and incomplete when either of these are deficient.

Q. What is an *aggregate* flower ?

A. An aggregate flower is a flower composed of florets standing on foot-stalks, attached to a broad receptacle.

Q. What is an *umbellated* plant ?

A. An umbellated plant is one which sends out towards the top, from the same point or centre, a number of branches, like the spokes of an umbrella, and bearing flowers on the top, as the Carrot, Parsnip, and Parsley.

CHAPTER IV.

On the Classification of Plants.

Q. What is intended by the classification of plants?

A. For the more easy comprehension on the science of Botany, Linnæus divided the whole vegetable creation into twenty-four *classes*. These are again divided into *orders*, which are subdivided into *genera* or tribes; and these genera are further divided into *species* or individuals.

Q. What may this division be likened to?

A. A class resembles an army, an order, a regiment; a genus, a company; and a species, a soldier.

Q. On what are the characters of the classes founded?

A. The characters of the classes are taken from the number, connexion, length, or situation of the stamens.

Q. You say there are twenty-four classes; how may they be distinguished?

A. In each of the first twenty classes there are stamens and pistils in the same flower; in the twenty-first class they are in distinct flowers on the

same plant ; in the twenty-second, in distinct flowers on different plants; in the twenty-third, they are in the same flower as well as in distinct ones ; and they are not all to be seen in the twenty-fourth class.

Q. As no progress can be made in Botany till the *names* of the classes are well understood, I will thank you to inform me whence they are derived, and then repeat them.

A. The names of the classes are formed from Greek words, and express the characteristics of each class. The first ten classes are named from the Greek numerals, and the word *andria*, which the student must consider as meaning the same as stamens.

CLASSES.

1. Monandria	One Stamen
2. Diandria	Two Stamens
3. Triandria	Three Stamens
4. Tetrandria	Four Stamens
5. Pentandria	Five Stamens
6. Hexandria	Six Stamens
7. Heptandria	Seven Stamens
8. Octandria	Eight Stamens
9. Enneandria	Nine Stamens
10. Decandria	Ten Stamens
11. Dodecandria	Twelve Stamens

CLASSES.

12. Icosandria	Twenty Stamens
13. Polyandria	Many Stamens
14. Didynamia	Four Stamens, two longer
15. Tetradynamia	Six Stamens, four longer
16. Monadelphica	{ Filaments united at bottom, { but separated at top
17. Diadelphia	Filaments in two sets
18. Polyadelphia	Filaments in many sets
19. Syngenesia	Stamens united by antheræ
20. Gynandria	Stamens and Pistils together
21. Monœcia	{ Stamens and Pistils in separate { flowers, upon the same plant
22. Dioecia	{ Stamens and pistils distinct, { upon different plants
23. Polygamia	Variously situated
24. Cryptogamia	Flowers invisible.

 CHAPTER V.
The Classification of Plants explained.

Q. The principles on which the classes are formed are certainly simple, and easily to be comprehended: but it will be necessary for us to go over them again, and distinguish the properties of each class more particularly before we proceed farther. Tell me, therefore, how the first ten classes are known.

A. All plants which have only one stamen are of

the first class; those that have only two, are of the second; those that have only three, are of the third; and so on, the number of stamens being the same with the number of the class in the first ten classes.

Q. How is the eleventh class (Dodecandria) known?

A. The eleventh class contains all those plants, which have from twelve to nineteen stamens, fixed to the receptacle.

Q. How is the twelfth class (Icosandria) known?

A. By having twenty, or more stamens, fixed to the inside of the calyx. In this class the place of insertion is more to be relied on than the number of the stamens, for there are sometimes less than twenty, and sometimes more.

Q. What plants are comprehended in the thirteenth class (Polyandria)?

A. Those that have more than twenty stamens attached to the receptacle.

Q. What distinguishes the fourteenth class (Didynamia)?

A. When there are four stamens in a flower, of which two are longer than the others, it belongs to the fourteenth class.

Q. How may the fifteenth be known?

A. Tetradynamia, the fifteenth class, is known by having six stamens in the flower, four of which are longer than the other two.

Q. Describe those of the sixteenth class (Monadelphia).

A. In the sixteenth class the stamens are united by their filaments into one set, forming a case round the lower part of the pistils, but separating at the top.

Q. How may the seventeenth class (Diadelphia) be distinguished ?

A. In the seventeenth class the corollas are papilionaceous, or like a butterfly, as the blossom of a pea ; the stamens are connected by their filaments, but divided into two sets, one of which is thicker, and forms a case round the pistil ; the other is smaller, and leans towards the pistil.

Q. How is the eighteenth class known ?

A. In the eighteenth class (Polyadelphia) the stamens are united by their filaments into more than two sets or parcels.

Q. By what means may the nineteenth class be known ?

A. Syngenesia (the name of the nineteenth) consists of compound flowers, as the common daisy or dandelion ; and they are called compound, because

each single flower consists of a collection of little flowers or florets, attached to the same broad receptacle, and contained within one calyx.

Q. What distinguishes the twentieth class (Gynandria) ?

A. In the twentieth class the stamens are attached to the pistil.

Q. By what may the twenty-first class be known ?

A. The twenty-first class (Monœcia) contains those plants, which have flowers of different kinds on the same plant, some bearing pistils, and others stamens only.

Q. How may the twenty-second class (Diœcia) be known ?

A. The twenty-second class consists of those species which have stamens on one plant, and pistils on another.

Q. What kind of plants does the twenty-third class (Polygamia) comprehend ?

A. The twenty-third class comprehends those plants which have at least two, and sometimes three kind of flowers. 1. Some with pistils and stamens in the same flower. 2. Others having stamens only. 3. Or having flowers with pistils only.

Q. What are comprehended in the twenty-fourth class ?

A. The twenty-fourth class (Cryptogamia) comprehends all plants in which the flowers are invisible to the naked eye ; as mosses, ferns, mushrooms, sea-weeds, &c.

CHAPTER VI.

Of the Orders of Plants.

Q. On what are the *Orders* founded ?

A. The formation of the orders is as ingenious and simple as that of the classes. In the first thirteen classes, the orders are founded wholly on the number of the pistils ; so that by adding *gynia* instead of *andria*, to the Greek words signifying the numbers, they will be easily recollected. Where they are not distinguished by the number of the pistils, their names are taken from some circumstances relative to the stamens, pistils, or seed.

Q. Name the first thirteen orders.

A. Monogynia 1 pistil
 Digynia 2 pistils

Trigynia	3 pistils
Tetragynia	4 pistils
Pentagynia	5 pistils
Hexagynia	6 pistils
Heptagynia	7 pistils
Octagynia	8 pistils
Enneagynia	9 pistils
Decagynia.....	10 pistils
Dodecagynia.....	12 pistils
Polygynia.....	many pistils.

Q. How many orders are there of the fourteenth class (Didynamia), and how are they known?

A. In the fourteenth class there are only two orders, which depend on the presence or absence of the pericarp or seed-vessel.

1. *Gymnospermia*. Naked seeds in the bottom of the calyx: as in mint, dead nettle, and thyme.
2. *Angiospermia*. Seeds enclosed in a pericarp; as in fox-glove, eye-bright, wood-flax, and fig-wort.

Q. What orders are there of the fifteenth class?

A. Two; which are taken from a difference in the form of the pericarp.

1. *Siliculosa*. Seeds enclosed in a silicle, or roundish seed-vessel, consisting of two pieces called valves, and the seeds fixed to both edges, or sutures, as in shepherd's purse and cress.

2. *Siliquosa*. Seeds enclosed in a silique, or long seed-vessel; as in mustard.

Q. How are the orders of the next four classes known?

A. In the classes *Monadelphia*, *Diadelphia*, *Polyadelphia*, and *Gynandria*, the orders are distinguished by the number of stamens; viz. *Pentandria*, five stamens; *Hexandria*, six stamens, &c.

Q. How many orders are there in the nineteenth class (*Syngenesia*)?

A. There are six orders in the nineteenth class, which are taken from the structure of the flower.

Q. Which is the first?

A. *Polygamia Æqualis*; having both stamens and pistils in the same floret; as in Dandelion, Thistle, &c.

Q. Which is the second?

A. *Polygamia Superflua*; when the flower is composed of two parts—a disk, or central part, and rays or petals projecting outwards; as in the Sunflower, Tansy, Camomile, &c.

Q. Which is the third ?

A. *Polygamia Frustranca*; the florets of the centre perfect or united; those of the margin without either stamens or pistils; as Bluebottles.

Q. The fourth ?

A. *Polygamia Necessaria*; where the florets in the disk, though apparently perfect, are not really so, and therefore produce no perfect seed; but the fertility of the *pistilliferous floscules* in the ray compensate for the deficiency of those in the centre of the flower; as in the Marygold.

Q. The fifth ?

A. *Polygamia Segregata*; when each of the florets has a calyx, besides the common or general calyx of the flower.

Q. Which is the sixth ?

A. *Monogamia*; when the flower is not compound, but single, and the anther united.

Q. From what are the orders formed in the next three classes ?

A. In the classes *Gynandria*, *Monœcia*, and *Diœcia*, the orders are formed from the number, and other peculiarities of the stamens:

Monandria	1 stamen.
Diandria, &c.	2 stamens, &c.
Polyandria	7 stamens.

Monadelphia	{	stamens united into one set.
Polyadelphia	{	stamens united into different sets.
Gynandria	{	stamens upon the pistil.

Q. How many orders are comprised in the twenty-third class?

A. The twenty-third class (Polygamia) comprises three orders; namely, *Monœcia*, *Diœcia*, and *Triœcia*.

Q. How many orders has the last class (Cryptogamia)?

A. Four: Ferns, Mosses, Sea-weeds, and Funguses.

CHAPTER VII.

CLASS I.—*Monandria*. (One stamen.)

THIS CLASS HAS TWO ORDERS.

Q. WHAT examples can you furnish me with of the class Monandria?

A. Most of the plants belonging to this class are natives of India, such as Ginger, Cardamons, Arrow-root, and Turmeric; but we have the *Hip-*

puris, or Mare's Tail, which grows in our muddy pools and ditches, and as it is easily procured, will serve for an example of *Order 1*.

Q. Describe it.

A. The *Hippuris*, or Mare's Tail, has neither calyx nor corolla. A single pistil denotes its Order, and it has only one stamen, which grows upon the receptacle, terminated by an anther slightly divided, behind which is the pistil, with an awl-shaped stigma, tapering to a point. The stem, is straight and jointed, and the leaves grow round the joints: at the base of each leaf is a flower, and it is seen in bloom in the month of May.

“ No velvet mantle, no embroidered veil,
Shields poor HIPPURIS from the northern gale ;
'Midst the damp meadow, or the oozy bed,
In lowly modesty she rears her head.”

Q. Describe some plant of this class belonging to *Order 2*.

A. The Water Star-Wort (containing two pistils) which takes its name from its upper leaves making a star-shaped appearance, is to be met with in ditches and standing water, and may be seen in blossom at any time between April and October.

CHAPTER VIII.

CLASS II.—*Diandria*. (Two Stamens.)

THREE ORDERS.

Q. WITH what examples can you furnish me in class *Diandria*?

A. The Privet (*Ligustrum*), being a shrub very common in our hedges and gardens, will serve to exemplify this class.

Q. Give me an account of it.

A. The Privet bears a white blossom, and generally flowers in June. It has a very small tubulated calyx of one leaf, its rim divided into four parts. The blossom is also of one petal, and funnel-shaped, with an expanded border, cut into four egg-shaped segments.

Q. How is it known to belong to this class?

A. By its having two stamens, which are placed opposite to each other, and nearly as long as the blossom. The seed-bud is roundish, the pistil or style short, terminated by a thick, blunt, cloven stigma. The leaves grow in pairs, and are sometimes variegated with white or yellow stripes.

Q. Does not the Privet bear berries?

A. Yes; the seed-vessel is a black berry, con-

taining but one cell, which encloses four seeds. These berries are useful to the dyers, as they give a durable green colour to silk or wool, by the addition of alum.

Q. Does not the common Jasmine (*Jasminum Officinale*) belong to class Diandria?

A. Yes; and as it is a most fragrant ornamental shrub which we are well acquainted with, I will, if you please, describe it.

Q. Do so.

A. The common Jasmine is a native of India, but has long been cultivated in Europe. It is chiefly raised against walls, and is interesting not only from the elegance of its foliage, but also from the number of beautiful white flowers with which it is adorned, which exhale a sweet odour, particularly after rain, and in the night.

“ With fragrant scent, in artless beauty’s ease,
In snowy folds that kiss the summer’s breeze,
Attractive fair, the lonely JASMINE see
Bow her fine head, and bend her supple knee;
With piteous air she lifts th’ imploring eye,
Pleads her sad tale, and heaves the tender sigh.”

Q. What useful foreign spice belongs to this class?

A. Pepper: there are upwards of sixty different species of pepper, and they are nearly all natives of

the East and West Indies. Black Pepper (which belongs to the third Order of this class) is a shrubby plant, and grows spontaneously in the East Indies and in Cochin China. It is also cultivated at many other places, but in no part of Europe.

Q. Is not White Pepper a different species from the Black ?

A. No : it was formerly thought so, but it is really nothing more than the ripe berries deprived of their skin by steeping them for a time in water, and then drying them in the sun.

Q. Is Cayenne Pepper produced from the same plant ?

A. No : Cayenne Pepper is produced in the West Indies, from a plant called *Capsicum Minimum*.

CHAPTER IX.

CLASS III.—*Triandria*. (Three Stamens.)

THREE ORDERS.

Q. How do you mean to illustrate the class *Triandria* ?

A. By giving you an account of some of the various *Grasses* which are comprised in it. Though it may appear surprising, it is no less true, that every

single blade of these apparently insignificant plants bears a distinct flower, perfect in all its parts, and only requires to be nicely viewed to excite our value and admiration.

Q. Are there not many varieties of grasses?

A. Yes; there are upwards of three hundred species. The general character of grasses may be thus described: the leaves furnish pasturage for cattle; the smaller seeds are food for birds, and the larger for man; but some are preferred to others: as fescue, for sheep; meadow-grass, for cows; canary, for small birds; oats and beans, for horses; rye, wheat and barley, for man.

Q. Do they not furnish us with many valuable necessities?

A. Yes; our most important articles of food and clothing are derived from them. Bread, meat, beer, milk, butter, cheese, leather, and wool; and all the advantages produced from the use of cattle would be lost without them.

Q. How may corn and grasses be distinguished from other plants?

A. By their simple, straight, unbranched stalk, hollow and jointed, commonly called a straw, with long, narrow, tapering leaves, placed at each knob or joint of the stalk, and sheathing or enclosing it

as by way of support : their ears, or heads, consist of a husk, generally composed of two valves, which form the calyx ; within which is the blossom, being also a husk of two valves.

Q. How are the various grasses divided ?

A. Linnæus has arranged them into four divisions ; the first three include those that are produced in panicles, or loose branches, which are distinguished by the number of flowers in each empalement ; the first having one flower, the second two, and the third several. The fourth division consists of all those that grow in spikes or heads, such as Wheat, Rye, Barley, &c.

Q. Describe Wheat.

A. Wheat, the chief support of man, is cultivated in most civilized countries of the world, and is supposed to have been originally introduced into Europe from Asia.* There is no grain so valuable as

* In Egypt corn grows spontaneously : Osiris, son of Jupiter and Niobe, and King of Egypt, is regarded as the inventor of the art of agriculture, and his wife Isis as the discoverer of the use of wheat and barley.

“ Then the far country waves with golden corn ;
The soil untill’d a ready harvest yields,
With wheat and barley wave the golden fields.”

HOMER’S ODYSSEY.

this; and it is wisely ordained by Providence that it is capable of sustaining the severity of the northern climates, and the excessive heat of the torrid zone.

Q. Does it not constitute the principal food for all classes of the community in Britain?

A. Yes; and its abundance or scarcity regulates, in a great degree, the welfare and prosperity of the inhabitants. The whole annual consumption of grain in this island is said to amount to twenty-five million of quarters; and in London alone, to more than 1,162,100 quarters, of which by far the greatest proportion is Wheat.

Q. Is not Sugar the produce of a plant belonging to this class?

A. Yes; the Sugar-cane (*Saccharum Officinarium*), a plant much cultivated in the East and West Indies, which has a jointed stem eight or nine feet high, long and flat leaves of a greenish yellow colour, and flowers in bunches.

Q. What methods are used to extract the sugar from the canes?

A. When cut down, the leaves are thrown away, and the stems or canes are divided into pieces, each about a yard in length: they are then tied up in bundles, and conveyed to the mill, where they are bruised between three upright wooden rollers co-

vered with iron. The *saccharine* juice which flows from them is conducted into a large vessel, and the quantity of juice prepared by some of these mills is upwards of ten thousand gallons in a day.

Q. What processes does it afterwards undergo ?

A. The juice is boiled in large cauldrons, and afterwards carefully drawn off, leaving the scum at the bottom of the pan. After being again boiled with a certain mixture of lime, the juice is transferred into a large, shallow, wooden vessel, where, as it cools, it runs into a sort of *crystallization*, by which it is separated from the *molasses* or *treacle*, an impure part of the juice, incapable of being crystallized, but which is used for various useful purposes.

Q. Does not the celebrated plant called by the ancients *Papyrus*, belong to this class ?

A Yes ; the plant *Papyrus** is of the rush kind,

Sac'charine, *a.* sweet, having the taste of sugar.

Crystalliza'tion, *s.* the process of congealing.

* From the word *Papyrus*, *paper* is derived ; and from the ancient custom of writing on the *leaves* of trees, books are said to be composed of leaves. The word *liber* signifies the inner bark of a tree, on which the ancients wrote ; and *volumen* was the manuscript rolled up : thus are our words *library* and *volume* derived.

and grows on the borders of the Nile to the height of ten or twelve feet. The stem is naked, having a bushy head, and a few short leaves at the bottom.

Q. What part of this plant was converted into paper?

A. The inner rind of the stem. It was principally manufactured at Alexandria, and the city derived great riches from its exportation. This kind of paper was used in the days of Alexander the Great, and continued in use till about the tenth century, when paper made of cotton was introduced; and such as we now use, made from linen, became common in the fourteenth century.

CHAPTER X.

CLASS IV.—*Tetrandria*. (Four Stamens.)

THREE ORDERS.

Q. How are the flowers of the class *Tetrandria* characterized?

A. They are characterized by having four stamens.

Q. Give me some examples.

A. Teasel, Madder, Ladies' Bedstraw, and Holly.

Q. What is Teasel ?

A. Teasel (*Dipsacus fullonum*) is a plant cultivated in several parts of England, and used in the carding of woollen cloths. It is distinguished from other plants of the same tribe by having its leaves connected at the base ; the flower-scales hooked, and the general calyx reflected or bent back.

Q. What is Holly ?

A. Holly (*Ilex aquifolium*) is a small ever-green tree, with shining, irregular leaves, and white flowers, which grow in clusters round the branches, and are succeeded by small red berries.

Q. What is the use of this plant ?

A. As a fence, Holly is very serviceable, and it retains its beautiful green verdure through the severest winters. The *wood* is very close-grained, and is used for many purposes. The leaves afford a grateful food to sheep and deer in winter ; and the *berries* yield a subsistence to numerous birds. We use branches of Holly to decorate our houses and churches at Christmas, to give an air of spring in the depth of winter.

Q. Is not *bird-lime* made of the bark of the Holly ?

A. Yes ; and for that purpose it is boiled about twelve hours ; and, after standing for a fortnight,

it is mixed over the fire with a third part of oil. The adhesive quality of bird-lime, thus prepared, is very remarkable, particularly to feathers and other dry substances; for which reason it is used for the smearing of twigs, to ensnare birds.

CHAPTER XI.

CLASS V.—*Pentandria*. (Five Stamens.)

SEVEN ORDERS.

Q. GIVE me some examples of this class.

A. It will be very easy to do so, for in the class *Pentandria* is comprised one-tenth of the vegetable world; and it includes many very agreeable flowers as well as noxious plants. The Primrose, Oxlip, Cowslip, and Polyanthus belong to it; and so does a tribe of plants called *Luridæ*, which is a name expressive of their noxious appearance and strong scent.

Q. Describe the Polyanthus.

A. The Polyanthus, so much admired and cultivated by florists for its variety and beauty, is derived from the Primrose; and is a pleasing instance of the improvement that art is capable of bestowing on nature.

Q. How is it known?

A. By its calyx consisting of one leaf, tubular, sharp, and upright; the blossom also tubular and of one petal, with the border divided into five segments: the seed-vessel is a capsule enclosed in the calyx, containing only one cell; and the stigma is globular. The species is marked by a five-angled calyx, the wrinkled surface and indented edges of its leaves.

Q. How are those plants belonging to the tribe called *Luridæ* distinguished?

A. Besides having the characteristic marks of five stamens and one pointal, they coincide in a calyx that is permanent, and divided like the corolla, which consists of one petal, into five segments. Their seed-vessel is either a capsule or a berry, enclosed within the flower.

Q. Will you furnish me with an example?

A. Yes; I will first mention the Deadly Nightshade (*Atropa Belladonna*), as it is the most fatal of any in its effects. The leaves are egg-shaped and undivided, and the blossoms of a dingy purple. Woods, hedges, and gloomy lanes mostly conceal this dangerous plant; and its bright, shining, black berries, have too frequently tempted children to partake of its dangerous poison.

Q. What are the names of the other poisonous plants belonging to this class?

A. The Thorn-apple (*Datura*); Henbane, (*Hyoscyamus*) the smell of which is exceedingly disagreeable; the Nightshade (*Solanum*) which comprises two kinds, the Woody Nightshade, known by its blue blossoms and red berries; the Garden Nightshade, distinguished by its white blossoms and black berries.

“ Oh, wander not where dark SOLANA showers
Her baleful dew, and twines her purple flowers,
Lest round thy neck she throw her snaring arms,
Sap thy life's blood and riot on thy charms.
Her shining berry, as the ruby bright,
Might please thy taste, and tempt thy eager sight;
Trust not this specious veil — beneath its guise,
In honied streams a fatal poison lies.”

Q. Does not the Passion Flower belong also to this class?

A. Yes; the common blue Passion Flower, which I shall describe, is a native of Brazil, and may be trained up to more than forty feet high. It is hardy enough, however, to grow here in the open air, and is now very common in England.

Q. Whence did it derive its name?

A. From a fanciful resemblance of the different

parts of the flower to the passion of Christ, which the Jesuists, who went as missionaries to South America, thus explained:—The three pistils, they said, represented the three nails with which our Saviour was nailed to the cross; the five stamina, the five wounds; and the radiant purple nectary, the rays that they supposed surrounded his head when expiring on the cross.

CHAPTER XII.

CLASS VI.—*Hexandria*. (Six Stamens.)

SIX ORDERS.

Q. What kind of plants belong to the class *Hexandria*?

A. Our gardens receive many of their most splendid embellishments from flowers of this description. The gaudy tulip, with its striped coat of various hues; the Hyacinth, of different colours and delightful fragrance; Lilies of every kind; the magnificent *Amaryllis*; and the great American *Aloe*, which rises to the height of 20 feet, and many other exotic plants of the liliaceous tribe, are comprised in this class.

Q. Do not many of our smaller garden flowers also belong to this class?

A. Yes; the modest Snowdrop, the golden Crocus, and the innocent and fragrant Lily of the Valley, with the Daffodil, Narcissus, and many others.

Q. Give me a botanical description of the Snowdrop.

The Snowdrop (*Galanthus nivalis*) is one of the earliest harbingers of spring. Its calyx is a sheath, and the corolla is superior, consisting of six white petals, a little tinged with green, of which the three innermost are the shortest. This beautiful little flower never appears to more advantage than when it intermixes its blossoms with those of the golden Crocus, to which, in its manner of growth and external structure, it is nearly allied.

“How snowdrops cold, and blue-eyed harebells blend
Their tender tears as o’er the stream they bend;
The love-sick violet and the primrose pale,
Bow their sweet heads, and whisper to the gale:
With secret sighs the virgin lily droops,
And jealous cowslips hang their tawny cups.”

Q. Does not the Barberry belong to this class?

A. Yes; the Barberry is a shrub common in hedges, and bearing bright, red, heavy berries in autumn. When this coral-like fruit is ripe, it adds much to the beauty of shrubberies; but its acidity is so great, that even the birds refuse to eat it.*

* "I have," says Mr. Phillips, the author of *Pomarium Britannicum*, "a barberry-tree in my garden near twenty feet in height, the branches of which extend over a circumference of sixty feet. It has been covered with blossoms this spring, and had a pleasing effect in the shrubbery; but it was so offensive for about a fortnight, that no one would walk near it during that time. It seems particularly attractive to singing birds, wherever it is planted, especially the bulfinch and the goldfinch, both of which often build in these bushes. A very singular circumstance has been stated, respecting the barberry shrub,—that corn sown near it proves abortive, the ears being in general destitute of grain; and that its influence is sometimes extended to a distance of three or four hundred yards across a field. This is a just cause for banishing it from the hedge-rows of our arable fields, for which, otherwise, its thorny branches would have made a desirable fence."

CHAPTER XIII.

CLASS VII.—*Heptandria*. (Seven Stamens.)

FOUR ORDERS.

Q. WHAT example will you give in this class ?

A. The Horse-chesnut (*Æsculus Hippocastanum*), which is a very common tree in parks and pleasure-grounds, bearing elegant clusters of flowers in the form of pyramids, and is certainly one of the finest trees of British growth. Its fruit, which is contained in prickly husks, has been found of considerable service in fattening cattle.

Q. What are its botanical characters ?

A. A small calyx, of one leaf, slightly divided at the top into five segments, and swelling at the base; a corolla of five petals, inserted into the calyx, and a capsule of three cells, in one or two of which only is a seed.*

* We insert in this place the following interesting account of chesnut-trees from Phillips's *Pomarium Britannicum* :

“The remains of very old decayed chesnut trees may be seen in the Forest of Dean, Enfield Chase, and in many parts of Kent. At Fortworth, in Gloucestershire, is a chesnut tree fifty-two feet round; it is proved to have stood there since the year 1150, and was then so remarkable, that it was called ‘the great chesnut of Forthworth.’ It

CHAPTER XIV.

CLASS VIII.—*Octandria*. (Eight Stamens.)

FOUR ORDERS.

Q. What kind of plants are comprised in this class ?

A. Various shrubs, both foreign and native ;

fixes the boundary of a manor. Mr. Marsham states that this tree is 1100 years old.

“ The great chesnut tree, near Mount *Ætna*, is perhaps one of the most extraordinary trees in the whole world. It is called ‘the chesnut tree of a Hundred Horses,’ from the following traditionary tale :—‘Joan of Arragon, when she visited Mount *Ætna*, was attended by her principal nobility, when a heavy shower obliged them to take refuge under this tree, the immense branches of which sheltered the whole party.’ According to the accounts given of it by Mr. Howel, this chesnut tree is 160 feet in circumference, and, although quite hollow within, the verdure of the branches is not affected : for this species of tree, like the willow and some others, depends upon its bark for subsistence. The cavity of this enormous tree is so extensive, that a house has been built in it, and the inhabitants have an oven therein, where they dry nuts, chesnuds, almonds, &c. of which they make conserves ; but as these thoughtless people often get fuel from the tree that shelters them, it is feared that this natural curiosity will be destroyed by those whom it protects.”

among the foreign ones are the Balm of Gilead shrub, which grows in several parts of Abyssinia and Syria: the Sugar-maple of North America, which is fifty or sixty feet high; and the Rose-wood tree, in the island of Jamaica, which yields an odoriferous balsam, and whose wood is much used by our cabinet-makers for *veneering* tables, &c.

Q. What native plants are comprised in this class?

A. The common Maple and Sycamore trees, and the Cranberry and Whortle-berry shrubs, with that well known plant the common Heath, growing wild on mountainous wastes in almost every part of England.

CHAPTER XV.

CLASS IX.—*Enneandria*. (Nine Stamens.)

THREE ORDERS.

Q. What examples can you furnish in this class?

A. The class *Enneandria* includes several foreign plants, such as Cinnamon, Cassia, Sassafras, Bay, Camphor, and Rhubarb; but we have only one

Veneer'ing, part. covering articles of furniture with ornamental wood.

plant that belongs to it growing wild in this country, which is the Flowering Rush (*Butomus umbellatus*).

Q. Describe it.

A. The Flowering Rush grows in the water, and has a round smooth stalk, which rises from one to six feet high, according to its situation; at the top of which is a head of bright red flowers, sometimes not less than thirty; three short leaves form the cup, and the corolla has six petals. This plant, so stately from its height, and its beautiful tuft of flowers, would make a charming appearance in canals or other pieces of water, if cultured by human art: and it is so hardy as to defy the severest frost.

“Flow in soft harmony, ye silver waves:

Obedient mermaids, leave your crystal caves;

Ye lakes and streams, unfold your hidden flow'rs,

For fair BUTOMA decks her sedge-wave bow'rs.”

CHAPTER XVI.

CLASS X.—*Decandria*. (Ten Stamens.)

FIVE ORDERS.

Q. What kind of plants does this class comprise ?

A. In the class *Decandria* are comprised several trees of foreign growth, as well as various plants and flowers common in this country. The *Lignum Vitæ* tree, Logwood, and Mahogany, all natives of the West Indies, each belong to this class.

Q. What well known flowers belong to it ?

A. The rich Carnation,* the modest Sweet William, and the whole tribe of Pinks.

* The bare mention of this flower brings to mind the following admirable lines of the poet Shenstone :

“ Search but the garden, or the wood,

Let your admired Carnation own,

Not all was meant for raiment, or for food,

Not all for needful use alone.

There while the seeds of future blossoms dwell,

’Tis colour’d for the sight, perfum’d to please the smell.

Why knows the nightingale to sing ?

Why flows the pine’s nectareous juice ?

Why shines with paint the linnet’s wing ?

For sustenance alone ? For use ?

For preservation ? Every sphere

Shall bid fair pleasure’s rightful claim appear.”

Q. Is there not a plant belonging to this class which exhibits a very curious instance of vegetable irritability?

A. Yes; it is called the Fly-trap of Venus, and is a native of America.

Q. Give a description of it.

A. At the bottom of the footstalk of this curious plant are several leaves, each of which are divided into two lobes at the extremity, having long teeth on the margin like the *antennæ* of insects, and armed within with six spines: these lie spread upon the ground round the stem, and are so irritable, that when a fly happens to light upon a leaf, it immediately folds up and crushes it to death.*

Q. Describe the tree from which the wood called Mahogany comes.

A. The Mahogany tree is of large dimensions, with winged leaves and small white flowers; its

Anten'næ, s. the feelers.—See *Catechism of Entomology*.

* Dr. Darwin observes, that “he saw this plant in the collection of Sir B. Boothby, of Ashbourn-hall, Derbyshire (1788), and that on drawing a straw along the middle of the rib of the leaves as they lay upon the ground round the stem, each of them, in about a second of time, closed and doubled up, crossing the thorns over the opposite edge of the leaf, like the teeth of a spring rat-trap.”

branches are numerous and spreading; its leaves are alternate and winged, with four or five pair of leaflets, somewhat spear-shaped. It grows in Jamaica and Honduras.

Q. Has not the cutting of mahogany been a source of considerable profit to the British settlers at Honduras?

A. Yes; in some instances the profit attending it has been very great. A single tree has been known to contain twelve thousand superficial feet, and to have produced £1000 sterling. The body of the tree is of course the most valuable; but, for ornamental purposes, the limbs are preferred, as the veins are more variegated, and the grain is closer.

CHAPTER XVII.

CLASS XI.—*Dodecandria*.* (Twelve Stamens.)

SIX ORDERS.

Q. Give us an example of this class.

A. I know of no one more valuable or interesting than *Weld*, or Dyer's Weed, which is found on

* Although the word *Dodecandria* implies twelve stamens, yet this class includes such plants as have from twelve to nineteen.

barren ground, or on walls; and in the clothing counties of England is cultivated to a considerable extent. Its leaves are spear-shaped and entire, with a tooth-like process on each side of the base. The flowers are yellow and in long spikes; and the calyx is divided into four segments.

Q. For what is it useful?

A. It affords a most beautiful yellow dye for cotton, woollen, silk, or linen, which is procured from its roots and stems; and blue cloths dipped in a decoction of it become green. The yellow hue of the paint called Dutch pink, is also obtained from this plant; and it is said that the ancient Britons used it to stain their bodies with.

CHAPTER XVIII.

CLASS XII.—*Icosandria*. (Twenty Stamens.)

THREE ORDERS.

Q. What plants belong to the class *Icosandria*?

A. A great variety of fruit trees, such as the Apple, Pear, Cherry, Plum, Nectarine, Peach, Almond, and Medlar. Also various shrubs and herbs; such as Laurels, Roses, Strawberries, &c.

Q. Is it true that all plums derive their origin from the Bullace or Wild Plum?

A. It is an established fact; though few persons

would suppose that the *Magnum Bonum*, the *Green Gage*, and several others of exquisite flavour, which are now common in our gardens, could be indebted for their parent stock to the *Wild Plum*.

Q. Do you not consider the *Rose* as one of the most elegant and fragrant of all vegetable productions?

A. Yes; and for that reason it has been denominated the *Queen of Flowers*. It is so general a favourite, that scarcely any garden is destitute of a *Rose*. That elegant perfume called *Otto of Roses*, is extracted from its petals by distillation; but so small a quantity of this aromatic oil can be procured, that the true otto is exceedingly dear. It is said that a hundred pounds weight of the flowers will yield only half an ounce of it.

“ Fair is the *Rose*, but withers soon away;
Fair the spring *Violets*, but soon decay;
Fair is the *Lily*, but in falling dies;
And the white snow not long unsullied lies:
Thus blooming youthful beauty quickly flies.”

CHAPTER XIX.

CLASS XIII.—*Polyandria*. (Stamens numerous and indefinite.)

SEVEN ORDERS.

Q. What examples will you give me in this class ?

A. The Poppy and the Tea tree ; the former being the plant from which opium and laudanum are produced ; and the latter affording us a beverage, which is now drank by all classes in this country.

Q. From what part of the plant is opium produced ?

A. From the seed vessels, in which several gashes are made, and a milky fluid exudes, which when it attains sufficient consistence is formed into balls or cakes, and is of dark brown colour. Its uses in medicine, to cause sleep, and alleviate pain, are well known. Laudanum is a liquid preparation from opium and spirits of wine, and is used for the same purposes.

Q. Describe the Tea-tree.

A. The Tea-tree is an evergreen shrub, about five or six feet high, and much branched : a native of China and Japan. It flourishes, with great luxuriance, in vallies, on the sloping sides of hills, and

on the banks of rivers. The leaves are narrow and tapering: the flowers not much unlike those of the wild rose, but smaller, and are succeeded by a fruit about the size of a sloe, containing two or three seeds. It is chiefly cultivated in the mildest and most temperate parts of China.*

CHAPTER XX.

CLASS XIV.—*Didynamia*. (Four Stamens, two long and two short.)

TWO ORDERS.

Q. What sort of plants are comprehended in this class?

A. Many which are distinguished by us as gar-

* The Tea is gathered at three separate times: the tenderest leaves, of but a few days' growth, are gathered in February or March; the second gathering is in April, and the third in June, when the leaves are full grown. The Tea is afterwards prepared by drying it in a stove in shallow iron pans; and the supposition of its ever being dried on copper, to give a more beautiful green to the leaves, seems to be entirely void of foundation. Tea was first introduced into Europe by the Dutch East-India Company, in 1641, and a small quantity was brought to England from Holland about the year 1666; it was for many years after only drank by people of quality, but during the last century it became general.

den herbs, and valued for their odoriferous smell and kitchen uses, as well as for the medicinal qualities which some of them possess.

Q. Mention one as an example.

A. Common or Spear Mint (*Mentha viridis*), one of our most common garden herbs; it is a native British plant, and grows wild in watery places, and near the banks of rivers, in several parts of England. Its flavour is to many persons peculiarly agreeable, and, on this account, it is preferred for many culinary purposes. The leaves are used in springsallads, are boiled with peas, &c. and, mixed with vinegar, form a sauce for lamb.

CHAPTER XXI.

CLASS XV.—*Tetradynamia*. (Six Stamens, four long and two short.)

TWO ORDERS.

Q. What kind of plants compose this class?

A. The plants in this class are all eatable, and generally supposed to possess anti-scorbutic qualities. In it we find the Cabbage, the Turnip, the Watercress, and Mustard, with a variety of wild plants and flowers.

Q. Give a description of Mustard.

A. Common Mustard is made from the powdered seeds of a plant (*Sinapisnigra*), which grows wild in corn-fields, and by road sides, in most parts of England; and is known by its yellow cruciform flowers, with expanding calyx, and its pods being smooth, square, and close to the stem.

Q. Is it not cultivated by us?

A. Yes; in light lands it is cultivated to great advantage, particularly in the county of Durham, and that which is produced there is considered the best.

Q. What are its uses?

A. Mustard is in daily use at our tables, and the seeds are used in pickles. Preparations from Mustard are also often employed in medicine, both internally and externally.

“Mark how kind Nature, friend to sweet repose,
Unites with Art to soothe our racking woes.”

CHAPTER XXII.

CLASS XVI.—*Monadelphia*. (All the Filaments united at the bottom, but separate at the top.)

EIGHT ORDERS.

Q. Give me an example in this class.

A. I know of none more interesting or useful than the Cotton plant, which is cultivated in the East and West-Indies, and numerous other hot countries. It grows to a considerable height, and has leaves of a bright green colour, with flowers of only one petal, of a pale yellow colour, with five red spots at the bottom. The seed-vessels, or cotton pods, contain a soft vegetable down, which envelopes the seeds.

Q. Is not the cloth we call Cotton made from this down ?

A. Yes ; after being gathered, and carefully separated from the seeds, it is packed in bags, and imported into this country. Here it undergoes the processes of carding, spinning, and weaving, which were formerly performed by hand, but is now, for the sake of expedition, effected by machinery.

CHAPTER XXIII.

CLASS XVII.—*Diadelphia*. (Filaments united in two Sets.)

FOUR ORDERS.

Q. WHAT examples can you furnish me with under the head *Diadelphia* ?

A. Many plants well known to us are comprehended in it; such as Peas, Beans, Vetches,

Clover, Lucern, Broom, Furze, &c.; but a description of one of them, I imagine, will be sufficient; they are called papilionaceous.

Q. Well, then, describe the Broom.

A. The common Broom is a shrub seen on sandy heaths in most parts of England; it has large yellow butterfly-shaped flowers, with leaves in threes, and the branches are without prickles. This shrub is distinguished from furze, which consists of a cup with two leaves, and is still more common here than Broom, though in other countries it is quite scarce.

Q. What curious sensitive plant belongs to the class Diadelphia?

A. The plant you allude to is called *Sensitive Hedysarum*; it is a native of Bengal, and may be considered as one of the most extraordinary plants in the vegetable world. When the air is very warm, and quite still, its leaves are in continual motion, some rising, others falling, and others turning round by twisting their stems; the cause of these phenomena is not at all accounted for.*

Q. What kind of plant is it in appearance?

* Dr. Darwin conjectures that this spontaneous motion may be as necessary to the Sensitive Plant, as perpetual respiration is to animal life.

A. It grows about three feet high; the leaves are of a bright green; and the flowers of a pale red, slightly tinged with blue or yellow.

CHAPTER XXIV.

CLASS XVIII.—*Polyadelphia*. (The Filaments united, making many Sets.)

THREE ORDERS.

Q. WHAT description of plants are arranged in this class?

A. Several foreign fruit trees, such as the Orange, the Lemon, the Citron, and the Cocoa-nut trees.

Q. Describe the Orange and Lemon trees.

A. The Orange and Lemon shrubs are ever-green plants. The latter has large and slightly indented shining leaves, of somewhat oval shape but pointed; the flowers are large and white, but of a purplish hue on the outside of the petals. The Orange tree is distinguished from the Lemon, by having a kind of winged appendage on the leaf stalks, of which the latter is destitute.

Q. What properties does the fruit of these trees possess?

A. Oranges, when ripe, are extremely sweet, grateful, and wholesome. In fevers and other

complaints, they are very serviceable in allaying heat and quenching thirst. The juice of Lemons is sharp and agreeable, and is used in cookery, confectionery, medicine, and various other ways. The rind is also used in cookery and confectionery, and is valued for its aromatic and bitter taste.*

CHAPTER XXV.

CLASS XIX.—*Syngenesia*. (Stamens united by Antheræ; Flower compounded.)

FIVE ORDERS.

Q. Describe some plant under the class *Syngenesia*.

* The following lines, from “Rowden’s Poetical Introduction to Botany,” are sweetly descriptive of the Citron, Lemon, and Orange.

“In beauty blooming, and in artless grace,
The fragrant *Citra* rears her glittering race:
The pale-eyed *Lima* lofty and austere,
Checks her gay suitors with a tone severe:
With milder charms along the fertile glade
Glows bright *Aurantia* with a deeper shade!
Rears her tall head in vegetable pride,
And bends her loaded boughs on every side.
These juicy stores to foreign skies unfold,
In clusters thick, like pendent drops of gold.”

A. As I mentioned the Daisy and Dandelion as examples of this class, in the fifth chapter, I will describe the one you prefer.

Q. Then I think the beauty of the humble Daisy justly entitles it to my preference.

A. The Daisy, which so delightfully enamels every meadow, will not be disregarded by the botanist, if taken separately; for there is much beauty and variety discernible in this little flower. The calyx is formed of a double row of spear-shaped leaves; the numerous tubular florets in the centre are yellow, and furnished with both stamens and pistils, while those composing the ray, which are white above, and pink beneath, contain pistils only. The receptacle is naked and conical, and a naked stalk supports a single flower.

CHAPTER XXVI.

CLASS XX.—*Gynandria*. (Stamens situated on the Pistils.)

NINE ORDERS.

Q. WHAT plants are comprised in this class?

A. Several well known field plants of the orchis tribe.

Q. Describe them generally.

A. They have an oblong withered germ, below the flower, which has no proper calyx, but only sheaths; the corolla consists of five petals, the two innermost of which usually join to form an arch or helmet over the top of the flower. In some species the root is composed of a pair of solid bulbs; in others it consists of a set of oblong fleshy substances, tapering towards the ends.

Q. Does not that beautiful and scarce flower called the Ladies' Slipper, belong to this class?

A. Yes; and the Ladies' Slipper may be considered as the most handsome of any of the orchis plants in this country, and as it is one of the scarcest flowers we have, is always sold at a very high price. It may be found in its wild state in some unfrequented woods in the north of England.

CHAPTER XXVII.

CLASS XXI.—*Monœcia*. (Stamens and Pistils in separate Flowers, but upon the same Plant.)

TEN ORDERS.

Q. Mention some of the plants comprised in this class.

A. There are a variety of trees and plants, both native and foreign, that belong to it.

Among those of native growth may be reckoned the Oak, Birch, Alder, Beech, Walnut, Sweet Chesnut, Fir, Hazel-nut, Filbert, and Mulberry trees; and the numerous kinds of Sedges. In the list of foreign plants may be noticed, the Bread-fruit tree, the Cork tree, the Cocoa-nut tree, the Tallow tree, Maize or Indian Corn, and many others.

Q. Give an example of one of the most interesting among those of British growth.

A. That is the Oak, which is a well-known timber tree, invaluable to us, for to it the British navy is indebted for its existence. Until the introduction of Mahogany, Oak-timber was very generally used for furniture, but it is now chiefly consumed in ship-building. The tree is remarkable for the slowness of its growth, for its great longevity, and the dimensions to which it attains.

Q. Is not the bark of Oak very useful?

A. Yes; before Oak-timber is in a state to be used, it is requisite that the bark should be stripped off, and the trees then suffered to stand uncut for three or four years, that they may become perfectly dry; and the bark thus obtained is very extensively used in the tanning of leather.

Q. Has not the poet Gray depicted the Oak and Beech in his "Ode to the Spring?"

A. Yes ; the lines are as follow :—

“ Where’er the oak’s thick branches stretch
A broader browner shade ;
Where’er the rude and moss-grown beech
O’er-canopies the glade ;
Beside some water’s rushy brink
With me the muse shall sit and think
(At ease reclin’d in rustic state)
How vain the ardour of the crowd,
How low, how little are the proud,
How indigent the great !”

Q. Where is the Bread-fruit tree cultivated ?

A. In the Sandwich Islands, where the fruit is eaten as bread. It is also a native of many islands in the East Indies, but it is not there much cultivated.

Q. Describe the tree and its fruit.

A. The Bread-fruit tree is about the size of a middling Oak, and the fruit is of the size and shape of a child’s head, growing on boughs like apples, with a thick and hard rind. When ripe, the fruit is yellow and soft, with a sweet and pleasant taste. It is, however, gathered green, baked in an oven, and the outside black crust being scraped off, there remains a tender thin crust ; but the inside is soft and as white as snow, having somewhat the consistence of new bread.

Q. Has not this tree another useful property ?

A. Yes it has ; for the inner rind of the young bark is manufactured into a kind of cloth, and worn by the natives.

Q. Describe the Cork tree.

A. The Cork tree grows in Spain and Portugal, and is a species of the Oak ; the external part is of a fungous texture, which, when stripped off, is that elastic substance we call cork, so serviceable for stopping hottles, &c.

CHAPTER XXVIII.

CLASS XXII.—*Diœcia*. (Stamens and Pistils distinct, upon different Plants.)

EIGHT ORDERS.

Q. Give me an example of some plant comprehended in this class.

A. As there are many varieties of the Willow every where to be met with, all of which belong to this class, I will describe the one most remarkable for its singularity, which is the round-leaved Willow. Its leaves are smooth, entire, and egg-shaped ; the upper surface is green and wrinkled ; the under one bluish, and covered with net-work of veins, which are at first red, but afterwards become green. It is but a low shrub, and produces both flowers and leaves from the same bud.

Q. But are there not other plants belonging to this class equally well known to us ?

A. Yes ; the parasitical Mistletoe, the Yew tree, and Hemp, belong to the twenty-second class.

Q. Why do you call the Mistletoe *parasitical*?

A. All plants that grow upon others are termed parasitical, and the Mistletoe is one of them. Instead of rooting and growing in the earth, it fixes itself into the branches of a tree, where it spreads and forms a bush. It is commonly found on apple trees, and sometimes on the Oak, producing a number of white berries, of a sweetish taste.

Q. Was not this plant regarded with superstitious reverence by the Ancient Britons?

A. Yes; it was always held sacred by them; but now it only retains a place at Christmas, to ornament our houses, and enliven the cheerless season of winter.

Q. Does not the Yew tree bring to our mind recollections of past times?

A. Certainly; before the invention of gunpowder the archers' bows were made of Yew, and the English were ever famous for their superior skill in archery.

“ When the rude natives of our polished land
Form'd the strong phalanx of their valiant band,
With dextrous hand the bended bow they drew,
And shap'd their arrows from the dusky Yew.
Long the brave warriors fought with Cæsar's host,
And stood the bulwark of their native coast.”

CHAPTER XXIX.

CLASS XXIII.—*Polygamia*. (Stamens and Pistils variously situated.)

THREE ORDERS.

Q. Describe some plant of this class.

A. To the negroes of the West Indies there is no production more serviceable than the Plantain tree; I therefore select it. Its stem grows to the height of about twenty feet, with several leaves on the summit, many of which are eight feet long and two feet broad, but remarkably thin and tender. The fruit is of a pale yellow colour, and is produced in bunches so large as to weigh about forty pounds.

Q. In what way is this plant so serviceable?

A. The fruit is, to the negroes, what bread is to us, and is denominated by them the staff of life. It is usually gathered before it is ripe, and after the skin has been peeled off, is roasted for a little while in a clear fire; it is then scraped and eaten as bread, for which it is an excellent substitute.

CHAPTER XXX.

CLASS XXIV.—*Cryptogamia*. (Flowers invisible.)

FOUR ORDERS.

Q. We are now come to the last class, which I believe you said comprehended all plants in which the flowers are *inconspicuous*, such as mosses, ferns, fungusses, &c.

A. I did ; and, among the latter, Mushrooms are of course included. The common Mushroom is a fungus, consisting of white stalk, and a convex cover of white or brownish colour, which has, beneath, an irregular arrangement of gills of a pink hue when young, but afterwards a dark liver colour. When it first appears above the ground, a Mushroom is smooth, and nearly globular, and in this state it is called a *button*.

Q. Ought not great caution to be used in selecting them ?

A. Certainly ; for though several of them are *edible*, many are extremely poisonous ; and instances of the fatal effects arising from an indiscriminate adoption of them are very numerous. An emetic is the best remedy that can be administered in cases of injury arising from poisonous fungusses.

Inconspicuous, *a.* not to be seen.

Edible, *a.* fit to be eaten.

Q. Does not that useful plant, the Rein-deer Moss, belong to this class ?

A. Yes ; all mosses come under the general term *Cryptogamia*. The Rein-deer Moss is an invaluable plant to the poor Laplanders, inasmuch as it not only wholly sustains their favourite animals, to whom they owe their greatest comforts, but they boil it in their broth, and find it a cordial and restorative, and even use it as a soft and easy bed for their new-born infants.

“ Fleet as the wind the hardy Rein-deer bounds
Across the dreary waste and frozen grounds ;
Crops with vermilion lips the icy flower,
Or sips, from crystal cups, the fleecy shower.”

APPENDIX.

Of the Method of forming an Herbarium, or Hortus Siccus.

It has been observed by the best writers on Botany, that every person who wishes to become a complete Botanist, will find it necessary to preserve, and to form into a collection, the plants which he has examined. We therefore present to those who

have made some progress in this interesting study, a few directions which we have extracted from a scientific treatise.

“ The best method of preserving them is by drying them : specimens ought to be collected when dry, and carried home in a tin box. Plants may be dried by pressing, in a box of sand, or with a hot smoothing-iron. Each of these has its advantages.

“ 1. If pressure be employed, a botanical press may be procured. The press is made of two smooth boards of hard wood, eighteen inches long, twelve broad, and two thick. Screws must be fixed to each corner with nuts. If a press cannot easily be had, books may be employed.

“ Next, some quires of unsized blossom blotting-paper must be provided. The specimens, when taken out of the tin box, must be carefully spread on a piece of pasteboard, covered with a single sheet of the blossom paper quite dry ; then place three or four sheets of the same paper above the plant, to imbibe the moisture as it is pressed out : it is then to be put into the press. As many plants as the press will hold may be piled up in this manner. At first they ought to be pressed gently.

“ After being pressed for twenty-four hours or so, the plants ought to be examined, that any leaves or

petals which have been folded may be spread out, and dry sheets of paper laid over them. They may now be replaced in the press, and a greater degree of pressure applied. The press ought to stand near a fire, or in the sunshine. After remaining two days in this situation, they should be again examined, and dry sheets of paper be laid over them. The pressure then ought to be considerably increased. After remaining three days longer in the press, the plants may be taken out, and such as are sufficiently dry may be put in a dry sheet of writing paper. Those plants which are succulent may require more pressure, and the blossom paper again renewed.

“ Plants which dry very quickly ought to be pressed with considerable force when first put into the press; and, if delicate, the blossom paper should be changed every day. When the stem is woody, it may be thinned with a knife, and if the flower be thick and globular, as the thistle, one side of it may be cut away, as all that is necessary in a specimen is to preserve the character of the class, order, genus, and species.

“ 2. Plants may be dried in a box of sand in a more expeditious manner, and this method preserves the colour of some plants better. The specimens, after being pressed for ten or twelve hours,

must be laid within a sheet of blossom paper. The box must contain an inch deep of fine dry sand, on which the sheet is to be placed, and then covered with sand an inch thick: another sheet may then be deposited in the same manner, and so on till the box be full. The box must be placed near a fire for two or three days. Then the sand must be carefully removed, and the plants examined. If not sufficiently dried, they may again be replaced in the same manner for a day or two.

“ 3. In drying plants with a hot smoothing-iron, they must be placed within several sheets of blotting-paper, and ironed till they become sufficiently dry. This method answers best for drying succulent and mucilaginous plants.

“ 4. When properly dried, the specimens should be placed in sheets of writing paper, and may be slightly fastened by making the top and bottom of the stalk pass through a slip of the paper, cut neatly for the purpose. Then the name of the genus and species should be written down, the place where it was found, nature of the soil, and season of the year. These specimens may be collected into general orders and classes, and titled and preserved in a portfolio or cabinet.

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
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