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Until the nineteenth century, the investigation of natural phenomena, plants and animals was considered either the preserve of elite scholars or a pastime for the leisured upper classes. As increasing academic rigour and systematisation was brought to the study of 'natural history', its subdisciplines were adopted into university curricula, and learned societies (such as the Royal Horticultural Society, founded in 1804) were established to support research in these areas. A related development was strong enthusiasm for exotic garden plants, which resulted in plant collecting expeditions to every corner of the globe, sometimes with tragic consequences. This series includes accounts of some of those expeditions, detailed reference works on the flora of different regions, and practical advice for amateur and professional gardeners.

Flowers of the Field

A keen collector and sketcher of plant specimens from an early age, the author, educator and clergyman Charles Alexander Johns (1811–74) gained recognition for his popular books on British plants, trees, birds and countryside walks. *The Forest Trees of Britain* (1847–9), one of several works originally published by the Society for Promoting Christian Knowledge, is also reissued in this series. First published by the Society in 1851, Johns' best-known work is this two-volume botanical guide to common British flowering plants. Following the Linnaean system of classification, Johns describes the various plant families, providing the common and Latin names for each species. The work is especially noteworthy for its delicate and meticulous line drawings, based on watercolours by the botanical artist Emily Stackhouse and the author's sisters Julia and Emily. Volume 1 includes an introduction to the Linnaean system and the botanical terms used in the text.

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CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge, CB2 8BS, United Kingdom

Published in the United States of America by Cambridge University Press, New York

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It furthers the University's mission by disseminating knowledge in the pursuit of
education, learning and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781108068642

© in this compilation Cambridge University Press 2014

This edition first published 1853
This digitally printed version 2014

ISBN 978-1-108-06864-2 Paperback

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FLOWERS OF THE FIELD.

BY THE

REV. C. A. JOHNS, B.A. F.L.S.

AUTHOR OF BOTANICAL RAMBLES, THE FRUIT TREES OF BRITAIN,
ETC. ETC.

IN TWO VOLUMES.

VOL. I.

PUBLISHED UNDER THE DIRECTION OF
THE COMMITTEE OF GENERAL LITERATURE AND EDUCATION,
APPOINTED BY THE SOCIETY FOR PROMOTING
CHRISTIAN KNOWLEDGE.

L O N D O N :
PRINTED FOR THE
SOCIETY FOR PROMOTING CHRISTIAN KNOWLEDGE;
SOLD AT THE DEPOSITORY,
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4, ROYAL EXCHANGE, 16, HANOVER STREET, HANOVER SQUARE;
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Cambridge University Press
978-1-108-06864-2 - Flowers of the Field: Volume 1
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[More information](#)

LONDON :
R. CLAY, PRINTER, BREAD STREET HILL.

INTRODUCTION
TO
BRITISH BOTANY.



CHAPTER I.

EXPLANATION OF TERMS.

THOUGH the highest claim of these volumes is to introduce the lover of Nature to an acquaintance with the common British plants, the Author has given to his first Chapter the somewhat presuming title of an "*Introduction to British Botany*;" lest those into whose hands the work may fall should pass over the earlier part of it as a treatise or summary of contents unconnected with what follows, the perusal of which may, therefore, be omitted or deferred with safety. So far is this from being the case, that the reader who is unacquainted with the elements of botany will find the body of the work of little use, unless he carefully peruses the earlier pages, and makes himself thoroughly acquainted with the general plan.

The limits of a work of this kind will not allow any account of the internal structure of plants, or of the functions of their various organs. Nor, indeed, is such description necessary in a work which professes merely to teach the unscientific how to find out the names of the flowers they may happen to fall in with in the course of their country rambles. Such a knowledge of plants as this, it may be said, and said with truth, is not Botany; nevertheless, it is a step towards Botany: for there can be no doubt that scientific treatises on this subject would often be studied with pleasure, if the

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reader were familiar with simply the outward appearance of the examples quoted : just as we take greater interest in accounts of astronomical discoveries, if we have seen and handled a telescope, than if we had merely had one described to us, no matter with what accuracy and minuteness. The reader, then, or, inasmuch as even the elementary knowledge of a science can only be attained by study, the *student* who wishes to make these volumes practically useful in enabling him to find out the names of our common wild flowers, is recommended to read with care and attention the following pages, into which the author has introduced nothing but what is essential to the proper understanding of the body of the work, and so to the attainment of his object.

Before a novice can commence the study of any science, he must make himself acquainted with the terms employed by writers on that science ; he must not be frightened if things new to him should have strange names. Unmeaning and hard to be remembered they must appear to him at first, but this will be only as long as they remain mere sounds. When he has gained a knowledge of the *things* for which they stand, they will lose their formidable appearance, and, hard as they may still be to pronounce, they will very soon become familiar to the mind, if not to the tongue. In a scientific treatise on Botany, taken in its widest sense, these terms must of necessity be very numerous. Not so, however, with a popular description of the plants growing wild in a single country of limited extent ; the Author, therefore, has endeavoured to keep technical terms out of sight, as much as possible, in the hope that the lover of Nature may be beguiled into forming an acquaintance with the outward appearance of the plants of his neighbourhood, and eventually be induced to study their characters, or to extend his researches beyond the limits of his own country. He has, consequently, avoided the use of Latin words wherever English ones would do as well, and has often preferred to express by several words what might

have been defined by one, because that one was probably strange to the reader. With respect to the organs of plants, he has not noticed the existence of any but those with which it is necessary that the student should be familiar before he refers to the body of the work for a description of any plant which he may have found; these, with their principal peculiarities, may be described at once. They are, ROOT, STEM, LEAF, STIPULES, BRACTS, FLOWER, CALYX, COROLLA, STAMENS, PISTILS, FRUIT, SEED, RECEPTACLE, and NECTARY.

THE ROOT.—The most frequent form of the *root* is a tuft of fibres, each of which ends in a porous substance serving to absorb moisture from the soil. In many instances, however, the nourishment thus obtained, instead of being transmitted at once to that part of the plant which rises above the ground, is lodged in another organ, which, though partaking in some measure the properties of root and stem, is distinct from both. This, too, with the fibres attached to it, is called a *root*, the fibres themselves being named *rootlets*. The principal forms of the root are :—

The *Creeping Root*, familiar examples of which are afforded by Couch-grass and Horse-radish.

The *Spindle-shaped Root*; examples, Carrot and Parsnep.

A Spindle-shaped Root which ends abruptly, is termed *premorse* (bitten off), as in Premorse Scabious, vol. i. p. 315.

The *Tuberous Root* consists of one or more roundish, solid masses, having the power of producing rootlets and buds from several parts of its surface, as the Potato.

The *Bulbous Root* is a solid roundish mass, producing rootlets at the lower extremity, and a bud at the other; it consists either of fleshy scales, as in the White Lily, concentric circles, as in the Onion, or is of one uniform substance throughout, as in the Crocus. This last is sometimes called a *corm*.

THE STEM.—The stem is said to be *simple* when it

bears leaves, or leaves and flowers only without branches ; as in Grass of Parnassus, vol. i. p. 120.

A *compound stem* is repeatedly and irregularly branched, as in Flax-seed, vol. i. p. 108.

A stem is said to be forked when it divides into two branches of equal, or nearly equal, size. The stem of Annual Knawel, vol. i. p. 229, is repeatedly forked.

The term *erect*, when applied to the stem, has the same meaning as *perpendicular*.

An *ascending stem* is one which is horizontal when first it leaves the root, and then becomes erect. When several stems grow from one root, the central one is often *erect*, the rest *ascending*, as in the common Mallow.

A *prostrate stem* trails along the ground without ever becoming erect.

A *creeping stem* differs from the last by sending out roots from its joints. Some plants have erect stems with creeping *scions*, or shoots from the base, as the Creeping Buttercup, vol. i. p. 11.

THE AXIL.—This name is given to the angle formed by a leaf where it leaves the stem. A bud or flower which springs from this angle, is termed *axillary*.



THE LEAF.—*Leaves* which spring directly from the root are called *radical* ; those which grow on the stem are either *alternate*, as in Balsam, vol. i. p. 130 ; *opposite*, as in the Pink, p. 88 ; or *whorled* : the leaves of Woodruff, p. 306, grow in *whorls*.

INTRODUCTION.

v

Leaves which have no stalks are termed *sessile* (sitting), as in Eryngo, vol. i. p. 254.

A leaf which consists but of one piece is said to be *simple*, as in Marsh Marigold, vol. i. p. 15; a *ternate leaf* consists of three *leaflets* on a common stalk, as in Medick, p. 149; a *quinate*, of five, as in Marsh Cinquefoil, p. 189. Other forms of the *compound leaf* are the *pinnate*, (from *penna*, a feather,) when a number of leaflets are ranged along the opposite sides of a common stalk, as in Saint-foin, vol. i. p. 169.

A simple leaf is sometimes *wavy* at the edge, as in the Oak, vol. ii. p. 185; 3-, 5-, or 7-*lobed*, as in the Mal-lows, pp. 110—113; and these *lobes* are often deeply *cut*, as in Geranium, p. 125. A leaf of five or more narrow lobes united near the main stalk, is termed *palmate*, (from *palma*, the palm of the hand,) as in Hellebore, p. 17. The *pedate* leaf differs from the palmate, in having the two side lobes divided a second time at the edge nearest the stalk. A leaf which is lobed after the manner of a pinnate leaf, is termed *pinnatifid*, (from *penna*, a feather, and *findo*, to cleave.)

If a stalk is attached to a leaf at or near its centre, such a leaf is termed *peltate*, (from *pelta*, a buckler,) as in Cotylédon, vol. i. p. 231.

A leaf through which a stalk passes is termed *perfoliate*, (from *per*, through, and *folium*, a leaf,) as in Hare's-ear, vol. i. p. 267.

Two leaves united by their bases, and allowing the stem to pass through them, are termed *connate*, (from *con*, together, and *nascor*, to grow,) as in Chlora, vol. ii. p. 37.

The margin of the leaf is either *entire*, as in Soapwort, vol. i. p. 90; *crenate*, as in Marsh Pennywort, p. 252; *serrate* (saw-edged), as in Rose, p. 199; *toothed*, as in Enchanter's Nightshade, p. 211; or *fringed*, as in Rock-rose, p. 73.

With respect to form, the varieties of leaves are very numerous, and the terms employed to define them not less so. Those which occur in this volume are :—

- Hair-like, or capillary*, as in Fennel, vol. i. p. 271.
Linear, as in the Grasses and Pink, vol. i. p. 88.
Strap-shaped, as in Corrigiola, vol. i. p. 227.
Oblong, as in Rock-rose, vol. i. p. 73.
Elliptical, oval, with both ends alike, as in the leaflets of Rose, vol. i. p. 199.
Egg-shaped, oval, with the base broader than the extremity, as in Pear, vol. i. p. 200.
Inversely egg-shaped, oval, with the base narrower than the extremity, as in Brookweed, vol. ii. p. 87.
Rounded, as in Pyrola, vol. ii. p. 21.
Heart-shaped, as in Violet, vol. i. p. 76.
Inversely heart-shaped, as in the leaflets of Medick, vol. i. p. 149.
Kidney-shaped, as in Ground Ivy, vol. ii. p. 114.
Arrow-shaped, as in Tower Mustard, vol. i. p. 58.
Halbert-shaped, arrow-shaped, but with the barbs turned outwards.
Angular, as in Danish Scurvy-Grass.



DANISH SCURVY-GRASS.

Sword-shaped, as in Iris, vol. ii. p. 206.

STIPULES.—The base of the leaf-stalk is not unfrequently furnished with two sheathing wings; these are called stipules. The leaf of the Rose has oblong stipules at its base.



BRACTS.—Beneath the flower are frequently situated small leaves called *bracts*. Sometimes they are mere scales, as in Broom-rape, vol. ii. p. 68; but more frequently they are only to be distinguished from true leaves by their smaller size, as in Evening Primrose, vol. i. p. 210.

In the Umbelliferous Tribe, vol. i. p. 244, they often grow, several in a whorl, at the base of the general and partial umbels; and in Compound Flowers, vol. i. p. 317, they are yet more numerous at the base of the heads of flowers. When they grow in this form, they are termed an *involucre*, (from *involvere*, to wrap up, because they enclose the flowers before expansion.)

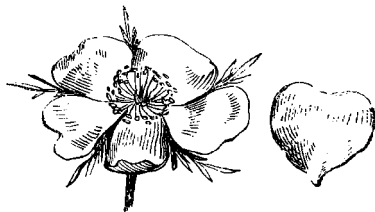
THE FLOWER.—This, as it is the most ornamental, so it is the most important part of the plant, being rarely produced until the juices fit for its nourishment have been selected by the roots and matured by the leaves, and containing all the apparatus necessary for perfecting seeds. In flowering plants, besides the parts which are indispensable to the ripening of seeds, there are others which evidently serve as a protection, and others, again, the use of which is not known. The flower, however, generally, being essential to the continuance of the

species, has been selected, as the part on which to found every arrangement of plants which can lay claim to accuracy or utility. A thorough knowledge of its structure is therefore necessary before the student can proceed to discover the names of the commonest plants which are flung with so bountiful a hand over our hills and fields.

THE CALYX.—This name is given to that part of the flower which in the bud stage is outside all the rest, and which when the flower is expanded encircles the more delicate parts. It is usually green, and consists of several leaves, termed *sepals*; but these sepals are often united at the base and form a cup, (hence the name *calyx*, a cup.)

It is unnecessary here to describe the various forms of the calyx, which are very numerous. It may be remarked, however, that when the calyx is divided into two distinct lobes, one of which overhangs the other, it is termed *gaping*; in the Mallow Tribe, vol. i. p. 109, it is double; and in Compound Flowers, p. 317, the Valerian, p. 308, and Teazel Tribes, p. 312, it is at first a mere ring, but afterwards becomes a chaffy or feathery appendage to the seed, termed a *pappus*.

THE COROLLA.—Within the calyx is the *corolla* (little crown), a ring of delicate leaves called *petals*, usually

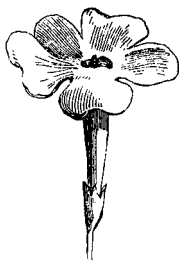


coloured—that is, not green—and often fragrant. The petals are either distinct, as in the Rose, in which the

INTRODUCTION.

ix

expanded part is termed the *limb*, the lower the *claw* ; or united below, when the expanded part is termed the *border*, the lower the *tube*. The corolla usually has as



many petals or divisions as there are sepals ; and if these are all of the same size and shape, the corolla is said to be *regular*.

The most common forms of the regular corolla of one petal, are :—

Salver-shaped, as in Primrose, vol. ii. p. 129.

Funnel-shaped, as in Cowslip, vol. ii. p. 131.

Wheel-shaped, when the tube is no longer in proportion than the axle of a wheel, as in Speedwell, vol. ii. p. 87.

Bell-shaped, as in Campanula, vol. ii. p. 3.

Trumpet-shaped, as in Convolvulus, vol. ii. p. 42.

When the irregular corolla of one petal is divided into two lobes, one of which overhangs the other, it is termed *labiate*, or *lipped*, as in the Natural Family *Labiatae*, vol. ii. p. 91 ; if the lips are open, it is said to be *gaping*, as in Yellow Dead Nettle, vol. ii. p. 106 ; if closed, *personate*, (from *persóna*, a mask,) as in Snapdragon, vol. ii. p. 74. In the Compound Flowers, vol. i. p. 317, there are frequently two kinds of florets in one flower, those of the *disk*, or centre, being tubular, without an evident border ; those of the *ray*, or margin, strap-shaped, as in the Daisy.

Among *regular* flowers of many petals, the only form

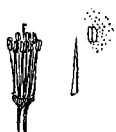
which it will be necessary to mention here is the *cruciform*, consisting of four petals placed cross-wise, as in the Cruciferous Tribe, vol. i. p. 35.

The most remarkable among the *irregular*, is the papilionaceous, (from *papilio*, a butterfly,) consisting of five petals, of which the upper one, called the *standard*, is usually the largest; the two side ones are termed *wings*, and the two lower ones, which are often combined, form the *keel*, vol. i. p. 138.

Both calyx and corolla are not always found in the same flower, and when one only is present, it is sometimes difficult to decide by what name it should be called. In this case the term *perianth* (from the Greek *peri*, around, and *anthos*, a flower,) is a convenient one. Some flowers have neither calyx nor corolla, as Water Star-wort, vol. i. p. 215. When the *perianth* is said to be double, it is to be understood that calyx and corolla are both present.

THE STAMENS.—Within the perianth, and frequently attached to it, is a row of delicate organs called *stamens*, of which the lower part is termed the *filament*, the upper the *anther*. When the filament is slender throughout, it is said to be *thread-like*; but if it be thick at the base, and taper to a point, it is said to be *awl-shaped*. The anther varies in shape, but is most frequently oblong,

and composed of two lobes and as many cells, which are filled with a fine dust, called *pollen*. If there be no filament, the anther is said to be *sessile*. In a majority of flowers the number of stamens equals that of the petals; a few plants have but one stamen: very often the number of stamens is some multiple of the petals, that is, there are twice or thrice, &c. as many, and not a few flowers have from twenty to several hundred. Sometimes the filaments are united at the base into one or more sets, as in *Hypericum*, vol. i. p. 116; sometimes they form a hollow tube, the anthers being distinct, or *free*, as in *Mallow*, vol. i. p. 109; and sometimes the



filaments are free, and the anthers are united into a ring, as in the Compound Flowers, vol. i. p. 317 ; and Heath, vol. ii. p. 14.

THE PISTIL.—This is the central part of the flower, and in its commonest form is a delicate column composed of three parts, the *ovary*, the *style*, and the *stigma*.

The *ovary*, (from *ovum*, an egg,) sometimes called the *germen*, contains the rudiments of the future seed.



The *style*, (from *stylos*, a column,) is to the pistil what the shaft is to a pillar, connecting the ovary with

The *stigma*, which is sometimes a mere viscid point, but more frequently an enlargement of the summit of the style, is variously shaped, being globular, flat, lobed, &c. If there be no style, the stigma is said to be sessile.

In the majority of flowers there is but one pistil; but very often there is a single ovary, which bears several styles and stigmas. In this case the ovary usually consists of several cells, each of which, with its style and stigma, is termed a *carpel*; and the same name is given to each of the ovaries in such flowers as Marsh Marigold, vol. i. p. 15, where they are distinct; and in Blackberry, p. 192, where they are united.

Both calyx and corolla, it has been said above, may be absent. Not so with respect to stamens and pistils; for, unless they are present, no seed can be perfected. It is not, however, essential that they should both be found in the same flower. Sometimes on the same plant flowers are to be found, some of which bear stamens only, others pistils only; and not unfrequently these organs grow, not only in separate flowers, but on different plants. In either case, those flowers alone which contain pistils produce seeds, and are therefore termed *fertile*; while those containing stamens only, are called *barren*. The external structure of barren and fertile flowers is often very dissimilar, as in Willow, vol. ii. p. 180; and Oak, p. 185. When the ovary is

inserted above the base of the perianth, it is said to be *superior*, as in Crowfoot, vol. i. p. 10; when below, *inferior*, as in Rose, p. 199. In like manner the perianth is said to be superior or inferior, according as it is inserted above or below the ovary.

THE FRUIT.—As the flower withers, the ovary enlarges and becomes the *fruit*, that is, the seed, with its case or covering, also called a *pericarp*, (from *peri*, around, and *carpos*, fruit.) Among the various forms of fruit, the principal are—

The *capsule*, (from *capsula*, a little box,) a dry case, either opening by *valves*, as in Pink, vol. i. p. 88; by *teeth*, as in Lychnis, vol. i. p. 93; by *pores*, as in Poppy, p. 26; or by splitting all round, as in Pimpernel, vol. ii. p. 133.

The *siliqua* and *silicle*, described at vol. i. p. 35.

The *pod*, or *legume*, a long seed-vessel, differing from the siliqua in having no partition, and bearing the seeds in a single row, as in the Pea and Bean Tribe, vol. i. p. 138.

The *berry*, a juicy or mealy fruit, bearing the seeds immersed in pulp, as in Elder, Currant, &c.

The *nut*, a dry fruit, composed of a hard shell, containing a seed, as in Hazel, vol. ii. p. 186; and Gromwell, p. 50.

The *drupe*, a nut enclosed in pulp, as the Plum and Cherry.

The *cone*, a collection of *imbricated* or overlapping scales, each of which covers two seeds, vol. ii. p. 188.

THE SEED.—A seed is said to be *dicotylédonous*, when it is composed of two lobes, or *cotylédons*, which enclose the *plumule*, or embryo of the future plant. As the seed germinates, the cotylédons either rise above the ground, as in Mustard, or remain buried, as in the garden Pea.



Plants bearing seeds of this structure compose the first Natural Class, DICOTYLÉDONOUS PLANTS, or EXOGENS, vol. i. p. 1. When the seed is not separable into two parts,

it is termed *monocotylédonous*; and plants bearing such seeds compose the Second Natural Class, MONOCOTYLÉDONOUS PLANTS, or ENDOGENS, vol. ii. p. 191.

RECEPTACLE.—This name is given to that part of the flower on which all the others rest. It is most conspicuous in the Compound Flowers, vol. i. p. 317, where it is sometimes *conical*, as in Daisy, p. 374; *chaffy*, as in Cat's-ear, p. 332; *bristly*, as in Thistle, p. 346; or *dotted*, as in Dandelion, p. 340.

NECTARY.—Any distinct organ in a flower which contains honey; for instance, the scale at the base of the petals in Crowfoot, vol. i. p. 8; the spurs of the Columbine, p. 18, &c.

INFLORESCENCE.—This term is used to denote the arrangement of flowers on the stem.

A flower-stalk springing directly from the root, and bearing no leaves, is termed a *scape*, as in Primrose, vol. ii. p. 129.

When it is inserted in the angle between the main stem and a leaf, it is termed *axillary*, as in Balsam, vol. i. p. 130.

When it is at the extremity of the main stem, having no leaves beyond it, it is said to be *terminal*, as in Grass of Parnassus, vol. i. p. 120.

A flower-stalk which bears but one flower, is said to be *simple*, as in Grass of Parnassus, vol. i. p. 120.

A stalk bearing a number of sessile flowers arranged one above another, is termed a *spike*, as in Plantain, vol. ii. p. 142.

When, instead of being sessile, the flowers are supported on simple stalks, the inflorescence is a *cluster*, as in Melilot, vol. i. p. 150.

A *panicle* differs from a cluster in being branched, as in Spurrey, vol. i. p. 98.

A *corymb* differs from a cluster in bearing the lower flowers on long stalks, while the upper are sessile, or nearly so, as in Stock, vol. i. p. 65.

In a *cyme* the stalks are irregularly branched, but

the flowers are nearly level, as in Elder, vol. i. p. 295.

The *umbel* is a mode of inflorescence in which the flower-stalks spring from a common centre, and bear each a single flower, as in Ivy, vol. i. p. 285. When the stalks bear, instead of a single flower, a second umbel, the inflorescence is a *compound umbel*, the primary division being termed a *general umbel*, the secondary a *partial*. This mode of inflorescence is common in the Umbelliferous Tribe, vol. i. p. 244.

A *head* resembles a simple umbel, except that the flowers are all sessile, as in Scabious, vol. i. p. 316.

A *catkin* resembles a spike, except that the flowers are enclosed each within a scale-like bract, as in Hazel, vol. ii. p. 186.

Other terms which are employed in the body of the work will be explained as they occur, or in the description which precedes the summary of each Natural Order. A Glossary will also be found at the end of the second volume, containing definitions of most of the common terms in use.

CHAPTER II.

SYSTEMATIC BOTANY.

It has been already stated that the only parts of a plant which are necessary to the production of seed are the *stamens* and *pistils*. On these organs, therefore, the learned Linnæus fixed, when framing his artificial arrangement of plants, as affording the readiest means of referring to the written characters of plants described in his works.¹ He nowhere claims the honour of having discovered their importance; on the contrary, he expressly alludes to a popular opinion that the fact was known to Thomas Millington, a naturalist of the preceding century. But whoever discovered the fact, it lay idle and unnoticed until Linnæus invented and perfected the system founded on the fact. This can be proved, both by the jealousy with which it was received by the naturalists of the day, whose favourite methods have disappeared before it, as well as by the acrimony with which the name and works of Linnæus are assailed by some modern botanists—men who, while they disparage the works of their great leader, find it impossible to quit the track that he has trodden out for them, from a conviction that truth lies in the path that he has prescribed, and nowhere else.

The first division of Vegetables, according to the system of Linnæus, is into TWENTY-FOUR CLASSES, depending on the number, position, and relative proportion of the *Stamens*.

The first eleven CLASSES are characterised solely by the number of the stamens, and are thus named :—

(1) The number of species known to Linnæus in 1753, when he published his "Species Plantarum," amounted only to 7,300.

- Class* I. MONANDRIA, one stamen.
 II. DIANDRIA, two stamens.
 III. TRIANDRIA, three ditto.
 IV. TETRANDRIA, four ditto.
 V. PENTANDRIA, five ditto.
 VI. HEXANDRIA, six ditto.
 VII. HEPTANDRIA, seven ditto.
 VIII. OCTANDRIA, eight ditto.
 IX. ENNEANDRIA, nine ditto.
 X. DECANDRIA, ten ditto.

XI. DODECANDRIA, twelve to nineteen ditto.

The Twelfth and Thirteenth Classes are distinguished by the situation as well as number of the stamens.

Class XII. ICOSANDRIA, twenty stamens, or more, inserted on the calyx.

XIII. POLYANDRIA, twenty stamens, or more, inserted on the receptacle.

The Fourteenth and Fifteenth Classes, by the number and relative proportion of the stamens.

Class XIV. DIDYNAMIA, four stamens, two longer than the others.

XV. TETRADYNAMIA, six stamens, four long and two short.

The Classes from the Sixteenth to the Nineteenth are distinguished by the combination of the stamens with each other, no account being taken of their number.

Class XVI. MONADELPHIA, stamens all united by their filaments.

XVII. DIADELPHIA, stamens combined by their filaments into two sets.

XVIII. POLYADELPHIA, stamens combined by their filaments into three or more sets.

XIX. SYNGENESIA, stamens united by their anthers; flowers compound.

In *Class* XX. GYNANDRIA, the stamens are inserted on the pistil, and so combined with it as to form a central *column*.

The Twenty-first, Twenty-second, and Twenty-third

Classes are distinguished by the stamens and pistils being in separate flowers.

Class XXI. MONŒCIA, stamens and pistils in different flowers, but on the same plant.

XXII. DICŒCIA, stamens and pistils in different flowers and on separate plants.

XXIII. POLYGAMIA, flowers of three kinds; some having stamens only, some pistils only, and some both stamens and pistils.

XXIV. CRYPTOGAMIA, flowerless plants, or those in which stamens and pistils have not been detected, fructification being performed by other organs.

Each of the Classes is subdivided into two or more ORDERS. The ORDERS of the first Thirteen Classes depend on the number of the *Pistils*. Thus, any plant in either of the classes from MONANDRIA to POLYANDRIA must be placed in one or other of the following ORDERS:—

Order MONOGYNIA, one pistil.
 DIGYNIA, two pistils.
 TRIGYNIA, three ditto.
 TETRAGYNIA, four ditto.
 PENTAGYNIA, five ditto.
 HEXAGYNIA, six ditto.
 HEPTAGYNIA, seven ditto.
 DECAGYNIA, ten ditto.
 DODECAGYNIA, twelve ditto.
 POLYGYNIA, many ditto.

In the Fourteenth Class, DIDYNAMIA, there are two Orders.

Order I. GYMNOSPERMIA, ovaries four, one-seeded.

II. ANGIOSPERMIA, ovary single, many-seeded.

In the Fifteenth Class, TETRADYNAMIA, there are two Orders.

Order I. SILICULOSA, fruit a *silicle*, or short pod without a partition.

II. SILIQUOSA, fruit a *siliqua*, or long pod without a partition.

The Orders of the Sixteenth, Seventeenth, and Eighteenth Classes, MONADELPHIA, DIADELPHIA, and POLYADELPHIA, depend on the *number of the stamens*: thus, *Class* MONADELPHIA, *Order* PENTANDRIA, includes plants having *five* stamens united by their filaments into one set; *Class* DIADELPHIA, *Order* DECANDRIA, plants having *ten* stamens combined by their filaments into *two* sets; and *Class* POLYADELPHIA, *Order* POLYANDRIA, plants with more than *twenty* stamens combined by their filaments into *three or more* sets.

In the Nineteenth Class, SYNGENESIA, the Orders depend on the structure and arrangement of the *florets*; but as they are Orders nearly identical with the *Groups* into which the COMPOUND FLOWERS are distributed, their limits need not be assigned here.

In the Twentieth, Twenty-first, and Twenty-second Classes, GYNANDRIA, MONŒCIA, and DICŒCIA, the Orders are determined by the *number of the stamens*. Plants, for example, having *one* stamen are in the *Order* MONANDRIA; those with *two* stamens, in the *Order* DIANDRIA, &c.

The Twenty-third Class, POLYGAMIA, contains only one British *Order*, namely MONŒCIA, in which there are three different kinds of flowers—those with stamens only, those with pistils only, and those with both stamens and pistils *on the same plant*.

As the limits of these volumes exclude all mention of the plants in the extensive *Class* CRYPTOGAMIA, it is not necessary to enumerate the *Orders* into which it is divided.¹

(1) The student is recommended to commit to memory the names, rather than the numbers of the Classes and Orders. While he does this he will find it useful to bear in mind that the names both of Classes and Orders are of Greek etymology, and that the prefixes are mostly numerals. Thus, *mon* signifies one; *di*, two; *tri*, three; *tetra*, four; *pent*, five; *hex*, six; *hepta*, seven; *oct*, eight; *enne*, nine; *dec*, ten; *dodec*, twelve; *icos*, twenty; and *poly*, many. The root *dynam* signifies power or excess: thus, *Didynamia* means "the excess of two;" *Tetradynamia*, "the excess of four." *Adelphia* signifies a brotherhood, as *Monadelphía*, "one brotherhood," or united set of stamens; *Syngenesia* signifies "a growing together," in allusion to the combination of the anthers in that class. The termination *œcia* denotes "a house-

This arrangement brings together, for no other purpose than for convenience of reference, plants dissimilar in structure, habit, and properties. It is, therefore, an Artificial System; as such Linnæus proposed it, and such he always professed it to be. "I have never pretended that the method was natural," he says, in his letter to Haller. "A Natural System," he repeatedly remarks, in his other writings, "is the first and last object to be aimed at by botanists." . . . A perfect system of this kind should assemble plants allied in habit, mode of growth, properties, and uses." Of such a system he left a slight sketch; but the rich store of plants which has been laid open to modern botanists never came within his reach; it is, therefore, not surprising that, being well aware of his defective materials, he never attempted to fill the sketch in. Make it as complete as he would, in a few years it would have been imperfect and useless. Not so, however, his Artificial System, which, still marked by the limits that he assigned, not only offers facilities for forming an acquaintance with the names of plants, but affords ready means of reference to any System in which plants are arranged according to their natural characters. It is not, therefore, too much to say that the Artificial System of Linnæus has served a double purpose. Before a Natural Method was arranged, it was the only one that was available; and now that it is

hold;" so in the Class *Monœcia*, the stamens and pistils may be supposed to occupy separate apartments in one house. *Polygamia* signifies "many kinds of fructification;" *Cryptogamia*, "concealed fructification." *Andria* denotes stamens; *gynia*, pistils: thus *Triandria* includes flowers with *three stamens*; *Digynia* flowers with *two pistils*; and *Gynandria* flowers with *pistils and stamens united*. In the two Orders of the Class *Didynamia*, the term *Gymnospermia* denotes "naked seed;" the fruit being apparently destitute of a covering: *Angiospermia* implies that the seeds are enclosed in a "seed-vessel." The terms *Siliculosa* and *Siliquosa* are explained in the text.

(1) *Methodi Naturalis fragmenta inquirenda sunt. Primum et ultimum hoc in Botanicis desideratum est. Plantæ omnes utrimque affinitatem monstrant uti territorium in mappâ geographicâ.*—*Lin. Phil. Bot. Aph. 77.*

Methodus Naturalis est ultimus finis Botanicæ.—*Ibid. Aph. 163.*

Naturalis Character ab omni Botanico tenetur oportet.—*Ibid. Aph. 191.*

Classes, quo magis naturales, eo, cæteris paribus, præstantiores sunt. Adfines conveniunt habitu, nascendi modo, proprietatibus, viribus, usu. Summorum Botanicorum hodiernus labor in his sudat, et desudare decet; methodus Naturalis hinc ultimus finis Botanicæ est et erit.—*Ibid. Aph. 206.*

superseded, it is still eminently useful as an index, or a catalogue of the contents of its successor; the secondary use being one which, perhaps, Linnæus himself scarcely contemplated.

It is not necessary here to give an account of the various Natural Systems which have been proposed. Suffice it to say, the one generally adopted in Britain is a modification of those of Jussieu and De Candolle. Here the whole Vegetable Kingdom is divided into three great CLASSES.

CLASS I. DICOTYLÉDONES.

In this Class are placed such plants as produce seeds divisible into two lobes or *cotyledons* (vol. i. p. 1). It is subdivided into Four *Sub-classes*, THALAMIFLORÆ, CALYCIFLORÆ, COROLLIFLORÆ, and MONOCHLAMYDEÆ.

Sub-class I. THALAMIFLORÆ.

Flowers furnished with calyx and corolla; *petals* distinct, inserted into the receptacle, or *thalamus*; *stamens* springing from the base of the *ovary*.—This Sub-class contains Twenty-two British Orders. (Vol. i. pp. 2—132.)

Sub-class II. CALYCIFLORÆ.

Flowers furnished with calyx and corolla; *sepals* distinct, or united; *petals* distinct; *stamens* inserted in the *calyx*, or close to its base.—This Sub-class contains Eighteen British Orders, numbered from XXIII. to XL. (Vol. i. pp. 133—290.)

Sub-class III. COROLLIFLORÆ.

Flowers furnished with calyx and corolla; *petals* united, bearing the *stamens*.—In this Sub-class there are twenty-seven British Orders, numbered from XLI. to LXVII. (Vol. i. p. 290, to vol. ii. p. 143.)

*Sub-class IV. MONOCHLAMYDEÆ.*¹

Peranths single, or none. This Sub-class contains thirteen British Orders, numbered from LXVIII. to LXXIX. (Vol. ii. pp. 144—190.)

CLASS II. MONOCOTYLEDONES.

Seeds with a single *cotyledon* (vol. ii. p. 191). It is subdivided into Two *Sub-classes*, PETALOIDEÆ and GLUMACEÆ.

Sub-class I. PETALOIDEÆ.

Flowers with petals.—This Sub-class contains sixteen British Orders, numbered from LXXX. to XCVI. (Vol. ii. p. 192 to the end.)

Sub-class II. GLUMACEÆ.

Flowers formed of chaffy scales, or *glumes*.—This Sub-class contains the Grasses and Sedges.

CLASS III. ACOTYLEDONES.

Flowerless plants. Here are placed the Ferns, Mosses, Liverworts, Lichens, Sea-weeds, and Fungi.

Each of the *Natural Orders*, or *Tribes*, alluded to above, consists of a number of plants which are more or less like one another in various respects, especially in the organs of fructification. The plants comprised in each Tribe are again distributed into *genera*, or *families*, each genus including all plants which resemble one another yet more closely in the essential characters of fructification. A *species*, or *kind*, is an assemblage of individual plants agreeing with each other in *all* essential points; and individuals which differ one from

(1) From the Greek *monos*, one, and *chlamys*, a mantle or covering; the plants of this Sub-class never having both calyx and corolla.

another in minor points, such as an irregular formation of leaves or mode of growth, unusual colour of flowers, extraordinary number of petals, &c., are termed *varieties*. These words are frequently used loosely in common conversation, but the habit cannot be too carefully avoided in botanical descriptions, as calculated to produce great confusion. Throughout these pages they will be employed exclusively with the meanings above assigned, which will be rendered clearer by the following examples:—The wild sweet-scented Violet is called by botanists *Viola odorata*; the former name, *Viola*, indicating that it belongs to the *genus* so called, and being, therefore, termed its *generic* name. Besides the scented Violet, we have in England the Dog-Violet, the Marsh-Violet, the Pansy, and several others, all belonging to the same *genus*, and, therefore, described under the name *Viola*. But the Dog-Violet differs from the Sweet-scented, in having acute sepals and leafy stems, whereas the latter has blunt sepals, and the leaves spring directly from the roots. The Dog-Violet is, therefore, a distinct *species*, *Viola canina*. The Marsh-Violet and Pansy differ also in important characters; they are, therefore, also considered distinct *species*, the fact being indicated by the addition of the *specific* or *trivial*¹ names, *palustris* and *tricolor*, to the *generic* name, *Viola*. The flowers of the scented *Violet* are sometimes white and sometimes blue; garden specimens are often tinged with pink, and still more frequently, double. These characters being either unimportant, or inconstant—for blue flowers generally have a great tendency to sport to white, and double flowers are not perpetuated by seed—the blue, white, pink, and double sweet Violets are not considered distinct *species*, but mere *varieties*. Now there are many

(1) No little merit is due to Linnæus for inventing the specific or trivial name of plants. The method in use previously to his time was to attach to every plant some such title as the following: *Gramen Xerampelinum*, *Miliacea*, *pratensis ramosaque sparsa panicula*, *sive*, *Xerampelino congener*, *arvense, æstivum*; *gramen minutissimo semine*. The name of this grass Linnæus expressed with accuracy and simplicity by the two words, *Poa bulbosa*.

plants which bear a close resemblance to a Violet in the structure of their flowers and seeds, but yet differ so far that they cannot be reduced under the same *genus*; they are, therefore, placed with it in the same *Tribe*, called VIOLACEÆ, all the genera in which differ in essential points from the genera which compose other Tribes, but agree with a vast number in having *two-lobed seeds* and *leaves with netted veins*, two of the characters of DICOTYLEDONOUS PLANTS. In this Class it is arranged with plants furnished with both calyx and corolla, and having their petals distinct and inserted with the stamens into the receptacle.

The plant of which we have been speaking belongs, then, to the—

CLASS I. DICOTYLÉDONES.

SUB-CLASS I. THÁLAMIFLORÆ.

Order or *Tribe* IX. VIOLACEÆ.Genus 1, *Viola*.*Species* 2, *odoráta*.*Variety*, *blue, white, or double*.

In the Linnæan system the same plant is placed in the *Class* PENTANDRIA, which comprises flowers having *five stamens*; and in the *Order* MONOGYNIA, which includes such of them as have *one pistil*.

In this work the British genera and species are arranged in their Natural Orders or Tribes; and a synopsis is also given of the genera only, as they stand in the Linnæan Classes and Orders. (Vol. i. p. xxviii. &c.)

The student, it is presumed, wishes to determine the genus and species, or to find the name, of the plants which he meets with in his walks. Suppose him to have found a small shrubby plant with oblong leaves and large yellow flowers: in which volume, and in what part of it, must he look for a description which he may

compare with the specimen in his hand? On examining a flower (he will do well to select one which is just expanded), he will discover a large number of *stamens*, evidently more than twenty, inserted in the receptacle,



HELIANTHEMUM VULGARE.

and he will have no doubt that it belongs to the Linneæan *Class* POLYANDRIA. In the centre of the stamens he will detect a single *pistil*, and hence will conclude that it should be referred to the *Order* MONOGYNIA in that *Class*. He will, accordingly, turn to *Class* POLY-