A GRAMMAR OF BOTANY,
ILLUSTRATIVE OF ARTIFICIAL, AS WELL AS CLASSIFICATION,
WITH AN EXPLANATION OF JUSSIEU’S SYSTEM.

BY

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Natural Orders instruct us in the nature of plants; artificial ones teach us to know one plant from another. Linn. Gen. P., ad O d. Nat.

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TO

MRS. CORRIE,

OF WOODVILLE LODGE, NEAR BIRMINGHAM,

THE AUTHOR DEDICATES THIS WORK;

AS A SINCERE TESTIMONY

OF ESTEEM AND RESPECT,

FOR THOSE EMINENT, THOUGH UNOBTRUSIVE,

VIRTUES AND TALENTS,

WITH WHICH,

BUT FOR THE SCIENCE OF BOTANY,

HE MIGHT NEVER HAVE HAD THE HAPPINESS

OF BECOMING ACQUAINTED.

Norwich, Sept. 27, 1820.
The intention of the present volume is not only to supply some deficiencies, in a work of the same author, entitled *An Introduction to Physiological and Systematical Botany*; but also to follow up its design, by additional information; especially on the subject of the natural classification, or affinities, of plants. The reception of that elementary treatise has been such, as to make it incumbent on the author to neglect no opportunity of being further useful. Yet he has not thought proper to add any new matter to the successive editions of his book, which the possessors of the original might not obtain in a separate form. The fourth edition, which, besides an American one, is now before the publick, has therefore merely received such emendations and corrections as were necessary to prevent mistakes.

The popularity and success of the former work have, as usual, called forth many la-
bourers into the same field. Some of these, though borrowing from it with unsparing hands, have thought proper to vary the form of their instructions; partly perhaps to conceal that want of originality, which generally enfeebles all compilations; and partly to tempt weak or sickly appetites, which have no previous taste for the invigorating food of real knowledge. It is a commendable intention to lure such triflers, by tales or dialogues, to more solid reading, and more efficient instruction. I mean not to discommend or undervalue any of these humble attempts; but the subject must not be reduced to their level. The only radical fault in compilers, especially of elementary scientific instruction, is their inability to appreciate what is most important to teach or to enforce. Hence they encumber themselves, and alarm beginners, with loads of unmeaning names, and of useless, or discarded, terms. Let such be found in their proper places, but not obtruded on the student where they can render him no service. The elements of every science are necessarily dry enough: but when they are correct and clear, they charm by their precision: a taste
for which quality is one of the great advantages to be derived by the youthful mind, from the study of nature.

With these considerations in view, I have commenced the present volume with what may be termed a Botanical Grammar. In the first five chapters the parts of the vegetable body, and their uses, are defined in a concise and methodical manner, with none but important technical terms. Perhaps the contents of these chapters might, with advantage, be learned by heart; the young scholar being directed to seek out examples, of each particular part, or character, as he proceeds, from the garden or fields. The more ample Introduction to Botany would furnish his tutor with references to every example in books, that could possibly be wanted; and the pupil might gradually be led on to a wider circle of terminology, (especially with regard to leaves,) necessary to be known before the species of plants can be investigated in detail. If the contents of these five chapters be well stored up in the mind, and the meaning of all the terms, therein explained, clearly and distinctly impressed upon the memory, the student will
be competent to read any book, or to examine any flower, with great advantage. He will find himself so well grounded, that every thing will subsequently be of very easy attainment, and he will soon be conscious of a great superiority over those who read, or observe, in a desultory way; possibly over many who write, or attempt to teach, without such a foundation. Nor will it be difficult for any attentive scholar, even without a master, to acquire these necessary principles. The paragraphs are numbered, and refer to each other where mutual illustration is requisite. The figures also are occasionally cited, and may be consulted throughout; though principally intended to explain the systematic part of the work, hereafter mentioned.

The theory of Systematic Arrangement, in the sixth chapter, should likewise be well fixed in the mind. This subject is here treated in the same compendious way as the former; with all that is essential, as a foundation for any degree of further inquiry.

The student being thus furnished with a knowledge of the materials with which he has to work, and the relative importance of those
materials for each particular purpose, will easily comprehend the principles of the Linnaean Artificial System, which claims his attention in the seventh chapter. This, he will soon perceive, is to be understood merely as a dictionary, to enable him to make out any plant that may fall in his way. He will learn to reduce such plant to its proper class and order, in some systematic work, where he will trace out in progression its genus and species, with every thing that any author has recorded of its history or use. A complete set of original figures, explanatory of this artificial system, is here subjoined, the want of such, in the above-mentioned Introduction to Botany, having been complained of. The chapter in question, after a few remarks on nomenclature and generic characters, closes with a detailed exposition of the principles and intention of the Linnaean definitions of species. Some of these rules have hitherto been applied to Latin composition only; but it does not appear that they may not be kept in view, though less strictly, in any language; and the laws of discrimination and definition are absolute in themselves.
Thus far only have the pupils of Linnaeus been accustomed to go. But it is the object of the present publication to enable them to proceed a little further. The English reader is here, for the first time, presented with a full explanation of the System of Jussieu. The subject of the natural affinities of Plants, and the question of classing them according to characters derived from thence, have, within a short time, excited the attention of British Botanists, after being still more canvassed and taught on the continent. This subject was originally called into notice by Linnaeus himself, he having first pointed out the difference between a natural and an artificial arrangement. Natural affinities cannot now be overlooked, by those who contemplate the Vegetable Kingdom with any degree of philosophical attention. As Professor de Jussieu and his pupils take the lead in the department of natural classification; the botanists of England, who have never been behind their neighbours, in real science, may well desire to know something of the principles or advantages of a system, which deservedly claims so much notice. I have the more readily un-
dertaken this task of explanation, as I propose to advert more fully, than has hitherto been attempted, to the subject of natural affinities, in my intended Flora, which has so long been promised to the British reader, in his own language. A work of this kind, founded on actual observation, is indeed requisite, instead of the various compilations of compilations, with which those who cannot read Latin have hitherto been obliged to rest satisfied. Some exposition of this kind must have accompanied that work, to render it intelligible; and it will be still more commodious for the student to become previously initiated, and to take a general view of the subject, before his attention can be directed to particulars.

The eighth chapter begins with an index, or key, to Jussieu's Classes, and an enumeration of his Orders. In the sequel each Order is given in its place, with the full character, translated from the Genera Plantarum of Jussieu. His descriptions and observations are everywhere marked by inverted commas, occasional corrections or remarks, intermixed with his text, being inclosed between brack-
ets. The characters of some Orders in the 1st Class, better understood, since he wrote, as the *Musei* and *Filices*, are totally reformed. To his definitions of a few others, given in his own words, are subjoined more complete and correct accounts, founded on more recent inquiries, as is particularly the case with the 20th, 21st, 26th, and 47th Orders. The establishment of new Orders, either by himself or other botanists of eminence, since his book came out, is indicated under the original Order from which each new one has been separated. The aim of the present work however is not, by any means, to give a full view of these. As nothing is more easy than subdivision in such studies, it is no wonder that the followers of Jussieu should often carry that principle too far; just as young botanists are prone to multiply genera. The talents for judicious combination are infinitely more rare. We must wait therefore till some of these innovations shall receive confirmation from superior authorities, as well as from long experience. My present design is rather to exemplify the original System of Jussieu: to point out it's merits and defects; to mark
the genuine, as well as doubtful, Genera of most Orders, and to give examples of all, with such observations, sparingly introduced, as may serve to throw light upon the subject. Many of the Genera for which Jussieu could not find a place in his System, being now better known, are here referred to their proper Orders. After all, the reader must not consider this publication as any thing like a complete view of a Natural System, but rather, to use a French idea, as Memoirs towards a System. Much still remains to be done by future observers, and still more by future systematic writers. It is evident that no such mode of classification can, at present, serve the purposes of analytical investigation, to make out an unknown plant. That is the exclusive object of the Artificial System of Linnaeus, which, of all the schemes hitherto contrived, is alone, perhaps, universally applicable to the end in question. A tacit conviction of this truth seems to be the source of great enmity, in many of the disciples of Jussieu, towards that System, which aims no hostility or rivalry against them. A dictionary quarrels not with a grammar, nor a history with a chrono-
logical table. It is pernicious, as well as foolish, to set them at variance.

The plates, composed in the first instance to explain the Artificial System of Linnaeus, have been extended much further, in order to afford representations of one or more Genera in each of Jussieu's Orders, or subdivisions of Orders. The figures, numbered in regular succession throughout, are cited in the text, and a full explanation of the whole is separately given. The volume ends with a comparison between the Linnaean Natural Orders, and those of Jussieu, by which it will be seen how nearly the conceptions of these great men, though not derived from the same principles, agree together. A few speculative remarks close the whole. They may teach the reader to think on the subject, and to judge for himself hereafter, how far the conjectures or conclusions, interspersed through the preceding review of Jussieu's Orders, are well founded.
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GRAMMAR OF BOTANY.

CHAPTER I.

SUBJECT.

1. BOTANY teaches the knowledge of Plants, either,
   1, with respect to their characters and distinctions;
   2, their structure and the uses of their several parts;
   or 3, their various qualities with regard to mankind,
   and the brute creation.

2. The 1st is called Systematical, the 2d Physiological, and the 3d Economical Botany.

3. Systematical Botany is founded on a knowledge of the external structure of plants, and the different forms under which their various parts and organs appear. By this we are enabled to distinguish one species of plant from another, as well as to assemble or arrange them in families, orders or classes.
4. Physiological Botany, besides a knowledge of the external forms of the vegetable body, requires an acquaintance with its internal structure, and the different substances therein produced and contained, termed Secretions, with the purposes which such secretions answer.

5. Economical Botany is either empirical or philosophical. The former originates in the experience and practical observation of mankind, from one age to another; the latter is deduced from a consideration of certain characters in vegetables; either indicating peculiar properties; or pointing out affinities, more or less remote, by which certain known qualities in some plants, are presumed to exist in others.

6. Before any knowledge of Systematical Botany (3), or the Classification of Plants, can be understood, it is necessary to be acquainted with the various parts of which the Vegetable body consists. These are the Root, Stem, Stalks, Buds, Leaves, Appendages, Flower and Fruit.
CHAPTER II.

DESCENDING PART OF A PLANT. ROOT.

7. Radix, the Root, serves to fix the plant, and to imbibe nourishment for its support. It usually consists of a Caudex, or Body, the top of which is called the Crown; and Radiculae, Fibres; the latter being always present, and constituting the real, or efficient, root. Radicula, the Radicle, or Primary Fibre, is the point of the Embryo (62:1) first protruded in incipient germination.

8. Roots are distinguished into 7 kinds.

1. Radix fibrosa, a Fibrous Root, composed of fibres only, as in many annual plants, and most grasses.
2. R. repens, a Creeping Root, as in Mint and Couch-grass.
3. R. fusiformis, a Tap Root, like the Carrot and Radish.
4. R. praemorsa, an Abrupt Root, as Scabiosa succisa.
5. R. tuberosa, a Tuberous or Knobbed Root, as the Potatoe, Pœony, and Orchis.
6. R. bulbosa, a Bulbous Root, either solid, like that of the Crocus; lamellated, like Onions; or scaly, like the White Lily.
4. **DESCENDING PART OF A PLANT. ROOT.**

7. *R. articulata* or *granulata*, a Jointed or Granulated Root, like Wood Sorrel, and White Saxifrage.

9. Roots differ in duration, being either annual, biennial, or perennial. Fibrous and Tap Roots are frequently annual; some Tap Roots are biennial; Creeping, Abrupt, Tuberous, Bulbous, and Jointed Roots are always perennial, as are some Fibrous and a few Tap Roots.

10. Annual Roots produce the herbage, flowers, and seeds within the compass of one season, after which they entirely die; Biennial ones produce herbage only the first summer, flowers and seeds the next, after which they also die; Perennial Roots bear herbage and flowers through several successive years, to an indeterminate extent, and moreover increase, or form offsets, either spontaneously, or with the assistance of art.

11. The Root is the first part produced by the Seed, when beginning to vegetate in the earth. It is naturally directed downwards, extending itself at the extremity, and forming fresh fibres every year, such (7) being an essential part of every kind of root, the vegetation of which, and of the plant it bears, going on only while the fibres continue to grow, and to imbibe nourishment.
CHAPTER III.

ASCENDING PART. HERBAGE.

12. **Caulis**, the Stem, properly so called, serves to elevate the leaves and flowers above the ground, as in trees, shrubs, and many herbaceous plants, but is not essential to all.

13. The Stem is either annual, or perennial; simple, or branched; leafy, scaly, or naked; solid, or hollow; upright, twining, climbing, procumbent, or creeping; straight, spreading, or zigzag; round, angular, winged, or compressed; smooth, downy, hairy, bristly, or prickly; even, striated, furrowed, or warty.

14. A branched Stem (13) is either irregularly subdivided, or

1. **Caulis dichotomus**, a Forked Stem, having a flower at each fork or subdivision.
2. *alternè ramosus*, alternately branched, the branches being solitary, and variously directed.
3. *oppositè ramosus*, oppositely branched, when two branches stand together, spreading in opposite directions.
4. *verticillatus*, whorled, many branches spreading in every direction from one point.
5. *determinatè ramosus*, abruptly branched,
when each branch, after terminating in flowers, sends out numerous shoots from near its extremity.


7. — *distichus*, two-ranked, the branches spreading in two opposite directions.

8. — *brachiatius*, four-ranked, when they spread in four directions.

9. — *volubilis*, twining, turns spirally; to the right in some plants, to the left in others, invariably.

15. Plants without a stem are termed *acaules*, stemless, and the leaves are then necessarily radical, springing directly from the root.

16. *Culmus*, a Culm or Straw, the peculiar stem of Grasses, is leafy, cylindrical, well known, though not easily defined, nor is this term very necessary. See fig. 139, 141.

1. *Culmus enodis*, simple, or without joints, as in *Juncus effusus*, &c.

2. — *articulatus*, jointed, as in Oats, and most Grasses.

3. — *geniculatus*, bent, at one or more joints, like the knee or elbow.

The surface is either smooth, rough, downy or hairy, never prickly; often striated or furrowed.

17. *Scapus*, a Stalk, springs from the root, and bears the flowers and fruit, but no leaves.

18. The *Scapus* is either simple or branched; single-
or many-flowered; erect or procumbent; straight, wavy, or spiral, as in *Cyclamen* and *Valisneria* after flowering.

19. *Pedunculus*, a Flower-stalk, springs from some part of the stem, and bears the flowers and fruit; if radical, it is a *Scapus*.

20. A Flower-stalk is either terminal or lateral: if lateral, it is either axillary, or *oppositifolius* (opposite to each solitary leaf), or *interpetiolaris* (between the bases of 2 foot-stalks, laterally), or *internodis* (from the part of a branch between 2 joints, or leaves). It is termed *gemmaeus*, when proceeding from the same bud with the leaves. It is simple or compound; solitary or aggregate; erect, spreading, drooping or pendulous.

21. Flowers destitute of a stalk are termed *sessiles*, sessile.

22. *Pedicellus*, a partial Flower-stalk, is the ultimate division of a *Pedunculus* (19). It is also used for the Fruit-stalk, elevating the *Germen* and *Fruit* in Mosses, and some other plants.

23. *Petiolus*, a Foot-stalk, is the stalk of a Leaf, very rarely connected with, or bearing, the flower-stalks. This part, usually channelled along the upper side, is either simple, as in all simple, and some compound leaves; or compound, either once, twice, or more; and sometimes, as in the *Pea* and *Vetch* tribe, ends in tendrils (47:5).
24. *Frons*, a Frond, is a stem and leaf in one, bearing the fructification, as in Ferns, where the flowers and seeds grow mostly on the back; or the *Lichen* and Sea-weed tribes, where they are more or less imbedded in the leafy or crusty substance of the plant. This term is only used in the class *Cryptogamia*, whose flowers are anomalous, or ill understood. In spiked Ferns the frond is partially transformed into fructification.

25. *Stipes*, a Stipe, is the Stem of a Frond (24), as in Ferns, where it is commonly scaly; or the stalk of a *Fungus*, (Mushroom) fig. 129.

26. *Gemma*, a Bud, contains the rudiments of a plant, or part of a plant, latent, and wrapt up in scales, till the season is fit for their expansion. *Vernatio* is used by Linnaeus to express the disposition or folding of the scales.

27. Buds chiefly belong to trees of cold or temperate climates, and powerfully resist cold till they begin to open.

28. The Buds of herbaceous plants (10) are radical. Bulbs are the buds of a certain tribe of herbs (8), their scales being no other than subterraneous leaves, as is evident in *Lilium*.

29. Some buds contain only leaves, others only flowers (20), others both.

30. *Folium*, a Leaf, a very general, but not universal organ, is of an expanded form, usually green, pre-
senting its upper surface to the light, the under commonly differing in hue, and in kind or degree of roughness. The inside is pulpy and vascular.

31. Leaves receive the sap from the wood by one set of vessels, and expose it to the action of air, light and heat by their upper surface, while what is superfluous passes off by the under. The Sap thus changed assumes peculiar flavours, odours, and other qualities, and is sent by another set of vessels into the bark, to which it adds a new layer every year internally, and another layer to the external part of the wood. Hence the concentric circles in trees, the number of which shows their age, and the breadth of each circle, the abundance and vigour of the foliage which formed it.

32. Leaves are wanting in some tribes of plants, whose stems are usually very succulent; such as Salicornia, Cuscuta, Stapelia.

33. The situation of Leaves (30) is either at the root, or on the stem or branches; alternate, scattered, opposite, crowded, whorled (3, 4, or more in a whorl), or tufted.

34. Their position is either close-pressed to the stem, imbricated, erect, spreading, horizontal, reclinate, recurved, or inflexed; oblique (or twisted) or reversed (the upper surface turned downward); depressed, floating, or immersed; two-ranked (spreading two ways 14:7); decussated (crossing each other in pairs); or unilateral (leaning all to one side).
35. Their *insertion* is either sessile or stalked; peltate, clasping, connate, perfoliate, sheathing, equitant, or decurrent.

36. Their *form* is simple, or compound in various degrees; undivided, or lobed; their outline very various in different plants; sometimes different on the same individual. The lower leaves of water plants, the upper of mountain ones, have commonly the greatest tendency to be much divided. For their particular forms see *Introduction to Botany*.

37. *Foliola*, Leaflets, are the partial leaves, which, connected by one common, simple or branched, footstalk (23), make a compound leaf.

38. The *margin* of Leaves or Leaflets is either entire, wavy, serrated, jagged, toothed or notched, in a simple or compound manner; naked, fringed, spinous, cartilaginous, glandular; flat, revolute (rolled backward), or involute (the reverse).

39. Their *surface* is smooth, naked, glaucous, downy, hairy, woolly, warty, glandular, or prickly; even, rugged, or blistery; veiny, ribbed, or veinless; coloured, variegated, opaque, or polished. Their ribs and veins contain the principal sap-vessels.

40. Some Leaves are fleshy, cylindrical, semicylindrical, awl-shaped, tumid, channelled, keeled, two-edged, hatchet-shaped, solid, or hollow.

41. Others are membranous, leathery, rigid, or almost woody.

42. The *termination* of Leaves is either obtuse, acute,
pointed, obtuse with a point, spinous-pointed, or cirrhose as in *Gloriosa*; abrupt, jagged-pointed, re-
tuse, or emarginate.

43. With respect to division (36), Simple Leaves are
either cloven, lobed, sinuated, deeply divided, laci-
niated, or cut; palmate, pinnatifid, pectinate, un-
equal (as in *Begonia*), lyrate, runcinate, fiddle-
shaped, hastate, arrow-shaped.

44. Compound Leaves are either jointed, fingered,
binate, (or conjugate,) ternate, quinate, pinnate with
or without an odd leaflet, whorled, or auricled;
they are simply, doubly, thrice, or more, compound;
pedate, twice paired, twice ternate, or doubly pin-
nate, &c.

45. In duration, Leaves are either deciduous or ever-
green; the former lasting but one summer; the
latter two or more, though a fresh crop is pro-
duced every year, so that the tree or shrub is never
stripped.

46. Some Leaves or Leaflets are *continuous*, never se-
parable from the stem or footstalk, as in *Ruscus*,
the natural order of *Musci* (Mosses), and the genus
*Jungermannia*.

47. *Fulcra*, Appendages, belong to the herbage of a
plant, and are of 7 kinds.

1. *Stipula*, the Stipula, a leafy appendage to the
proper Leaves (30), or their Footstalks (23); us-
ually in pairs, at the base of the latter, either
united thereto, or distinct; sometimes simple and
intrafoliaceous (withinside of the leaf), as in Grasses, fig. 141, and Polygonum, as well as the tribe called Rubiaceæ, fig. 198, 199. In some of the latter they are divided, or compound. Some Stipulas are soon deciduous, others permanent as long as the Leaves. This organ is by no means universal, even in the same genus, as Cistus; nor constant in the same species, as Salix.

2. Bractea, the Floral Leaf, a leafy appendage to the Flower, or its Stalk (17, 19), is often coloured; either deciduous, or as permanent as the Flower-stalk, to which it is sometimes firmly attached.

3. Spina, a Thorn, originates in the wood itself, and by culture in rich soil, disappears, becoming a branch. Footstalks (23) sometimes harden into spines; as do Stipulas (47 : 1) in Xanthium; and Flower-stalks (19) in Pisonia.

4. Aculeus, a Prickle, arises from the bark only, as in Roses, and does not disappear by culture.

5. Cirrus, a Tendril, a true fulcrum or support, is either axillary, or terminates a Leaf (42) or a Footstalk (23) or even a Flower-stalk (19), serving to sustain weak stems upon others. Tendrils, at first straight, soon turn spirally, and in some instances turn again, in the contrary direction. They are simple or branched; their extremities often dilated and adhesive. The fibrous supports of Ivy are peculiar Tendrils, not Roots. Foot-
stalks (23) sometimes perform the office of Ten- 

drils, as in *Clematis cirrosa*.

6. *Glandula*, a Gland, a small tumour, discharging 
a fluid, either resinous, oily, or saccharine.

7. *Pilus*, a Hair, including all the various hairy, 
woolly, bristly, or even tubercular, clothing (or 
pubescence) of plants. Such hairs are either sim- 
ple, hooked, forked, starry, or branched, gene-
rally jointed and tubular; either harmless, pun-
gent, or stinging; erect, close-pressed, or deflex-
ed; flexible, rigid, or brittle and deciduous. 
They protect plants against heat and cold, or the 
attacks of animals. They are very often excre-
tory ducts, discharging more or less of an oily, 
glutinous, odoriferous, or colouring fluid.
CHAPTER IV.

INFLORESCENCE.

48. **Inflorescentia**, the Inflorescence or Mode of Flowering, expresses the manner in which Flowers are situated upon a plant. It is essential, though of temporary duration, and comes under the following denominations.

1. *Verticillus*, a Whorl, when the Flowers form a ring round the stem, though perhaps inserted on two of its opposite sides, or even on one only.

2. *Racemus*, a Cluster, consists of scattered Flowers, each on its own proper stalk (22), connected by one common stalk (20), all nearly in perfection together. A Cluster is sometimes compound; or aggregate like *Actea racemosa*.

3. *Spica*, a Spike, is composed of many Flowers, sessile, or nearly so (21), on one common stalk, sometimes branched, generally very erect; the flowers opening in succession; sometimes unilaterial (34). *Spicula*, a Spikelet, is the inflorescence of such Grasses, as have many florets in one calyx.

4. *Corymbus*, a Corymb, a kind of Cluster (48:2), whose partial stalks are gradually longer downwards, so that the flowers they bear are nearly
on a level. After flowering this usually becomes a perfect *Racemus*.

5. *Fasciculus*, a Tuft, is composed of numerous level Flowers, on little stalks, variously connected and subdivided.

6. *Capitulum*, a Head, consists of sessile Flowers, crowded together into a globular figure, the central, or terminal ones generally opening first.

7. *Umbella*, an Umbel, is formed of several Stalks, radiating from a centre, and nearly equal in length, so as to compose a level, or convex, rarely concave, surface of flowers. It is, in true Umbelliferous plants, rarely simple, generally compound, each Stalk, or Ray, bearing a Partial Umbel, *Umbellula*. The Umbel in such plants is termed *flosculous*, when the flowers are all nearly equal and uniform; *radiant*, when the marginal ones are more or less irregular and unequal. In other orders of plants the Umbel, if present, is generally simple, but less perfect as to the insertion of its stalks; witness the orders of *Apocineae* and *Asclepiadæ*. In *Euphorbia*, the General Umbel consists of stalks repeatedly forked, not umbellate.

8. *Cyma*, a Cyme, consists of several Stalks, springing from one common centre, like an Umbel, but subdivided in an irregular, somewhat alternate, mode, and forming a nearly level, or mostly convex, surface of flowers.
9. *Panicula*, a Panicle, is a loose, irregularly subdivided, Cluster (48:2); either *diffusa*, lax; or *coarctata*, dense; the Flowers are generally drooping; sometimes unilateral.

10. *Thyrsus*, a Bunch, is only a very dense or close Panicle, assuming an ovate form. Such is a Bunch of Grapes.
CHAPTER V.

FRUCTIFICATION, OR FLOWER AND FRUIT.

49. *Flos*, the Flower, is a temporary part of a plant, destined to form, and to perfect, the Fruit and Seed, which it always precedes, and is therefore essential.

50. *Fructus*, the Fruit, and especially *Semen*, the Seed, is the ultimate object of all the other parts of fructification, destined to reproduce and continue the species, terminating the old individual, and beginning the new.

51. Annual or Biennial Plants (10) literally finish their existence in producing one crop of Seeds. Perennial ones renew their life, as it were, every season, either in the Root, or Root and Stem, acquiring a new layer of Wood and of Bark (31), as well as a new set of Leaves (45), and of Flowers (49), affording an annual supply of Fruit and Seed.

52. The parts of Fructification are seven; four of them, *Calyx*, *Corolla*, *Stamina*, and *Pistilla*, belonging to the Flower; two, *Pericarpium* and *Semen*, to the Fruit; and one, *Receptaculum*, is common to both.

53. *Calyx*, the Calyx, or outer integument of a Flower, not universal in all Flowers, resembles the Leaves in texture and colour (30), and perhaps performs their functions (31) as far as the Flower- or Fruit-
stalk is concerned. It also frequently shelters and protects the more delicate internal parts; is either general or partial; permanent or deciduous; simple or double; of one leaf or of several; undivided, cloven, or many-cleft. There are 7 kinds of Calyx.

1. Perianthium, Perianth, or Calyx commonly so called, the most general, is that which is contiguous to, or actually makes a part of, the Flower, but is not always present. This is sometimes double. It differs in situation with regard to the Germen (59), being either superior or inferior to that organ; sometimes intermediate, or surrounding it about the middle. Its forms are extremely various, of one leaf or of several; regular or irregular; simple, or with an external, generally smaller, calyx, Calyculus; or other appendages, as in Pultenæa. It is either round, or angular; compressed, tumid, or inflated; leafy, coriaceous, or membranous; sometimes finally pulpy; smooth, hairy, or prickly. In Compound Flowers generally composed of imbricated scales, which close over the Seeds.

2. Involucrum, an Involucrum, is remote from the rest of the Flower, partaking of the nature of a Bractea (47: 2), and chiefly noticed in the characters of proper Umbelliferous Plants (48: 7). This part is either general, or partial; the latter being denominated Involucellum. The Involucrum of Ferns is membranous, covering the
masses of fructification, termed Sori, fig. 100, 103, but not invariably present.

3. **Amentum**, a Catkin, consists of a cylindrical common Receptacle (63), beset with numerous firmly inserted Scales, each scale accompanied by one or more Stamens (58) or Pistils (59); rarely both. The pistil-bearing Catkin only is permanent after flowering, as it becomes the Fruit. See fig. 85-91.

4. **Spatha**, a Sheath, more or less remote from the Flower, bursts longitudinally, and finally becomes, for the most part, membranous. The elongated common Receptacle, in some instances contained within the Spatha, is termed Spadix, as in Arum and Calla.

5. **Gluma**, a Husk, or Glume, the chaffy Calyx peculiar to Grasses. The Arista, or Awn, a spiral hygrometrical bristle, is its occasional appendage, though more generally belonging to the chaffy Corolla (56) of the same plants.

6. **Perichaetium**, a Scaly Sheath, investing the fruit-bearing Flowers of some Mosses, fig. 106, 110; and remaining at the base of their Fruit-stalk (22).

7. **Volva**, a Wrapper, the membranous covering of the tender fructification in some of the Fungus tribe, as the Gills of Mushrooms, which are finally exposed, by the Volva forming a ring round the Stalk (25). The same term is used,
in the same tribe, for the fleshy external coat, or case, of several kinds of Puff-ball, and those Agarics, which constitute Persoon's genus of *Amanita*. See fig. 129, a. and b.

54. **Corolla**, the Corolla, or inner integument of a Flower, generally more dilated, delicate, and coloured, than the Calyx, is not always present. This organ is supposed to perform some function with respect to air and light, analogous to that of the Leaves; but limited to the use of the more essential internal organs. It consists frequently of two distinct parts, the Petal and the Nectary.

55. **Petalum**, the Petal, is either one or more, regular or irregular; equal or unequal; transient and deciduous, or withering and permanent; variously coloured; often fragrant; frequently bearing honey, without any particular apparatus, or Nectary (57).

56. A Corolla of one Petal, or piece, is called monopetalous; one of several, polypetalous. The base of the former is named *Tubus*, the Tube; the spreading part, variously divided, the *Limbus*, or Limb. The base of each Petal, in a polypetalous Corolla, is the *Unguis*, Claw; the expanded part the *Lamina*, Border. The more or less hollow, or dilated, part, within the mouth, (or eye as it is sometimes called,) in both, is denominated *Fauv*, the Throat, and is either open and pervious, or closed with hairs, scales, or valves.

57. **Nectarium**, the Nectary, secretes or contains ho-
Fluctification, or Flower and Fruit.

Honey, a nearly universal fluid in Flowers, but not always lodged in any organ, distinct or separate from the Petals (55). When it is so, the Nectary is either an assemblage of Glands (47:6), or a tubular elongation of the Petal, or of the Calyx, or a sort of Crown, or variously-formed appendage, to the former. Honey brings insects about flowers, to assist in the dispersion of the Pollen (58).

58. Stamina, the Stamens, internal with respect to the Corolla (54), are essential to every species of plant, in some form or other. Each Stamen consists of an Anthera, Anther, usually membranous, of two cells, bursting lengthwise, or sometimes opening by terminal pores, rarely by a lid or valve: and of a Filamentum, Filament, various in length and proportion, supporting the Anther, but not invariably present. The Pollen, or Dust, contained in the Anther, consists mostly of fine grains, bursting with moisture, and discharging an elastic vapour. In some of the Orchis tribe, the Asclepiadaceae (48:7), fig. 185, Mirabilis, 167, and a few others, the Pollen is glutinous, waxy, or elastic and very tenacious.

59. Pistilla, the Pistils, central, essential, not always in the same Flower with the Stamens, but in another of the same species. Each consists of a Germin*

* Gartner, who is followed by the French and some others, prefers the term Ovarium to Germin. But Ovarium is used by anatomists for a peculiar animal organ, unknown in vegetables, and can only lead to error if applied to them. This has been shown long ago.
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or Seed-bud, which is essential; *Stylus*, the Style, one or more, not always present; and *Stigma*, the Stigma, which is essential. The Stigma is moist or glutinous, to retain the Pollen, which bursts there, and serves to perfect the Seed in the Ger-

60. *Aestivatio*, which may be englelished by Aestiva-
tion, or by Flower-budding, expresses the mode in which the divisions of any Corolla (54-56) are dis-
posed in the bud. It is either *imbricata*, folded, from left to right, as in *Cistus*, or from right to left, as in *Hypericum*: or *valvata*, valvular, the divisions meeting side by side, as in *Protea*.

61. *Pericarpium*, the Seed-vessel, formed of the en-
larged germen, is extremely various, but not inva-
riably present. It serves to protect the Seeds till ripe, and then, by one means or other, to promote their dispersion. When dry, it often bursts elasti-
cally; when pulpy, it is usually the food of animals, who thus convey its contents to a distance. The principal forms of the Seed-vessel are the follow-

ing.

1. *Capsula*, a Capsule, finally dry, membranous or woody, rarely externally pulpy, opening by valves, or by pores, or by the swelling of the seed; in-
ternally of one cell or several, separated by *dissepimenta*, partitions, and bearing the Seeds either on the margins of its valves, or partitions, or on the Central Column, *Columella*. The partitions
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 originate either from the margins or centre of each valve, or from the central column, except when single or solitary. *Utriculus* is a thin bladdery, dry, single-seeded Capsule without valves. *Achenium* of Richard is the same thing, whether membranous, or coriaceous, or even woody. *Samara* a compressed, dry Capsule, of 2 cells, without valves, often winged. *Folliculus* a leathery or woody Capsule, of one valve, bursting lengthwise, with marginal Seeds. *Coccum*, one portion of an aggregate, dry, elastic, bivalve Capsule, as in *Euphorbia*, and the Rutaceous order. An unnecessary term.

2. *Siliqua*, a Pod, a long, dry, solitary Seed-vessel of two valves, with an intermediate parallel single partition, whose edges bear the numerous Seeds. *Silicula*, a Pouch, is only a shorter or rounder *Siliqua*, with fewer Seeds.

3. *Legumen*, a Legume, a solitary Seed-vessel, of two valves, without any separate longitudinal partition, and bearing the Seeds along one of its margins only.

4. *Drupa*, a Stone-fruit, is fleshy, sometimes dry, containing one hard or bony Nut, of one or more cells, and as many kernels.

5. *Pomum*, an Apple, is fleshy, containing a Capsule, with several Seeds.

6. *Bacca*, a Berry, is fleshy, sometimes dry, containing one or more Seeds, enveloped with pulp.
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B. *composita*, a Compound Berry, is composed of several single-seeded grains. *B. corticata*, a Thick-skinned Berry, has a firm rind, like the Orange, the Gourd, &c. *B. spuria*, a Spurious Berry, originates either in the Calyx becoming pulpy, like the Mulberry, and perhaps the Fig; the Corolla, as in *Commelina Zanonia*; the scales of a Catkin (53:3), as in *Juniperus*; or the Receptacle (63), as in the Strawberry, and perhaps the Yew.

7. *Strobilus*, a Cone, a Catkin (53:3) enlarged and hardened, lodging the Seeds; either naked between its scales; or in a sort of Capsule, connected with the base of each, more rarely stalked and distinct, as in Willows.

62. *Semina*, the Seeds, to the perfecting of which all the other organs are subservient. Each Seed consists of several parts.

1. *Embryo*, the Embryo or Germ (called *Corculum* by Linnaeus) is the most essential of all, no seed being capable of vegetating if this part be defective, as happens chiefly for want of the assistance of the Pollen (58), if the latter be spoiled by wet, or otherwise hindered; though the Seed may outwardly appear sound. This part sends out the Root (7) downwards, and the *Plumula*, or bud of the Stem or Herbage (12), upwards.

2. *Cotyledones*, Cotyledons or Seed-lobes, closely attached to the Embryo, commonly two, rarely
more, in some tribes altogether wanting. They either ascend out of the ground, and perform for a while the office of Leaves (31), or remain buried, till they gradually decay.  

3. **Albumen**, the White, a farinaceous, fleshy, horny, or almost stony, substance, destined to nourish the Embryo during the first stage of vegetation, till the Root can perform its office (7). The **Albumen** forms a separate body in Grasses, Palms, the Liliaceous tribe, and other monocotyledonous Plants, properly so called, though this substance itself, which makes up the chief bulk of such Seeds, is commonly taken for their Cotyledon. Becoming fluid, it is soon totally absorbed by the sprouting Embryo of these plants. In many dicotyledonous Plants the **Albumen** is likewise distinct from the Cotyledons, as the Nutmeg, where it is large and curiously eroded or sinuated; **Mirabilis**, **Polygonum**, and **Rumex**, where it is mealy and shapeless, inclosing the Embryo and Cotyledons; and some few Leguminous Plants (61:3), though in most of this last tribe it does not constitute a separate part, any more than in the Gourd family, the Walnut, and many others. In such, the albuminous matter is lodged in the substance of their Cotyledons; for it must be present in some mode or other, to supply the first food of the germinating Embryo. Gaertner distinguishes an organ by the name of **Vitellus**, or Yolk,
in Seeds, which appears to me always either a pair of subterraneous Cotyledons, or a part of the Embryo; see Trans. of Linn. Soc. v. ix. 204.

4. Testa, the Skin, either simple, or lined with a finer film, Membrana, contains, and gives a shape to, the foregoing parts, and in vegetation bursts irregularly. A pulpy Seed, Semen baccatum, is furnished with pulp between the Membrana and the outer Skin, as in Jasminum*.

5. Hilum, the Scar; or point of attachment, at the base of every Seed, where all the internal parts meet, and through which they are nourished while growing.

Accessory, not essential, parts of a Seed are:

6. Strophiolum, the Crest, an occasional appendage to the Scar, of a glandular appearance, as in Chelidonium, and some Leguminous genera, Ulex, Spartium, &c.

7. Pellicula, the Pellicle, a thin close membrane; a downy covering; or a glutinous substance, not perceptible till the Seed is moistened, as in Salvia verbenaca.

* M. Richard, who unnecessarily, I think, invents the term Episperm for the Testa of Gärtner, asserts this covering to be always simple, though he allows it to be formed of two membranes, with an intermediate vascular parenchyma, or pulp. Any person who examines the kernel of an Apple will surely, in every stage of its growth, find a double Testa, the outermost firmly coriaceous, the innermost membranous; nor are numerous instances, of the same kind, wanting, where the external Testa can by no means be taken for any thing else.
8. **Arillus**, the Tunic, a complete or partial covering, attached to the base only, more or less loose, or inflated, as in *Urania*, fig. 155, *Euonymus*, and the Mace of the Nutmeg. In *Oxalis* this part is elastic; yet perhaps a more genuine *Arillus* than in the true *Rutaceae*, or the *Euphorbiae*. See Jussieu's 81st and 96th orders.

9. **Pappus**, the Seed-down, a feathery, hairy, bristly, or membranous tuft, or crown, at the summit of a Seed, rarely at its base, most important in the Compound Flowers.

10. **Cauda**, a Tail, a terminal, often feathery or hairy, appendage, formed of the permanent Style (59).

11. **Rostrum**, a Beak, an elongation of a Seed-vessel, as in the *Geranium* tribe, or of a Seed, as in *Scandix*, fig. 210.

12. **Ala**, a Wing, a dilated membranous or coriaceous expansion, terminating or surrounding a Seed, or Seed-vessel, fig. 221, c.

63. **Receptaculum**, the Receptacle, the common base, or point of connexion, where all the parts of a Flower meet: as also the place of insertion of the Seeds (62) more particularly. The Receptacle of a Flower is the disk, or space between the Stamens (58) and Pistil (59); especially if the Germen be inferior. In Compound Flowers (68) the Common Receptacle, being either naked, hairy, scaly, or cellular, affords generic distinctions.
64. *Flos completus*, a Complete Flower, is furnished with both *Calyx* (53) and *Corolla* (54); without the former, it is *nudus*, naked; without the latter, *apetalus*, apetalous.

65. With respect to the essential organs of fructification; *Flos perfectus*, a Perfect, or United, Flower, bears Stamens (58) and Pistils (59) in the same individual. *Flores separati*, Separated Flowers, have Stamens in one, Pistils in another. This separation is absolute in *Monoecious* Flowers, where both kinds grow on the same plant, and in *Dioecious* ones, where they grow on two distinct plants, of the same species; but in *Polygamous* ones there are some Perfect Flowers, as well as Separated ones, on the same plant, or on different ones. Neuter or Abortive Flowers have both organs defective.

66. *Flos sterilis*, a Barren Flower, has Stamens only (65), and can consequently produce no Fruit or Seed.

67. *Flos fertilis*, a Fertile Flower, has Pistils only (65), but produces no Seed without the assistance of the Barren one (66).

68. *Flos compositus*, a Compound Flower, consists of numerous *Floresculi*, Florets, or partial flowers, in a Common Calyx, the *Anthers* (58) of each of such florets being united into a cylinder. The *Corolla* (54) of each floret is monopetalous (56), and either *tubulosa*, tubular, or *ligulata*, strap-shaped, flat.
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69. *Flos aggregatus*, an Aggregate Flower, consists of several Flowers, or Florets (68), with distinct Anthers, collected into one Common Calyx, as in *Scabiosa*, and all Amentaceous Flowers (53:3), as also most Grasses, and according to Linnaeus, umbellate and even cymose flowers (48), which last we can scarcely admit, they being rather modes of Inflorescence.

70. Compound Flowers (68), as well as Aggregate ones (69), are either *flosculosi*, flosculous, or *radiati*, radiant, as already explained under Umbella (48:7).

71. Cryptogamic Plants, are those whose Flowers are either totally unknown, like Ferns (77); or not constructed according to the analogy of Plants in general, as above described, like Mosses (77): so that they cannot be referred to Classes and Orders by their Stamens and Pistils, as hereafter to be explained. Phænogamic Plants, on the contrary, have evident Flowers, constructed according to the above-described principles.
CHAPTER VI.

PRINCIPLES OF CLASSIFICATION.

72. Ever since Botany has assumed the form of a Science, Botanists have agreed that every principle of Classification must be deduced from the parts of fructification (52).

73. All botanists are also agreed, in distinguishing the Vegetable Kingdom into Classes, Orders, Genera, and Species.

74. Species are generally acknowledged to be permanently distinct, though liable to Varieties, and occasionally to the production of intermediate Species, by the access of the Pollen (58) of one, to the Stigma (59) of another; but such appear to have only a transient duration.

75. Genera, as far as they are rightly determined, are considered by Linnaeus, and his scholars, as no less natural than Species (73), but this opinion is rejected by many botanists, especially of the French school, even while they contend for the existence of natural Orders.

76. Classes and Orders, which are assemblages of Genera (75), are either natural or artificial.

77. Natural Classes and Orders (76) are such as ap-
pear indicated by Nature herself. Some are very evident, as Grasses, Umbelliferous Plants, Compound Flowers, the Orchis tribe, Palms, Ferns, and Mosses. Others are more obscure, and many plants cannot yet be referred to any such Orders or Classes.

78. Artificial ones (76) are contrived for human convenience, to assist the memory, and to promote the determination and discrimination of plants. Such constitute the Linnaean system, founded on the Stamens and Pistils (58, 59); those of Tournefort and Rivinus upon the Corolla (54); and those of Ray, and several other authors, upon the Fruit (61) and Seed (62).

79. Linnaeus first pointed out the distinction betwixt a Natural and an Artificial System; but Bernard de Jussieu and his nephew Antoine Laurent de Jussieu, first formed and published a Natural System, reduced to a regular form upon scientific principles.

80. Linnaeus contended that human science was not yet competent to give definitions, or technical characters, of Natural Classifications.

81. Adanson indeed undertook this, and A. L. de Jussieu has founded his System, published at Paris in 1789, upon such characters; which though incomplete, and liable to various exceptions, is of great use as a key to a Natural Arrangement (79). In proportion however as it serves this purpose, and is dependent on definitions, it becomes in many
instances artificial, breaking natural affinities, or producing unnatural ones; defects inevitable in all such undertakings, from our imperfect acquaintance with the Vegetable productions of the whole globe.

82. In the Systematic arrangement of Plants, whether artificial or natural, some botanists consider one part of the fructification (49), others another part, more important than the rest.

83. As far as Artificial Classification (78) is concerned, this is little more than a matter of opinion; but the Linnæan System, as being founded on the number, situation, and proportion, of the Stamens and Pistils (58, 59), organs which must exist in some shape or other, has been found the most commodious, and has put aside every other.

84. Such a mode of arrangement answers the purpose of a dictionary, to find out plants by their characters, as words by their orthography.

85. There is scarcely a principle which can be assumed as universal, or without exception, in Natural Classification. Number, in the parts or divisions of each organ, proves often fallacious; Insertion, or the mode of connexion of the several organs, and their comparative situation, with regard to each other, is found far less exceptionable; Structure, or the different forms of the same organ, in different instances, is of very great moment.

86. Linnaeus and Jussieu concur in considering as of primary importance the Structure (85) of the Em-
bryo (62: 1), and the Cotyledons (62: 2); and the former has declared that the number of the Cotyledons appeared to him to afford a sure basis, or primary source of discrimination for a Natural System. He soon found what he thought an exception in Nymphaea, but was deceived in that instance. The above principle, doubtless, is good, but some correction of the commonly received ideas and terms is become necessary, since the structure and economy of Seeds have been more closely investigated.

87. Gærtner and Jussieu have shown that the Albumen (62: 3) advantageously serves in the natural arrangement and discrimination of Plants. This however is liable to as many exceptions, in the detail, as almost any other source of characters.

88. Plants with a simple undivided Embryo (62: 1) are termed Monocotyledones, or monocotyledonous; the upper end of that organ being presumed to perform the necessary functions of a Cotyledon, with respect to air, in the earliest stage of germination. Hence the term in question may properly be retained, though originally meant to apply to the separate, and usually copious, Albumen of such plants, visible in Corn, Palms, &c.

89. Plants whose Embryo divides at the top into two parts or lobes, which are the Cotyledons (62: 2), are named Dicotyledones, or dicotyledonous. In some few instances, as the Fir tribe, there are numerous Cotyledons; but such plants differ in no particular.
of their economy from those which have only two, and are therefore comprehended under the same denomination.

90. Some Plants, especially those with anomalous or obscure fructification, have been judged Acotyledones, or destitute of a Cotyledon. The idea and the term are partly founded in error. Of some which have been thus considered, nothing is correctly known of the structure or germination of their Seeds, as Fungi, and Submersed Algae (Fuci, Confervæ, &c.), nor has much been ascertained relative to the Hepaticæ, or the Lichenes. We know that their Embryo is of the most simple kind, without appearance of Cotyledons or Albumen, so that they appear to differ from the Monocotyledones (88) chiefly in the want of a separate Albumen, that nutritious matter being probably lodged in the substance of the Embryo, as it is in the Cotyledons of many of the Dicotyledones (62:3). But this is conjectural. Musci, Mosses, (77) properly considered, appear to agree with Hepaticæ, to which they are otherwise very closely allied, in having a simple Embryo, without either separate Cotyledons or Albumen. But they subsequently produce a peculiar accessory organ, consisting of several branch-ed and jointed fibres, springing upwards or laterally, from the crown of the Root (7), and very distinct from its radicles. These fibres are taken by Hed-wig for Cotyledons, which from their late forma-
tion they can scarcely be; and we may rather consider their nature and use as undetermined. They perhaps differ little from the woolliness so common on the Stem of these plants in an advanced state. *Filices*, Ferns, (*77*) differ somewhat from Mosses in having a membranous and flat expansion of the *Embryo*, sometimes fixed by the centre. Still this part may be considered as simple, and what are subsequently produced, howevershapeless, are doubtless of the nature of Leaves, or Fronds (*24*), which in these plants are of a more Proteus-like, or mutable, figure than in any others. Ferns want the above-mentioned jointed fibres of Mosses in germination.

91. From what has been said (*90*) it appears that the old appellation of *Acotyledones* may commodiously remain with Cryptogamic vegetables in general (*71*), though the form of their *Embryo*, and mode of germination, are, in some of this tribe, only presumed from analogy. Those with which we are acquainted are certainly destitute of any Cotyledon, and of any separate *Albumen*.

92. Jussieu however ranks under this denomination an Order termed *Naiades*, consisting of aquatic plants, with perfect, not cryptogamic, fructification. Of many of these his knowledge, respecting the point in question, was incomplete, and he has candidly owned his difficulties. Most of the plants, on being better understood, prove either dicotyle-
donous, or monocotyledonous, and naturally range with their allies in other parts of the System.

93. Mr. Robert Brown, who has greatly illustrated the System of Jussieu, and the Natural Orders of Plants, has shown that in the Monocotyledones the number three, and its compounds, prevail in the several parts of fructification, insomuch that in Orders furnished with only one evident and perfect Stamen, there are rudiments of 2 others. So in the Orchis tribe, as I understand it at least, while there are 3 Calyx-leaves, the 2 Petals (55) and the solitary Nectary (57) make up the same number in the Corolla, fig. 70, 77.

94. In Dicotyledones the number five no less remarkably prevails, throughout the great bulk of the Vegetable kingdom, as is evident on the slightest inspection.

95. Jussieu and his followers attribute a Calyx only, no Corolla, to Monocotyledonous plants, however conspicuous, coloured, elaborate, or compound the integuments of the Flower (53, 54) may be. This proves most flagrantly paradoxical in the natural order of Scitamineae, fig. 1; and it is evidently absurd that we must wait to name the obvious parts of a flower, till we have investigated the structure or germination of its seed. We allow indeed that the difficulty is lessened, though not infallibly removed, by Mr. Brown's rule respecting numbers (93, 94).
96. The insertion of the parts of a Flower, or in other words, the situation of the Germin (59), whether inferior or superior, with regard to the rest, next takes the lead in importance in Jussieu’s system; and in the Dicotyledones the absence or presence, the number or divisions, of the Petals (55), afford even more leading, if not important, distinctions.

97. The terms used by Jussieu to indicate the above different insertions apply to the Stamens (58). Thus,

*Stamina hypogyna* are inferior, inserted beneath the Germin, fig. 14 and 16.

*Stamina epigyna* are inserted above it, fig. 11.

*Stamina perigyna* are inserted into the integuments of the Flower, which, if simple, is always denominated a Calyx (95) by this author, fig. 13; if otherwise, the Stamens are borne either by the Calyx, fig. 19, or the Corolla, fig. 8, 9. But such insertion never takes a lead in his system, unless it be into, what he at least considers as, a Calyx. The above terms apply likewise to the Corolla.

98. Characters derived from proportion, do not enter at all into the principles of Jussieu’s classification, nor scarcely those founded on number, except so far as whether that of the Stamens or Pistils be definite or indefinite.

99. This System is confessedly incomplete, as there are numerous, even well-known, Genera (73, 75)
which cannot well be referred to any of his natural orders.

100. The same imperfection occurs in the Fragments of a Natural Method, left by Linnaeus, and it is remarkable that the comparative number of such doubtful Genera is very similar in both these arrangements.

101. The foregoing observations concerning Classification, are also applicable to the Generic distinctions of plants; but in their latter application they are deduced from all, or any, of the seven parts of Fructification (52), according as each may afford the most clear and essential difference.

102. Generic Characters are of two kinds, the natural and the essential.

103. Natural Generic Characters are a concise, technical, but full description of the seven parts of Fructification of each Genus, in their natural order, as in sect. 52, so as to apply, as nearly as possible, to every known Species. Such are contained in the Genera Plantarum of Linnaeus.

104. Essential Generic Characters consist of the striking and essential differences, between one Genus and another, in any one or more of those seven parts, with respect to insertion, structure, division, or any other permanent mark; such parts being disposed in each, according to their relative importance, for such discrimination, in the Natural Order to which the Genus in question belongs.
Characters of this kind are given in the *Systema Natura*, and *Systema Vegetabilium* of Linnaeus, as well as in our *Flora Britannica*, and the *Genera Plantarum* of Jussieu. In the latter are subjoined, in a different type, various accessory or explanatory characters, of great value, respecting the herbage, or general habit, of every Genus.

105. These principles of Generic discrimination are equally stable and important, whether Genera be considered, with Linnaeus, as natural assemblages; or with some other botanists, as commodious artificial contrivances.

106. It seems to me that the soundest most irrefragable Genera, have been established by those botanists who believed them to be founded in nature; those who think otherwise, being prone to recur to minute distinctions, of whose relative importance they have no principle by which they can judge.

107. While *Rosa, Rubus, Quercus, Salix, Ficus, Cypripedium, Epimedium*, and *Begonia* exist, it will be vain to deny that Generic distinctions are founded in nature, though botanists may, as yet, be very far indeed from having discovered them all correctly.
CHAPTER VII.

EXPOSITION OF THE LINNÆAN ARTIFICIAL SYSTEM, SOMEWHAT REFORMED.

The Classes are 24, distinguished by the number, situation, proportion, or connexion of the Stamens (58).

The Orders, sub-divisions of the Classes (76), are founded on the number of the Pistils (59), or rather of the Styles, or Sessile Stigmas; or on the Fruit (61); or on the nature of the different Florets (68); or on some character of the preceding Classes; or lastly, in the 24th Class, on Natural Families.

The first eleven Classes are known solely by the number of Stamens, in each Perfect Flower (65).


11. **Dodecandria.** Stamens 12 to 15 or 19. fig. 17. *Reseda lutea.*

The two next depend on the situation, or insertion, of the Stamens.

12. **Icosandria.** Stamens 20 or more, inserted into the Calyx (53), fig. 18, 19. *Mespilus grandiflora.*

13. **Polyandria.** Stamens numerous, inserted into the Receptacle (63), fig. 20. *Capparis spinosa.*

The two following depend on the proportion of the Stamens.

14. **Didynamia.** Stamens 4, 2 uppermost longest, fig. 21, 22. *Lamium album.*


The five following are distinguished by some union of the Stamens to each other, or to the Pistil.
16. **Monadelphia.** Stamens combined by their Filaments (58) into one tube, or common base. fig. 31-35. *Geranium sylvaticum*, 36, 37. *Althaea officinalis*.

17. **Diadelphia.** Stamens combined by their Filaments into two parcels or sets, mostly in unequal numbers; those parcels sometimes combined at their base. fig. 38, 39. *Fumaria solida*.


The three next are known by a disunion of the Stamens and Pistils, the former being in one Flower, the latter in another, of the same species, such being denominated Separated Flowers (63).
21. **Monoeция.** Stamens and Pistils in different Flowers, on the same individual plant. fig. 80-84. *Quercus Robur.*


23. **Polygamia.** Stamens and Pistils separate in some Flowers, united in others, either on the same plant, or on two or three different ones; such different Flowers being, moreover, dissimilar in their structure in some other respect. fig. 92-95. *Ficus Carica.*

24. **Cryptogamia.** Stamens and Pistils either imperfectly, or not at all, known, or not capable of being numbered with any precision. See tab. 7-9.

The *Palme* originally constituted an appendix to this system, because their Flowers were too little known to admit of arrangement by the Stamens and Pistils. But that difficulty is now almost entirely removed, and the Genera of this tribe are mostly found reducible to the 6th, 21st, or 22d Classes.

The Orders of the first 13 Classes, *Monandria* to *Polyandria* inclusive, are characterized solely by the number of the Styles, or sessile Stigmas, in each Perfect Flower (65). These Orders are more or less numerous in the several Classes, and are distinguished as follows:
EXPOSITION OF THE LINNEAN

**Monogynia.** Style, or Sessile Stigma, 1. fig. 1, 2, 13, 20.

**Digynia.** Styles, or Sessile Stigmas, 2. fig. 16.

**Trigynia.** ———— 3. fig. 19, 48.

**Tetragynia.** ———— 4. fig. 135.

**Pentagynia.** ———— 5. fig. 34, 51.

**Hexagynia.** ———— 6. fig. 14.

**Heptagynia.** ———— 7. Septas capensis. Andr. Repos. t. 90.

**Octagynia.** ———— 8. 

**Enneagynia.** ———— 9. 

**Decagynia.** ———— 10. Neuradra and Phytolacca.

**Dodecagynia.** ———— about 12. fig. 242.

**Polygynia.** ———— numerous. fig. 229.

These parts are seldom so numerous in any Flower as the Stamens, very rarely more so. There is usually an analogy between their respective numbers in the same flower.

The two Orders of the 14th Class are distinguished by the nature of the Fruit.

1. **Gymnospermia.** Seeds naked, usually 4, never more. fig. 22.

2. **Angiospermia.** Seeds in a Pericarp (61), mostly very numerous. fig. 175.
The two Orders of the 15th Class are distinguished by the shape of their Pericarp.

1. Siliculosa. Fruit a Silicula, or Pouch (61:2). fig. 24.

2. Siliquosa. Fruit a Siliqua, or elongated Pod (61:2). fig. 30.

The various Orders of the 16th, 17th, and 18th Classes are characterized by the number of the Stamens, the Classes themselves being marked by their various modes of union. These Orders therefore bear the same appellations as the first 13 Classes.

The Orders of the 19th, or Compound-flowered, Class are marked by the Perfect,Separated, Barren, Fertile, or Abortive nature of the Florets (65).  

1. Polygamia-æqualis. Florets all perfect, each having efficient Stamens and Pistil, and producing one Seed. fig. 57-63.

2. Polygamia-superflua. Florets of the disk perfect; those of the circumference, or radius, having a Pistil only: but both kinds forming perfect Seed. fig. 66-69.

3. Polygamia-frustranea. Florets of the disk perfect; those of the circumference with an abortive Pistil, or none at all. fig. 64, 65.

4. Polygamia-necessaria. Florets of the disk with Stamens only; those of the circumference with each a Pistil only.

5. Polygamia-segregata. Several Flowers, either simple or compound, but with united An-
thers, and a Proper Calyx, all included in one Common Calyx.

The 6th Linnean Order, *Monogamia*, consisting of Simple Flowers, with united Anthers, is abolished, as being unnatural, and extremely uncertain. fig. 195 b.

The Orders of the 20th Class are distinguished by the number of their Stamens. *Gynandria Monandria*, fig. 70-72. *Tetrandria*, 73-76.

Those of the 21st and 22d by the same circumstance, or by any other character of the preceding Classes founded on the union of the Filaments.

The Orders of the 23d are,

1. **Monoecia**. The two or three different descriptions of Flowers all on the same plant.
2. **Dioecia**. The different descriptions of Flowers on two separate plants.
3. **Trioecea**. The same on three separate plants.

The Orders of the 24th Class are natural orders or families.

3. **Hepaticae**. Liverworts. fig. 114, 115. *Jungermannia multifida*.
ARMIFICIAL SYSTEM, SOMewhat REFORMED. 47


The 3d and 4th of these Orders are added since the time of Linnaeus. The whole will be explained hereafter.

The difficulties, or exceptions, to which the above System is liable, are the following:—

Number in the parts of Fructification proves not always uniform in one Genus or Species, nor even in the same individual plant. In the latter case Linnaeus teaches that the central, or terminal, Flower must be our guide, as in Euonymus, Monotropa, Chrysosplenium, and Adoxa. When a species is variable in the number of Stamens or Pistils, or if one or more species of any genus differ from the rest in those respects, such irregular species are to be named in a synoptical or analytical table at the head of the particular Class or Order to which they technically belong; though placed in due course, likewise, in the proper Class and Order of the Genus of which, independent of such artificial characters, they naturally form a part. The same plan is, of course, to be pursued with regard to any species, anomalous in other respects, as the dioecious ones of Valeriana, Lychnis, &c.

That this System sometimes puts widely asunder some genera naturally allied to each other (as a few with Ringent Flowers, that by their natural affinity belong to the 14th Class, placed in the 2d because
they have only two Stamens), is no objection to it on the score of facility or convenience. It does not profess to be a natural arrangement; and if in many parts it proves so, more is performed than had been promised, or than could reasonably be expected. The 15th and 19th Classes are perfectly natural (except Cleome, badly placed in the former); as are, more or less, several Orders, or Sections of Orders, in other Classes.

Greater technical inaccuracy occurs relative to some characters, founded on connexion of parts. The Stamens, or Filaments, of several Papilionaceous genera, referred with their strictly natural allies, to Diadalphi Decandria, are perfectly monadelphous. fig. 40. We do not mean merely that their two sets of Stamens are united into one at the base; but there is really no distinction of two sets, in any part of their structure. Indeed if the ten Filaments are any way combined, in a Papilionaceous Flower, such is referred by Linnaeus to the Class and Order just mentioned. If they are altogether distinct, in which case their whole configuration is totally dissimilar from the flat and membranous Filaments of the true Diadelphia, they belong, though Papilionaceous, to the 10th Class.

Culture, and other accidents, produce changes against which no principles of arrangement can provide. Such causes peculiarly affect number in the parts of a Flower, the Stamens, and Pistils, as well
as the divisions of the Calyx and Corolla, being frequently multiplied by luxuriance of soil, to the great delight of florists, but much to the inconvenience of botanists. So also the Stamens and Pistils are often transformed to Petals, which constitutes a double Flower.

In the Classes with separated Flowers, accidents occur with regard to the situation of the Stamens or Pistils. If the structure of the other parts of the Flower be alike, in every individual, both these organs are liable to meet in the same Flower; just as, on the other hand, they occasionally are met with separate, in Classes, or in some Species of Genera, to which united Flowers naturally belong (65). Hence so great a proportion of trees in hot climates, as well as of grasses in all climates, are polygamous; having the characters of the 23d Class, as defined by its author Linnaeus. But if respect be always had to the accessory parts of a Flower (53, 54), as well as the essential ones (58, 59), and those are found different in structure, number, or otherwise, such Flowers must remain permanently distinct. Such only would I admit into the Class Polygamia, by which measure botanists in tropical countries are relieved from one of the greatest of inconveniences.

I have even ventured to suggest, Introd. to Botany, ed. 3. 368, that the 21st, 22d, and 23d Classes of the Linnaean system might possibly be well reduced to one, under the name of Diclinia (already used by
Jussieu and some other writers), which might contain all genera with separated Flowers, whose accessory organs differ in any respect. This alteration has been adopted by an able practical botanist, whose experience had taught him to approve it, Mr. Frederick Pursh, in his *Flora Americæ Septentrionalis*, published in 1814. He has divided the Class *Diclinia* into the three following Orders.

1. **Segregatae.** Flowers not Amentaceous (53:3).

2. **Amentaceæ.** Barren Flowers, at least, in Catkins (53:3); the Fertile ones not always so. Fruit distinct from the Calyx. fig. 274, 275.

3. **Coniferae.** Barren and Fertile Flowers in Catkins. Fruit a *Strobilus* or Cone, (61:7) fig. 276.

Under each Order of the Linnaean System, are disposed the Genera which belong to it, in a regular series, as nearly as possible according to their natural affinity to each other, with the Essential Character (104) of each. The Species are, in like manner, ranged, according to their affinities, under each Genus, with their Specific Characters. Synonyms are subjoined, with mention of the native country of each Species; after which follow occasionally compendious descriptions, with any useful remarks. Some large Genera are commodiously divided into Natural Sections, by leading characteristics of certain Species taken collectively.

At the head of every Class, all its Orders are enumerated; and under each Order its appropriate Ge-
nera are arranged, in a Synoptical or Analytical manner, according to their shortest, most technical, characters. In these, whatever part of the Fructification affords the most decisive or striking characters in each artificial Order or subdivision, takes the lead, the others following according to their importance. But in the above-mentioned Essential Characters (104), at the head of each Genus, the parts of Fructification, whence those characters are derived, should be disposed, as has already been observed, according to their relative importance in the particular Natural Order, or Series, to which such Genera belong.

These are the principles of arrangement which Linnaeus appears to have laid down for himself, and upon which he gradually improved. But in the detail of his System he has not always kept them strictly in view; nor have his pupils, followers, or editors, paid the requisite attention to them, especially with regard to those intricate or recondite natural relationships, which few of these writers perhaps were competent to observe, and to which, it must be confessed, botanists of the old Linnaean school have generally paid too little attention.

Respecting Nomenclature, it is only necessary to remark, that every Genus should be distinguished by a name, either of Greek or Latin derivation, or formed out of the proper name of some botanist, worthy of such commemoration. Names of barbarous origin have, however, crept in, by the means of Linnaeus.
himself, contrary to his own wise laws. Genera have also been dedicated to abundance of persons, who have no claim to this honour. Corrupt names, composed of other generic appellations, already established, though strictly and judiciously prohibited by all classical botanists, have here and there been introduced. Of these the worst of all are made up of two such established names as *Calamagrostis*. Future general writers on Botany, of competent authority, must reform these abuses. No authority can sanction their continuance. If any indulgence be admitted, it may perhaps be in favour of a few well-sounding generic names of barbarous origin; for there can be no question that Pliny, and even purer Latin writers, would have adopted such names, properly modified, had they treated of the new plants of foreign countries.

The generic name being fixed, each Species must also be designated by an appropriate concise appellation, of a single word if possible. This should be either a characteristic adjective, expressive of the character, aspect, colour, quality, or use of the Species; or of some substantive, not necessarily agreeing in gender with the generic name, and therefore always beginning with a capital letter, by which some circumstance in the history of the plant, or some synonym, may be recorded.

Important or permanent Varieties (74) may, with propriety, be noticed. These are conveniently marked
with the Greek letters, numbers being reserved for Genera and Species.

It would be well for every person who undertakes to write a systematic work on Botany to consider these leading principles of Linnaeus, and to study with care those more particular ones, laid down in his Fundamenta Botanica, as well as his Philosophia and Critica. If his rules be faulty or unnecessary, they should be expunged; but no good writer will transgress them through ignorance or neglect.

His principles for the distinction of Species should be studied and contemplated over and over again, by every person ambitious of permanent botanical fame, beyond the reach of the fashions of System. This department of Botany Linnaeus justly terms artis robur, the strength, or sinews of the science. Species are perhaps the only distinctions which are indubitably natural; and to stamp them clearly, as well as concisely, is the most important, perhaps the most difficult, office of the philosophical botanist. No one yet has equalled Linnaeus; nor has any one swerved from his rules, in theory or in practice, but for the worse. No intended improvement in this department has come under my inspection, that does not appear to me worse than indifferent. I speak with the greatest respect and deference for the authors of such projects, which it would be invidious to particularize, and which have, doubtless, been well intended. The more common faults in these compositions arise from negligence
or inability, from a want of deep study of the subject, a confusion or inaccuracy of ideas, a feebleness of style or expression, or a want of command of language.

I have chosen to conclude this chapter with the subject of specific characters, because it is of the most fundamental importance, and the most difficult in practice. It is the only sure ground of what Linnaeus justly declares as the test of a good botanist, the knowledge of the greatest number of Species. (Phil. Bot. sect. 256.) Now this knowledge, if merely empirical, can but of little value or certainty. Its dignity and solidity must consist in an intimate acquaintance with the comparative or respective importance of different characters, in different orders, tribes, or genera of plants. Several general rules indeed may be given, but scarcely one of those is without exception; and particular rules apply to almost every natural assemblage throughout the vegetable kingdom. The latter are only to be attained by acute observation and great experience.

The 8th chapter of the Philosophia Botanica of Linnaeus, entitled Differentiae, contains a full display of the ideas of that great writer, the first who ever undertook to consider this matter in a philosophical light, or to lay down any rules for the guidance of others. We shall give an epitome of his principles, recommending his reasons and illustrations, in the chapter just cited, to the attentive consideration of the student, who, before he attempts to apply them to
practice, should give his days and nights to the subject.

A *Differentia Specifica*, Specific Character, or as Linnaeus usually called it *Nomen Specificum*, should comprehend such characters only as are requisite, or sufficient, to distinguish a plant from every other species of the same Genus. Such therefore is not a description, but a difference, and where only one Species exists, a *Differentia Specifica* is an absurdity. If it attempts to contrast the plant with the Species of any other Genus, it is fallacious and erroneous.

A Specific Character therefore is the essential peculiarity of the full description, or complete idea, of every plant, whether drawn out in detail, or existing in the mind of the author.

All accidental circumstances are necessarily to be excluded, such as Country, Situation, Duration, Economical Uses, the Name of the Discoverer, &c.

All marks universally variable are also to be omitted, among which are Colour, Smell, Taste, Size, Hairiness in general, Curling of Leaves, Doubling of Flowers, or any kind of Monstrosity.

The direction of the hairs of Plants, as on the Calyx and Flowerstalk in *Mentha* and *Myosotis*, the Stem of *Papaver*, and some other instances, not noticed by Linnaeus, forms one exception to the above rule; and perhaps the presence or absence of a glaucous hue in the herbage is another.

Characters which presuppose any knowledge of
other plants, even of the same Genus, in the reader, as well as any allusions to the rarity or frequency of a plant, are manifestly faulty.

The Root (7) often affords solid specific distinctions, but is not infallible; nor can it always, in cultivated plants, or in dried specimens, be examined, or preserved.

Stems (12) frequently afford clear and certain distinctions, in their forms, postures, angles, wings, or other particulars.

Leaves (30) abound in the most elegant and unexceptionable characters for specific discrimination, in their situation, form, division, surface, margin, veins, and even pubescence. But scarcely any one mark concerning them is absolute, throughout all plants whatever, and experience only can teach, in every case, what is most to be relied on.

Appendages (47) are usually very serviceable in specific characters, especially the Stipulas, as to their presence or absence, situation, form, or even duration.

Inflorescence (48) is declared by Linnaeus to yield the best of all specific differences. Phil. Bot. sect. 279. The importance of the distinctions to be derived from hence is so great, that some botanists, especially of the French school, do not scruple to found some of their Generic Characters upon it. Even Linnaeus is justly charged with having had recourse to the Inflorescence, in arranging the Genera of the Umbelliferous tribe (48:7), though the principle is disguised under
the idea of an Aggregate Flower (69). Our great leader is the more censurable, as the Flowers and Seeds of those Plants, properly studied, afford all-sufficient Generic Characters.

The parts of Fructification themselves, so far as their differences do not enter into the Generic Characters, often display most excellent Specific marks. Such now and then serve to divide a genus into Sections; as the Petals in Iris, and the Styles in Hypericum.

The more concise a Specific Character, the better it is. As in philosophy, it is not allowed to recur to two causes for the explanation of any phenomenon, when one is sufficient, so if one idea will serve to distinguish a Species, no more should be admitted. If more be necessary, as is generally the case in large Genera, they should be so disposed and contrasted, in the several Specific definitions, as to strike the mind at once forcibly and distinctly. This cannot be done if characters be much extended. Linnaeus has therefore limited each definition to twelve words. There is no magic in this number, but I believe it is seldom exceeded with any good effect. Much will depend, after all, on the wording and construction of the sentence. A weak character of half a dozen words may be puzzling and insufficient; while a much longer may be clear, and readily conceived as well as compared, at one view.

All the terms and definitions should be precise, lite-
ral, and unambiguous. They are not allowed to be expressed in the comparative degree, though sometimes admitted, of late, in the superlative. They must be positive, not negative; devoid of obscure comparisons; contain no adjective but what follows its substantive; no article, connecting particle, or parenthesis.

Linnaeus has adopted an arbitrary mode of punctuation in Specific Characters, in which the usual power of the different signs is reversed. He uses a Comma (,) to separate the different parts of the plant which come into the Specific Character. This is most frequently wanted, as between the Stem and Leaves and Inflorescence, if they all happen to occur. A Semicolon (;) separates two descriptions of the same organ, as Radical Leaves from the rest. A Colon (:) is introduced between the several parts or divisions of any one organ, as the segments, margin, or veins of a Leaf. A Period (.) of course, as usual, closes the sentence. The intention of this method seems to be, to lead the mind to a longer pause, in proportion as the parts under consideration are most nearly related. To practise it quite correctly requires more attention than is usually bestowed; and even Linnaeus, or his printer, makes frequent, though not very serious mistakes. The following examples are correct:—

Biscutella siliculis glabris, foliis lanceolatis serratis.
Dentaria foliis inferiöribus pinnatis; summis simplicibus.
Cardamine foliis pinnatis: foliolis quinis incisis.
SPECIFIC CHARACTERS.

Melochia floribus umbellatis axillaribus, capsulis pyramidatis pentagonis: angulis mucronatis, foliis tomentosis.

Those who describe new plants would do well, in general, to keep in view the laws of Specific distinction in their names likewise, though with less strictness; avoiding always what is trifling, incorrect, or erroneous; and selecting what may best impress the imagination, or assist the memory. No name whatever should be considered as of any authority, unless printed by some author who gives at the same time a specific character; though a judicious writer will always adopt what has, by any means, been received by the publick, if it be not materially objectionable,
CHAPTER VIII.

EXPOSITION OF THE NATURAL SYSTEM OF JUSSIEU.

The Classes are 15, not distinguished by any particular appellations. One of them is Acoyledonous (90, 91); three are Monocotyledonous (88); the remaining eleven Dicotyledonous (89).

The Orders are 100, distributed in natural series under every Class, and each defined by rather full definitions, taken, in the first place, from the parts of Fructification (52), and illustrated by secondary characters, founded on any other circumstance.

The Genera stand, in one or more sections, according to their respective affinities, and with their Essential Characters (104) under each Order, at the end of which are usually many valuable critical remarks.

There is at the end a very large assemblage of Planta incertae sedis; Genera not reducible to any of these Orders. These are, for convenience, artificially arranged, by the Corolla (whether monopetalous, polypetalous, or wanting), the situation of the Ger- men, and the number of Styles and Stamens. Many of the Genera have subsequently been reduced to their proper Orders.
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CLASS 1. ACOTYLEDONES.

Embryo destitute of Cotyledons, as well as of a separate Albumen.

Ord. 1. FUNGI. Tab. 9. fig. 129-133. "Either parasitical, or springing from the ground naked, or inclosed in a splitting Volva (53:7). Substance in some corky, or toughly coated; in others softer, fleshy, or mucilaginous. Some are simple, others branched; some spherical; several have a Head, *Pileus*, either stalked or sessile, sometimes orbicular and peltate; sometimes semi-orbicular, and laterally attached. Leaves and Flowers are wanting; but there is in the place of Anthers (58) a scattered, external or internal, powder. The place of Pistils (59) is supplied by organs variously constructed, resembling thin plates, wrinkles, furrows, pores, tubes, scales, fibres, &c.; in which, in some manner or other, are lodged bodies, that germinate in the earth like Seeds (62), or take root like creeping shoots, and reproduce the plant. The corky *Fungi* are perennial, and often parasitical; the rest either parasitical or terrestrial, short-lived, prone to putrefaction."

Such is the substance of Jussieu's character of this Order. We have no doubt that *Fungi* are propagated by real Seeds, though increased also, like other plants, by their fibrous Radicles (7).

Ord. 2. ALGÆ. Tab. 8, 9. fig. 116-128. "Various in habit, texture, substance, and organs of propagation.
Some are filamentous, some gelatinous like *Fungi*; some coriaceous or crustaceous; some herbaceous, in a manner leafy, and more akin to other plants. Organs analogous to Stamens and Pistils are in some altogether unknown, in some more conspicuous, and in others well known, differing greatly among themselves as to structure and situation."

This Order consists chiefly of Submersed *Algae*, fig. 123-128, and *Lichenes* (90), fig. 116-122, with which a few *Fungi* are confounded. The "well-known" fructification is attributed to the *Lichenes*, in which however scarcely more than the Seeds have been ascertained. These generally are 8 together, in separate tubular parallel vertical cells, sunk in a horizontal or convex disk, exactly as in some *Fungi*, particularly the genus *Peziza*; a coincidence too little noticed.

*Ord. 3. Hepaticæ*. fig. 114, 115. Herbaceous, creeping, many-rooted plants inhabiting damp places, whose Fructification is monoecious or dioecious, apparently of a various and complex nature, but not perfectly understood. The Seeds are often attached to elastic fibres, and send out Radicles from underneath. *Jungermannia, Marchantia*, &c. are examples.

*Ord. 4. Musci*. fig. 108-113. True Mosses (90), whose Fructification, as now well understood from the investigations of *Hedwig*, is generally monoecious. The Barren Flowers (66) consist of an indefinite number of jointed tubular bodies, discharging a volatile Pollen (58); the Fertile ones (67) are generally se-
veral together, though scarcely more than one produces Fruit. Their Germen (59), at first sessile, is covered with a membranous Calyptra, or Veil, in the place of a Corolla, whose summit admits the Pollen. The ripening Pericarp (61) is generally elevated on a Pedicellus (22), and carries up the Veil, torn from the base, along with it. The Fruit is a Capsule (61:1), opening by a Lid; its margin either naked, or variously fringed with a determinate number of hygro-metrical teeth, in a single or double row, affording good Generic distinctions (101). The Seeds are minute and innumerable, but have been proved such by germination. Musci are herbaceous, leafy, mostly branched; their Leaves continuous (46), pellucid and often reticulated. Roots abundantly fibrous; annual or perennial. Few plants are more tenacious of life, or revive more readily after drying.

Examples of genera without a Fringe (Peristomium) are Sphagnum and Gymnostomum; with a single Fringe, Grimmia and Dicranum, fig. 108; with a double one, fig. 112, Bryum, Hypnum, &c.

Ord. 5. Filices. Ferns (90) fig. 96-104. Nothing is known of their Fructification but the Capsules, fig. 101, 104; situated either on the back of the Frond (24) and composing Sorî, fig. 100, 102, 103, (53:2), with, or rarely without, a membranous Involuticum, fig. 100, 103; or in Spikes, fig. 96, (48:3) which seem transformations of the Frond or its segments (90). The most usual form of their Pericarp
(61) is a stalked globular Capsule, fig. 101, 104, of two valves, either naked, or bound by a transverse elastic ring. Seeds very minute, readily germinating, and so abundant, that many a species, if its possible increase were uninterrupted for 20 years, might cover the whole earth. The forms and situations of the Sori, and the direction in which the Involucrum separates, afford generic characters, unknown when Jussieu published.

Polypondium has no Involucrum; Aspidium a rounded one; Pteris a continuous one, separating inward; Lindsaea the reverse.

Ord. 6. Naiades. "Calyx either entire or divided, superior or inferior, rarely wanting. Stamens definite, perhaps perigynous (97). Germen superior or inferior, solitary or four-fold. Style 1, rarely 2, to each Germen, or wanting. Stigma one or several. Seeds solitary, or several, either naked and superior, or closed in a Pericarp which is either superior or inferior. Leaves mostly opposite or whorled. Flowers in some perfect (65), in others monoecious or dioecious. Plants all herbaceous, and, except Saururus, aquatic." The uncertainty of this Order has been already noticed, (92), and the characters, above given, have so many ambiguities as to amount scarcely to anything. The Genera are, Hippuris, fig. 252, Chara, Ceratophyllum, Myriophyllum, fig. 251, Naias, Saururus, Aponogeton, fig. 134, Potamogeton, fig. 135, Ruppie, Zannichellia, Callitriche and Lemna, fig. 136. Naias, Lemna, and Chara, are judged by Mr. Brown
to be akin to his *Hydrocharideae*, Prodr. N. Holl. v. 1. 345. See some of the rest in Ord. 88.

**Class 2. Monocotyledones, with inferior Stamens (97).**

"Calyx necessarily inferior, if present. Corolla none. Stamens often definite, rarely indefinite. Germens simple. Style 1, or many, or wanting. Stigma simple or divided. Seed 1, naked or covered, or Fruit of one cell, with 1 or many Seeds. Leaves mostly alternate and sheathing. Flowers occasionally becoming separated (63), by the imperfection of one or other organ."

**Ord. 7. Aroideæ.** "Spadix simple, many-flowered, either encompassed with a Spatha (53:4), or naked. Proper Calyx none, or simple. Stamens and Germens inserted, either separately or intermixed, into the Spadix. Style 1 to each germen, or wanting. Stigmas simple. Fruit of 1 cell, with 1 or many Seeds. Embryo in the centre of a fleshy Albumen. Leaves sheathing, alternate, generally all radical. Plants rarely caulescent; some of them very irregular in the arrangement of their Stamens and Pistils. Their germination is not well known." The Genera are Zostera, Arum, Cala, Pothos, Acorus, fig. 137, and others.

**Ord. 8. Typhæ.** "Flowers monoecious; barren ones aggregate, triandrous, with a 3-leaved Calyx; fertile ones also aggregate, with a 3-leaved Calyx, a superior Germen, simple Style, and 1 Seed. Leaves all alternate, sheathing. Aquatic herbs."
Typha, fig. 138, and Sparganium. Mr. Brown unites this Order and the Aroideae.

Ord. 9. Cyperoideae. "Fl. united, or monocious; each with a Scale in the place of a Calyx, nor is there generally any other. Stamens 3. Germen 1. Style 1. Stigmas 3, rarely but 2. Seed 1, either naked, or tunicated (62:8); sometimes surrounded at the base with bristles, or soft hairs. Embryo and germination as in the next Order. The single-flowered Scales are crowded into Spikes, or Tufts (48:5), variously disposed, some of them empty, the flowers being abortive. Stems or Culms (16) round or triangular, seldom jointed. Floral Leaves sessile; the rest sheathing, with an entire Sheath."

Carex, fig. 139, 79, Eriophorum, Scirpus, fig. 140, Cyperus, &c. a tribe much increased by Mr. Brown in Prodr. Nov. Holl. v. 1. 212.

Ord. 10. Gramineae. Grasses, fig. 3, 4, 141. "Glume (53:5) (Calyx of Linnaeus) of 2 valves, rarely of 1, or of many, or wanting, either single-flowered, or containing 2, or more, Flowers, or Florets, in a two-ranked Spikelet (48:3). Each Flower has a Calyx (Corolla of Linnaeus) resembling the Glume, mostly of 2 valves, rarely of 1, or wanting, the outermost either awned or not (53:5). Stamens generally 3, rarely 2, 6, or 1, in Pariana of Aublet 40. Anthers oblong, cloven at each end. Germen 1, with 2 little scales at the base, not always obvious. Styles mostly 2, each with a feathery Stigma; in some the Style is
solitary, with a simple or divided Stigma. Seed in both instances solitary, either naked, or frequently covered with the permanent hardened inner valve of the Calyx (Corolla of Linnaeus). Embryo small, attached laterally to the base of a much larger farinaceous Albumen. The lobe of the Embryo, in germination, remains with the annexed Albumen, sessile, connected at one side with the primary sheath which surrounds the Plumula (62:1). Roots fibrous, capillary. Culms cylindrical, either hollow or pithy, knotty or jointed; generally herbaceous, and unbranched. Leaves alternate, simple and undivided, springing solitary from each knot, sheathing; the Sheath split down to the knot. Flowers either tufted, or spiked along a linear Receptacle or Rachis, or panicked; concealed while young in the sheath of the uppermost Leaf. Some species become, by abortion, monoecious."

A great and well-known family, distributed into 13 sections, by the number of the Styles, Stamens, and Florets. Examples are, Anthoxanthum; Alopecurus, Panicum, Agrostis; Holcus; Cenchrus, Rottboellia; Aira, Melica; Dactylis; Sesteria, Elymus, Triticum; Bromus, Poa, fig. 3, 4, Briza, Arundo; Oryza, Ehrharta; Nardus, Apluda, Zea; Pharus, Cornucopiae, Coix, fig. 141; Nastus; Pariana. "The habit, chaffy flower, single seed, mealy albumen, situation of the embryo, and mode of germination, render this Order peculiarly distinct." — Jussieu.
Class 3. Monocotyledones, with perigynous Stamens (97).

"Calyx of 1 leaf, tubular, or deeply divided, superior or inferior, sometimes naked, but mostly subtended by a single- or many-flowered Spatha (53:4), rarely with an Involucrum resembling an outer Calyx. Corolla none, (what Tournefort, Linnæus, and others call so, being Jussieu's Calyx). Stamens mostly definite, inserted into the base or the top of the Calyx (Corolla), opposite to its segments; their Filaments distinct, rarely combined; Anthers distinct, of 2 cells. In a few the Germens are several, superior, with as many Styles or Stigmas. Capsules as many, either of 1 cell, with 1 Seed, or internally of 2 valves, with numerous Seeds inserted into their margins. Most have a single, superior or inferior, Germen; with 1, rarely 3, Styles or sometimes none; and a simple or divided Stigma. Fruit pulpy, or capsular, of 3 cells, with 3 or many Seeds; sometimes only 1 cell, or 1 Seed, coming to perfection. In the Berried fruits (61:6) the Seeds are inserted into the inner angle of each cell; in the Capsules, usually of 3 valves, they stand on the edge of an elevated Receptacle (63), constituting the partition, from the middle of each valve, and separating therewith. Embryo small, in a rather large horny Albumen."

Ord. 11. Palœ. The Palm tribe, fig. 142. "Ca-
lyx (Corolla Linn.) in 6 deep segments, often permanent; 3 outermost often smallest. Stamens 6, rarely more or fewer, inserted into the base of its segments, or rather perhaps into a glandular body under the Germen,” (this last opinion is confirmed by Roxburgh and Salisbury,) “their Filaments often united at the base. Germen superior, mostly simple. Style 1 or 3. Stigma simple or 3-cleft. Fruit a Berry, or fibrous Drupa, of 1 or 3 cells, and 1 or 3 bony Seeds. Embryo very small, in a dorsal or lateral cavity, rarely in the base, of a large Albumen, which is at first tender and eatable, finally horny. Stem simple, usually lofty, round, formed without concentric circles (31), and scaly or fibrous from the remains of Footstalks (23). Leaves in a terminal tuft, alternate, sheathing, folded when young; (their Bud (26) perennial, but never renewable). Flower-stalks generally much branched, invested with one large common Sheath, and many partial ones, or Bracteas, in pairs. Flowers mostly Hexandrous, sometimes Monoecious, Dioecious, but more frequently Polygamous (65).” Palms are very long-lived, generally tropical, some of them affording valuable food for man in a state of nature.

The Leaves are pinnate in Phœnix, Areca, Cocos, Caryota, &c.; palmate in Corypha, Borassus, Chamecrops, &c.

inserted therein. Germen simple; Styles 1 or 3; Stigma simple or three-cleft. Fruit pulpy, rarely capsular, of 3 cells. Seeds few, or solitary. Embryo at the scar of a horny Albumen. Stem often herbaceous. Leaves alternate, (simple, undivided); seldom opposite or whorled. Flowers each with a scaly Bractea, occasionally dioecious, sometimes deprived of a third, or gaining a fourth, in the number of their parts.”


Sect. 3. Fl. dioecious. Germ. inferior. *Tamus, Rajania*.

Mr. Brown removes *Asparagus* and *Dracæna*, with some of their allies, to *Asphodeleæ* or *Asphodeli*, Ord. 16.

*Ord. 13. Junce.* “Calyx inferior, in 6 deep segments, the 3 inner ones sometimes larger and petal-like, sometimes all 6 are glumaceous (53 : 5). Stamens usually 6. Germen in some simple, with one Style, and a Capsule of 3 valves with central partitions, bearing the Seeds: or several, 3 or 6, rarely many, each with 1 Style and Stigma; becoming so many Capsules, with 1 or many Seeds. Embryo, in some at least, at the scar of a horny Albumen. Herbs, with (simple,) alternate, sheathing Leaves; the upper
and floral ones sessile. Flowers with sheath-like Bracteas."

Eriocaulon, Restio, Xyris, Aphyllanthes, Juncus, fig. 145, Commelina, and Tradescantia exemplify the Genera with a simple germin; Butomus, fig. 14, Alisma, Sagittaria, Scheuchzeria, Triglochin, Nartheicum, Veratrum and Colchicum those with a compound one. This is a paradoxical Order to a beginner, and has been much altered by Mr. Brown, who has separated from hence his Restiaceae, Commelineae, and Melanthiaceae, certainly with great advantage.

Alisma and Triglochin, with Potamogeton, see Ord. 6. enter his Alismaceae, Prodr. N. Holl. v. 1. 342.

Ord. 14. Lilia. "Calyx (Corolla, Linn.) inferior, coloured, in 6 deep divisions, mostly equal and regular, bearing the Stamens from their lower part. Germen simple. Style 1. Stigma 3-cleft. Capsule of 3 cells and 3 valves, containing numerous, generally flat, Seeds, in 2 rows in each cell. Stem herbaceous, rarely shrubby. Leaves (simple and undivided), sheathing or sessile, alternate, or incorrectly whorled. Flowers often drooping, the Style longer than the Stamens (Linn.), either naked, or subtended by a Leaf or Sheath; generally splendid in aspect and colour."

Tulipa, fig. 146, Erythronium, Gloriosa (Methonic, Juss.) Uvularia, Fritillaria, Lilium, and Yucca.

Ord. 15. Bromelie. "Calyx in six divisions, 3 alternate segments often largest, superior or infe-
ior. Stamens 6, inserted into its middle, or base, or into glands proceeding therefrom and lying on the Ger-
men, which is simple, with 1 Style, and a three-cleft Stigma. Fruit of 3 cells, either pulpy and not burst-
ing, or capsular, of 3 valves, with 1 or several Seeds in each cell. Leaves sheathing, usually all radical.
Flowers spiked, panicled, or corymbose, each accompa-
nied by a Sheath or Bractea.”

Sect. 1. Germin superior. Burmannia and Til-
lanclia, (the former thought more allied to Junce by Mr. Brown), also Puya of Molina.

Sect. 2. Germin inferior. Xerophyta, Bromelia, and Agave, fig. 147. Jussieu himself seems dissatis-
fied with this Order, whose germination is not tho-
roughly known.

Ord. 16. Asphodeli. “Calyx (Corolla Linn.) inferior, coloured, most frequently in 6 deep equal divisions; sometimes tubular and undivided below.
Stamens 6, inserted into its middle or base. Germin simple. Style 1. Stigma simple or 3-cleft. Capsule of 3 cells and 3 valves, with many Seeds. Root in most instances bulbous, bearing a Scapus (17); if fibrous, it often produces an herbaceous Stem. Leaves sheathing, alternate, often all radical. Spike, or Cluster, simple or branched, with a Sheath, or mem-
hranous Bractea, under each branch and flower.
Flowers terminal, rarely axillary; in Allium umbel-
late,” as well as in the new genus Soxcerbica, fig. 149, Sm. Tr. of Linn. Soc. v. 4. 218.
Alctris, Aloe; Anthéricum, Asphodelus; Eucomis, Hyacinthus, Lachenalia, Massonia; Albuca, Scilla, Ornithogalum; Allium and Sowerbaæ, fig. 149, exemplify this Order, which is much enlarged by the discoveries of Mr. Brown and others in New Holland; especially as the learned botanist last named refers hither some of the Asparagi, Ord. 12; even Asparagus itself, with Dianella of Lamarck, &c.

Ord. 17. Narcissi. "Calyx (Corolla Linn.) superior, in some inferior, coloured; tubular at the base; limb in 6 deep, mostly equal, segments. Stamens inserted into the tube, their filaments rarely combined at the bottom. Germen simple. Style 1. Stigma 3-lobed or simple. Capsule of 3 cells, and 3 valves, with many Seeds; Haemanthus only having a Berry, with but 3 Seeds. Root in general bulbous. Leaves radical, sheathing. Flowers terminating a Scapus (17), solitary or umbellate, with a common membranous Sheath, Spatha (53:4), either simple or divided."

Sect. 1. Germen superior. Gethyllis, Bulbocodium, Hemerocallis, Agapanthus, Crinum, and Tulbaghia. These, except the first, constitute the Hemerocallideæ of Brown, along with Blandfordia, fig. 148, Sm. Exot. Bot. 5. t. 4, and some of Jussieu's Asphodeli with a tubular flower; but Mr. Brown himself is disposed to consider this new assemblage rather as a section of the Lilia, Ord. 14.

Sect. 2. Germen inferior. Haemanthus, Amaryllis,
Pancratium, Narcissus, fig. 150, Leucojum and Galanthus, fig. 10, 11. These are Mr. Brown's Amaryllidæ, Prodr. Nov. Holl. v. 1. 296.

Sect. 3. The following are mentioned by Jussieu as not perfectly answering to either section. Hypoxis, Pontederia, Polyanthes, Alstroemeria, Tacca. The last, a singular tropical East Indian genus, is considered by Mr. Brown as intermediate between the Aroidæ, Ord. 7, and Aristolochia, Ord. 23.

Ord. 18. Irides. "Calyx (Corolla Linn.) superior, coloured, tubular at the base, the limb in 6, more or less deep, equal or unequal, regular or irregular, segments. Stamens inserted into the tube, opposite to 3 alternate segments of the limb, their filaments rarely united into a cylinder round the Style, which is always solitary, with a three-fold, often subdivided, Stigma. Capsule of 3 cells and 3 valves, with many, generally roundish, Seeds. Root fibrous, or tuberous, or a solid bulb. Stem herbaceous, leafy, rarely almost wanting. Leaves alternate, sheathing, generally sword-shaped, ensiformia. Flowers attended by membranous Sheaths, often of 2 valves, 1 or more Flowers in each Sheath."

Sect. 1. Stamens monadelphous. Galaxia, Sisyrinchium, fig. 151, Tigridia, and Ferraria.

Sect. 2. Stamens distinct. Iris, fig. 152, Moraea, Ixia, Watsonia, Gladiolus, Antholyza, Witsenia, Crocus.

Sect. 3. The following, "akin to the Irides," Xi-


Class 4. Monocotyledones, with epigynous Stamens (97).

"Calyx of one leaf, superior, tubular, or deeply divided. Corolla none, as in Cl. 3;" (unless, like Linnaeus, and all but Jussieuans botanists, we consider as such those internal coloured dilated integuments, manifestly analogous to the Petals of all other plants.) "Stamens definite. Style either solitary, or wanting, rarely (if ever) multiplied. Stigma simple or divided. Fruit of 1 or several cells, pulpy or capsular."

Ord. 19. Musæ. "Calyx (Corolla Linn.) superior, in 2 deep, simple, or lobed, segments. Stamens 6, upon the Ger men; some of them occasionally imperfect. Style simple. Stigma sometimes divided. Fruit of 3 cells, with one or many Seeds in each. Embryo in the hollow of a farinaceous Albumen. Stem herbaceous, though in size often arborescent,
mostly clothed with the sheathing Footstalks. Leaves alternate, sheathing, convolute when young; their simple mid-rib sending off at each side innumerable, transverse, or obliquely parallel, ribs. Flowers on a common stalk, from the central leaves, in alternate Clusters, each Flower and Cluster attended by a Sheath."

*Musa, Heliconia, and Ravenala,* fig. 155, (Schreber's *Urania,* Gen. Pl. 212,) compose this Order, to which belongs *Strelitzia,* fig. 154, Ait. Hort. Kew. v. 2. 54.

**Ord. 20. CANNÆ.** "Calyx superior, coloured, divided into many, generally 6, petal-like segments, mostly unequal and irregular, the 3 outermost sometimes smallest, resembling an outer Calyx. Stamen 1, its filament inserted at the base of the Style, often flat and petal-like, with a linear adhering Anther, simple, or rarely double. Germen with a simple, often thread-shaped Style, and a simple or divided Stigma. Capsule of 3 cells, mostly with 3 valves, and many Seeds. Root often tuberous and creeping (perennial). Stem herbaceous, clothed with sheathing Footstalks. Leaves alternate, sheathing, convolute when young; either many-ribbed; or with a single mid-rib, sending off parallel ribs at each side. Flowers accompanied by Sheaths, generally disposed on a terminal or radical *Spadix*" (rather a Common Flowerstalk).

Jussieu's Genera are his own *Catimbiun,* (which
is Renealmia of Linn. Suppl. 7, but really belongs to (Alpinia,) Canna, Globba, fig. 1, Myrosma, Amomum, Costus, Alpinia, Maranta, Thalia, Curcuma, Kæmpferia, and Hedychium, append. 448.

Mr. Roscoe, Tr. of Linn. Soc. v. S. 330, has first correctly defined the genera of this Order, by the shape of the Stamen, or Filament, which affords excellent essential characters, concurring with other differences in habit and inflorescence, and all together establishing the most natural genera possible.

The Order is well divided by him and Mr. Brown, Prodr. N. Holl. v. 1. 307, into real Canneæ, comprising Canna, Maranta*, Thalia, Phrynium, with (certainly) Myrosma; and Scitamineæ, as Linnaeus terms the whole, embracing all the rest. The Canneæ have a simple Anther, and are scarcely fragrant in any part; their Style is petal-like, or tumid, with a nearly simple, naked Stigma. The Scitamineæ, fig. 1., have an Anther of two distant lobes, meeting around their thread-shaped Style, whose Stigma is dilated, cup-shaped, and fringed. The plants are in some part or other, if not all over, powerfully aromatic or pungent. The character of this last Order may, according to our judgment, be thus more correctly given.

Calyx, fig. 1, a, superior, tubular, undivided, or unequally 3-lobed. Corolla, b, more or less tubular

* Dr. Meyer, Fl. Essequeb. 6, has separated M. Casupo, Jacq. Fragm. 51. t. 63. f. 4, as a genus, by the name of Calathea.
at the base: Limb double; outer, c, c, c, in 3 deep segments, sometimes ringent; inner of two equal segments, d, d, occasionally abortive, as in *Amomum* and *Alpinia*, and a third larger, different in shape and colour, constituting an ornamental Lip, e, often lobed. Stamen 1, inserted into the tube of the Corolla opposite to the lip, its Filament, f, more or less dilated and petal-like, often lobed and elongated beyond the Anther, g, which consists of 2 lateral, parallel, distant, oblong lobes, clasping the Style, h. Mr. Brown has found 2 glandular bodies, rarely deficient, at the base of the Style, which he considers as rudiments of Stamens, making up, with the perfect one, the number 3, and confirming his theory (93). Germin, i, of 3, more or less complete, cells; Style, h, thread-shaped; Stigma, k, dilated, hollow, fringed. Capsule of 3 cells and 3 valves, in some instances pulpy, with many roundish, sometimes tunicated, Seeds. Albumen farinaceous. Embryo in the centre of the Albumen, somewhat turbinate, sheathing the simple *Plumula* (62 : 1) which arises from its base.

Gaertner and Brown consider the tubular part of the Embryo, in these plants, as a peculiar organ, termed *Vitellus* (62 : 3), whose office is conceived by the former to be the nourishment of the Embryo, though the Albumen is acknowledged to serve no other purpose. The part in question seems to me nearly analogous in form to the undisputed peltate Embryo of *Musa*, Gaertn. t. 11, in whose centre the point of
the _Plumula_, in like manner, appears, nor is that of some of the Palms very different from the last.

The known genera of these true Scitamineae are _Hedychium_, _Alpinia_, _Hellenia_ of Willdenow and Brown, _Zingiber_, _Costus_, _Kämpferia_, _Roscoea Sm._ Exot. Bot. t. 108, _Amomum_, _Curcuma_, _Globba_, fig. 1. and _Elettaria_ Maton Tr. of Linn. Soc. v. 10. 254. These are hardly found without the tropics.

The puzzling genus _Philydrum_, Curt. Mag. t. 783, once referred to the Scitamineae, is better placed by Mr. Brown in the _Junci_, with _Burmannia_.

**Ord. 21. Orchideæ, fig. 70-72.** "Calyx superior, often coloured, in 6 deep segments, 5 of which are superior, the 6th inferior, Nectary of Linnaeus, mostly larger and dissimilar. Style 1, ascending, often connected with the upper lip at its base, sometimes very short, or scarcely any. Stigma dilated, not entirely terminal, but clapped as it were to the front of the Style. Anther 1, proceeding from the top of the Style under the Stigma, of two separate cells, often remote from each other; sometimes sessile and closely adhering to the two sides of the Style, sometimes supported by their own short filaments; each of 2 valves, and containing a glutinous mass of Pollen. Capsule of one cell, with 3 keeled angles, and 3 valves, bursting between the usually permanent keels. Seeds numerous, in general chaffy, inserted into receptacles attached to the middle of each valve. Root fibrous, usually with 2 knobs, each of which is either undi-
vided or lobed. Stem frequently little more than a Scapus, rarely climbing. Leaves alternate, entire; the radical ones sheathing and ribbed; those of the Stem sessile, and scale-like. Flowers with sheath-like Bracteas, terminal, mostly spiked, rarely solitary."

Jussieu's genera, chiefly Linnaean, are Orchis, Satyrium, Ophrys, fig. 70, Scrapias, Limodorum, Thelymitra Forst., Disa, Cypripedium, Bipinnula Commerson, Arethusa, Pogonia Juss., Epidendrum, and Vanilla.

Dr. Swartz and Mr. Brown have greatly improved the history of this Order, and augmented its genera, of which New Holland affords many new ones. From the remarks of these writers I would reform Jussieu's description, but without adopting their ideas of the integuments of the Flower, which I understand as follows.

Calyx superior, of 3 leaves, fig. 70, a, a, a, either spreading or converging; the solitary upper one often vaulted, rarely spurred at the base; the 2 lateral ones equal, sometimes combined at the bottom. Petals 2, b, b, ascending between the lateral and the uppermost calyx-leaves, and less than either, sometimes converging. Nectary, c, a lip, undivided or lobed, projecting, or dependent, between the 2 lateral calyx-leaves in front, often with one concave spur; rarely 2, from its base behind, in which, or occasionally in a chink on the, sometimes crested, disk of the lip, the honey is lodged; "the lip now and then bears a stalked appendage, whose stalk is occasionally irrita-
ble at its joint." Brown. The Stamens, according to this able observer, consist of 3 Filaments, combined together, as well as more or less united to the Style, within the upper Calyx-leaf, opposite to the Lip; the 2 lateral ones almost always abortive, and generally short, or obsolete, the intermediate one only bearing an Anther. In Cypripedium alone, as far as hitherto observed, the latter only is abortive, both the side ones being antheriferous. Anther of 2 cells, which are either separate, and fixed to the sides of the Column (or Style), often extending beyond them; or brought together into a simple Anther, either parallel to the Stigma, immovable and permanent, fig. 71, e, or terminating the Column in the form of a, generally movable, deciduous lid, fig. 77 and 78, a; each cell being divided internally by one, seldom three, longitudinal partitions. The Pollen consists either of simple grains, or frequently of fourfold globules, collected into masses fitting the cells; these in the fixed divided Anther fig. 71, e, rarely in the terminal movable one, fig. 77, 78, a, consist of many angular portions, cohering by elastic gluten; in the parallel Anther, rarely in the terminal one, the masses are rather powdery, in plates, of easily separable granulations; in the terminal lid fig. 78, a, they are usually waxy, homogeneous and smooth; after the cells open, the masses of Pollen, fig. 71, d and fig. 72, stick by a taper base, or elastic thread, to the Stigma, or any thing else. Germin, fig. 78, d, roundish, obovate, or ob-
long, with 3 principal ribs, or angles, each opposite to a Calyx-leaf; Style, fig. 78, b, united, more or less, with the Stamen, sometimes very short; Stigma fig. 78, c, c, oblique, facing the Lip, concave, moist, accompanied at the summit or sides with one or two glands, fig. 72, g, either naked, or in a membranous pouch or pouches, serving to attach the discharged Pollen. Capsule shaped like the Germen, of three valves, splitting for the most part at their sides only, between the ribs. Seeds very numerous and minute, mostly tunicated with a loose membrane; which is wanting in Vanilla, where they are imbedded in pulp. "Albumen the shape of the Seed." Gärtn. Embryo minute, simple, central, near the Scar.—"The Flowers of the Orchideæ have their lower part, or Lip, naturally placed inwards, but by a twist in their Stalk, or base of the Germen, they are mostly turned half round." Brown.

They all, as far as hitherto known, belong properly to Gynandria Monandria of Linnaeus, Cypripedium only being referable to Gynandria Diandria. They are well distributed into sections, by the three different forms of the Anther, as above described; the texture of the Pollen being used by Mr. Brown for further distinctions. The Genera are distinguished according to these improved principles, in Sm. Compend. Fl. Brit. ed. 2 and 3, and by Brown in Ait. Hort. Kew. ed. 2, where they are greatly increased in number.

Ord. 22. Hydrocharides. "Calyx of 1 leaf,
superior, either entire or divided, the segments in a simple or double row, the inner ones (Corolla Linn.) petal-like. Stamens definite or indefinite, inserted upon the Pistil,” (that is above the germen). “Germen simple. Style either simple, or definitely multiplied, or wanting. Stigma simple or divided. Fruit of one or many cells. Plants herbaceous and aquatic.”

Jussieu’s genera are Valisneria, Stratiotes, Hydrocharis, fig. 156, Nymphae, Nelumbium, Trapa, Proserpinaca and Pistia. The author confesses his dissatisfaction respecting the last five genera, and not without reason. Mr. Salisbury, in Sims and Konig’s Annals of Bot. v. 2. 69, first I believe showed Nymphaea and it’s allies, amongst which are my Nuphar and Cyamus, (the latter Jussieu’s Nelumbium,) to be dicotyledonous, and therefore they can have no place here; see Ord. 62. Trapa is well explained by Gaertner, as having two, though very unequal, Cotyledons. Proserpinaca has two very distinct equal ones.

Class 5. Dicotyledones, without Petals, and with epigynous Stamens (97).

“Calyx superior, of one leaf. Corolla none. Stamens definite. Styles either wanting, or single, or definitely numerous.”

Ord. 22. Aristolochiae. The only Order. “Stigma divided. Fruit of many cells, with numerous Seeds.”
Aristolochia, Asarum, fig. 157, and Cytinus.
Mr. Brown considers this Order as monocotyledonous, and akin to Tacca; see Ord. 17.

Class 6. Dicotyledones, without Petals.
Stamens perigynous (97).

"Calyx of 1 leaf, superior or inferior, entire or divided. Corolla none, except occasional scales, resembling petals, inserted into the upper part of the Calyx. Stamens inserted into the Calyx, definite or indefinite. Filaments as well as Anthers distinct. Germen, Style, and Stigma simple, rarely definitely multiplied. Seed either naked and superior; or Pericarp superior or inferior, mostly with one Seed, rarely many. Situation of the Embryo various. Flowers in some instances separated."


Sect. 1. Thesium, fig. 158, Hippophae, and Elæagnus, are examples with 5 Stamens or fewer.

Sect. 2. Bucida and Terminalia have usually 10. These last belong to Mr. Brown's Combretaceæ, see Ord. 88.

This is one of Jussieu's least solid Orders, and has been divided subsequently by himself. Out of it,
with some of the Onagrace, Ord. 88, Mr. Brown has formed his Santalaceae, Prodr. Nov. Holl. v. 1. 350, to the Seed of which he attributes a fleshy Albumen. Their Calyx is superior, partly coloured, it's Aestivation valvular (60); Stamens opposite to it's segments. Germen of 1 cell, with 2 to 4 rudiments of Seeds, pendulous from the upper part of a central Receptacle, 1 of them only coming to perfection. To this belong Thesium, Santalum, and some new genera, as also perhaps Osyris and Olux. Eleagnus has really, according to Mr. Brown, an inferior Calyx, the lower part of the tube being unconnected with the Germen, though enfolding it so closely as to have deceived most botanists. Gærtner found the same in Hippophiæ, and these 2 genera make a small family by themselves.

**Ord. 25. THYMELEÆ.** "Calyx inferior," (coloured at least internally). "Corolla none, but in some there are 4, 8 or 10 fleshy scales, in the throat of the Calyx. Stamens definite, inserted into the tube, and generally twice as many as the segments of the limb, in 2 series. Germen, Style, and generally Stigma, simple. Seed 1, naked, or pulpy, or invested with the Calyx. Albumen none. Radicle superior. Stem shrubby. Leaves mostly alternate."

A most natural Order, consisting of Daphne, fig. 13, Passerina, Struthioia, Dais, Gnidia, &c., to which is added the extensive New Holland diandrous genus Pimeleæ, remarkable for its long Stamens.
Mr. Brown remarks, that the Aestivation (60) is imbricated, and that there is sometimes a thin fleshy Albumen. This is therefore one of the instances in which the absence or presence of that substance affords no absolute distinction, scarcely any Order being more natural than the present. The splendid silky tenacious fibres, of the bark when broken, mark the *Thymelaeae*. A burning acrimony pervades the whole of the plants. The Flowers are generally fragrant. Leaves simple, undivided, and entire.

*Ord. 26. Proteae.* "Calyx in 4 or 5 very deep segments, or tubular, with more shallow ones, its base occasionally subtended by minute hairs or scales; segments each bearing 1 Stamen about the middle. Germen 1, superior. Style simple, as is usually the Stigma. Seed 1, either naked, or in a Pericarp, or the latter is a Capsule with several Seeds. Albumen none. Radicle inferior. Stem shrubby. Leaves alternate, or crowded into imperfect whorls. Flowers either distinct, or variously aggregate in an imbricated common Calyx, with a common Receptacle. Stamens and Pistil sometimes separated."

*Protea*, fig. 159, *Banksia*, *Roupala*, of Aublet, *Brachecium*, and *Embothrium*, fig. 160, are all the Jussicuan genera. But this Order, of which Linnaeus had conceived no idea, has risen to great importance in the hands of Mr. Brown, Tr. of Linn. Soc. v. 10. and Prodr. Nov. Holl. v. 1. 363, under the name of *Proteaceae*. Several of its new genera in-
Deed were first defined by the writer of this, in Tr. of Linn. Soc. v. 4; but New Holland afforded so many new ones, and those of southern Africa were so ill understood, that the subject required entire revision. The Aestivation of the Flower in this Order is valvular. What Jussieu and Brown term Calyx, I rather, with Dryander in Ait. Hort. Kew. and Linnaeus, take for a Corolla. The Stigma is different in different genera, as well as the Pericarp, and the composition of the Flower, which calls up the puzzling question respecting Inflorescence (48) and Aggregate Flowers (69). The presence of a Common scaly or cellular Receptacle (63) in some Proteaceae, I think, proves the latter; while in others the Flowers are certainly distinct, usually racemose. This difference is not at all incompatible with the integrity of the Natural Order, nor is the same terminology necessarily to be applied to both. The genera, 38 in Mr. Brown’s essay above cited, I presume to think rather too much multiplied. They are principally arranged by the Fruit, which in some is closed (not bursting), the Anthers being either distinct or connected; in others bursting, bivalve, of 1 or 2 cells, whose partition is moveable.

There is not the most remote affinity between this Order and the preceding. The Proteaceae have scarcely any flavour or scent in any part. Their fibres are coarse and rigid. Leaves various, entire or toothed, simple or repeatedly subdivided.
Ord. 27. Lauri. "Calyx in 6 divisions, permanent, bearing 6 Stamens from the base of it's segments, in some instances accompanied by an inner row of the same number. Anthers adhering to each filament, and bursting from the base upwards. Germen superior. Style 1. Drupa or Berry of 1 cell, with 1 seed. Albumen none. Stem arboreous or shrubby. Leaves generally alternate."

Laurus, fig. 161, is the type of this Order, to which Mr. Brown adds Tetranthera of Jacquin, and Cassytha Linn., with some new genera. Myristica and Hernandia are considered as bordering upon it.

There is always something peculiar in the structure of the Stamens in Lauri; they are remarkably compound, as it were, or aggregate, in a manner scarcely observable elsewhere.

Ord. 28. Polygonææ. "Calyx of 1 leaf, divided, (coloured,) bearing the Stamens from it's base. Germen simple, superior. Stigmas several, often sessile. Seed 1, naked, or enveloped in the permanent Calyx. Embryo immersed in a farinaceous Albumen. Leaves alternate, each inserted into an annular, or sheathing, intrafoliaceous Stipula, or sheathing Footstalk; young ones revolute. Stem generally herbaceous."

Polygonum, fig. 162, Rumex, Rheum, are the chief genera.

In the first the Stamens can hardly be called, with Jussieu, definite. They are 5, 6, 8, or 9, bearing no analogy to the Calyx, which is 5-cleft. Styles or
Stigmas 2 or 3, sometimes separated from the Stamens. Mr. Brown observes the farinaceous Albumen to be sometimes deficient, that substance being fleshy and in very small quantity, in *Eriogonum* of Michaux; Pursh N. Amer. 277; a genus which cannot be removed from this very natural Order.

*Ord. 29. ATRIPLICES.* "Calyx of 1 leaf, deeply divided, bearing the definite Stamens from its base. Germin 1, superior. Style 1, or wanting, or many, each with 1, rarely 2, Stigmas. Seed 1, many in *Phytolacca*, 2 in *Galenia*, either naked, or enveloped in the Calyx, or inclosed in a pulpy or capsular Pericarp. Embryo curved round the farinaceous Albumen. Stem herbaceous, in some shrubby. Flowers sometimes separated. Leaves mostly alternate, undivided, entire, more or less fleshy, without Stipulas."

A very natural and numerous Order, especially where the Seed is invested with the Calyx, as in *Basella*, *Salsola*, *Spinachia*, *Chenopodium*, *Atriplex*, fig. 163, *Blitum*, *Salicornia*. In the two latter the Stamens, being occasionally 1, 2, or 3, and bearing no fixed analogy to the Calyx, are scarcely to be called definite. Mr. Brown denominates this Order *Chenopodeae*, with DeCandolle, and remarks that it has no character to distinguish it from the *Amaranthi*, *Ord. 30*, though there is a difference in habit. In fact, the insertion of the Stamens is not, in either tribe, so fixed, as to be depended on, though the di-
distinction between Jussieu's 6th and 7th Classes depends hereon.

**Class 7. Dicotyledones, without Petals**.  
**Stamens hypogynous** (97).

"Calyx inferior, of 1 or many leaves. Corolla scarcely any, though some have petal-like scales, or bristles, bearing the Stamens, or alternate with them, and others even a tube, either bearing the Stamens or not. Stamens definite, usually distinct, and, properly, inserted beneath the simple Germs, without any attachment to the Calyx, but this is not constant. Style 1, or many, or wanting. Stigma 1, or several. Seed 1, or Capsule of 1 or 2 cells, with 1 or many Seeds."

**Ord. 30. Amaranthi.** "Calyx deeply 5-cleft, often surrounded by scales. Stamens sometimes combined, occasionally having intermediate scales, or a common tubular base. Styles or Stigmas 1, 2, or 3. Capsule of 1 cell, with an unconnected Receptacle, and either bursting at the top, or all round. Seed 1 or many. Embryo rolled about a farinaceous Alburn. Flowers capitate, or spiked; sometimes separated. Leaves usually undivided and pointed; sometimes with Stipulas. Stem in the greater part herbaceous."

*Amaranthus, Celosia, Achyranthes*, fig. 164, Gov.

* Except Ord, 31, 32, and 33.
phrena, are genuine examples, and Mr. Brown has several new ones. He separates those with Stipulas into an Order termed Illecebræ, of which Paronychia of Tournefort, and Herniaria, are specimens.

Ord. 31. Plantagines. "Calyx generally deeply four-cleft, with a thin narrow-mouthed tube, like a Corolla, but fading, not deciduous, often splitting. Stamens 4, long, prominent, connected with the bottom of the tube. Germin, Style, and Stigma simple. Capsule bursting circularly, of 1 or 2 cells, with 1 or more Seeds in each, destitute of Albumen. Herbs, with sometimes separated Flowers."

Psyllium of Tournefort, with Plantago, fig. 166, and Littorella, are all the genera. The two former are united by Linnaeus, DeCandolle and Brown; the last is monoecious. Much doubt attends this singular and unconnected Order. Mr. Brown, like Linnaeus, gives the evident Corolla its proper appellation, there being a distinct Perianth, in 4 deep segments, besides.

Ord. 32. Nyctagines. "Calyx tubular, like a Corolla, either naked, or surrounded by an outer Calyx. Germin, Style and Stigma simple. Stamens definite, inserted into a glandular ring, proceeding from the Receptacle, round the base of the Germin. Seed 1, covered by the ring, as well as by the base of the tube, both permanent. Embryo surrounding a farinaceous Albumen. Stem shrubby or herbaceous. Leaves opposite or alternate, simple and undivided. Flowers axillary and terminal."
Mirabilis, fig. 167, (Nyctago Juss.) Boerhaavia, and Pisonia, with Abronia of Jussieu (Tricratus L’Herit.) and Buganvillea of Commerson, compose this Order, to which Oxybaphus of L’Heritier, Curt. Mag. t. 434, must be added.

The Calyx of Jussieu is the evident Corolla of other botanists, nor do we perceive what is gained by his paradoxical appellation. Still less does the apetalous character of his 7th Class suit the following Order.

Ord. 33. PLUMBAGINES. "Calyx tubular. Corolla of 1 or many Petals, beneath the Germin. Stamen definite, inserted either beneath the Germin, or into the Corolla. Germin solitary, superior. Style 1 or many. Stigmas many. Capsule separating into several valves at the base only. Seed solitary, pendulous from a thread-shaped stalk, originating from the Receptacle of the Germin. Embryo oblong, flat, surrounded by a farinaceous Albumen. Stem herbaceous, or somewhat shrubby. Leaves alternate," (undivided).

Plumbago and Statice, fig. 168, (the latter subdivided by Brown) are the only genera.

This Order and the 31st are arranged by Mr. Brown amongst his Monopetae.

We cannot but remark a great inaccuracy in this part of the Jussieuian System, as to technical characters respecting Calyx and Corolla; but without any reflection upon it’s illustrious author. Such are incidental to every attempt of the kind, nor can art
keep pace with nature. It seems proper nevertheless that these three last Orders should be removed to some of the following Classes.

**Class 8. Dicotyledones. Corolla monopetalous, hypogynous.**

"Calyx of one leaf. Corolla regular or irregular, bearing the Stamens, which are definite, and generally alternate with its segments when of equal number. Germin superior, in general simple, with one Style; but in some Apocinei, Ord. 47, the Germin is double, without any Style. Stigma simple or divided. Seeds either naked, or more frequently in a Pericarp, either pulpy or capsular, of 1 or many cells."

A great and important Class; whose 15 Orders follow one another in a tolerably natural series. Some are generally furnished with Albumen, others not; but this difference bears no analogy to the other characters of affinity, or of distinction, between the Orders.

**Ord. 34. Lysimachiae.** "Calyx divided. Corolla mostly regular, five-cleft, bearing as many Stamens opposite to the lobes. Style 1. Stigma rarely cloven. Fruit of 1 cell, with many Seeds, often capsular, with a central unconnected Receptacle. Stem herbaceous. Leaves opposite, or alternate."

Some have a Stem, as *Anagallis*, fig. 169, *Lysimachia*, *Hottonia*, *Limosella*, &c.; others radical
Flower-stalks, mostly umbellate, as *Androsace, Primula, Dodecatheon, Cyclamen*; and there is an appendix of nearly allied genera, comprising the very doubtful *Globularia*, with *Conobea* of Aublet, *Tozzia, Samolus, Utricularia*, fig. 170, *Pinguicula* and *Menyanthes*, fig. 184.

Mr. Brown, following Ventenat, calls this Order *Primulacea*, and has separated from it some of the appendix, by the name of *Lentibulariae*, given by Richard. Their Corolla is irregular, with a spur. Stamens 2. Albumen none. Embryo sometimes undivided—that is, to speak plainly, *monocotyledonous*!

**Ord. 35. Pediculares.** "Calyx divided, permanent, often tubular. Corolla usually irregular. Stamens definite. Style 1. Stigma rarely cloven. Capsule of 2 cells and 2 valves, each having a central partition, bearing the numerous Seeds. Stem generally herbaceous. Leaves, as well as Flowers, opposite or alternate, with 1 Bractea to each Flower."

*Erinus, Castilleia, Euphrasia, Bartsia*, fig. 171, *Pedicularis, Rhinanthus, Melampyrum*, are genuine examples of this Order, all turning more or less black in drying, and well distinguished by their Anthers and Seeds. Their Stamens are 4, 2 longer than the rest. *Hyobanche, Orobanche, Lathraea*, &c., are less strictly akin to these; and *Polygala*, with *Veronica*, fig. 2, and *Sibthorpinia*, fig. 176, are but slightly related to them or to each other.

**Ord. 36. Acanthi.** "Calyx divided, permanent,
Jasmineae.

often bracteated. Corolla generally irregular. Stamens 2; or 4, 2 of which are longer. Style 1. Stigma 2-lobed, rarely simple. Capsule of 2 strong elastic valves, with central partitions, bearing the few and large Seeds. Stem herbaceous or shrubby. Leaves, as well as Flowers, mostly opposite."

Acanthus, Barleria, Ruellia, Justicia, fig. 172, with some others, constitute this very natural Order, which Mr. Brown has deeply studied, and happily illustrated, Prodr. Nov. Holl. v. 1. 472. He notices the various, equal or unequal, simple or double, forms of the Anthers, and the awl-shaped support of each Seed, which is very peculiar, though not invariably present. The Seeds have no Albumen. There is often a rudiment of a fifth Stamen.

Ord. 37. Jasmineae. "Calyx tubular. Corolla regular, tubular, rarely deeply four-cleft, occasionally wanting. Stamens 2. Style 1. Stigma 2-lobed. Fruit either capsular, somewhat like the Acanthi; or pulpy, with 1 or 2 cells. Seeds few. Embryo straight and flat, mostly surrounded by a fleshy Albumen. Stem shrubby, or arborescent, with opposite branches and Leaves. Flowers oppositely panicled, or corymbose."

Syringa (Lilac Juss.) and Fraxinus, with Chionanthus, Olea, fig. 173, Jasminum and Ligustrum are examples of this Order, which abounds with elegant Shrubs, whose fragrant Flowers are highly valued. Its relationship to the last is extremely
slight, and scarcely discernible in any one point, except the valves and fixed partitions of the Capsule in Syringa, obscurely resembling Justicia &c., but not, like them, elastic, nor is there any resemblance in the number, form or disposition, of the Seeds or their supports.

Mr. Brown separates the true Jasminae, whose Seeds are erect, with hardly any Albumen, and their Corolla salver-shaped, in from 5 to 8 segments, with an imbricated twisted Aestivation; from the Oleina of Hoffinansegg and Link, whose Seeds are pendulous, with a copious, dense, fleshy Albumen, and a deeply four-cleft Corolla, sometimes wanting.

*Ord. 38. Vitices.* "Calyx tubular, often permanent. Corolla tubular, for the most part irregular in the limb. Stamens generally 4, didynamous, rarely 2, or 6. Style 1. Stigma variously shaped. Seeds definite, either naked, or more frequently in a pulpy, sometimes capsular, pericarp. Stem shrubby (or arboresous), in a few herbaceous. Leaves opposite for the most part; as are the Flowers when corymbose; but when spiked they are alternate." These different forms of inflorescence mark the 2 Sections.

In the 1st, are Clerodendrum, Vitex, Callicarpa, Cornutia, Tectona (Theka Juss.) &c.; in the 2d, Petrea, Citharexylum, Duranta, Verbena, fig. 174, and others. Eranthemum, Selago, and Hebenstretia stand as "akin to Vitices."

Jussieu has changed the name of this Order to

Ord. 89. LABIATÆ. "Calyx tubular, either 2-lipped, or rather unequally 5-cleft. Corolla tubular, irregular, mostly 2-lipped. Stamens 4, didynamous, inserted under the upper lip; 2 of them sometimes imperfect, or wanting. Germen 4-lobed. Style 1, central, from the base of the lobes. Stigma cloven. Seeds 4, naked, erect, inserted by their base into a Receptacle at the bottom of the permanent Calyx. Albumen none. Stem quadrangular, oppositely branched, mostly herbaceous. Leaves opposite, scarcely ever compound. Flowers opposite, with leafy or bristly Bracteas; solitary, or whorled; corymbose, or spiked; terminal, or axillary."

A most natural Order, the *Verticillatae* of Ray and Linnaeus. Herbage usually aromatic, often bitter, always harmless.

Jussieu makes 4 Sections.

Sect. 1. Two Stamens only perfect. *Lycopus, Monarda, Rosmarinus, Salvia,* &c.

Sect. 2. Four perfect Stamens. Upper lip scarcely any. *Ajuga (Bugula Juss.)* and *Teucrium.*


Westringia Sm., which turns out to be a considerable New Holland genus, belongs to Sect. 3d.

Ord. 40. SCROPHULARIAE. "Calyx divided, often permanent. Corolla often irregular, with a divided limb. Stamens 4, didynamous, rarely but 2. Style 1. Stigma simple or cloven. Fruit capsular, of 2 cells, and 2, more or less deeply separated, valves, (which are now and then cloven,) naked and concave within; the Receptacle central, bordered, bearing Seeds, generally numerous and minute, on both sides, and serving as a partition, meeting the inflexed edges of the valves. Stem herbaceous, rarely shrubby. Leaves opposite or alternate, seldom compound. Flowers bracteated."

Buddleia, Scoparia, Scrophularia, Gerardia, Antirrhinum, fig. 175, Hemimeris, Digitalis, and some others, give the true idea of this Order. Calceolaria, Wulfenia, and Commerson's Bœa, are the diandrous genera.

There are 2 Sections of numerous genera, one with opposite, the other alternate, Leaves, marked as "akin to Scrophulariae." Among the first are Columnea, Besleria, Gratiola, Lindernia, Mimulus; those with alternate Leaves being Schwalbea, Schwenkia, and Browallia.

Mr. Brown brings hither some of the 35th Order, as Veronica, fig. 2, (certainly with great propriety,) including Jussieu's Hebe. He reckons Gratiola one of the true Scrophulariae, as well as Euphrasia, part
of *Buchnera*, with *Minulus*, and *Limosella*, to which New Holland has furnished several new additions. Respecting *Limosella*, as being much better placed here than in the 34th Order, there can surely be no doubt. *Sibthorpi*a and *Disandra* belong, without question, to the *Scrophulariaceae*, not to the *Pedicul·lares*.

Except in the Stamens, and perhaps Corolla, there is little affinity between this Order and the *Labiatae*. Their qualities are almost totally different; nor is there any analogy between the Fruit of each. The bulk of the 39th makes the 1st Order in Linnaeus’s *Didynamia*, that of the 40th the 2d Order of that Class.

**Ord. 41. SOLANÆ.** "Calyx more or less deeply 5-cleft, often permanent. Corolla 5-cleft, and most generally regular, bearing the 5 Stamens from its base. Style simple, as is generally the Stigma. Fruit of 2 cells, with many Seeds; either capsular, and agreeing with the *Scrophulariaceae*; or more frequently pulpy, with central Receptacles, from the middle of the partition, subdividing the cells, and covered with the Seeds. Embryo surrounding a farinaceous Albumen. (See below.) Stem herbaceous or shrubby. Leaves alternate; sometimes 2, accompanying the inflorescence, from the same point. Flowers variously disposed, often extra-axillary, from the sides of the branch, next to the Leaves."

The Fruit is capsular in Sect. 1. *Celsia, Verbascum, Hyoscyamus, Nicotiana*, and *Datura*; pulpy in Sect. 2.
Atropa, Physalis, Solanum, fig. 177, Witheringia, Capsicum, Lycium, Cestrum, &c.

The Flowers are rarely 4-cleft; often irregular, as occasionally in Solanum, which genus cannot safely be divided on that account. The Albumen is more correctly described, by Gærtner and Brown, as fleshy, inclosing the curved Embryo. This curvature, and the plaited Aestivation of the Corolla, which is not ringent, or 2-lipped, Mr. Brown reckons the most essential differences between this Order and the Scrophulariace. Bontia, Brunfelsia, and Crescentia are subjoined as akin to Solanace. The genuine plants of this Order are narcotic, foetid, often very dangerous, termed by Linnaeus Luride, or Gloomy. Verbascum however, abounding with mucilage, is only mildly sedative, and perfectly safe for internal use, though intoxicating to fish.

Ord. 42. Boragineæ. "Calyx 5-cleft, permanent. Corolla almost universally regular, and Stamen 5. Germen either simple or 4-lobed. Style 1. Stigma divided, or furrowed, or simple. Seeds mostly 4; sometimes in a capsular or pulpy pericarp; sometimes naked, attached obliquely to the base of the Style, and encompassed with the (often greatly enlarged) Calyx. Albumen none. Stem in most cases herbaceous; rarely shrubby or arboreous. Leaves alternate, often harsh." (Stipulas wanting.)

These, the Asperifoliae of Ray and Linnaeus, compose on the whole a very natural assemblage; of
which Heliotropium, Echium, Lithospermum, fig. 178, Pulmonaria, Onosma, and perhaps Coldenia, all which have a naked-mouthed, or pervious, Corolla; with Symphytum, Lycopsis, Myosotis, Anchusa, Borago, Asperugo, Cynoglossum, and Trichodesma of Brown, whose tube is closed with valves, constitute indubitable examples. Tournefortia, Ehretia, and Cordia, (the latter comprehending Varronia,) are also retained here; but Mr. Brown proposes to separate Hydrophyllum, Ellisia, and Jussieu's Phacelia, as having a copious cartilaginous Albumen, compound, or at least deeply lobed, Leaves, and a capsular Fruit.

The true Boragineae are allied by their Seeds to Labiatae, Ord. 39; but differ in their pungent or warty, not hairy, pubescence; mucilaginous, not aromatic, qualities; alternate, not opposite, Leaves; and blue, rather than crimson or purple, Flowers, except in the bud. Messerschmidia and Cerinthe differ from the rest in having a kind of two-celled twin Capsule, or Nut; and Cerinthe has a glaucous, smoother, though warty, habit, with reddish or yellow Flowers. Onosma too is always yellow-flowered. The change in the Corolla of the Boragineae in general, from bright red, to a vivid blue, as the Flower expands, apparently caused by the sudden loss of some acid principle, is a very curious phenomenon.

Ord. 43. Convolvuli. "Calyx deeply 5-cleft, often permanent. Corolla regular, with a generally 5-lobed limb. Stamens as many as the segments, al-
ternate with them, inserted into the lower part of the tube. Style 1, or definitely divided into several. In the latter case the Stigmas are simple; in the former the solitary Stigma is sometimes divided. Capsule of 3, rarely 2 or 4, cells, with 1 or many Seeds, which are rather bony, marked with a Scar, Hilum, in the lower part, and attached to the base of the central partition, whose angles meet, but are not connected with, the margins of the valves. Embryo curved, the radicle inferior. Plants shrubby, or often herbaceous, twining in several instances, sometimes milky. Leaves alternate, very seldom imperfectly opposite.”

Mr. Brown notes the want of Stipulas, and the presence of a small mucilaginous Albumen, as well as the corrugated Cotyledons (always attendant on Seeds whose number is definite). He differs from Jussieu with regard to some genera, but the following are indubitable specimens of the Order.

Sect. 1. With 1 Style. Convolvulus, fig. 179, and Ipomaea.

Sect. 2. with several Styles. Evolvulus and Cressa, as well as Breweria, Polymeria, and probably Wilsonia, of Brown. Dichondra enters a Section with from 2 to 4 single-seeded Germens; and Cuscuta forms another, destitute of Cotyledons!

Ord. 44. Polemonia. “Calyx divided. Corolla regular, 5-lobed, with 5 Stamens inserted into the middle of its tube. Style 1, with 3 Stigmas. Capsule surrounded by the permanent Calyx, of 3 cells
and 3 valves, with many Seeds, each valve bearing a central partition, meeting an angle of the triangular central column, or Receptacle of the Seeds. Stem herbaceous or shrubby. Leaves alternate or opposite. Flowers terminal or axillary."

**Phlox** and **Polemonium**, with Jussieu’s **Cantua** and **Hoitzia**, make up this Order. The first is somewhat allied to the **Caryophylleae**, Ord. 82, but, being monopetalous, cannot be referred thither. Indeed their affinity is but slight. Jussieu confounds with his **Cantua**, the very distinct **Ipomopsis** of Michaux, fig. 180; see Exot. Bot. t. 13, 14.

**Ord. 45. BIGNONIE.** “Calyx divided. Corolla mostly irregular, with 4 or 5 lobes. Stamens generally 5, one of them imperfect. Style 1. Stigma simple, or 2-lobed. Fruit of 2 cells; in some capsular, of 2 distinct valves, the partition, bearing the numerous Seeds, either opposite or parallel to the valves, and separable therefrom; in others coriaceous or woody, bursting at the top only, with few seeds, on a partition inseparable from the valves, which is often extended at each side into a ridge, or wing, partially subdividing the cells. Albumen none. Stem herbaceous, shrubby, or arboreous. Leaves mostly opposite.”

**Sect. 1. Capsule of 2 valves. Stem herbaceous. Chelone, Sesamum, and Jussieu’s Incarvillea**, Lamarck Illustr. t. 527. The latter is named after Father d’Incarville, to whom Jussieu attributes the importation
of the *Aster chinensis* in 1743. But Sherard cultivated that plant before 1732.

Sect. 2. Capsule of 2 valves. Stem arboreous or shrubby. *Millingtonia, Jacaranda Juss., Catalpa, Tecoma Juss.* and *Bignonia,* fig. 181, with *Spathodea* of Palisot and Brown, and *Cobea* of Cavanilles, Curt. Mag. t. 851, whose capsule has from 3 to 5 valves and cells, make up this Section, to which Mr. Brown confines his idea of *Bignoniaceae,* Prodr. Nov. Holl. v. 1. 470; perhaps admitting also the above-mentioned *Incarvillea.*

Sect. 3. Fruit between coriaceous and woody, bursting at the top. Stem herbaceous. *Tourretia* (*Dombeya L’Herit.)*, *Martynia, Craniolaria,* and *Pedalium.* We know not whether Mr. Brown admits all these, as well as Ventenat’s *Josephinia,* Jard. de la Malmais. t. 67, into his *Pedalinae,* Prodr. N. Holl. v. 1. 519.

Ord. 46. *Gentianæ.* "Calyx of 1 leaf, divided, permanent. Corolla regular, often withering, it’s limb in as many equal, sometimes oblique, lobes, as there are segments in the Calyx, usually 5. Stamens as many, inserted into the middle or top of the tube. Anthers incumbent (sometimes combined). Style 1, rarely splitting into 2. Stigma simple or lobed. Capsule simple or twin, many-seeded, of 2 valves, and 1 or 2 cells, the edges of the valves inflexed, forming the partition when there are 2 cells, rolled inward when there is only 1. Seeds minute, their Receptacle mar-
Stem herbaceous, rarely somewhat shrubby. Leaves opposite, mostly undivided and sessile; floral cones occasionally diminished into a pair of Bracteas."

A very natural Order, distinguished by its general, often very intense, bitterness. Mr. Brown observes, that the segments of the Corolla are imbricated before expansion, and vary from 4 to 8; we may say to 12 or 13. The Fruit is sometimes pulpy. The Em-bryo is straight, in the axis of a soft fleshy Albumen; the Radicle pointing towards the Scar. Plants mostly smooth. Leaves undivided and entire, without Stipulas.

Sect. 1. Capsule of 1 cell. *Gentiana*, fig. 182, whose Corolla is very differently shaped in the different species, *Lita* Schreb. Gen. 795, *(Vohiria* Aubl.), *Picrium* Schreb. 791. *(Contoubea* Aubl.), *Swertia* and *Chlora*; to which may be added *Sabbatia* of Adanson and Salisbury, Pursh N. Amer. 137, *Orthos-temon* Br. and *Erythraea* of Renealn and Brown, Prodr. N. Holl. v. 1. 451, composed of several *Chironice* of other authors.


Sect. 3. Caps. of 2 separable cells. *Spigelia* and *Ophiorrhiza*, excluding *O. Mungos* which is a distinct genus of the *Rubiaceae*, Ord. 57. Here also is to be
introduced Mr. Brown's *Logania* (*Euosma* Andr. Reppos. t. 520), curious as a connecting link between this Order and the next.

Sect. 4. contains only *Nicandra* Schreb. Gen. 283, (*Potalia* Aubl.) as being akin to *Gentianae*. So also Mr. Brown subjoins *Villarsia*, fig. 184, Ventenat Choix, t. 9, (extracted from the Linncean *Menyanthes*) and *Anopterus* of Labill. Nov. Holl. t. 112; plants differing from true *Gentianeae* in having mostly alternate, partly toothed, Leaves, and on the whole very ambiguous.

**Ord. 47. Apocineae.** "Calyx 5-cleft. Corolla regular, with 5, often oblique, lobes, sometimes naked, sometimes accompanied by 5 internal, variouslyshaped, appendages. Stamens 5, inserted into the lower part of the Corolla, alternate with it's lobes; the filaments often short, either distinct, or more rarely united into a tube closely embracing the Germin. Anthers of 2 cells, the summit extended into a membrane, or thread. Germin single, or double, standing on a frequently glandular Receptacle. Styles 1 or 2, sometimes extremely short, attached, as it were by a joint, to the single or double Germin. Stigma one, capitate, obsolete. Fruit, in those with a single Germin, pulpy, or rarely a solitary Capsule, usually of 2 cells, with many Seeds; in those with 2 Germens, 2 combined, oblong, coriaceous Follicles (61:1), rarely shortened and slightly pulpy, bursting lengthwise at the inner edge, each of 1 cell. Seeds numerous,
either naked or feathery, imbricated, in many rows, 
over one side of a lateral, unconnected, flat Recepta-
ucle, lying along the inside of the Follicle, near it's su-
ture. Embryo flat, in a thin fleshy Albumen. Plants 
herbaceous, shrubby, or arboresous, generally milky. 
Leaves opposite or alternate, with fringed axillary 
glands, not always evident."

Sect. 1. Germens 2. Follicles 2. Seeds not feath-
ery. Vinca, fig. 186, Matelea Aubl., Ochrosia 
Juss., Tabernemontana, Cameraria and Plumieria.

Sect. 2. Germ. and Follic. 2. Seeds feathery. Ne-
trium, Echites, Ceropogia, Pergularia, fig. 185, Sta-
velia, Periploca, Apocynum, Cynanchum and Ascle-
pias.

Sect. 3. Germen simple. Fruit pulpy, rarely caps-
sular. Willughbeja Schreb. Gen. 162, (comprising 
Ambelania and Pacouria of Aubl.) Alamanda, Mel-
dinus, Gynopogon, Rauwolfia, Ophiorixylon, Cerbera
and Carissa.

Sect. 4. Genera akin to Apocineae, not milky. 
Strychnos, including Ignatia of Linn., Theophrasta, 
Anassa Juss., Fagraea Thumb. and Gelsemium Juss.

This Order, very natural, except the last Section, 
is what Linnaeus termed Contortae, from the frequent 
oblitiy, or flexure, of the Corolla. Mr. Brown has 
most happily divided it, see Tr. of the Wern. Soc. 
v. 1. 12, and Prodr. N. Holl. v. 1. 465, separating from 
the rest such as have the Pollen of each Anther co-
alesceing into two distinct, stalked masses, like the
Orchideae, Ord. 21, and deposited by the Anther upon 5 appropriate prominences of the pentagonal Stigma which is common to the 2 Styles. These plants constitute a new Order, named Asclepiadeae, of which Ceropogia, Stapelia, Pergularia, Asclepias, Cyananchum and Periploca are examples. Mr. Brown has 38 genera in all, the original Stapelia being greatly perhaps too much, subdivided. Of the remaining Apocineae, whose Pollen is granular and conveyed in the usual way to the Stigma, Mr. Brown has 15 genera with feathery Seeds, among which are Echites, Apocynum and Nerium. Of those whose Seeds, though sometimes winged with a membrane, are not feathery, such as Vinca, Plumeria and Cameraria, he has not yet published any particular illustration.

The leaves in both Orders are simple and entire. Inflorescence of Asclepiadeae aggregate, lateral, between the Footstalks.

Ord. 48. Sapotae. "Calyx divided, permanent. Corolla regular, its segments either equal in number to those of the Calyx, with alternate interior appendages; or twice as many, without such appendages. Stamens opposite to the segments of the Corolla, and agreeing with them in number; or else twice as many, the appendages bearing Anthers. Germen, Style, and generally Stigma, simple. Fruit a berry, or drupa, of one or many single-seeded cells. Seeds bony, polished, with a lateral scar. Embryo flat, encompassed with a fleshy Albumen. Stem woody. Leaves
Alternate, mostly undivided and entire. Flowers axillary, many together on single-flowered stalks. Plants milky.

Jacquinia, Sideroxylum, Bassia, fig. 187, Mimusops (including Imbricaria of Jussieu, which is perhaps M. Kauki Linn.), Chrysophyllum and Achras, with one or two others, less certain, make up this Order. Myrsine, fig. 188, (to which I have long ago referred Jussieu's Mangillla, Bumelia Mangillla Willd. Sp. Pl. v. 1. 1087.) enters a new Order, Myrsinaceae of Brown, Prodr. N. Holl. v. 1. 532, with Aegiceras of Gartner, and of Konig, Ann. of Bot. v. 1. 129. t. 8, and I presume Inocarpus Forst. Ola is judged by Mr. Brown as rather akin to his Santalaceae, see (Ord. 24; and Leea, the same genus with Aquilicia, is undoubtedly one of the Meliae, Ord. 71.

(Class 9. Dicotyledones, Corolla monopetalous, perigynous.

"Calyx of one leaf, sometimes deeply divided, bearing the Corolla, which is monopetalous, though occasionally so deeply divided as to become polypetalous*; regular, rarely irregular. Stamens inserted either into the Corolla or Calyx, definite, seldom indefinite. Germe simple, superior or inferior. Style generally single. Stigma rarely divided. Fruit pulpy or capsular, of one or many cells."

* Even in one and the same species, as Andromeda calyculata.
The insertion of the Corolla, characteristic of this Class, is not very apparent, and I observe that Mr. Brown does not allude to such insertion, but, even in the character of the *Ebenueae*, contradicts it. In fact, nature and art accord very ill in this part of the System. The first Order might, in the main, be removed to the foregoing Class, with whose character it agrees: while the fourth goes most readily and naturally to the eleventh Class, having some relationship to the tenth. But the great difficulty consists in the second and third Orders of this ninth Class, in which there is really no such insertion of the Corolla as above mentioned*; and the inferior Germen of *Vaccinium* is an insurmountable stumbling-block. Nothing could justify, in a professedly natural system, the removing this last genus from the neighbourhood of *Erica* and *Azalea*; and it were better to have met the difficulty by an open avowal, with some contrivance of an artificial nature, making *Vaccinium* an exception. The true *Rhododendra* and *Ericæ* would go very well into the eighth Class. It must be observed that their Stamen are often hypogynous, really inserted into the Receptacle under the Germen.

**Ord. 49. Guaiacanæ.** "Calyx of one leaf, divided in the upper part. Corolla lobed, or deeply divided. Stamens inserted therein; sometimes definite, as many, or twice as many, as its segments; some—

* Mr. Salisbury has long ago anticipated this remark. *Tr. of Linn. Soc.* v. 8. 12.
times indefinite, monadelphous or polyadelphous at the base. Germs mostly superior, in a few inferior, or half-inferior. Style I. Stigma simple or divided. Fruit capsular, or more frequently pulpy, of many single-seeded cells. Embryo flat, in a fleshy Albumen. Stem shrubby or arborescent. Leaves alternate. Flowers axillary."


This Section constitutes an Order subsequently re-established by Jussieu, under the name of Ebenaceae, and adopted by Mr. Brown, Prodr. N. Holl. v. 1. 524. The latter considers Diospyros, Royena, Embryopteris Gaertn., Paralea Aubl., Maba Forst. (Ferreola Koen. and Roxb.), and his own Cargilla, Prodr. 526, as perhaps the only certain genera of this new Order; whose Corolla is really hypogynous, leathery, generally downy on the outside. Flowers more or less separated. Anthers lanceolate, attached by the base, bursting lengthwise. Berry with few perfect Seeds.

Sect. 2. Stam. indefinite. Alstonia, Symplocos, Ciponima Aubl., Paralea Aubl., and Hopea Linn., all now considered as one genus under the oldest name Symplocos. Styra and Halesia certainly answer best, even to the technical character of this Section, and perhaps ought to be placed here; unless more
akin, as Jussieu hints of the former, to his *Melia* Ord. 71.

**Ord. 50. Rhododendra.** "Calyx divided, permanent. Corolla attached to its base" (scarcely so) "either monopetalous and lobed, or so deeply divided as to become almost polypetalous. Stamens definite, distinct, inserted into the Corolla if monopetalous (very slightly, if at all); "if it be polypetalous, into the bottom of the calyx" (rather into the receptacle). Germin superior. Style 1. Stigma single, often capitate. Capsule superior, with many cells and many valves, whose inflexed edges constitute the partitions uniting with the central column. Seeds numerous, minute. Stem shrubby. Leaves alternate, rarely opposite, mostly revolute when young.


Sect. 2. Cor. nearly polypetalous. *Rhodora, Ledum, Bejaria* (erroneously printed by Linnaeus *Besaria*) and *Itea*.

It is singular that the able author should have remarked in *Rhodora* only, what is the striking mark of his true *Rhododendra*, the bursting of the Anthers by 2 oval pores near the top, without any crest or appendage. *Itea* wants this character.

This Order appears to have scarcely any affinity except perhaps in hardness of wood, to the preceding
Mr. Salisbury has remarked a coloured glandular tip to the Leaves, as characteristic of the *Rhododendrum*.

**Ord. 51. ERICE.** "Calyx of 1 leaf, permanent, sometimes superior, more frequently inferior, deeply divided. Corolla monopetalous, in some instances deeply divided, inserted into the bottom of the Calyx, or glands belonging to it," (Jussieu says also into the top,) "often withering and permanent. Stamens definite, distinct, inserted similarly, or rarely proceeding from the base of the Corolla. Anthers often with 2 horns at the base" (always I believe opening by 2 pores). "Germen superior, or rarely inferior. Style 1. Stigma generally single. Fruit of many cells, pulpy, or more frequently capsular, with many valves, the partitions" (not constantly) "from the middle of each, joining the central column. Seeds numerous, and generally minute. Stem mostly shrubby. Leaves alternate, opposite, or whorled."


**Sect. 2. Germen inferior, or half-inferior.*** Argocephylhum Forst., *Maesa* Forsk., and *Vaccinium*, fig. 192. *Empetrum* and *Hudsonia* are subjoined as allied to *Erica*.

Mr. Brown has happily separated from hence *Epacris*, fig. 8, 9, and it's very numerous allies, which
compose a beautiful and distinct Order, termed Epacridae, Prodr. N. Holl. v. 1. 535. They occupy the same place at New Holland, that the vast genus Erica docs at the Cape of Good Hope, and are distinguished by the simple structure of their Anthers, first noticed by Mr. Brown. Each Anther bursts longitudinally in front, opposite to its dorsal point of insertion, and then becomes a single flat valve, the rather large Pollen being borne by a narrow receptacle, or partition, which originally divided the Anther into 2 cells. The Germen has usually 5 scales, sometimes a notched ring, at the base. Stigma capitate, sometimes notched or toothed. Fruit either a Drupa, Berry, or Capsule, rarely of only 1 cell. Stem shrubby, with rigid, alternate, mostly entire, Leaves, and elegant white or crimson, rarely blue, Flowers, variously disposed, often drooping.

Itea, including Cyrilla, has Anthers of 2 cells, bursting from top to bottom, at 2 opposite sides, so that, to say nothing of the great difference of habit, it cannot be brought hither.

The partitions of the Capsule are in some of the genus Erica formed from the inflexed edges of the valves, as in the Rhododendra, Ord. 50; in others proceeding from the centre of each valve. This difference exists in species otherwise so nearly akin, that no person has ventured to divide the genus by it, any more than by various appendages to the Anthers, which, however remarkable, afford no sound generic distinctions.
Ord. 52. CAMpanulaceæ. "Calyx superior, its limb deeply divided; rarely half-inferior. Corolla (inserted into the top of the Calyx Juss.) mostly regular, with a divided limb, generally withering. Stamens inserted into the same part under the Corolla, alternate with its segments, and equal to them in number, generally 5, with distinct, occasionally combined, Anthers. Germen glandular at the top. Style 1. Stigma single or divided. Capsule usually of 3 cells; sometimes of 2, 5, 6, or 8, bursting laterally. Seeds numerous, attached to the inner angle of each cell. Herbs with a milky juice, rarely shrubby. Leaves mostly alternate. Flowers distinct, or (in Jasione) aggregate."

It is not easy to divine what is meant by Jussieu's expression of the Corolla being "summo calyci inserta." Both those parts and the Stamens are really epigynous. We cannot trace the slightest relationship between this Order and the Ericeæ or Rhododendra. But their milky, often bitter, quality, and in some New Holland species a very strong resemblance of habit, approaches to the great natural class of Compound Syngenesious Flowers, from which their generally 3-celled, many-seeded, Capsule forms as wide an aberration, as the same sort of fruit in Begonia does from the natural Order of Polygonææ, n. 28, to which that singular genus is otherwise so much akin. Phytolacca exhibits a somewhat similar anomaly in the Atriplices, n. 29.
Jussieu's Sections of *Campanulaceae* are,


New Holland has greatly enriched this Order, and, under Mr. Brown's auspices, thrown much light upon it. He separates from hence, by the name of *Goodenovia*, Prodr. N. Holl. v. 1. 573, *Scævola*, fig. 194, along with the new genera of *Goodenia*, Sm. Tr. of Linn. Soc. v. 2. 346, *Velleia*, Sm. ib. v. 4. 217, and several more, first discovered by himself; amongst which not the least interesting is *Brunonia*, Sm. Tr. of Linn. Soc. v. 10. 365, whose affinity is among the most puzzling, approaching both the 55th and 56th of Jussieu's Orders. The *Goodenoviae* are not milky. Their Pericarp is of 2, rarely 4, cells, with 1 or more Seeds in each cell. Their essential character is a cup-like membranous integument, entire or divided, embracing the thick abrupt Stigma.

Between them and the real *Campanulaceae*, Mr. Brown interposes another new Order, *Styliæae*, fig. 73-76, whose 2 Stamens are Gynandrous, like the *Orchidæae*, with twin Anthers; their Style, or Column, generally bent, and highly irritable. Capsule of 2 cells and 2 valves, with many Seeds.

If the 9th Class of the Jussieuan System, to which
so many objections have just been started, were removed, it would unquestionably leave a great and absolute separation between the 8th and the 10th, as to natural affinity; while much is gained in that respect by its preservation, however faulty the characters.

(Class 10. Dicotyledones. **Corolla monope-talous, epigynous. Anthers combined.**

*Flowers tubular, aggregate in a Common Calyx, whence they are termed compound (68), upon a Common Receptacle (63), which is either naked, scaly, or hairy. Proper Calyx none, except the cuticle of the Seed, and the Seed-down which is often a continuation thereof. Corolla of 1 tubular Petal, standing on the Pistil (Germen); in some instances flosculous, having a regular limb, almost invariably 5-cleft; in others ligulate, the limb being extended into a lateral flat expansion, entire or toothed at its extremity. Stamens definite, almost always 5, with distinct Filaments, inserted into the Corolla. Anthers united into a tube, very rarely approximated only. Germin inferior (with respect to the Corolla and Proper Calyx) simple, standing on the Common Receptacle. Style 1, passing through the tube formed by the Anthers. Stigma generally deeply divided, rarely single. Seed 1, either naked, or crowned with a border, wing or down. Albumen none. Radicle inferior. Flowers sometimes all flosculous, or all ligulate, in the same Calyx; or those of
the centre are flosculos, those of the margin ligulate."

Exceptions to the above characters, of this most natural and very extensive Class, occur in the two last sections of the 55th Order, hereafter to be explained; as also in Tussilago, several of whose species are incompletely dioecious, and have disunited Anthers; in Eclipta, the Flowers, or Florets, of whose disk are 4-cleft and tetrandrous; in Siegesbeckia flosculosula, where they are 3-cleft and triandrous; and in Seriphium, as also in Stachelina uniflosculosula, Prodr. Fl. Græc. v. 2. 162, which have only 1 Floret in each Calyx. The occasionally undivided or club-shaped Stigma is always, I believe, inefficient.

Ord. 53. Cichoraceæ, fig. 57-60. "Florets all ligulate and perfect, fig. 59. Common Calyx various. Each Floret, entire or toothed at the apex, has a twin Stigma. Seed either naked, or feathery, fig. 60. Receptacle either naked, fig. 58, or covered with hairs or scales. Plants milky, herbaceous, often caulescent. Leaves alternate. Flowers usually yellow." Schkuhr has remarked that their Pollen is angular; in the tubular Florets it is spherical or oval. Br. Tr. of Linn. Soc. v. 12. 88.

This Order is equivalent to the first Section of the Syngenesia Polygamiæqualis of Linnaeus, of which Sonchus, Hieracium, Picris, fig. 57-60, Leontodon, Tragopogon, and Cichorium are examples, nor can anything be more natural.
Ord. 54. Cinarocephale, fig. 61-65. "Florets all floscusous, sometimes all perfect; sometimes partly neuter, fig. 64, or partly fertile, mixed with the perfect ones. Common Calyx of many rows of imbricated scales, either spinous or unarmed. Common Receptacle hairy, fig. 62, or more usually scaly. Neuter Florets, fig. 64, often irregular; the rest, fig. 65, regular, 5-cleft and pentandrous, with a simple or divided Stigma, often continuous, not jointed, with the Style. Seed with a hairy, fig. 62, or feathery Down. Stem herbaceous, rarely shrubby. Leaves alternate, often spinous. Flowers various in colour, terminal, rarely axillary."

These make the 2d, or capitate, Section of the same Class and Order of Linnaeus, of which Carlina, Centaurea, Carduus, fig. 61, 62, and Serratula are examples; part of his 3d Order, Polygamia-frustranea, is likewise included, and part of his 5th, Polygamia-segregata, certainly with very great advantage.

Ord. 55. Corymbiferae, fig. 66-69. "Flowers either altogether floscusous, or radiated, fig. 66; the Florets of the Disk, in the latter case, being floscusous, fig. 68, those of the Margin ligulate, fig. 67. The floscusous ones are either all perfect, or the marginal ones are fertile or neuter; more rarely the central ones have Staminens only, the marginal ones only Pistils. The radiant Flowers never consist entirely of united Florets, but for the most part those of the disk are such, the rays being either furnished with perfect or imperfect Pistils,"
or sometimes without rudiments of any. Common Calyx of 1 leaf, or of many; either simple, or surrounded by a smaller exterior Calyx, or imbricated throughout: containing in general numerous Florets, sometimes but a few, or only one; the Common Receptacle being either naked, or clothed with hairs or scales, fig. 69, separating the Florets. The Florets are almost universally 5-cleft, rarely 3- or 4-cleft; the number of Stamens corresponding therewith: ligulate ones either entire or toothed at the end. Anthers very rarely unconnected. Stigmas a continuation of the Style; 2 in the perfect and fertile Florets; single, or wanting, in the barren and neuter ones. Seed either naked, or crowned with scales or down. Plants herbaaceous, sometimes shrubby. Leaves more frequently alternate than opposite. Disk of the Flowers mostly yellow; rays often of the same, not unfrequently of a different, colour."

The 2d, 3d, and 4th Orders of Linnaeus's Syngenesia (Polygamia-supersflua, P. frustranea and P. necessaria,) compose this Order; as well as what Jussieu terms Corymbiferæ anomala, having perfectly separated Florets, either in the same Common Calyx, or in 2 different ones, on different plants, their Anthers being convergent, but not united. These last, wanting the Syngenesious character, Linnaeus has placed, with much violence to nature, in his Monoecia, Class 21. Iva, Clibadium, Parthenium, Ambrosia, Xanthium, and Nephelium are the genera. They make
the 8th and 9th Sections of Jussieu's *Corymbiferæ*, the other seven being marked by a naked or scaly Receptacle, winged or naked Seeds, and flosculous or radiated Flowers. The last character is not always well defined, nor free from variation. The change of flosculous, or regular, Florets, into ligulate, or radiant, or tubular and neuter, ones, is, in this tribe, analogous to the change of Stamens or Pistils into Petals, in the generality of double Flowers. Examples of these seven Sections are—

Sect. 1. Receptacle naked. Seed with down, or crown. Flowers flosculous. *Kuhnia*, referred by Linnaeus to his *Pentandria Monogynia*, because of the separate Anthers; *Cacalia, Eupatorium, Xeranthemum, Gnaphalium, Filago*, and several others. *Mutisia* and *Barnadesia*, being evidently radiant, seem misplaced here. In *Gnaphalium* indeed the marginal Florets are more or less ligulate, though too minute to form a visible Radius. *Seriphium*, whose Calyx is single-flowered, is well brought hither from the now abolished Linnaean Order, *Syngenesia Monogamia*, and *Stoebe* from *Syng. Polyg.-segregata*.


Sect. 4. Recept. and Seed naked. Fl. flosculous.
Cotula, Ethulia, Hippia, Tanacetum, Artemisia, &c., some of which have minute ligulate Florets in the Radius, and others approach towards the nature of double Flowers, by acquiring evident Rays.


Sect. 6. Recept. chaffy. Seed toothed or scaly at the crown. Fl. generally radiant. Spilanthus without, and Verbesina with rays, scarcely differ otherwise; Bidens and Coreopsis are in the same predicament, and often vary into each other; Silphium, Helianthus, Rudbeckia, &c.

Sect. 7. Recept. chaffy. Seed with a feathery, hairy, or bristly crown. Fl. mostly radiant. Arctotis, Tridax, Amellus, &c.

Sect. 8 and 9 have already been explained. The former is said to be monoecious, the latter dioecious, which is not uniformly correct. In fact this circumstance varies.

Mr. Brown, in a learned paper on this natural family of Composite, Tr. of Linn. Soc. v. 12. 76, lays much stress on the situation of the nerves, or principal vessels, of the Corolla of the tubular Florets, which is always alternate with their segments, not, as in all other plants, central, or running along the middle of each segment, though such do also, less universally, occur. The same writer notices that the Aestivation of the Florets is valvular, which is not indeed peculiar to
This paper abounds with copious and most valuable critical remarks on the differences or affinities of particular genera.


"Proper Calyx" (Perianth, 53:1) "of 1 leaf, superior. Corolla of 1 petal, rarely of several united by their broad bases, superior, often regular. Stamens definite, inserted into the Corolla, with distinct" (distant or divaricated) "anthers. Germin simple. Style usually one, sometimes several, or wanting. Stigma simple or divided. Seed, or generally Pericarp, either capsular or pulpy, inferior, of 1 or many cells, with 1 or many Seeds."

Jussieu makes the separate Anthers the difference between this Class and the last, speaking of the present (so far, we must presume, as it consists of aggregate Flowers,) as rather superfluous. But the disposition of the vessels of the Corolla, noticed by Mr. Brown in the former Class, affords a decisive distinction.

Ord. 56. Dipsaceae. "Calyx single or double. Corolla tubular, with a divided limb. Stamens definite. Style and Stigma simple. Capsule generally single-seeded, not bursting, but resembling a naked Seed; very rarely composed of 2 or 3 single-seeded cells. Albumen none. Radicle superior. Stem usually herbaceous. Leaves opposite, rarely whorled. Flowers in a few instances distinct, in most aggregate, on
a chaffy Common Receptacle, surrounded by a Common Calyx of many leaves.”

Morina, Dipsacus, Scabiosa, fig. 5-7, Knautia, Al lionia, and Valeriana are the genera, all except the last having aggregate Flowers.

Ord. 57. Rubiaceæ. “Calyx simple, its limb almost always divided. Corolla regular, mostly tubular, with a divided limb. Stamens definite, 4 or 5, seldom more, inserted into the tube of the Corolla, alternate with its segments, and agreeing with them in number. Germen inferior. Style 1, very rarely 2. Stigmas generally 2. Fruit either of 2 single-seeded lobes or grains, not bursting, and resembling naked seeds; or a capsular or pulpy Pericarp, often of 2 cells, with 1 or many Seeds in each; sometimes of only 1 cell, or of many: it is either crowned with the permanent Calyx, or naked” (having a scar where the Calyx has been). “Embryo oblong, slender, in a large, horny, lateral Albumen. Stem herbaceous, shrubby or arborescent. Leaves (simple) in a few instances whorled, in most opposite, their Footstalks combined at the base either by a simple sheathing intransfoliaceous Stipula, or a fringed membranous lax one.”

A vast and important Order, which Jussieu has all the merit of having brought into due notice. The peculiar stipulation is, in the shrubby genera, a ready mark of distinction. There are eleven Sections, of which the first two might well constitute an Order by themselves; the rest are mostly tropical, with woody Stems. Mr.
Brown observes, Bot. of Terra Australis, 31, that it is scarcely possible to distinguish the Rubiaceae, as now constituted, from the Apocineae, Ord. 47, by characters taken from the fructification alone. This is but one confirmation amongst many, which the numerous exceptions throughout the Jussieuan classification afford, of the opinion of Linnaeus, that natural orders are, as yet, not possibly to be defined by technical marks. Nevertheless, every attempt of the kind is useful, as tending to dissipate some obscurity, or to point out some truth; nor does the fact just mentioned at all invalidate the propriety, or necessity, of recurring to the fructification, for every principle of classical arrangement, as well as of generic distinction, though our incomplete knowledge of plants renders exceptions, to all our rules, inevitable.

Sect. 1. Fruit of 2 single-seeded grains. Stamens mostly four. Leaves mostly whorled, and Stem herbaceous. Sherardia, fig. 196, Asperula, Galium, Crucianella, Valantia, Rubia, and Anthospermum, the last not well characterized by Linnaeus.


Sect. 3. Pericarp simple, of 2 cells, with many Seeds. Stamens 4. Leaves opposite. Stem herbaceous or shrubby. Hedyotis and Oldenlandia, two
genera which, as usually understood, are not distinct. But *O. pentandra, digyna,* and *depressa* of authors constitute a good genus, now bearing that name, Sm. in Rees’s Cycl. v. 25, and belonging to Jussieu’s *Saur-fragæ,* Ord. 84. *Carphalea* Juss., Lamarck Illustr. t. 59, with *Gomozia, Petesia,* and Catesbæa of Linnæus, and a few Aubletian genera, compose the rest of this Section.

Sect. 4. Fruit the same. Stamens 5. Leaves opposite, as in all the following. Stem often shrubby. *Bellonia,* very little known, with *Virrecta,* the beautiful *Mussænda,* the valuable *Cinchona,* fig. 197, the fragrant *Gardenia,* and magnificent *Portlandia,* are here the principal genera. *Gonipa* and *Randia* are *Gardeniæ.*

Sect. 5. Fruit the same. Stam. 6 or more. Stem in some arboreous. *Coutarea* Aubl. t. 122, which is *Portlandia hexandra* Linn., *Hillia,* and *Duroia,* are all the genera mentioned.


Sect. 7. Pericarp and Seeds the same. Stamens 5. Stem shrubby or arboreous. *Chiococca, Psychotria,* and *Coffeea,* fig. 198, are the chief examples.

Sect. 8. Pericarp simple, of many single-seeded cells. Stam. 4, 5, or more. Stem often shrubby. *Eriöthalis, Laügeria, Guettarda,* &c., with a few of Commerson’s, not very certain, genera. *Matthiola* of Plumier and
Linn. is a Guettarda. The former, as the oldest name, should have been retained.

Sect. 9. Peric. the same, with several Seeds in each cell. Stam. 5 or more. Stem shrubby or herbaceous. 

_Hamelia_, fig. 199, with _Patima_ and _Sabicea_ of Aublet.

Sect. 10. Flowers aggregate on a Common Receptacle, or rarely confluent. Stem woody, rarely herbaceous. _Mitchella_, the curious _Canephora_ of Juss. 

Lamarck Illust. t. 151, _Callicocca_, _Morinda_, _Nau-clea_, _Cephalanthus_.

Sect. 11. Genera akin to _Rubiaceae_, whose Fruit was not well known to Jussieu. _Serissa_, now found to belong to Sect. 7; _Pagamea_, and _Faramea_ of Aublet, perhaps near _Callicocca_; and _Hydrophilax_, which should go to the 6th Section.

**Ord. 58. Caprifolia.** "Calyx superior, often with 2 Bracteas, or an outward Calyx, at its base" (or rather at the base of the Germin). "Corolla usually monopetalous, either regular, or irregular; in a few polypetalous, the Petals combined by their broad bases. Stamens definite, mostly 5; inserted into the tube of the monopetalous genera, alternate with the segments; in the others either standing on the Germin, alternate with the Petals, or attached to the middle of each Petal. Style 1, or wanting. Stigma 1, rarely 3. Fruit inferior, pulpy, or sometimes capsular, of 1 or many cells, with 1 or many Seeds in each. Embryo in a cavity in the upper part.
of the large solid Albumen. Stem woody, rarely herbaceous. Leaves generally opposite, seldom alternate; without any intermediate Stipulas."

There is a fallacy in the character of this Order, as stated by Jussieu, and the acknowledged diversity of insertion of the Stamens indicates, what it really is, a very heterogeneous Order. The outer Calyx, or rather pair of Bracteas, is not at the base of the proper Perianth, which is superior, but at the base of the Germin, which is inferior.

The 1st Section exemplifies the true Caprifolia, having a Style, and a monopetalous Corolla. These are Linnaea, fig. 200. Triosteum, and Lonicera, divided by Jussieu into Symphoricarpos, Diervilla, Xylosteum, and Caprifolium. Lonicera corymbosa, gathered by Mr. Menzies in Chili, proves not an Ivora, but a Loranthus. Ovieda is properly removed to the Vitices.

Loranthus, Viscum*, and Rhizophora, which constitute the 2d Section, have surely but little relationship to the foregoing, or perhaps to each other. Mr. Brown makes an Order of Rhizophoreæ, Bot. of Terra Austr. 17, akin to his Cunoniaceæ, see Ord. 84; and considers Loranthus as much allied to Proteaceæ.

The 3d Section consists of Viburnum, fig. 201, and

* Seeds of Viscum are now germinating under my observation, some of which send out two radicles, as Duhamel remarks, Arb. v. 2. 355, though Gaertner never saw more than one. Such seeds have in the centre a double Plumula, like an egg with two yolks.
Sambucus; for Jussieu's Hortensia is, according to all appearance, a Hydrangea, and, however near to these two genera in habit, very different in structure. This Section is characterized by 3 sessile Stigmas, though the Seed is solitary in Viburnum.

The 4th Section is formed of Cornus and Hedera, which have a polypetalous Corolla, and no external Calyx, except what is common to numerous Flowers. They are slightly akin. Hedera naturally belongs to the Aralia, Ord. 59. Jussieu himself candidly expresses his dissatisfaction with the Order in question.

**Class 12. Dicotyledones. Corolla polypetalous. Stamens epigynous.**

"Calyx of one leaf, superior. Petals of a definite number, standing on the Pistil, that is, on the margin of a gland crowning the Germin. Stamens definite, distinct, inserted into the same part, as many as the Petals, and alternate with them. Germin single" (scarcey so in the 60th Order). "Styles several, definite. Stigmas as many. Seeds as many, naked, or rarely in a Pericarp, the number of whose cells answers to the Styles. Embryo minute, oblong, in the upper part of a hard Albumen. Flowers umbellate (48:7), with or without a general or partial Involucrum, or both."

The Germin is considered single, because the Stamens are epigynous; and in fact the Receptacle of
the Flower is simple, though the Seeds are often distinctly separated in many of the Umbelliferae.

Ord. 59. Araliae. "Calyx entire or toothed. Styles several. Fruit pulpy, or more rarely capsular, of many single-seeded cells. Stem woody or herbaceous. Leaves alternate, often compound; their Footstalk sheathing at the lower part. Umbel generally accompanied by an Involucrum."

Gastonia of Commerson, and Polyscias of Forster, with Aralia, Cussonia and Panax, compose this Order. Sciodaphyllum of Browne's Jamaica, like Aralia capitata of Jacquin, seems to me a species of Hedera. See the end of Ord. 58.

Ord. 60. Umbelliferae. "Calyx entire, or 5-toothed. Petals 5. Stamens 5. Styles and Stigmas 2. Fruit separable perpendicularly into 2 Seeds, variously shaped, pendulous from the top of a central, thread-shaped, often cloven, Receptacle. Flowers disposed in Umbels, and those generally divided into partial Umbels, Umbellulæ, each either with an Involucrum, or without, and in most instances regular, though in some anomalous. Stem herbaceous, rarely shrubby. Leaves alternate, for the most part repeatedly compound, rarely simple. Footstalks sheathing. Flowers white, or purplish, sometimes yellow."

One of the most natural of all Orders. "Lagoecia only has a solitary Style and Seed." They are distributed by Jussieu, as well as by Linnaeus, according to
the presence or absence of their general or partial In-
volucrum. Artedi, the early friend of Linnaeus, who
devoted himself to the study of the Umbelliferae, sug-
gested, or adopted, this plan. But those parts are often
variable in the same species. The regularity or irreg-
ularity of the Petals also, and the perfection or par-
tial imperfection of the Stamens or Pistils, have been
resorted to, and do perhaps often afford good marks.
The simple or divided form of the Petals is very ma-
terial. But the figure, margin, ribs, angles, and sur-
face of the Seeds yield excellent characters, allsuffi-
cient for the establishment of good genera, though not
yet perfectly well applied to use. The earlier sys-
tematic botanists, and more recently Crantz and Cus-
son, have had this object in view. Hoffmann and
Sprengel are now intent upon it. The Prodromus of
the latter, published at Halle in 1813, does honour to
it's author, though his Species Umbelliferarum minus
cognita, published five years later, may serve to show
that his ideas of genera are not yet settled. It would
be superfluous to give the detail of Jussieu's 4 Sections.
Sprengel's are as follows:

1. Fruit compressed, flat. Hasselquistia, Tordylium,
Heracleum, Peucedanum, fig. 203, Ferula and Pasti-
naca are good examples. Hydrocotyle appears mis-
placed here.

2. Fr. solid, winged at the margin. Drusa, De
Cand. Ann. du Mus. v. 10, Mulinum Persoon, Se-
linum, Angelica, Imperatoria, Thapsia, Laserpitium, and Artedia, fig. 204.

3. Fr. with a bladdery skin. Hermas, Cicuta, Physospermum Cusson (Ligusticum cornubiense Linn.), and Astrantia, fig. 206.

4. Fr. with a thick coat. Cachrys, Coriandrum, Dondia Spreng. (Astrantia Epipactis Linn.), Smyrnium, fig. 207, Aethusa, and Agasyllis Spr. (Bubon Galbanum and Sison salsum Linn., &c.).

5. Fr. armed. Daucus, Caulis, fig. 208, Torilis Adanson, Sanicula, Bowlesia Ruiz. and Pavon, Cumminum, Oliveria Ventenat, Athamanta, Bubon, Tragium Spr., Eriocalia, fig. 205 and 209, Anthriscus Pers., Fischera Spr. (Azorella Cavan. and Labill.), and Bunium.

6. Fr. solid, naked; either linear-lanceolate, as Myrrhis Morison, Scandix, fig. 210, Chærophyllum, Schulzia Spr., Sium, Carum, Tenoria Spr. chiefly extracted from Bupleurum, and Meum Tourn.—or oblong-ovate, as Echinophora, Exoacantha Labill. Odontites Spr. Bolax Commerson, Spananthe Jacq., Apium, Pimpinella, Sison, fig. 211, Seseli, Oenanthe, Conium, Bupleurum, Cnidium Cusson, Ligusticum, Ammi, and Siler Gärtn. (Laserpitium aquilegfolium Jacq.).

The following Linnaean genera are excluded from this system. Crithmum, which is referred to Cachrys; Aegopodium to Sison; Anethum to Meum; and Phellandrium to Oenanthe.
Eryngium, fig. 212, is either excluded or overlooked, by Prof. Sprengel, though unquestionably of this natural order. It's simple Umbel is merely condensed into a Capitulum (48:6), resembling the Dipsaceae, Ord. 56, and Cinarocephala, Ord. 54, to which last the rigid spinous habit of the herbage approaches.


"Calyx of one or many leaves; very rarely wanting. Petals hypogynous, that is, inserted under the Pistil, definite; very rarely indefinite; mostly distinct, sometimes united at the base into a kind of monopetalous Corolla; rarely entirely wanting. Stamens hypogynous, definite or indefinite, their Filaments usually distinct, but sometimes united into a tube, or more rarely collected into several bundles. Anthers distinct, except in" (some species of) "Viola and Balsamina (Impatiens Linn.). Germen superior, in numerous instances single, in some multiplied. Style one, or several, or wanting. Stigma 1, or several. Fruit superior, either single, with 1 or many cells, or more rarely multiplied, each separate Pericarp being of 1 cell."

No trace of connexion or affinity is discernible between this Class and the preceding, either in characters, habit, or qualities. The present is a great polypetalous hypogynous assemblage, of various discordant tribes
and genera, as the 8th Class is a monopetalous one. The series of Orders is made as natural as circumstances will allow, in this, as in the former, case.

Ord. 61. **Ranunculaceæ.** "Calyx of many leaves, sometimes wanting. Petals usually 5. Stamens indefinite, except in *Myosurus*" (where however they are variable). "Anthers continuous with the Filaments. Germens several, indefinite or definite, rarely but one. Style one to each, rarely wanting, with a solitary Stigma. Capsules, rarely Berries, as many; in some instances single-seeded, and not bursting; in others many-seeded, splitting at the inner edge, half way down, into 2 valves, whose edges bear the Seeds. Embryo minute, in a cavity at the upper part of a large horny Albumen. Stem mostly herbaceous. Leaves alternate, or rarely, in *Clematis* and *Atragene*, opposite; some half sheathing; others compound, either pinnate or digitate; others again simple, and in that case either palmate, or otherwise lobed, their sinuses frequently pale."


Sect 2. Caps. many-seeded, bursting internally. Petals irregular. (What Jussieu here terms Petals, are Nectaries according to Linnaeus, the coloured Calyx of the former being Linnaeus's Petals.) *Trol-
PAPAVERACEÆ. 137

lius, Helleborus, fig. 215, Isopyrum, Nigella, Garidella, Aquilegia, Delphinium and Aconitum.

Sect. 3. Caps. the same. Petals regular. Caltha, fig. 216, Peonia, Xanthorrhiza and Cimicifuga.

Sect. 4. Germen single. Berry of 1 cell, with many Seeds, on a single lateral Receptacle. Actaea, fig. 217, and Podophyllum. Perhaps these, especially the last, might be removed to the next Order.

The Ranunculaceæ have lately been admirably illustrated by Prof. DeCandolle, in his Regni Vegetabilis Systema Naturale, v. 1. 127, both with respect to genera, species and synonyms. This learned writer observes, that the genuine plants of the Order in question have external or dorsal Anthers; the spurious ones, Actaea (which includes Cimicifuga), Xanthorrhiza and Peonia, have interior Anthers, that is, turned towards the Pistils. He reduces Atragene to Clematis; except A. zeylanica, which constitutes a genus, called by him Naravelia, a name of barbarous origin, and it seems better that Atragene should remain to designate this genus.


Sect. 1. Stamens indefinite. Sanguinaria, Arge-
mone, *Papaver*, fig. 218, *Glaucium*, *Chelidonium* and *Bocconia*.

Sect. 2. Stam. definite. *Hypecoum* and *Fumaria*, fig. 38, 39; the latter an anomalous genus, much subdivided by some authors, on account of its diversity of Pericarps.

The Order of *Nymphææ*, established by Mr. Salisbury, see Ord. 22, should be here introduced. An example of it is *Nuphar*, fig. 219.

Ord. 63. *Cruciferae*, fig. 23-30. "Calyx of 4 leaves, generally deciduous. Petals 4, disposed like a cross, whence the name of the Order, alternate with the Calyx-leaves, often furnished with Claws, and inserted into a disk, or glandular Receptacle, under the Germen. Stamens 6, likewise there inserted, tetradymanous, that is, 4 of them larger, in pairs, and 2 smaller solitary and opposite to each other, each individual, or each pair, opposite to a Calyx-leaf. Ger- men simple, standing on the above-mentioned disk, which sometimes swells into glands withinside of the Stamens. Style simple, or wanting. Stigma generally simple. Fruit a long Pod (61:2), or short Pouch (61:2), mostly of 2 cells, and 2 distinct valves, separating lengthwise, parallel to a membranous, thick-edged partition, which sometimes extends like a beak beyond the valves, and bears on both it's edges several, rarely solitary, Seeds. Albumen none. Plants herbaceous, seldom shrubby. Leaves alternate, in *Lunaria* partly opposite. Flowers seldom axillary,
mostly terminal, racemose, or corymbose, sometimes panicled."

This Order, constituting Linnaeus's 15th Class, is so natural in itself, that we can scarcely say whether any real affinity exists between it and any other. Hypericum, in the last, betrays a slight resemblance, rather than a relationship, to this; as Cleome does in the following; but this last genus is incorrectly referred by Linnaeus to his Tetradyname, according to any rule that I can discover.

The genera of Cruciferae, in which Jussieu follows Linnaeus, are among the least satisfactory in either of their systems. Mr. Brown, in Ait. Hort. Kew., ed. 2. v. 4. has greatly improved them, taking into account the position and direction of their Cotyledons, whether spiral, doubled, or flat; incumbent, folded together upon the Embryo, or accumbent, folded contrarilywise, their edges meeting the Embryo. The number of Seeds also lends occasional assistance, in the Siliculosa at least.

In some few instances, 2, or even 4, of the Stamens are wanting.

Crambe, Coronopus, Peltaria, whose Pouch does not burst, Isatis, Vella, Teesdalia Br., fig. 25-27, Iberis, Thlaspi, fig. 23, 24, Lepidium, Farsetia, and Lunaria, are among the best genera in Tetradyname Siliculosa; as are Arabis, Brassica, Sinapis and Raphanus in T. Siliquosa. Mr. Brown's Malcomia appears more satis-
factory than his *Matthiola*, as separated from *Cheiranthus*.

**Ord. 64. Capparides.** "Calyx either of many leaves, or of one leaf in many segments. Petals 4 or 5, mostly alternate therewith. Stamens definite, or more frequently indefinite. Germin simple, often stalked, the stalk sometimes bearing the Stamens, it's base occasionally glandular at one side. Style 1, or more frequently wanting. Stigma solitary. Fruit many-seeded, either a Pod or Berry, of 1 cell, scarcely more. Seeds kidney-shaped, attached to parietal Receptacles. Albumen none. Embryo incurred, the Radicle lying above the Cotyledons. Stem herbaceous, shrubby, or arboresous. Leaves alternate, simple, rarely ternate, or digitate, sometimes furnished at the base with a pair of Stipulas, Prickles, or Glands."

*Cleome*, *Cadaba* Forsk., *Capparis*, fig. 20, *Sodada* Forsk., *Crataeva*, *Morisonia* and *Durio* are Jussieu's genera, to which *Boscia*, Lamarck Illustr. t. 395, is to be added.

The following very miscellaneous assemblage is subjoined, as akin to the true Capparides; *Marcgravia*, *Norantea* Aubl. (*Ascium* Schreb. Gen. 358), *Reseda*, fig. 17, *Drosera* and *Parnassia*.

**Ord. 65. Sapindi.** "Calyx of many leaves, or of 1 leaf, mostly divided. Petals 4 or 5, inserted into a disk under the Germin; either simple and naked, or bearing hairs or glands, sometimes an inner petal, on their disk at the inside. Stamens generally 8, with
distinct Filaments, inserted into the same disk. Ger-
men simple. Styles 1 or 3. Stigmas 1, 2, or 3. Fruit
fleshy, or capsular, of 1, 2, or 3, cells, or as many
prominent lobes, each cell or lobe containing one Seed,
attached to it's inner angle. Albumen none. Radicle
incurved, upon the, often incurved, Cotyledons. Stem
arboreous, or shrubby, rarely herbaceous. Leaves
alternate."

Sect. 1. Petals double. Cardiospermum, Paullinia,
Sapindus, Talisia Aubl. and Aporetica Forst.

Sect. 2. Petals simple. Schmidelia and Ornitrophe
Commers. both perhaps one genus with Aporetica;
Euphoria (Dimocarpus Willden. Sp. Pl. v. 2. 346),
Melicocca, Toulicia Aubl. (Ponea Schreb. Gen. 266),
Trigonis Jacq. with Molinæa and Cossignia Commers.
comprise this section. Many of them require exami-
nation, and some are perhaps not distinct from Cu-
pania, which not being hitherto well understood, is
placed, with Matayba, Enourea and Pekea of Aublet,
very different from it and from each other, in a doubt-
ful Section at the end.

Ord. 66. Acera. "Calyx of 1 leaf. Petals de-
finite, rarely wanting, inserted around a hypogynous
disk. Stamens inserted into the middle of the same
disk, definite, but often not agreeing with the Petals
in number. Germin simple, standing on the disk.
Style and Stigma single, rarely 2. Pericarp of 2 or 3
cells or capsules. Seeds either solitary, or at most
3, in each, attached to the inner angle, some of them
often abortive. Albumen none. Radicle lying on the Cotyledons. Stem arboreous or shrubby. Leaves opposite, without Stipulas. Flowers racemose or corymbose, their Stamens or Pistils often partially imperfect."

*Aesculus*, fig. 12, and *Acer*, fig. 221, are the only genera; with *Hippocratea*, and the obscure *Thryallis* of Linnaeus, judged intermediate between this Order and the next. *Aesculus* is, as Jussieu indeed hints, full as much intermediate between the present and the last.

**Ord. 67. Malpighiæ.** "Calyx in 5 deep segments, permanent. Petals 5, alternate with the Calyx, inserted into a hypogynous disk, by their claws. Stamens 10, inserted into the same part, 5 of them opposite to the Petals, 5 intermediate ones to the Calyx, their Filaments sometimes connected at the base. Anthers roundish. Germin either simple, or 3-lobed. Styles 3. Stigmas 3 or 6. Fruit either of 3 Capsules, or simple with 3 cells. Seeds solitary in each Capsule or cell. Albumen none. Embryo with a straight radicle, the Cotyledons reflexed at their base. Stem shrubby. Leaves opposite, simple, with some traces of Stipulas. Flowerstalks terminal, or more generally axillary, either aggregate and single-flowered, or solitary and many-flowered, either umbellate, spiked, or panicked, each Stalk usually with a joint and 2 small scales about the middle."

*Bannisteria* and *Triopteris* have a tricapsular winged
Fruit; *Malpighia*, fig. 222, a simple Berry, or Drupa, with 3 bony Nuts. *Trigonia* Aubl. and *Erythroxylum* are considered doubtful, as having each a simple Style, and the former a long Capsule of 3 valves, with numerous woolly Seeds; the latter alternate Leaves, double Petals like the *Sapindi*, and a Drupa with 1 Seed, whose Cotyledons are not folded or reflexed at the base.

These ambiguous genera however form no link with the following Order, nor do we perceive a real approach towards that Order, in any characters of the *Malpighia*, though the learned author is commendably solicitous to indicate such, in the opposite Leaves, 3 Styles, and 3-celled Fruit.

**Ord. 68. Hyperica.** “Calyx in 4 or 5 deep segments. Petals as many. Stamens numerous, united at the base into several sets. Anthers roundish. Ger- men simple. Styles several, with as many Stigmas. Fruit generally capsular, the number of it’s cells and valves corresponding with the Styles, the partitions formed of the inflexed edges of the valves. Seeds very minute, attached to a Receptacle in the centre of the Fruit, either simple, or split into as many parts as there are valves. Embryo straight. Albumen none? Stem herbaceous, or more or less woody. Leaves op- posite. Flowers oppositely corymbose, often termi- nal.”

*Ascyrum, Brathys* and *Hypericum*, fig. 48-50, are
all the genera. The latter has often been attempted to be divided, but hitherto not successfully. Brathys is reduced to Hypericum in Sm. Plant. Ic. t. 41. It is scarcely polyadelphous.

Ord. 69. Guttiferae. "Calyx either of a definite number of leaves or of segments, very rarely wanting. Petals definite, frequently 4. Stamens mostly indefinite, their Filaments rarely monadelphous, or polyadelphous. Anthers continuous with the Filaments. Germen simple. Style 1, or none. Stigma simple, or divided. Fruit generally of 1 cell, pulpy or capsular, in some closed, in others opening by valves, and containing 1 or many Seeds, inserted either into the central Receptacle, or into the sides of the Pericarp. Albumen none. Embryo straight, with spongy or callous Cotyledons. Trees or Shrubs, mostly turgid with a resinous juice. Leaves generally opposite, coriaceous, smooth, undivided and entire, with 1 central rib, and many transverse veins. Flowers axillary or terminal, with one or other organ of impregnation sometimes imperfect, so as to become Monoecious or Dioecious."

Sect. 1. Style none. Gambogia, Clusia, Garcinia, Tovomita Aubl., Xanthe Schreb. Gen. 710 (Quapoya Aubl.), and Grias. To which is to be added Xanthochymus, fig. 223, Roxb. Coromand. t. 196.

Sect. 2. Style one. Symphonia Schreb. Gen. 452 (Moronobea Aubl.), Macoubea Aubl., Mammea, Ma-
AURANTIA.

Sect. 3. Genera with alternate Leaves, allied on one hand to this Order, on the other to the following.

Wateria, Vatica, Elieocarpus, and Allophyllus.

A noble and very natural Order, not detected by Linnaeus, connecting the Hypericæ with the Aurantiæ.

Ord. 70. AURANTIA. "Calyx of 1 leaf, often deeply divided. Petals definite, broad at the base, inserted around a hypogynous disk. Stamens inserted into the same disk, mostly definite, either distinct, monadelphous, or polyadelphous. Germin and Style simple. Stigma rarely divided. Fruit mostly pulpy, in some instances capsular, of 1 or many cells, with 1 or 2 seeds in each. Albumen none. Embryo straight, upright. Stem arboreous or shrubby. Leaves alternate, simple, or rarely compound."

Sect. 1. Fruit single-seeded. Leaves without pellucid dots. These are spurious Aurantia. Ximenia, Heisteria, and Fissilia Commerson. The last is well referred to Olax by Vahl, Enum. v. 2. 33.

Sect. 2. Fruit many-seeded, pulpy. Leaves full of resinous pellucid dots. True Aurantia. Bergera, Murræa (which is also Chaleas), Cookia Sonnerat., Citrus, fig. 224, and Limonia; a most natural tribe.

Sect. 3. Fr. many-seeded, capsular. Leaves not dotted. Genera akin to Aurantia, and to the following Order (in our opinion rather nearer to the latter).
Ternstromia (Tonabea Juss. being the same genus), Thea and Camellia. These serve to connect the Aurantia and Melie, without much real affinity perhaps to either. They have some points of relationship to the Malvaceae, Ord. 74; at least to Gordonia and Stuartia.

Ord. 71. Melie. "Calyx of 1 leaf, more or less deeply divided. Petals 4 or 5, with broad claws, generally connected at the base. Stamens definite, as many, or more frequently twice as many; their Filaments united into a tube, or cup, toothed at the summit, each tooth either bearing, or overshadowing, a close-pressed internal Anther. Germin and Style single. Stigma rarely divided. Fruit pulpy, or more frequently capsular, of many cells, with 1 or 2 Seeds in each, the valves as many as the cells, each with a central partition. Stem shrubby or arboreous, with alternate branches. Leaves simple or compound, alternate, without Stipulas."

Sect. 1. Leaves simple. Canella (Winterania Juss.), Symphonia, Tinus, excluding the "Peruvian shrub," which is Strigilia of Cavanilles, Monad. t. 201., Geruma Forsk., Aitonia, Quivisia Commers. Lam. Illustr. t. 302, and Turrcea, fig. 225, see Sm. Plant. Ic. t. 10-12.

Sect. 3. Allied to Meliace.—Swietenia and Cedrela. Leea makes a connecting link with the following Order.

Ord. 72. Vites. "Calyx of 1 leaf, short, nearly entire. Petals definite, 4, 5, or 6, broad at the base. Stamens as many, opposite to the Petals, with separate Filaments, inserted into a hypogynous disk. Germen, Style if present, and Stigma, single. Berry of one or many cells, with one, or a definite number of bony Seeds, whose surface is unequal, and which are attached to the bottom of the fruit. Albumen none. Embryo descending, with straight Cotyledons. Stem shrubby, trailing or climbing, knotty. Leaves alternate, with Stipulas. Tendrils or Flower-stalks opposite to the Leaves."

Cissus and Vitis, fig. 226, are the only genera. Jussieu ingeniously points out an affinity to these in some of the shrubby Gerania, Ord. 73, confirmed by the acidity of the Leaves in some instances. This affinity serves well to introduce the following.

Ord. 73. Gerania. "Calyx simple, of 5 leaves, or in 5 deep segments, permanent. Petals 5" (regular or irregular). "Stamens definite, their filaments connected at the base; some of the Anthers often wanting. Germen single. Style 1. Stigmas 5, oblong. Fruit of 5 cells, or 5 Capsules, each containing 1 or 2 Seeds. Albumen none. Stem slightly shrubby, or herbaceous. Leaves opposite or alternate,
with Stipulas. Flowers opposite to the alternate Leaves, axillary at the opposite ones."

Geranium, fig. 31-35, from which are now so satisfactorily separated Erodium and Pelargonium, fig. 227, composes, with Monsonia, the whole of this Order. Tropaeolum, fig. 228, Impatiens (Balsamina Juss.) and Oxalis are subjoined as related to those genera. In the first I confess myself unable to discern any affinity whatever with them, or to form any idea to what tribe it belongs. Impatiens is surely, as Jussieu hints, p. 237, more akin to his Papaveraceæ, Ord. 62. Oxalis I have long ago, Engl. Bot. t. 762, proposed removing to the Rutaceæ, see Ord. 81.

Ord. 74. Malvaceæ. "Calyx in 5 segments, more or less deep, either simple, or accompanied by an external Calyx, of 1 or many leaves. Petals 5, equal, either distinct and hypogynous, or connected at the base, and united to the lower part of the tube of the Stamens, which are hypogynous, and either definite or indefinite. Their Filaments are either united, almost all the way up, into a tube, closely embracing the Style, and nearly as long, which bears the Petals at it's base, and is laden, at or about the top, with Anthers, each supported by it's own Filament, rarely sessile: or the Filaments are merely combined into a sort of cup, whose segments either all bear one or more Anthers, or some of them are without any. Ger-
solitary, rarely several. Stigmas usually numerous, very rarely indeed solitary. Fruit either of many cells, and many valves, with partitions from the centre of each, or of many Capsules, generally bursting, rarely closed, crowded into an aggregate Fruit, either whorled round the base of the Style, or more rarely forming a head above the Receptacle. Seeds either 1 or more in each cell or Capsule, either inserted into the inner angle, or into the central columnar Receptacle, which connects all the cells or Capsules together. Albumen none. Cotyledons folded, bent over the Radicle. Stem arboresous, or shrubby, or herbaceous.” (Bark with tough fibres.) “Leaves with Stipulas, alternate, mostly simple, occasionally digitate. Flowers axillary or terminal, very rarely with imperfectly separated organs.”

Sect. 1. Stamens united into a tube bearing the Corolla, indefinite. Fruit of many capitate Capsules. *Palava* Cavan. and *Malope*.

Sect. 2. Stam. and Cor. as above. Capsules whorled, or crowded into one orbicular figure. *Malva, Althaea*, fig. 36, 37, *Lavatera, Malachra, Pavonia* Cav., *Urena, Napaea* and *Sida*.


All these Sections compose a very natural assem-
blage of true Malvaceae, or Linnaean Columnieae. The following are more miscellaneous, or uncertain.

Sect. 4. Stam. united into a tube bearing the Corolla, definite. Fruit of many cells. Senra Cav., Fungosa Juss. (Cienfuegosia Cav.), genuine Malvaceae, as likewise appears to be Plagianthus Forst. t. 43. Myrodia Schr. Gen. 472 (Quararibea Aubl.) is suspected to be rather akin to the Melia, especially to Turcica. It has the smell of Melilot when dry.

Sect. 5. Stam. all fertile, definite or indefinite, united at the base into a small sessile cup. Melochia, Ruizia Cav., Stuartia, fig. 51, 52 (including Mala-

chondrum, as well as Stuartia, Juss. 292), Gordonia, Hugonia, Bombax, and Adansonia. To these the 3d Section of the Aurantia, Ord. 70, might perhaps be transferred.

Sect. 6. Stam. united as in the last, partly imperfect; definite, rarely indefinite. Pentapetes, Pterospermum Schr. Gen. 461., Theobroma, Abroma, Bu-
broma Schreb. (Guazuma Juss.), Melhania Forsk., Assonia Schreb. 460. (including Dombeya Cav.) and Biittneria.

Sect. 7. Stam. united into a cup, closely surrounding the Germen, and elevated with it on a stalk; generally definite, and all fertile. Ayenia, Kleinholvia, Helicteres and Sterculia.

Sect. 8. Akin to Malvaceae. Carolinea (Pachira Aubl.).
There is not the slightest relationship between this 74th Order and the four following.

**Ord. 75. Magnolæ.** "Calyx of a definite number of leaves, sometimes with external scales. Petals mostly definite, truly hypogynous;" (inserted into the Receptacle of the Flower, which supports the Germs). "Stamens numerous, distinct, inserted into the same part. Anthers continuous with the Filaments. Germens several, definite or indefinite, on a Common Receptacle. Styles as many, or wanting. Stigmas as many. Capsules or Berries as many, each of 1 cell, with 1 or many Seeds; sometimes coalescing into one fruit. Albumen none." (DeCandolle rightly says fleshy.) "Embryo straight. Stem shrubby or arboreous. Leaves alternate, mostly undivided and entire; each embraced while young by a Stipula sheathing the branch, and rolled up, as in *Ficus*, into a sort of horn, making a terminal bud. Each such Stipula soon falls off, leaving an annular scar. Flowers terminal or axillary." (The Stipulas of *Liriodendrum* are in pairs, and rather more durable.)


DeCandolle, in the same work, 395, establishes
a new Order, by the name of *Dilleniaceae*, composed of *Dillenia*, fig. 230, 231, and *Curatella*, put, with *Ochna* and *Quassia*, at the end of the *Magnoliæ* by Jussieu. This new Order, more approaching the *Ranunculaceæ* in character, though very wide of them in habit, is thus defined.

"Calyx of 5 permanent leaves. Petals 5, deciduous. Stamens indefinite. Anthers continuous, internal or lateral. Germens indefinite, sometimes by abortion or coalition solitary, each with 1 Style or Stigma. Albumen fleshy. Shrubs or trees, with simple, usually alternate, leaves." Hither are referred, besides the two genera above named, *Tetracera* (including Forster's *Euryandra*, *Tigarea* of Aubl. and *Wahlbomia* of Thunb.), *Delima*, *Candollea* Labill., *Pleurandra* Labill., *Hibbertia*, *Wormia*, and several others, whose limits may by some botanists be disputed.

**Ord. 76. ANONÆ.** "Calyx short, 3-lobed, permanent. Petals 6; the 3 outermost resembling an inner Calyx. Stamens numerous, consisting of nearly sessile Anthers, covering a hemispherical Receptacle, each of them nearly quadrangular, broadest at the top. Germens numerous, occupying the centre of the Receptacle, much crowded, hardly to be distinguished from the Anthers, and in a manner covered by them. Styles as many, short, or wanting. Stigmas 1 to each. Berries or Capsules as many, with 1 or more Seeds, and either distinct, with or without a partial stalk to
each from the Common Receptacle, or confluent into a single pulpy Fruit, under whose bark are numerous cells, one for each Seed. Outer Skin of the Seed (62:4) coriaceous; inner membranous, with many inward folds, introduced between the transverse lobes of the large solid Albumen, in which, at the Scar, is lodged the minute Embryo. Stem arboreous or shrubby, alternately branched; the Bark mostly reticulated. Leaves alternate, simple, undivided and entire, without Stipulas. Flowers axillary."

*Anona, Unona, Uvaria, Cananga Aubl., and Xylopia,* are Jussieu's genera. DeCandolle has added several new genera, as well as a multitude of species, with many illustrations. He invents the term *Carpel/a,* Partial Fruits, for the aggregate Pericarps of this tribe.

**Ord. 77. Menisperma.** "Calyx of a definite number of leaves. Petals definite, opposite thereto, sometimes with each a, likewise opposite, internal scale. Stamens definite, as many as the Petals, and opposite to them. Germens several, definite, with each a Style and Stigma. Fruits as many, pulpy or capsular, kidney-shaped, each with 1 Seed of the same shape, several of them, sometimes all but one, abortive. Embryo flat, small, with thin Cotyledons, in the top of a large incurved Albumen. (See below.) Stem shrubby, usually trailing. Leaves alternate," (generally) "simple, without Stipulas. Flowers axillary or terminal, often in spiked or racemose tufts, with
a Bractea to each tuft. Stamens and Pistils generally separated, more or less completely."

_Cissampelos, Menispermum, Leæba Forsk., Epibaterium Forst., and Abuta Aubl._

Prof. DeCandolle has treated of this Order, by the name of _Menispermeæ_, Syst. v. 1. 509, with the following principal characters. "Flowers separated. Calyx-leaves and Petals definite, deciduous. Barren Fl. with usually monadelphous Stamens, opposite to the Petals, and agreeing with them in number, or else numerous, in several rows. Fertile Fl. with a few distinct, rarely combined, Germens. Seeds compressed, generally crescent-shaped. Cotyledons remarkable, in some instances, for being distant, and lodged in 2 different cells of the Seed. Albumen none, or very small." (This agrees with Gærtner's figures and descriptions, better than Jussieu's account, yet they are not irreconcilable.) "Leaves in some genera, once, twice or thrice ternate."


Sect. 2. Leaves simple. _Spiropermum_ Petit-Th., _Cocculus_ DeCand. a genus of 46 species, _Pselium_ Lour., _Cissampelos, Menispermum, Abuta_, and _Agdestis_ of Moç and Sessé Fl. Mex. _Schizandra_ of Michaux stands alone, as of spurious affinity, because of a disagreement in number between the Anthers and integuments of the Flower.

_Ord. 78. Berberides." Calyx of a definite num-


ber of leaves or segments. Petals definite, as many as the Calyx-leaves, and often opposite to them, sometimes simple, sometimes furnished with an internal Petal at the base. Stamens definite, as many as the Petals, and opposite thereto. Anthers united with the Filaments, bursting from the bottom upwards, by a valve at each side. Germen simple. Style 1 or none. Stigma often single. Berry or Capsule of 1 cell, frequently with several Seeds, inserted into the bottom of the cell. Embryo descending, flat, surrounded by a fleshy Albumen. Leaves simple or compound, mostly alternate, with, or more often without, Stipulas.”

*Berberis, Leontice, Epimedium, fig. 234, Rinorea Aubl. and Conoria of the same author, compose this singular Order. Riana Aubl., Corynocarpus Forst., Barreria Schreb. 598 (Poraqueiba Aubl.), Hamamelis, Othera Thunb., and Rapanea Aubl. are subjoined, as more or less allied, though in some instances slightly, to the above.*

**Ord. 79. Tiliaceae.** “Calyx of several leaves or segments. Petals definite, distinct, in Sloanea wanting, alternate with the divisions of the Calyx, and generally as many. Stamens mostly indefinite, and distinct. Germen simple. Style 1, rarely many, or none at all. Stigma simple or divided. Fruit pulpy or capsular, generally of many cells, and as many valves with central partitions. Seeds 1 or more in each cell. Embryo flat, in a fleshy Albumen. Stem
arboreous or shrubby, seldom herbaceous. Leaves alternate, simple, with Stipulas."

Sect. 1. Stamens definite, more or less monadelphous. Doubtful Tiliaceae. Waltheria, Hermannia, and Mahernia. These would surely be better placed with the Malvaceae. The Cotyledons of the two latter agree full as well with them as with Tilia.

Sect. 2. Stam. distinct, mostly indefinite. Fruit of several cells. True Tiliaceae. Antichorus, Corchorus, Heliocarpus, Triumfetta, Sparmannia, Sloanea, Aubletia Schreb. 353 (Apeiba Aubl.), Muntingia, Flacourtia Commers., Oncoba Forsk. Lam. Illust. t.471., Grewia and Tilia, fig. 235. Stuartia is to be excluded; see Ord. 74.

Sect. 3. Akin to Tiliaceae. Fruit of 1 cell. Biva, Laetia and Aublet’s and Schreber’s Banara. The first seems a genuine Tiliacea.

Ord. 80. Cisti. "Calyx in 5 deep segments. Petals 5. Stamens numerous. Germen simple. Style 1. Stigma 1. Capsule either of 1 cell, with 3 valves, or of many cells with many valves, the numerous small Seeds attached to the centre of each, which either projects so as to form a partition, or is merely a longitudinal line. Embryo inclosed in a thin Albumen, it’s Radicle incurred upon the Cotyledons. Stem woody or herbaceous. Leaves mostly opposite, with or without Stipulas. Flowers either spiked, or solitary, or corymbose, somewhat umbellate."

Cistus and Helianthemum, fig. 236, constitute the
genuine plants of this Order, the latter being separated as a genus from Cistus, by Jussieu and others, because the Capsule is supposed to have only 3 valves, and 1 cell, instead of 5 or 10 cells and valves. But H. thymifolium has really 3 cells, and the habit of the plants scarcely warrants such a separation. Helianthemum is inadmissible as a name, being the same in meaning as Helianthus.

The following genera are supposed related to the Cisti, as having a Capsule of 3 valves, into which the Seeds are inserted; but the number of their Stamens is definite. Viola, whose affinity is one of the most puzzling; Piriqueta Aubl., now referred by Schreber, Gen. 327, to Turnera; Piparea Aubl., of which too little is known to afford matter for much conjecture; and Tachibota of the same author (Salmasia Schreb. 201.) scarcely less obscure. Viola is perhaps, like Turnera, more akin to Jussieu’s Ficoidæ, Ord. 87, than to the Cisti.

Ord. 81. Rutaceæ. "Calyx of 1 leaf, often in 5 deep segments. Petals mostly 5, alternate therewith. Stamens definite, distinct, mostly ten, alternately opposite to the Petals and Calyx. Germen simple. Style 1. Stigma single, rarely divided. Fruit of many cells, or many Capsules, usually 5, with one or more Seeds attached to the inner angle. Embryo flat, in a fleshy Albumen. Stem herbaceous, or shrubby, rarely arboreous. Leaves in some alternate, naked;
in others mostly opposite, with Stipulas. Flowers axillary or terminal."

Sect. 1. Leaves with Stipulas, generally opposite. Tribulus, Fagonia, Zygophyllum, and Guaiacum.

Sect. 2. Leaves alternate, without Stipulas. Ruta, Peganum and Dictamnus.

Sect. 3. Genera akin to Rutaceae, Melianthus, Diosma, Empleurum, and Aruba Aubl.

Such is Jussieu's view of this Order, which requires great emendation, and respecting which Mr. Brown has made very important remarks in his Bot. of Terra Australis, 13. Five New Holland genera had indeed previously been added to it, Boronia, fig. 237, 238, Corrœa, Eriostemon, Crowea and Zieria, by the writer of this, who first also referred Melicope of Forster to this family, see Rees's Cyclop. v. 23. Phelalium of Ventenat also belongs to it. To these Mr. Brown adds Pagara, Xanthoxylon, Iambolifera, Calodendrum, Euodia, Pilocarpus, Empleurum, Dictamnus, Cusparia Humb. and Bonpl., Ticorea and Galipea of Aublet, and perhaps the little-known Monnieria, as well as Diosma, from which last he would name the Order in question Diosmeæ; Ruta and Peganum, though admissible into it, not being calculated to give a clear idea of this very natural assemblage. The same learned writer speaks of two other New Holland genera, as belonging to his Diosmeæ, though paradoxical in character. One of them, not yet named,
Caryophylleae.

(Cl. 13.)

Caryophylleae.

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has a Calyx in 10 divisions, 10 Petals, and an indefinite number of perigynous Stamens! Another, Diplolana, found originally by Dampier, and figured in this Voyage, v. 3. 110. t. 3. f. 3, bears a double Involuticum, containing many decandrous flowers, with Stamens and Pistils proper to the Order, but only a few irregularly-placed scales in the place of Perianth and Petals!

Jussieu's first Section undoubtedly constitutes a distinct Order, which Mr. Brown names Zygophylleae. Melianthus, to whatever it may belong, (surely not, as Jussieu hints, to Tropæolum,) has little affinity to Diosmeæ, or Zygophylleæ.

Whether Oxalis may be admitted into the former, as being, in the occasionally lobed Filaments, elastic Arillus, acid flavour, and number of parts, allied to Boronia and Eriostemon, I merely beg leave to suggest, till it can be more decisively placed elsewhere. What has commonly been taken for an elastic Arillus in the Diosmeæ or true Rutaceæ may, as in Eu- phorbiae, be only the inner coat of the Capsule, according to the opinion of Jussieu and Richard.

Ord. 82. Caryophylleæ. "Calyx of 1 leaf, mostly permanent, either tubular, or deeply divided. Petals definite, seldom wanting, alternate with the segments of the Calyx, and equal to them in number, generally with Claws. Stamens definite, sometimes fewer than the Petals, but more frequently the same in number, and alternate therewith, or twice as many,
and alternately inserted upon them or under the Germen, which is always simple. Styles several, rarely solitary, with the same number of Stigmas. Fruit capsular, of 1 or several cells, with numerous Seeds, on a central Receptacle. Embryo incurved, surrounding a farinaceous Albumen. Stem mostly herbaceous. Leaves opposite, combined at the base, or rarely whorled; in a few instances accompanied by Stipulas, but more usually without. Flowers either axillary, or more commonly terminal.”

A large and very natural Order, much more akin, except in having Petals, to some of Jussieu’s earlier Orders, as the Amaranthi, both in habit, nature of the Albumen, and even insertion of Stamens, rightly considered. But the laws of system, with regard to the Corolla, have almost obliged this learned author to place these two families widely apart, which necessity is rendered somewhat less unfortunate, by an agreement, as to the Albumen, with the 1st Order of the next Class. The Caryophyllæae are chiefly of European growth, and their genera have scarcely undergone any controversy, or received any addition or alteration, except Cucubalus, since their establishment by Linnaeus, who first reduced them to any thing like scientific order. Jussieu’s Sections are the following. Number, it must be observed, is often variable in these plants.

Sect. 1. Calyx deeply divided. Stamens 3. Style 1, or more frequently 3. Ortega, Loeflingia, Holo-
Sect. 2. Cal. the same. Stam. 4. Styles 2 or 4. Buffonia and Sagina.

Sect. 3. Cal. the same. Stam. 5 to 8. Styles 2, 3, or 4. Alsine (A. media is a Stellaria. Fl. Brit. 473), Pharmaceum, Moehringia and Elatine.

Sect. 4. Cal. the same. Stam. 10. Styles 3 or 5. Bergia, Spergula, Cerastium, Cherleria, Arenaria and Stellaria, fig. 240. (Arenaria, Alsine and Holosteum vary into each other, except the last may be determined, as I believe, by it's jagged Petals.)

Sect. 5. Cal. tubular. Stam. 10, 5 alternate ones generally attached to the Petals. Styles 2, 3, or 5. Gypsophila, Saponaria, Dianthus, fig. 15, 16, Silene, Cucubalus, Lychnis and Agrostemma.


Sect. 7. Genera akin to Caryophyllaceae. Rotala, Frankenia, fig. 241, Linum and Lechea. The latter may be referred to Sect. 1. Rotala belongs, as Jussieu suspected, to his Salicariae, Ord. 91. Linum is very ambiguous, and it's affinity has not been satisfactorily determined by any botanist. Frankenia bears some relationship to the Ficoideae, Ord. 87.


"Calyx of one leaf, superior or inferior, more or less
deeply divided. Corolla perigynous, that is, inserted into some part of the Calyx, of several Petals, sometimes wanting, more rarely monopetalous, from an union of the Petals into one. Stamens inserted into the Calyx or Corolla, definite or indefinite, for the most part distinct, though sometimes with combined Filaments.Germs superior, single or multiplied, or rarely inferior and simple. Each Germen has one or more Styles, or none at all. Stigma undivided or divided. Fruit sometimes single, whether superior or inferior, of one or many cells; more rarely aggregate, superior, each Pericarp of one cell. Flowers sometimes, by imperfection of organs, separated.

Ord. 83. Sempervivæ. "Calyx inferior, in a definite number of deep segments. Petals definite, as many as the segments of the Calyx, and inserted into its base alternately with them; or more rarely the Corolla is monopetalous, either tubular, or deeply divided. Stamens either as many as the Petals, and alternate with them, or twice as many, inserted alternately into their claws, and into the base of the Calyx. Anthers roundish. Germens several, equal to the Petals in number, united at their base or the inner side, glandular at the outer, the glands sometimes assuming the form of scales. Styles and Stigmas 1 to each Germen. Capsules as many, each of 1 cell, dividing at the inner edge into 2 valves, whose margins bear the numerous Seeds. Embryo incurved, surrounding a
farinaceous Albumen. Stem herbaceous, or somewhat shrubby. Leaves opposite or alternate, succulent.”

_Tillaea, Crassula, Cotyledon, Rhodiola, Sedum, Sedum_, _Sempervivum_, fig. 242, and the variable genus _Septas_, perhaps not distinct from _Crassula_, are all Jussieu’s certain genera; _Penthorum_ being placed at the end, as their ally. This last however is as genuine a specimen of the Order as any of them, the Capsules being only more united into one, opening at the inner margin of each cell, as in the rest, and by no means _circumscissa_, nor bursting all round, as the author, by some accident, has been led to suppose. The Petals are often partly or entirely wanting, in which case the segments of the Calyx become multiplied.

_Ord. 84. Saxifragæ._ “Calyx either superior, or more frequently inferior, in 4 or 5 segments. Petals 4 or 5, rarely wanting, inserted into the upper part of the Calyx, alternate with it’s segments. Stamens as many, or rather twice as many, inserted into the same part. Germen simple. Styles and Stigmas 2. Fruit often capsular, many-seeded, of 1 or 2 cells, opening at the top with 2 valves, whose inflexion forms the partitions. Embryo incurved, surrounding a farinaceous, or somewhat solid, Albumen. Stem usually herbaceous. Leaves alternate, rarely opposite, occasionally rather succulent.”

_Sect. 1._ Fruit superior, capsular, with 2 beaks at the top. _Heuchera, Saxifraga_, fig. 243. _Tiarella_ and
Mitella. The late Mr. Dryander removed Galax hither, from Jussieu's undetermined genera, 420.

Sect. 2. Fruit inferior, capsular or pulpy. Chrysosplenium and Adoxa.

Sect. 3. Genera allied to Saxifragæ. Weinmannia, Cunonia, and Hydrangea.

Mr. Brown proposes a new Order, Bot. of Terra Austr. 16, by the name of Cunoniaceæ, to receive Weinmannia, Cunonia, Ceratopetalum, fig. 244, Calycomis, and Codia, to which Bauera Sm. (Curt. Mag. t. 715) may be referred, but in a separate section.

Ord. 85. CACTI. "Calyx superior, divided at the summit. Petals either definite or indefinite, inserted into the upper part of the Calyx. Stamens definite or indefinite, inserted into the same part. Germen inferior, simple. Style one. Stigma divided. Berry of 1 cell, with many Seeds inserted into its sides. Stem shrubby or arborescent. Leaves alternate, often wanting."


This Order serves as a connecting link between Saxifragæ and Portulaceæ, but the affinity between it's two Sections we must acknowledge to be rather slight.

Ord. 86. PORTULACEÆ. "Calyx inferior, divided at the summit. Corolla of a definite number of Petals, rarely monopetalous or wanting, inserted into the base or middle of the Calyx, mostly alternate with
it's segments, when the number of it's divisions agrees therewith. Stamens definite, or rarely indefinite, inserted into the same part. Germs simple. Styles 1, 2, or 3, rarely wanting. Stigmas often numerous. Capsule of 1 or many cells, each containing 1 or many Seeds. Embryo incurved, surrounding a farinaceous, or somewhat fleshy, Albumen. Herbs or Shrubs of a succulent habit, rarely arboreous. Leaves opposite or alternate, often juicy."

Sect. 1. Fruit of 1 cell. Portulaca, Talinum, Turnera, Bacopa Aubl., Montia, fig. 247, Rokejeka Forsk., Tamarix, Telephium, Corrigiola, Scleranthus, and Gymnocarpus Forsk., which last is certainly a Trianthema.

Sect. 2. Fruit of many cells. Trianthema, Limeum, Claytoria, and Gisekia.

This Order, in having petals, differs from the Polygoneæ, 28, much as the Caryophylleeæ, 82, do from the Amaranthi, 30.

Ord. 87. Ficoideæ. "Calyx inferior or superior, of 1 leaf, in a definite number of segments. Petals mostly indefinite, inserted into the upper part of the Calyx, sometimes wanting, in which case the inside of the latter is coloured. Stamens more than 12, often very numerous, inserted into the same part. Anthers oblong, incumbent. Germs simple. Styles several. Stigmas as many. Capsule or Berry superior or inferior, of as many cells as there are Styles, with numerous Seeds in each, attached to the inner angle of
the cell. Embryo incurved, surrounding a farinaceous Albumen. Stem herbaceous, or slightly shrubby. Leaves opposite or alternate, mostly succulent, very various in shape."


Sect. 2. Germen inferior. *Mesembryanthemum*, fig. 248, and *Tetragonia*.

Ord. 88. **ONAG-RJ.E.** "Calyx superior, of 1 leaf, tubular; its limb divided, either permanent or deciduous. Petals definite, inserted into the upper part of the Calyx, alternate with its segments. Stamens definite, inserted into the same part, either as many, or twice as many, as the Petals, rarely still more numerous. Germen simple. Style mostly solitary. Stigma either deeply divided, or undivided. Fruit capsular or pulpy, inferior, or rarely half-inferior, usually of many cells, with many Seeds in each, rarely of only 1 cell; sometimes crowned with the limb of the Calyx, sometimes naked at the top. Embryo destitute of Albumen. Stem herbaceous or shrubby. Leaves alternate or opposite."


Sect. 2. Style 1. Fruit capsular. Stamens as many as the Petals. *Montinia, Serpicula, Circæa* and *Ludwigia*. 
Sect. 3. Style and Fr. the same. Stamens twice as many as the Petals. *Jussieca, Oenothera, Epilobium*, fig. 249, *Gaura, Cacoucia Aubl., Combretum*, and *Guiera Juss. Lam. Illstr. t. 360.*


Sect. 5. Polyandrous genera, akin to the *Onagreae*. *Mentzelia* and *Loasa*.

Mr. Brown has established an Order, entitled *Haloragae*, Bot. of Terra Austr. 17, out of *Haloragis, Meionectes*, a New Holl. genus, *Proserpinaca, Myriophyllum*, fig. 251, *Serpicula, Gonocarpus, Hippuris*, fig. 252, and *Callitriche*. See Ord. 6, to which several of these, as being supposed monocotyledonous, because they are aquatics, were referred. *Petaloma, Bæckeia, Memecylon and Jambolifera* are indubitably *Myrti*.

*Combretaceæ*, Brown Terra Austr. 16, another new Order, contains *Nyssa, Combretum, Bucida, Terminalia, Cacoucia Aubl., Quisqualis, Getonia Roxb., Gonocarpus*, and a new decandrous genus with a winged fruit, found by the last-named botanist in the East Indies. These are, in many instances, furnished with Petals, and therefore must, in Jussieu's system, stand near the *Onagreae*, though allied to his Ekeagni, and to the *Santalaceæ* of Brown. See Ord. 24. The Ger-
men of the Combretaceae is of one cell, containing from 1 to 4 rudiments of Seeds, pendulous from the top of the cell, only one of which is perfected. Albumen none. Cotyledons leafy, generally involute. Radicle superior. Plumula inconspicuous. Stamens twice as many as the segments of the Calyx, or, if only the same number, alternate therewith.

Ord. 89. Myrti. "Calyx of 1 leaf, pitcher-shaped, or tubular, superior, or rarely only half-superior, either naked or with 2 scales at the base. Petals definite, inserted into the upper part of the Calyx, alternate with its segments, and equal to them in number. Stamens indefinite" (in some definite), "inserted into the same part under the Petals. Anthers small, roundish, curved, bordering the dilated summit of each Filament. Germin simple, inferior, or occasionally half-inferior. Style 1. Stigma single, rarely divided. Fruit a Berry, Drupa, or sometimes a Capsule, of 1 or many cells, with 1 or many Seeds. Embryo straight or incurved, destitute of Albumen. Stem arborescent or shrubby, with usually opposite branches. Leaves mostly opposite and simple, rarely alternate, very often marked with pellucid dots."

Sect. 1. Flowers axillary, either solitary, or on opposite many-flowered stalks. Leaves generally opposite, and dotted. Alangium Lamarck, Dodecas, Melaleuca, fig. 53-56, Leptospermum, Guapurium Juss., Psidium, Myrtus, Eugenia, Caryophyllus (which is an Eugenia), Decumaria, Punica, Philadelphus, Son-
neratia, Fexidia Commers. Lamarck Illust. t. 419, Catinga Aubl. and Eucalyptus, fig. 253, L'Herit. To these are to be added Calyptranthes Swartz Ind. Occ. 917, Bæbecka, to which Mr. Brown refers Jungia of Gaertn. t. 35 (Imbricaria Sm. Tr. of Linn. Soc. v. 3. 257), Fabricia Gært., Memecylon and Jambolifera, as well as Mr. Brown’s new genera from Australasia, Tristania, Calothamnus, Beaufortia Ait. H. Kew. v. 4. 418, Callistemon, Eudesmia Bot. Terr. Austr. t. 3.


The first Section constitutes, for the most part, a very natural family of aromatic and elegant trees or shrubs, in which New Holland is remarkably rich, Mr. Brown having found there considerably above 200 species, nearly 100 of which compose the genus Eucalyptus. Alangium belongs rather to the 2d Section, and Dodecas, as Jussieu suspected, to the Salicariæ, Ord. 91.

Ord. 90. Melastomæ. “Calyx of 1 leaf, tubular, superior or inferior, sometimes surrounded by scales at the base. Petals definite, inserted into the top of the Calyx, alternate with its segments, and equal to them in number. Stamens inserted into the same part, definite, twice as many as the Petals; the apex of each Filament, under the Anther, generally furnished with a pair of bristles, or auricles. Anthers
long, beaked at the point, attached by the base to the very top of each Filament, and in an early stage drooping, from the incurvation of the Filament, but afterwards erect" (large and conspicuous). "Germe either superior, closely covered by the Calyx, or inferior. Style 1. Stigma single. Fruit pulpy, or capsular; if superior, concealed by the narrow-mouthed Calyx; if inferior, becoming confluent with the enlarged or pulpy Calyx; of many cells, with many Seeds in each. Albumen wanting? Stem somewhat arboreous or shrubby, more rarely herbaceous. Leaves opposite, simple, with 3 or more longitudinal ribs. Flowers opposite, axillary or terminal, one or many on a Stalk."


- Sect. 2. Germe superior. Topobea, Tibouchina, Mayeta, and Tococa, all genera of Aublet's, with Osbeckia and Rheavia.

A very handsome Order, mostly remarkable for the size and beauty of the Anthers. Osbeckia has been much increased by the discoveries of Dr. A. Aftzelius at Sierra Leone; see Sm. in Rees's Cyclop. v. 25. The 4 or 5 deciduous teeth of the Calyx, accompanied by intermediate scales, best distinguish this genus from Rheavia, whose teeth are permanent and simple.

Ord. 91. Salicariæ. "Calyx tubular, or pitcher-shaped. Petals definite, inserted into the top of the
Calyx, alternate with its segments, sometimes wanting. Stamens definite, except in *Lagerstromia* and *Munchausia*, as many, or twice as many, as the Petals, inserted into the middle part of the Calyx. Anthers small. Germen simple, superior. Style 1. Stigma often capitate. Capsule surrounded by the Calyx, of 1 or many cells, with many Seeds, inserted into a central Receptacle. Albumen none. Stem shrubby or herbaceous. Leaves opposite or alternate. Flowers axillary or terminal."

Sect. 1. Flowers with several Petals. *Lagerstromia, Munchausia, Pemphis, Ginoria, Grisæa, Lawsonia, Crenea Aubl. and Lythrum*, fig. 255, with *Acisanthera, Parsonia* and *Cuphea* of Browne's Jamaica.

Sect. 2. Flowers often without Petals. *Isnardia, Ammnnia, Glaur*, and *Peplis*, to which *Rotula* is to be added.

**Ord. 92. Rosaceæ.** "Calyx either superior and tubular, or inferior, pitcher-shaped, or wheel-shaped, usually permanent; it's limb generally divided. Petals definite, mostly 5, inserted into the top of the Calyx, alternate with its segments, sometimes wanting. Stamens indefinite, rarely definite, inserted into the same part under the Petals. Anthers often roundish. Germen either simple and inferior, with, for the most part, numerous Styles and Stigmas; or superior, either simple, with 1 Style, or several with as many Styles; the Styles always originating from the side of each Germen. Structure of the Fruit various: in some
an Apple, *Pomum* (61: 5), inferior, and of many cells; or the urn-shaped inferior body of the Calyx is contracted at its mouth over the numerous Seeds; in some the Seeds, or Pericarps of one cell generally single-seeded, whether indefinite or definite, are superior, being placed on a Common Receptacle; in others the Capsule is solitary, superior, of 1 cell, or the Nut, likewise superior, contains 1 or 2 Seeds, and is either naked, or clothed with a” (more or less) “fleshy coat. Scar of the Seed beneath the summit at one side, connected with a cord arising from the base of the Pericarp. Embryo straight, without any Albumen. Stem herbaceous, shrubby, or arboresous. Leaves alternate, simple, or compound, with Stipulas.”

Sect. 1. *Pomaceæ*. Germen single, inferior. Styles several. Apple of several cells, umbilicated with the border of the Calyx. Trees or Shrubs. *Malus, Pyrus,* and *Cydonia* of Tournefort and Jussieu, all included most naturally under *Pyrus* by Linnaeus; *Mespilus*, fig. 18, 19, *Crataegus*, and *Sorbus*.


Sect. 3. *Sanguisorbae*. Germens definite, rarely single, in the pitcher-shaped body of the Calyx, each with 1 Style. Seeds as many. Stem herbaceous in general; some without Petals, some with definite Stamens, some with separated Flowers. *Poterium, San*
guisorba, Ancistrum Forst., which is the same genus with Acæna, Agrimonia, Neurada, probably more akin, as Jussieu thinks, to the Ficoideæ, Ord. 87, Clifforcia, Aphanes, Alchemilla and Sibbaldia, fig. 258.

Sect. 4. Potentillæ. Germens indefinite, truly superior, on a Common Receptacle, each with 1 Style. Seeds as many, naked, or rarely pulpy. Herbs, rarely shrubby. Tormentilla, Potentilla, Fragaria, fig. 259, Comarum, Geum, Dryas and Rubus.

Sect. 5. Spirææ. Germens several, definite, superior, each with 1 Style. Capsules as many, with 1 or more Seeds. Shrubs, rarely Herbs. Spiræa, fig. 260, Suriana and Tetracera (see next Section).

Sect. 6. Prochkeæ. Germen 1, superior, with 1 Style. Fruit of 1 cell, with 1 or many Seeds. Trees or Shrubs, sometimes wanting Petals. Tigarea Aubl., and Délina (these with Tetracera, of which Tigarea is a species, belong to DeCandolle’s Dilleniaceæ, see Ord. 75) Prockia and Hirtella.

Sect. 7. Amygdaleæ. Germen 1, superior, with 1 Style. Nut with 1 or 2 Seeds, naked, or more frequently drupaceous. Trees and Shrubs. Hedycreæ Schreb. 160 (Licania Aubl.), Grangeria Commers. Lamarck Illustr. t. 427, Chrysobalanus, Prunus, fig. 261 (from which Jussieu, like Tournefort, divides Cerasus and Armeniaca), Amygdalus, Moquilea Aubl., Couepia Aubl., Acia Schreb. 458 (Acioa Aubl.), and Petrocarya Schreb. 245 (Parinarium Aubl.).

Sect. 8. Genera allied to Rosacesæ. Plinia, Ca-
lycanthus, Luidia, Commers. Lamarck Illustr. t. 466
Blackwellia Commers. Lam. t. 412, Homalium, and
Napimoga Aubl. (The three last are probably one genus, to which the name of Homalium must belong.)

To the 5th Section of Rosaceæ are to be added
Prof. DeCandolle’s Kerria and Purshia, Tr. of Linn Soc. v. 12. 152. The former is that elegant Japanese shrub, commonly called Corchorus japonicus; which is also Rubus japonicus of Linnaeus. The latter is Tigarea tridentata, Pursh N. Amer. 333. t. 15, very distinct from the real Tigarea, which is, as above said, a Tetracera.

A new Section must, it seems, be made to admit the Cephalotus of Labillardiere, Nov. Holl. v. 2. 7. t. 145, so admirably illustrated by Mr. Brown and Mr. Bauer, Bot. of Terra Austr. 68. t. 4. This has a coloured Calyx, in 6 segments, whose aestivation is valvular; no Petals. Twelve Stamens, inserted into the Calyx. Anthers glandular at the back. Six distinct Germens, with terminal Styles, and solitary erect Seeds. The great peculiarity of the herb consists in its large radical water-pitchers, interspersed among the Leaves, each closed by a lid, as in Nepenthes.

Ord. 93. Leguminosæ, fig. 40-47, and 262, 268.
"Calyx of 1 leaf, fig. 43, variously divided. Corolla polypetalous, very rarely monopetalous, or wanting, inserted into the upper part of the Calyx, below its segments. Petals 5, sometimes fewer, either regular and nearly equal; or more commonly 4, irregular
butterfly-shaped, whence the flower in question is termed papilionaceous; the uppermost and exterior Petal being termed the Standard (Vexillum, fig. 44), which half embraces the rest, and is in general the largest of all; the 2 lateral ones are called wings (Alæ, fig. 45); the lowermost the Keel (Carina, fig. 46), which is sometimes divided, or composed of 2 equal Petals. Stamens 10, fig. 40-42, rarely fewer or more, inserted into the Calyx beneath the Petals, their Filaments either quite distinct, fig. 262, or combined slightly at the very base only, or more frequently diadelphous, fig. 263, 9 of them being united into a tube, cloven lengthwise under the Standard, to whose fissure the tenth is closely applied; or sometimes the 10 are all united into 1 undivided tube, so as to be really monadelphous, fig. 41. Anthers distinct, generally roundish and small; sometimes oblong and incumbent. Germen, fig. 47, simple, superior” (often stalked). “Style 1. Stigma 1. Fruit in a few instances capsular, of 11 cell, and generally 1 Seed, either of 2 valves, or none at all; in the greater number leguminous, whence the name of the Order, elongated, of 2 valves, of 3 in Moringa, and of 4 in a few of the Mimosa tribe” (Schrankia, Willd. Sp. Pl. v. 4. 1041); “sometimes of 1 cell, with 1 or more Seeds; sometimes of many cells, divided by transverse partitions, the single-seeded cells being occasionally pulpy. The Seeds are inserted into one of the lateral sutures. In those with polypetalous irregular Flowers, the Radicle is bent
over the Cotyledons, without any separate Albumen; in those with regular ones, the Embryo is enfolded in a thickish membranous Albumen, and the Radicle is straight. The Cotyledons usually rise in the form of seminal leaves, like the generality of dicotyledonous plants; sometimes they remain below, distinct from the first Leaves. Stem, herbaceous, shrubby, or arboreous, for the most part alternately branched. Leaves with Stipulas, alternate, in a very few imperfectly opposite, sometimes simple, more generally ternate, or digitate, or once or repeatedly pinnate. Inflorescence various."

Such are the marks of this great natural Order, which has no relationship at all to the last, in characters or properties, as far as I can perceive, though Jussieu hints at an affinity between those with regular Flowers, and some of the monogynous Rosaceae. The difficulties attending the papilionaceous tribe, with respect to their being referred to the Linnaean class Diadelphia, have already been explained, p. 48. Jussieu's Sections labour under the very same exceptions.


Sect. 2. Cor. regular. Legume of 1 cell and 2

Sect. 3. Cor. slightly irregular. Stamens distinct, or only connected at the bottom. Legume of 1 cell and 2 valves. Trees or Shrubs, with abruptly-pinnate Leaves, sometimes only either conjugate, or simple. *Dipteryx* Schreb. 485 (*Taralea* Aubl.), *Dimorpha* Schreb. 493 (*Paricoa* Aubl.), *Vouapa* Aubl. (united with *Outea* by Schreber, under his *Macrolobium*, see Sect. 1.), *Cynometra, Hymenæa, Bauhinia*, and *Ginannia* Schreb. 271 (*Palovea* Aubl.).

Sect. 4. Cor. irregular, papilionaceous (sometimes incomplete). Stam. distinct, or rarely combined at the base. Legume of 1 cell and 2 valves. Trees or Shrubs. Leaves simple, or ternate, or pinnate with an odd leaflet. *Cercis, Rittera* Schreb. 364 (*Possira* Aubl.), *Anagyris, Sophora, Mullera*, and *Couplandia* Aubl. This Section has received a great addition of new genera, not only by the unavoidable subdivision of *Sophora*, from which *Edwardsia, Ormosia, Thermopsis* Br., *Virgilia* Lamarck, *Cyclopia* and *Baptisia* Ventenat, and *Podalyria* Lamarck, have been taken; but still more by the discovery of many, previously entirely undescribed, in New Holland. Of these *Pultenæa, Aotus, Gompholobium, Chorizema* Labill., Da-
biesia, Viminaria, fig. 262, Sphærolobium, Dillwynia, and Mirbelia (the last having a Legume divided lengthwise, by the inflexion of its valves), were first defined in Sims and Kon. Ann. of Bot. v. 1. Mr. Brown has added the following, in Ait. Hort. Kew. ed. 2. v. 3. Podolobium, Oxylobium, Brachysenna, Burtonia, Jacksonia, Eutaxia, Sclerothamnus, Gastrolobium, and Euchilus.

Sect. 5. Cor. papilionaceous. Stam. 10, diadelphous (more or less correctly, as already mentioned). Legume of 1 cell and 2 valves. Shrubs or Herbs. With simple or ternate, rarely digitate, sometimes pinnate, Leaves. Stipulas more or less evident, united or not to each Footstalk. Ulex, fig. 41, Aspalathus, Bourbonia, Liparia, Genista (including Spartium, fig. 40), Cytisus, Crotalaria, Lupinus, Ononis, Arachis, Anthyllis, Dalea, Psoralea, Trifolium, Melilotus Tourn., Medicago, Trigonella, Lotus, Dolichos, Phaseolus, Erythrina, Clitoria, and Glycine. This Section has also received additions from New Holland, Platyllobium, Bossæa, Hovea Br., Callistachya Venten., Scottia Br., Templetonia Br., Kennedia Venten., Goodia Salisb., and Lodigesia Sims; as well as from the Cape of Good Hope, Lebeckia, Wiborgia, Oedmannia, Rafaia, Hypocalyptus, Sarcophyllus, and Hallia Thunb.; also from the East Indies Butea and Flemingia of Roxburgh.

Sect. 6. Cor. Stam. and Legume as the last. Herbs, Shrubs, or Trees. Leaves pinnate with an odd one.
(Astragalus and Biserrula have a Legume of 2 cells.)

—Abrus, Amorpha, Piscidia, Robinia, Caragana Van Royen, Astragalus, fig. 263, Biserrula, Phaca, Co-lutea, Glycyrrhiza, Galega, and Indigofera.—To these Swainsonia Salisb., Sutherlandia Br., and Lessertia DeCand. may be added.

Sect. 7. Cor. Stam. and Legume as the last. Herbs. Leaves pinnate, or conjugate, rarely obliterated; their common Footstalk ending in a Tendril or Bristle. Stipulas distinct from that Stalk. Lathyrus, Pisum, fig. 42-47, Orobus, Vicia, Faba Tourn., Ervum and Cicer.

Sect. 8. Cor. and Stam. the same. Legume of single-seeded joints. Herbs or Shrubs, rarely Trees. Leaves simple or ternate, or more frequently pinnate with an odd one. Stipulas distinct from the Footstalk. Scorpiurus, Ornithopus, Hippocrepis, Coronilla, Hedysarum, Aeschynomene, with Diphsya Jacq., to which may be added Smithia, Dryand. in Ait. Hort. Kew.

Sect. 9. Cor. the same. Stam. mostly 10, diadel-phous. Legume capsular, often not bursting, of 1 cell, and usually 1 Seed. Trees or Shrubs. Leaves generally pinnate with an odd leaflet. Stipulas distinct from the Footstalk, soon deciduous. Dalbergia, Amerimnon Browne, Galedupa Lamarck (Pungamia Lam. Illustr. t. 603), Andira Lam., Geoffroea, Deguelia Aubl., Nissolia, Dipteryx Schreb. 485 (Cou-marouna Aubl.), Acouroa Aubl., and Pterocarpus.
Sect. 10. Cor. irregular, sometimes wanting. Stam. 10, distinct. Legume capsular, generally not bursting, of 1 cell, and mostly 1 Seed. Trees or Shrubs. Leaves either pinnate with an odd one, or simple. Stipulas like the last. *Crudia* Schreb. 282 (*Apalatoa* Aubl.), *Detarium* Juss., *Copaifera* and *Myroxylum* (*Myrospermum* Jacq.).

Sect. 11. Four Genera akin to *Leguminosae*. *Securidaca*, which might be removed to the 9th, and *Brownnea* to the 2nd Section. *Zygia* Browne, an obscure plant of the *Mimosa* family, and *Aruna* Schreb. 26 (*Arona* Aubl.).

Mr. Brown has well divided the *Leguminosae* into 3 Orders, *Mimosae*, *Lomentaceae*, and *Papilionaceae*. Bot. of Terra Austr. 19.

*Ord. 94. Terebintaceae.* "Calyx of 1 leaf, inferior, in a definite number of segments. Petals definite, rarely wanting, inserted into the bottom of the Calyx, as many as its segments, and alternate therewith. Stamens as many, alternate with the Petals, or twice as many, inserted into the same spot. Germens either single, or of a determinate number: in the former case there is either 1 Style, rarely wanting, with a simple or divided Stigma; or many Styles with as many Stigmas; and a capsular, sometimes pulpy, or drupaceous, Fruit, of one or many single-seeded cells: in those with several Germens, there are as many single Styles and Stigmas; with the same number of distinct single-seeded Capsules. Seeds
generally lodged in a bony Nut. Albumen none. Radicle lateral, reflexed upon the Cotyledons. Stem arboreous or shrubby. Leaves alternate, without Stipulas, either simple, or ternate, or pinnate with an odd leaflet."

Sect. 1. Germen 1. Fruit of 1 cell, with 1 Seed. *Anacardium* (Cassuevium Rumph. and Juss.), *Semecarpus*, fig. 264 (*Anacardium Juss.*), *Mangifera, Conna-rus, Rhus*, and *Robergia Schreb. 309 (Rourea Aubl.*). *Anacardium*, *Juss.)*, *Mangifera, Conna-rus*, *Rhus*, and *Robergia Schreb. 309 (Rourea Aubl.*).

Sect. 2. Germen 1. Fruit of many cells, some of which are sometimes abortive. *Cneorum, Rumphia, Comocladia, Canarium, Icica Aubl., Amyris, Scopolia Sm., Schinus, Spathelia, Pistacia (Terebinthus Tourn. and Juss.), Bursera, Toluifera, Jonquetia Schreb. (Tapiria Aubl.), Poupartia Commers. (Mangiferapinnata Linn. Suppl. 156.), and Spondias*.

Sect. 3. Germens several. Fruit of several single-seeded Capsules. *Zwingera Schreb. 802 (Simaba Aubl.), Aylanthus Desfont., and Brucea.*

Sect. 4. Genera akin to Terebintaceae, differing in having a fleshy Albumen, which approaches them to the Rhamni. *Cnestis Juss. Lam. Illustr. t. 387.; Fagara and Xanthoxylum (genuine Rutacea, see Ord. 81.); and Ptelea.*

Sect. 5. Genera akin to Terebintaceae, destitute of a fleshy Albumen. *Dodonea, Averrhoa, Juglans* (all surely very remotely allied to this order, or to each other!).
Ord. 95. *Rhamni.* "Calyx inferior, of one leaf, definitely divided at the border. Petals 6, rarely 4 or 6, very rarely wanting, inserted either into the upper part of the Calyx, or into it's disk, alternate with the segments and equal to them in number, sometimes resembling scales, and furnished with claws, sometimes dilated and joined at the base. Stamens as many, inserted into the same part, either alternate with, or opposite to, the Petals. Germin superior, encompassed with the glandular disk of the Calyx. Style 1, or several. Stigma 1 or more. Fruit either pulpy, of many cells, or with many Nuts, each cell or Nut containing 1 Seed; or capsular, of many cells and many valves, with central partitions, each cell having 1 or 2 Seeds. Embryo flat and straight, lodged in a fleshy Albumen. Stem arboreous or shrubby. Leaves alternate or opposite, with, often very minute, Stipulas."


Sect. 2. Stam. as above. Fruit pulpy. *Myginda, Glossopetalum* Schr. 205 (*Goupia* Aubl.), *Rubentia Commers., Cassine, Ilex* and *Prinos.* (*Schrebera* of Linnaeus, placed here, is an error, the plant described being a *Cuscuta* on a *Myrica*!)

The greater part of these 2 Sections composes Mr. Brown's new Order of *Celastrinae,* Bot. of Terra
Austr. 22. The Aestivation of their Calyx is imbricated. Seeds tunicated.


These 2 last Sections chiefly contain Mr. Brown's true *Rhamnææ*, the Aestivation of whose Calyx is valvular, and it's tube coheres more or less with the Germs. He admits here *Rhamnus*, *Ziziphus*, *Paliurus*, *Ceanothus*, (from which last, as he justly says, *Pomaderris* is hardly distinct,) *Colletia*, *Cryptandra* Sm., *Phylica*, *Gouania*, *Ventilago* Gaertn., and probably *Hovenia*.

Another Order of Mr. Brown's, named *Buttneriaceæ*, Bot. of Terra Austr. 8, is allied on one hand to *Rhamnææ*, on the other to *Malvaceæ*. To this belong *Abroma*, *Commersonia*, *Lasiopetalum*, fig. 267, and several unpublished genera.

Sect. 5. Akin to *Rhamni*, generally with a superior Germs. *Brunia*, and Thunberg's *Bumalda*.

Class 15. Dicotyledones, without Petals.

Stamens separated; that is, in a different Flower from the Pistils.

"Flowers either monoecious (65) or dioecious, or very rarely united. Calyx in each of one leaf, or a scale in it's stead. Corolla none, but sometimes there are scales, or inner segments of the Calyx, assuming the appearance of Petals. The Barren Flowers have Stamens inserted into some part of the Calyx, or of the Scale supplying it's place, definite, or more rarely indefinite, their Filaments either distinct, or sometimes united into a stalk proceeding from the centre of the Calyx. Germen of the Fertile ones simple, or sometimes several, superior, or rarely inferior. Style 1, or more, or occasionally wanting. Stigma simple or divided. Fruit various in structure, as well as in the number of it's cells."

Ord. 96. Euphorblæ. "Flowers monoecious or dioecious, rarely united. Calyx of each tubular, or deeply divided, single or double, the inner segments sometimes assuming the aspect of Petals, nor are there any other. Barren Flowers with Stamens definite or indefinite, their Filaments inserted into the centre of the Calyx, separate or combined, sometimes branch-ed, sometimes jointed. In some instances there are chaffy scales interspersed between the Stamens. Fertile Flowers with 1 Germen, which is superior, either
sessile or stalked. Some have several Styles, often 3, and a Capsule with as many cells, with 1 or 2 Seeds in each: others have only 1 Style, with 3 or more Stigmas, and a Fruit of a corresponding number of cells, each containing 1 or 2 Seeds. The cells are each lined with 2 elastic valves; the Seeds half-tunicated, attached to the upper part of a permanent central column. Embryo flat, inclosed in a fleshy Albumen. Plants herbaceous, shrubby, or arborescent; some milky. Leaves alternate or opposite, rarely wanting, either with or without Stipulas.


Sect. 2. Style solitary. *Tragia*, *Stillingia*, *Sapium* Browne, *Hippomane*, *Aegopron* (Maprounea Aubl.), *Secchium* Browne, *Hura*, *Omphalea*, *Phukenetia* (which has certainly Stipulas), and *Dalechampia*.

Jussieus has hinted an ingenious idea respecting the genus *Euphorbia*, which Mr. Brown, Bot. of Terra Austr. 24, has fully developed, that the Flowers, even in this instance, are monoecious. The Calyx and Petals of Linnaeus are considered by these writers as an Involucrum, containing several Barren Flowers,
around a solitary fertile one. But Mr. Brown alone has asserted each of the former to consist of a mere Stamen, articulated with the partial Stalk of this simplest of all Flowers, there being no Corolla nor Perianth, the Scales at the base being rather of the nature of Bracteas. The Fertile Flower in the centre is, in like manner, a naked Pistil, whose Germen is sessile on a similar Stalk. If conviction were wanting, this opinion is proved by an unpublished genus, whose several Flowers have each a lobed Perianth at the articulation above mentioned.

Ord. 97. Cucurbitaceæ. "Flowers monoecious, rarely dioecious, or still more rarely, in Gronovia and Melothria, united. Calyx (Corolla Tourn. and Linn.) superior, contracted just above the Germen, then dilated, five-cleft, often coloured, withering, slow in falling, furnished externally at the base with 5 green appendages (Calyx Tourn. and Linn.) resembling outer segments of the Calyx, and falling with it. Corolla" (according to Jussieu) "none. Barren Flowers with usually five, sometimes distinct, and sometimes variously combined, Filaments and Anthers; the former inserted into the contracted part of the Calyx; the latter of 1 cell, oblong, attached to the tops of the Filaments, and often forming a doubly curved line, 4 of them being combined in pairs, the fifth solitary. There is an imperfect or abortive Germen. Fertile Flowers with imperfect Stamens, or none at all. Germen inferior. Style 1, rarely more."
Stigmas generally several. Fruit a Berry, with usually a solid coat, of 1 cell, with 1 or numerous Seeds, or of several many-seeded cells. Seeds cartilaginous or crustaceous, inserted into lateral, or cortical, Receptacles. Embryo flat, without Albumen. Root mostly tuberous. Stem herbaceous, trailing, or climbing. Leaves alternate, simple, heart-shaped or palmate, rarely digitate” (or very deeply lobed), “often harsh with callous points. Tendrils axillary. Flowerstalks axillary, simple or many-flowered.”


Sect. 2. Style 1. Fr. of 1 cell, with many Seeds. Bryonia, fig. 270, and Elaterium.


Sect. 4. Styles several. Doubtful Cucurbitaceae. Feuillea and Zanonia.

Sect. 5. Genera akin to Cucurbitaceae, but especially different in having a superior Germen. Passiflora, fig. 271, from which Jussieu separates, surely without sufficient grounds, Murucuia and Tacsonia, (the latter distinguished by its tubular Calyx, which serves at least to show that this Order has a real Calyx and Corolla,) and Carica (Papaya Juss.).

The Modecca (a barbarous name) of Rheede Hort. Malab. v. 8. t. 20-23, mentioned by Jussieu under
Passiflora, is doubtless a very distinct genus, with a coloured, bell-shaped Calyx, and fringed, deeply 5-cleft, Corolla. I would call it Blepharanthes, to preserve an analogy with Trichosanthes. A species of this genus, brought by Dr. Afzelius from Sierra Leone, flowered, many years since, in Sir Abraham Hume's stove, and I believe is still growing there. Zucca of Commerson likewise appears to be a distinct genus, which cannot be settled for want of the Fruit.

Ord. 98. Urticae. "Flowers monoecious or dioecious, rarely united. Calyx, in every instance, of 1 leaf, divided. Corolla none. Barren Flowers with definite Stamens, inserted into the lower part of the Calyx, opposite to its segments. Fertile Flowers with a single superior Germen. Style either wanting, or 1 or 2, often lateral. Stigmas often 2. Seed 1, inclosed either in a brittle crust, or a tunic, either naked, or covered with the sometimes pulpy Calyx. Embryo straight or incurved, destitute of Albumen. Trees, Shrubs, or Herbs, sometimes milky. Leaves alternate or opposite, generally with Stipulas. Flowers either solitary, racemose, or assembled many together on a catkin-like Receptacle, or concealed more or less in a single-leaved common Involucrum. Fruit sometimes many-seeded, from the assemblage of numerous Seeds in one aggregate, or confluent, Involucrum or Receptacle."

Sect. 1. Flowers concealed in a Common Involu-
Sect. 2. Flowers either on a many-flowered common Receptacle, or capitate and accompanied by involucral scales, or distinct and scattered. Cecropia, Artocarpus, Morus, Elatostema Forst., Boehmeria Jacq. (Caturus Linn.), Procris Commers. Lam. Illustr. t. 763, Urtica, fig. 273, Forskalea, Parietaria, Pteranthus Forsk. (Louichea Schreb. 840.), Humulus, fig. 274, Cannabis, and Thelygonum. To these are to be added Brosimum, Swartz Ind. Occ. 15. t. 1, Antiaris, Br. Bot. of Terra Austr. 70. t. 5, and Olmeda, Fl. Peruv. 118.

Sect. 3. Genera allied to Urticeae. Gunnera, Misandra Commers. perhaps the same genus, Piper, Gnetum (including Thoa, see Sm. in Rees’s Cycl. v. 16), Bagassa Aubl., Coussapoa Aubl., and Pourouma Aubl., the 3 last very imperfectly known.

Ord. 99. AMENTACEÆ. "Flowers monoecious or dioecious, rarely united, all destitute of Petals. Barren ones disposed in a Catkin, furnished with scales, which, if there be no other Calyx, bear the Stamens; or, otherwise, are each accompanied by a single-leaved Calyx, fig. 89, into which the Stamens are inserted. Stamens definite or indefinite, with distinct Filaments. Fertile Flowers either in Catkins, or fasciculated, or solitary, each furnished either with a single-leaved Calyx, fig. 82-84, or only with a scale. Germen su-
Coniferæ.

Sect. 1. Flowers (imperfectly) united. Fothergilla, Ulmus, and Celtis.

Sect. 2. Fl. dioecious. Salix, fig. 85-87, Populus, fig. 88-91, and Myrica.


Between this Order and the following may be introduced the Casuarineæ, founded by Mirbel, and adopted by Mr. Brown, Bot. of Terra Austr. 39, solely for the New Holland genus Casuarina.

Ord. 100. Coniferæ. "Flowers monoecious or dioecious. Barren ones mostly amentaceous, or collected into a Catkin, each furnished with a Scale, and sometimes also a Calyx, either the Calyx or the Scale bearing the Stamens, which are either definite or indefinite; their Filaments either distinct, or united into a simple or branched stalk. Fertile Flowers either solitary, or capitate, or disposed in a Cone, Strobilus
(61:7), formed of densely imbricated scales separating the Flowers, and each performing the office of a Calyx. Germen superior, conical, sometimes 2 or more, with as many Styles and Stigmas. Seeds, or single-seeded Capsules, as many as the Germens. Embryo cylindrical, in the centre of a fleshy Albumen, the 2 Cotyledons either undivided, or sometimes cloven, as if palmate, into numerous segments, appearing, in Pinus, as if there were many distinct Cotyledons (89). Stem arboreous or shrubby."

Sect. 1. Calyx bearing the Stamens. Ephedra, Casuarina (see above), and Taxus, fig. 275.

Sect. 2. Calyx wanting. Scales bearing the Stamens. True Coniferæ. Juniperus, Cupressus, Thuya, Dombeya Schreb. 704 (Araucaria Juss.), Pinus, fig. 276, and Abies (the last including Abies and Larix of Tournefort).

To these are to be added Agathis, Salisb. Tr. of Linn. Soc. v. 8. 311, Podocarpus L'Herit., Dacrydium Soland. fig. 277, and Callitris Venten. Dec. Gen. Nov. 10.

The structure of the Pistil of Coniferæ, long misunderstood, has been explained by Mirbel, Schoubert, and Brown. These writers describe a covering, termed by them Cupula, but which Linnaeus would probably have called Nectarium, closely investing the Germen, and, in most cases, the Stigma also. This becoming pulpy, forms the red half-drupe of Taxus; and is double in Podocarpus and Dacrydium,
according to Mr. Brown, as well as remarkably inverted, having the aperture near the base. The outermost of these coverings is probably a real Calyx, as appears by the figure of Dacrydium in Lambert's Pinus, t. 41.

The above general view of this celebrated System will be sufficient for any attentive student to enable him to apply it to practice, and even to correct it, or to make additions, by means of new discoveries. The Plantæ incertæ sedis, or Genera which the author could not, at the time he published his work, reduce to any of his Orders, are artificially classed, at the end, by their Petals, situation of the Germin, and number of the Styles and Stamens. These genera amount to 137; but many of them have since been better understood by the author himself, or have been elucidated by others; and several will be found, in the foregoing exposition, either referred to other genera, previously known, or classed with some of their allies. The observations of the distinguished Gärnner, on Fruits and Seeds, in his well-known work on that subject, have conduced greatly to the improvement of Jussieu's system, both in principle and detail; and it's illustrious author has profited by those observations, in several treatises upon different Orders or families, in the Annales du Museum d'Hist. Nat., some of which have been translated by Mr. König, in
EMENDATIONS OF JUSSIEU.

To have undertaken to digest all these improvements, and to have attempted to elucidate them by all that has been done by others, as Wentenat, Salisbury, Link, and especially by Mr. Brown and Prof. DeCandolle, would have been quite beyond the scope of the present publication. Such a task indeed could be undertaken by Jussieu himself alone, who has now for 30 years bent all his attention to the subject, with a view to a new edition of his immortal work, but has not been able to complete his scheme.

Meanwhile DeCandolle, in his Théorie Elémentaire de la Botanique, published in 1813, p. 213, has proposed a sketch of Jussieu's System, with many of the above additions, insomuch that the original 100 Orders are here augmented to 145. The series in which they are disposed by their Cotyledons is given, as avowedly artificial. The terminations of the names of the Orders, which are French, are according to the more recent plan of Jussieu and his followers. For instance, Convolvulacées, Convolvulaceae, and Cistinées, Cistineae, instead of Convolvuli and Cisti. But as this scheme of nomenclature is scarcely yet settled, and may again be altered, I have rather chosen to retain the original terminations, till Jussieu, by a new edition, has established one or the other, according to an uniform plan.

The question of the natural or artificial character of Jussieu's System has been ably discussed by the
celebrated Mr. Roscoe, in Tr. of Linn. Soc. v. 11. 65, who, in showing that this method involves several as unnatural assemblages as the professedly artificial system of Linnaeus, contends, that little is to be gained by its adoption, with respect to a conformity to nature. Every one must also perceive, that no use can be made of any such system, in the practical or analytical examination of plants. Natural Orders indeed must, in future, be studied by all who deeply contemplate the Vegetable Kingdom, and some links of connexion, or points of discrimination, cannot but be kept in view between them. We require a cabinet, as it were, with cells or drawers, where we may find each Order as we want it; and Jussieu's classification, with all it's unavoidable imperfections, goes much beyond any system previously invented, in the natural assemblages which it produces. Nevertheless, Linnaeus has truly observed that Natural Orders are related to each other by so many points, that they rather resemble a geographical map, than a continued series; which he has attempted to illustrate by example, in his Praelectiones published by Giseke. There remains therefore, in the study of natural classification, only a choice of difficulties; and while we labour to bring plants together, as naturally as possible, in groups or families, for their mutual illustration, we must perpetually relax or vary those general ties, of which we can, as yet, obtain but very confined and imperfect views. Hence therefore I am
almost inclined to revert to the idea of Linnaeus, that
we are not competent to define technically any na-
tural orders, without so many, and such paradoxical,
exceptions, as to destroy all consistency. The labours
of his successors too often illustrate and confirm this
opinion, by their failure in the details of the subject.
The learned and candid DeCandolle, (who first has
claimed, from the botanists of his own school, the
honours due to Linnaeus, relative to the principles of
natural arrangement, *Théorie Elém*. p. 60 &c.,) though
he has successfully defined several Orders, is obliged
to have recourse to an artificial distribution of them,
which I have mentioned above, and to which the fol-
lowing is the key.

<table>
<thead>
<tr>
<th>Class</th>
<th>1. Dicotyledonous. Corolla polypetalous, hypogynous.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Corolla polypetalous, hypogynous.</td>
</tr>
<tr>
<td></td>
<td>3. Corolla monopetalous, perigynous.</td>
</tr>
<tr>
<td></td>
<td>5. Flowers apetalous, or with one integument only.</td>
</tr>
<tr>
<td></td>
<td>7. Flowers phanogamous.</td>
</tr>
</tbody>
</table>
|       | 8. Acotyledonous. Leafy, and with Organs of impreg-
|       | nation.                                            |
|       | 9. Without leaves, or any known Organs of impreg-
|       | nation.                                            |

The able author proposes this method, as less at
variance, than any other, with natural affinities, but
still as serving merely for convenience, nor does he
attach to it any further importance.
The *Genera Plantarum* of Jussieu, with all his characters and remarks, have been translated into French by Ventenat, who has interspersed several additional observations. His work makes four octavo volumes, the first containing a dictionary of Botany. The last, besides a general analytical table, is enriched with plates of the fructification of every one of Jussieu’s Orders, drawn by the masterly hand of Redouté. For such a purpose, however, the very best figures are hardly sufficient. Nothing is so instructive as Nature herself; and the student who has made sufficient progress in Botany to understand the foregoing explanations of Jussieu’s System, will be at no loss to procure examples, of the greater part of his Orders at least, by the dissection and comparison of whose structure he will gradually become familiarized with the subject, though its details are inexhaustible.
CHAPTER IX.

COMPARISON OF THE NATURAL ORDERS OF LINNÆUS WITH THOSE OF JUSSIEU.

The present publication would be incomplete without some account of the Fragments of a Natural Method, as Linnaeus terms his performance, subjoined by this great botanist to the 6th edition of his *Genera Plantarum*, an ample commentary upon which, collected partly from his lectures on this particular subject, was published at Hamburgh in 1792, by Prof. Giseke, under the title of *Prælectiones in Ordines Naturales Plantarum*.

An exposition of these Linnæan Orders, which amount to 58, is before the publick in the 2d volume of the Supplement to the *Encyclopædia Britannica*, published at Edinburgh, in which I have extracted what appeared to me most valuable in the above *Prælectiones*, interspersing some very curious particulars, from unpublished notes of Linnaeus, in my possession, with a few original remarks; I have also taken a brief comparative view of Jussieu's system at the end. Having in the present volume more fully explained the latter, I shall here reverse the mode of comparison, and place some of the remarks and illustrations in a different light, with a few additional matters.

The name of each Linnæan Order is, in the fol-
lowing table, placed first, and where no particular explanation is necessary, or there is no very material disagreement, the generally corresponding one of Jussieu is merely named; with it’s appropriate number, to enable the reader to turn to each Order in it’s proper place.

1. **Palmæ—*Palmæ Juss.* Ord. 11.**

Linnaeus proposed latterly to remove from hence *Cycas* and *Zamia*, which he, like Jussieu, considered as *Filices*, but which Persoon, and Brown, Prodr. N. Holl. v. 1. 346, have more properly disposed in a new Order, called *Cycadeæ*. Linnaeus also meant to take away the section β, in which the Fruit is inferior and many-seeded, and which consists of *Stratiotes*, *Hydrocharis* and *Vallisneria*. See Jussieu’s *Hydrocharides*, Ord. 22.

2. **Piperîtæ—*Aroideæ* 7.**

*Piper* only is referred by Jussieu to his *Urticae* 98; and *Saururus* to *Naïades* 6.

3. **Calamariæ—*Cyperoideæ* 9.**

*Sparganium* and *Typha*, subsequently removed from hence to his *Piperitæ* by Linnaeus, as akin to *Zostera*, make by themselves Jussieu’s *Typhae* 8.

4. **Gramina—*Gramineæ* 10.**

About the plants of this Order, the true Grasses, only one opinion can exist.

5. **Tripétaloideæ—*Junci* 13.**

*Calamus* is properly considered by Jussieu as one of the *Palmæ*, Ord. 1.
6. Ensatae—Irides 18, with some of the Junci 13, and their allies.

Linnaeus's manuscript indicates Kaempferia as betraying an affinity to this Order in the next, but it is chiefly in general aspect.


10. Coronariae—Asphodeli 16, some Lilia 14, Bromeliae 15, with some of the Narcissi 17, and of the Junci 13.

11. Sarmentaceæ—A few of the Lilia 14, begin this Order, but it chiefly consists of the Asparagi 12, with the Menisperma 77, and Aristolochia 23. Centella is to be erased, as not distinct from Hydrocotyle.

Linnaeus, in his manuscript notes, justly observes, that part of this Order is monocotyledonous, part dicotyledonous. He adverts also to Nymphaæ, as having, in like manner, even some species with one, others with two, Cotyledons. This is a mistake into which Gaertner and Jussieu have likewise fallen. See the foregoing exposition of Jussieu's system, Ord. 22 and 62. It appears from Giseke's publication, pref. 20, that Linnaeus kept from his pupils his ideas respecting Nymphaæ, not having, perhaps, satisfied his own mind. He seems to have thought the existence of such a differ-
ence in the Cotyledons of one genus, might well justify him in not dividing an Order on that account, and possibly cherished this idea, as an irrefragable proof of his position, that no character whatever was free from exception in natural orders. Neither the deduction, nor the fact as to Nymphæa, is now admitted, and yet the Lentibulariaceae of Brown, see (Ord. 34) p. 96, and Cuscuta, see Convolvuli, are strong exceptions.

12. Holeraceæ—A large Order, of which the 1st section is composed of many of Jussieu’s Atriplices 29; the 2d of more of the same, with Calligonum, one of his Polygonaceæ 28; the 3d of Axyris only, one of his Atriplices; the 4th of some Ama
ranthi 30, and some Atriplices; the 5th of Poly
goneæ 28, with Begonia their ally in habit, see a re
mark on Jussieu’s 52d Order; the 6th of Nyssa, Mi
musops, Rhizophora and Bucida; the 7th of Anacar
dium (removed by a manuscript note from the 6th section), Laurus, Tinus, Winterania and Heisteria. There is no analogy between these two latter sections and any of Jussieu’s Orders. His Lauri 27, a good Order, was not perceived by Linnaeus.

13. Succulentæ—Cactus, one of Jussieu’s 85th Order, with some of his Portulaceæ 86, and Fico
deæ 87, make the 1st section; Sempervivæ 83 are the 2d; some more Portulaceæ chiefly compose the 3d; and Saxifragæ 84 are the 4th section of this Order, in which Linnaeus was guided by habit, and
OF LINNÆUS WITH THOSE OF JUSSIEU. 201

Jussieu, tracing nearly the same affinities, was much embarrassed for technical characters.

14. Gruinales—Gerania 73, and some of the first section of Rutaceae 81, with Oralis, Linum, and a few ambiguous genera, as Aldrovanda, Drosera, and Averrhoa, make up this Order. Linnaeus has added several, more or less happily, in manuscript.

15. Inundatae—are analogous to Naïades 6, and require as much correction.


17. Calycanthemæ—contain many Onagraceæ 88, with the Melastomaceæ 90, and Salicaceæ 91.


19. Hesperidæ—Myrti 89.

20. Rotaceæ—Lysimachæ 34, chiefly sect. 1, and Gentianæ 46.

A separate section comprises Hyperica 68, and Cisti 80; at least the genuine Cisti, sect. 1.


22. Caryophylleæ—Caryophylleæ 82.

23. Trihilæ—Melici 71, make the 1st section; Sapindi 65, Aceræ 66, and Malpighiæ 67, chiefly compose the 2d and 3d sections. Tropæolum is certainly better placed here by Linnaeus than in Jussieu’s Gerania 73.

24. Corydales—These have no analogy to any particular Order of Jussieu. The Linnaean genera
are *Melianthus* and *Monnieria*, for both which see remarks on Jussieu’s *Rutaceæ* 81; *Epimedium*, see *Berberides* 78; *Hypecoum*, and *Fumaria*, see *Papaveraceæ* 62; *Leontice*, see *Berberides* 78; *Impatiens* see *Gerania* 73; *Utricularia* and *Pinguicula*, see the end of *Lysimachiae* 34. Jussieu’s Order of *Berberides* 78 entirely escaped Linnaeus.

25. *Puta'mineæ*—*Capparides* 64, except *Crescentia*. Linnaeus has noted that this Order and the 24th should stand next to the 27th *Rhoeadeæ*.

Seeds inserted into 1 suture only. *Linn. MS.*

Linnaeus has brought hither *Nymphaæ*; see obs, on Jussieu’s Ord. 62.

*Aestivatio plicata*. (Corolla plaited in the bud.) *Linn. MS.*

29. *Campanaceæ*—*Campanulaceæ* 52; as also *Convolvuli* 43, and *Polemonia* 44, both well separated from the first by Jussieu. Linnaeus has referred *Viola* to this Order, and has mentioned in manuscript *Parnassia*, with an exception on account of it’s not being milky.

30. *Contortæ*—*Apocineæ* 47.
*Aestivatio contorta*. (Corolla twisted, or it’s segments oblique.) *Linn. MS.* This author, as well as Jussieu, has committed some errors with regard to
particular genera. *Genipa* and *Gardenia*, both one genus, and *Macrococnum*, belong to Jussieu's *Ruicaee* 57.

31. *Vepreculeae*—*Thymeleeae* 25. *Thesium* and *Santalum*, the latter added in manuscript, do not belong to it, but to Mr. Brown's *Santa-aceae* mentioned under Jussieu's *Elaeagni* 24. *Scleran-thus*, also added in manuscript, is referred by Jussieu to his *Portulaceae* 86, not without a suspicion of its re-

32. *Papilionaceae*—such of the *Leguminosae* 93, has a papilionaceous corolla.

33. *Lomentaceae*—the rest of the *Leguminosae* 93.

34. *Cucurbitaceae*—*Cucurbitaceae* 97.

35. *Senticosae*—consist of the 2d, 3d and 4th sections of Jussieu's *Rosaceae* 92; *Poterium* and *San-

36. *Pomaceae*—Sect. 1, with part of the 3d and 7th sections of *Rosaceae* 92. *Ribes* is introduced here; *see Jussieau's Cacti* 85. *Punica*, one of the Linnaean *Pomaceae*, is referred to *Myrti* 89, by Jussieu, per-

37. *Columniferae*—*Malvaceae* 74. *Camellia* and *Thea* are included. *see Aurantia* 70, sect. 3.


40. *Personatae*—*Pedicularis* 35, *Acanthi* 36, *Vitices* 38, *Scrophulariae* 40, and a few of the *Sola-

These very distinct Jussieuan Orders were
probably not discriminated by Linnaeus, in consequence of the habit he had acquired of considering his Didynamia Angiospermia as completely a natural assemblage.

41. Asperifoliate—Borraginaceae 42.
42. Verticillatae—Labiatae 39.
43. Dumose—Rhamni 95 constitute the bulk of this Order; with one or two Rutaceae 81, more of which latter are added in manuscript. Viburnum, Sambucus and Rhus are also placed here, with some marks of doubt, and Linnaeus ingenuously confesses that he was dissatisfied with the whole.

44. Sepiare—Jasminaceae 37.
45. Umbellatae—Umbelliferae 60.
46. Hederaceae—Aralieae 59, at least so far as concerns the first two genera, Panax and Aralia. Xanthoxylon is one of the Rutaceae 81. The remaindei, Hedera, Vitis, and Cissus, are proposed in the manuscript of Linnaeus to be transferred to his 34th Order, Cucurbitaceae, but he remarks that their fruit is not tricapsular, or trilocular. The tendrils and foliage may possibly have led to this idea of their affinity, which is certainly not tenable on other grounds.

47. Stellate—Rubiaceae 57, sect. 1 and 2, the remaining sections of Jussieu being faintly indicated by Linnaeus in his sect. β and γ. The latter had not detected those characters, even of habit, which unite the shrubby Rubiaceae into a very distinct and natural assemblage.
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48. AGGREGATE.—The two systems do not here accord, and it is necessary to explain some manuscript alterations of Linnaeus. This Order is divided, in the old Pl., into four sections. α consists of Statice only: of Hartogia, Brunia, Protea, Globularia, Leucadendron, Hebenstretia, Selago, Cephalanthus, Dipsacus, Scabiosa, Knautia and Alliaria: γ of Valeriana, Morina, Boerhaavia and Circea, to which Mirabilis is added in manuscript; and δ of Lonicera, Chioococa, Aristostem, Mitchella, Lisianthus in manuscript, Linnea, Morinda, Conocarpus, Hillian in manuscript, Loranthus and Viscum. The letter β is removed in the manuscript to Cephalanthus; so that the 1st section extends from Statice to Selago, inclusive; and is marked "alternifolia infera;" leaves alternate, flowers inferior (or genera superior). The other three sections, from Cephalanthus to Viscum, are marked "oppositifolia supera;" leaves opposite, flowers superior. The first section thus extended abounds with errors. Statice and Brunia indeed, thought near akin by Linnaeus, are puzzling genera, about which various opinions may be formed. Jussieu refers the former to his Plumbaginées 3, the latter to his doubtful Rhamni 95. Hartogia is the same genus as Diosma, a true Rutacea 81, which Linnaeus subsequently discovered. Protea and Leucadendron form the basis of Jussieu’s and Brown’s great Order of Proteaceæ 26, not detected by Linnaeus, to which Jussieu was inclined to refer Globularia; but he left the latter at the end of his Lysima-
comparision of the natural orders

chiae, where surely it is much misplaced. Hebenstroth and Selago are related to Verbena, see Vitice 38.

With respect to the opposite-leaved sections, β, γ, and ζ; Cephalanthus, Chiococca, Mitchella, Morinda, and Hillia are well considered by Jussieu as Rubiacæe 57. From Dipsacus to Morina, inclusive, and his Dipsaceæ 56. Boerhaavia and Mirabilis are Nyctagines 32. Circaea is one of the Onagraceæ 38. Lonicera, Triosteum; Linnea, Loranthus and Viscum are Caprifoliæ 58. Lisianthus belongs undoubtedly to the Gentianæ 46.

From the above detail it appears, that there can hardly be a greater discordance of opinion than exists between Linnaeus and Jussieu, concerning the plant of this Order; nor can the latter be denied the honour of having best, if not perfectly, understood their affinities.

49. Composite, Sect. α—Cinarocephale 54.

— sect. β—Cichoraceæ 53.

— sect. γ, ζ—Corymbiferae 55.

50. Amentaceæ—Amentaceæ 99, with an exception or two, such as Sloanea, marked with a doubt by Linnaeus, and referred by Jussieu to his Tiliaceæ 79; and Pistacia, one of the Terebintaceæ 94. Cynomorium is placed by Jussieu, with Balanophora of Forster, t. 50, among the plantæ incertæ sedis.

51. Conifere—Conifere 100, except Equisetum, one of the Filices 5.

52. Coadunatae—Anoneæ 76, and Magnoliae 75.
53. Scabridae—Urtica 98.
Linnaeus includes Trophis, which Jussieu did not determine; as also Ulmus with Celtis, both referred by the latter, less correctly perhaps, to his Amentaceae 70. Bosea and Aenida are, with more justice, placed among his Atriplices 29.

54. Miscellaneae—An Order composed of 3, truly miscellaneous, sections, most of them abrogated by the pen of Linnaeus himself.
Sect. 6, consisting of Reseda and Datisca, has not undergone any correction. Reseda is referred by Jussieu, somewhat paradoxically, to his Capparides 64; and Datisca, though allowed by him to be, in some points, akin to the former, stands among the unclassed genera.

β Poterium and Sanguisorba, are removed to the 35th Order, before Agrimonia, as they stand in Jussieu’s Rosaceae 92, sect. 3.

γ Pistia and Lemna are referred to the 15th Inunclatae. Jussieu has the former among his Hydrocharides 22, with a hint of its probable affinity to Aroideae 7, or Aristolochie 23; and Lemna, one of his Naiades 6, is, according to Mr. Brown, one of the Hydrocharides.

δ Coriaria, and Empetrum with a mark of doubt. The first is not thought referable to any Order by Jussieu; the latter is supposed akin to Ericceae 51.
ε Achyranthes, Celosia, Amaranthus, Iresine, Gomphrena and Phytolacca are all removed to the 5th
section of the 12th Order, Holeraceae. Jussieu has them all amongst his Amaranthi 30, except Phytolacca, which is one of the Atriplices 29.

ζ Nymphœa and Sarracenia, are both transferred to the 27th Order, with a query whether the latter especially may not be akin to Asarum, and therefore to the Sarmentaceæ, Ord. 11. We find that Linnaeus once placed both these genera, as well as Aristolochia, and it's allies Asarum and Cytinus, in his 11th Order. He had a fanciful idea of an affinity between Nymphœa and Sarracenia, founded on the singular economy of the leaves in the latter. These he supposed to be contrived for the purpose of affording the plant a continual supply of water, which, like it's aquatic relation, it might require. Jussieu but faintly hints at the affinity in question, placing Sarracenia among the plantæ incertæ sedis.

η Cedrela and Swietenia are both removed to the 23d Order, along with Turræa Linn. Mant. 150. They all undoubtedly belong to the 1st section of that Order, being among the Meliæ, 71, of Juss.

ζ Telephium, Limeum and Corrigiola are transferred to the 5th section of the Holeraceæ, Ord. 12. Jussieu has them all in his Portulaceæ 86, on account of their being furnished with petals; which circumstance here, as in the instance of his 82d Order compared with the 30th, breaks the natural chain of his system.

55. Filices—Filices 5. Linnaeus seems to have
OF LINNÆUS WITH THOSE OF JUSSIEU. 209

had an idea of bringing hither *Lemna* and *Pistia*, for which it is difficult to suggest a motive, except he had any reason to doubt the accuracy of those who had described *Lemna*, and whom he had previously followed.

56. Musci—*Musci* 4.

57. Algæ—*Algæ* 2, and *Hepaticæ* 3. *Chara* is removed from hence, in the manuscript, to the 15th Order, *Inundatae*.

58. Fungi—*Fungi* 1.

A catalogue of 116 Genera, which Linnaeus could not reduce to any of the foregoing Orders, is subjoined. Concerning 20 of these he afterwards satisfied himself; and at least half the rest are now sufficiently well understood to be referred to their proper places.

The following manuscript sketch, of an arrangement of the *Dicotyledones*, left by this great author at the end of his *Genera Plantarum*, may be thought worthy of preservation. It has undergone many changes and corrections, as might be expected. The meditations of such a mind cannot but furnish some ideas to others, however incomplete in themselves.

**Oppositifoliiæ.**

A line is drawn through this word, as if the author was dissatisfied with it.

*Calycifloræ* 16

*Calycanthemæ* 17

**Alternifoliiæ.**

*Cucurbitaceæ* 34

*Ilicaceæ* 46

*Sambuceæ* 45

*Compositæ* 49

*Amentaceæ* 50
Caryophyllae 22
Conifera 51
Aggregatae 48
Coadunatae 32
Stellatae 47
Papilionaceae 32
Sepiariae 44
Lomentaceae 33
Dumose 43
Corydales 24
Succulentae 18
Multisilique 26
Gruinales 14
Rhoeadae 27
Contortae 30
Putamineae 25
Rotaceae 20
Siliquosae 39
Hesperideae 19
Asperifolias 41
Inundatae 15
Verticillatae 42
Holeraeae 12
Campanaceae 29
Scabridae 58
Luridae 28
Veprecola 31
Personatae 40
Precis 21
Senticosae 35
Precipitae 21
Pomaceae 36
Precipitae 21
Columniferæ 37
Inundatae 15
Tricoceae 38
Hesperideae 19
Trihilatae 23
Putaminae 25

The first idea of Linnaeus, in the above scheme, appears to have been to throw the dicotyledonous Orders into two great Sections, characterized, in a general way, by their opposite or alternate leaves, with
subdivisions indicating the Orders most allied to each other. But in the execution of this plan, difficulties immediately arose, especially respecting the *Verticillatae* 42, whose leaves are invariably opposite, and the *Asperifoliae* 41, as regularly furnished with alternate leaves. Yet these two Orders could not, in any natural arrangement, be placed asunder. So the *Pteronatae* 40, chiefly opposite-leaved, were necessarily to be classed near the *Luridae* 28, and others, with alternate leaves. It is needless to point out exceptions amongst other Orders, or tribes of Genera.

No discriminating character of his Orders, or "Fragments," was ever formed by Linnaeus. On the contrary, he adverts under almost every one of them, in the *Praelectiones* published by Giseke, to the anomalies or exceptions which militate against such an attempt. His judgment, as I have already hinted, is confirmed by the result of the labours of those who have undertaken this arduous task; though the world is extremely indebted to them for having, in the face of such obstacles, entered upon it. The difficulties, apparent contradictions, and various exceptions, which embarrass them in the detail of their performance, are inherent in the organization of the vegetable body, in which there is throughout no positive or mathematical certainty. A few practical observations, illustrative of this truth, may, not altogether unprofitably, close the subject.

Philosophers have attributed to Nature a plastic
power, by which form and organization are given to substances apparently homogeneous, and destitute of any particular configuration. Thus the fluid of the egg changes to an organized animal body; and thus the blood and lymph, in the stump of an amputated limb, become occupied with muscles, blood-vessel and nerves, like the corresponding parts of the animal frame. Analogous facts, though less evidently perceptible, are to be traced, without any uncertainty in the vegetable body. In the latter we may perhaps, even more positively than in animals, satisfy ourselves of the influence of particular circumstances in causing a different organization. Many a plan may be extensively increased by cuttings or by roots for a succession of years, without producing any seeds or even the least rudiments of flowers. But if one or more of these cuttings or roots should be treated differently from the rest, with respect to their allotted portion of water, heat, or nourishment, such may very probably bear flowers and seeds, as happened by chance to the Solandra at Kew; see Introd. to Botany, chap. 14. In other words, the same organic matter which, under the influence of certain causes, assume the form of branches and leaves, in different circumstances becomes flowers and seeds. If we trace this indefinite power of organization a step further we perceive that the materials of a perfect flower, destined to form seed, are sometimes transformed into a mutilated or an over-luxuriant one, consisting of
multiplied petals only, in the place of the organs essential to the propagation of the species; and in certain circumstances, the whole flower itself is replaced by a gemma or bud (26), when the plant which bears it is termed viviparous.

So with respect to the appropriate organization of particular plants. Each species is naturally furnished with flowers, of a determinate structure, having a certain number of stamens and pistils, as well as of divisions or parts in their integuments, all which are connected together, in an appropriate mode, in every flower. But circumstances sometimes cause an alteration, frequently in the comparative number of such parts or divisions, though very rarely in their mode of connexion.

Such are accidental variations, which a competent degree of attention and caution in the observer will enable him to guard against. Their study, cautiously pursued, may often throw light on those more permanent diversities of structure, which occupy the studies of the profound botanist, and of which I would now attempt somewhat of a comparative view.

In general, the aberrations of Nature in plants bear a considerable analogy to her accidental variations, but are, of course, much more diversified and extensive. Thus, in tribes very nearly akin, a corresponding number in the parts of fructification is found liable to many more exceptions than a similarity of connexion or insertion. In the Caryophyllaceae, Juss. 82. Linn. 22,
some have 10, others 5, stamens; some have 5 others 3 or 2, styles; in the Bicornes of Linn. 18 (the Rhododendra 50, and Ericeae 51, of Jussieu) the differences between 4 and 5, 8 and 10, or 5 and 10, are so frequent, as to cause great trouble in classing these plants, after the Linnæan artificial system. But the instance of an inferior germen in Vaccinium, is a wide and remarkable difference, of extremely rare occurrence, between that genus and its near relations Menziesia, Erica, Arbutus, &c.

In general, variations or diversities of structure have been thought to take place most in the parts of the flower, and especially in those accessory, rather than essential, organs, the calyx and corolla. The production of the fruit and seed, especially of the latter, being the main object of all the rest, many botanists have, reasonably enough, concluded, that the peculiar organization, and even the number of parts, in the seed-vessel, and, above all, the form and number of the seeds, were likely to furnish indications of the most important and invariable principles of affinity or distinction. Even the diversities in the internal parts, or materials, of a seed, have of late been laid under contribution, for the purposes of methodical arrangement; as appears from the foregoing explanations of different botanical systems.

As far as regards the comparative number of seeds, the slightest observation will teach any person, that Nature has not always made this circumstance of
importance, in the indication of natural affinities. The thing itself is often indeterminate, several rudiments of seeds being frequently provided, though only one regularly comes to perfection. More frequently are observable plants with numerous seeds in a cell, or capsule, which are nearly, or very closely, allied to others with only 1 or 2. See the Onagraceae 88, of Jussieu, the Crucifereae 63, the genus Juncus, and many besides. The provision of seed to each vegetable is indeed of the last importance; but the quantity is, comparatively, immaterial, variable, or precarious. It seems therefore that number, as a principle of arrangement, may well be expected to prove more treacherous here than in other cases.

The nourishment of a seed, in the first stages of germination, depending generally on the albumen, in whatever form or state that substance may exist, is wariously conducted, according to circumstances, in plants otherwise nearly allied; witness the papilionaceous family, where the albuminous matter is lodged in cotyledons, that in some species rise into seminal leaves, in others decay speedily under ground. In some plants, as we have seen, the albumen is evident in a distinct and separate form; while in others, nearly akin, no such substance exists, except, as must be presumed, in the body of each cotyledon. Here again therefore, however essential the part in question, the mode of its existence appears to be of very subordinate consideration, and should not be allowed, in
the details of systematic arrangement, to overrule characters which are judged, by experience or analogy, to be more important. The able writers whose labours we have been contemplating, the chief systematic botanists who have adverted at all to the albumen, have been well aware of this.

What has just been remarked, of the inconstancy of number in the seeds of particular plants, and of it's great diversity in species or genera nearly akin, may possibly diminish the apparent absurdity of considering the great differences between the fruit of *Begonia* and *Polygonum* or *Rumex*, and between that of some *Campanulaceae* and the *Compositae*, as a matter of but secondary importance, and may reconcile us to the opinion that such differences should give way, in both cases, to strong points of agreement. Even the great distinction between the inferior germen of *Begonia*, and the superior one of the Order of *Poligoneneae*, Juss. 28, is invalidated by the above instance of *Vaccinium*; and the coincidence of habit is so remarkable, that I cannot but confess myself very anxious to ascertain a decisive affinity, or analogy, in the fructification, lest the great fundamental principle of all sound botanical classification should, in any degree, be undermined.
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ADDITIONS AND CORRECTIONS.

Page 24, after line 10th, add, A pulpy fruit, still further from the nature of a real pericarp, is formed of a branched common-flowerstalk in Hovenia dictis, Thunb. Jap. 101, Sikk of Kämper's Amaranthes Exoticae 808. l. 809; and of the same part perhaps, rather than the scales of a receptacle, in Pollichia campestris, Ait. Hort. Kew. v. 1. 12. Smith Spirit. 1. t. 1. The latter is a very curious genus, of the Monardes Monogynta, belonging to Mr. Brown's Illecebræ, see p. 93, where it should stand next to Herniaria.

Page 76, l. 6, read Polianthes.
109. l. 22, read Anasir.
168, l. 3 from the bottom, before Leptospermum insert Metrosideros, Sm. Tr. of Linn. Soc. v. 3. 266.